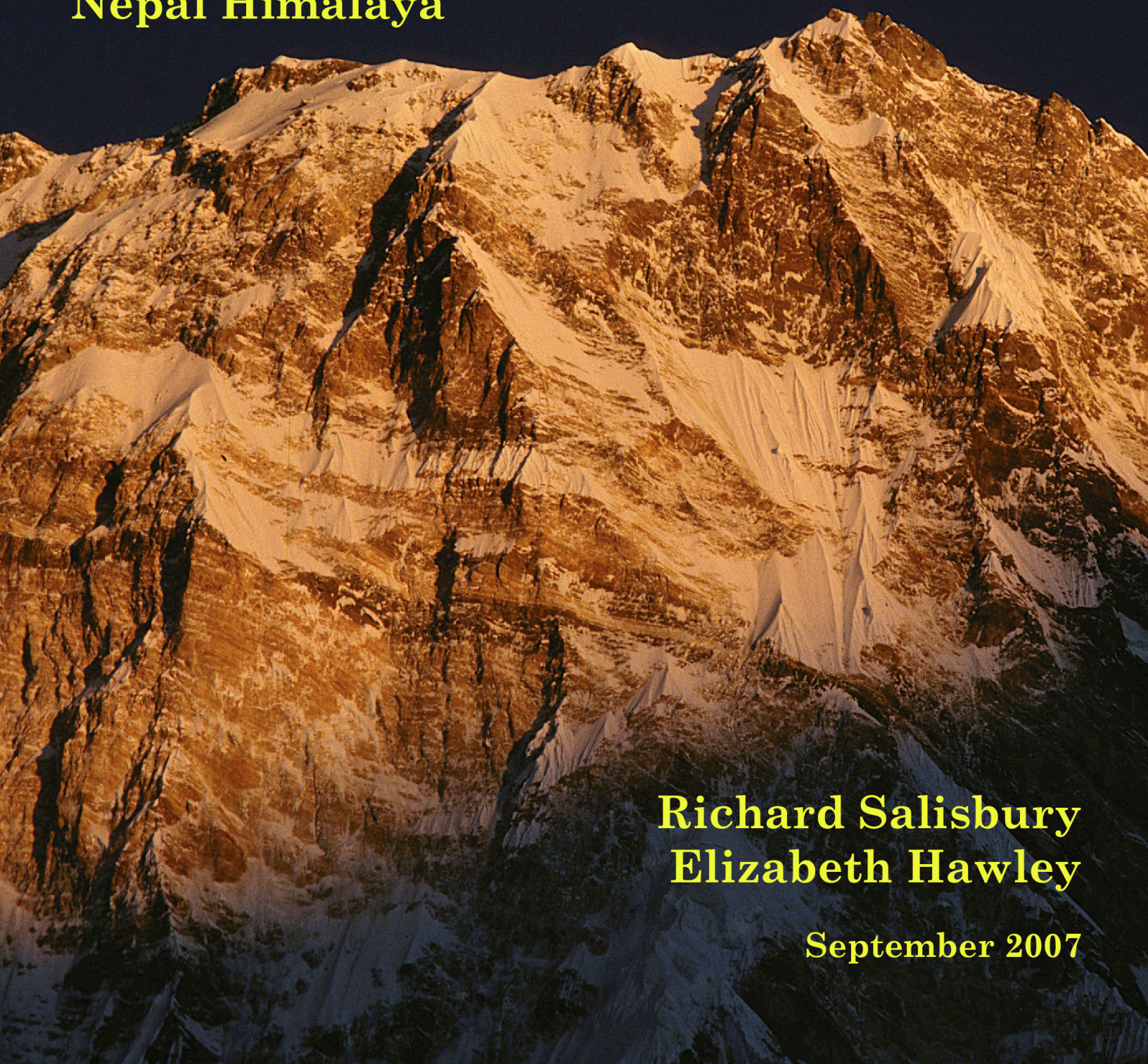
The Himalaya by the Numbers

A Statistical Analysis of Mountaineering in the Nepal Himalaya



Richard Salisbury
Elizabeth Hawley

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Cover Photo: Annapurna South Face at sunrise (Richard Salisbury)

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Introduction

The Himalayan Database, published by the American Alpine Club in 2004, is a compilation of records for all expeditions that have climbed in the Nepal Himalaya. The data are based on the expedition archives of Elizabeth Hawley, a longtime journalist living in Kathmandu, and it is supplemented by information gathered from books, alpine journals, magazines, and correspondence with Himalayan climbers.

The original data (published in CD format) cover all expeditions from 1905 through 2003 to more than 300 significant Nepalese peaks. Also included are expeditions to both sides of border peaks such as Everest, Cho Oyu, Makalu, and Kangchenjunga as well as to some smaller border peaks. Updates for the 2004 and subsequent climbing seasons are available free for download at *www.himalayandatabase.com* and can be applied to the original data set.

The analyses in this book draw primarily on information from *The Himalayan Database* and examine expedition climbing activity, ascents, and fatalities. The seasonal climbing summaries by Elizabeth Hawley written from 1985 to the present also contribute to the narrative portions of the book. The complete texts of these summaries are contained on *The Himalayan Database* CD.

For the analyses in this book, we divide the history of climbing in Nepal into four parts:

1900-1949 – the exploratory period
1950-1969 – the expeditionary period
1970-1989 – the transitional period
1990-2006 – the commercial period

The early exploratory period is comprised primarily of expeditions to Everest in the 1920s and 1930s by the British and to the Kangchenjunga region during the 1930s by the Germans. These expeditions were few in number and do not contribute significantly to any meaningful analyses and thus are not included in the analyses in this book.

The expeditionary period began in 1950 with the opening of Nepal to foreign expeditions. For the peaks higher than 8000m (the 8000ers), relatively large teams (8 or more members) used a military assault-style of climbing that employed many lowland porters to ferry in large stock-piles of equipment to base camp and then used hired high-altitude assistants or "Sherpas" to establish and cache higher camps until a final summit assault was mounted. Sherpas also accompanied the climbers to the top on all first ascents of the 8000ers in Nepal except for Annapurna, Lhotse, and Kangchenjunga.

The expeditionary period was also the beginning of the "super" expedition age that began with the large American and Indian Everest expeditions in 1963 and 1965 (both sent 60+ climbers and high-altitude assistants above base camp), continued into the 1970s with a very contentious international effort on Everest in 1971 (80+ persons) and the 1973 Italian Everest expedition (sending up 150+ persons and one helicopter), and culminating with 1989 USSR traverses of four summits of Kangchenjunga and the "extra-super" 1988 China-Japan-Nepal Friendship expedition that sent over 200 climbers and high-altitude assistants up the mountain from both sides and completed

the first north-south traverses. The Chinese also contributed with two very large expeditions to the north side of Everest in 1960 and 1975 that sent up the mountain hundreds of climbers and porters (or "assistants" as they are called on Chinese expeditions).

During the transitional period from 1970 to 1989, alpine-style climbing slowly began to replace expeditionary-style climbing. Highly skilled climbers such as Reinhold Messner and Jerzy Kukuzcka using lightweight gear moved rapidly up and down the mountain with fewer fixed camps and with minimal or no high-altitude assistant support. After Messner and Peter Habeler's ascent of Everest without supplementary oxygen in 1978, climbing all the high peaks without oxygen became the ultimate goal of many elite climbers. On Everest, many of the largest expeditions were limited to the effort of a nation's first attempt (the Japanese in 1970, the Yugoslavs in 1979, the Canadians and Soviets in 1982, and the Czechs in 1984). New challenging routes that required greater technical skills were opened up on the great walls of the big peaks (the south face of Annapurna I in 1970, the south-east face of Cho Oyu in 1978, the Kangschung face of Everest in 1983, and finally the tragic efforts on the south face of Lhotse in the late 1980s). Highlighting the mid-1980s was the race to be the first to climb the fourteen 8000ers that was completed by Messner when he summited Makalu and Lhotse in the autumn of 1986.

In the early 1980s, the German DAV Summit Club under the leadership of Franz Kroell and Guenther Haerter organized the first commercial teams to Annapurna IV and Baruntse. Other groups soon followed and by the 1990s the commercial era of Himalayan climbing was in full motion.

Ama Dablam, Cho Oyu, and Everest (which are referred to as the ACE peaks later in this book) became the prime target of commercial ventures; Ama Dablam because of its majestic splendor overlooking the Khumbu Valley, Cho Oyu being the "easiest" of the 8000m peaks, and Everest being the ultimate goal of many Himalayan mountaineers. Many of the earlier commercial outfitters, Alpine Ascents (1990 Todd Burleson), Adventure Consultants (1990 Rob Hall & Gary Ball), Mountain Madness (1991 Scott Fischer), International Mountain Guides (IMG) (1991 Eric Simonson), Amical Alpin (1992 Ralf Dujmovits), Himalayan Experience (1994 Russell Brice), Himalayan Guides (1995 Henry Todd) are still operating today, although some are under new management due to climbing accidents involving the original founders (Gary Ball died on Dhaulagiri in 1993 and Rob Hall and Scott Fischer on Everest in 1996).

The Everest disaster that claimed 8 lives in 1996 did not deter interest in Everest and Himalayan climbing, but had almost the opposite effect of increasing interest to the point that now hundreds of climbers scramble to reach the summit each spring season. During the spring 2006 season, 480 climbers and high-altitude assistants reached the summit of Everest from both sides, and in the spring 2007 season over 500 summited.

The quest for the seven summits (the highest peak on each of the seven continents) for adventure climbers and the 14 8000ers for elite climbers has created a climate of "peak bagging." This along with the endless quests of "firsts" (being the first ethnic "x", the oldest or youngest "y", or overcoming obstacle "z") has added to the lure and congestion of Everest. All of this has also required some creative fund-raising efforts for those that could not afford to buy themselves a spot on a commercial expedition.

In addition to the "firsts", innovative and sometimes fatal variations became almost the norm – descents by skiing, snowboarding, and parapenting, speed ascents, a summit bivouac on Everest, etc.

The steady increase of climbing activity in Nepal was tempered by the Maoist insurgency that helped to divert many expeditions into the Khumbu and Annapurna regions and across the border to the Tibet while the more remote regions of Nepal experienced a serious decline, especially on the lower peaks.

The Nepalese government tried to counter this exodus by opening up over 100 new remote peaks to expeditions, but until Nepal's political stalemate is completely resolved, these peaks will be considered unsafe to approach. If and when this finally happens, there will be vast number of challenges for those who truly yearn for a unique out of the way adventure.

Methodology

For all analyses in this book, expeditions since 1950 to peaks open for mountaineering by the Nepal government's Ministry of Tourism and a few other major peaks not officially open are included. Expeditions to the border peaks such as Everest, Cho Oyu, Makalu, and Kangchenjunga are included for both the Nepalese side and the Chinese or Indian sides.

Expeditions prior to 1950 are excluded because they were few and far between and mostly originated outside of Nepal from either Tibet or Sikkim.

Expeditions to trekking peaks are excluded starting either in 1978 for the first 18 peaks that were designated as such by the Nepal government, or in the year that they were subsequently added to the official list of trekking peaks. For trekking peaks, *The Himalayan Database* generally records only first ascents or unusual events such as new routes, exceptional climbs, or major accidents.

Expeditions to a few peaks entirely outside of Nepal such as Changtse and Kabru Dome are also excluded. Most attempts on those peaks were secondary goals for expeditions to another higher peak. Changtse was usually climbed (often illegally) from the North Col of Everest, and Kabru Dome was often a part of a larger Indian expedition to the Kabru massif on the Nepal-Sikkim border.

The ascent and death rates in the tables and charts are based separately on the number of members, hired personnel, or total climbers that went above base camp. In the past ascent rates often were based on the number of expeditions, and death rates were often calculated as a fraction of the number of summiters since data for the numbers of climbers venturing above base camp were not readily available until the publication of *The Himalayan Database*. By basing ascent and deaths rates on the numbers that went above base camp instead of summiter counts, we can now obtain more accurate rates instead of some of the wildly exaggerated rates presented in the past.

The data in the tables throughout the book are extracted from *The Himalayan Database* using the reporting and analysis commands in the Himal program. The data were then exported to Excel for further processing and charting. For the trend lines

in the charts, 2 or 3-period moving averages or *n*-order polynomial curves are usually employed.

Yates' chi-square tests (formulated to give more accurate results for statistical significance when sample sizes are smaller) are used to calculate statistical significance of the results and those results are shown as "p-values" which indicate the probability of a given result occurring by randomly by chance. Most statisticians consider a p-value of 0.05 or smaller as being statistically significant, that is, there is less than a 5% probability that the result occurred by chance.

The data used for the analyses in this book are current as of May 2007 and correspond to *The Himalayan Database* data set with the 2006 Autumn-Winter Update applied to the database.

Acknowledgements and Credits

The authors would like to thank Dr. Raymond B. Huey, Department of Biology, University of Washington, for his assistance with the statistical analyses presented in this book. His guidance and patience in reviewing our methodology has been an eye-opening and a wonderful learning experience.

Comments, Corrections, and Suggestions

Comments, corrections, and suggestions are most welcome. Please send them to

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They will be graciously considered for future editions of this book.

Analysis of Climbing Activity

This chapter focuses on the climbing activity on the principle peaks in the Nepal Himalaya, those peaks officially open for mountaineering and a few additional peaks with significant activity. Border peaks such as Everest, Cho Oyu, and Kangchenjunga are included for expeditions from the Nepalese, Chinese, and Indian sides of the border. Trekking peaks are omitted as well as peaks entirely outside of Nepal such as Changtse and Kabru Dome.

The tables and charts cover the period from 1950 through 2006 unless specified otherwise. Before 1950 there were few expeditions, almost entirely before World War II, and they were mostly from the Tibetan or Indian side of the border.
Climbing activity is measured by the number of climbers and hired personnel that went above base camp, or advanced base camp in those cases where no technical skills are required to reach it, such as Chinese base camp at 5700m on the northwest ridge route of Cho Oyu and the normal advanced base camp at 6400m on the north side of Everest (climbing activity is measured from the traditional base camp at 5300m on the south side of Everest since all higher camps are above the dangerous and technically demanding Khumbu Icefall). The analyses examine climbing activity over time on a yearly basis, by geographic regions in Nepal, by climbing season (spring, autumn, and winter), by age and gender, and by team composition (the numbers of climbers and hired personnel per expedition).

Members of an expedition are those persons who are listed on the climbing permit and they are generally foreigners except for all-Nepalese or Chinese climbing teams. *The Himalayan Database* notes expeditions that did not attempt to climb their objective peak and distinguishes those members that either did not reach base camp or did no climbing above base camp or advanced base camp; these groups are eliminated from the analyses.

Hired personnel are those who are paid by the expedition for their services. They may be lowland porters ferrying loads to base camp, base camp staff including liaison officers, and high-altitude assistants (usually Sherpas or Tibetans) who establish and stock higher camps, fix ropes, or serve as guides for the climbing members. Foreign guides and leaders on commercial expeditions are considered as members, not hired personnel. Hired personnel are not listed on Nepalese climbing permits, but are listed on Chinese permits, which makes for some difficulty in distinguishing them from members on all-Chinese teams. *The Himalayan Database* tracks the numbers of hired personnel that went above base camp and these numbers are used in the analyses. Lowland porters and base camp staff figure only in the death analysis chapter later in this book.

Yearly Activity

Charts C-1a and C-1b show climbing activity for all peaks from 1950 to 1969 and 1970 to 2006 measured by the number of members that climbed above base camp (in **blue**).

In each of the years from 1950 to 1965, the number of members above base camp ranged from a low of 15 (1950, 1951, and 1957) up to 138 (1960) and 140 (1954). The 140 count is actually inflated since one expedition led by Edmund Hillary attempted

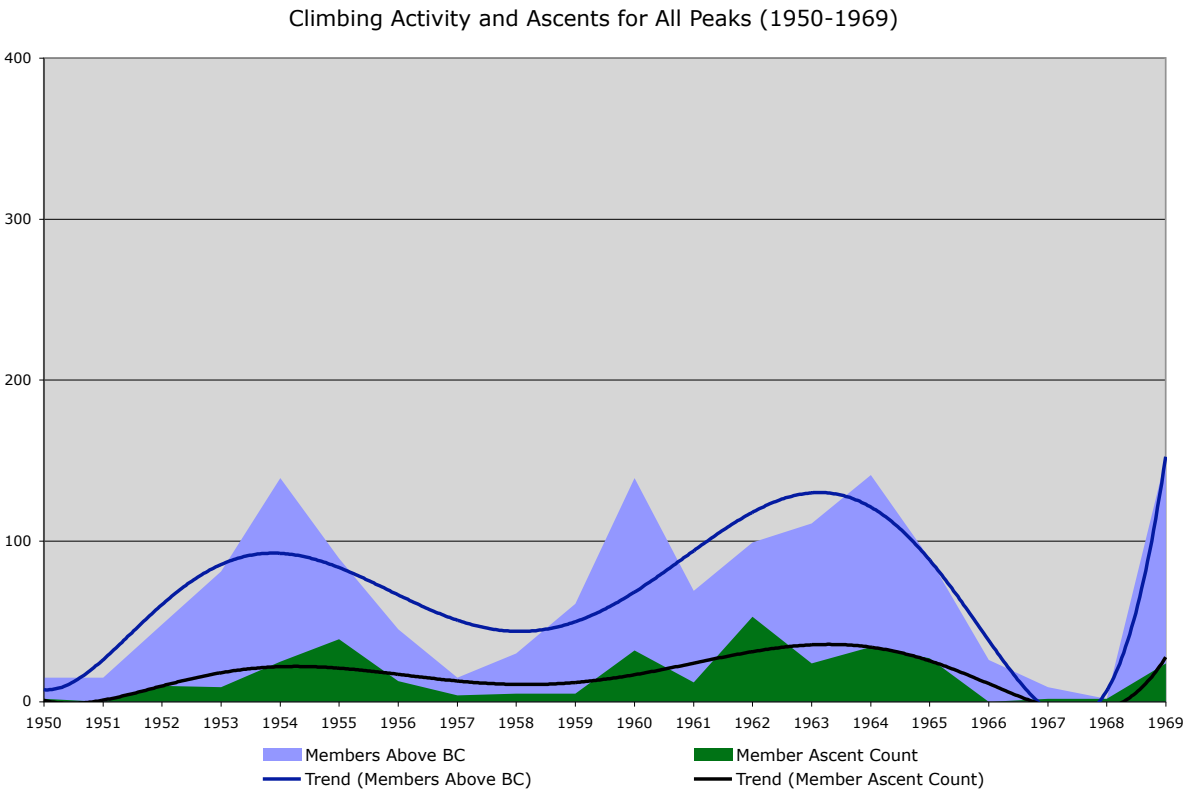


Chart C-1a: Climbing activity (members above base camp) and ascent counts for all peaks from 1950-1969

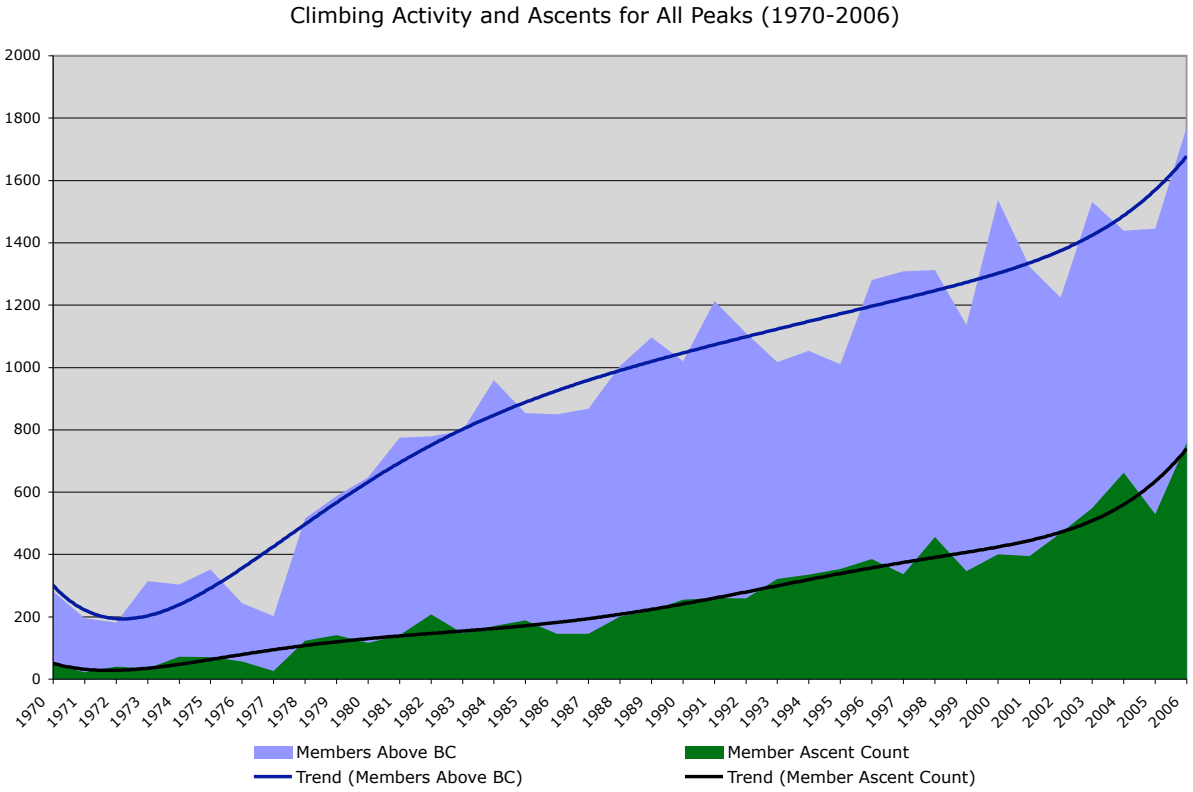


Chart C-1b: Climbing activity (members above base camp) and ascent counts for all peaks from 1970-2006

seven peaks in the spring of 1954 and another expedition led by the Frenchman Jean Franco attempted five peaks in the following autumn. The 138 count for 1960 is also somewhat inflated due to several teams attempting multiple peaks. If only the number of *different individuals* that went above camp were counted, then the result would be a smoother increase from 1950 to 1964.

From 1966 to 1968, Nepal closed its peaks to foreign expeditions. Thus only the Chinese from Tibet or the Indians from Sikkim did any meaningful climbing; in addition there were a few unauthorized climbs of minor peaks within Nepal, often by American Peace Corps volunteers or trekking groups.

When Nepal reopened its peaks to foreigners in 1969, expeditions returned in larger numbers. In the spring of 1969 an American team led by Boyd Everett Jr. attempted Dhaulagiri with disastrous results (five members and two Sherpas were killed by an avalanche at their deposit camp). The following autumn Yuichiro Miura from Japan reconnoitered Everest in preparation for his famous "ski descent" in 1970 (which lost seven Sherpas in the Khumbu Icefall and Miura narrowly escaped his own demise at the end of his famous vertical downhill speed-run from the South Col). Muira's 1970 expedition is recounted in the book and movie, *The Man Who Skied Down Everest*.

Starting in 1978 climbing activity nearly quadrupled in the span of four years (from 202 members above base camp in 1977 to 775 in 1981). Teams from other countries including Eastern Europe now joined in with the many American, Western European, and Japanese teams already climbing in the Himalaya for several years. In addition, Tibet opened is borders to foreign expeditions in 1979, first allowing access to Everest from the north, and then later to Cho Oyu.

In the late 1980s-early 1990s, commercial climbing became more popular and many commercially guided expeditions flocked to Ama Dablam, Cho Oyu, and Everest (these three peaks are referred to as the ACE peaks in subsequent text). Four routes became extremely popular: the southwest ridge on Ama Dablam, the northwest ridge on Cho Oyu, and the South Col-southeast ridge and North Col-northeast ridge on Everest and are referred to as the ACE commercial routes. In recent years, expeditions attempting these four routes have exceeded the numbers to all of the other routes and peaks in the Nepal Himalaya.

Charts C-2a–d show climbing activity for all peaks, the 6000ers, 7000ers, and 8000ers for all routes and for all routes with the ACE commercial routes removed (in **magenta**). The difference between the two is the ACE climbing activity (in **blue**).

When separating out the ACE commercial routes for all peaks in Chart C-2a, there is a steady rise of non-ACE climbing into the early 1980s followed by a leveling out for the remainder of decade, then a slow decrease after the early 1990s when commercial climbing started in earnest. The more rapid decline from 2003 onward may be result of the Maoist insurgency as the more remote areas became less attractive to foreign expeditions due to transportation hazards and increased extortion for money.

For the 6000ers, the 1980s was the most active period for climbing with a very busy year in 1982 due in part to large expeditions to Bhrikuti (Austrian), Kotang (Indian), and Phurbi Chhyachu (Japanese), which accounted for 72 of the 239 members above base camp. Recently interest in the 6000ers has been renewed after the Nepal

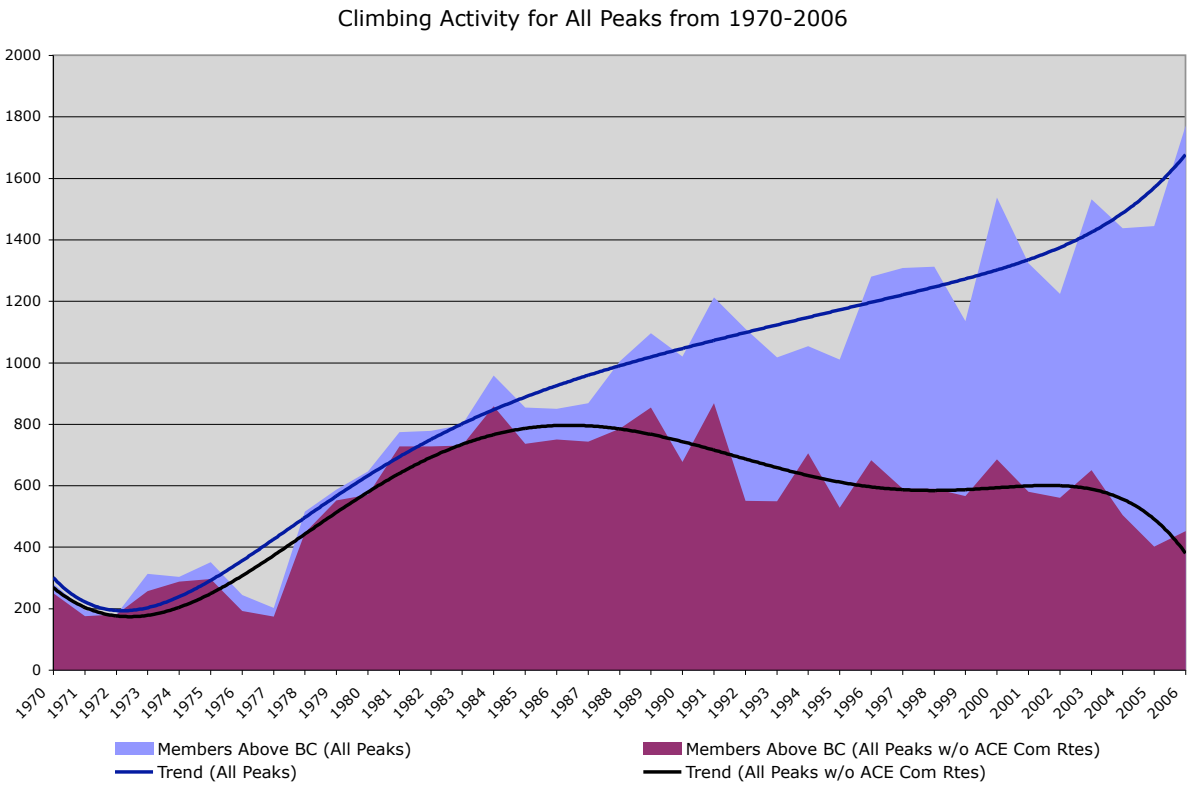


Chart C-2a: Climbing activity (members above base camp) for all peaks from 1970-2006 with Ama Dablam, Cho Oyu, and Everest commercial routes separated out

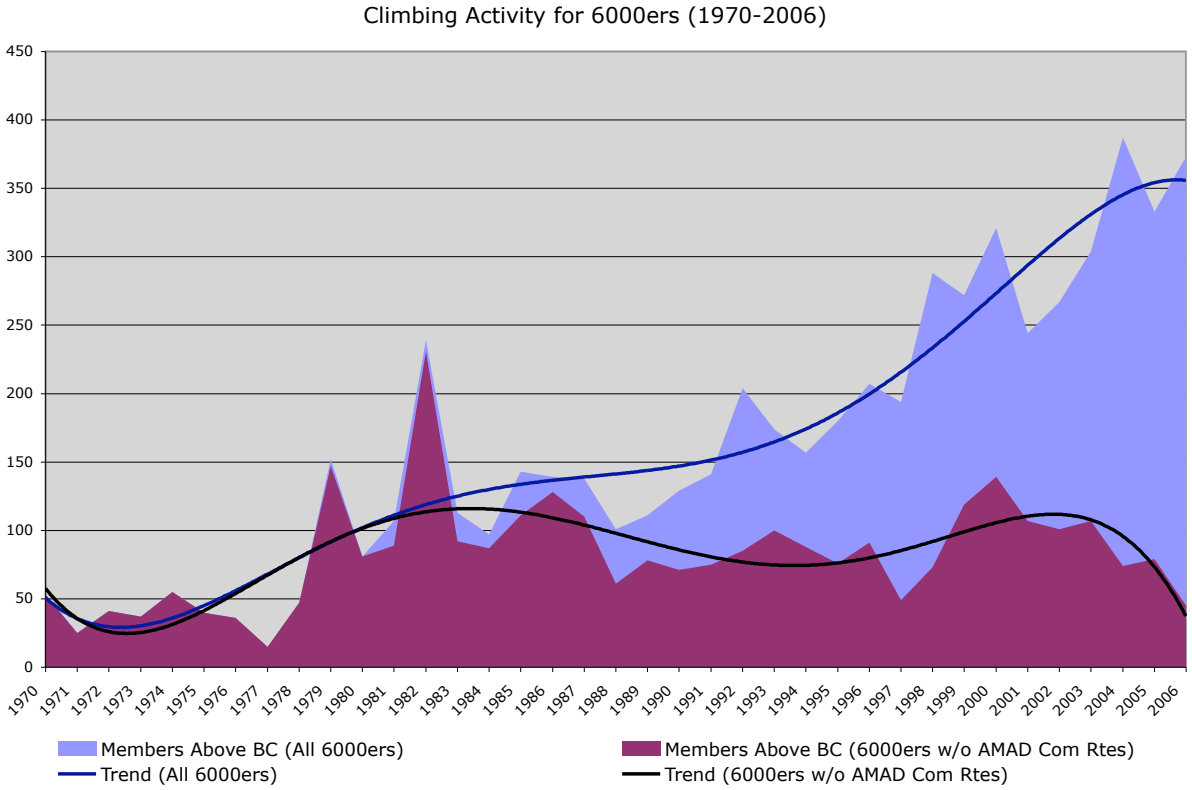


Chart C-2b: Climbing activity (members above base camp) for all 6000ers from 1970-2006 with the Ama Dablam commercial route separated out

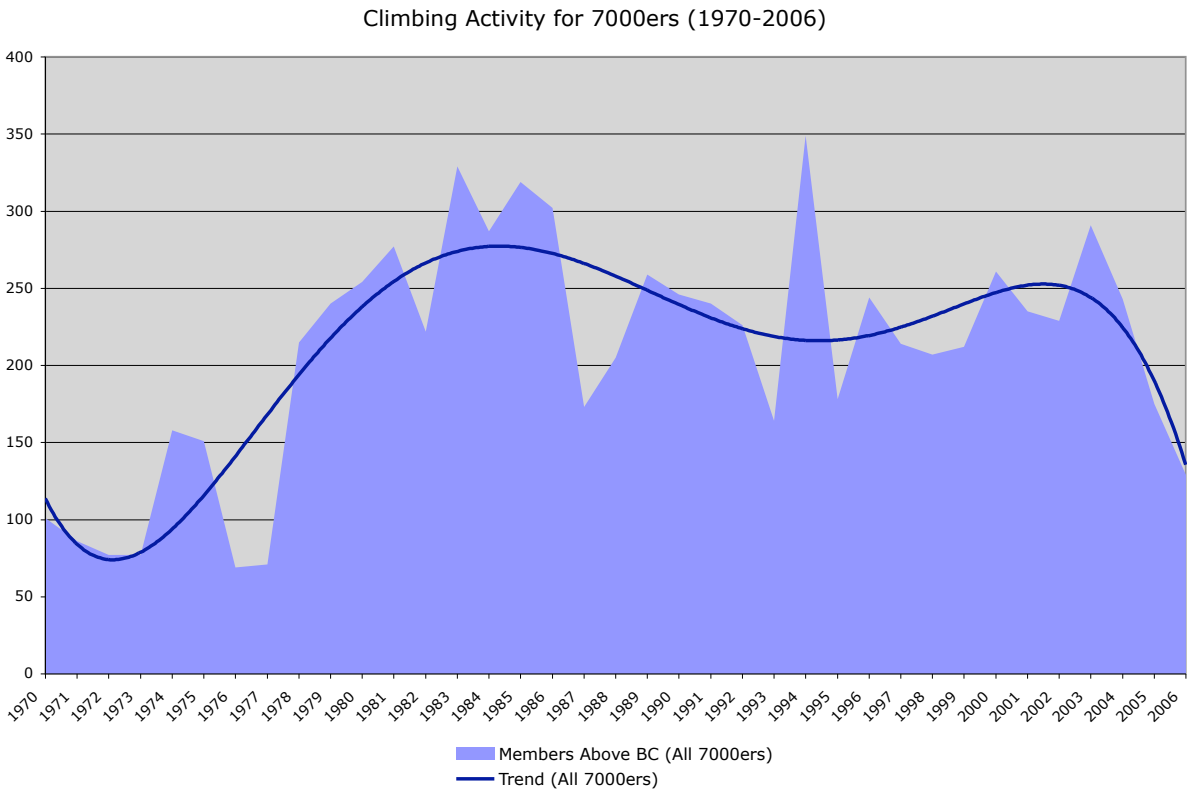


Chart C-2c: Climbing activity (members above base camp) for all 7000ers from 1970-2006 (there are no ACE commercial routes in the 7000ers)

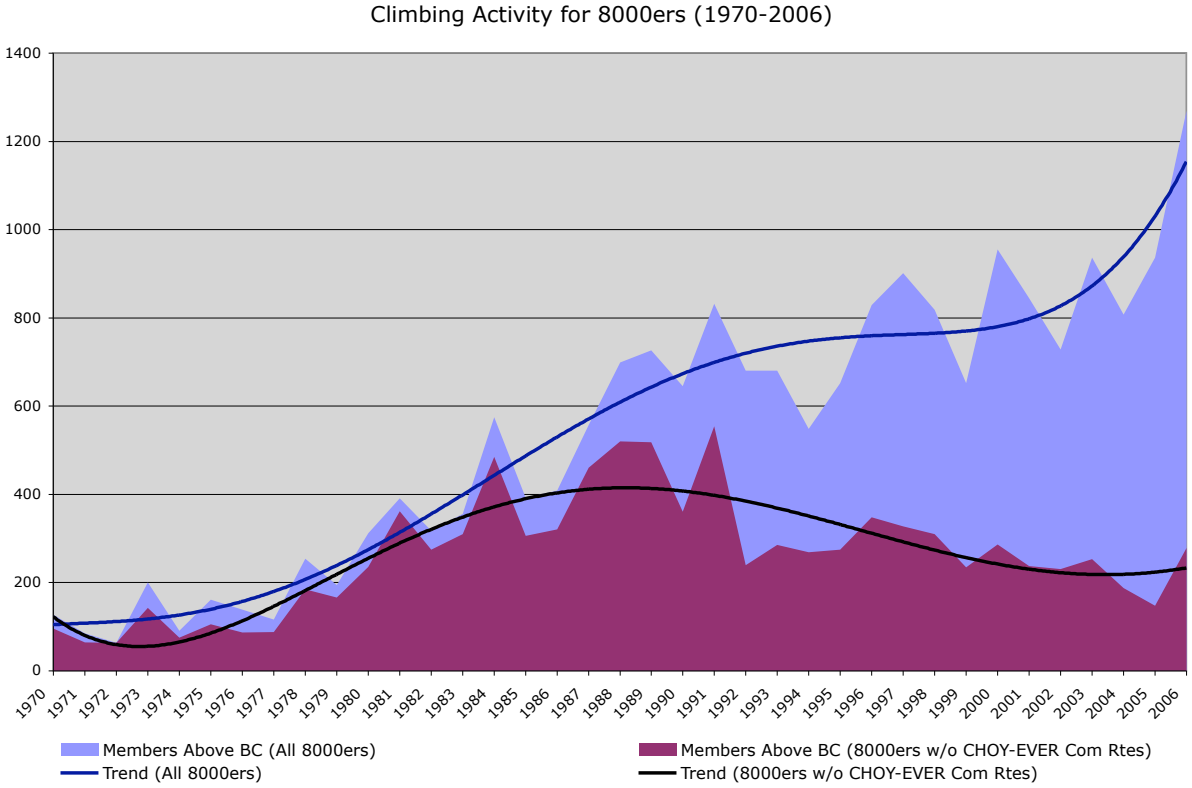


Chart C-2d: Climbing activity (members above base camp) for all 8000ers from 1970-2006 with the Everest and Cho Oyu commercial routes separated out

government starting in 1997 opened over 150 new peaks for mountaineering, many in the 6000m range.

For the 7000ers, the 1980s was the most active period, after which interest declined except for the large spike in 1994 due to extensive Indian activity on the Kabru massif on the Nepal-Sikkim border: one expedition of 27 climbers to three Kabru peaks (for a total of 81 members above base camp), twelve expeditions to Pumori (65 above base camp), and nine expeditions to Baruntse (58 above base camp), all of which accounted for more than half of the climbers that season. There also was renewed interest in the early 2000s of some of the secondary commercial peaks such as Annapurna IV, Himlung, Pumori, and Tilicho.

For the 8000ers excluding the ACE commercial routes, the late 1980s was the most active period, after which there has been a steady decline. Only one new 8000m peak was added to the list of newly opened peaks, the very difficult and almost inaccessible middle summit of Lhotse (8410m), which was successfully climbed in 2001 from the South Col to the north ridge/face of Lhotse by a very talented Russian team led by Sergei Timofeev. The middle summit of Lhotse is unlikely to be climbed again unless there is an attempt to traverse the treacherous knife-edged ridge of the three Lhotse summits, Lhotse Main, Lhotse Middle, and Lhotse Shar.

Charts C-3a-c show climbing activity on Ama Dablam, Cho Oyu, and Everest.

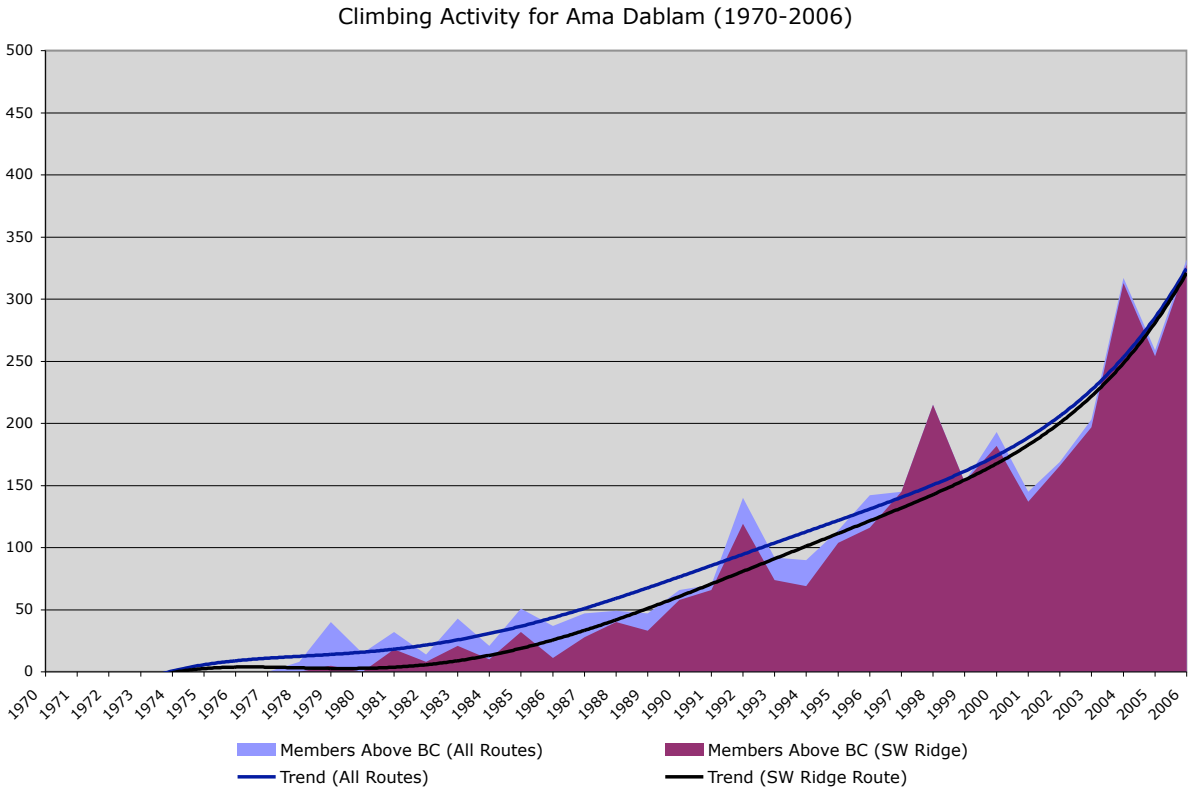


Chart C-3a: Climbing activity (members above base camp) on Ama Dablam for all routes and the SW Ridge route from 1970-2006

On Ama Dablam from the mid-1970s through the 1980s, climbing activity although minimal was spread out across various routes with the southwest ridge, north ridge, and south face being the most popular. However, since the early 1990s, almost all

activity has been on the southwest ridge route as indicated by the closeness of the two trend lines in Chart C-3a. Only a few have ventured onto the northwest and northeast ridges, perhaps to escape "the crowds." In 2001 Rich Cross and the late Julian Cartwright climbed the entire length of the northwest ridge, the first time it had been done successfully.

On Cho Oyu much of the early climbing activity was from the Gokyo Valley on the Nepal side since the original northwest ridge route climbed by the Austrian expedition in 1954 was inaccessible to most climbers except for those daring few who ventured illegally across the Nangpa La when Chinese border guards occasionally patrolling the area were absent. But once the northwest ridge route opened up from China in 1987, most climbers switched to this route (approaching from Tingri) as indicated by the convergence of the trend lines in Chart C-3b, since the alternative southwest ridge and south face of Cho Oyu were much too difficult and dangerous. There have been only three attempts on the south side of Cho Oyu from the Gokyo Valley during the last ten years (two teams from South Korean in 2000 and a Slovenian team in 2006).

Climbing Cho Oyu from the Chinese side has in general been successful, but there have been occasional incidents that have upset the tranquility (see inset box following).

The early expeditions to Everest went for the traditional South Col and North Col routes, but then in the 1980s much of the activity ventured away from these two routes to the more challenging southwest face, north face, and west ridge routes as shown by the widening gap in the trend lines in Chart C-3c. The larger, more nationalistic teams had already succeeded via the traditional southeast ridge route and smaller alpine-style teams of elite climbers looking for more difficult challenges were now replacing

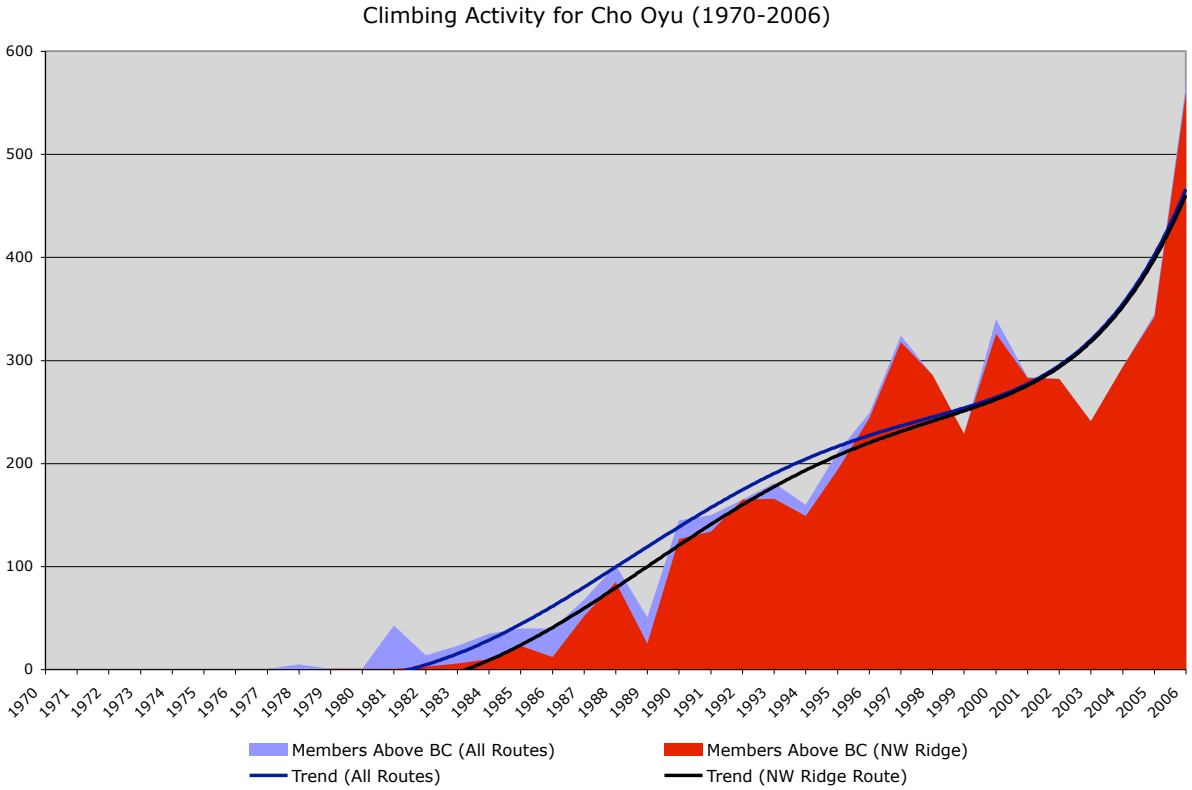


Chart C-3b: Climbing activity (members above base camp) on Cho Oyu for all routes and the NW Ridge route from 1970-2006

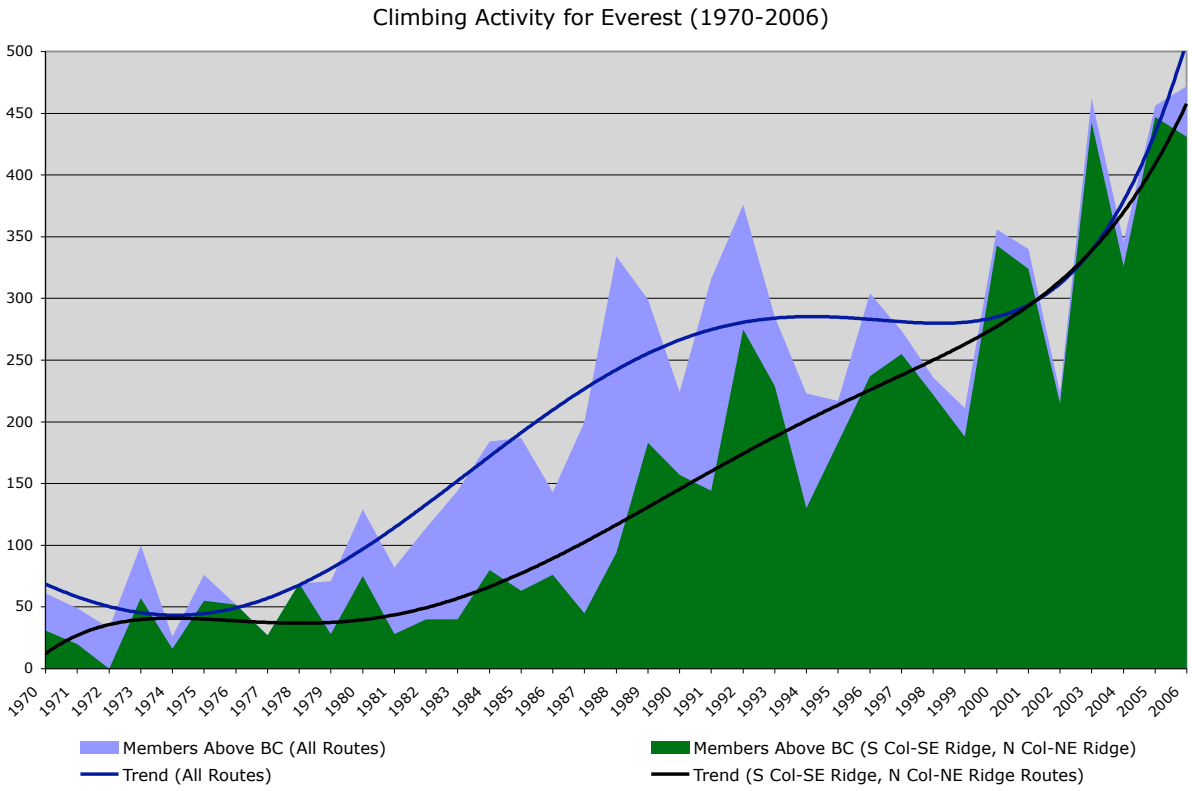


Chart C-3c: Climbing activity (members above base camp) on Everest for all routes and the S Col-SE Ridge and N Col-NE Ridge routes from 1970-2006

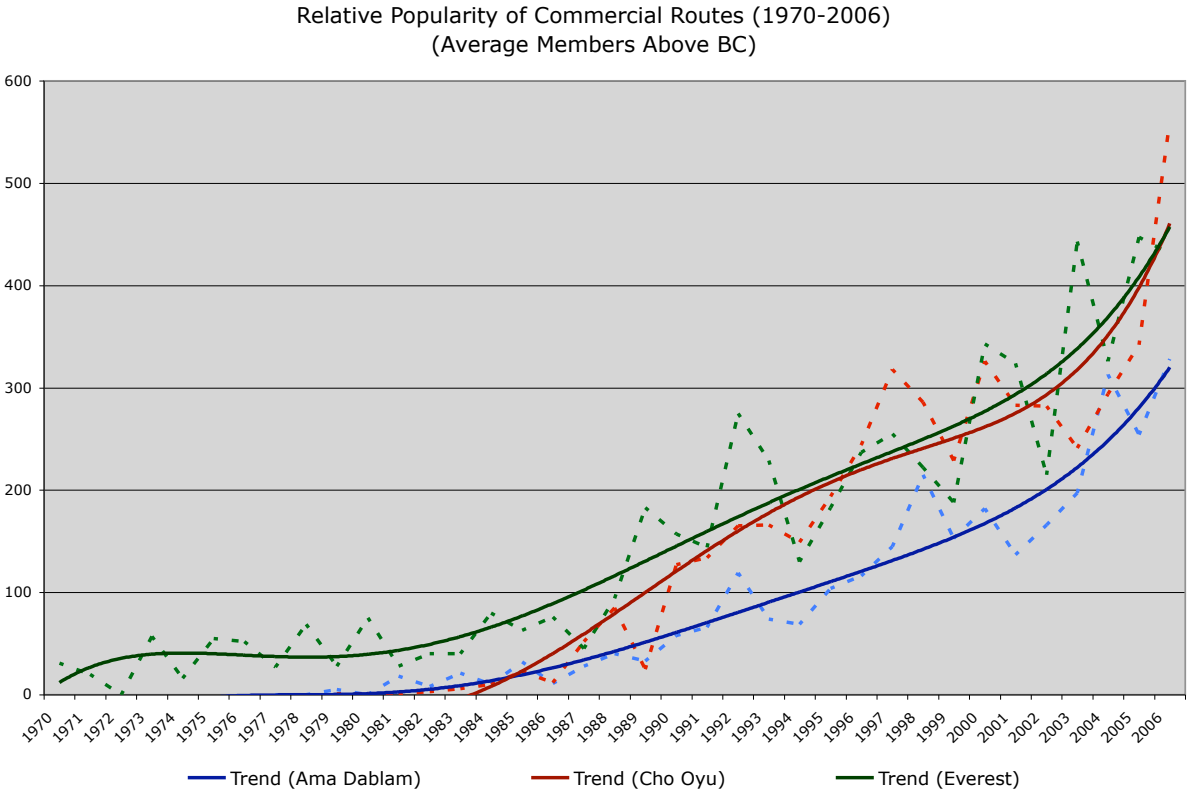


Chart C-3d: Relative climbing activity (average members above base camp) for the commercial routes on Ama Dablam, Cho Oyu, and Everest from 1970-2006

Gunfire on the Nangpa La

From *The Seasonal Stories* of Elizabeth Hawley – Summer-Autumn 2002

In autumn of 2002, a two-man American expedition planned to make the first ascent of Nangpa Gosum I, which is in the Cho Oyu area, but they never got above base camp. Dave Morton and Jeff Lamoureux unexpectedly encountered three soldiers from China who had come into Nepal via the Nangpa La, a major pass between Nepal and Tibet.

The climbers had pitched their base camp at 5100m at the foot of the southeast face of their 7312m objective, and then on the 20th of September went around to its west side intending to look for a possible descent route via the north ridge. The Nangpa Gosum range is just south of the Tibet-Nepal border, if not actually on it, and the western end of Nangpa Gosum I is not far from the 5700m Nangpa La.

Suddenly they were fired on by two men who turned out to be Chinese soldiers; it was the first incident of this kind ever to befall any mountaineers within Nepalese territory. The Americans were unharmed, but they immediately abandoned any thought of climbing their mountain. "It was scarier than any climbing I've ever done," Lamoureux said about their experience. Added Morton, "It was hard to figure out what their motive was, which made it more frightening."

Morton told how "a shot came at us and just missed us. We heard the bullet go right past our ears. ... We started running and there was another shot. We hid behind a rock and ditched our backpacks so we could run faster, then kept running. It seemed clear they were actually shooting towards us. There were about five shots total at us." The Chinese appeared to keep pursuing the Americans, who managed to escape by turning up a side glacier and hiding for several hours behind rocks. They then got safely back to base camp, packed up their gear and spent the night hiking down to the nearest village, Thami.

The tents of Cho Oyu expeditions' advance base camps were on the other side of the border not far from the Nangpa La, and one of the leaders who were there at the time, Russell Brice, explained the background to the incident: three soldiers of the Chinese army, the People's Liberation Army (PLA), were searching for a group of about 20 Amdos, Tibetans from northwest Tibet. Since the Nangpa La is an important escape route for Tibetans fleeing their country, usually to passing through Nepal to join the Dalai Lama in northern India, a unit of the PLA is permanently posted close to Cho Oyu base camp on a highway.

The three soldiers found a woman lying down near the pass; she probably was a decoy, for when they went to look at her closely, they were unexpectedly attacked by Amdos, who hit them over the head with rocks and stole two of their guns before escaping across the pass into Nepal. The three soldiers, two of who were Tibetans themselves while only one was Han Chinese, chased after them the next day. The night after that the two Tibetan soldiers came back across the Nangpa La and slept in one of Brice's advance base camp tents. They had no sleeping bags, warm clothing or food.

On the third day, 15 to 20 more soldiers arrived at advance base camp looking for the same group of Amdos. Some searched the moraine, some went to the Nangpa La and returned to advance base. Three of them spent the night in Brice's tent and the rest slept in tents of a joint Japanese-Chinese/ Tibetan women's Cho Oyu expedition. Next day the soldiers went back to their encampment near the road.

Later that morning shots were heard at advance base camp, fired by the Han Chinese soldier from the original trio who was now crawling, dragging himself through the snow and firing to attract attention. Brice, his Sherpas and some Tibetans employed as Sherpas by the women's expedition went to investigate and brought the unfortunate soldier into camp. Brice speculates that the Americans were caught in crossfire between the Amdos and the PLA.

Note: A similar incident occurred in the autumn of 2006 when Chinese soldiers fired upon a group of Tibetans crossing the Nangpa La; a Tibetan nun was killed during this encounter.

them. In fact during the late 1980s, these other routes had slightly more activity than the traditional routes as this was just before commercial climbing became popular. But by the late 1990s, these other routes were almost abandoned. Currently there are only occasional attempts on the north face and west ridge, two of which ended disastrously during snowboard/ski descents (Marco Siffredi disappeared in the Hornbein Couloir in 2002 and Tomas Olsson fell to his death after pulling out an anchor in the Great Couloir in 2006). The east side is almost entirely ignored due to the difficult and dangerous ice seracs on the Kangschung face. The only remaining unclimbed route is "fantasy ridge," a steep knife-edged icy ridge that joins into the northeast ridge from the east side of Everest at the bottom of the Kangschung Glacier.

Chart C-3d shows the steady increase in popularity of the commercial routes (thus commercial climbing) on Ama Dablam, Cho Oyu, and Everest. From 1997-2004, the activity on Cho Oyu leveled off, perhaps indicating that more commercial clients were attempting Everest without having prior experience on other 8000ers such as Cho Oyu, perhaps due to fewer novice Everesters having both the time and finances to fund two 8000m expeditions and instead were training on less expensive peaks such as Aconcagua or Denali (or skipping high-altitude training altogether). From 2005 Cho Oyu activity has again increased sharply.

Table C-4 summarizes the current trends in climbing activity since 1990. The overall annual increase in climbing activity from 1990 to 2006 for all peaks is 3.3%, but when the ACE commercial routes are removed, there is an annual decrease of 2.3%. Ama Dablam has shown the largest increase in activity with 10.7% growth per year. Cho Oyu and Everest are not far behind, with 9.1% and 6.1% annual growth, respectively. Most everything else has been in decline.

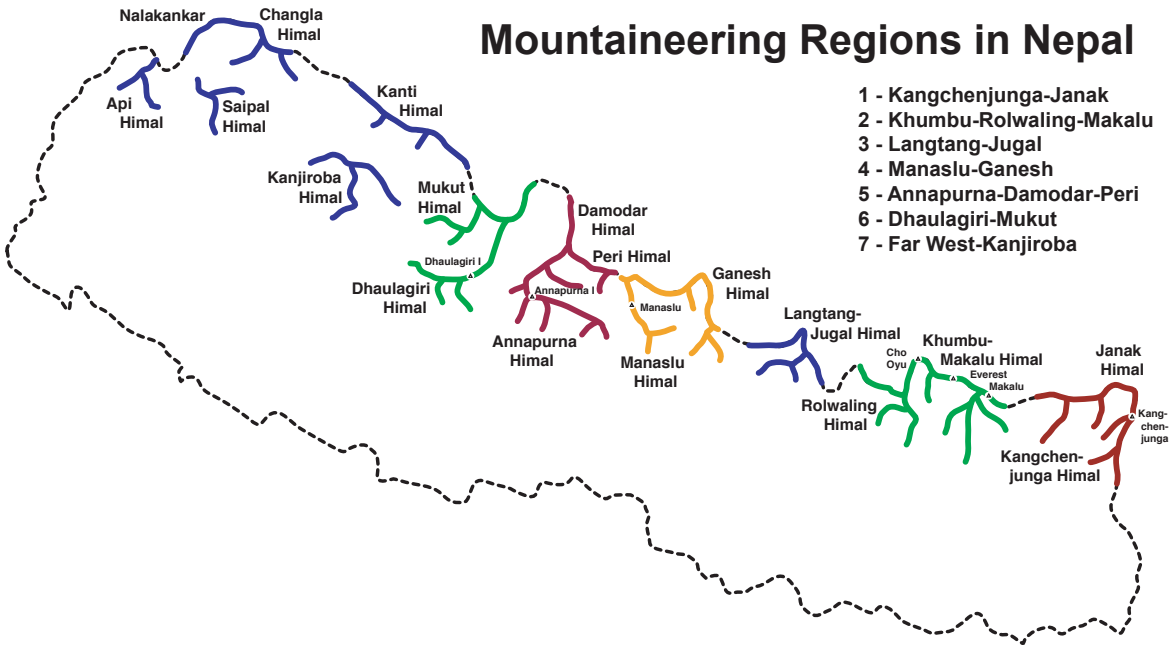
	Members Above BC		Average Annual Yearly Change
	1990	2006	
All Peaks	1020	1772	3.3
All Peaks w/o AMAD-CHOY-EVER Commercial Routes	678	453	-2.3
6000ers	129	373	6.4
6000ers w/o AMAD Commercial Route	71	45	-2.7
7000ers	246	129	-3.7
8000ers	645	1270	4.1
8000ers w/o CHOY-EVER Commercial Routes	361	279	-1.5
AMAD Commercial Route (SW Ridge)	58	328	10.7
CHOY Commercial Route (NW Ridge)	127	560	9.1
EVER Commercial Routes (S Col-SE Ridge, N Col-NE Ridge)	157	431	6.1

Table C-4: Current trends in climbing activity from 1990-2006 (average annual change in members above base camp)

Regional Activity

For the purpose of analyzing climbing activity by geographical regions, the Nepal Himalaya is divided into seven regions:

The regional locations of all of the peaks are given in Appendix A. The weather patterns and snow conditions differ from region to region with certain regions having more favorable and safer climbing conditions depending on the season. The later chapters on ascent and death analyses probe deeper into these regional differences.



Charts C-5a–g show climbing activity on a regional basis from 1970 to 2006.

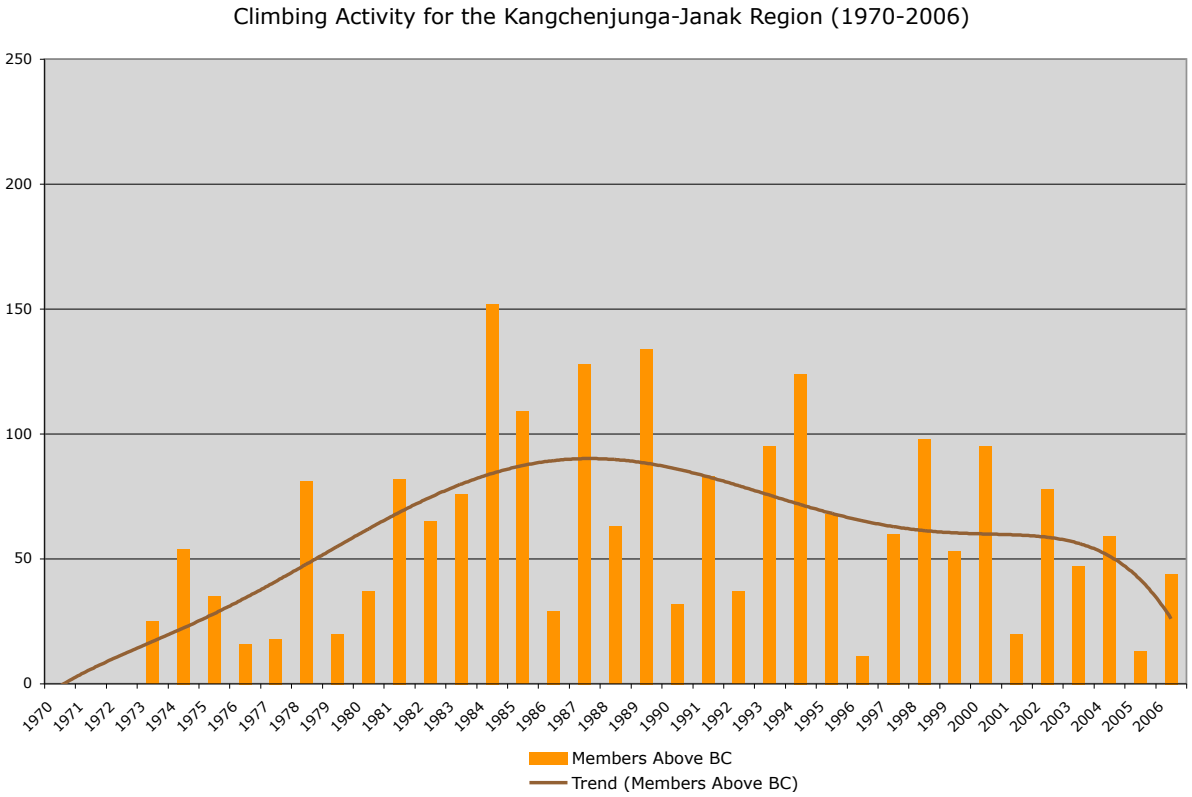


Chart C-5a: Climbing activity (members above base camp) for the Kangchenjunga-Janak region from 1970-2006

During the 1960s and early 1970s, expeditions to the Kangchenjunga-Janak region were limited mostly to Japanese exploratory teams to the peaks northwest of the Kangchenjunga massif and Indian expeditions to peaks in the Kabru range along the Sikkim border south of Kangchenjunga.

More teams went into the region beginning in the mid-1970s. From 1984 to 1994 several very large teams accounted for much of the activity: a 36-person Japanese traverse team to the four summits of Kangchenjunga in 1984; a 31-person British military team to Nepal Peak and Kirat Chuli in 1985; a 62-person Indian team to Kangchenjunga in 1987; a 32-person Russian traverse team to Kangchenjunga; and a 27-person Indian team to the three Kabru border peaks in 1994.

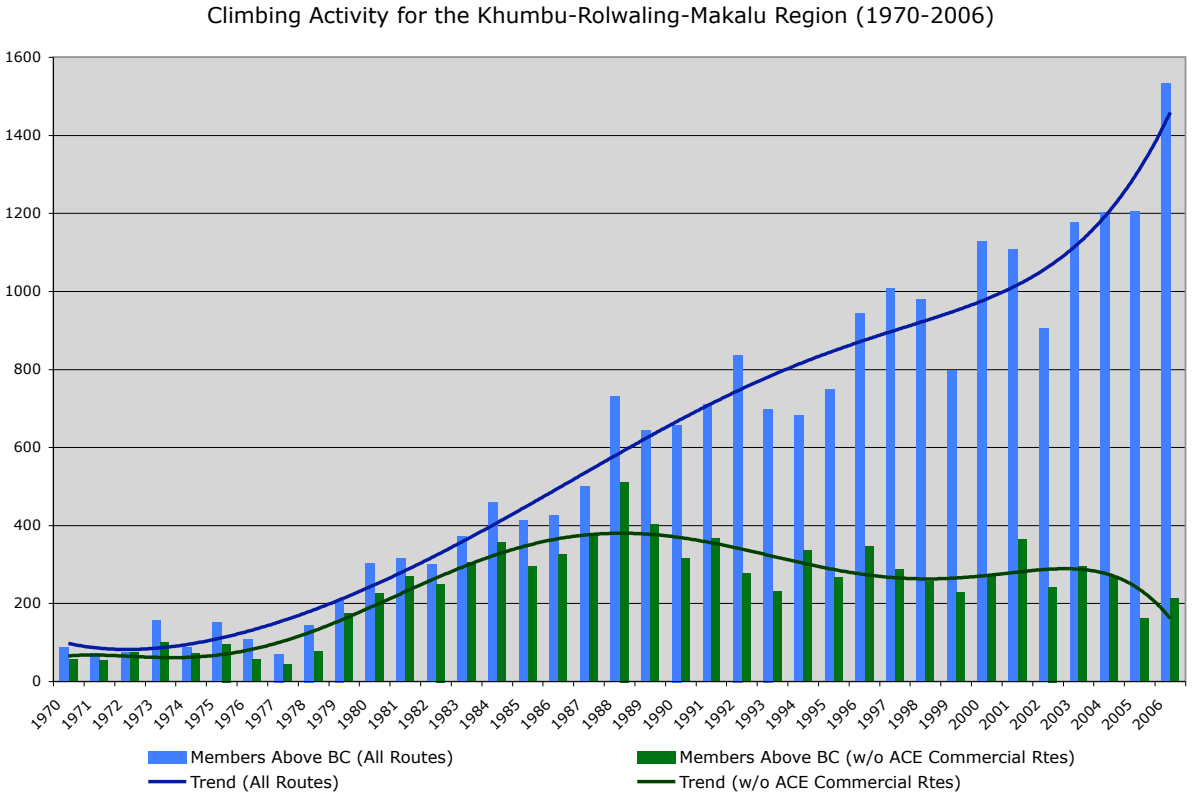


Chart C-5b: Climbing activity (members above base camp) for the Khumbu-Rolwaling-Makalu region from 1970-2006

The Khumbu-Rolwaling-Makalu region has had explosive growth with most of it on the commercial routes of Ama Dablam, Cho Oyu, and Everest. But when these routes are subtracted out, the overall pattern is similar to the other regions with more activity in the 1980s, but at much higher numbers averaging between 200-400 climbers per year. During the last ten years, the Khumbu has been the easiest region to travel to and the safest in terms of Maoist interference with expeditions as very few rebels have operated successfully above the Lukla airstrip, the gateway into the Khumbu. Only in the Makalu and Rolwaling regions have expeditions been approached for "donations."

Other than a few American expeditions to Ganchempo and Urkinmang in the 1970s, the Langtang-Jugal area was mostly ignored until the 1980s. This region has no 8000ers except for Shishapangma, which is entirely in Tibet and was off limits to foreigners until 1980; thus there was no strong attraction to Langtang-Jugal for the

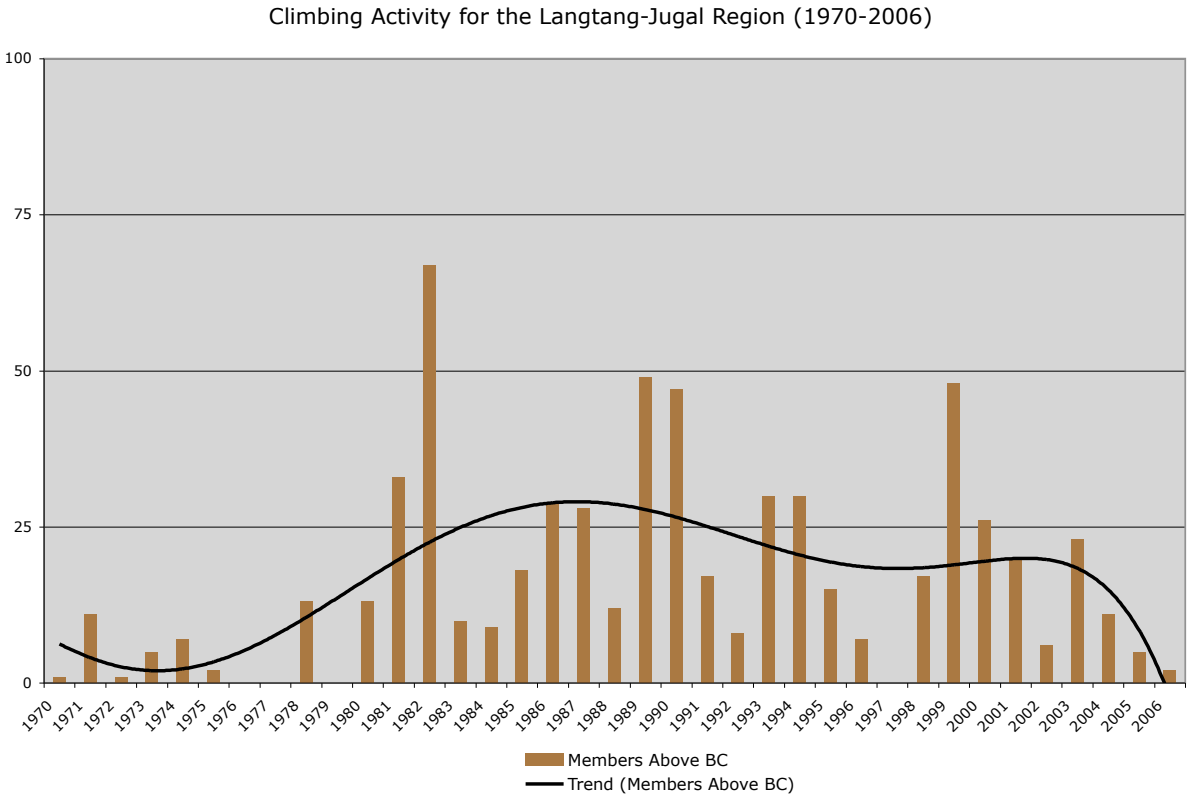


Chart C-5c: Climbing activity (members above base camp) for the Langtang-Jugal region from 1970-2006

more skilled climbers. The two most attractive peaks, Langtang Lirung (7227m) and Dorje Lhakpa (6966m), did not have their first ascents until 1978 and 1981, respectively.

The most active year was 1982 when five Japanese teams went to Langtang-Jugal. Two of those teams (19 to Phurbi Chhyachu and 12 to Langsisa Ri) were very large by normal standards for the region as most teams tended to be small private groups of climbing friends. In 1990, the Nepal Mountaineering Police also mounted a large 19-person training expedition to Ganchempo. Other than a strong autumn 1999 season, recent activity has been low.

The Japanese were also very active in the Manaslu-Ganesh region from the 1950s to the early 1980s. After making the first ascent of Manaslu in 1956, the Japanese turned their attention to its neighboring peaks, Peak 29 and the Himalchuli's, and then finally to the Ganesh peaks. Other European teams also joined in on expeditions to Ganesh Himal in the 1980s when activity to the region was at its highest. But since then, Ganesh has fallen out of favor as there have been only five teams during the last ten years (1996-2006).

Expeditions to Manaslu peak itself have remained steady, as it is one of the coveted fourteen 8000m peaks, and actually reached a high-point of twelve teams in 1996, before subsiding a bit because of Maoist influence in the Gorkha area. The first teams that the Maoists began "taxing" were in-bound for Manaslu in 2000.

The early 1980s were the most active period for the Annapurna-Damodar-Peri region with most expeditions going to the Annapurnas and Tilicho south of the Marshyangdi

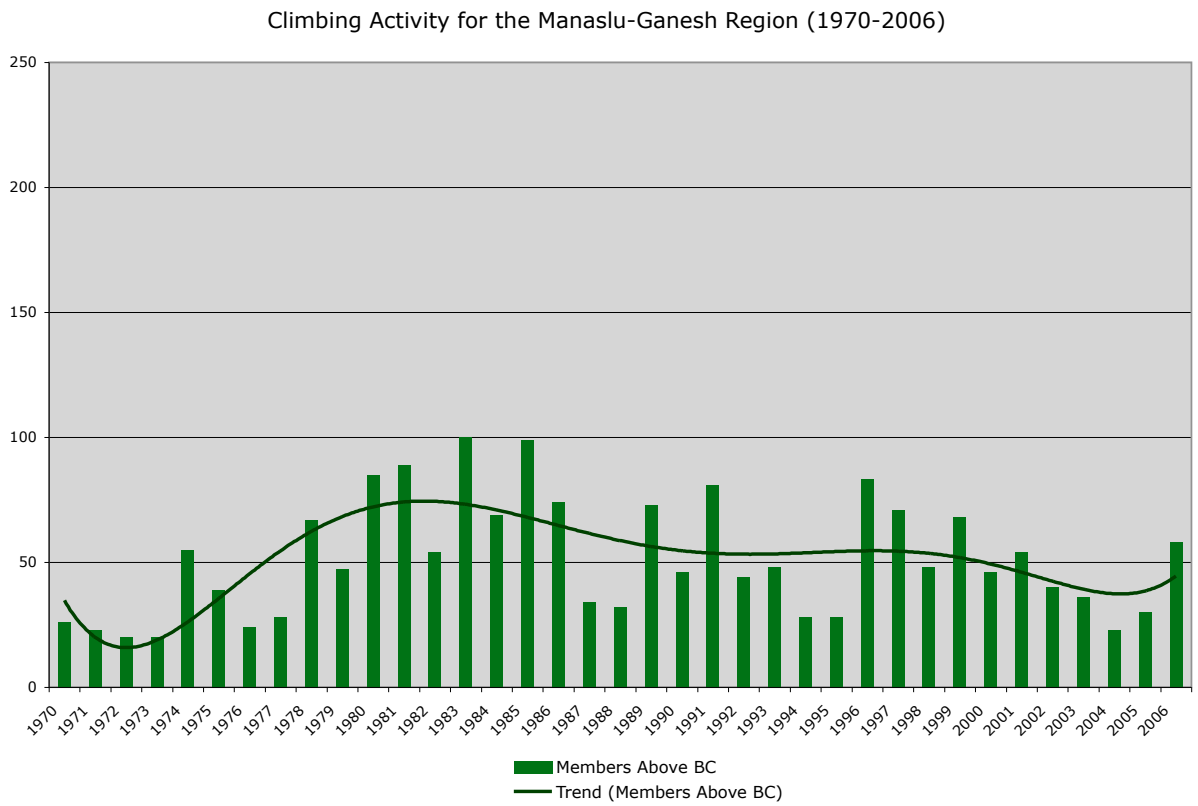


Chart C-5d: Climbing activity (members above base camp) for the Manaslu-Ganesh region from 1970-2006

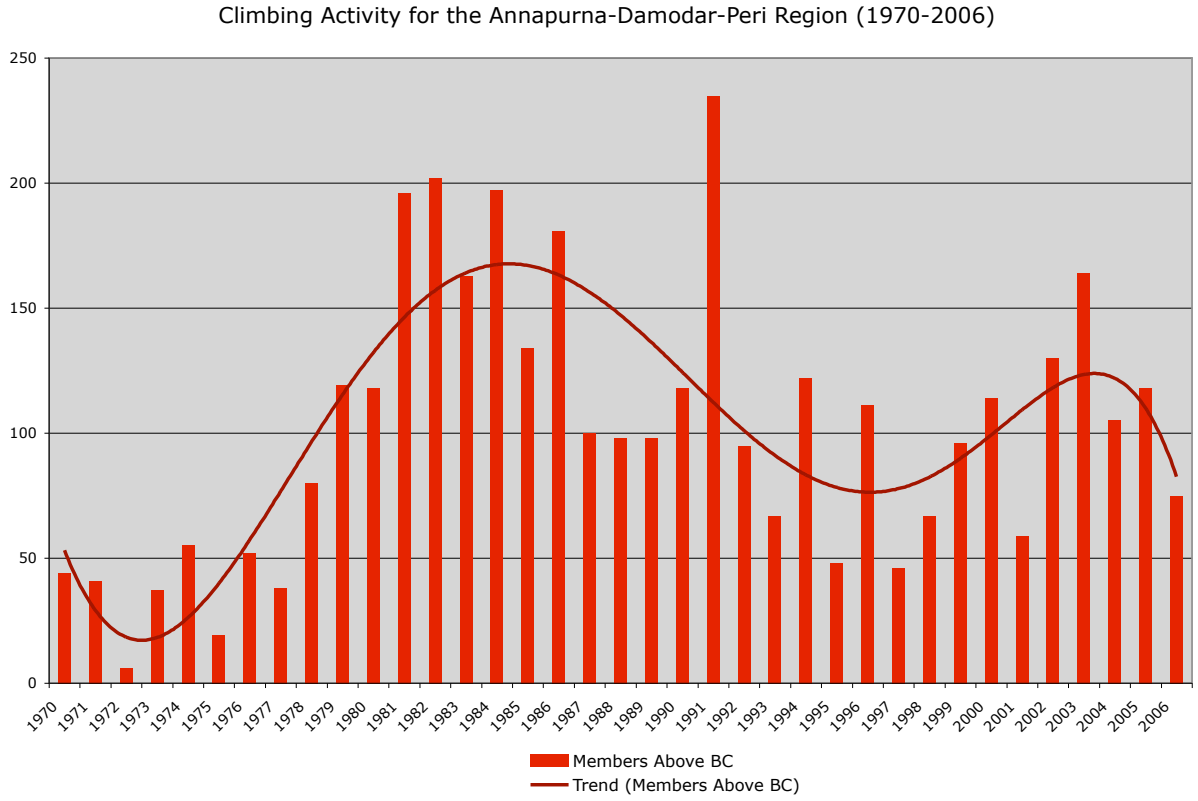


Chart C-5e: Climbing activity (members above base camp) for the Annapurna-Damodar-Peri region from 1970-2006

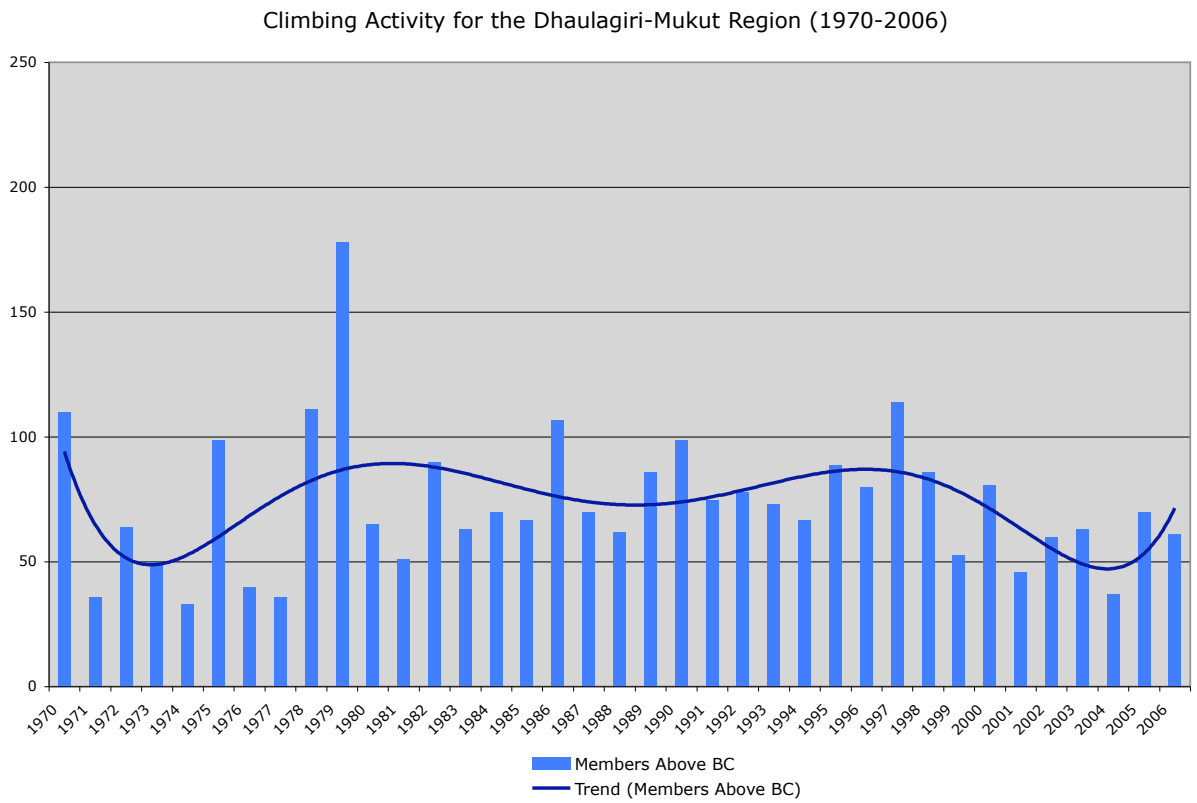


Chart C-5f: Climbing activity (members above base camp) for the Dhaulagiri-Mukut region from 1970-2006

Valley and Thorung La. These peaks are easily accessible, provide good opportunities for small teams, and present 8000m challenges for the more skilled climbers. Only the north side of Annapurna I and the Nilgiris are difficult to approach due to the steep trails along the Miristi Khola and over the Thulobugin Pass.

After 1986, interest in the Annapurna region declined for about 10 years except for the autumn season of 1991 when ten teams went to Annapurna I (a record season for that peak). Over the last ten years, interest has again been renewed with a number of peaks opening up in the Damodar and Peri Himals north of the Marshyangdi River. In autumn 2003 seven teams went to Himlung, which is now gaining popularity for commercial climbing.

The Japanese dominated in the Dhaulagiri-Mukut region during the first half of the 1970s. Their high activity in 1970 was the result of three multi-peak Japanese expeditions to the Dhaulagiri 7000ers, while in 1975 six different Japanese teams climbed in the region.

By the late 1970s, other nationalities ventured into the area. In 1979, the record year for the region, 18-person Spanish and Polish teams attempted Dhaulagiri I, a 20-person Japanese team climbed three Dhaulagiri 7000ers, and a 27-person German DAV commercial expedition repeated the club's success on Putha Hiunchuli the previous year with a 26-person team.

Interest in the Dhaulagiri-Mukut region remained steady before trailing off after 2000. Most of the recent activity has been confined to Dhaulagiri I and other peaks accessible

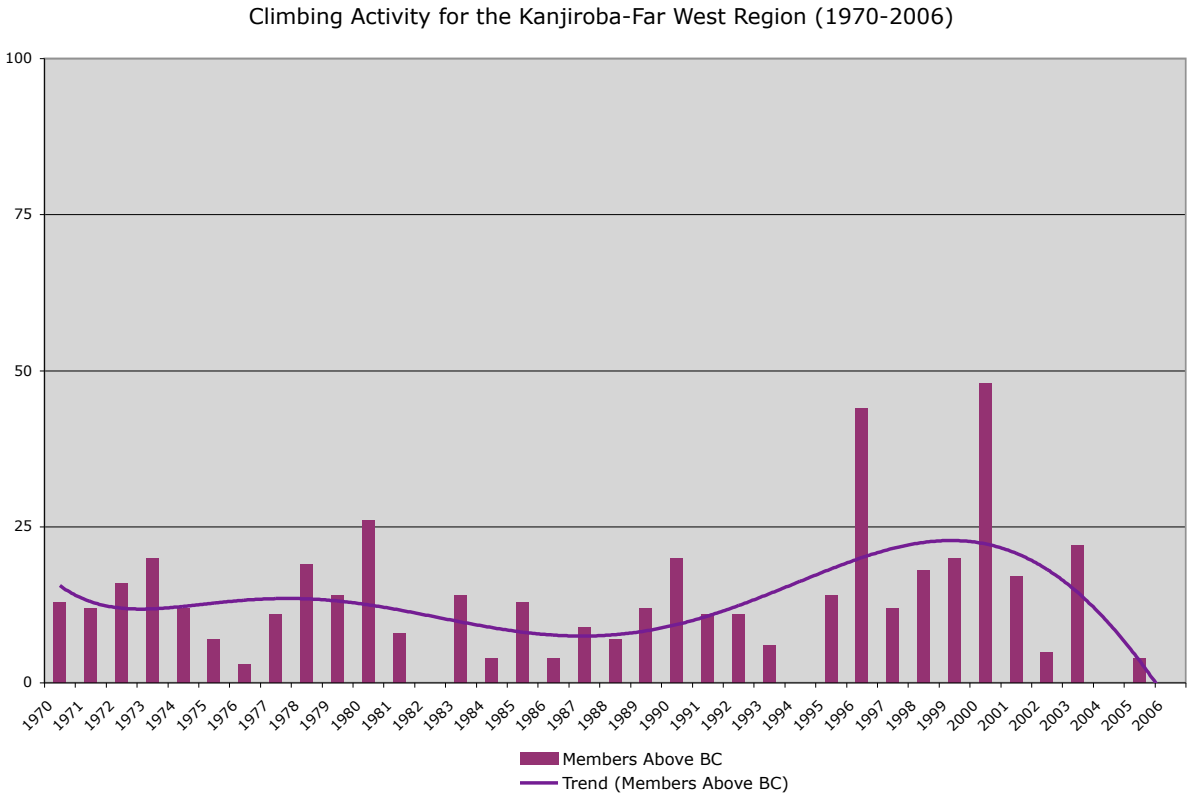


Chart C-5g: Climbing activity (members above base camp) for the Kanjiroba-Far West region from 1970-2006

from the Kali Gandaki valley. Maoist presence has discouraged approaching through Dolpo from the west or up the Myagdi Khola from Beni.

The Kanjiroba-Far West region generally has experienced very low activity except in 1996 and 2000. But in both these cases, the two spikes in Chart C-5g are the result of only two expeditions. A 12-person Slovenian expedition in 1996 led by Roman Robas

Api-Bobaye-Nampa Trilogy

From *The Seasonal Stories* of Elizabeth Hawley – Autumn 1996

The first ascent of Bobaye, a 6808m mountain in the far west of Nepal, was accomplished in alpine style by one member alone from a Slovenian team that set out to scale simultaneously three western peaks, all by new routes in alpine style, and they succeeded in their ambitious objective on all three; in fact, on Bobaye the soloist made the first attempt via any route. This expedition of ten climbers led by Roman Robas established a central base camp for their climbs of the three mountains, two better-known peaks, Api and Nampa, which had been successfully climbed in earlier years, as well as the virgin Bobaye. The three stand near each other in a triangle with Bobaye south of Nampa and southeast of Api. No Sherpas, no fixed ropes, no fixed camps figured in these ascents, none of which took longer than four days from depots at the feet of their mountain faces to their respective summits.

Bobaye was scaled by Tomaz Humar, who began his climb from a depot at 4300m on 1 November at 2:00 a.m. by crossing a glacier in deep snow on his hands and knees because of fear of hidden crevasses. Then he moved onto the west face and into a small diagonal couloir, where he had to hurry because its 80-degree slope was a chute for pieces of ice from a frozen waterfall. He traversed the face towards the northwest ridge; he wanted to bivouac on the ridge, but deep soft snow made his progress very slow, so at 3:00 p.m. he bivouacked on the face at 5500m in an ice cave under seracs.

The next day Humar resumed his ascent at 5:30 a.m., reached the northwest ridge and crossed over onto the mixed ice and rock of the northwest face, came to a rock band with thin ice cover at 6500m, then a col (saddle) between Bobaye's middle and main summits and finally up the last 30-40 vertical meters or 150 linear meters on the north ridge from the col to the highest point at 1:00 p.m. Most of his ascent had been on terrain slanting at 60 to 90 degrees.

At the summit he had clear weather although gusts of wind were blowing snow horizontally, and it was very cold. In his descent he took a different, more direct line via the west pillar and west face, avoiding the extremely difficult northwest face, and was back in his bivouac at 4:00 p.m. This was 27-year-old Humar's first solo climb.

Nampa stands north of Bobaye. Here two other Slovenians, Matija Jost and Peter Meznar, pioneered a new route via the central couloir of its southwest face, and on 3 November they made the second ascent of the 6755m mountain on the fourth day of their assault. They began their climb from their 4200m depot at 10:00 p.m. on the 31st of October, and just above a large crevasse at 4500m they entered an ice couloir. They needed two hours to surmount the first 300 vertical meters of the 50-degree couloir, but they had to spend nine hours on the next very steep (85-degree) 400m section. At the top of the gully, at 5500m, they rested for four hours on the rocks of a ridge to the left of the top of the couloir, climbed for three hours on the ridge, then stopped again and now, at 6:00 p.m. on 1 November, made their first bivouac at 5600m and went to sleep.

Next day they started late at 10:00 a.m., continued up the ridge and bivouacked at 6300m at 6:00 p.m. Finally on 3 November they gained the summit after coming close to the west ridge and joining the route by which a Japanese team in the spring of 1972 had made the mountain's first ascent. They were at the top at 9:50 a.m., descended by the west ridge and briefly by the north face to 5800m, where they found a Japanese piton and rope, and on down to their final bivouac at 8:00 p.m. at 4800m on rock below a col on the west ridge.

Three more members of the expedition set out on 1 November for an ascent of the highest of the Slovenians' peaks, 7132m Api, which is west of Nampa, on a route that had been attempted by a British team in the autumn of 1992. (Led by Robert Brown, the five Britons had to abandon their climb because of heavy snowfall and lack of time after they had reached 6000m. The Slovenians found some of their pitons and rope.) The British called the feature they climbed the south face, but the Slovenians believe it is more accurately described as the southeast face, and they completed the British route. They were the fifth expedition to summit Api by any route.

Dusan Debelak and Janko Meglic completed their ascent of Api on the fourth day of their push up the face. Tomaz Zerovnik started out with them, but became sick during the night at their third bivouac at 6050m and was unable to make the final day's climb to the top. On their last day, 4 November, Debelak and Meglic began at 1:00 a.m., traversed beside a crevasse and moved up the snow face in very cold wind blowing the loose snow of frequent small avalanches at them, which made breathing difficult. Finally they came to rock covered by thin ice and then arrived at the western plateau and from there climbed the last 20 vertical meters (100 linear meters) to the top at 3:30 p.m. They descended the same route, moving fast in strong wind, and slept that night in the bivouac where Zerovnik had waited for them. They had crowned their expedition's plans to summit three mountains with the third success.

successfully scaled three peaks in the Api Himal: Api Main (6th ascent), Nampa (2nd ascent), and Bobaye (1st ascent solo by Tomaz Humar) (see inset box); and a 12-person Japanese expedition led by Tamotsu Ohnishi explored several peaks of the Nalakankar region in the far northwest corner of Nepal.

Seasonal Activity

The primary climbing seasons in the Nepal Himalaya are spring and autumn when the bulk of the expeditions come during the good weather months from March to May and September to November. Most commercial expeditions climb during these two periods. The winter season from December to February has only had occasional activity when

a few brave and hardy souls are willing to endure the cold winter winds either for the additional challenge or to avoid the prime-season crowds on the more popular peaks.

During the summer monsoon season from June to August there is minimal climbing except for a few exploratory expeditions to the drier climates of the far western areas. The summer season is ignored in our analyses.

Charts C-6a–c show climbing activity on a seasonal basis from 1970 to 2006 for the spring, autumn, and winter seasons. Overall only the spring season shows a steady increase due to the rapid rise in spring expeditions to Everest and Ama Dablam (see Charts C-7a and C-7c). The autumn season activity has held steady since 1990 with the increase in Cho Oyu expeditions (see Chart C-7b) offsetting the general decline in autumn expeditions to other peaks. Expeditions to non-ACE peaks are now less than half of what they were at the beginning of the 1990s. Winter climbing hits its peak in 1984 and 1985 and has declined to almost nil by 2006 as there is now very little winter activity on the ACE peaks except for a few expeditions to Ama Dablam.

Chart C-6d shows the climbing activity of these three seasons on a comparative basis. During the 1980s and 1990s the autumn season (shown in **red**) was the most popular by a wide margin, but in recent years the spring season (shown in **blue**) has surpassed the autumn season boosted primarily by the large numbers attempting Everest (see Chart C-7c).

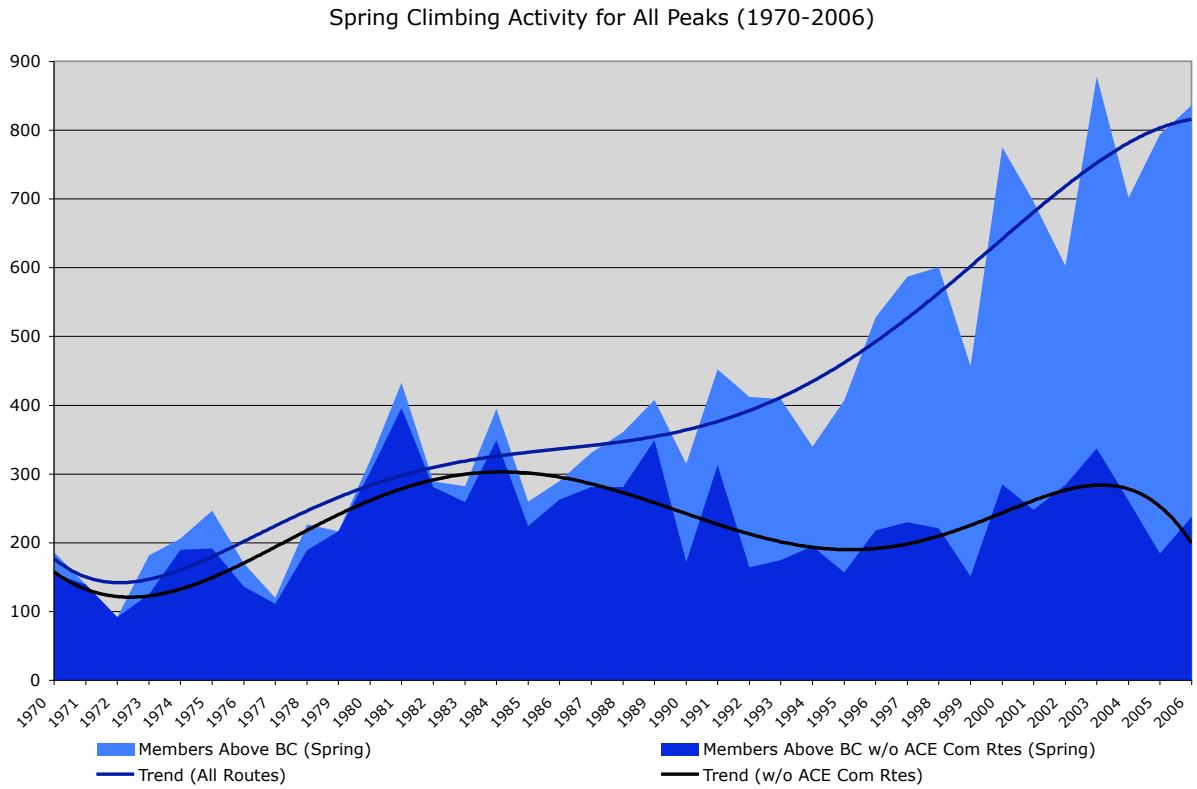


Chart C-6a: Climbing activity (members above base camp) for spring season for all peaks from 1970-2006

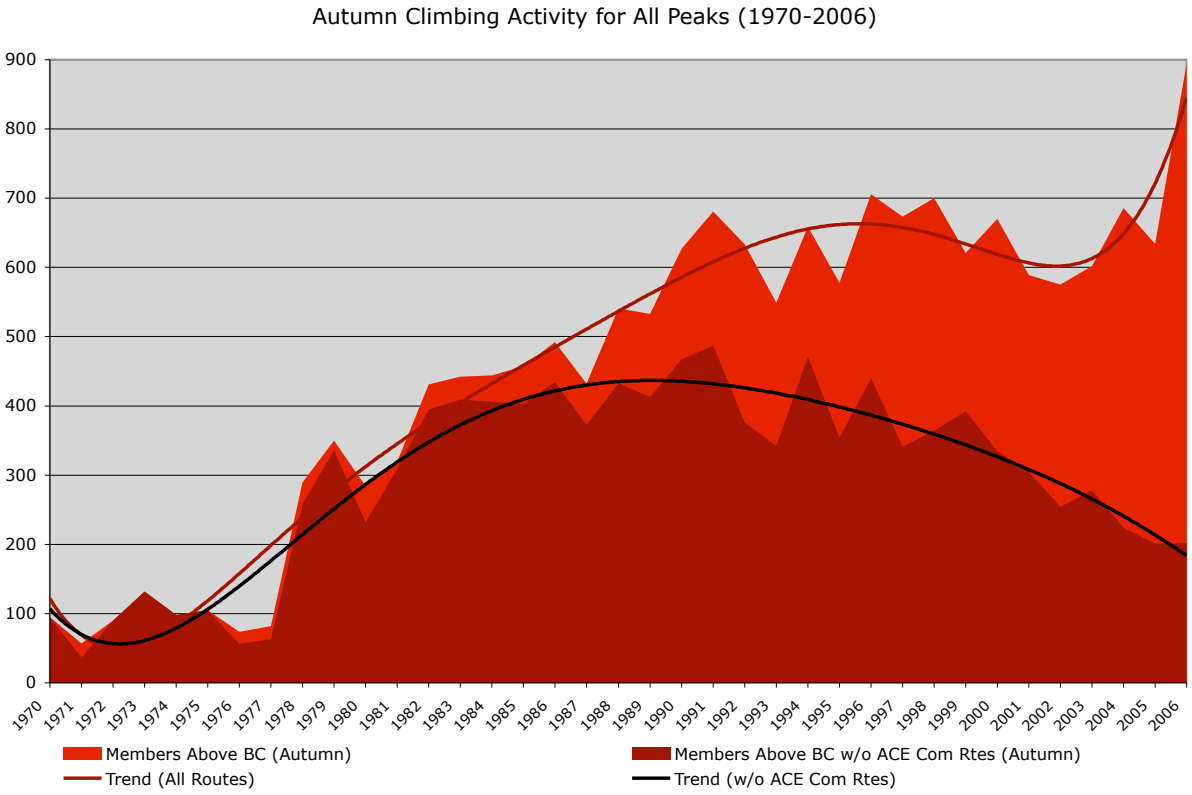


Chart C-6b: Climbing activity (members above base camp) for autumn season for all peaks from 1970-2006

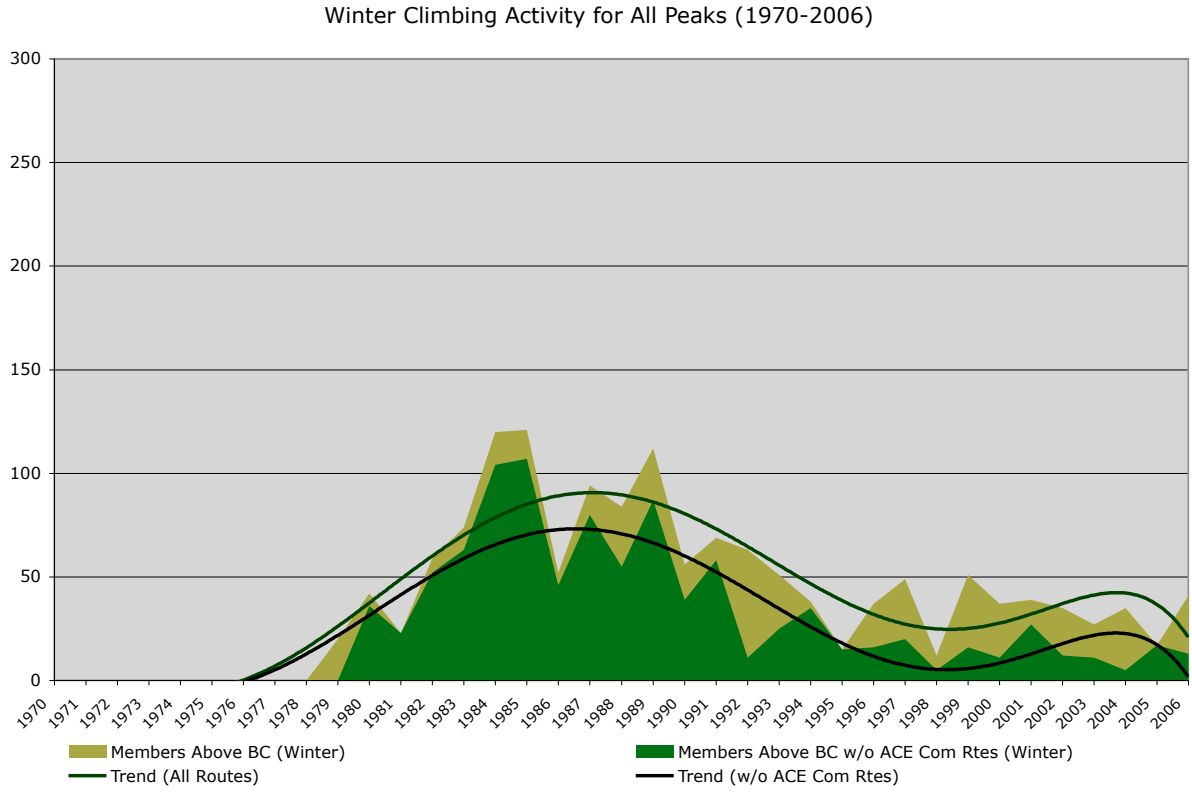


Chart C-6c: Climbing activity (members above base camp) for winter season for all peaks from 1970-2006

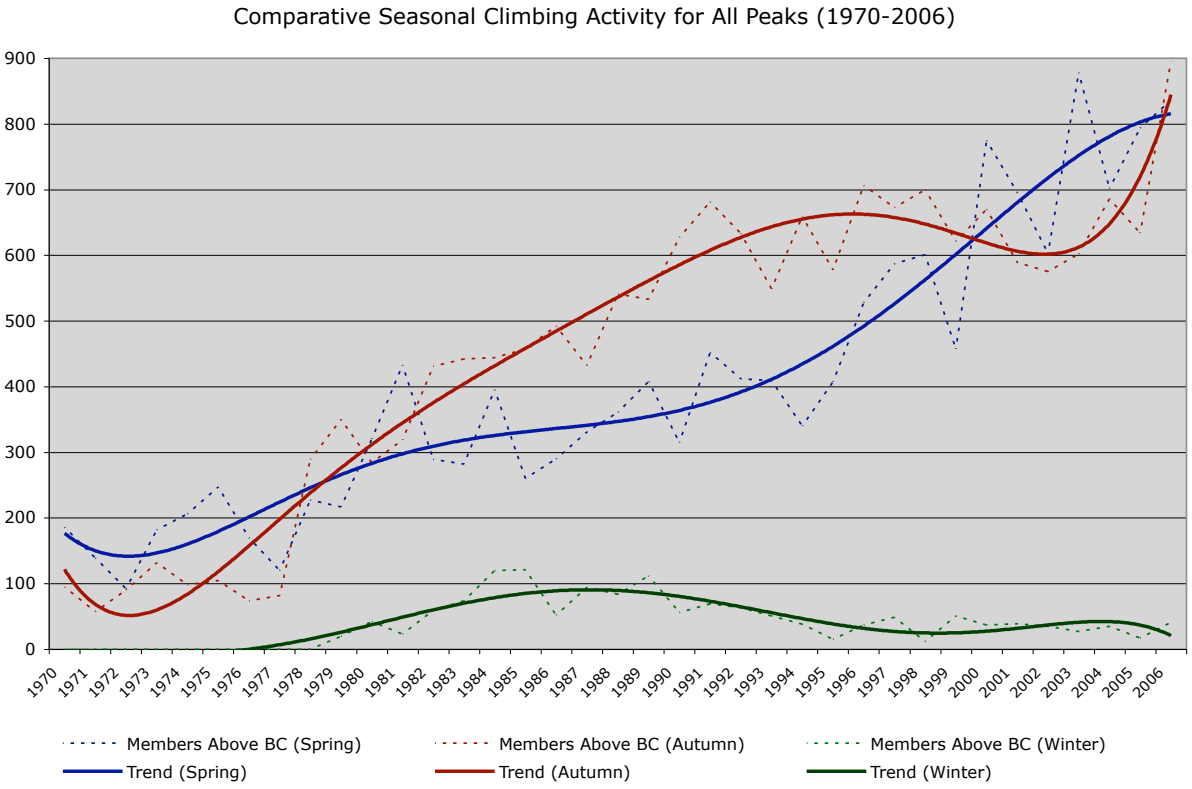


Chart C-6d: Comparative climbing activity (members above base camp) for all peaks from 1970-2006

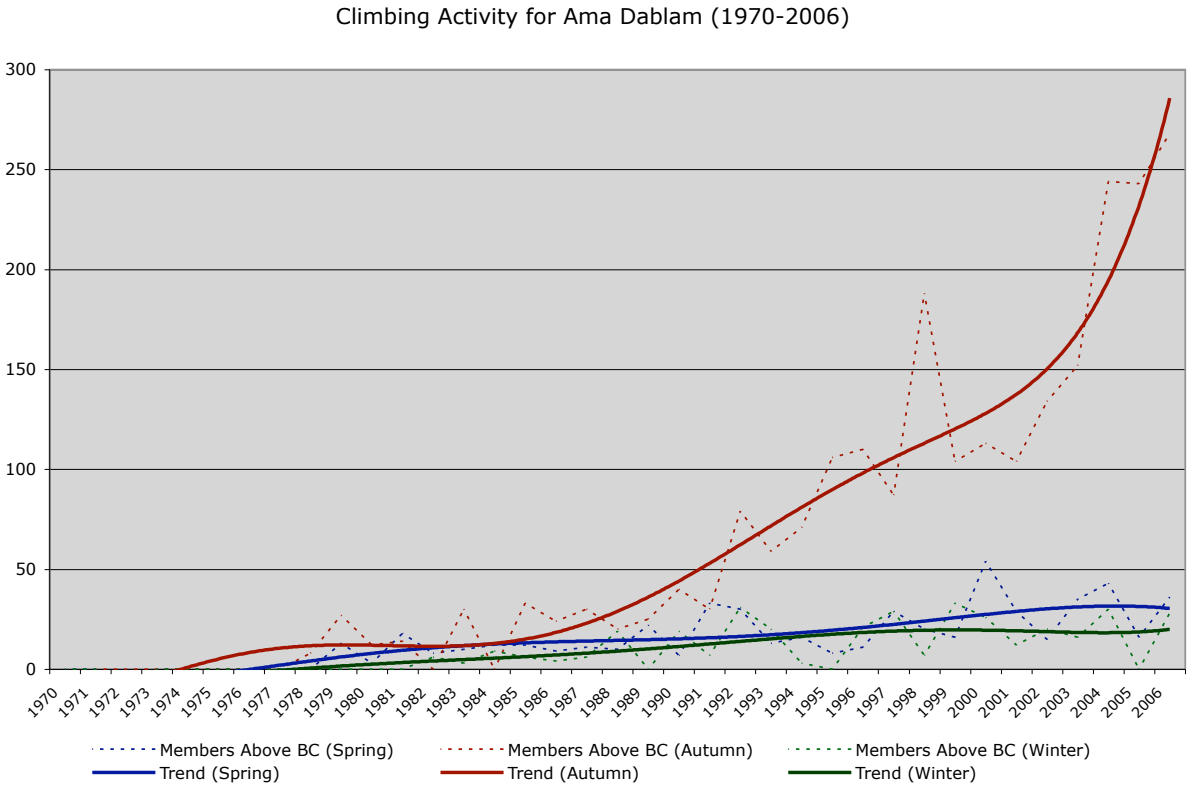


Chart C-7a: Seasonal climbing activity (members above base camp) for Ama Dablam (all routes) from 1970-2006

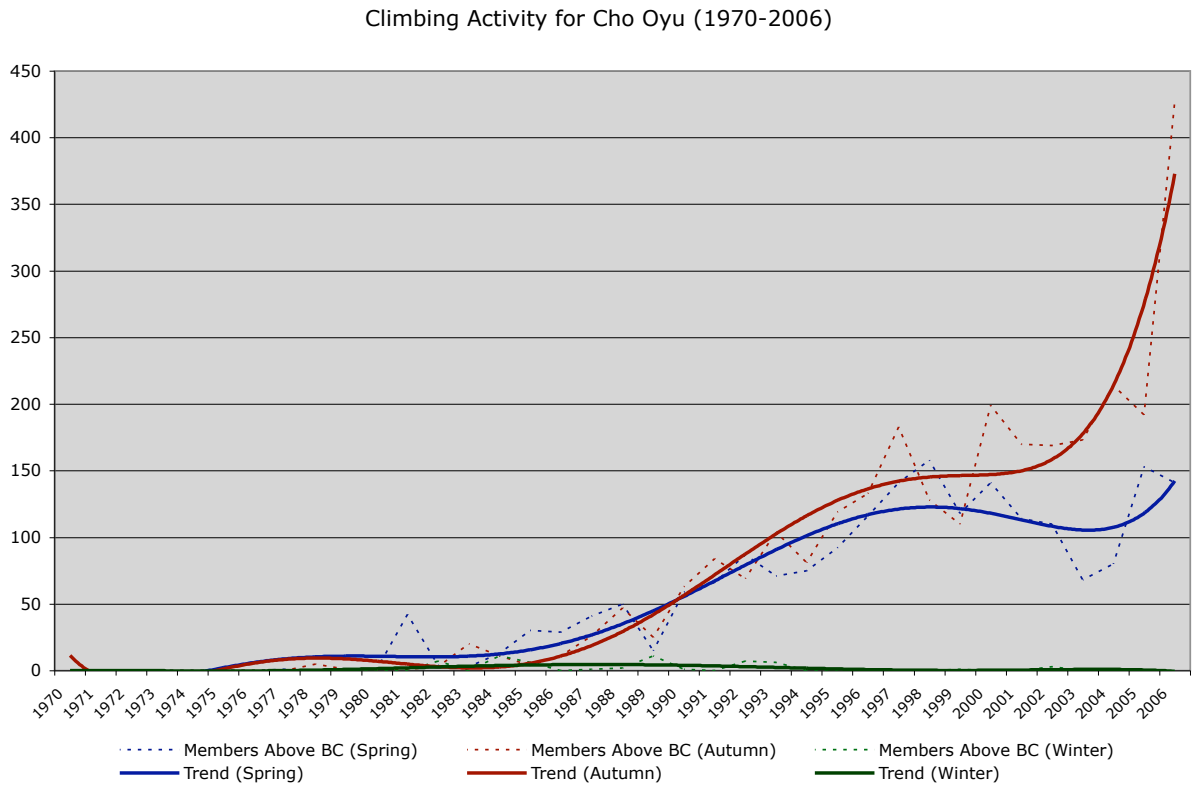


Chart C-7b: Seasonal climbing activity (members above base camp) for Cho Oyu (all routes) from 1970-2006

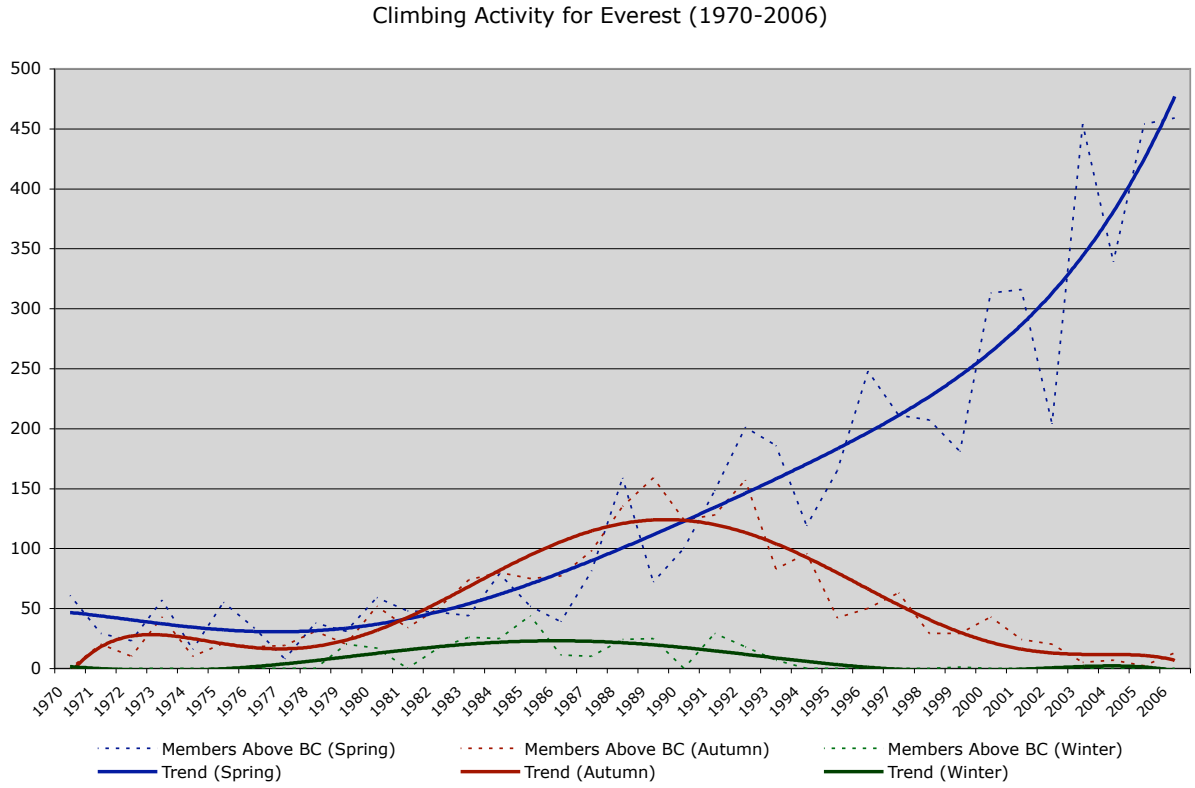


Chart C-7c: Seasonal climbing activity (members above base camp) for Everest (all routes) from 1970-2006

Charts C-7a-c show the seasonal patterns for Ama Dablam, Cho Oyu, and Everest. Everest has become increasingly popular in the spring while the autumn season has declined to almost nil due to more favorable spring-time weather conditions and the ability to more accurately forecast the window of opportunity for a summit attempt when the prevailing winds are shifting from the winter to the summer monsoon seasonal patterns.

Many commercial outfitters now allocate their climbing resources and guides to the spring season to meet the growing Everest demand and schedule their Ama Dablam and Cho Oyu trips for the autumn season. This has led to severe crowding on the southwest ridge route on Ama Dablam as the limited campsites cannot accommodate the increased traffic; this is not such a severe problem on Everest and Cho Oyu as the terrain is more forgiving of larger crowds. In very recent years, the largest commercial outfitters are now offering simultaneous Everest and Cho Oyu trips during the spring season, which accounts for the final turn-up in the **blue** trend line in Chart C-7b.

A Bloody Confrontation

From *The Himalayan Database* notes of Elizabeth Hawley

The winter of 1989-90 featured the first battle between two expeditions, the Belgian-French and South Korean teams on Cho Oyu. The Belgian team was attempting the southeast face and had established camps and fixed lines up to 7200m. The South Korean team, originally permitted for the southwest ridge, made no attempt to climb their route, but came over to the Belgian route. The Sherpas for the Korean team used Belgian fixed ropes without asking & made their C1 at same Belgian site.

On December 18, Alain Hubert & Regis Maincent of the Belgian team went to the Korean's C1 to talk to the Koreans about sharing the route. But the Koreans they spoke to did not understand and did not agree. So the Belgians said they would next day remove their own rope and on this day (Dec 18) they cut on Korean rope at bottom of the route, which made the Koreans and their Sherpas very angry. On the 19th the Korean's Sherpas replaced the cut rope and Belgians took down their own short section of ropes, so then the Korean's Sherpas fixed entire route. On evening of the 19th (6:00 p.m.) three Koreans (including the deputy leader) & seven Korean Sherpas came over to the Belgian BC to fight. The deputy leader said to Hubert & Maincent, the only Belgian team members in BC, "I kill you" and two Koreans with sticks and two Sherpas with fists attacked Hubert & Maincent. In the hour-long fight that ensued, Maincent received a head wound that bled, and a rope was tied around his neck and his arms were pinned behind his back. He fell over and was able to free his hands from the insecure knots.

The Europeans fled in the night, hobbling away with the aid of their ski poles, leaving their own two Sherpas at camp, fearing the Koreans would return & again attack with their larger members. They reached Gokyo early in morning & then continued on down. "I never imagined such a thing could happen," said Hubert of the fight. "Mountain climbing should never turn into a battlefield."

The Korean leader, Lee Ho-Sang, denies that any Koreans took part in the fracas, but he does agree that in the hour-long fight Maincent received a head wound that bled, and that a rope was tied around Maincent's neck and his arms were pinned behind his back.

A week later Ang Lhakpa Sherpa of the Korean expedition reached the highest point of 7800m alone; he then fell 200m and a big snow avalanche immediately carried away his body. The other Sherpas refused to continue climb, and the Koreans then gave up.

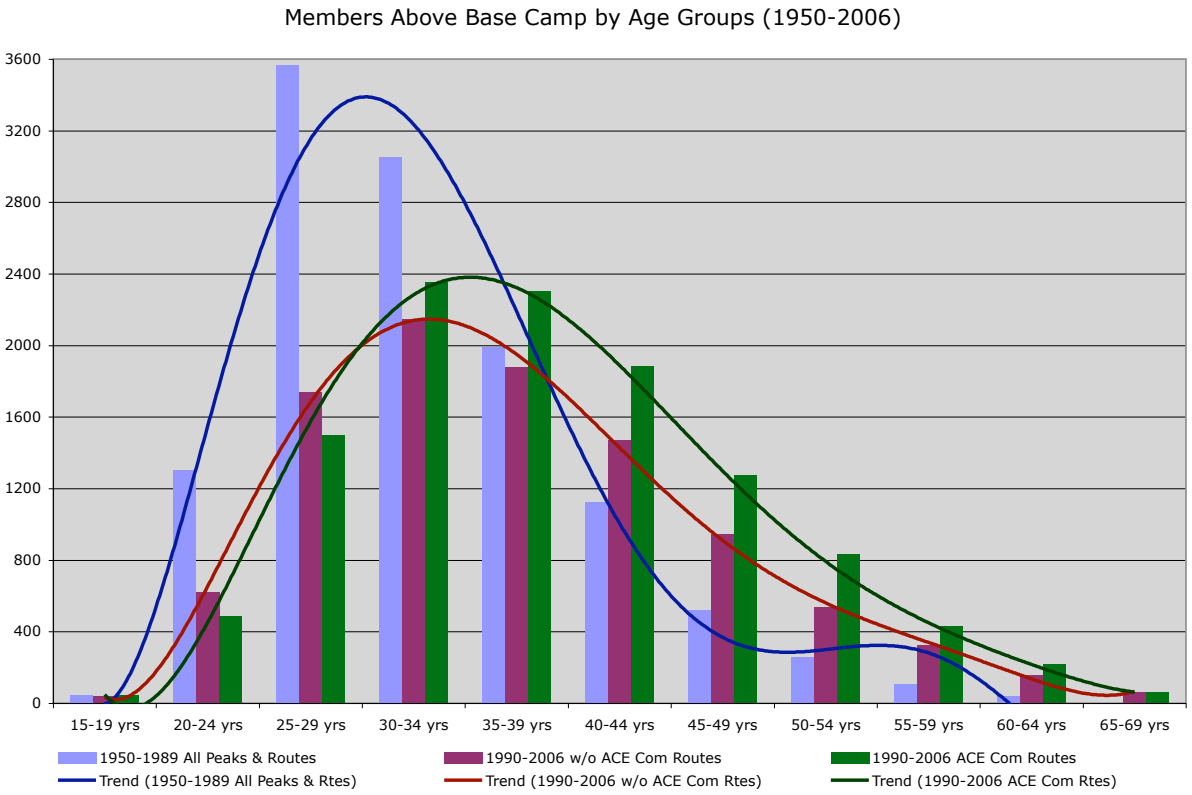


Chart C-8a: Members above base camp from 1950-1989 (all peaks & routes) and from 1990-2006 (all peaks with ACE commercial routes separated out)

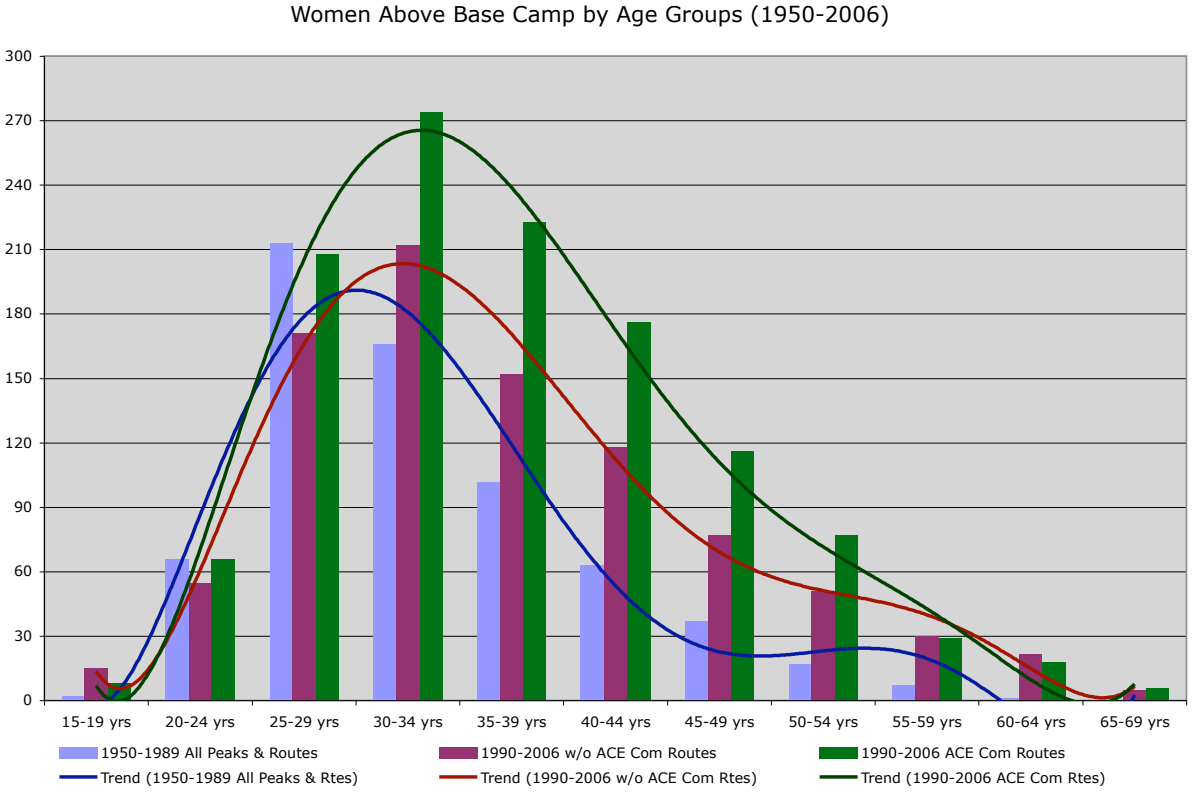


Chart C-8b: Women members above base camp from 1950-1989 (all peaks & routes) and from 1990-2006 (all peaks with ACE commercial routes separated out)

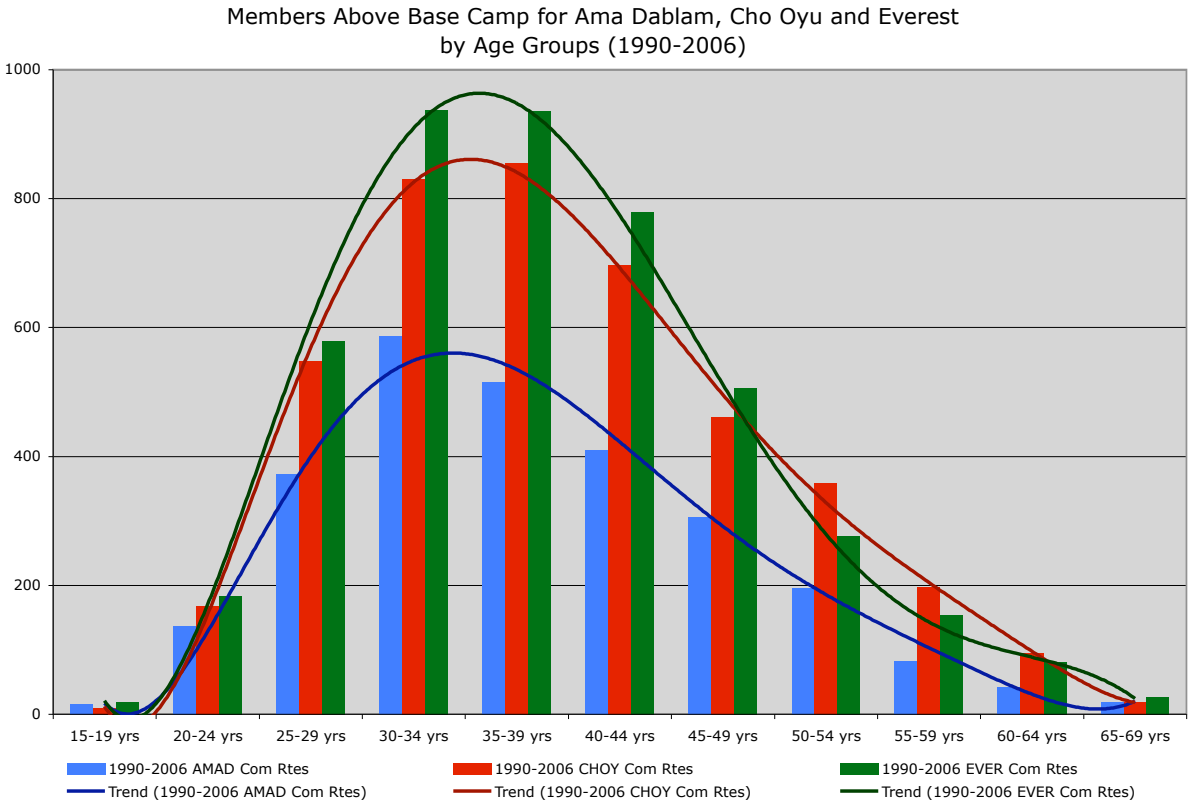


Chart C-8c: Members above base camp from 1990-2006 for Ama Dablam, Cho Oyu, and Everest commercial routes

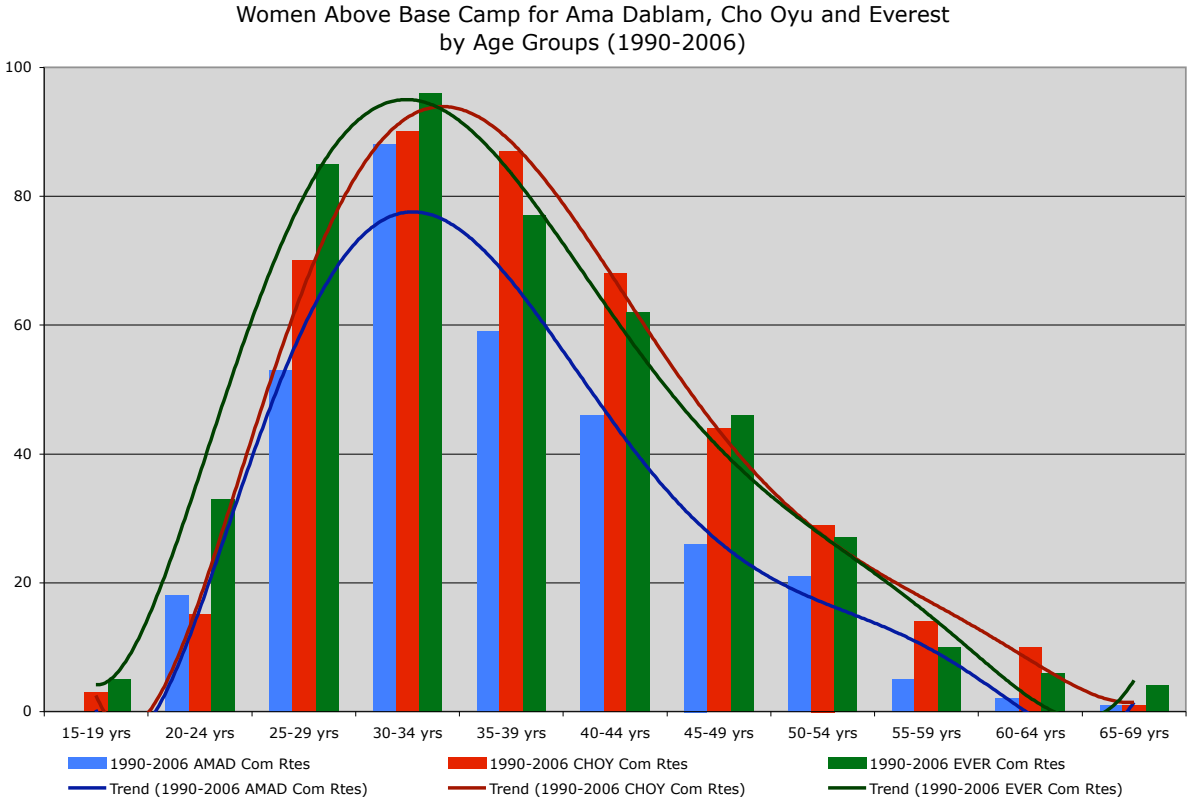


Chart C-8d: Women members above base camp from 1990-2006 for Ama Dablam, Cho Oyu, and Everest commercial routes

Activity by Age and Gender

Charts C-8a-b show the age group distribution for all members and women members above base camp for all peaks from 1970 to 1989 and from 1990 to 2006 with the ACE commercial routes separated out for the latter period. For the 1970-1989 period, the majority of the climbers were in their late twenties to early thirties with a more rapid decline for those in their late thirties and older.

The 1950-1969 period has a pattern similar to the 1970-1989 period, but in much smaller numbers; however, it is excluded from the charts because of the large number of climbers with unknown ages.

More recently for the 1990-2006 period, the average age of climbers has both increased and spread out over a wider age range with more climbers in their forties, fifties, and older. This increase is even more pronounced when looking at climbers tackling the ACE commercial routes.

Women members follow a similar pattern with slightly younger average ages and a higher propensity to climb the ACE commercial routes.

Charts C-8c-d show the age group distribution for all members and women members above base camp for each of the ACE commercial peaks from 1990 to 2006. For all members, the numbers of climbers and their average ages increase with peak altitude with Everest attracting more and older climbers than Cho Oyu and Ama Dablam. For women, the numbers are more equally distributed among the three peaks.

Activity by Citizenship

Table C-9 shows climbing activity by citizenship for the 1950-1989 and 1990-2006 periods with the ACE commercial routes separated out in the latter period.

During the 1950-1989 period, Japanese climbers dominated the Nepal Himalaya by a wide margin, most likely due to the popularity of climbing in Japan and the relative

All Peaks 1950-1989		
Country	Mbrs	Women
Japan	3027	130
France	1055	113
USA	1038	115
UK	944	39
W Germany	676	49
S Korea	672	16
Spain	662	25
Italy	646	26
Poland	583	38
Switzerland	570	46
Austria	469	9
India	403	20
Yugoslavia	365	14
Czechoslov.	272	17

All Peaks 1990-2006 w/o ACE Commercial Routes		
Country	Mbrs	Women
Japan	1109	122
France	1091	194
Spain	742	48
USA	737	73
S Korea	694	15
UK	669	52
Germany	658	80
Italy	535	29
Switzerland	442	55
Austria	393	47
Russia	319	11
Slovenia	292	10
India	267	12
Australia	175	17

ACE Commercial Routes 1990-2006		
Country	Mbrs	Women
USA	1843	191
UK	1076	95
Spain	887	57
France	733	113
Germany	679	73
Italy	628	41
S Korea	591	44
Japan	553	94
Switzerland	468	64
Austria	409	46
Russia	302	14
Australia	290	28
Canada	256	33
India	245	33

Table C-9: Members and Women Above Base Camp by Citizenship from 1950-1979 and 1990-2006 for the most active countries

closeness of the Himalaya. Many Japanese universities and towns had climbing clubs that often organized outings to Nepal especially for the sub-8000m peaks.

Since 1990 climbers from other countries have surpassed the Japanese in numbers. On the ACE commercial routes, the Americans and the British are the most numerous, while the French and Japanese are the leaders on the non-ACE routes. Several French commercial companies have organized trips to peaks such as Baruntse and Himlung. Japanese climbing clubs still remain active and often send groups to Nepal, especially into the Khumbu.

Early on most teams were of one nationality or related nationalities. In the 1970s, a few large international teams were assembled to climb Everest, but due to their large size they tended to break down into smaller sub-groups along national lines often with unfortunate interpersonal consequences (the 1971 International Everest expedition led by Norman Dhyrenfurth is a prime example). As smaller alpine-style groups became more prevalent, they often looked past nationality and instead looked at compatibility and climbing resumes of individuals. Today most of the larger commercial expeditions are international. Still some friction can occur between teams (see previous inset box).

Team Composition

Charts C-10a-b illustrate how team composition (the numbers of members and hired personnel above base camp) has changed over the last 35 years. Chart C-10c shows the ratio of hired personnel to members.

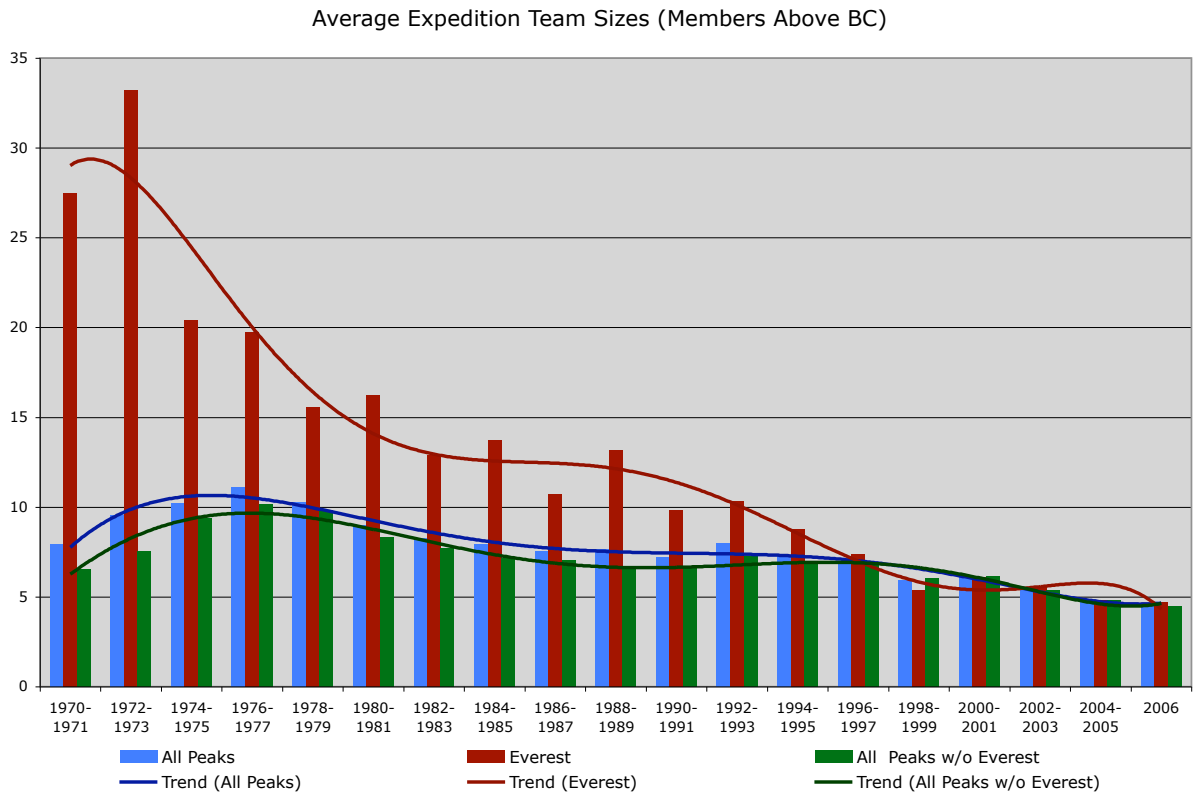


Chart C-10a: Average expedition team sizes (members above base camp) from 1970-2006

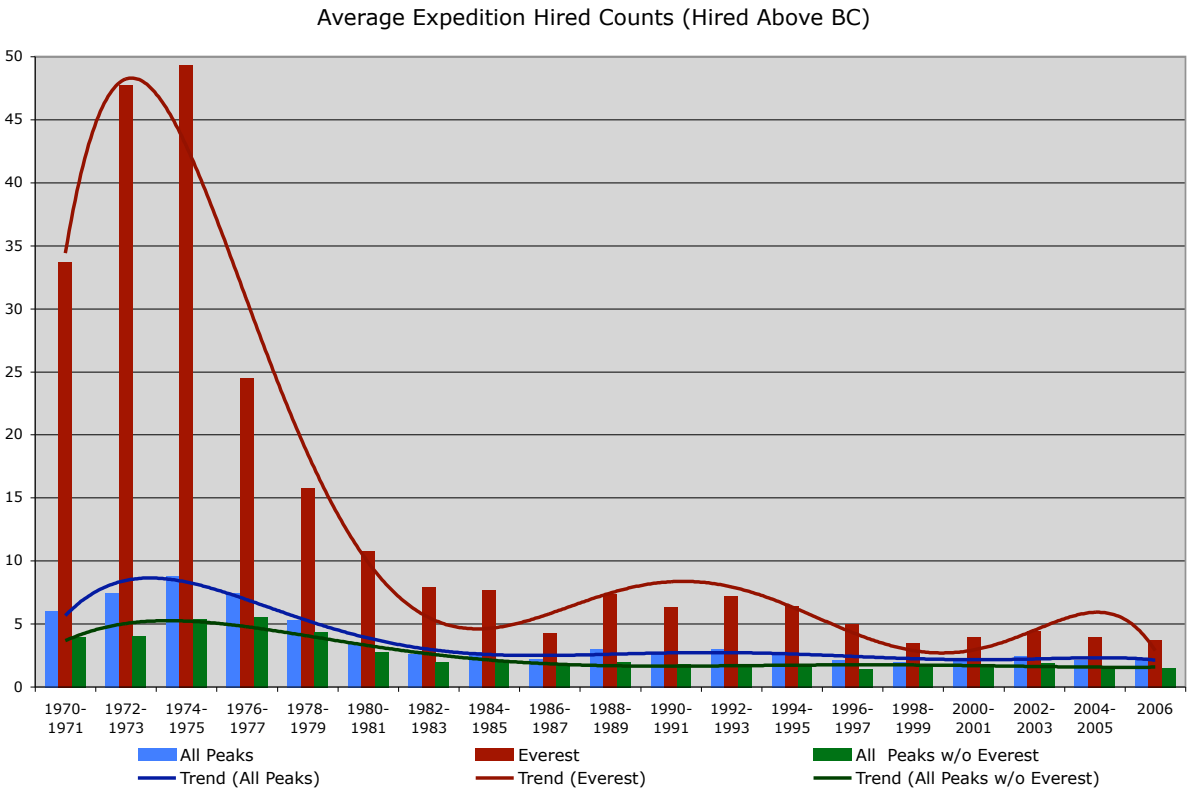


Chart C-10b: Average hired personnel counts (hired above base camp) from 1970-2006

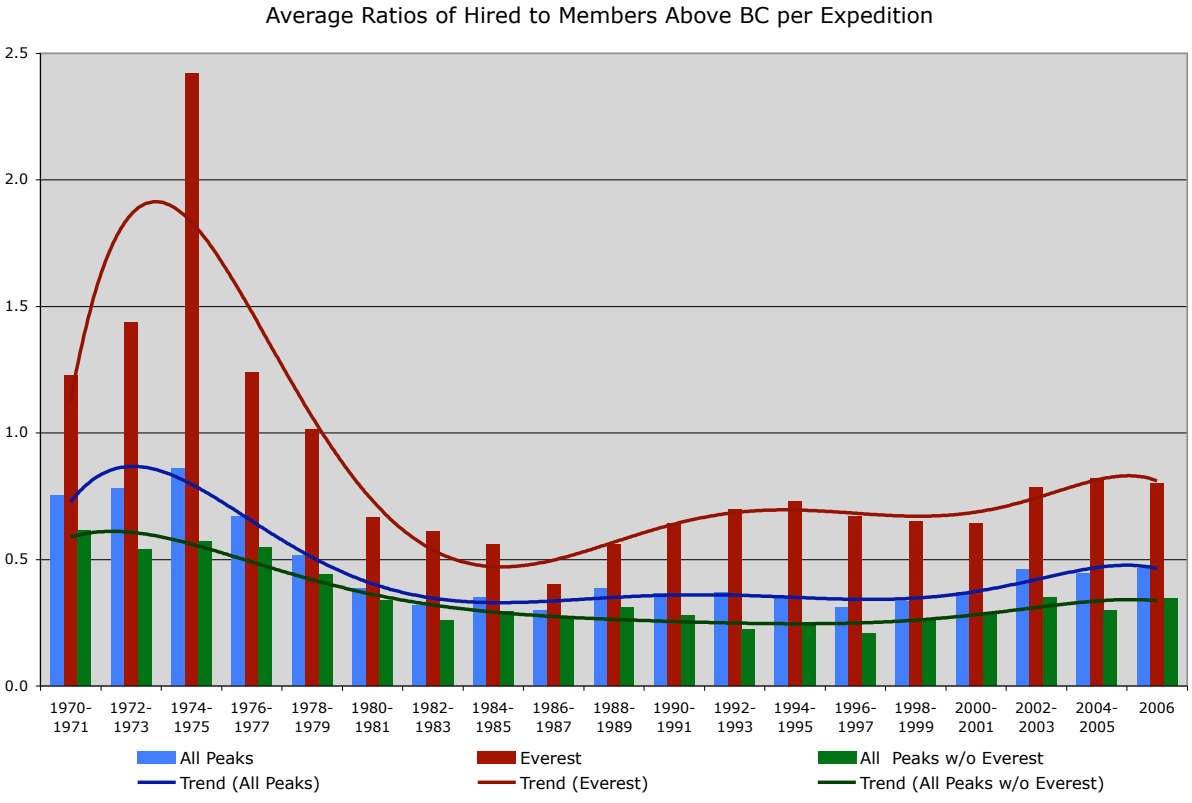


Chart C-10c: Average ratios of hired to members above base camp from 1970-2006

For all peaks, the average team member size shows a steady decline from a high of 11 members in 1976-77 to fewer than 5 members from 2004-2005 onward. Everest shows a more dramatic decline from 33-34 members in 1972-73 to fewer than 5 members from 2004-2005 onward. Since 2000 Everest has followed the norm for all peaks.

For all peaks, the average numbers of hired personnel employed shows a steeper decline from a high of almost 9 hired per expedition in the mid-1970s to about 2.5 hired per expedition by the early 1980s. For Everest there has been a more dramatic decline from nearly 50 per expedition in the early 1970s to fewer than 10 per expedition after 1980 and a further decline to fewer than 5 per expedition by the mid-1990s.

The ratio of hired personnel to members for all peaks was the highest in 1973-1974 at nearly 2.5 hired for every member and dropped to it lowest of about .3 hired for every member in the mid-1980s.

The ratio of hired to members for Everest was nearly 2.5 in 1974-75 and dropped to .4 in 1986-87, but then has been on a steady increase mostly likely due to the increased employment of Sherpas by commercial expeditions for client safety.

Expedition Results

Table C-11 lists the reasons that expeditions have terminated, both successfully and unsuccessfully.

Reason for Expedition Termination	All Seasons		Spring		Autumn		Winter	
	Cnt	Pct	Cnt	Pct	Cnt	Pct	Cnt	Pct
Success (Main Peak)	**2854**	**54.5**	**1314**	**56.7**	**1404**	**53.5**	**112**	**45.3**
Partial Success (Attained Subpeak only)	41	0.8	15	0.6	24	0.9	2	0.8
Unrecognized Success Claim	18	0.3	8	0.3	9	0.3	1	0.4
Bad Weather (Storms, High Winds)	**732**	**14.0**	**334**	**14.4**	**336**	**12.8**	**56**	**22.7**
Bad Conditions (Deep Snow, Avalanches)	**619**	**11.8**	**181**	**7.8**	**392**	**14.9**	**28**	**11.3**
Accident (Death or Serious Injury)	196	3.7	75	3.2	109	4.2	11	4.5
Illness, AMS, Exhaustion, or Frostbite	204	3.9	115	5.0	81	3.1	8	3.2
Lack of Supplies or Equipment	112	2.1	55	2.4	44	1.7	13	5.3
Lack of Time	113	2.2	53	2.3	56	2.1	4	1.6
Route Too Difficult, Lack of Strength	**270**	**5.2**	**119**	**5.1**	**135**	**5.1**	**12**	**4.9**
Did not reach BC	0	0.0	0	0.0	0	0.0	0	0.0
Did not attempt climb	0	0.0	0	0.0	0	0.0	0	0.0
Attempt rumored	0	0.0	0	0.0	0	0.0	0	0.0
Other	82	1.6	47	2.0	34	1.3	0	0.0
	5241	**100.0**	**2316**	**100.0**	**2624**	**100.0**	**247**	**100.0**

Table C-11: Reasons of expedition termination for all peaks from 1950-2006 (most common reasons shown in red)

For seasonal differences in success rates, the probability of success in winter at 45.3 is significantly lower than in spring and autumn seasons (p=.0009).

For seasonal differences in failure rates, bad weather (storms, high winds) occurring in the winter season (22.7) and bad conditions (deep snow, avalanching) occurring in the autumn season (14.9) are significantly higher than the other seasons (p=<.0001 and p=.0000, respectively). Winter is the time of cold, high winds coming down from the Tibetan plateau and autumn is more prone to avalanching from the snow pack built up by late monsoon storms.

The seasonal differences in failure rates for the other causes of termination generally are not significant.

As shown in table C-11 and C-12, bad weather and bad conditions are the primary causes of expedition failure (nearly 26% total for all peaks in all seasons). Winter as expected was the most difficult for climbing with over a 33% failure rate, while spring was the most favorable for climbing with only a 22% weather failure rate.

100% – %success – %bad weather – %bad conditions = %all other causes

All Seasons	100.0 – 54.5 – 14.0 – 11.8 = 19.7
Spring	100.0 – 56.7 – 14.4 – 07.8 = 21.1
Autumn	100.0 – 53.5 – 12.8 – 14.9 = 18.5
Winter	100.0 – 45.3 – 22.7 – 11.3 = 20.7

All other causes for expedition failure total approximately 20%. Within that group, accidents average in the 3-4% range while route difficulties and lack of team strength are in the 5% range.

	Bad Weather		Bad Conditions		Bad Weather & Conditions Combined		Accidents		Route & Strength Difficulties		Success	
	Cnt	Pct	Cnt	Pct	Cnt	Pct	Cnt	Pct	Cnt	Pct	Cnt	Pct
All Peaks, All Seas	732	14.0	619	11.8	1351	**25.8**	196	3.7	270	5.2	2854	54.5
All Peaks, Spring	334	14.4	181	7.8	515	**22.2**	75	3.2	119	5.1	1314	56.7
All Peaks, Autumn	336	12.8	392	14.9	728	27.7	109	4.2	135	5.1	1404	53.5
All Peaks, Winter	56	22.7	28	11.3	84	**34.0**	11	4.5	12	4.9	112	45.3
Regions, All Seasons												
Kanjiroba-Far West	6	7.0	12	14.0	18	20.9	4	4.7	11	12.8	38	44.2
Dhaulagiri-Mukut	57	13.4	81	19.1	138	**32.5**	18	4.2	26	6.1	208	48.9
Annapurna-Damo-Peri	74	13.1	117	20.7	191	**33.8**	42	7.4	31	5.5	241	42.7
Manaslu-Ganesh	56	19.3	48	16.6	104	**35.9**	27	**9.3**	22	7.6	116	**40.0**
Langtang-Jugal	7	5.5	14	10.9	21	16.4	10	7.8	16	12.5	63	49.2
Khumbu-Makalu-Rolw	495	14.3	314	9.0	809	23.3	84	2.4	136	3.9	2053	59.2
Kangchenjunga-Janak	37	13.4	33	11.9	70	25.3	11	4.0	28	10.1	135	48.7
Regions, Spr/Aut												
Kanjiroba, Spring	3	11.1	3	11.1	6	22.2	2	7.4	5	18.5	8	29.6
Kanjiroba, Autumn	3	6.0	9	18.0	12	24.0	2	4.0	4	8.0	23	46.0
Dhaulagiri, Spring	22	13.7	29	18.0	51	31.7	10	6.2	11	6.8	78	48.4
Dhaulagiri, Autumn	33	13.4	51	20.6	84	**34.0**	7	2.8	14	5.7	120	48.6
Annapurna, Spring	19	11.2	30	17.6	49	28.8	12	7.1	7	4.1	87	51.2
Annapurna, Autumn	45	13.0	77	22.3	122	**35.4**	29	8.4	17	4.9	139	**40.3**
Manaslu, Spring	23	17.6	19	14.5	42	32.1	10	7.6	11	8.4	59	45.0
Manaslu, Autumn	25	17.7	28	19.9	53	**37.6**	16	**11.3**	10	7.1	52	**36.9**
Langtang, Spring	3	5.9	4	7.8	7	13.7	4	7.8	6	11.8	28	54.9
Langtang, Autumn	3	4.7	9	14.1	12	18.8	5	7.8	9	14.1	27	42.2
Khumbu, Spring	242	14.9	88	5.4	330	20.3	35	2.2	63	3.9	967	59.5
Khumbu, Autumn	214	12.9	194	11.7	408	24.6	42	2.5	69	4.2	999	60.2
Kangchenjunga, Spr	22	14.6	8	5.3	30	19.9	8	5.3	16	10.6	87	57.6
Kangchenjunga, Aut	13	11.0	24	20.3	37	31.4	24	20.3	12	10.2	44	37.3

Table C-12: Reasons of expedition termination by season from 1950-2006

Bad weather and bad conditions are more prevalent in the central Nepal regions of Dhaulagiri, Annapurna, and Manaslu with Manaslu being the worst especially in the autumn seasons. The accident rates are also much higher for the Manaslu-Ganesh region due to avalanching after the heavy snows of the summer monsoon season as shown in Chart C-10. If avalanche accidents were included with bad conditions, the Manaslu autumn of 37.6% rate would be even higher.

Periodically, massive storms fueled by large cyclones in the Bay of Bengal strike Bangledesh and then move up into the Himalaya and cause much havoc with expeditions. One such storm that occurred in November 1995 is described next.

The Epic Storm of November 1995

From *The Seasonal Stories* of Elizabeth Hawley – Autumn 1995

Ama Dablam had enjoyed an exceptional season. 67 climbers from 17 teams gained the summit of Ama Dablam by its usual route on the southwest ridge. Leaders returning from Ama Dablam commented on how smooth relations were amongst the large international community on their mountain, a situation that was a very pleasant surprise for many of them, including Russell Brice, who amazed others by his ascent that began from camp 1 at 5200m at 6:00 a.m., just after an early breakfast, put him on the top at 9:20 a.m., and got him safely back to base camp at 4600m in time for lunch at 1:00 p.m. "It was just a nice day out for me, a half-day holiday" from his work as leader of a small team.

Brice's summit day, 8 November, was the final day on which anyone got to the summit of Ama Dablam. The last teams to arrive in Nepal to attempt any peak in the autumn season, which officially ends on the 15th of November, were three for Ama Dablam, and they paid a price for coming so late and therefore not having time to spare to wait out bad weather. One of them, six Italians and an Austrian, had come to base camp two days before and had pitched their first high camp that day but returned to base to sleep. Another, a Spanish party, arrived at base camp the next day, the 9th, to start their climb, and the third, a French group, had a summit-attack party in their highest camp, poised for a push to the top on the 9th.

But on the 9th an unusually large snowstorm began about noon and by the time it ended in the night of the 10th, it had dumped a remarkable two meters of fresh snow at base. Brice knew how much had fallen because only the top of his toilet tent was visible above it. He suddenly found himself hard at work during these days shoveling snow off his team's tents and taking hours to dig out a path to the start of the ridge so other climbers could get safely down to base. Everyone who was in base camp remained snowbound there until the morning of the 11th, when the Italian-Austrian group, the Spaniards and some of Brice's own members plowed their way out to the village of Pangboche.

Up on the mountain on the 9th were eight Frenchmen who had planned to attack the summit that day. Brice, an experienced Himalayan climber, advised them by radio to descend immediately, and down they struggled with difficulty for 12 hours through half a meter of snow on the ridge to their first high camp, a descent that would normally take perhaps seven hours. Then they were stuck in camp 1 on the 10th; their leader, Michel Cormier, spent two hours to go to the Italians' tent not far away to fetch food and return to his camp. On the 11th they managed to reach an intermediate camp, but could go no farther in the very deep snow. Finally by the 12th, Brice, his teammate who was still in base camp and two of Cormier's members who had summited on the 8th and had safely descended to base before the height of the storm, had dug out a trail up from base and were able to rescue Cormier and his party. These Frenchmen, who came down the last part of the ridge on their backsides or crawling while dragging their sacks of belongings to the point where they met Brice's party and the trail, suffered no frostbite from their ordeal, but Cormier felt that if they had spent one more night above base camp, they would have had frostbitten feet.

The French team left base on the 13th for Pangboche on their trek down to an airfield for a flight to Kathmandu. The Italians went back to base camp that day from Pangboche to retrieve their tents and gear left at camp 1 but made no attempt to go higher. The Spaniards also returned to base on the 13th; they established their own camp 1 on the 14th with

the intention of trying to go on to the summit. But on the 15th, when their leader, Jorge Clariana, and Gyalbu Sherpa tried to reach the site for camp 2, they were unable to gain more than 500 meters altitude before they decided that the snow on the ridge was still too deep and the avalanching falling onto their intended route was too dangerous to continue. Their climb was finished.

The world's television, radio and newspapers carried many stories about this epic storm, and especially about the tragedy in the Gokyo Valley, northwest of Ama Dablam and its Khumbu Valley, where a massive avalanche smothered a tiny village called Panga and killed almost all of the people in a Japanese trekking group sleeping there; all 13 Japanese trekkers and 10 of their 11 Nepalese staff (guide, cook and porters), plus two local residents, were killed. Farther east, at the site of the north Kangchenjunga base camp, another Japanese trekking group was hit by the heavy snowfall, and here three Japanese and four Nepalese died while six Japanese survived. In the Manang region, just north of the great Annapurna massif in north-central Nepal, a landslide caused by constant rains buried a cluster of houses and lodges, and here six foreign trekkers (a German, an Irishwoman, a Briton and three Canadians) and some of the local residents also died. No mountaineering expedition members were lost, but the climbing season had come to an abrupt and dramatic end.

The Hallelujah Summit?

From *The Seasonal Stories* of Elizabeth Hawley – Autumn 1997

A planned climb that did not actually happen was an attempt on Everest from the Nepalese side by three Mexicans and a Costa Rican under the leadership of Mrs. Ana Mendez from Mexico City. Their expedition was called *Summit for Peace – Everest 1997*, and their intention was to pray at the highest point on earth for peace in the world and against poverty. As Mrs. Mendez explained, "The top of the world is a symbol of the world. By standing on the top of the world, I intercede with God for the world." She said that 50 million people around the world from a large number of Christian organizations would pray with her team as they held a brief ceremony on the summit. She acknowledged that none of the four climbing members including herself had known much about climbing one year before, so they had done some "intensive training" in Mexico and Peru.

However Mrs. Mendez never received a permit from the Nepalese authorities to set foot on Everest, and her party never moved above base camp. She claimed her Kathmandu trekking agent robbed her; the agent said she never produced the funds for the permit and instead made a concerted effort to convince officials that disasters would strike Nepal if they could not pray at the summit, and they should not be charged any fee for their vital services to the country; the tourism ministry said no permit was issued because only part of the $50,000 royalty fee was offered by a representative of the team (not the agent).

So Mrs. Mendez's group fascinated others at base camp by their unprecedented activities. One Spanish leader reported that they explained their goal was to take the devil away from the summit of Everest so that God could come to Nepal and the Hindu and Buddhist people of Nepal could be evangelized. They wrote with an ice axe on seracs near base camp "Jesus Lives," and they made an altar in the ice at which they prayed every day. Even before they reached base camp, they were praying, he said: it took them six hours to travel the final normal one hour's walk into camp because they frequently fell on their knees in prayer. They found a big hole on the way to camp, and they said this was the gateway to Hell; they prayed to God to close it. (He did not.) When they didn't receive their climbing permit, they declared that they realized base camp was just as good a site as the summit for their purposes.

Ascent Analysis

This chapter analyzes ascents of the principle peaks in the Nepal Himalaya, those peaks officially open for mountaineering and a few additional peaks with significant activity. Border peaks such as Everest, Cho Oyu, and Kangchenjunga are included for expeditions from the Nepalese, Chinese, and Indian sides of the border. The tables and charts cover the period from 1950 through 2006 unless specified otherwise.

Ascents are analyzed by several different categories: peak altitude, climbing season, historically over time, age, citizenship, and gender. Ascent rates are given for the most popular peaks. Ascents are also analyzed by team composition, that is, the number of members and hired personnel on an expedition and the ratio between the two.

Ascent rates are calculated only for members because ascent rates cannot be reasonably calculated for hired personnel as many of them went above base camp with no intention of attempting the summit, but only fulfilling their assigned roles of ferrying loads or establishing higher camps.

Disputed ascents, as marked in *The Himalayan Database*, are counted in the ascent totals. Claimed, but unrecognized ascents, and ascents of sub-peaks are excluded from the ascent totals.

Tables are given at the end of this chapter showing the average duration and the minimum and maximum days to the summit for successful expeditions for many popular peaks.

Ascents by Altitude Range

Table and Chart A-1 show member ascent rates from 1950 to 1989 and 1990 to 2006 for all peaks in altitude ranges from 6000m to 8850m in 500m increments.

Peak Altitude	1950-1989 All Peaks with All Routes			1990-2006 All Peaks with All Routes			1990-2006 All Peaks And Routes excluding Ama Dablam-Cho Oyu-Everest Commercial Rtes		
	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate
6000-6499m	609	286	47.0	556	250	45.0	556	250	45.0
6500-6999m	1573	610	38.8	3620	1790	49.4	924	261	28.2
7000-7499m	2521	594	23.6	3099	782	25.2	3099	782	25.2
7500-7999m	1833	293	16.0	744	77	10.3	744	77	10.3
8000-8499m	3197	501	15.7	7316	2308	31.5	2976	629	21.1
8500-8850m	3451	404	11.7	6401	1851	28.9	1852	392	21.2
	13184	**2688**	**20.4**	**21736**	**7058**	**32.5**	**10151**	**2391**	**23.6**

Table A-1: Member ascents for peak altitude ranges (6000-8850m)

As shown in Chart A-1, member ascent rates for all peaks from 1950 to 1989 are the highest at 47.0% for the lower 6000m+ peaks and then drop steadily to 11.7% as peak height increases to 8500m+ suggesting as would be expected that the higher the peak, the more difficult it is to climb.

The center and rightmost columns of Table A-1 show member ascent rates from 1990 to 2006 for all peaks including and excluding expeditions on the commercial routes of the

three most popular peaks, Ama Dablam (southeast ridge), Cho Oyu (northwest ridge), and Everest (South Col and North Col-northeast ridge).

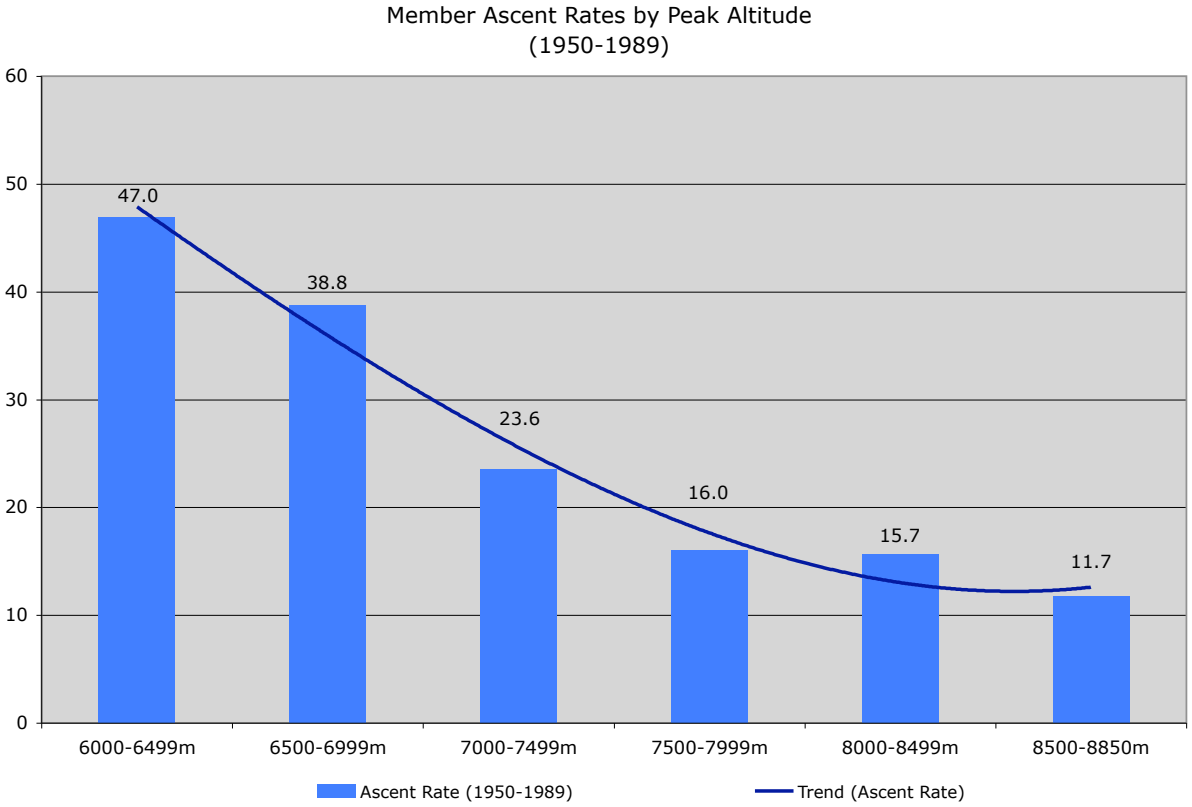


Chart A-1: Member ascent rates for all peaks and routes from 1950-1989

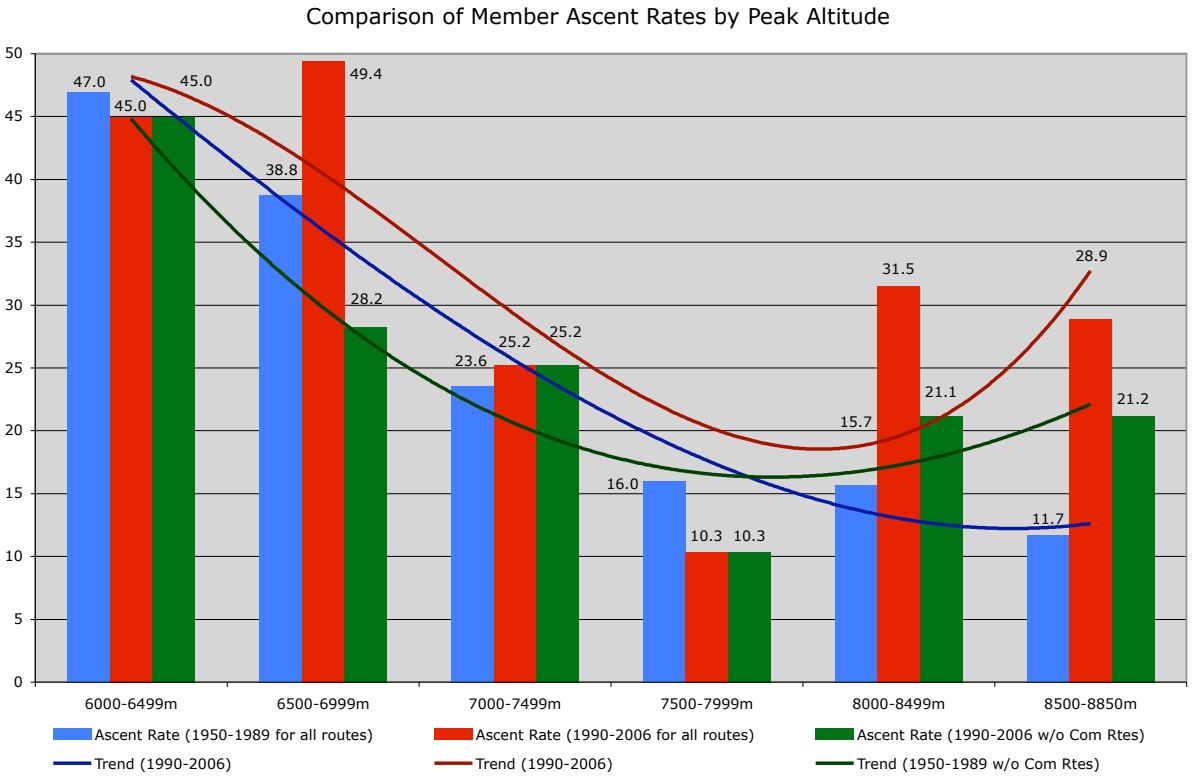


Chart A-2: Comparison of member ascent rates between 1950-1989 and 1990-2006

Commercial climbing has become increasingly popular since 1990 and has contributed significantly to the numbers of climbers going above base camp (53% of all climbers above base camp were on the commercial routes of one of these peaks from 1990-2006).

In Chart A-2 the **blue** columns and trend line show member ascent rates during the 1950-1989 period, and the **red** columns and trend line show ascent rates during the 1990-2006 period for all peaks and routes. The **green** columns and trend line show ascent rates during the 1990-2006 period factoring out the commercial routes on Ama Dablam, Cho Oyu, and Everest. The difference between the red and green trend lines illustrates the impact of commercial climbing after 1990 as the red trend line is substantially higher than the green trend line.

Segregating out the commercial routes for the 1950-1989 period does not substantially affect the member ascent rates during that period since earlier expeditions did not concentrate so much on those routes, but were more eager to explore new and unclimbed routes. Many climbers since 1990 are pursuing quests for the seven summits and the fourteen 8000ers and thus want to climb Everest and Cho Oyu as quickly and simply as possible.

Popular Peaks by Altitude Range

Chart A-3 gives member ascent rates for the most popular peaks in Nepal, those peaks with more than 750 total climbers above base camp (roughly equivalent to 75 or more expeditions).

Member ascent rates for two commercial peaks, Ama Dablam at 54.4% and Cho Oyu at 37.8%, are higher than the mean (average) of 27.9% for all peaks (in black), while the ascent rate for Everest is lower at 22.4%.

Member ascent rates for all of these peaks or groups are significantly higher or lower (statistically) than the 27.9% mean ascent rate for all peaks except for Lhotse, which has an ascent rate very close to the mean ascent rate for all peaks.

The next group of charts shows member ascent rates grouped by 6000m, 7000m, and 8000m altitudes for the most popular peaks in Nepal.

Chart A-4 shows the 6000m peaks with 50 or more members above base camp. Ama Dablam accounts for 52% of the members above base camp and 67% of the member ascents for all 6000m peaks. If this peak were omitted from the counts, the overall ascent rate for the other 6000ers would drop from 46.2% to 37.5%.

Two of the peaks in Chart A-4, Langsisa Ri and Cholatse, were reclassified as trekking peaks in 2002. Expeditions to those peaks after that date are not counted in the 6000m totals. Expeditions to Dhampus since 2001 are also no longer tracked in *The Himalayan Database* as this peak is very easy and is often climbed illegally by trekking groups.

Lamjung, Cholatse, and Bhrikuti do not have significantly higher or lower ascent rates than the mean for all 6000ers since their rates are very close to the mean. Langsisa Ri and Rathong with few members above base camp are still too close to the mean to be significant.

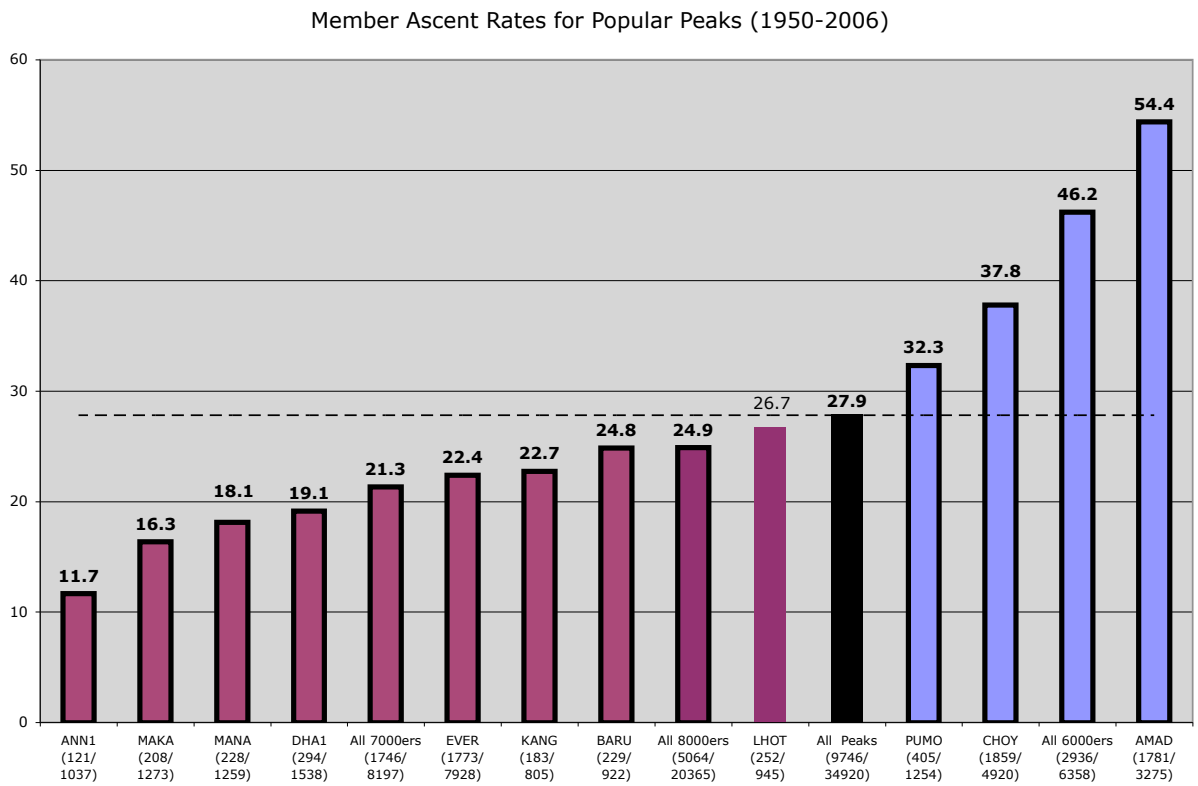


Chart A-3: Member ascent rates for popular peaks from 1950-2006 with more than 750 members above base camp (the ascent rate is above the column bar; the ascent / above BC counts are below)

The columns outlined in black in the above chart and in the three charts that follow for the most popular 6000ers, 7000ers, and 8000ers for members represent peaks or groups of peaks that statistically have either significantly higher (in **blue**) or lower (in **red**) ascent rates than the mean ascent rate for all peaks (in black). Statistical significance means that there is less than a 5% probability that the result occurred by chance. For the non-outlined peaks, the ascent rates can be considered as only anecdotal evidence of higher or lower ascent rates than the mean rate for all peaks.

Chart A-5 shows the 7000m peaks with 100 or more members above base camp. Himlung and Pumori have the highest member ascent rates for the 7000ers and are often attempted by commercial expeditions with Himlung being especially popular for French groups (Pumori also has an above average death rate). Many commercial groups also attempt Baruntse and Tilicho. Gangapurna, Makalu II, Jannu, and Tilicho do not have significantly higher ascent rates than the mean for all 7000ers since their rates are very close to the mean.

Chart A-6 shows member ascent rates for the 8000m peaks with 150 or more members above base camp. Cho Oyu by far enjoys the highest member ascent rate (37.8%), while the lowest ascent rates are on Lhotse Shar (7.7%) and Annapurna (11.7%). Interestingly for the 8000m peaks, Cho Oyu is also the safest, while Lhotse Shar and Annapurna are the most dangerous (see the chapter *Death Analysis*).

Kangchenjunga does not have a significantly lower ascent rate than the mean for all 8000ers since its rate is very close to the mean. Yalung Kang with only 174 members above base camp and Lhotse with 945 members above base camp are still too close to the mean to be significant.

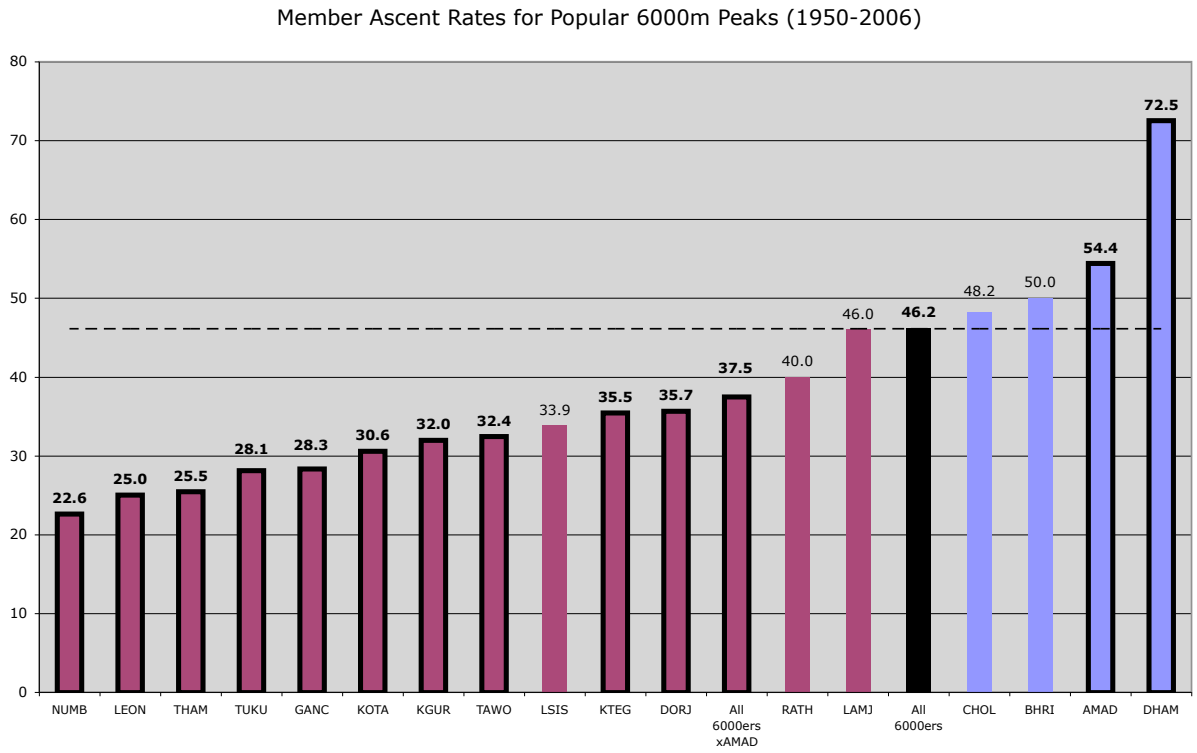


Chart A-4: Member ascent rates for selected 6000m peaks with 50+ members above base camp from 1950-2006

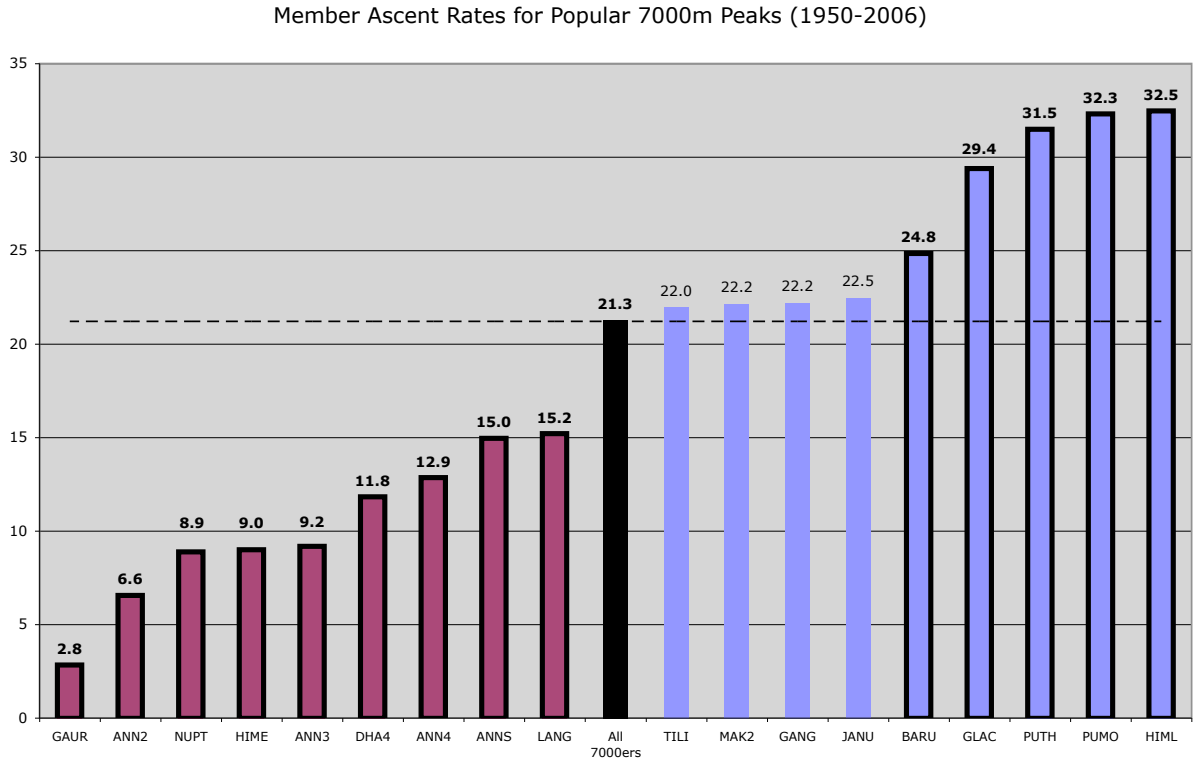


Chart A-5: Member ascent rates for selected 7000m peaks with 100+ members above base camp from 1950-2006

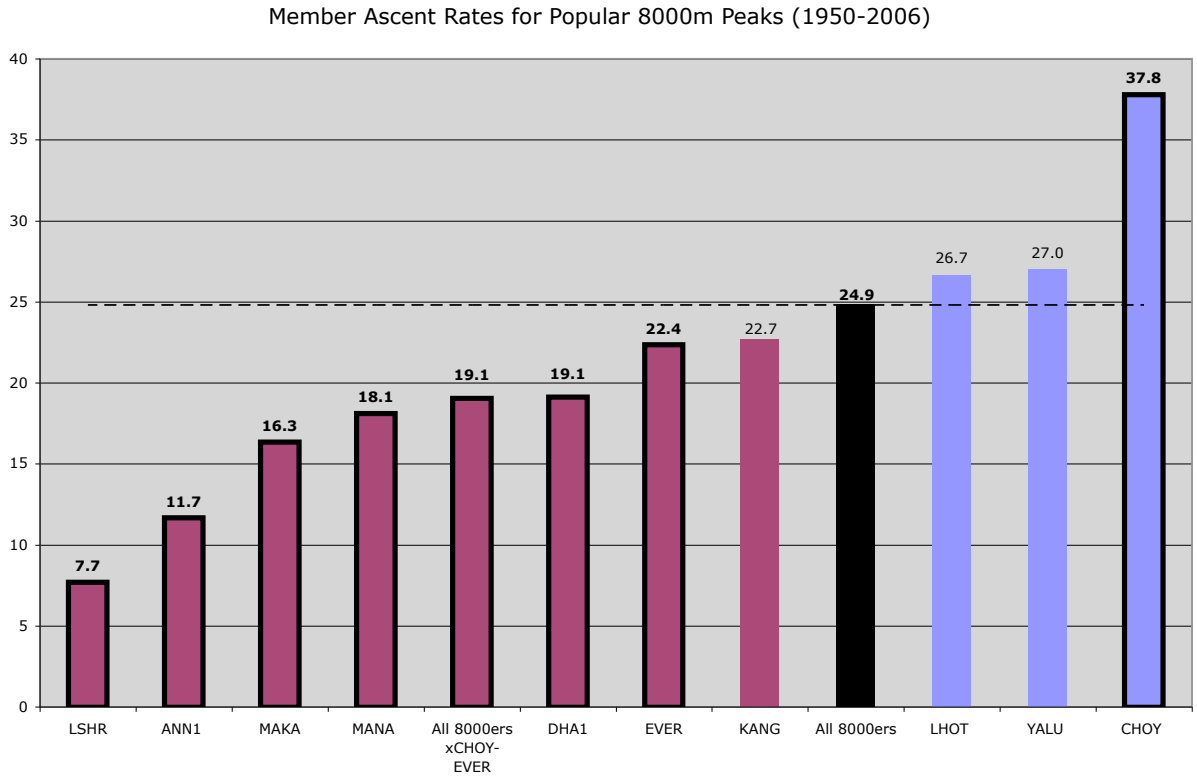


Chart A-6: Member ascent rates for selected 8000m peaks with 150+ members above base camp from 1950-2006

The member ascent rates for all peaks are given in Appendix A. However, most of those peaks that are not depicted in the previous charts do not have ascent and member above base camp counts high enough to be statistically significant when comparing them to the mean ascent rates for all peaks in their respective group.

Ascents by Climbing Season

Chart A-7 shows member ascent rates by climbing season for all peaks.

The member ascent rates the autumn season of 29.0% and the winter season of 21.0% are statistically significantly higher and lower than the mean ascent rate of 27.9% for all seasons. The spring ascent rate of 27.5% is too close to the mean rate to be significant. The summer ascent rate of 23.7% is also insignificant due to fewer members above base camp. Most of the summer expeditions were either to Cho Oyu or Everest from the Tibetan side in the 1980s, or were summer explorations of northwest Nepal by Tamotsu Ohnishi. For these reasons, the summer season is excluded from the analyses in remainder of this section.

Table A-8 shows member ascent counts and rates for selected peaks and peak ranges for the spring, autumn, and winter climbing seasons.

Chart A-8 compares member ascent rates for selected peaks and peaks ranges for the spring and autumn climbing seasons.

Overall, the spring member ascent rates are higher for the 8000m peaks except for Cho Oyu, and lower for the 6000m and 7000m peaks.

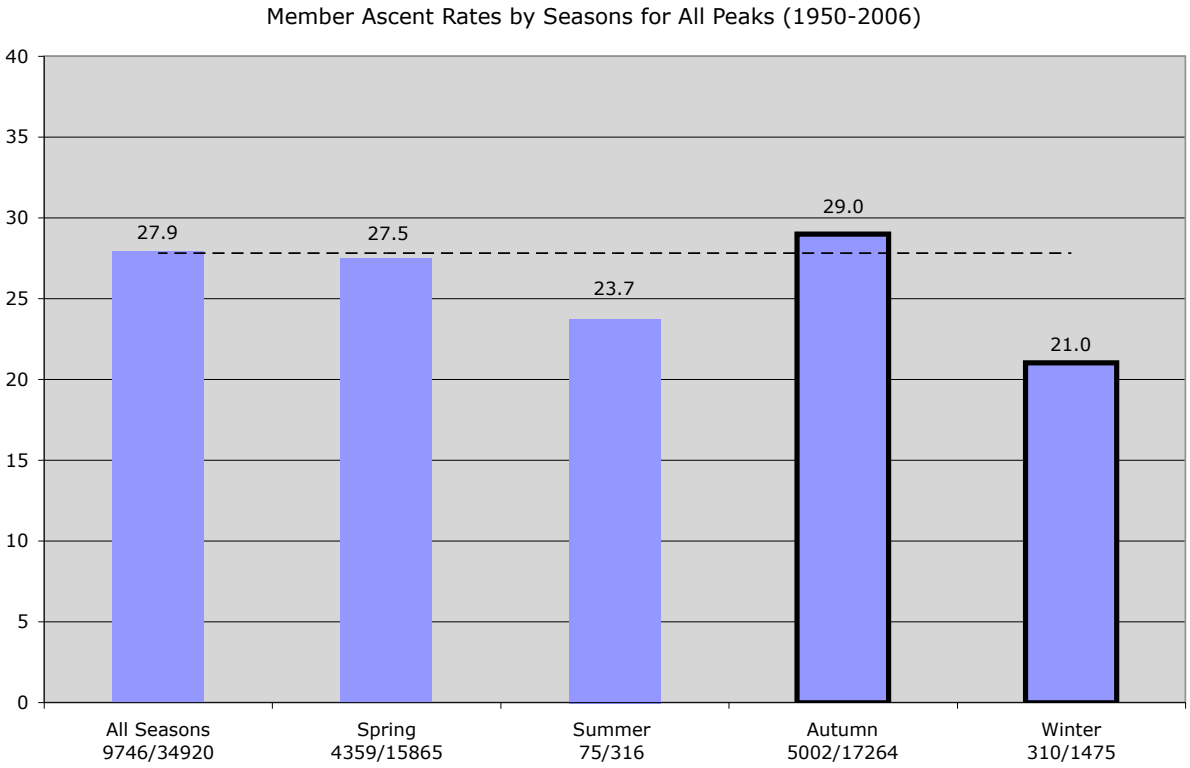


Chart A-7: Member ascent rates by climbing season for all peaks from 1950-2006 (the ascent rate is above the column bar; the ascent and above BC counts are below)

The columns outlined in black in the above chart represent seasons that statistically have either significantly higher or lower ascent rates than the mean ascent rate for all seasons. Statistical significance means that there is less than a 5% probability that the result occurred by chance. For the non-outlined peaks, the ascent rates can be considered as only anecdotal evidence of higher or lower ascent rates than the mean rate for all seasons.

	Spring			Autumn			Winter		
	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate
All Peaks	15865	4359	27.5	17264	5002	29.0	1475	310	21.0
6000ers	1637	628	38.4	4114	2053	49.9	485	195	40.2
7000ers	2651	514	19.4	5290	1181	22.3	247	50	20.2
8000ers	11577	3217	27.8	7860	1768	22.5	743	65	8.7
KANG	648	159	24.5	131	21	16.0	26	3	11.5
MAKA	684	160	23.4	538	48	8.9	51	0	0.0
LHOT	605	186	30.7	303	65	21.5	37	1	2.7
EVER	5526	1565	28.3	1978	189	9.6	274	13	4.7
CHOY	2040	679	33.3	2794	1154	41.3	56	18	32.1
MANA	590	135	22.9	590	80	13.6	79	13	16.5
ANN1	403	69	17.1	490	46	9.4	139	6	4.3
DHA1	650	153	23.5	823	132	16.0	65	9	13.8
AMAD	559	174	31.1	2361	1445	61.2	355	162	45.6
BARU	237	47	19.8	675	178	26.4	10	4	40.0
PUMO	374	111	29.7	827	277	33.5	53	17	32.1

Table A-8: Member ascents by season for selected peaks from 1950-2006

Table and Chart A-9a show member ascent counts and rates by season broken out by geographic regions for all peaks

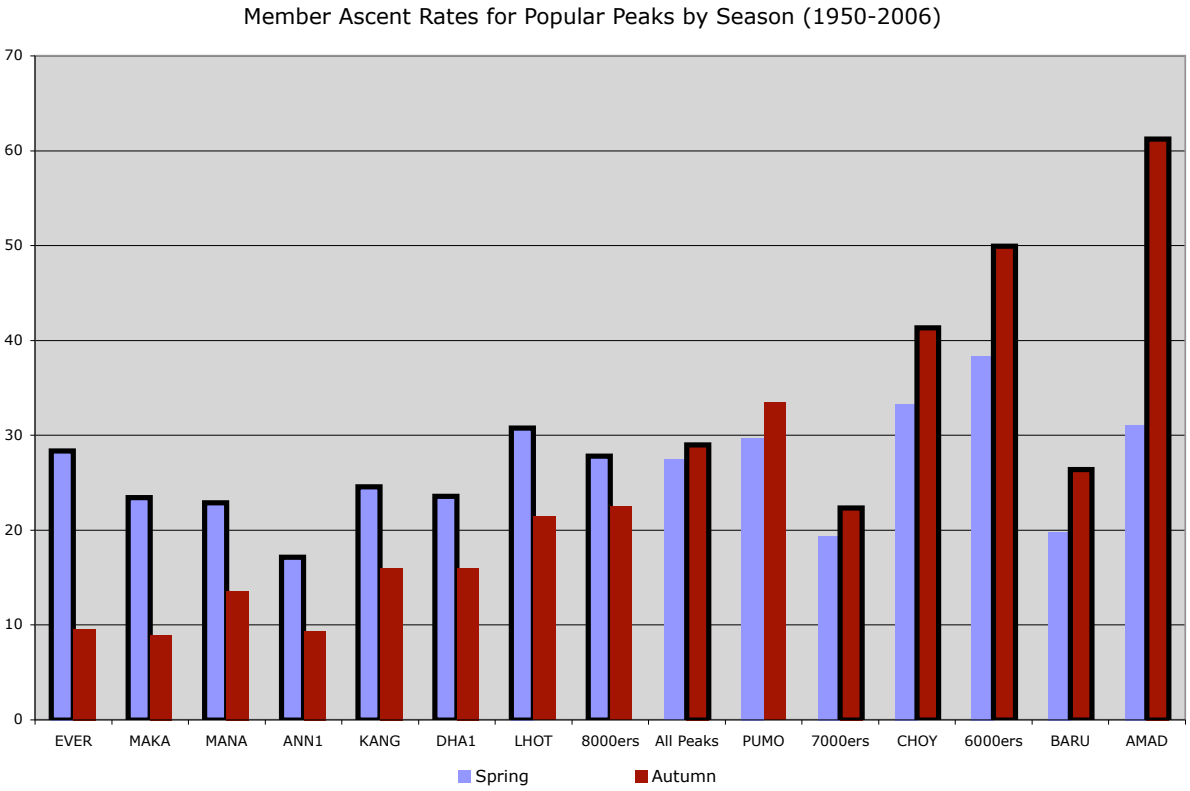


Chart A-8: Member ascent rates for selected peaks by season from 1950-2006 (ranked from left to right by favorability from spring to autumn)

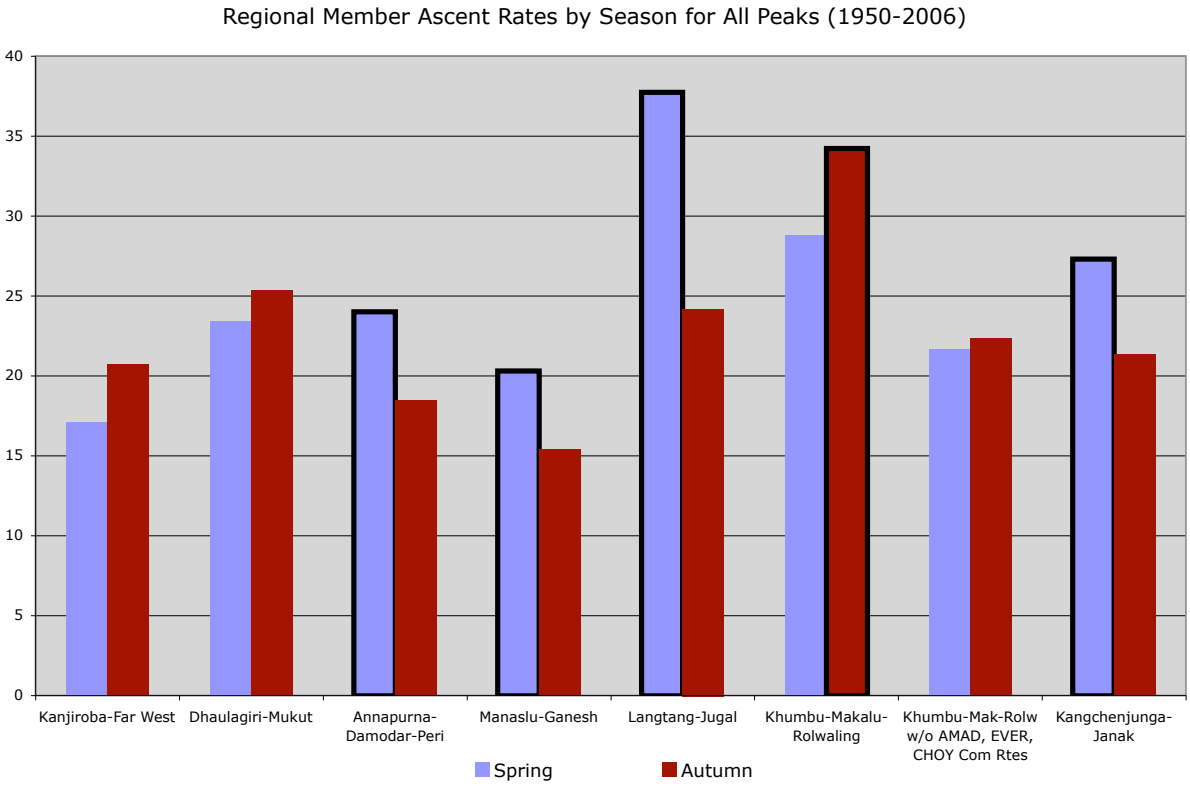


Chart A-9a: Regional member ascent rates by season for all peaks from 1950-2006

The columns outlined in black in the above and following charts represent seasons that statistically have significantly higher ascent rates than the corresponding season for that region.

	Spring			Autumn			Winter		
	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate
Kanjiroba-Far West	152	26	17.1	304	63	20.7	7	2	28.6
Dhaulagiri-Mukut	1076	252	23.4	1734	439	25.3	68	12	17.6
Annapurna-Damodar-Peri	1196	287	24.0	2461	455	18.5	228	21	9.2
Manaslu-Ganesh	916	186	20.3	989	152	15.4	96	14	14.6
Langtang-Jugal	281	106	37.7	376	91	24.2	71	13	18.3
Khumbu-Makalu-Rolwal.	10775	3101	28.8	10641	3640	34.2	943	243	25.8
Kangchenjunga-Janak	1469	401	27.3	759	162	21.3	62	5	8.1
	15865	**4359**	**27.5**	**17264**	**5002**	**29.0**	**1475**	**310**	**21.0**
Khumbu-Makalu-Rolwal. w/o ACE Com Rtes	3992	865	21.7	4679	1045	22.3	459	70	15.3

Table A-9a: Regional member ascents by season for all peaks from 1950-2006

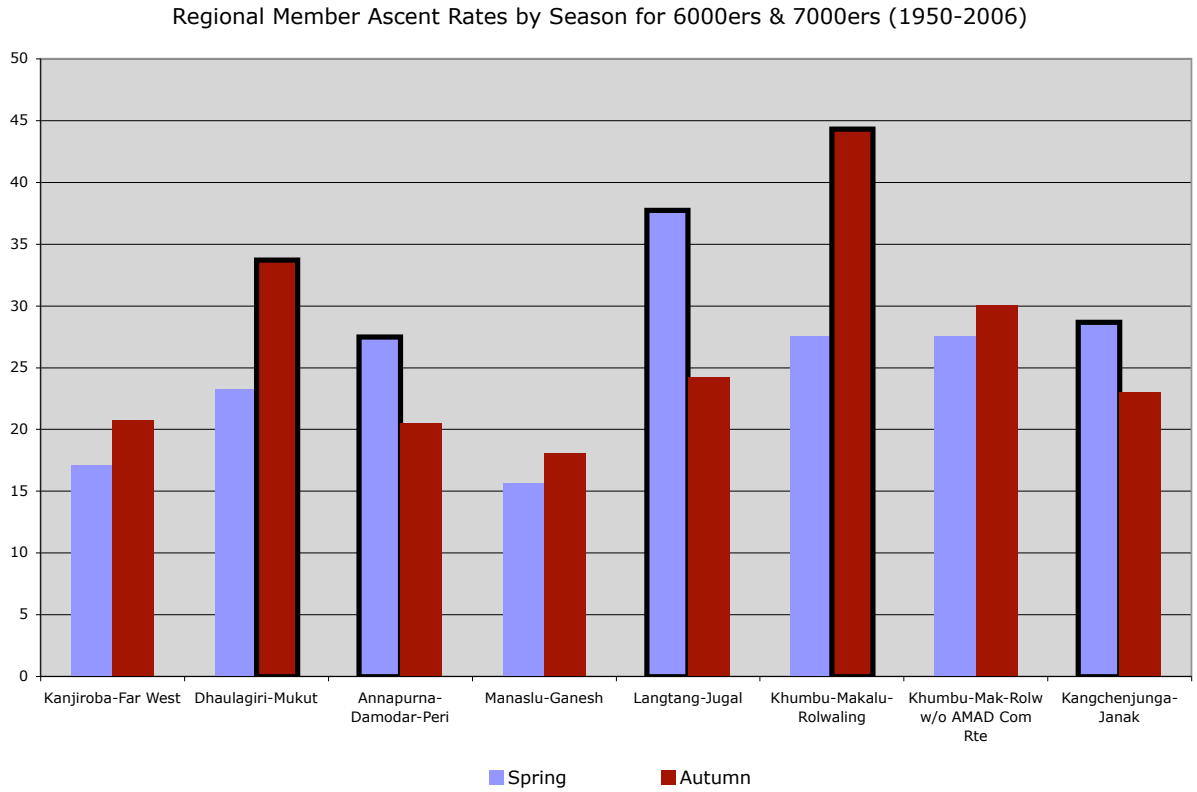


Chart A-9b: Regional member ascent rates by season for the 6000m and 7000m peaks from 1950-2006

	Spring			Autumn			Winter		
	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate
Kanjiroba-Far West	152	26	17.1	304	63	20.7	7	2	28.6
Dhaulagiri-Mukut	426	99	23.2	911	307	33.7	3	3	100.0
Annapurna-Damodar-Peri	772	212	27.5	1939	397	20.5	84	14	16.7
Manaslu-Ganesh	326	51	15.6	399	72	18.0	17	1	5.9
Langtang-Jugal	281	106	37.7	376	91	24.2	71	13	18.3
Khumbu-Makalu-Rolwal.	1797	495	27.5	4905	2173	44.3	525	211	40.2
Kangchenjunga-Janak	534	153	28.7	570	131	23.0	25	1	4.0
	4288	**1142**	**26.6**	**9404**	**3234**	**34.4**	**732**	**245**	**33.5**
Khumbu-Makalu-Rolwal. w/o AMAD Com Rte	1304	359	27.5	2725	819	30.1	171	49	28.7

Table A-9b: Regional member ascents by season for the 6000m and 7000m peaks from 1950-2006

The results indicate that the spring season is more favorable in the central and far eastern regions of Nepal, areas that are prone to heavy snowfall and avalanching, while the autumn season is more favorable in the Khumbu-Makalu-Rolwaling and in the western regions of Nepal. The Khumbu region is still slightly more favorable in autumn when the expeditions to Ama Dablam, Cho Oyu, and Everest are factored out (Ama Dablam and Cho Oyu are best in autumn while Everest is best in spring as shown in Table A-8).

Table and Chart A-9b show member ascent counts and rates by season broken out by geographic regions for the 6000m and 7000m peaks.

When only peaks under 8000m are considered, only the Annapurna-Damodar-Peri and Langtang-Jugal regions remain significantly more favorable in the spring since the Manaslu-Ganesh and Kangchenjunga-Janak regions are skewed by the higher spring success rates on Manaslu and Kangchenjunga (see Charts A-8 and 9a). The Dhaulagiri-Mukut region becomes significantly more favorable in the autumn when the high spring success rate on Dhaulagiri I is factored out. The Khumbu-Makalu-Rolwaling region is neutral when Ama Dablam is omitted.

Ascents by Expedition Years

Chart A-10 shows member ascent rates by expedition years in 5-year steps for all peaks.

The results from the early years from 1950 to 1970 are more erratic due to the lower numbers of expeditions, especially in the late 1960s when Himalayan climbing was suspended in Nepal and before the Chinese side of the border was opened to foreign climbers in 1980. From the 1970s onward, the data in Chart A-10 show more consistent results as the trend lines show a steady increase in member ascents and ascent rates for all peaks combined.

Chart A-11 shows member ascent rates over time broken out by altitude. The rates for the 6000ers and 7000ers are relatively even, 40-50% for the 6000ers and 20-25% for the 7000ers. Only for the 8000ers has there been a steady increase since 1970, starting at about 7% in 1970 and increasing to 40% after 2000.

Charts A-12 through A-14 give a more detailed view of member ascent rates since 1970 when segregating out the ACE commercial routes. These commercial peaks show a more rapid increase in ascent rates during the last 15 years. For the 6000ers, there actually has been a decrease in ascent rates when Ama Dablam is removed, possibly due to recent emphasis on exploratory expeditions to the newly opened 6000m peaks. For the 8000ers, there has been an increase in ascent rates for peaks other than Cho Oyu and Everest, most likely due to the increasing interest in climbing all of the fourteen 8000ers.

Chart A-15 shows member ascent rates for only the commercial routes on Ama Dablam, Cho Oyu, and Everest since 1990.

Charts A-16 through A-18 compare member ascent rates on Ama Dablam, Cho Oyu, and Everest for the commercial routes and the non-commercial routes since 1970. Only Everest shows an increase in member ascent rates for the non-commercial routes.

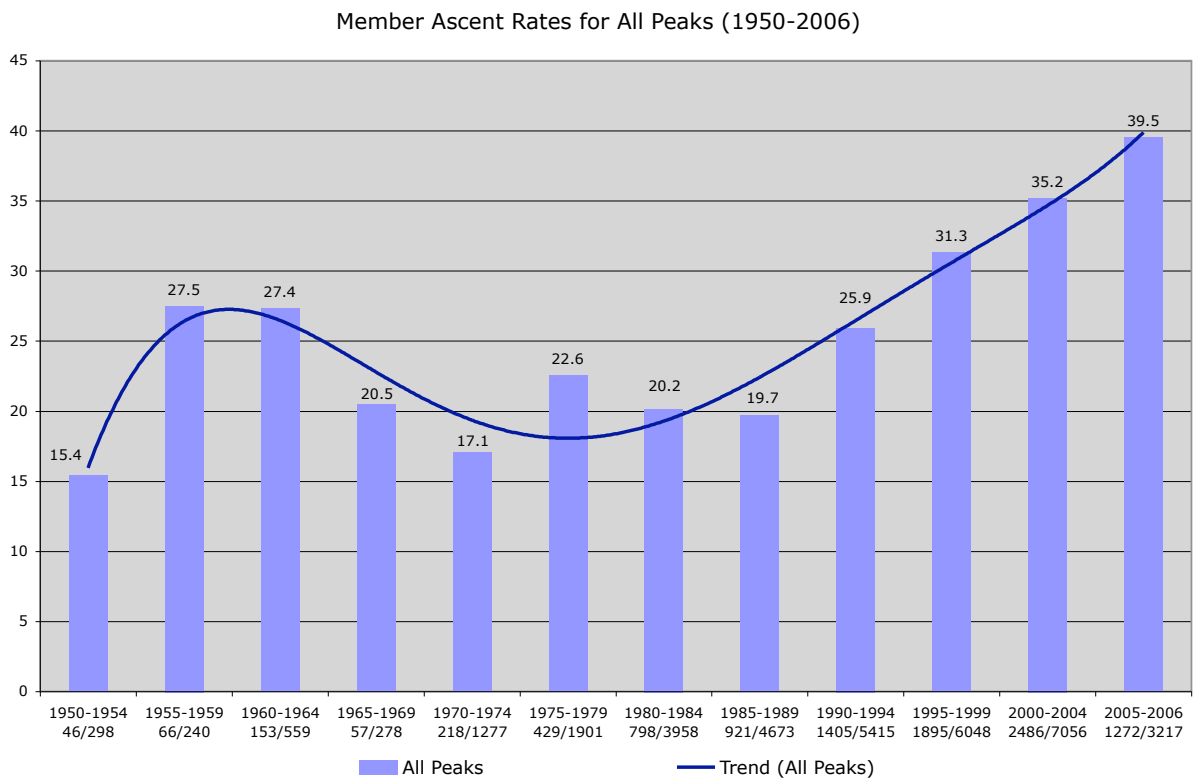


Chart A-10: Member ascent rates by expedition year for all peaks from 1950-2006 (the ascent rate is above the column bar; the ascent / above BC counts are below)

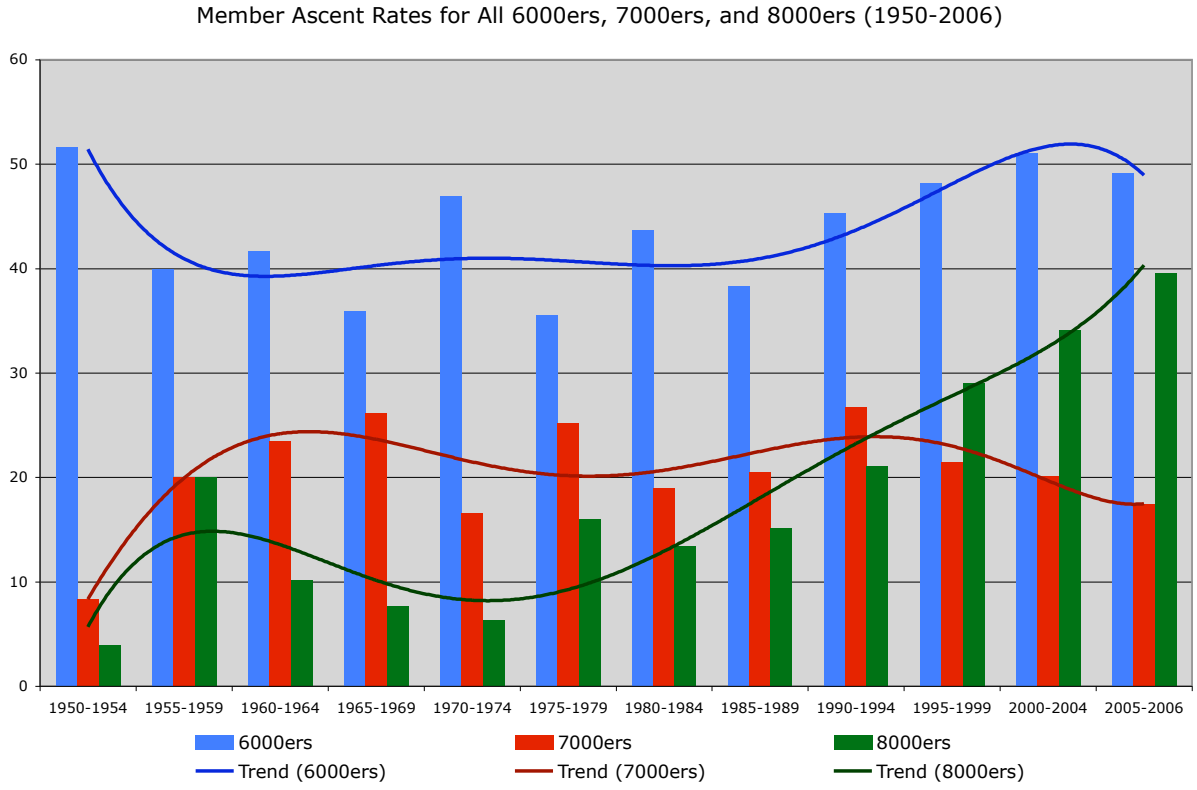


Chart A-11: Member ascent rates by expedition year for 6000ers, 7000ers, and 8000ers from 1950-2006

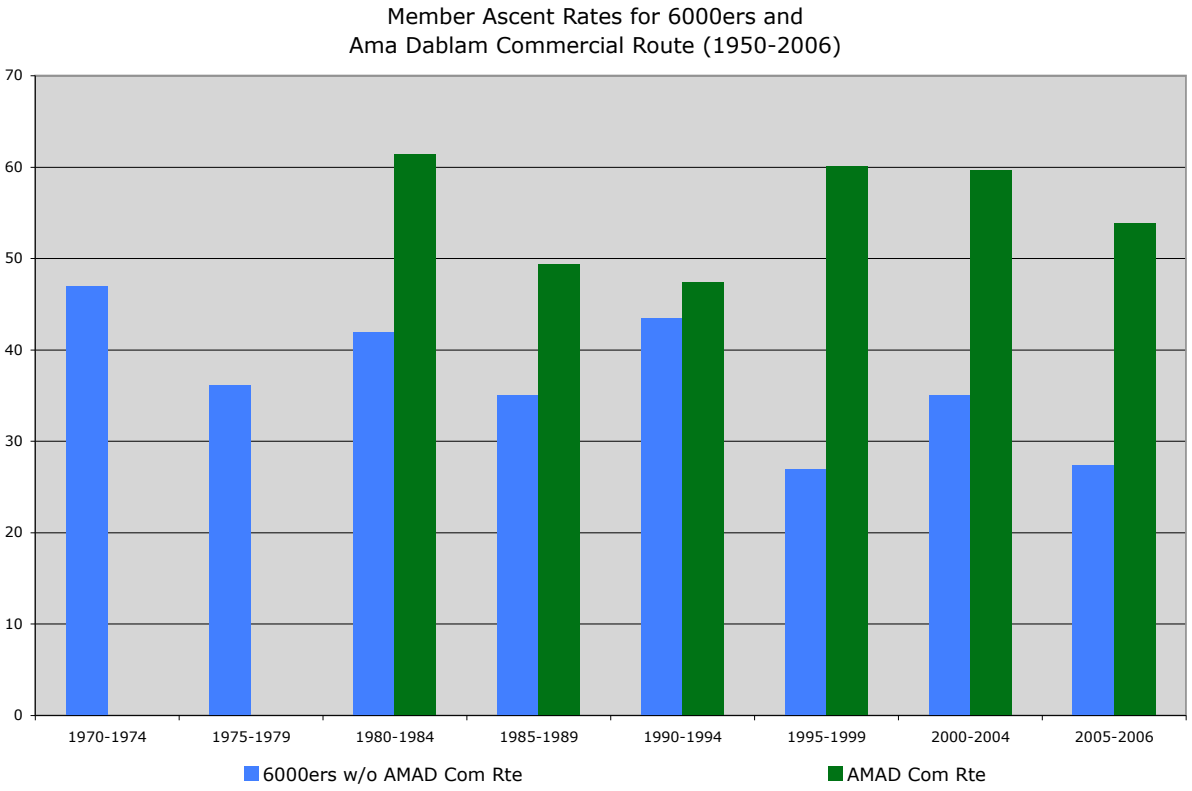


Chart A-12: Member ascent rates by expedition year for 6000ers and Ama Dablam from 1970-2006

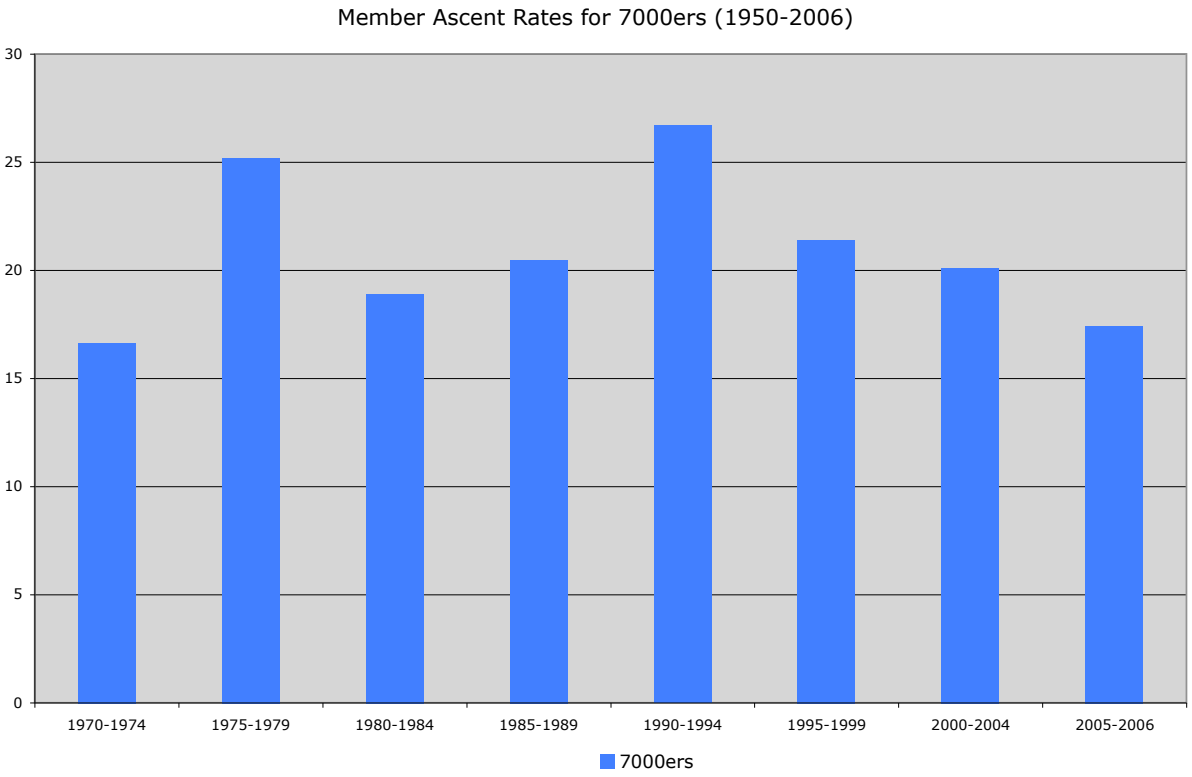


Chart A-13: Member ascent rates by expedition year for 7000ers from 1970-2006

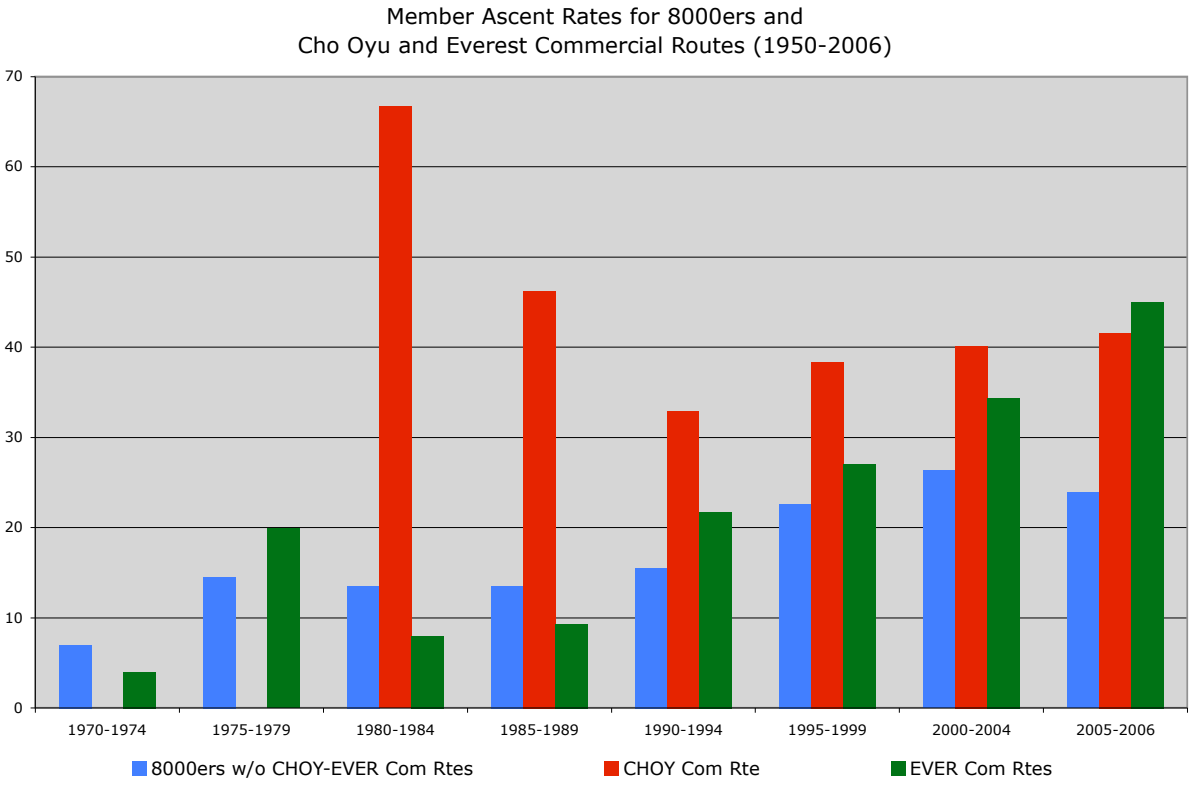


Chart A-14: Member ascent rates by expedition year for 8000ers, Cho Oyu, and Everest from 1970-2006

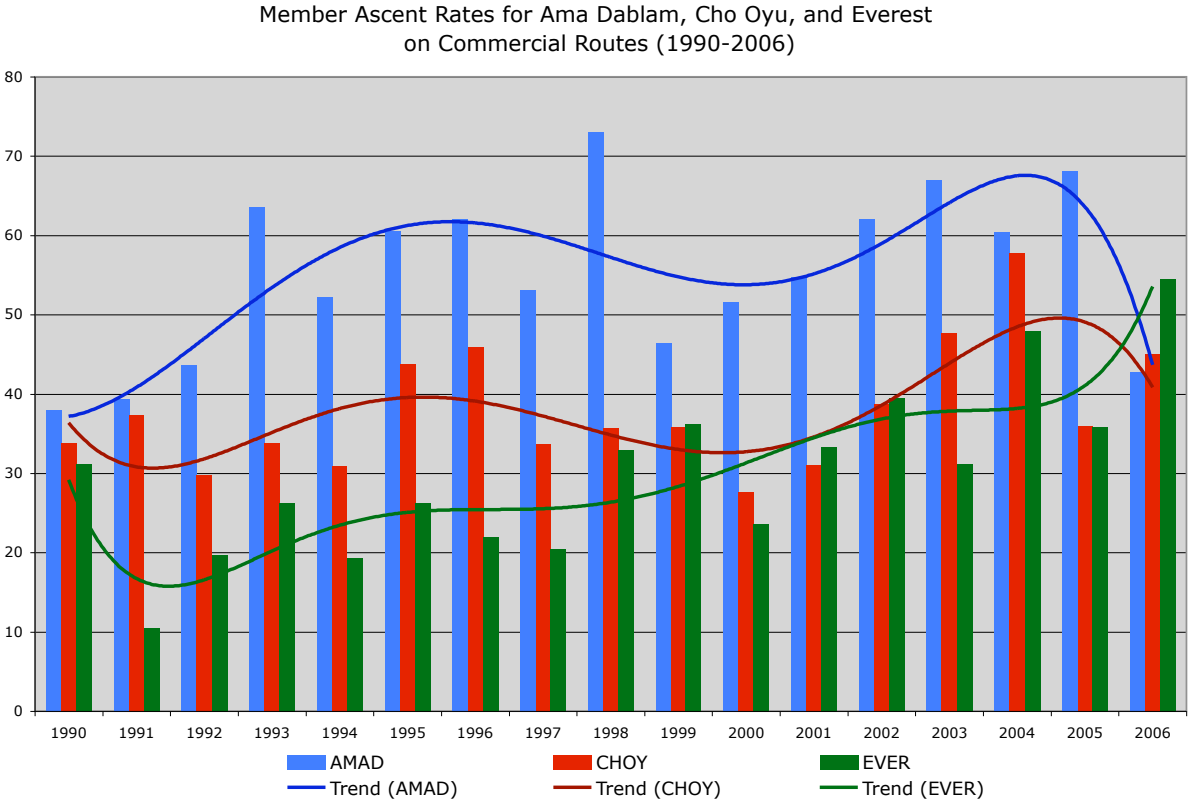


Chart A-15: Member ascent rates by expedition year for commercial routes on Ama Dablam, Cho Oyu, and Everest from 1990-2006

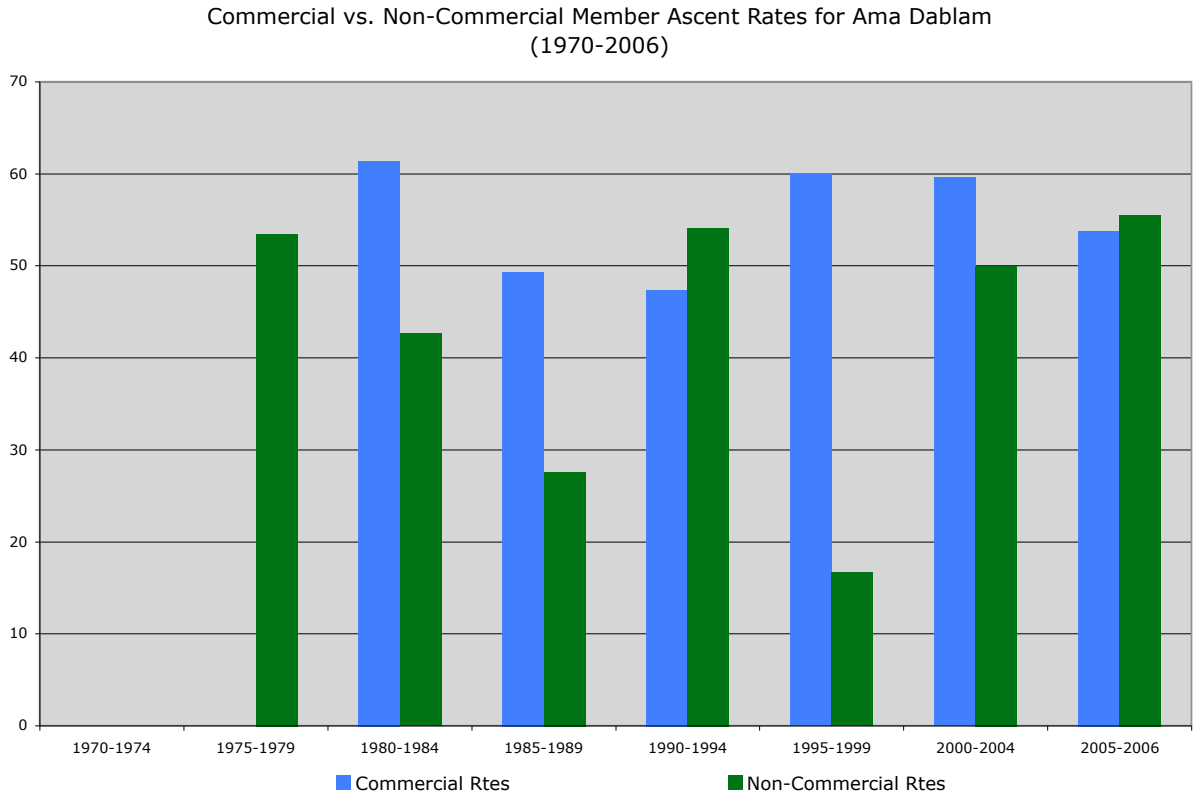


Chart A-16: Member ascent rates by expedition year for commercial (SE ridge) and non-commercial routes on Ama Dablam from 1970-2006

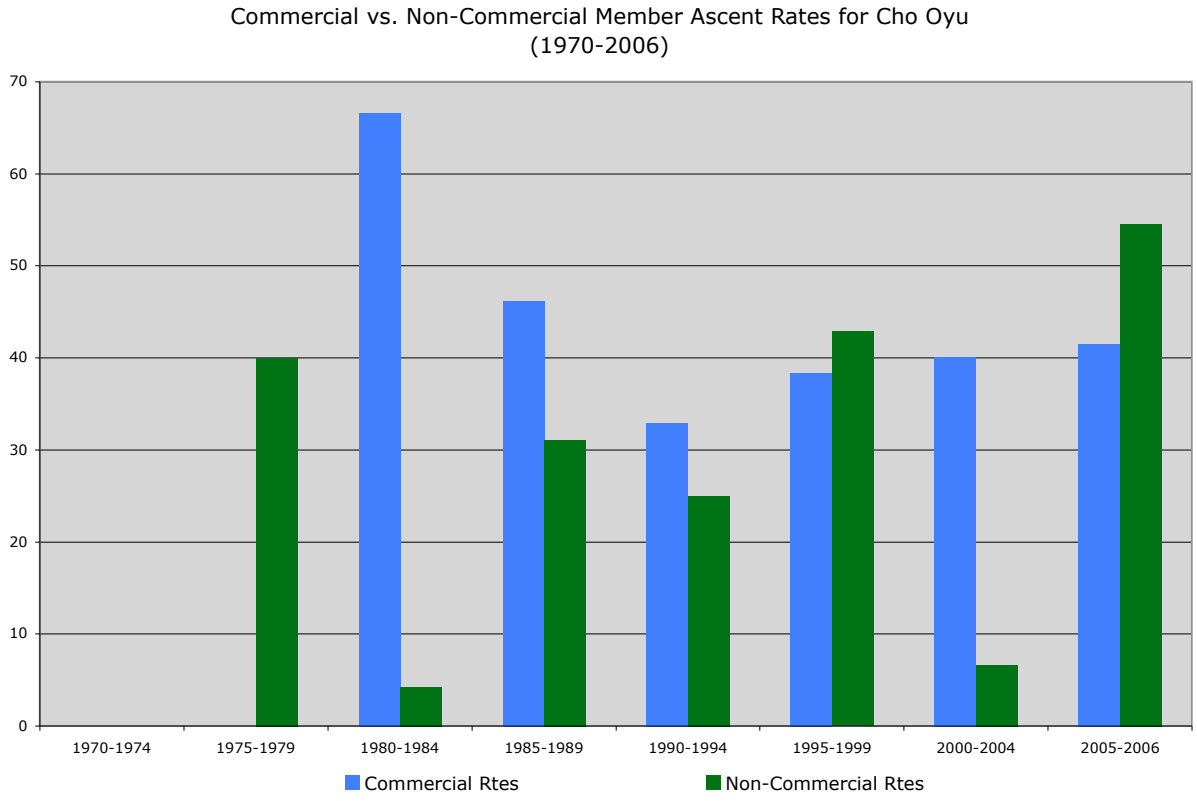


Chart A-17: Member ascent rates by expedition year for commercial (NW ridge) and non-commercial routes on Cho Oyu from 1970-2006

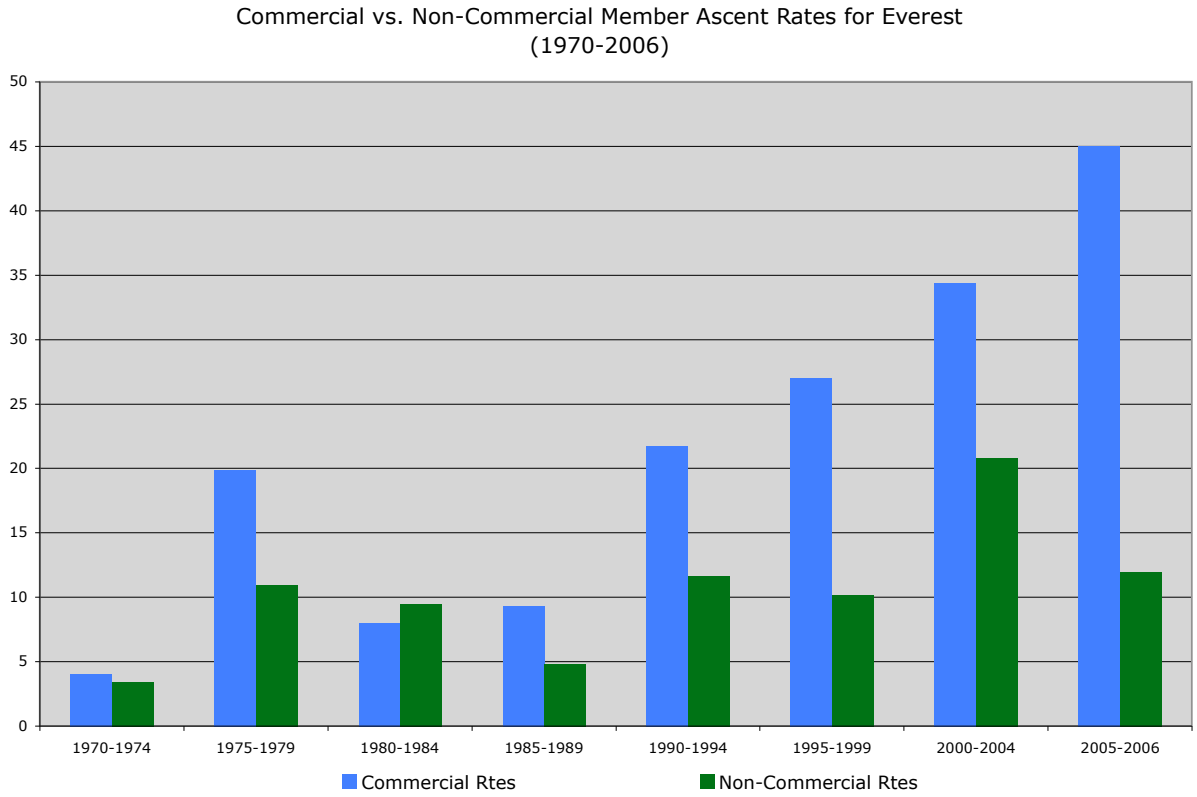


Chart A-18: Member ascent rates by expedition year for commercial (S Col and N Col) and non-commercial routes on Everest from 1970-2006

Ascents by Age Groups

Table and Chart A-19 show member ascent counts and rates by age groups in 5-year intervals. The table is divided into three sections: all peaks and routes from 1950 to 1989, all peaks and routes from 1990 to 2006, and all peaks and routes from 1990 to 2006 excluding the commercial routes on Ama Dablam, Cho Oyu, and Everest.

Age Groups	1950-1989 All Peaks with All Routes			1990-2006 All Peaks with All Routes			1990-2006 All Peaks and Routes excluding Ama Dablam-Cho Oyu-Everest Commercial Rtes		
	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate
Unknown	1156	174	15.1	384	79	20.6	221	49	22.2
10-14	1	0	0.0	4	0	0.0	1	0	0.0
15-19	45	7	15.6	85	46	54.1	42	20	47.6
20-24	1304	269	20.6	1106	341	30.8	618	129	20.9
25-29	3569	830	23.3	3235	1067	33.0	1736	418	24.1
30-34	3054	670	21.9	4499	1537	34.2	2145	509	23.7
35-39	1989	396	19.9	4181	1467	35.1	1875	468	25.0
40-44	1122	211	18.8	3353	1128	33.6	1469	356	24.2
45-49	521	94	18.0	2216	676	30.5	943	228	24.2
50-54	258	25	9.7	1367	399	29.2	536	113	21.1
55-59	107	8	7.5	756	184	24.3	323	62	19.2
60-64	39	3	7.7	374	92	24.6	156	20	12.8
65-69	14	0	0.0	125	32	25.6	62	13	21.0
70-74	3	0	0.0	43	8	18.6	19	4	21.1
75-79	2	1	50.0	8	2	25.0	5	2	40.0

Table A-19: Member ascents by age groups

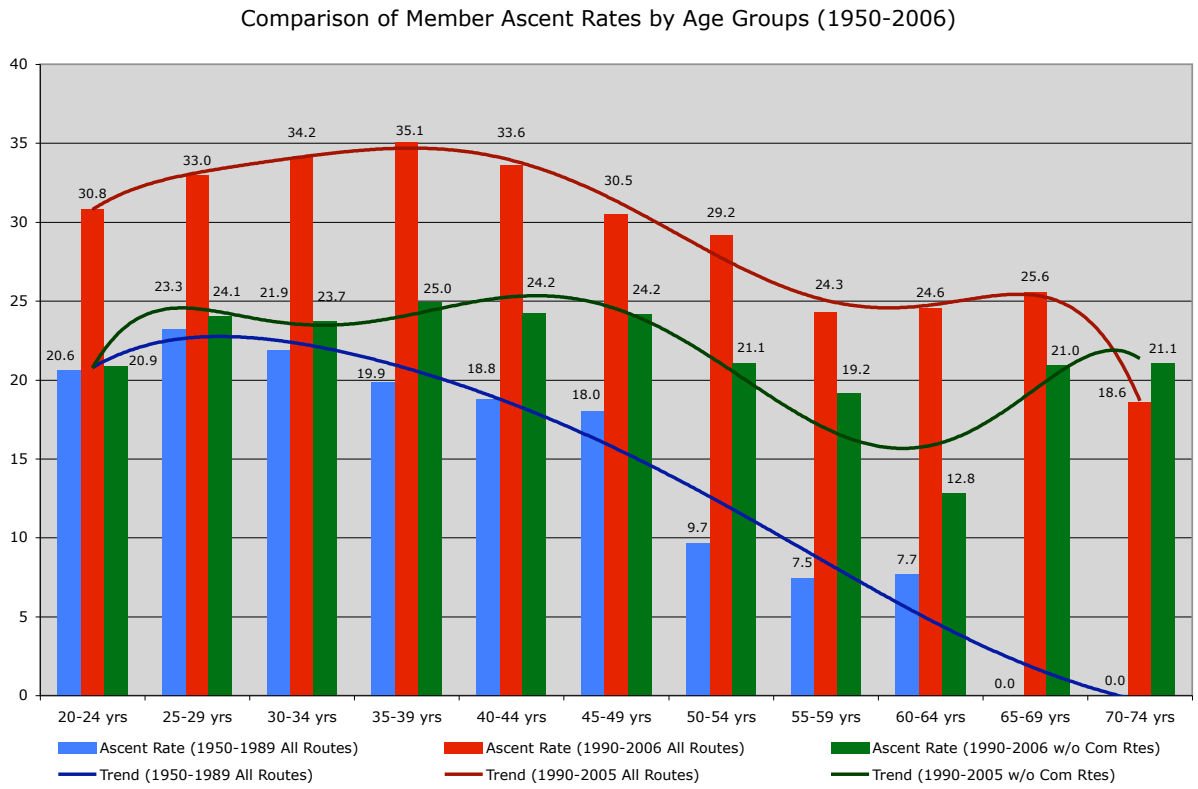


Chart A-19: Comparison of member ascent rates by age groups for all routes between 1950-1989 (blue) and 1990-2006 (red) and for 1990-2006 excluding commercial routes (green)

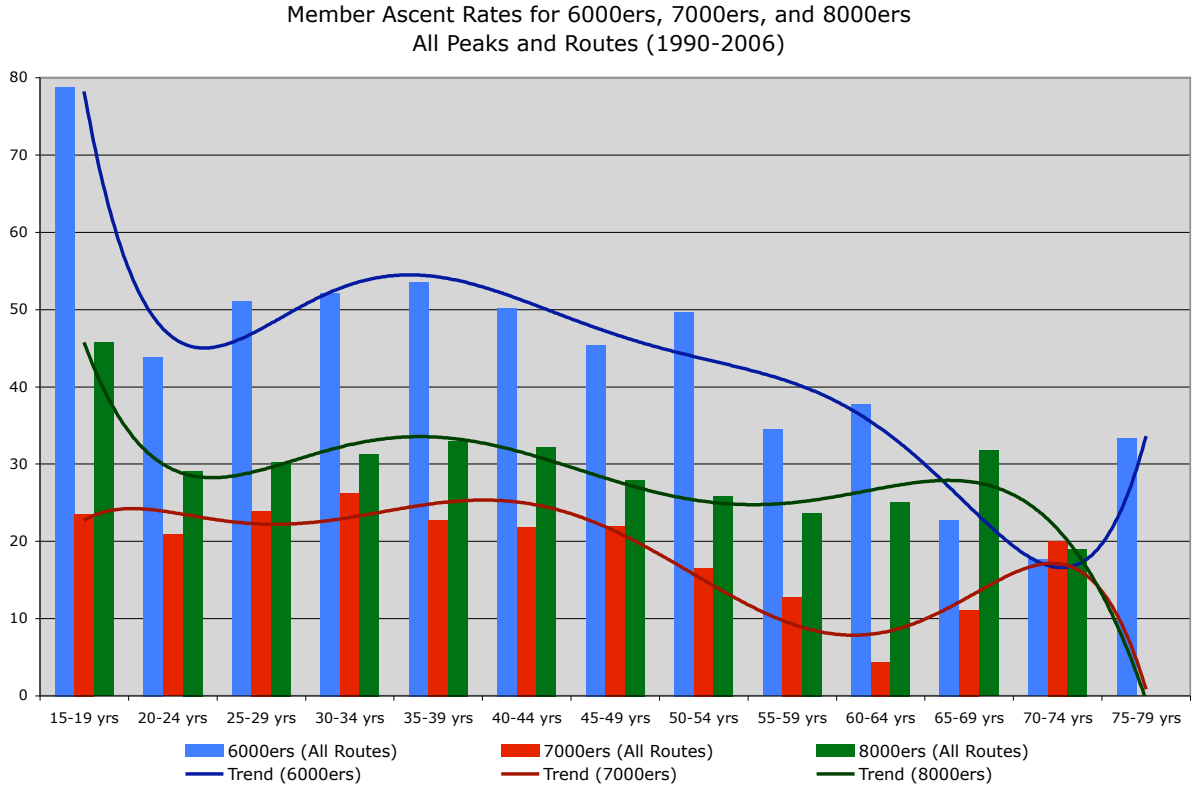


Chart A-20a: Member ascent rates by age groups for 6000ers, 7000ers, and 8000ers from 1990-2006 for all peaks and routes

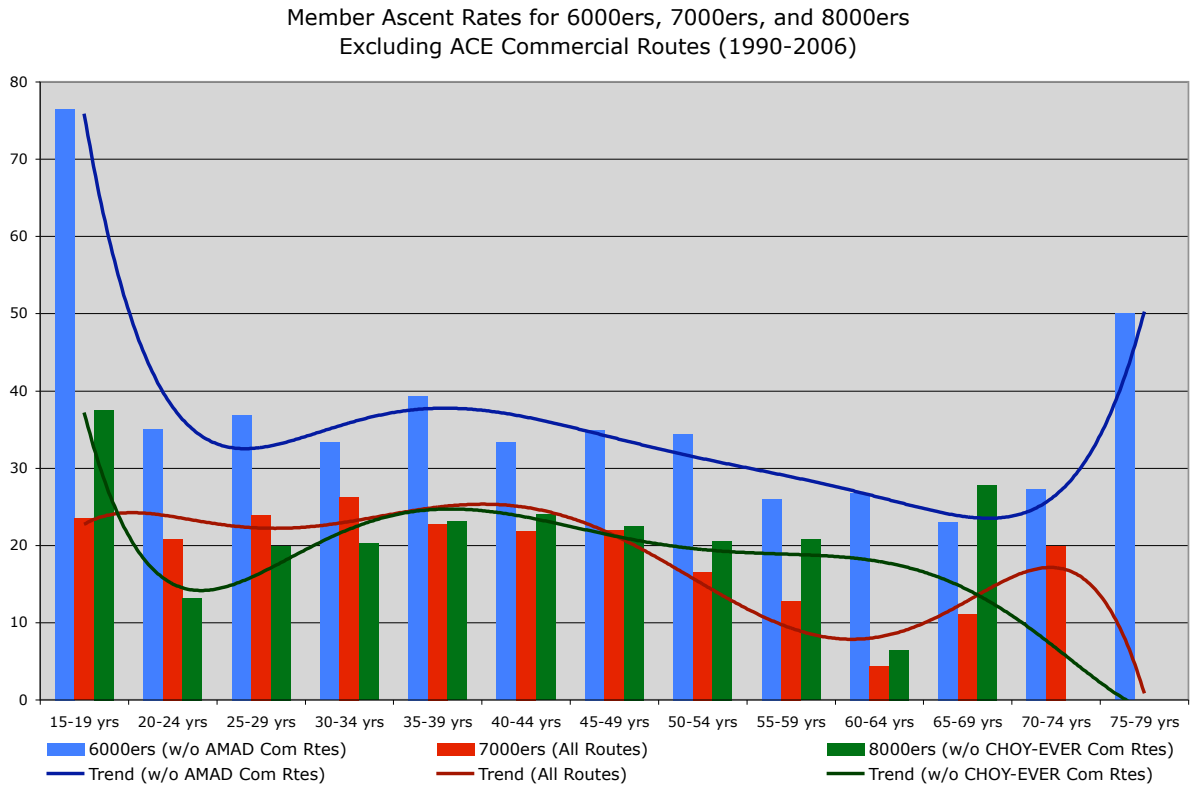


Chart A-20b: Member ascent rates by age groups for 6000ers, 7000ers, and 8000ers from 1990-2006 excluding commercial routes for Ama Dablam, Cho Oyu, and Everest

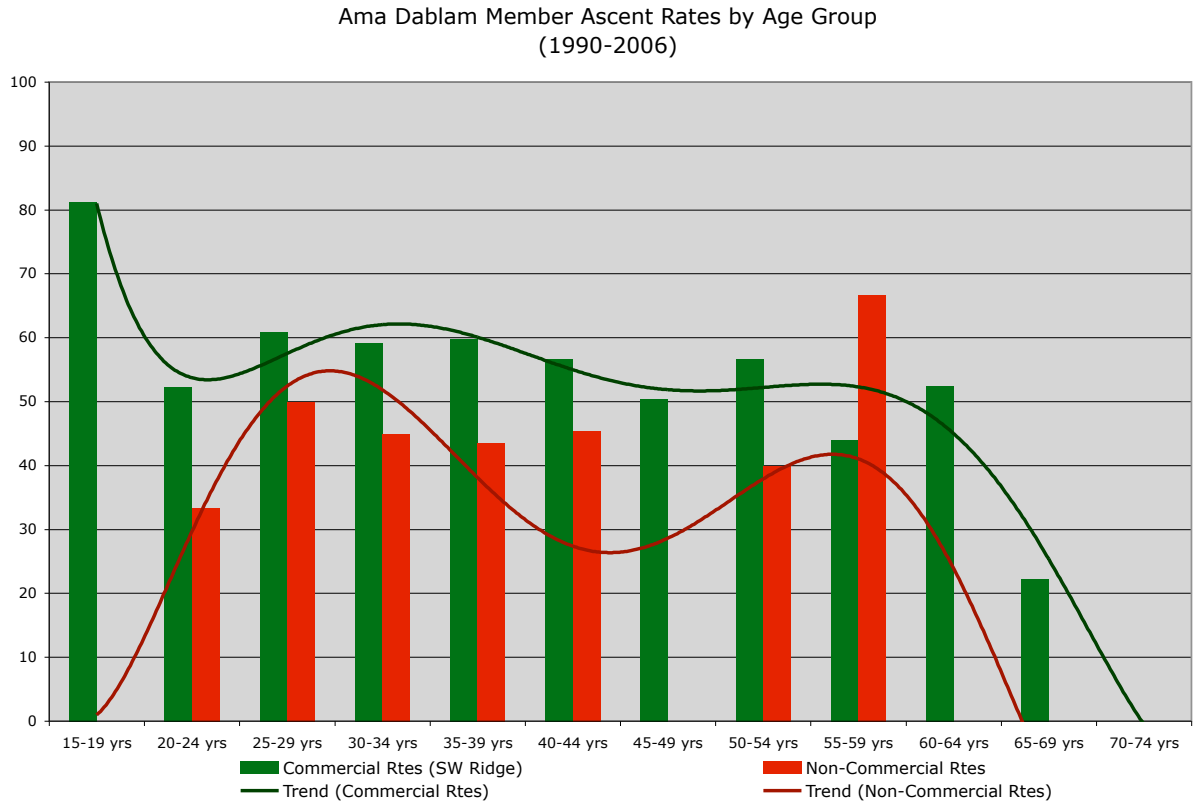


Chart A-21: Member ascent rates by age groups for the commercial (SW Ridge) and non-commercial routes for Ama Dablam from 1990-2006

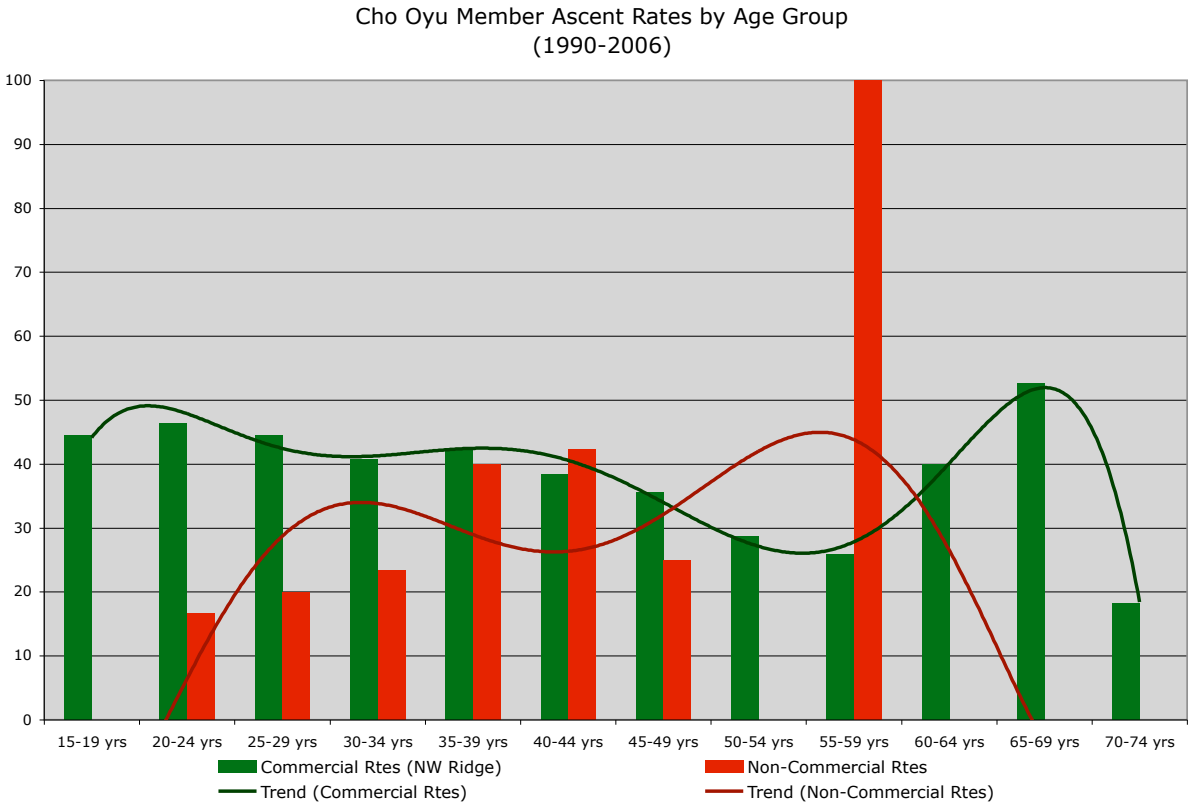


Chart A-22: Member ascent rates by age groups for the commercial (NW Ridge) and non-commercial routes for Cho Oyu from 1990-2006

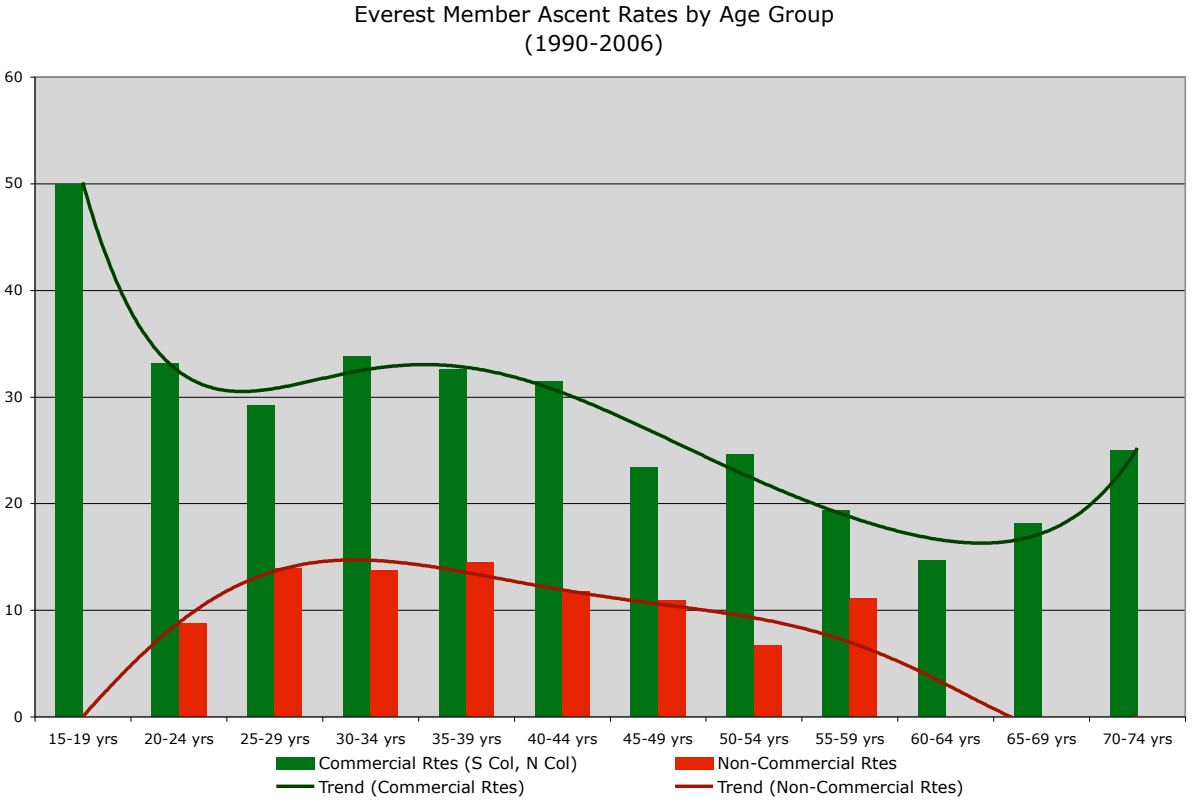


Chart A-23: Member ascent rates by age groups for the commercial (S Col, N Col) and non-commercial routes for Everest from 1990-2006

Chart A-19 shows the difference between the 1950-1989 and 1990-2006 periods and the effect of commercial climbing when considering a climber's age.

During the 1950-1989 period (before commercial climbing), the optimal age for summiting was in the late 20s to early 30s as shown by the **blue** trend line in the chart. Above that age, the member ascent rate shows a slow steady decline as age increases into the 40s followed by a more rapid decline into the 50s and 60s. After age 65, there were no ascents.

During the 1990-2006 period, the optimal age shifts upward to the middle to late 30s with a slower decline as climbers age beyond 40. There are also ascents by climbers in their late 60s and early 70s as shown by the **red** trend line.

When the commercial routes on Ama Dablam, Cho Oyu, and Everest are factored out (green trend line), the optimal age shifts even higher into the late 30s to early 40s. The upswing of the **green** trend line after age 65 is due primarily to groups of Japanese seniors in excellent health with good climbing skills attempting peaks in the 6000-6500m range.

The 10 summiters of all peaks that are of age 70 or older are all Japanese. These 10 summits include two Cho Oyu summits and two Everest summits; the remainder are low 6000ers. The oldest summiter is Nobuo Akayama who at age 75 summited Arniko Chuli (6034m) and Yemelung Kang (6024m) in 2003. Other notable ascents were of Cho Oyu in 2002 by Ms. Toshiko Uchida (age 70) and of Everest in 2003 by Yuichiro Miura (age 70), who previously gained fame in 1970 as "the man who skied down Everest" and in 2006 by Takao Arayama (also age 70, but 3 days older than Miura). Miura has vowed to return to Everest to recapture his record.

Charts A-20a-b compare member ascent rates for all peaks between the 6000ers, 7000ers, and 8000ers by age groups both including and excluding the Ama Dablam, Cho Oyu, and Everest commercial routes.

For the 6000ers, there is a noticeable flattening of the (**blue**) trend line when the Ama Dablam southwest ridge route is excluded indicating higher ascent rates for climbers under 50. For the 8000ers when the Cho Oyu and Everest commercial routes are excluded, the (**green**) trend line drops off at both ends indicating that middle-aged climbers (30 to 50) fare better on the more difficult 8000er routes, most likely because they usually are attempted only by more experienced, non-elderly climbers.

Charts A-21 through A-23 compare the member ascent rates for Ama Dablam, Cho Oyu, and Everest by age groups for the commercial and non-commercial routes.

For Ama Dablam and Cho Oyu, the member ascent rates are considerably higher for the commercial routes except in the late 30s or early 40s when the non-commercial route ascent rates nearly match or exceed the commercial route rates. For Everest, the commercial route ascent rates exceed the non-commercial route ascent rates by a comfortable margin throughout the entire age range.

Ascents by Citizenship

Table A-24 shows *member* ascent rates by citizenship for all peaks and Everest for those nationalities that had a substantial number of members above base camp (50 or more for all peaks and 20 or more for Everest). Citizens from countries that had fewer than the 50- or 20-member cutoff points are grouped into the "**All Others**" category.

Citizens of Nepal and China are split into two groups: Sherpas/non-Sherpas and Tibetans/non-Tibetans, respectively, in order to differentiate the higher-altitude from the lower-altitude residents. Also for Nepalese Sherpas and Chinese Tibetans, the numbers above base camp include only those who were actual members of an expedition, not those who were hired as high-altitude assistants. For all peaks and Everest, the Sherpas and Tibetans performed much better than their countrymen as full members of expeditions, but the actual ascent rates of Tibetans may be somewhat suspect due to the lack of reliable information regarding whether they were actually full members or hired personnel since the climbing permits issued in China do not make this distinction. *The Himalayan Database* reasonably differentiates between members and hired personnel for foreign expeditions, but the data for the larger Chinese national expeditions are only estimates.

The climbers from the former Soviet-bloc countries (e.g., USSR, Russia, Kazakhstan, Georgia, Ukraine) have done remarkably well since many expeditions from those countries have attempted only the 8000m peaks or difficult routes on the 7000m peaks; fewer have ventured to the 6000m peaks, most likely due to funding constraints that limits training expeditions to the Pamir and Caucasus mountain ranges in Russia.

All Peaks			
Citizenship	Above BC	Ascent Cnt	Ascent Rate
Kazakhstan	72	53	73.6
China (Tibetan)	204	129	63.2
USSR	241	152	63.1
Georgia	54	27	50.0
Ukraine	181	84	46.4
Russia	621	287	46.2
Iran	101	44	43.6
Mexico	140	58	41.4
All others	622	253	40.7
New Zealand	452	178	39.4
Nepal (Sherpa)	224	84	37.5
Finland	64	23	35.9
Switzerland	1480	515	34.8
Norway	198	68	34.3
Denmark	108	37	34.3
S Africa	61	20	32.8
Chile	99	32	32.3
Germany	1339	425	31.7
Australia	606	190	31.4
W Germany	712	218	30.6
USA	3618	1101	30.4
Japan	4689	1342	28.6
Ireland	90	25	27.8
France	2879	796	27.6
Austria	1271	337	26.5
Slovenia	369	97	26.3
Canada	550	142	25.8
Sweden	210	54	25.7
Poland	869	223	25.7
India	915	225	24.6
Greece	107	26	24.3
UK	2689	653	24.3
Czech Republic	288	69	24.0
Colombia	51	12	23.5
Italy	1809	417	23.1
Belgium	268	59	22.0
Nepal (non-Sherpa)	367	80	21.8
Spain	2291	490	21.4
Hungary	75	16	21.3
Brazil	65	13	20.0
Yugoslavia	438	86	19.6
S Korea	1957	374	19.1
Netherlands	416	79	19.0
Taiwan	59	11	18.6
Bulgaria	163	26	16.0
Czechoslovakia	317	50	15.8
Slovakia	96	15	15.6
Argentina	117	15	12.8
Indonesia	51	6	11.8
China (non-Tibetan)	257	30	11.7
Mean Ascent Rate			**27.9**

Everest			
Citizenship	Above BC	Ascent Cnt	Ascent Rate
Kazakhstan	23	14	60.9
China (Tibetan)	107	58	54.2
Mexico	52	26	50.0
USSR	64	31	48.4
Slovenia	21	9	42.9
Malaysia	21	8	38.1
All others	278	102	36.7
Russia	213	78	36.6
Greece	25	9	36.0
Iran	34	12	35.3
New Zealand	134	43	32.1
S Africa	43	13	30.2
Ukraine	30	9	30.0
W Germany	47	14	29.8
Australia	145	43	29.7
Norway	65	19	29.2
Nepal (Sherpa)	119	33	27.7
USA	1237	342	27.6
Denmark	29	8	27.6
India	374	95	25.4
Bulgaria	42	10	23.8
Chile	55	13	23.6
Ireland	35	8	22.9
Canada	171	39	22.8
Poland	91	20	22.0
Austria	126	25	19.8
Japan	687	134	19.5
Sweden	80	15	18.8
UK	719	133	18.5
Switzerland	205	36	17.6
France	411	69	16.8
Brazil	42	7	16.7
Italy	285	46	16.1
Netherlands	75	11	14.7
Spain	520	76	14.6
S Korea	525	76	14.5
Taiwan	43	6	14.0
Germany	113	15	13.3
Yugoslavia	83	11	13.3
Nepal (non-Sherpa)	116	15	12.9
Czech Republic	49	6	12.2
Belgium	60	7	11.7
Argentina	28	3	10.7
China (non-Tibetan)	181	19	10.5
Indonesia	24	2	8.3
Czechoslovakia	62	4	6.5
Hungary	39	1	2.6
Mean Ascent Rate			**22.4**

Table A-24: Member ascents by citizenship from 1950-2006
(minimum 50 Above BC for all peaks, minimum 20 Above BC for Everest)
(blue rows are above the mean ascent rate, black rows are below the mean ascent rate)

Ascents by Gender

Table and Chart A-25 show member ascent rates by gender from 1950-1989 and 1990-2006.

	Males			Females			Male/ Female Ascent Ratio
	Above BC	Ascent Cnt	Ascent Rate	Above BC	Ascent Cnt	Ascent Rate	
All 6000ers (1950-1989)	2019	842	41.7	163	54	33.1	1.26
All 7000ers (1950-1989)	4104	854	20.8	250	33	13.2	1.58
All 8000ers (1950-1989)	6320	880	13.9	328	25	7.6	1.83
All Peaks (1950-1989)	12443	2576	20.7	741	112	15.1	1.37
All 6000ers (1990-2006)	3668	1817	49.5	508	223	43.9	1.13
All 6000ers w/o AMAD Com Rtes (1990-2006)	1291	455	35.2	189	56	29.6	1.19
All 7000ers (1990-2006)	3433	787	22.9	410	72	17.6	1.31
All 8000ers (1990-2006)	12511	3792	30.3	1206	367	30.4	1.00
All 8000ers w/o CHOY-EVER Com Rtes (1990-2006)	4514	970	21.5	314	51	16.2	1.32
All Peaks (1990-2006)	19612	6396	32.6	2124	662	31.2	1.05
All Peaks w/o ACE Com Rtes (1990-2006)	9238	2212	23.9	913	179	19.6	1.22
Ama Dablam Com Rtes (1990-2006)	2377	1362	57.3	319	167	52.4	1.09
Cho Oyu Com Rtes (1990-2006)	3906	1503	38.5	434	176	40.6	0.95
Everest Com Rtes (1990-2006)	4091	1319	32.2	458	140	30.6	1.05
AMAD-CHOY-EVER Com Rtes 1990-2006	10374	4184	40.3	1211	483	39.9	1.01

Table A-25: Member ascents by gender from 1950-1989 and 1990-2006

Statistical significances of ascent rates for men and women:

1950-1989:

6000ers: M (41.7), F (33.1), *p*=.032
7000ers: M (20.8), F (13.2), *p*=.005
8000ers: M (13.9), F (7.6), *p*=.002
All peaks: M (20.7), F (15.1), *p*=<.001

1990-2006:

6000ers: M (49.5), F (43.9), *p*=.020
6000ers xAMAD: M (35.2), F (29.6), *p*=.152
7000ers: M (22.9), F (17.6), *p*=.016
8000ers: M (30.3), F (30.4), *p*=.956
8000ers xCHOY, EVER: M (21.5), F (16.2), *p*=.033
All peaks: M (32.6), F (31.2), *p*=.185
All peaks xACE: M (23.9), F (19.6), *p*=.004
AMAD Com Rte: M (57.3), F (52.4), p=.106
CHOY Com Rte: M (38.5), F (40.6), p=.430
EVER Com Rtes: M (32.2), F (30.6), p=.499

p-values for statistically significant differences ($p <= .05$) are shown in **red** above and their columns are outlined in black in Chart A-26. All others are statistically insignificant.

The table and chart show that for all peaks men had significantly better ascent rates than women during the 1950-1989 period (20.7% to 15.1%), but this advantage subsequently narrowed during the 1990-2006 period (32.6% to 31.2%) and became statistically insignificant.

But when the commercial routes for Ama Dablam, Cho Oyu, and Everest are factored out for all peaks during the 1990-2006 period, the men still have a significantly better ascent rate (23.9% to 19.6%). Women have done the best on these commercial routes, slightly trailing men on Ama Dablam and Everest, but doing better that than men on Cho Oyu. The overall ascent rates for all the commercial routes is nearly even at 40%.

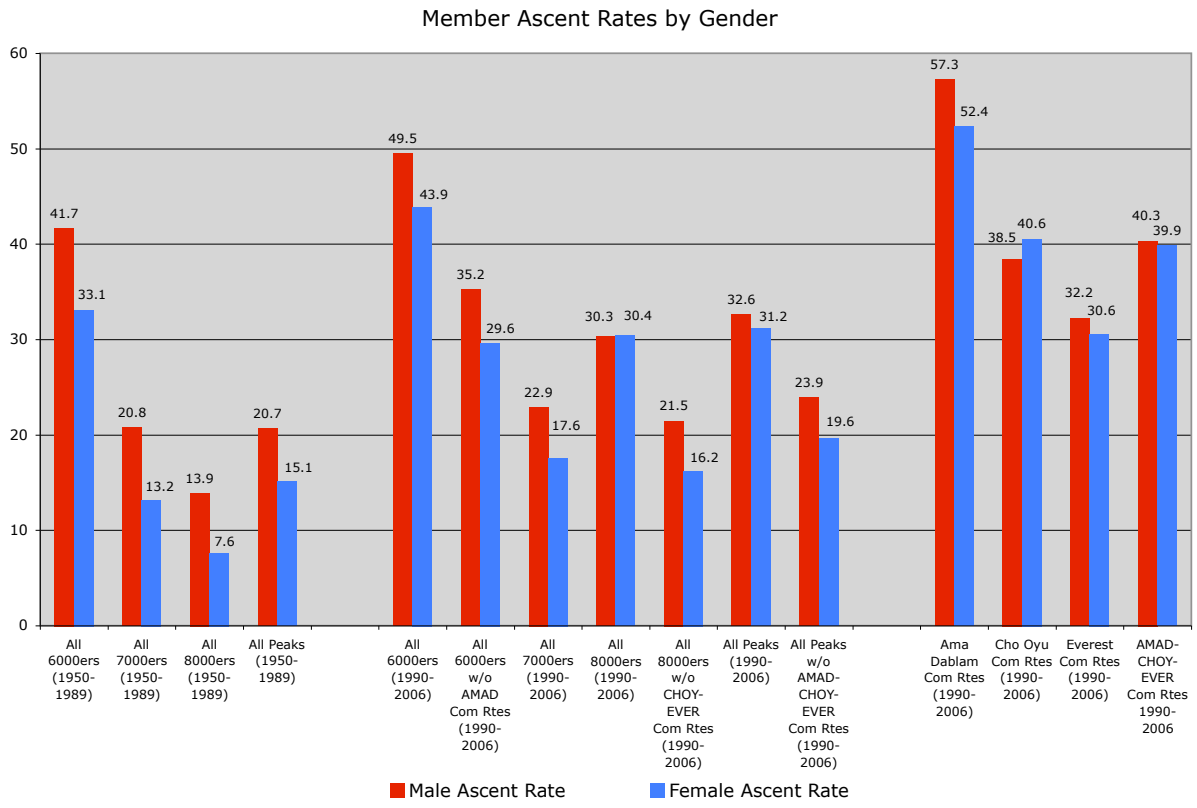


Chart A-25: Member ascent rates by gender from 1950-1989 and 1990-2006

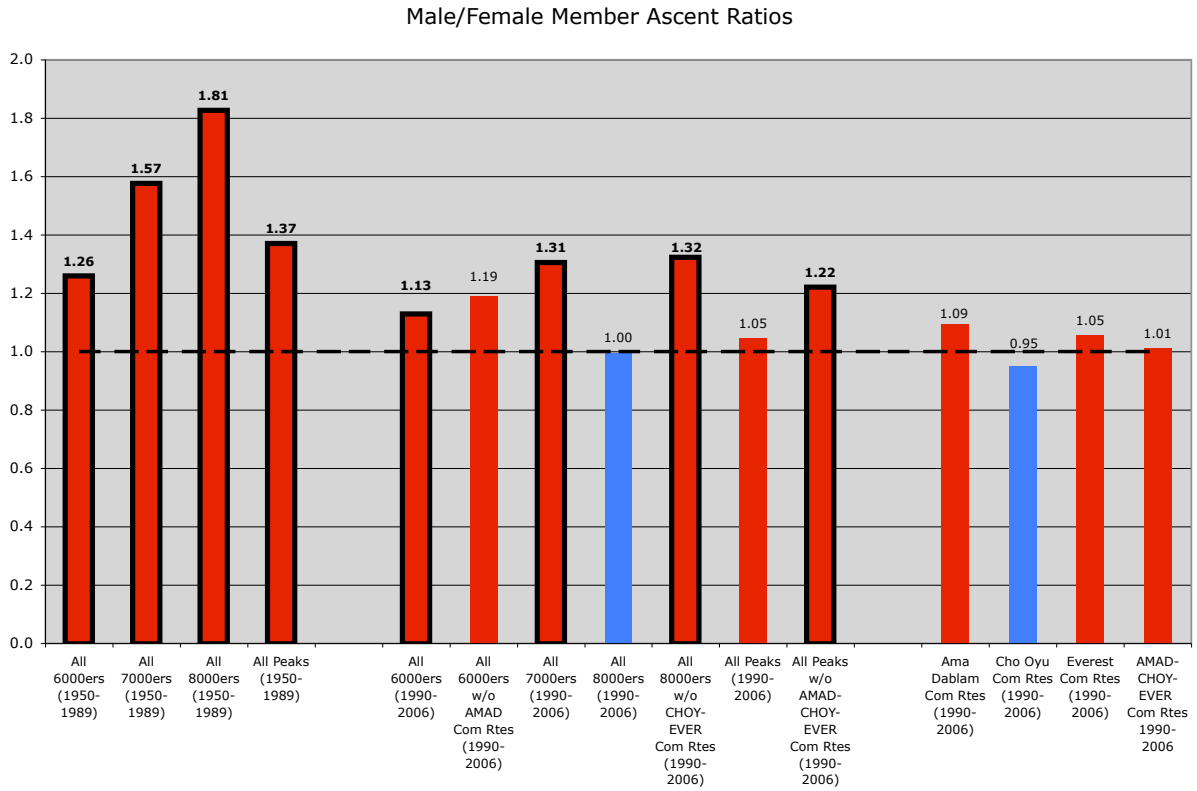


Chart A-26: Male to Female member ascent ratios from 1950-1989 and 1990-2006 (red columns show better rates for men, blue columns show better rates for women, the seven columns with statistically significant differences are outlined in black)

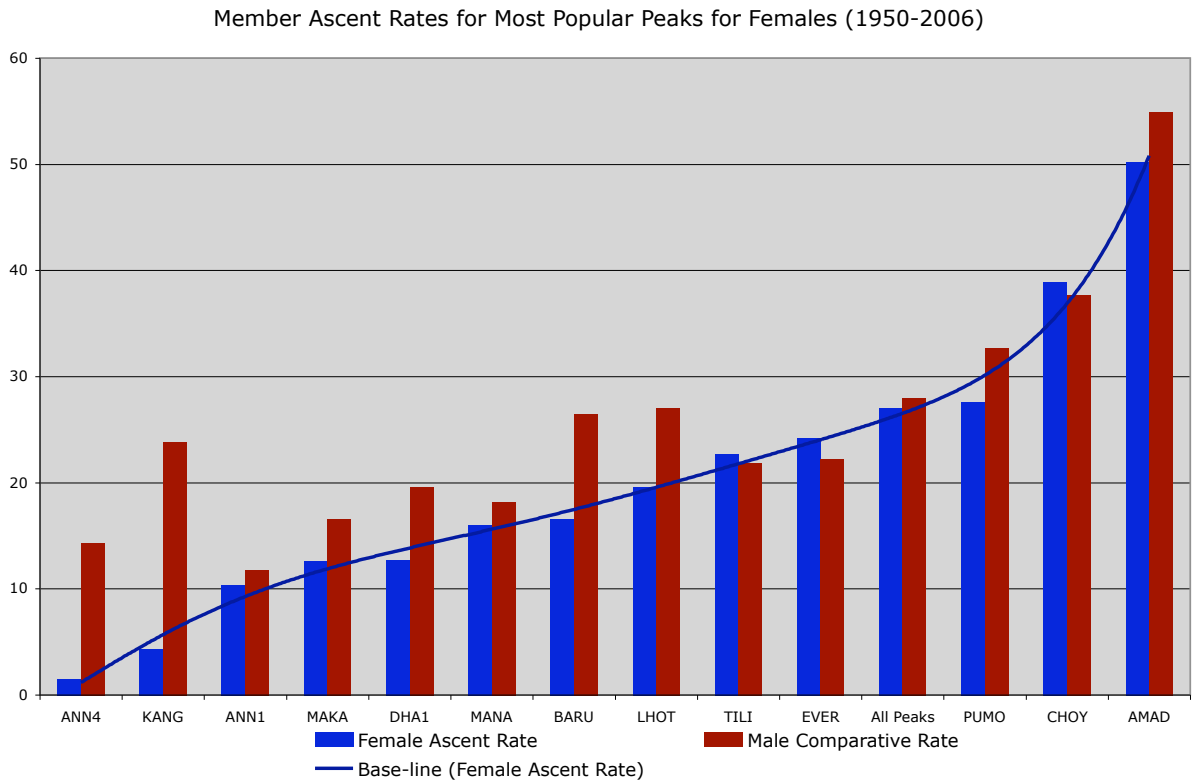


Chart A-27: Ascent rates for peaks with 40+ females above base camp from 1950-2006

Chart A-26 gives the male to female member ascent ratios, which is another way to compare the ascent rates between men and women. The ascent ratio is defined as the male ascent rate divided by the female ascent rate.

For the 1950-1989 period, the ascent ratios vary from under 1.3 for the 6000ers to over 1.8 for the 8000ers, which is approaching a success rate for men of almost double of that for women for the 8000ers. The chart also shows that the higher the peak, the greater the difference in ascent ratios between men and women.

For the 1990-2006 period, the ascents ratios are much closer varying from .95 to 1.41. Ascent ratios under 1.0 (shown in **blue**) indicate better ascent rates for women. The increased level of success that women have had on Cho Oyu and Everest combined with the very large numbers of climbers to those peaks has dramatically narrowed the difference of ascent rates between men and women for all the 8000ers and for all peaks. Chart A-27 shows the female ascent rates along with the male comparative rates for the most popular peaks climbed by women, those peaks with 40 or more women above base camp. The female rates in general are comparable to the male rates except for Annapurna IV, Kangchenjunga, and Baruntse. The women slightly excel on Everest and Cho Oyu when considering all climbing routes.

Chart A-28 shows male ascent rates along with female comparative rates for the most popular peaks climbed by men, those peaks with 400 or more men above base camp. The female rates in general are comparable to the male rates except for Annapurna IV, Kangchenjunga, and Baruntse.

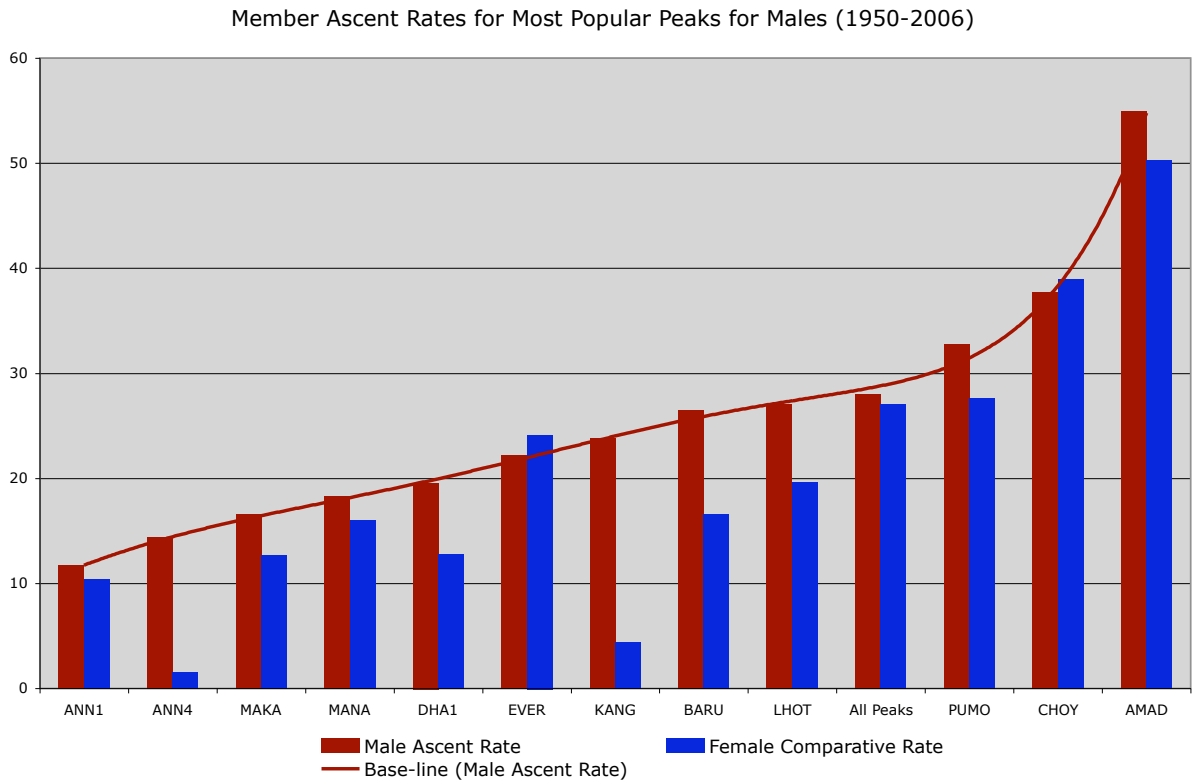


Chart A-28: Ascent rates for peaks with 400+ males above base camp from 1950-2006

An "Unsupported" Ascent of Everest

From *The Seasonal Stories* of Elizabeth Hawley – Spring 1995

Alison Hargreaves, Britain's best woman climber, reached the top of Everest via the North Col-northeast ridge on 13 May 1995 at 12:08 p.m., shortly after two Italians, who had camped very near her last camp at 8300m. She was the first woman to make an unsupported ascent of Everest, and she accomplished this without the use of any supplemental oxygen.

Hargreaves does not claim to have made a solo ascent as some of the British press trumpeted – how could she when there were 182 other climbers including the two Italians on the same route and 33 more on the Japanese route that joins hers very high up? Nor does she claim to have been the first woman to summit without using any bottled oxygen. That distinction belongs to a New Zealander, Lydia Bradey. But Hargreaves is the first British woman to have done so. And other climbers on her route concur that she can rightfully claim to have made the first unsupported ascent by any woman. By "unsupported" she means that she was an entirely self-contained unit above advance base camp, that she carried all her own supplies of tents, gear and food up the mountain, slept in her own tents rather than in camps pitched by or with others, ate her own high-altitude food which she cooked herself, and did not climb in the company of anyone else. The other climbers noted that she had refused invitations to come into their tents for a chat or a cup of their tea; she stayed outside to visit with them, and she drank her own brews.

According to her account, Hargreaves carried her loads of supplies in three trips to the North Col (7000m), where the north ridge begins, slept there the third time, then down to advance base; went up to 7000m, pitched a tent and slept one night there, then again down to advance base. Finally she started her summit push on 11 May, went up to the Col, picked up gear including a tent and went to her other tent at 7700m where she slept that night. On the 12th she climbed to 8300m and pitched there the tent she had brought from the Col; she

had a hard time making her own platform for this tent, having to move a lot of stones to do so, and she spent the night melting snow and drinking liquids, occasionally falling into a light sleep. She had no sleeping bag with her at 8300m because she had lightened her final load as much as she possibly could.

At 4:40 on the morning of the 13th (Nepalese time) she left the tent for the top of the world in very clear weather with no wind, but "it was incredibly cold." She took with her a water bottle, a small camera, a walkie-talkie radio and spare batteries for her foot-warmers (she had suffered frostbitten toes on earlier climbs and did not want frozen feet again). Climbing not far behind the two Italian summiters, Marco Bianchi and Christian Kuntner, she joined them on the summit at 12:08 p.m. and left them after 40 minutes. She had noticed a single set of footprints coming up to the top from the Nepalese side, prints that she learned later would have been made on 7 May by Lobsang Jangbu Sherpa of a commercial team from Nepal. She took photos and sent a message by walkie-talkie: "to Tom and Kate, my two children, I'm on top of the world and I love them dearly." Then down she went.

At 4:00 p.m. she packed up her tent at 8300m, chatted with some Sherpas, and set off down to 7700m, where she arrived at 7:00 p.m. in fading daylight and stayed the night. (The Italians, she said, descended only as far as 8300m, and the leader of another expedition reported that she descended "in good order," whereas the Italians were quite sick). On the next day, the 14th, she continued down alone to 6500m, where an American and a New Zealander came up to meet her, and the three went down together to advance base, where she arrived at perhaps 2:00 p.m. "very, very tired."

Throughout this final day's descent, all of the 20 or more Sherpas she met wanted to shake her hand and hug her, and the dozen foreigners along the route congratulated her and gave her hand a shake. "At this point, I realized that I had done something people thought was quite special. I still find it hard to believe [in a posh Kathmandu hotel a week later] that I actually climbed Mount Everest."

Commented Bianchi when he too had returned to Kathmandu: "She is a new star of the Himalaya – of women for sure, but also of men. She climbs like a man. She is very strong. And very kind." Her future climbing plans were immediate: she would go next to the world's second highest mountain, K-2 in Pakistan's Karakoram range, a month or so later and to the third highest, Kangchenjunga, in the autumn or next spring.

Note: Reinhold Messner is the only climber that has truly soloed Everest, during the summer of 1980 when he was entirely alone on the mountain. Alison Hargreaves died on K-2 in the summer of 1995, trapped near the summit in a severe storm.

Ascents by Team Composition

Expedition team size can also play a role in the success rates for climbers. In this section, we look at three factors:

(1) the number of members above base camp per expedition,
(2) the number of hired personnel above base camp per expedition, and
(3) the number of hired personnel for each team member above base camp per expedition expressed as the ratio of the number of hired to the number of members above base camp.

Charts A-29 and A-30 show member ascent rates by the number of members and the number of hired above base camp per expedition for Everest and for all peaks without Everest from 1950 to 2006.

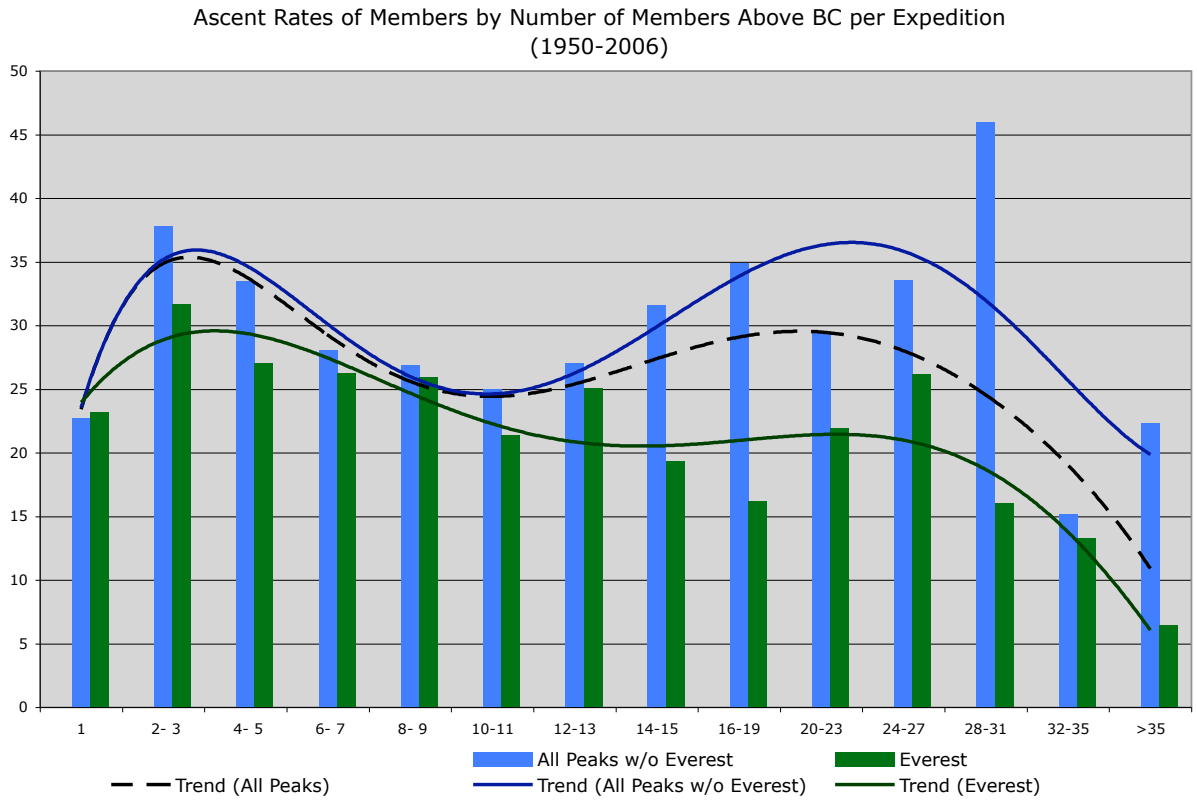


Chart A-29: Member ascent rates by number of members above base camp per expedition from 1950-2006

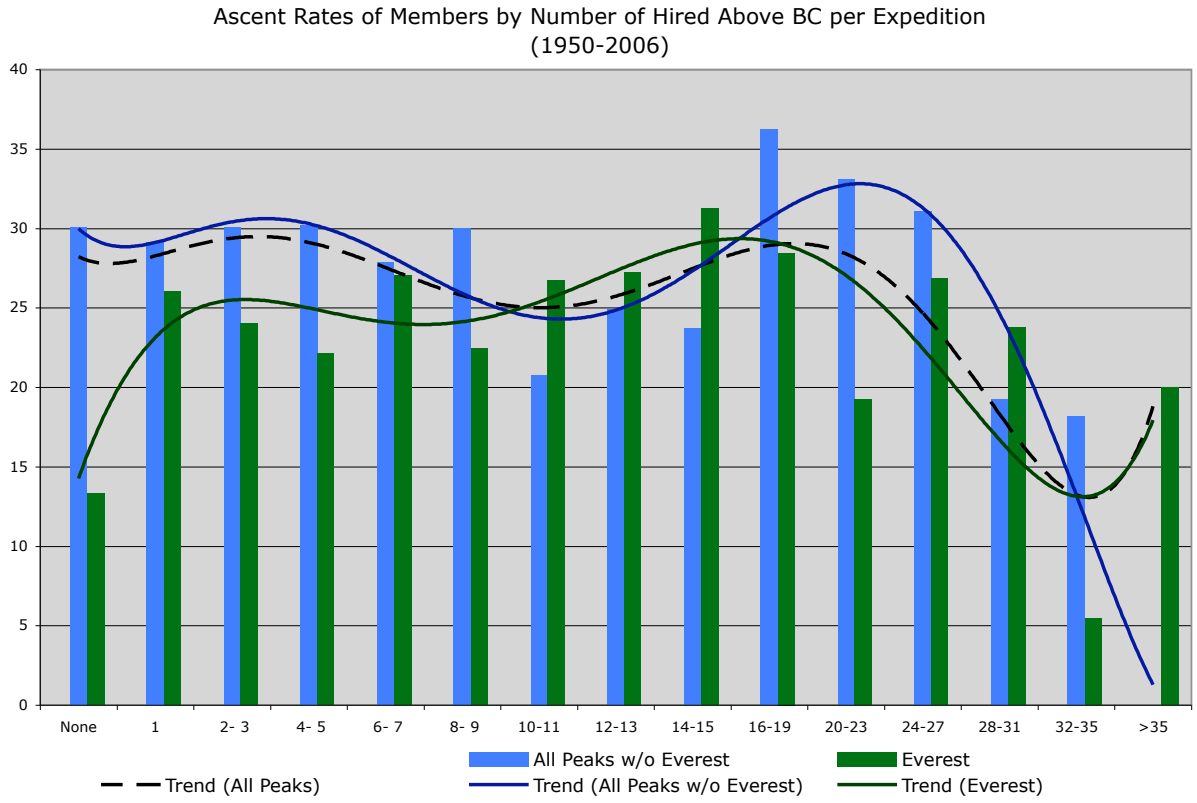


Chart A-30: Member ascent rates by number of hired above base camp per expedition from 1950-2006

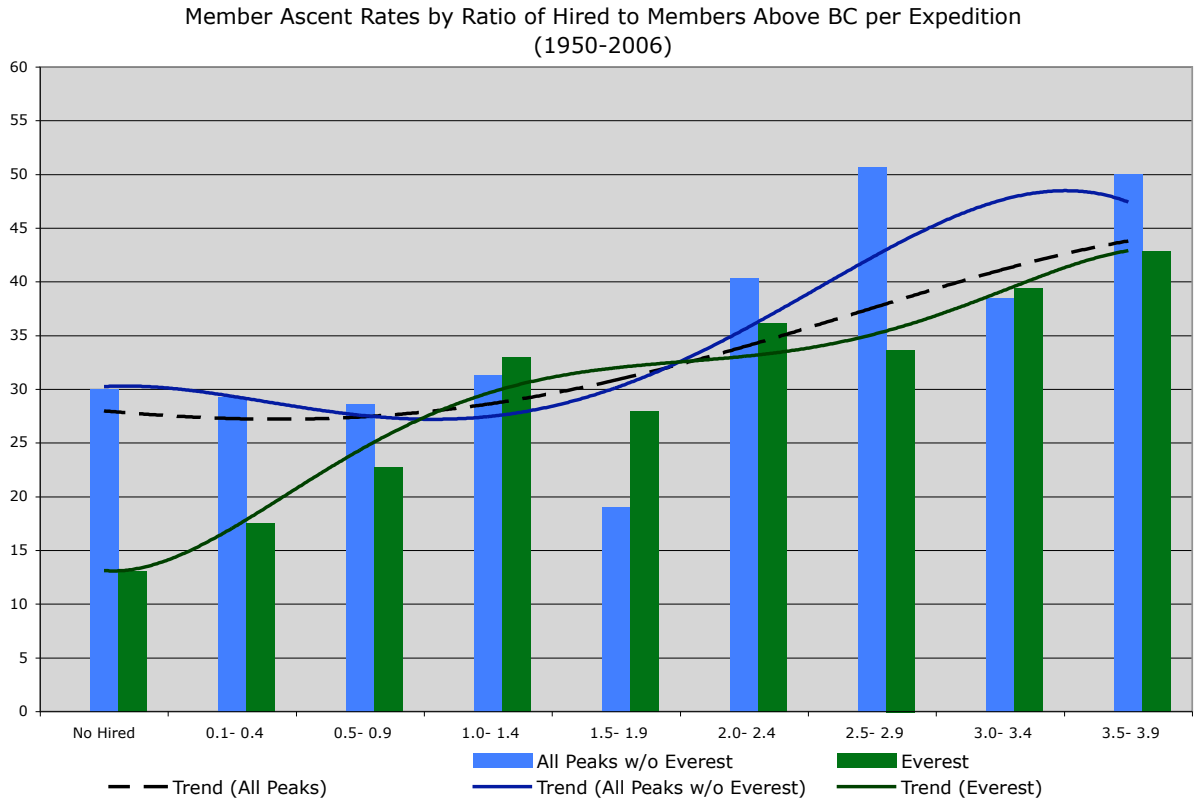


Chart A-31: Member ascent rates by the ratio of the number of hired to number of members above base camp per expedition from 1950-2006

Chart A-31 shows member ascent rates by the ratio of the number of hired to the number of members above base camp per expedition for Everest and for all peaks without Everest from 1950 to 2006.

From these three charts, it is evident that team composition does play an important role in expedition success, especially for Everest.

On Everest the optimal combination for success appears to be smaller teams of 2 to 3 members with abundant hired personnel support. In general as the teams increased in size, the ascent rates declined except for a few very large teams in the 20-27 member range. Single climbers in most cases had better ascent rates than teams with 10 or more climbers, but worse than smaller teams of less than 10.

Everest teams with hired to member ratios greater than one hired per member (1:1) seemed to do better than teams ratios less than one hired per member or with no hired personnel. Very few expeditions had ratios higher than 4:1 and for those that did, the results were very erratic and unpredictable.

Everest teams without hired personnel and very large teams or teams with excessive hired support had the lowest ascent rates indicating that either too little or too much assistance may have posed difficulties. It would appear that teams with over 35 members or hired above base camp suffered from the sheer size of the expedition and the accompanying logistical problems.

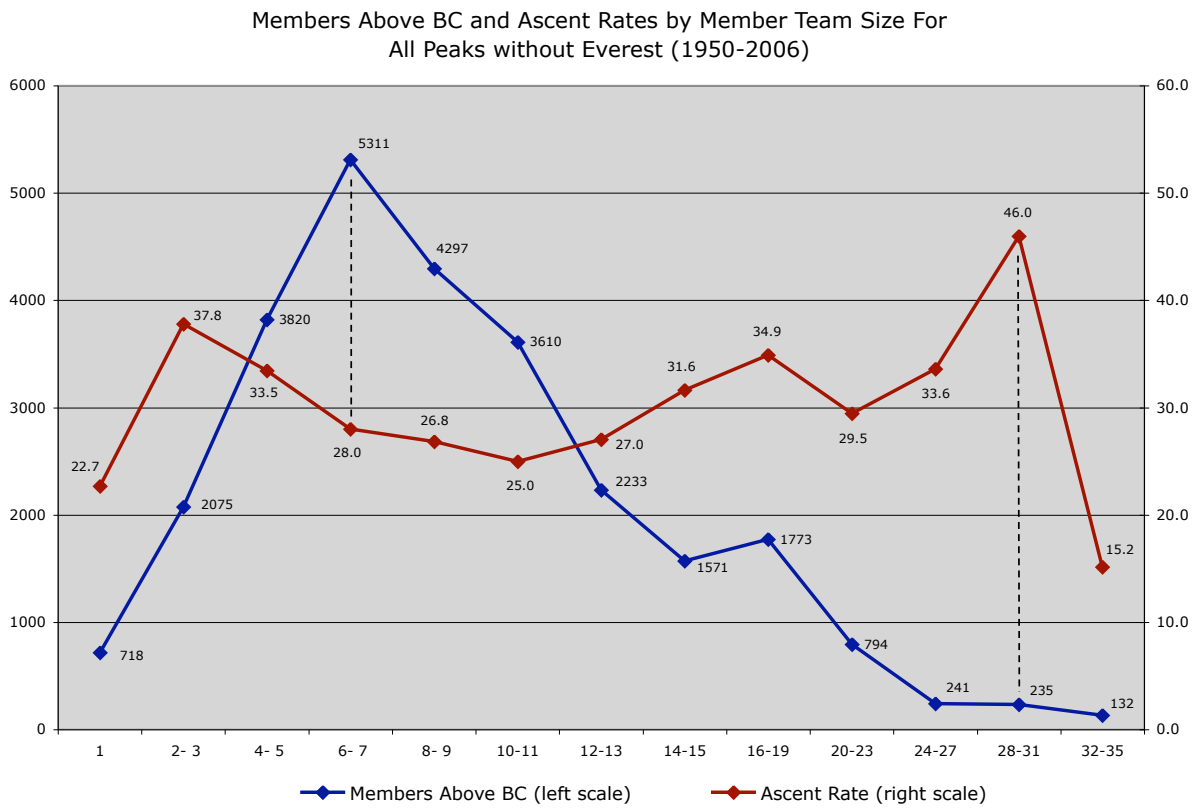


Chart A-32: Ascent rates by member team size for all peaks without Everest from 1950-2006 (the horizontal scale is the member team size; the blue line is the total number of members above BC for each team size increment; the red line is the ascent rate for each team size increment)

For all the other peaks, the results are less clear. Optimal team size and number of hired personnel are most likely very dependent of the particular peak. Again for all other peaks, there reaches point where sheer expedition size becomes counter-productive. The spike in ascent rate for teams of 28-31 members in Chart A-29 was due mostly to two 30-member commercial Ama Dablam expeditions in 2004, and the 32-member USSR Kangchenjunga traverse in 1989. All three of these large teams had very high ascent rates (60-85%).

Many of the larger expeditions from the earlier years often had members that went above base camp to assist the primary summit team with the knowledge that they would never have a chance for the summit themselves. But in recent times with commercial climbs dominating the popular peaks, nearly all the paying members have summit dreams, otherwise they would not pay the expedition fees.

Chart A-31 shows that for all peaks a hired/members ratio from 3:1 to 4:1 to be the optimum for success. However, it will be shown later in the death analysis chapter that a lower ratio of 1:1 to 2:1 is safer in terms of death risk. Many Everest commercial expeditions currently use a ratio of about 1:1 (one Sherpa or Tibetan assistant for each potential summit climber).

Charts A-32 and A-33 show the ascent rates for each team size increment (the **red** lines) along with the number of members that went above base camp for each team size increment (the **blue** and **green** lines). These charts illustrate how many climbers attempted climbs at each team size and how well they did.

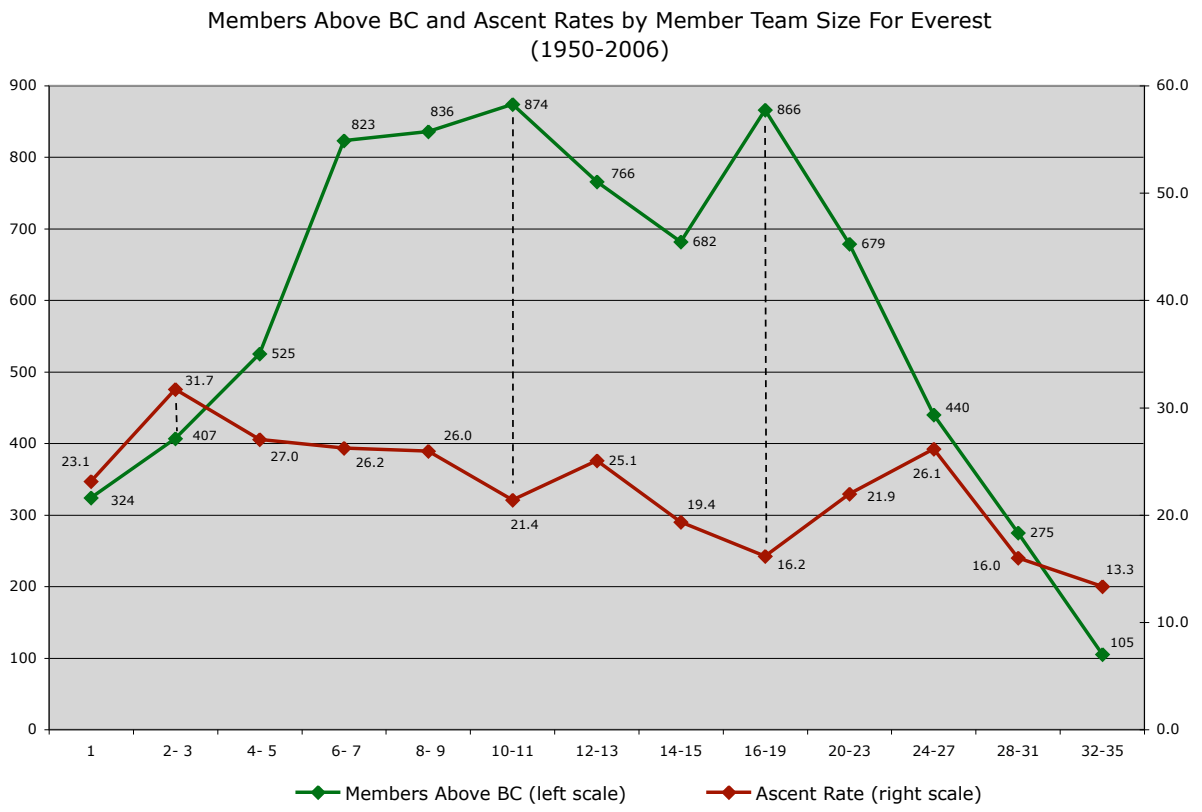


Chart A-33: Ascent rates by member team size for Everest from 1950-2006 (the horizontal scale is the member team size; the green line is the total number of members above BC for each team size increment; the red line is the ascent rate for each team size increment)

For all peaks without Everest, the most successful team size was 2-3 members with an ascent rate of 37.8%, but only 2075 members that went above base camp were in teams of this size. Teams of 6-7 members sent the most members above base camp (5311), but had a lower ascent rate of 28.0%. The spike at team size 28-31 with a 46.0% ascent rate is due to the three large Ama Dablam and Kangchenjunga expeditions discussed above.

For Everest, the most successful team size again was 2-3 members with an ascent rate of 31.7%, but only 407 members that went above base camp were in teams of this size. Teams of 10-11 and 16-19 members sent the most members above base camp (874 and 866), but had lower ascent rates (21.4% and 16.2%).

Average Expedition Duration and Days to Summit

Charts A-34a-g show average duration (the time from arrival at base to departure from base camp) for successful expeditions (the **blue** lines in the charts) and the average number of days taken to reach the team's first summit (the **green** lines) for the period from 1970 to 2006. These charts show the times for all peaks, the 6000ers, 7000ers, and 8000ers, Ama Dablam, Cho Oyu, and Everest. They may be used as indicator of how long an expedition should plan to be on the mountain in order to succeed in their summit quest. The quickest and longest time for each peak are given in Table A-36. The quickest times should not be confused with speed ascents, which are usually done several days or weeks after arrival at base camp and after proper acclimatization has been completed.

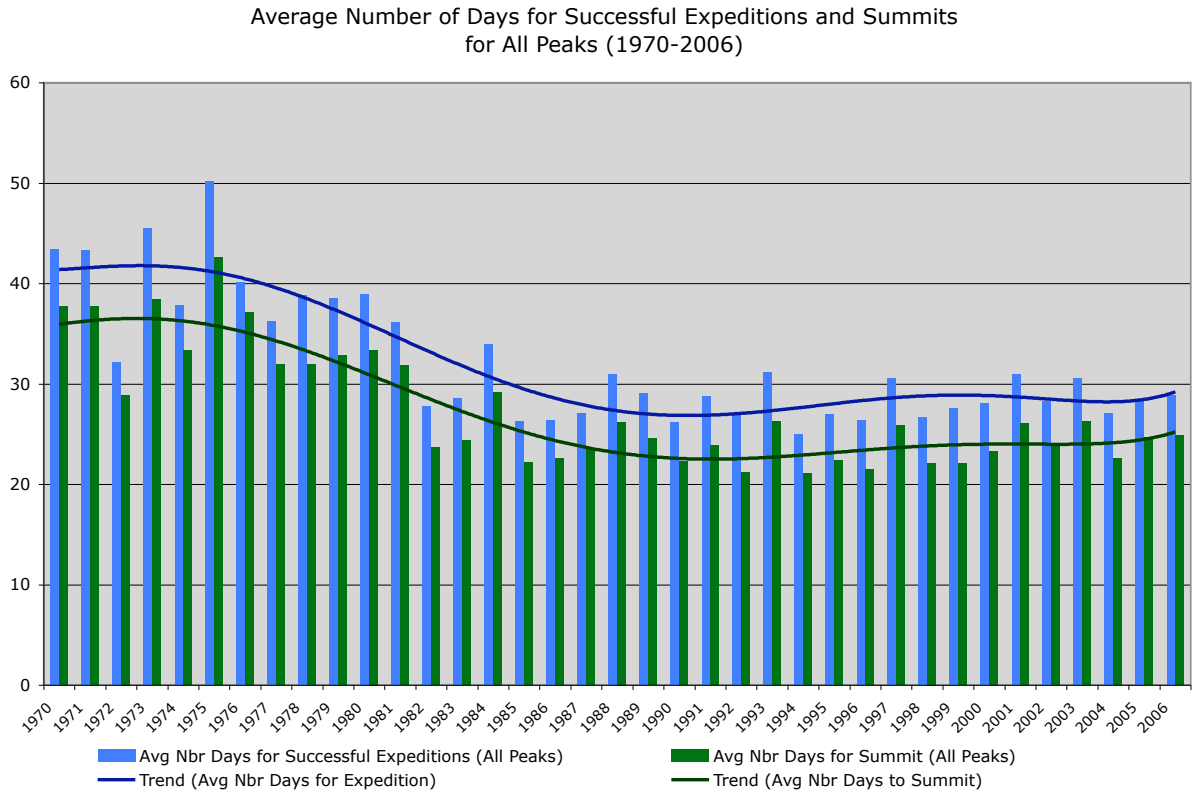


Chart A-34a: Average number days of successful expeditions and days to first summit for all peaks from 1970-2006

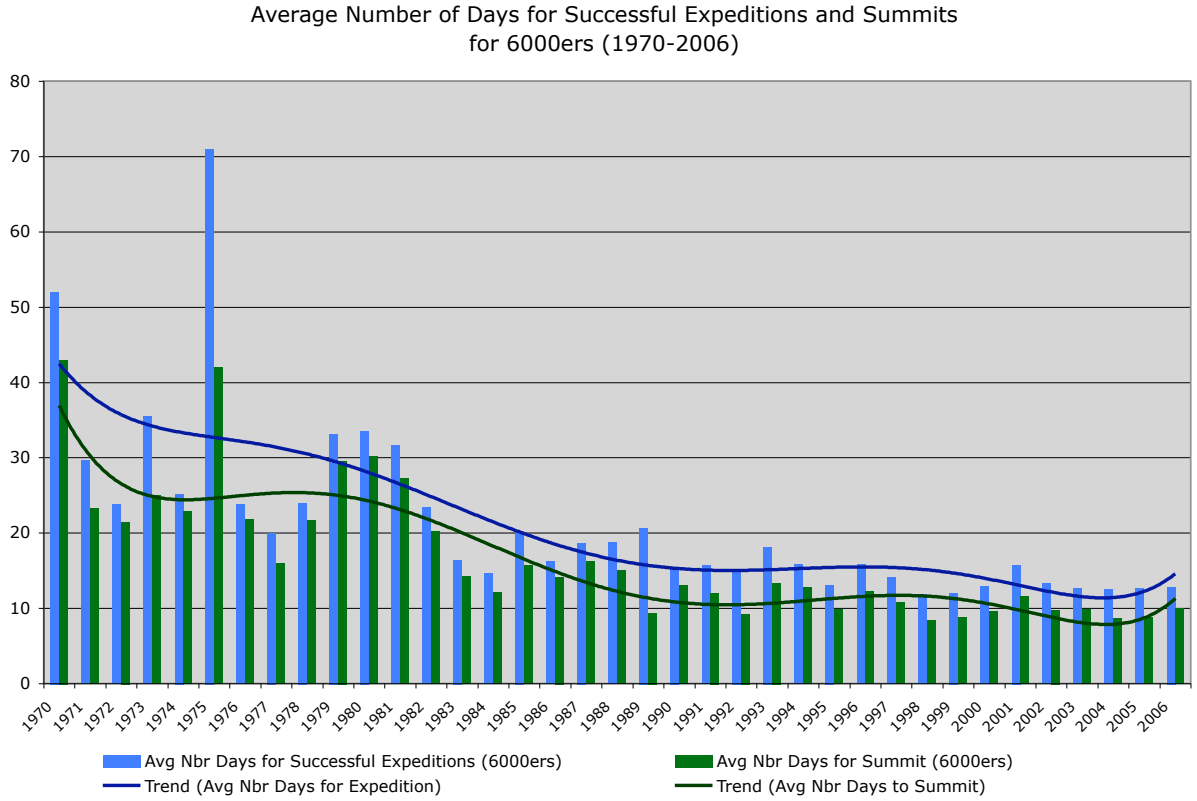


Chart A-34b: Average number days of successful expeditions and days to first summit for all 6000ers from 1970-2006

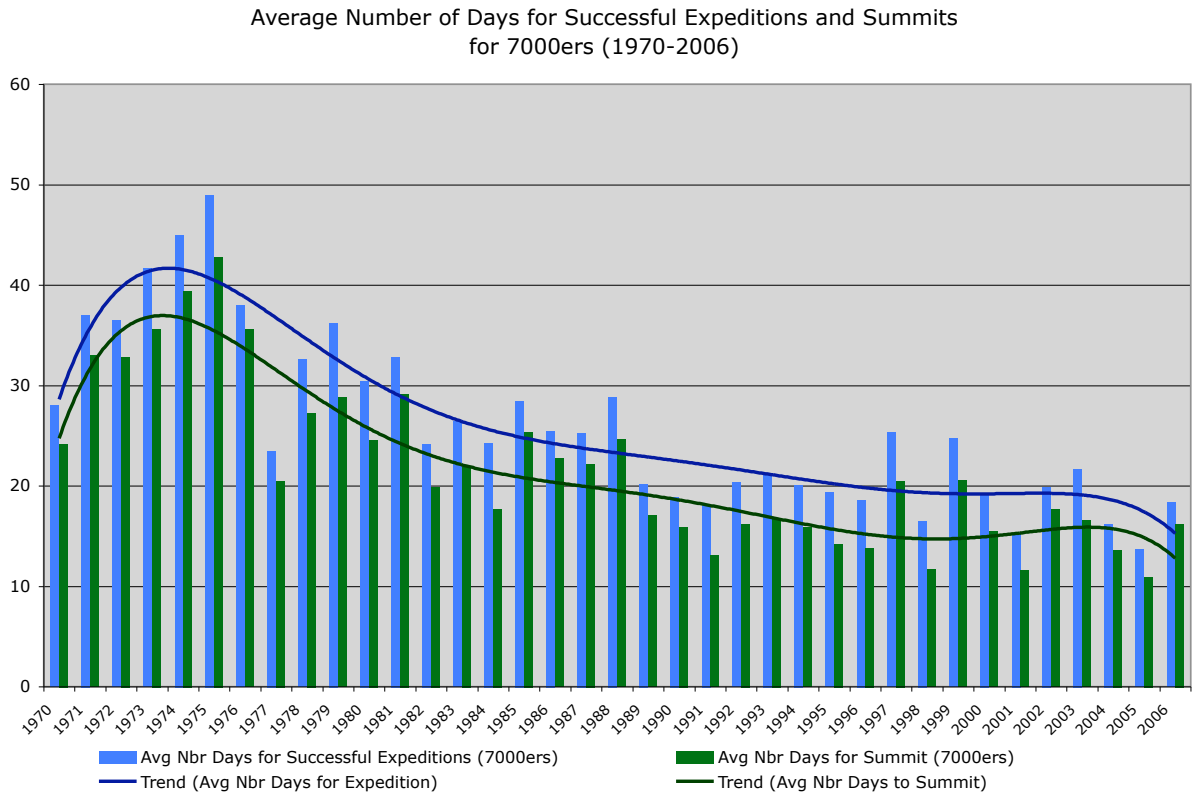


Chart A-34c: Average number days of successful expeditions and days to first summit for all 7000ers from 1970-2006

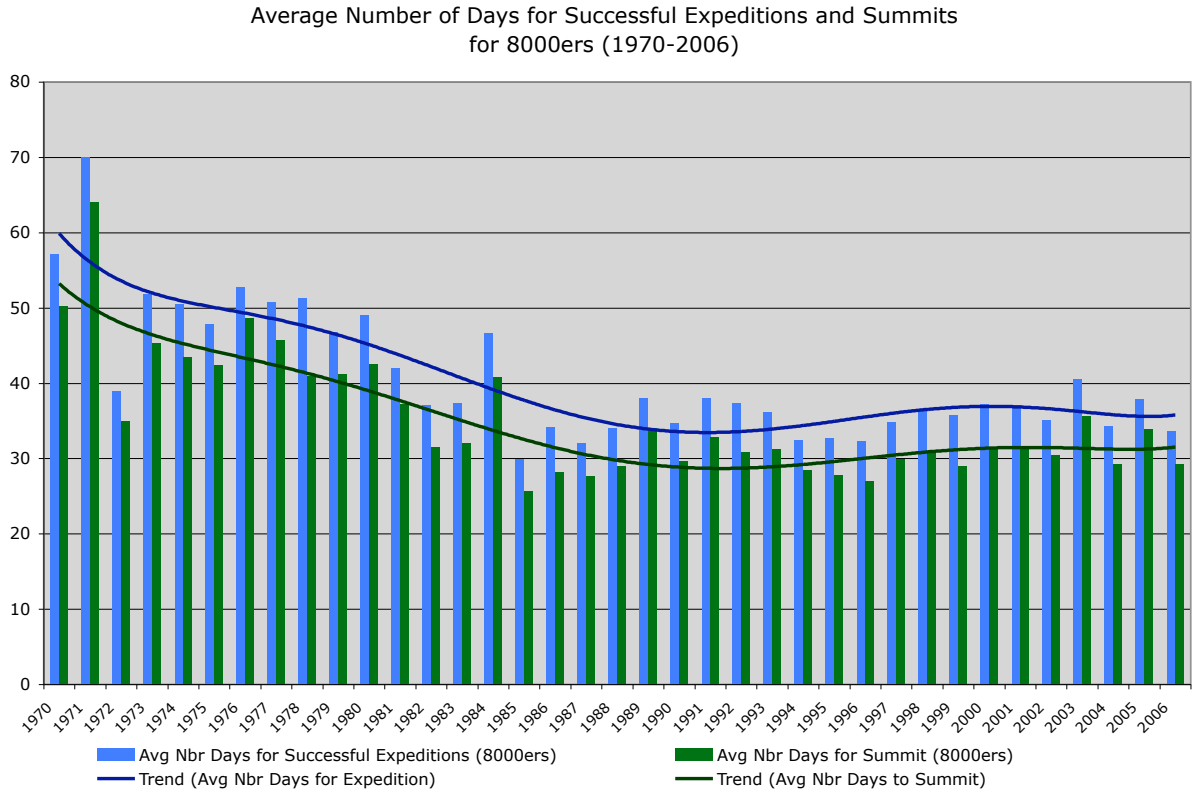


Chart A-34d: Average number days of successful expeditions and days to first summit for all 8000ers from 1970-2006

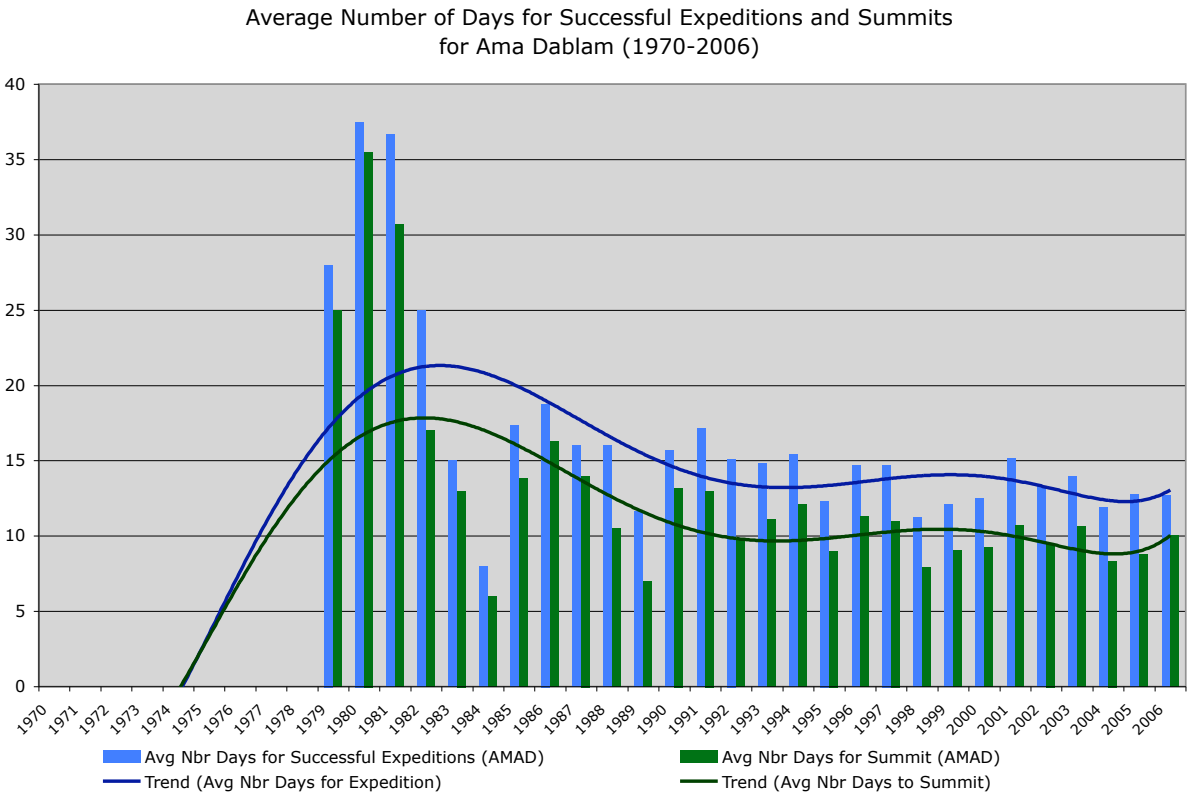


Chart A-34e: Average number days of successful expeditions and days to first summit for Ama Dablam from 1970-2006

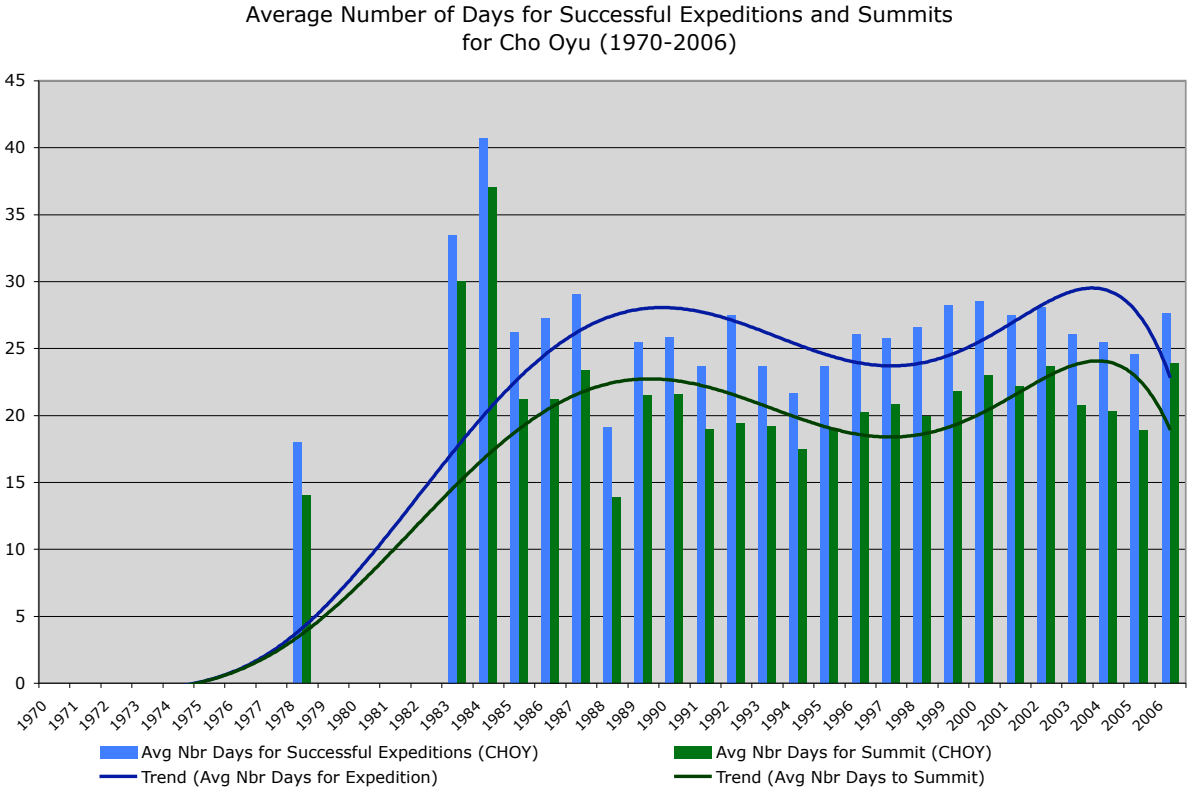


Chart A-34f: Average number days of successful expeditions and days to first summit for Cho Oyu from 1970-2006

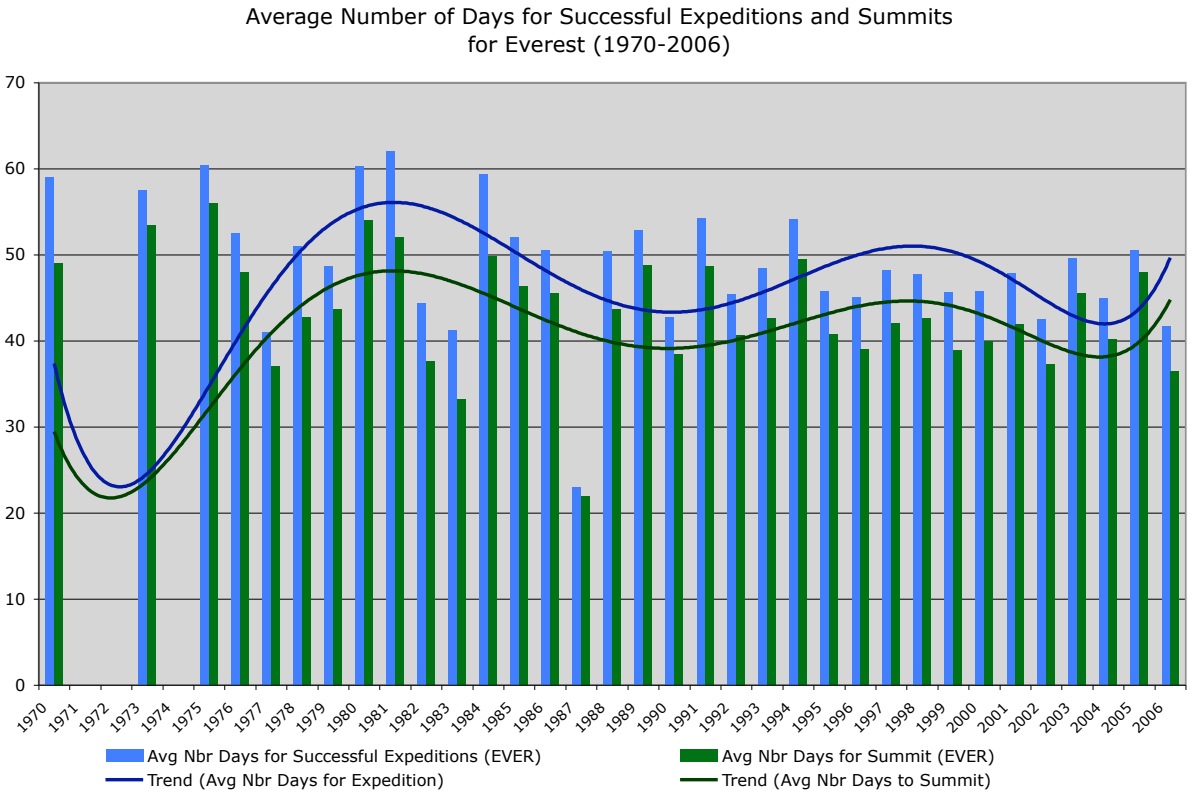


Chart A-34g: Average number days of successful expeditions and days to first summit for Everest from 1970-2006

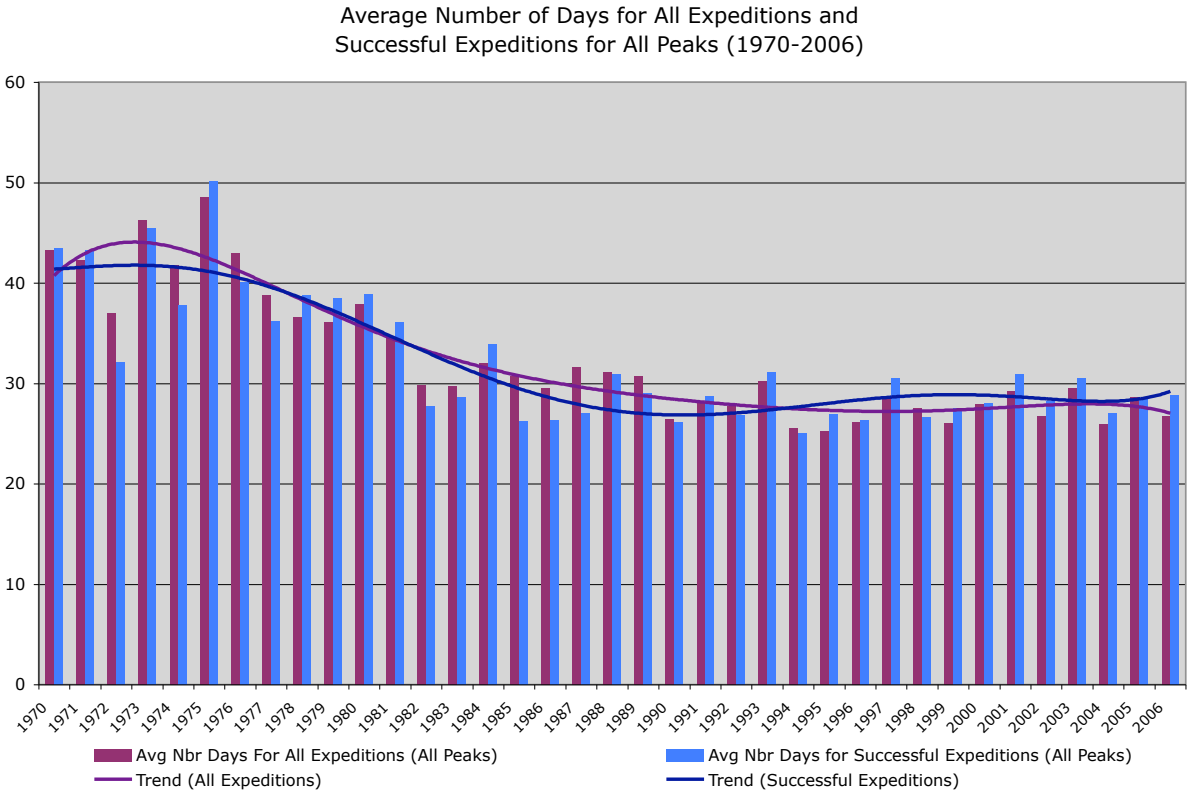


Chart A-35: Average number days of all expeditions and successful expeditions for all peaks from 1970-2006

Chart A-35 compares the duration of all expeditions to that of successful expeditions for all peaks from 1970 to 2006. The closeness of the two lines indicates that most unsuccessful expeditions do make a serious attempt at summiting before abandoning their climbs. Expeditions that did not reach base camp or made no attempt to climb are in not included in the data since many of these had no intention of summiting, for example, those expeditions holding multiple permits and using only some of them, or arriving at base camp and discovering conditions unsuitable for climbing.

Table A-36 shows climbing activity for popular peaks in Nepal (50 or more members above base camp), and for successful expeditions shows the average duration and number of days to summit, and the shortest and longest times to summit.

Peak ID	Peak Name	Height	Region	Exp Cnt	Mbrs Abv BC	Avg Suc Exp Days	Avg Smt Days	Min Smt Days	Max Smt Days
AMAD	Ama Dablam	6814	2	586	3275	13.8	10.3	1	42
ANN1	Annapurna I	8091	5	145	1037	31.4	27.7	3	62
ANN2	Annapurna II	7937	5	27	168	48.6	44.4	27	63
ANN3	Annapurna III	7555	5	31	218	30.2	26.2	16	46
ANN4	Annapurna IV	7525	5	70	560	25.2	21.5	8	64
ANNS	Annapurna South	7219	5	32	194	34.6	28.3	19	38
APIM	Api Main	7132	7	12	88	23.0	17.7	14	19
BARU	Baruntse	7152	2	144	922	15.9	11.7	1	33
BHRI	Bhrikuti	6361	5	11	74	5.6	3.8	1	8
CHAM	Chamlang	7321	2	10	66	25.4	21.4	15	28
CHOL	Cholatse	6440	2	14	83	19.4	13.1	2	23
CHOY	Cho Oyu	8188	2	829	4920	26.2	21.1	1	52
CHRE	Churen Himal East	7371	6	7	56	44.0	41.0	41	41
CHRW	Churen Himal West	7371	6	12	79	28.0	24.5	4	39
DHA1	Dhaulagiri I	8167	6	233	1538	32.6	27.5	3	64
DHA2	Dhaulagiri II	7751	6	14	93	39.3	32.0	28	36
DHA4	Dhaulagiri IV	7661	6	11	110	53.0	47.0	46	48
DHAM	Dhampus	6012	6	14	91	12.7	3.6	1	13
DORJ	Dorje Lhakpa	6966	3	25	143	20.9	17.3	7	36
EVER	Everest	8850	2	1015	7928	47.1	41.9	7	75
FANG	Fang	7647	5	8	68	41.0	35.0	35	35
GAN1	Ganesh I	7422	4	8	51	37.0	34.0	34	34
GAN2	Ganesh II	7118	4	10	61	31.0	28.0	27	29
GAN4	Ganesh IV	7104	4	9	66	27.0	24.0	16	40
GANC	Ganchempo	6387	3	13	53	19.3	16.0	6	28
GANG	Gangapurna	7455	5	22	144	37.4	30.6	19	44
GAUR	Gaurishankar	7135	2	21	142	34.0	31.7	30	34
GIMM	Gimmigela Chuli	7350	1	6	66	36.7	29.7	26	37
GLAC	Glacier Dome	7193	5	25	177	22.4	19.0	7	53
GURJ	Gurja Himal	7193	6	8	66	24.9	20.7	9	28
GYAC	Gyachung Kang	7952	2	12	90	31.0	25.0	21	32
HIME	Himalchuli East	7893	4	24	189	44.2	39.0	28	49
HIML	Himlung Himal	7126	5	22	154	15.3	9.2	4	17
JANU	Jannu	7711	1	44	280	37.2	33.9	6	60
JONG	Jongsang	7462	1	5	70	0.0	0.0	0	0
KANB	Kangbachen	7902	1	5	57	39.5	30.5	21	40
KANC	Kangchenjunga Central	8473	1	7	103	47.8	42.0	19	71
KANG	Kangchenjunga	8586	1	97	805	43.6	38.0	19	71
KANS	Kangchenjunga South	8476	1	5	79	47.5	41.3	18	72
KGUR	Kang Guru	6981	5	30	172	16.9	13.7	7	36
KIRA	Kirat Chuli	7362	1	6	56	0.0	0.0	0	0
KOTA	Kotang	6148	1	12	85	13.0	9.5	6	13
KTEG	Kangtega	6783	2	21	110	20.1	17.1	11	27
LAMJ	Lamjung Himal	6983	5	8	63	31.2	28.7	19	38
LANG	Langtang Lirung	7227	3	39	263	33.2	29.8	12	58

Peak ID	Peak Name	Height	Region	Exp Cnt	Mbrs Abv BC	Avg Suc Exp Days	Avg Smt Days	Min Smt Days	Max Smt Days
LEON	Leonpo Gang	6979	3	7	52	38.7	32.7	24	40
LHOT	Lhotse	8516	2	145	945	37.8	32.6	4	58
LSHR	Lhotse Shar	8382	2	30	23	45.9	40.9	31	50
LSIS	Langsisa Ri	6412	3	11	65	13.7	10.7	5	21
MAK2	Makalu II	7678	2	43	266	30.6	24.6	12	52
MAKA	Makalu	8485	2	178	1273	39.6	34.4	5	65
MANA	Manaslu	8163	4	190	1259	32.6	28.1	6	63
MANN	Manaslu North	7157	4	9	80	26.8	22.2	8	28
NEPA	Nepal Peak	7177	1	5	57	19.0	17.0	17	17
NILN	Nilgiri North	7061	5	13	80	26.2	21.6	13	32
NUMB	Numbur	6958	2	15	93	20.6	18.3	12	28
NUPT	Nuptse	7864	2	32	169	43.2	33.4	20	46
PK29	Peak 29	7871	4	8	87	35.0	32.0	32	32
PUMO	Pumori	7165	2	208	1254	18.2	14.6	2	45
PUTH	Putha Hiunchuli	7246	6	29	235	18.1	14.3	6	36
RATH	Rathong	6682	1	4	60	8.0	6.0	6	6
ROCN	Roc Noir	7485	5	8	66	43.0	33.0	19	44
SAIP	Saipal	7030	7	11	63	30.0	25.8	19	37
TAWO	Tawoche	6495	2	16	74	16.4	12.6	2	21
THAM	Thamserku	6618	2	13	55	20.6	18.8	2	33
TILI	Tilicho	7134	5	55	428	14.7	10.9	3	23
TUKU	Tukuche	6920	6	35	256	13.5	11.7	5	20
YALU	Yalung Kang	8505	1	18	174	40.3	34.4	23	54

Geographical Region Codes:

1 = Kangchenjunga-Janak
2 = Khumbu-Rolwaling-Makalu
3 = Langtang-Jugal
4 = Manaslu-Ganesh
5 = Annapurna-Damodar-Peri
6 = Dhaulagiri-Mukut
7 = Kanjiroba-Far West

Table A-36: Average duration and days to first summit for successful expeditions

Oxygen and the 8000ers

Charts A-37a-b show the percentage of ascents without the use of supplementary oxygen for each of the 8000m peaks for the 1950-1989 and 1990-2006 periods.

The 8000m peaks can be divided into three groups of peaks of similar altitude:

8091-8188 (Annapurna I, Manaslu, Dhaulagiri I, Cho Oyu)
8485-8486 (Makalu, Lhotse, Kangchenjunga)
8850 (Everest)

In general as shown in the following charts, the percentages of ascents without supplementary oxygen decrease with altitude as would be logically expected.

For members, the percentages of ascents without supplementary oxygen increase in 1990-2006 period over the 1950-1989 period for each peak except Everest and Cho Oyu (the commercially climbed peaks). For the commercial routes on Everest and Cho Oyu, the use of supplementary oxygen increases since most commercial clients are more interested in success than climbing style and route difficulty due to their general lack of experience and their relative high investment in the expedition in terms of cost and time. Many of them cannot devote more time to their climbing adventures due to other commitments in their lives.

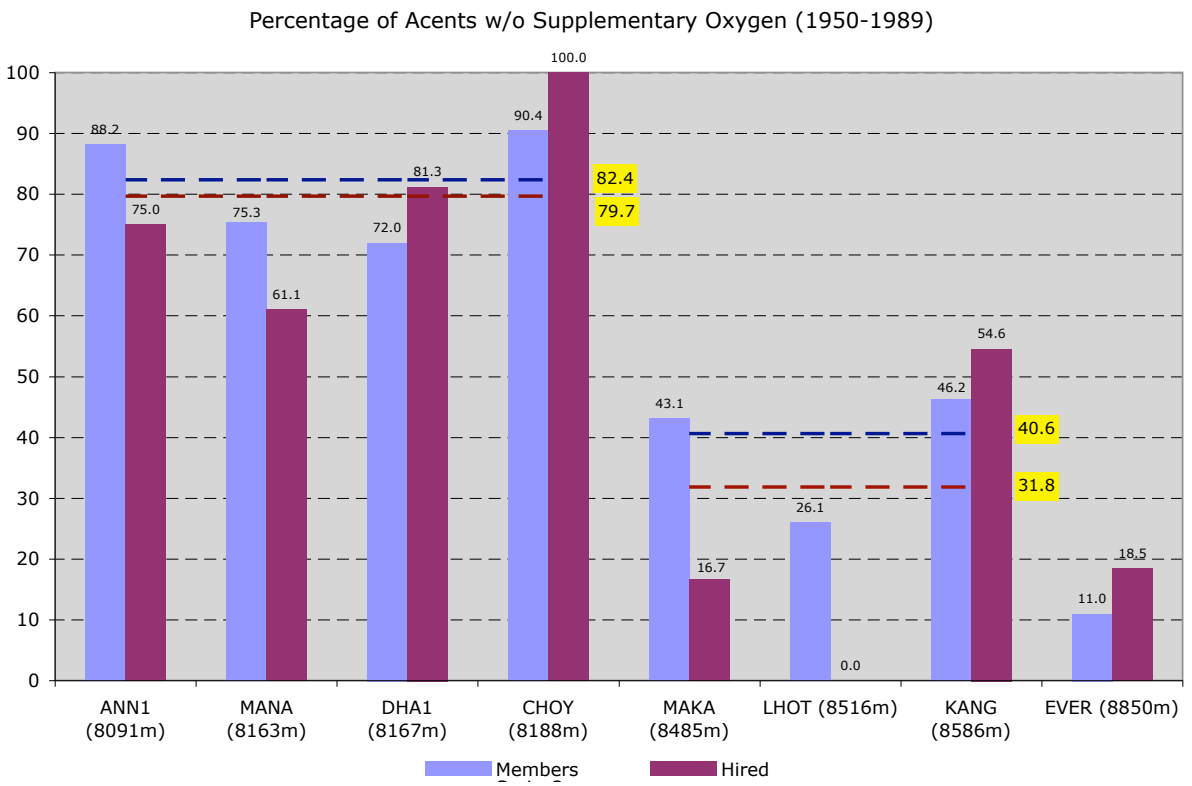


Chart A-37a: Percentage of ascents without supplementary oxygen for 8000m peaks from 1950-1989

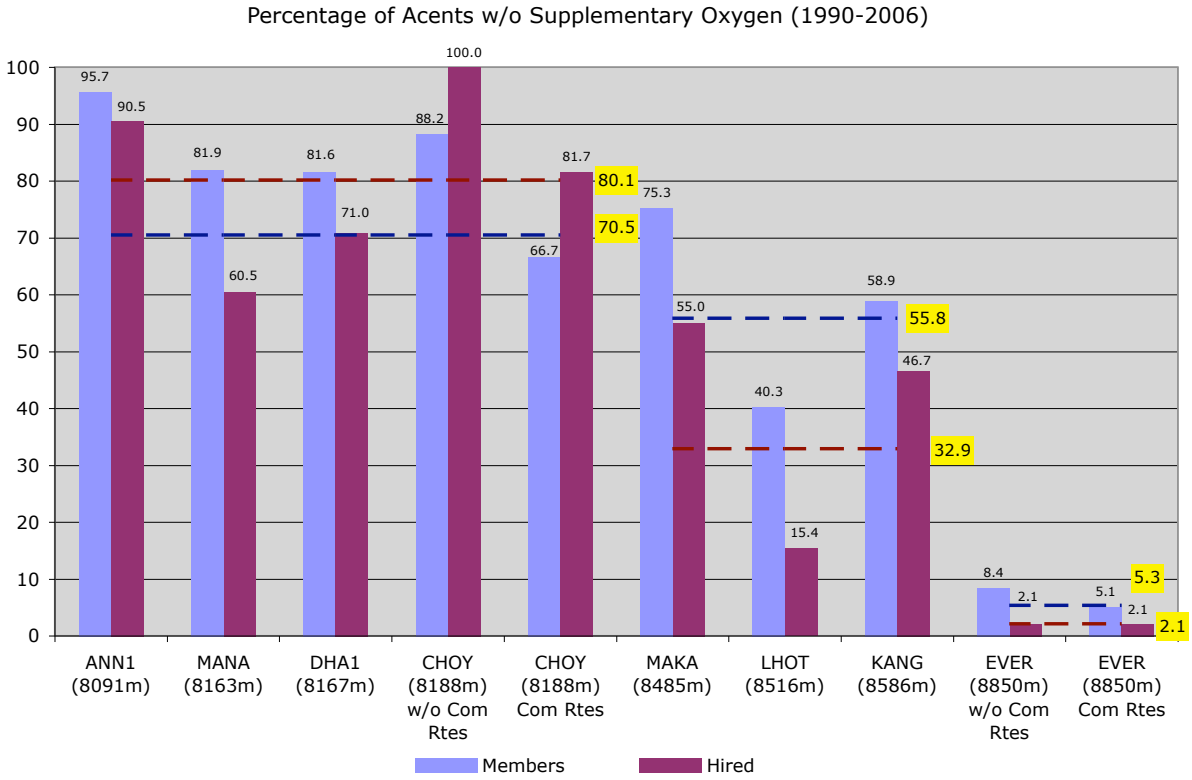


Chart A-37b: Percentage of ascents without supplementary oxygen for 8000m peaks from 1989-2006 with commercial routes separated out for Cho Oyu and Everest

Members have higher percentage of ascents without supplementary oxygen on the more difficult peaks than the hired most likely because many elite climbers do not climb with hired on their summit days, either because they are not using any hired on their expeditions or are using them only for establishing the lower camps. During the 1990-2006 period, the average percentage of ascents for hired (80.1%) in the 8091-8188m group is higher than members (70.5%) only because of the heavy use of hired on Cho Oyu, the easiest of the 8000ers (see Charts A-37a-b).

A Contrast of Styles

From *The Seasonal Stories* of Elizabeth Hawley – Spring 1988

The contrast was startling. A massive expedition went to Mount Everest in the spring of 1988 with 252 members and a budget of probably $7 million to spend on climbing and live television coverage. At the very same time there was another team of just four men whose funds probably totaled no more than two or three percent of that amount. Both succeeded.

The little one, composed of two Americans, one Briton and a Canadian, put the British climber, Stephen Venables, on the top the world by a new route up the vast east face of the mountain, a face which had been scaled successfully only once before. The huge expedition of Japanese, Chinese and Nepalese sent 14 members to the summit by the two easiest routes on Everest that had been conquered before them by a total of nearly 150 men and women. The big party got the television coverage and a series of gala victory celebrations in three nations' capitals while the little group quietly went their separate ways home.

The four-man team who made the remarkable oxygen-less ascent of Everest's east face from Tibet could well have been the subject of such a debate themselves, but all of them survived. They were able to find a line up a previously unclimbed buttress, which they have called the Neverest (Everest/Never-rest) Buttress, that provided a direct route to the South Col, and here they came to the normal route from the south side up the southeast ridge. They reached the Col on May 10 and pitched their small tent there at nearly 8000 meters.

One of the four, the Canadian, Paul Teare, realized he was developing altitude sickness, and next morning he descended the whole east face entirely alone. He reached their advance base camp safely in seven hours and recovered swiftly. Meanwhile the other three spent the day at the Col waiting for the winds to lessen and were finally able to set out for the summit at 11:00 that night.

In the lead was Stephen Venables, 34-year-old mountaineering writer and lecturer from London, who plodded on and on up the southeast ridge and finally found himself at the highest summit in the world at 3:40 the following afternoon. His two friends, expedition leader Robert Anderson, an American who lives in New Zealand, and the team's other American, Edward Webster, from Colorado, had turned back in the deteriorating weather, and they took refuge that night of May 12/13 in a tent that the tri-national team had left at 8300 meters. Venables had to spend the night out without shelter when he could not find the way back to the South Col in the misty weather; he made his unprepared bivouac at a point that was about 200 meters above the tent his friends were in.

On the 13th Venables caught up with the other two and all three reached their tent at the Col, where they rested for the remainder of the day and the night before beginning their very slow descent of the face. It was not until the 17th and 18th that they separately managed at last to get down to advance base camp, delayed by new snowfall and their own exhaustion, starved for food and liquids and frostbitten.

Venables had realized when he set out from the Col for the summit that he was beginning to have no feeling in his toes. He took the conscious decision to carry on anyway; he may

lose the tips of five frostbitten toes. Webster, a professional photographer, had taken great pains to get his shots just right, and he will probably lose the ends of five fingers. Anderson suffered milder frostbite. But all of them did manage to get down alive.

There could be no debate over anyone being left anywhere on their mountain by the Chinese-Japanese-Nepalese Everest team, for there were too many camps, climbers, walkie-talkie radios, oxygen bottles and support staff at the two base camps, one on the north side and the other on the south, for that. In addition with three nations' governments and climbing establishments were involved in their climb, detailed planning had been done months in advance – the Japanese climber who would make the first north-south traverse had already been chosen well before departure from Japan – and the expedition's tri-national commanders, sitting in Peking, could radio instructions to their climbing leaders on the scene. In fact, with an elaborate command structure, a small village of support personnel (cooks, doctors, interpreters, radio operators) plus television and newspaper journalists and technicians at each base camp and 176 people climbing above their bases, it is a wonder that the whole enterprise did not collapse of its own weight before the mountain could be climbed.

But collapse it did not, and no doubt a large amount of credit goes to the two Japanese climbing leaders, Tsuneo Shigehiro on the north side in Tibet in charge of progress via the North Col and the northeast ridge, the classical route of the first British efforts in the 1920s and 1930s, and Gota Isono managing the climb from Nepal in the south via the South Col and the southeast ridge, the route pioneered 35 years ago by Hillary and Tenzing. Fourteen men succeeded in gaining the summit, nine from the north and five from the south, on May 5 and 10. Six of them descended the opposite sides from which they had come up.

First on the top on May 5 were the north-south traverse team of one man from each of the three nations, Noboru Yamada from Japan in his third Everest ascent, Lhakpa Nuru Sherpa (also known as Ang Lhakpa) of Nepal, and a Tibetan, Cering Doji, representing China. They waited an hour on the summit, but when neither the south-north traverse party nor the television crew for live telecasting from the top of the world had appeared, they began their descent of the southern route, the first people ever to cross Mount Everest from one side of the Sino-Nepalese border to the other by way of the summit.

As they were about to make their way down the southeast ridge, which Yamada had climbed twice before, the first member of their so-called support team, meant to be bringing them fresh supplies of oxygen, arrived at the summit; these three men later descended the route they had climbed. The Chinese in this support party, Li Zhixin, the only non-Tibetan amongst the four Chinese citizens to make it to the top, had not actually carried out his support role, for he had brought oxygen only for himself. Apparently it was politically necessary for at least one Han Chinese (an ethnic Chinese, not of a minority race like the Tibetans) to stand on the summit, and to ensure this, Li had not burdened himself with an extra bottle for anyone else.

Last to arrive at the top from the north side were the three-man Japanese television crew whose live telecast from the highest point on earth, the first ever achieved in Everest climbing history, was the reason Nippon Television Networks Corporation had put up millions of dollars worth of financing for this expedition. The arrangements for the television coverage were most elaborate with tons of costly sophisticated equipment including a satellite dish at the northern base camp and a specially devised climber's helmet with a very light camera attached. Unfortunately the summiting cameraman forgot to bring along the helmet: the camera actually used on the summit was a conventional hand-held unit.

The day's last arrivals at the summit were the south-north traverse team of two Tibetan Chinese and a Nepalese Sherpa, and when they reached the top the cameraman was able to show to the watching world their last slow, tired steps as they made their way with

considerable effort through deep snow on the southeast ridge.

After May 5's major successes from the expedition's commanders' point of view, the double traverse of the mountain and the first live television pictures from the summit, the leadership decided that the men poised for subsequent ascents should be instructed that the climb was over. The leadership wanted to call a halt while the safety record was so good – no accidents, no frostbite and no serious illness except for the fatal heart attack of a base-camp doctor whose death was not related to the climb. But this decision was greeted with dismay by Japanese climbers, who had paid to come on the expedition and were ambitious for their own summit successes, and by Nepalese Sherpas keen to set more records for the number of times they had been to the top of the world. The Japanese climbing leadership on the spot managed to keep discipline amongst their compatriots, but six Nepalese on the south side rebelled – it was their country after all – and made their own summit bid on May 10. Two men succeeded; one of them was Sungdare Sherpa, who became the first person ever to conquer Everest five times.

The summiters and their leaders were showered with congratulations, awards and victory celebrations in Kathmandu, Peking and Tokyo. King Birendra of Nepal bestowed high decorations on them, Chinese premier Li Peng and the acting prime minister of Japan, Keizo Obuchi, received them at gala functions. Their success had been a great historic mountaineering achievement, it was said, and a glorious contribution to international friendship. "It is an historic feat and an example of human success in conquering nature," said Mr. Obuchi. A Nepalese government minister noted that "the feat coincidentally marks the 35th anniversary of the first ascent of Sagarmatha. If in 1953 with the success of human beings on Sagarmatha, mountaineering history was written, today the joint expedition has added yet another chapter by achieving the unique feat of traversing the peak simultaneously from the southern and northern sides. ... The success of this expedition is the tale of the indomitable human spirit and the coordinated work of all the members from China, Japan and Nepal."

But was it really a magnificent accomplishment? Sir Edmund Hillary, the 1953 conqueror, seems to dissent. While the expedition was getting underway in March, he expressed a strong lack of enthusiasm for its goal: "A double traverse is not very impressive. ... I think it's a massive undertaking and I personally think a singularly unattractive one. You've got hundreds of people milling around on the mountain, and it's not all that big a deal climbing the easiest two routes and descending the easiest routes already prepared. They're spending more money on the expedition than anyone has ever spent before. Maybe that's the most unusual aspect of it. ... "

"Mountaineering traverses are certainly highly regarded only when a party climbs up one route and descends a side of the mountain they don't have a prepared route down. ... I find it extremely difficult to get the least bit excited about this massive traverse, and I think this would be the attitude of most climbers throughout the world. We all know the Nepalese climbers can climb it, and all they have to do is trundle down the other side. ... I think mountaineering is at its best when the people involved have raised the money themselves, planned it themselves, and climbed it themselves. I find the whole project basically unattractive. I'm just glad we climbed Everest 35 years ago when we didn't have all this hullabaloo going on."

Death Analysis

This chapter analyzes deaths on the principle peaks in the Nepal Himalaya, those peaks officially open for mountaineering and a few additional peaks with significant activity. Border peaks such as Everest, Cho Oyu, and Kangchenjunga are included for expeditions from the Nepalese, Chinese, and Indian sides of the border. The tables and charts cover the period from 1950 through 2006 unless specified otherwise.

Deaths for members and hired personnel are analyzed by several different categories: peak altitude, geographical region, climbing season, causes of death, age, historically over time, citizenship, and gender. Death rates are given for the most popular peaks. Ascents are also analyzed by team composition, that is, the number of members and hired personnel on an expedition and the ratio between the two.

Particular attention is given to avalanches, falls, and physiological factors, the leading causes of death in the Himalaya.

Deaths by Peak Altitude Ranges

Table D-1 shows death counts and rates for members and hired personnel for all peaks from 6000m to 8850m pooled in 500m increments from 1950 to 1989 and 1990 to 2006.

Peak Altitude Range	Members			Hired		
1950-1989	**Above BC**	**Death Cnt**	**Death Rate**	**Above BC**	**Death Cnt**	**Death Rate**
6000-6499m	609	5	0.82	227	0	0.00
6500-6999m	1573	17	1.08	512	4	0.78
7000-7499m	2521	68	2.70	881	14	1.59
7500-7999m	1833	60	3.27	861	18	2.09
8000-8499m	3197	104	3.25	1440	39	2.71
8500-8850m	3451	75	2.17	2705	47	1.74
	13184	**329**	**2.50**	**6626**	**122**	**1.84**
1990-2006						
6000-6499m	556	0	0.00	156	0	0.00
6500-6999m	3620	18	0.50	889	16	1.80
7000-7499m	3099	32	1.03	715	16	2.24
7500-7999m	744	11	1.48	217	0	0.00
8000-8499m	7316	89	1.22	2049	27	1.32
8500-8850m	6401	92	1.44	4379	30	0.69
	21736	**242**	**1.11**	**8405**	**89**	**0.92**
6500-6999m w/o 2005 KGUR accident	3613	11	0.30	886	5	0.56

Table D-1: Member and hired deaths for peak altitude ranges (6000-8850m) from 1950-1989 and 1990-2006

The table also shows the effect of a single catastrophic accident on Kang Guru (6981m) in 2005 that claimed the lives of 7 members and 11 hired (61% of the hired death count in the 6500-6999m range for the 1990-2006 period), which greatly affects hired death rates as illustrated in the charts that follow.

Chart D-1a shows member and hired death rates from 1950 to 1989. The member death rates top out in the 7500-7999m range at 3.27% and in the 8000-8499m range

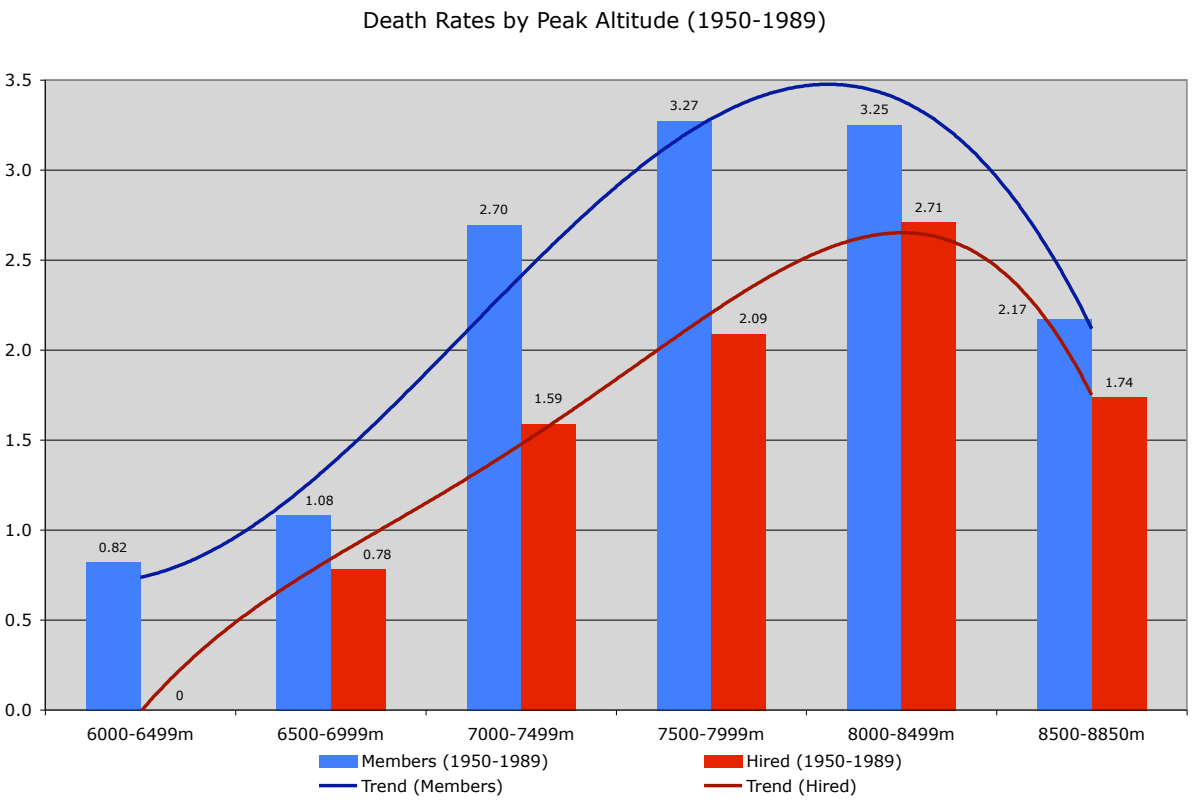


Chart D-1a: Member and hired death rates for all peaks from 1950-1989

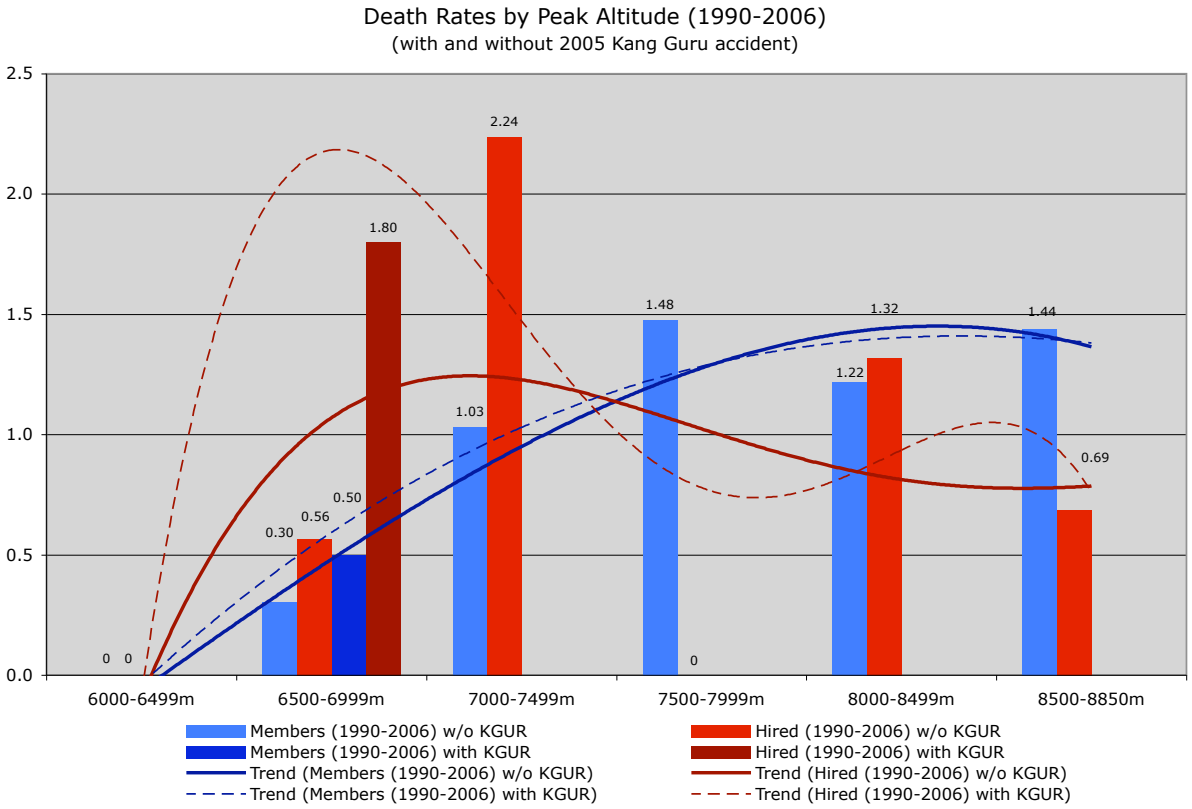


Chart D-1b: Member and hired death rates for all peaks from 1990-2006 with and without the 2005 Kang Guru accident

at 3.25% and then decline at the highest altitudes, while the hired death rates top out at 2.71% in the 8000-8499m range, suggesting that the 7500-8499m peaks are the deadliest for members while the 8000-8499m peaks are the deadliest for hired personnel. Hired personnel also fare better than members in all altitude ranges.

Chart D-1b shows member and hired death rates from 1990 to 2006, showing the death rates both when the 2005 Kanguru accident is included and excluded. Death rates for members have decreased in all groups when compared to the 1950-1989 period. Death rates for hired generally have decreased from the those of the 1950-1989 period except in the 6500-6999m range (and only when the Kang Guru accident is included) and in the 7000-7499m range. But in the 7500-7999m range, the hired death rate has dropped to zero, most likely due to the fewer hired personnel used above base camp by more recent expeditions attempting the 7000ers in alpine style.

When the commercial routes for Ama Dablam, Cho Oyu, and Everest are separated out in the 1990-2006 period, a different picture emerges as shown in Table and Chart D-2. The early 1990s coincide with the increase in popularity of commercial climbing, which has contributed significantly to the numbers of climbers going above base camp (53% of all climbers above base camp were on the commercial routes of one of these three peaks after 1990).

	Members			Hired		
1990-2006	**Above BC**	**Death Cnt**	**Death Rate**	**Above BC**	**Death Cnt**	**Death Rate**
6000-6499m	556	0	0.00	156	0	0.00
6500-6999m w/o Ama Dablam Com Rte	924	10	1.08	260	13	5.00
7000-7499m	3099	32	1.03	715	16	2.24
7500-7999m	744	11	1.48	217	0	0.00
8000-8499m w/o Cho Oyu Com Rte	2976	67	2.25	867	24	2.77
8500-8850m w/o Everest Com Rtes	1852	28	1.51	999	8	0.80
Totals w/o Commercial Routes	**10151**	**148**	**1.46**	**3214**	**61**	**1.90**
Ama Dablam Commercial Route	2696	8	0.30	629	3	0.48
Cho Oyu Commercial Route	4340	22	0.51	1182	3	0.25
Everest Commercial Routes	4549	64	1.41	3380	22	0.65
Totals with Commercial Routes	**11585**	**94**	**0.82**	**5191**	**28**	**0.54**

Table D-2: Deaths for peak altitude ranges (6000-8850m) from 1990-2006 with Ama Dablam, Cho Oyu, and Everest commercial routes separated out (and excluding the 2005 Kang Guru accident)

Comparing Charts D-1b and D-2, one can see that the death rates are higher when the Ama Dablam, Cho Oyu, and Everest commercial routes are removed and more closely resemble what one would expect for Himalayan climbing.

In Chart D-2 the death rate continues to climb into the 8000m-8499m range topping out at 2.33% for members and 2.85% for hired, then declines for the very highest peaks. Note that if the 2005 Kang Guru accident were not excluded, the highest death rate for hired would be in the 6500-6999m range at 5.00%.

The three most dangerous peaks, Annapurna I, Manaslu, and Dhaulagiri I (see Table D-3) are in the 8000m-8499m range and their death rates are strongly affected by avalanches (see the later section on avalanche deaths).

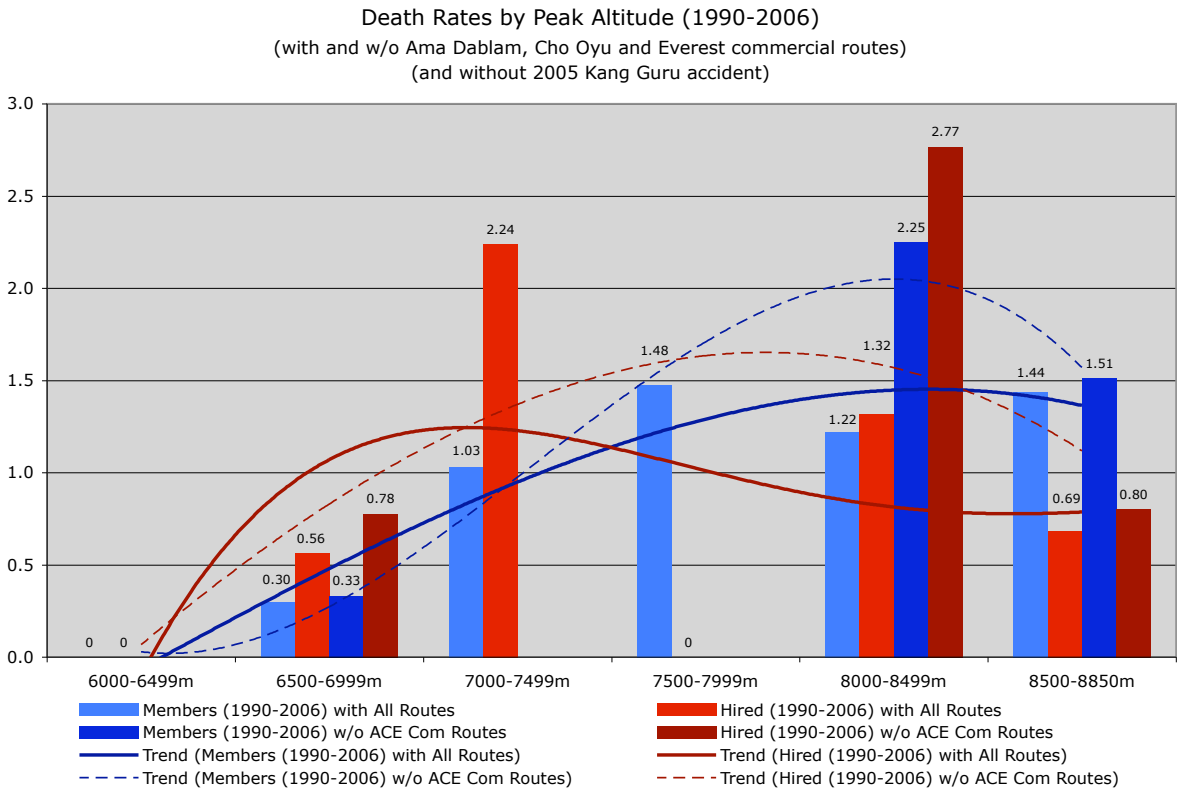


Chart D-2: Member and hired death rates from 1990-2006 with Ama Dablam, Cho Oyu, and Everest commercial routes separated out and excluding the 2005 Kang Guru accident (the dashed moving averages are inserted from Chart D-1b)

The death rates for Ama Dablam, Cho Oyu, and Everest are lower than the other peaks in their respective altitude ranges suggesting that they are relatively safer. But this appearance of safety may be due to the fact that the vast majority of the climbers are on the easiest and safest routes and in many cases under the supervision of experienced commercial guides or Sherpas. During the 1950-1989 period before commercial climbing become common and when other more challenging routes were being attempted in higher proportions, the death rates on Ama Dablam, Cho Oyu, and Everest were much higher.

Deaths on Popular Peaks

Table and Chart D-3 give the death rates for the most popular peaks in Nepal, those peaks with more than 750 members above base camp (roughly equivalent to 75 or more expeditions).

Ama Dablam and Cho Oyu are significantly safer for members than the mean (average) of 1.64% for all peaks (in black), while Everest is very close to the mean for all peak. For two other peaks that are often climbed commercially, Baruntse is very safe at 0.43% while Pumori is more dangerous at 2.55%.

	Exped Cnt	Members			Hired			Total		
		Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate
BARU (7152m)	144	922	4	0.43	251	5	1.99	1173	9	0.77
AMAD (6814m)	586	3275	15	0.46	725	3	0.41	4000	18	0.45
All 6000ers	1148	6358	40	0.63	1784	20	1.12	8142	60	0.74
CHOY (8188m)	829	4920	32	0.65	1366	9	0.66	6286	41	0.65
LHOT (8516m)	145	945	9	0.95	592	1	0.17	1537	10	0.65
EVER (8850m)	1015	7928	129	1.63	6033	67	1.11	13961	196	1.40
All Peaks	5241	34920	571	1.64	15031	211	1.40	49951	782	1.57
MAKA (8485m)	178	1273	22	1.73	516	12	2.33	1789	34	1.90
All 8000ers	2902	20365	360	1.77	10573	143	1.35	30938	503	1.63
All 7000ers	1191	8197	171	2.09	2674	48	1.80	10871	219	2.01
PUMO (7165m)	208	1254	32	2.55	251	9	3.59	1505	41	2.72
DHA1 (8167m)	233	1538	43	2.80	478	15	3.14	2016	58	2.88
KANG (8586m)	97	805	24	2.98	357	7	1.96	1162	31	2.67
MANA (8163m)	190	1259	41	3.26	510	13	2.55	1769	54	3.05
ANN1 (8091m)	145	1037	43	4.15	397	15	3.78	1434	58	4.04

Table D-3: Deaths for peaks with more than 750 members above base camp from 1950-2006 ordered by increasing member death rate

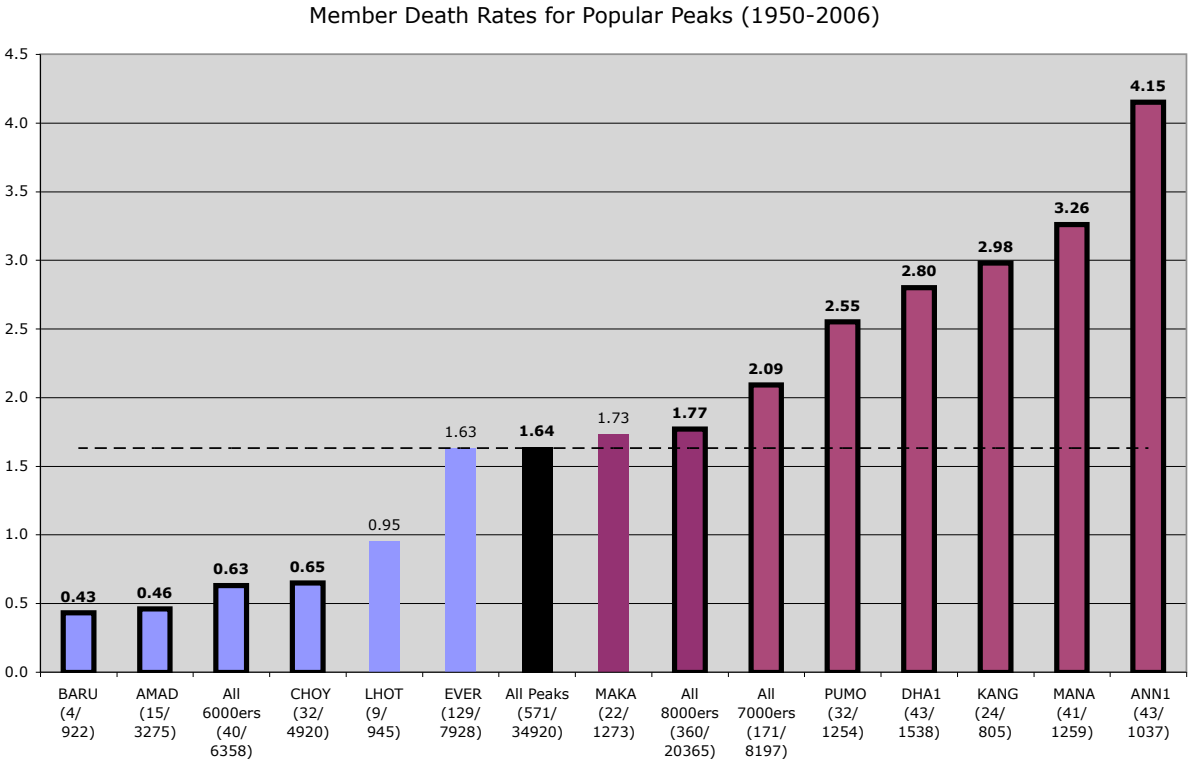


Chart D-3: Member death rates for popular peaks from 1950-2006 with more than 750 member climbers above base camp (the death rate is above the column bar; the death and above BC counts are below)

The columns outlined in black in the above chart and in the six charts that follow for the deadliest 6000ers, 7000ers, and 8000ers for members and hired represent peaks or groups of peaks that statistically have either significantly higher (in **red**) or lower (in **blue**) death rates than the mean death rate for all peaks (in black). Statistical significance means that there is less than a 5% probability that the result occurred by chance. For the non-outlined peaks, the death rates can be considered as only anecdotal evidence of higher or lower death rates than the mean rate for all peaks.

Deadliest Peaks for Members

The next group of charts shows member death rates for the deadliest peaks in Nepal, those peaks with member death rates above average and with some significant amount of climbing activity.

Chart D-4 shows the 6000m peaks with member death rates above average for peaks with 25 or more members above base camp. All of these peaks have death rates higher than the mean death rate of 0.63% for all 6000ers.

But it should also be noted that most 6000m peaks only have one or two member deaths, which means that a single accident can easily alter the results. Only Langsisa Ri with three Japanese deaths in 1973, Kang Guru with seven French deaths in 2005, and Ama Dablam with and one British and two Swedish deaths in 2006 have more fatalities, all of which occurred in single avalanche accidents; the two Austrian deaths on Chobutse also were the result of a single avalanche. Langsisa Ri, Kang Guru, and Chobutse are the only peaks with statistically significantly higher death rates given the number of deaths and the numbers of climbers attempting the peak.

Chart D-5 shows the 7000m peaks with member death rates above average for peaks with 75 or more members above base camp. All of these peaks have death rates equal to or higher than the mean death rate of 2.10% for all 7000ers.

Dhaulagiri IV (7661m) has the highest death rate for members with nearly four times the mean. Five of the nine member deaths on Dhaulagiri IV occurred in one accident

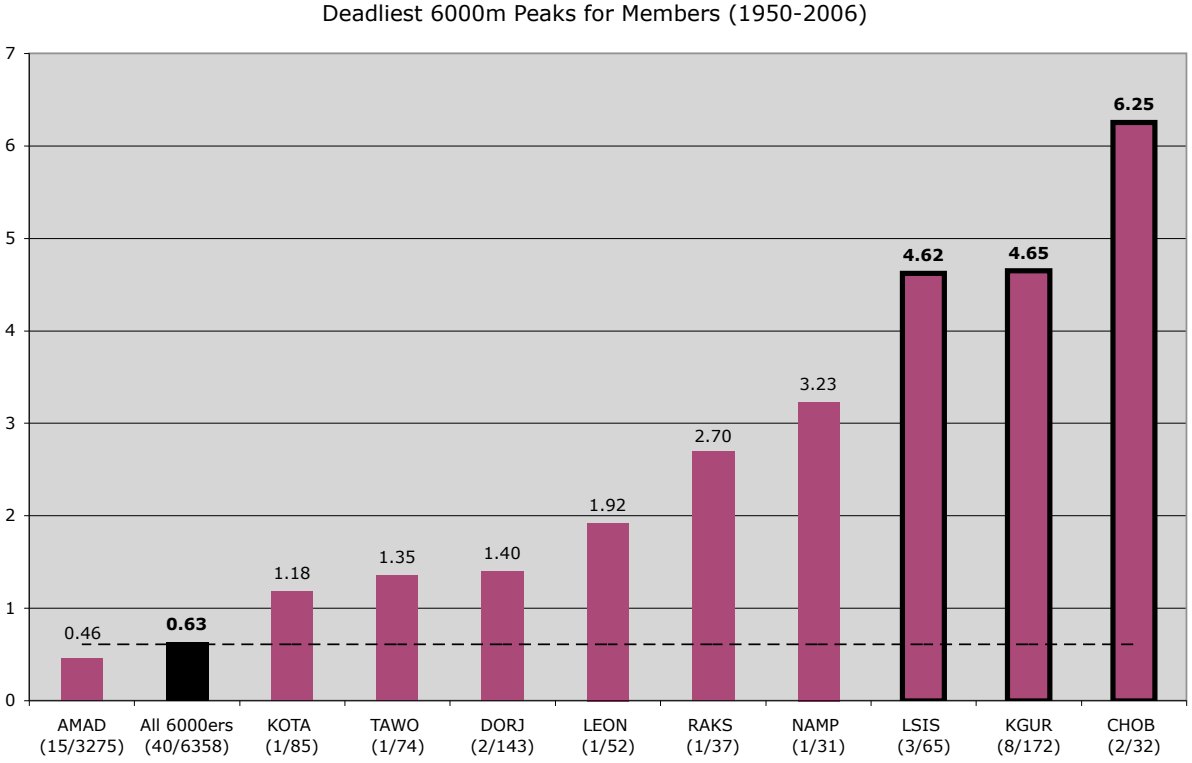


Chart D-4: Member death rates for selected 6000m peaks with 25+ members above base camp from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

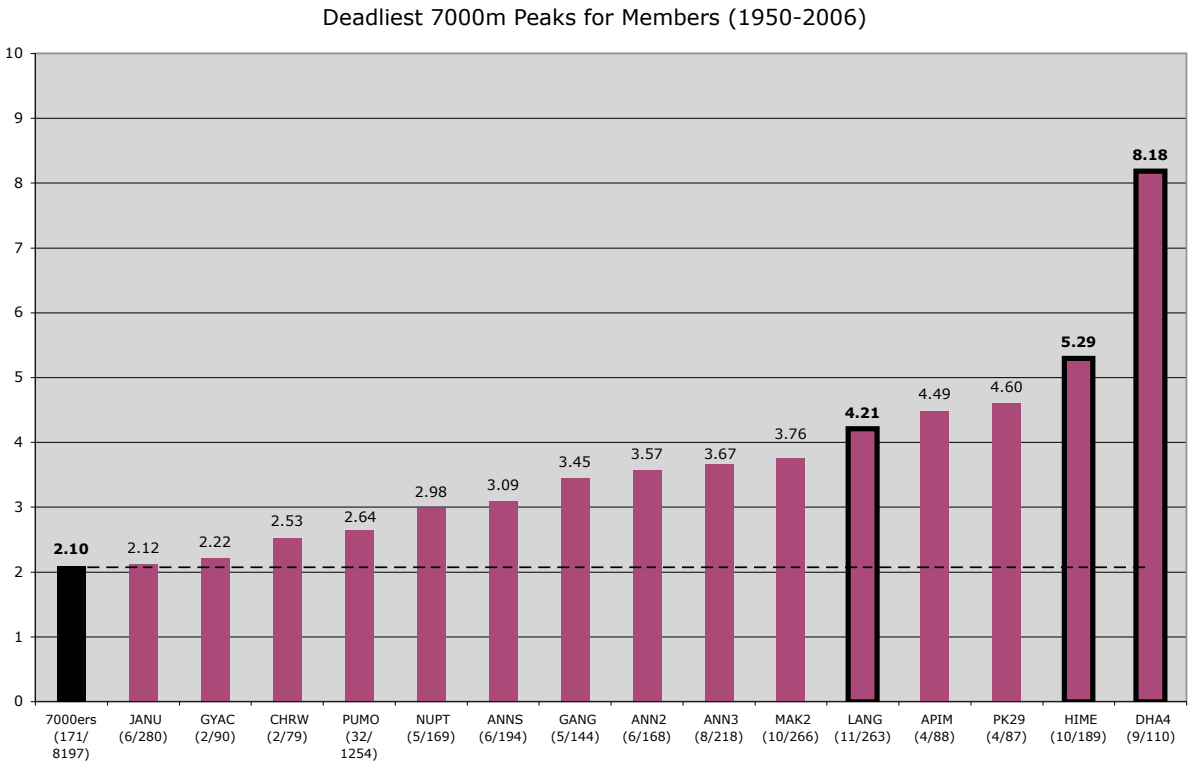


Chart D-5: Member death rates for selected 7000m peaks with 75+ members above base camp from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

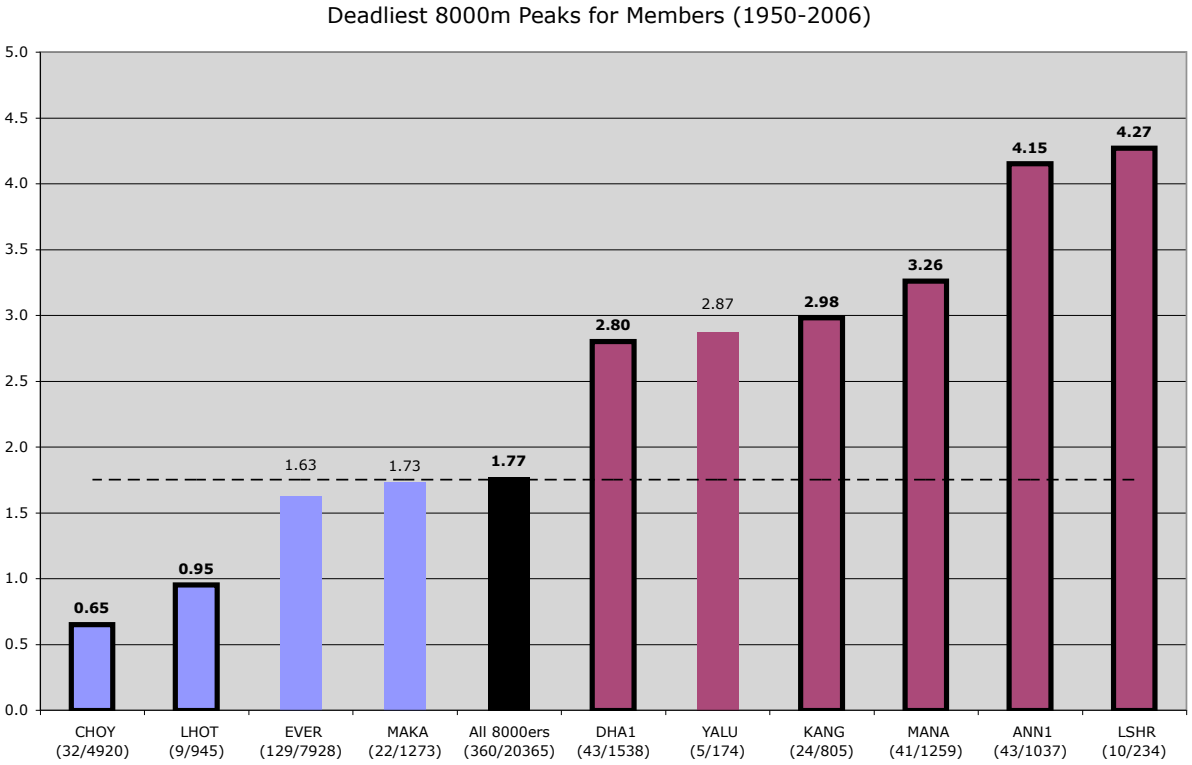


Chart D-6: Member death rates for 8000m peaks with 150+ members above base camp from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

when five Austrians and their Sherpa disappeared on a summit bid in 1969. Bad weather delayed helicopter searches and their bodies were never found, presumed lost in an avalanche or a fall.

However, the deaths rates for each of the 7000ers are only truly significant for Dhaulagiri IV, Himlung, and Langtang Lirung. The death rates for three other peaks, Pumori, Annapurna III, and Makalu II, are close to the limits of being statistically significant due to their higher above base camp counts.

Chart D-6 shows member death rates for the 8000m peaks with 150 or more members above base camp. The most deadly 8000m peaks are Lhotse Shar, Annapurna I, Manaslu, Kangchenjunga, and Dhaulagiri I, all with death rates significantly higher than the mean death rate of 1.77% for all 8000ers, and all avalanche prone and technically demanding. Lhotse and Cho Oyu have death rates significantly lower than the mean.

The death rates for Everest and Makalu in spite of their high above base camp counts are too close to the death rate for all 8000ers to be significantly lower. The above base camp count for Yalung Kang is too small to be significant.

The Death of Dawa Wangchu on Cheo Himal

From the Elizabeth Hawley notes of an interview with Alan Burgess - 6 Nov 1990

On the 29th of October Burgess and Dawa Wangchu went on recce to see if it was feasible to climb the SE Ridge; they decided it was and then returned to C1. On the 30th the team set out for the ridge (and the summit if possible, but this was “a long shot”). Burgess, Golden, Whiteley, Nobles and Dawa Wangchu left C1 at 4 a.m. Nobles turned back after an hour (trouble with his crampons and he was not entirely well) while the other four continued on. At 11 a.m. they were about 200 ft below the SE Ridge with Whiteley and Golden 300 ft behind Burgess and Dawa Wangchu. Dawa Wangchu was now leading and he put in an ice stake and Burgess climbed up to him and from there Dawa was to go on up and put in another ice stake that would be better anchored. Dawa anchored the rope and came down his fixed line and tied on another rope to the fixed rope but became disconnected from the fixed rope (probably the rope broke after he had untied a knot that Burgess had put there to tie off a flaw in the rope). Dawa fell 800 vertical feet (1000 ft in distance) but he was still alive after landing in deep snow at the bottom of a section of very dangerous ice cliffs. Burgess reached him in 30 minutes: he had massive head injuries (a fractured skull) and was bleeding from his skull profusely and coughing blood. Burgess stayed with him 3 hours, and finally got him standing. Dawa could see but could not speak. Burgess tried to pull him down a steep snow slope and got him down 60 ft, but then Dawa disconnected his harness and took off his gloves and turned away from Burgess and lay down signaling Burgess to go on alone. Regretfully Burgess left him. Now the ice and ice cliffs will soon take him all the way down (he probably would have died in next half hour).

Deadliest Peaks for Hired Personnel

The next group of charts show death rates for hired personnel for the most dangerous peaks in Nepal, those peaks with death rates above average and with a significant number of hired personnel that went above base camp.

Chart D-7 shows the 6000m peaks with hired death rates above average for peaks with 10 or more hired above base camp. All of these peaks have death rates higher than the mean death rate of 1.12% for all 6000ers.

Only five peaks have hired death rates higher than the 1.02% mean rate illustrating how relatively safe the 6000ers have been for hired personnel. Note from the Chart D-7, the five peaks with death rates higher than the mean had only a total of 16 deaths: one on Kantega, two on Leonpo Gang, one on Cheo Himal, one on Raksa Urai, and eleven on Kang Guru, indicating the low numbers of hired personnel used on the 6000m peaks (see Table D-1). Only on Kang Guru is the hired death rate statistically significant.

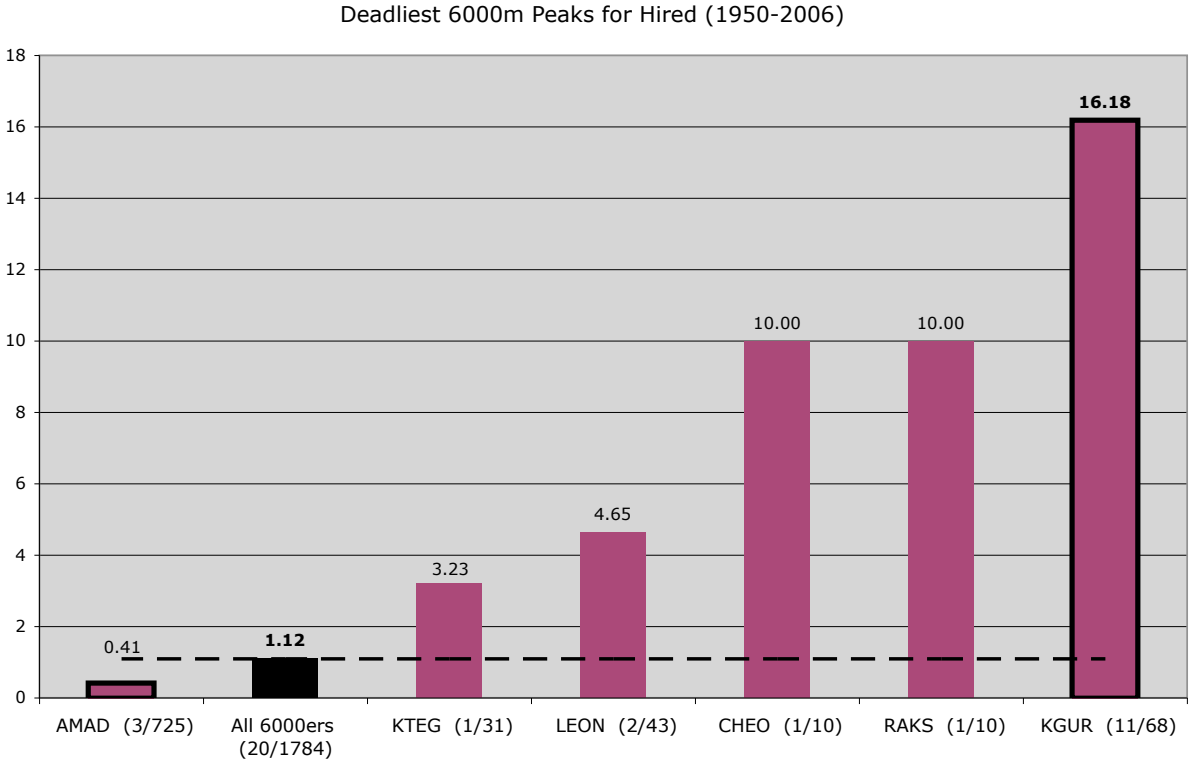


Chart D-7: Hired death rates for selected 6000m peaks with 10+ hired above base camp from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

Chart D-8 shows the 7000m peaks with hired death rates above average for peaks with 25 or more hired above base camp. All of these peaks have death rates equal to or higher than the mean death rate of 1.80% for all 7000ers. Dhaulagiri IV and Gangapurna have been extremely dangerous for hired with deaths rates approaching five times the average. These two peaks along with Pumori have statistically significantly higher death rates than the mean death rate for all 7000ers.

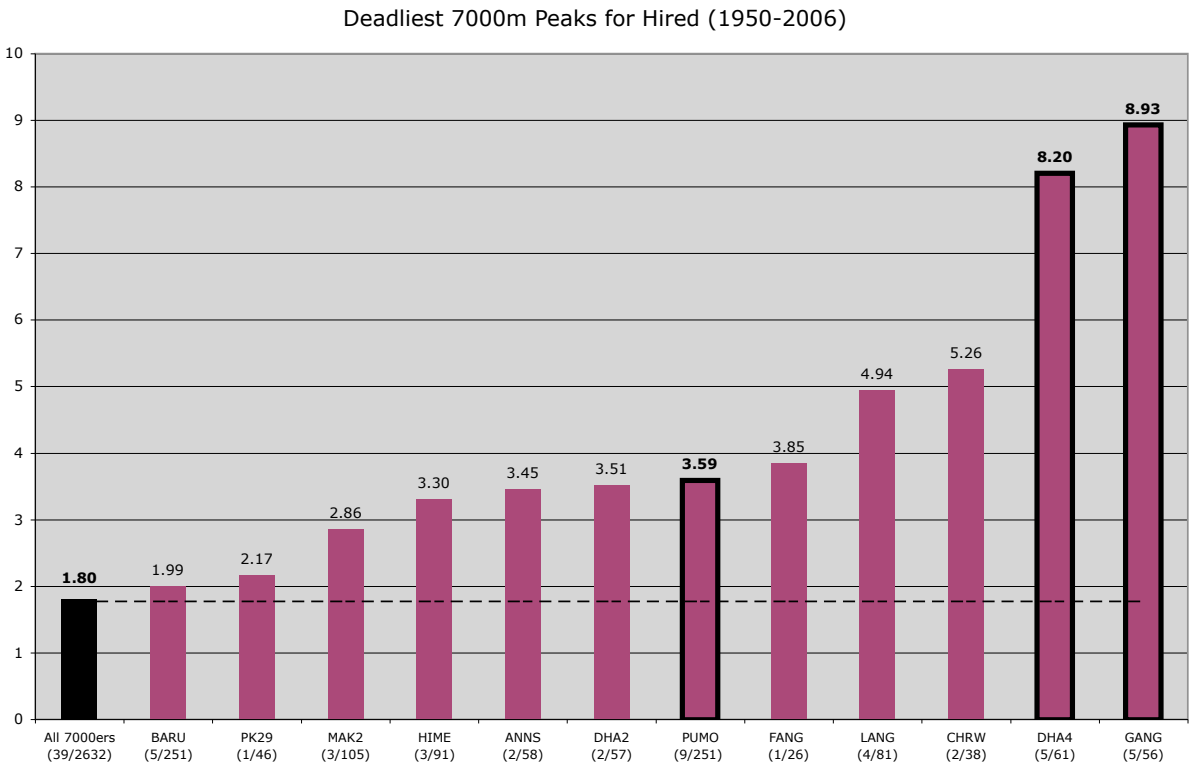


Chart D-8: Hired death rates for selected 7000m peaks with 25+ hired above base camp from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

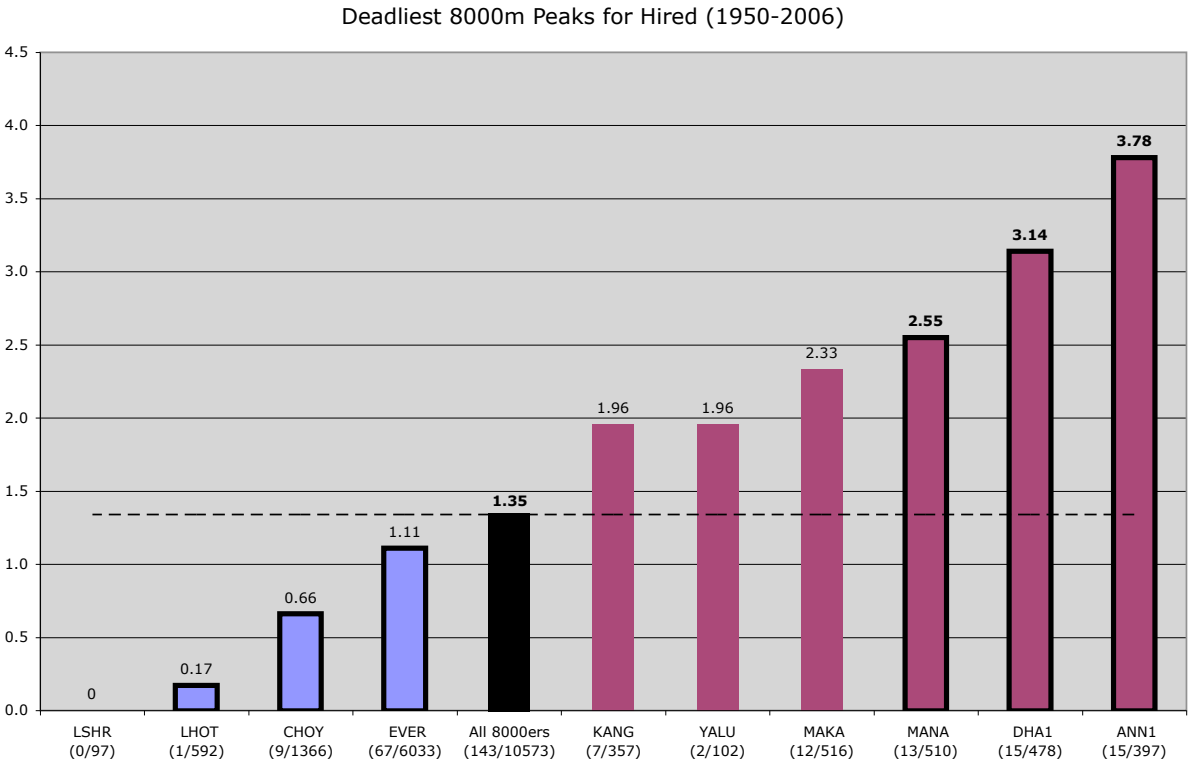


Chart D-9: Hired death rates for 8000m peaks with 75+ hired above base camp from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

A Deadly Bolt From the Sky

From *The Seasonal Stories* of Elizabeth Hawley – Spring 1991

Hans Kammerlander, Friedl Mutschlechner, and Karl Grossrubatscher planned an alpine-style ascent of the normal northeast-face route on Manaslu from a camp at 6000 near the base of their 8163m mountain.

But their program did not work out in several ways. They climbed without any Nepalese Sherpas or artificial oxygen, as planned, but unfavorable weather with frequent heavy snowfall caused them to set up three successively higher camps in the course of their ascent.

After nearly three weeks of climbing, they decided that bad weather and lack of time was forcing them to give up hope of reaching the summit, but early in the morning of 10 May three of them started up from camp 3 at 6900m. They could see that the weather would not remain good long enough for them to make a summit bid, but the morning was fine and they would climb upwards for a while.

After half an hour's climb, at about 7000m, Mutschlechner's fingers were becoming numb from the extremely cold wind, and having suffered from frostbitten fingers before, he did not want another episode of that, and he turned back to camp 3. When the two others had reached about 7200m, Grossrubatscher had to stop climbing up; he had not brought his ice ax with him that morning, and now the terrain required one. So he, too, returned to camp 3 and was seen moving around its tent by teammates watching from base camp until clouds moved across and the camp was no longer visible from below. Kammerlander continued alone to 7500m and then finally he also abandoned the climb.

When Kammerlander arrived back at camp 3, Mutschlechner asked him, "Where is Karl?" Near the tent they discovered his ice ax with a glove in its strap. A bit farther away, perhaps 100m, they found his body. His neck was broken. How this had happened is a mystery: his legs, arms and head were not badly broken; the slope where camp 3 was located was gentle with snow in good condition; if he had climbed up to a nearby serac and fallen from it, there was no trace of his fall in the snow; he was a healthy, strong professional mountaineer.

The two survivors placed their friend's body atop a closed crevasse that in warmer weather will open and receive it. They then took down the tent, descended to camp 2 at 6200m, packed up that tent and, roped together and on skis, they continued down the snow-covered slopes. But now fog or wisps of cloud were passing over them and visibility was poor; finally, about 100m above camp 1 at 5600m, they were enveloped in such thick cloud that Mutschlechner suggested they wait for the mists to clear a bit. They could hear continuous soft thunder, their hair was full of electricity and their ice axes were humming from it, but they saw no lightning in their dense fog. But suddenly Kammerlander had a sharp popping sound in his ear, which felt as though it had been bitten. He dropped to the snow and tugged on the rope between him and Mutschlechner; there was no answering tug, and when he went to Mutschlechner later, Kammerlander saw that he was dead with three burn marks on his head and his cap. Mutschlechner had been only eight meters away from his colleague and a mere two vertical meters above him at the highest point of a small snow-covered hill. It was about 4:00 p.m. and snow was falling. Mutschlechner is believed to have been the first mountaineer ever killed by lightning in Nepal.

Combined with the very high death rate for members, *Dhaulagiri IV is the most dangerous peak* for all climbers in the Nepal Himalaya. Out of eleven expeditions (mostly Japanese to Dhaulagiri IV from 1969 to 1975), five ended with fatalities (four deaths by avalanches, three by falls, one by AMS, and six by disappearance of the team on their summit bid). After the Japanese summited Dhaulagiri IV on three successive

days in 1975 (the first verified ascents of the peak), the peak has never been attempted again.

Chart D-9 shows hired death rates for the 8000m peaks with 75 or more hired above base camp. The most deadly 8000m peaks are Annapurna I, Dhaulagiri I, and Manaslu with death rates significantly higher than the mean death rate of 1.35% for all 8000ers. Everest and Lhotse have death rates significantly lower than the mean. The hired death rate of 0.0% Lhotse Shar is particularly striking since the member death rate of 4.27% is the highest for the 8000ers (see Chart D-6). Lhotse Shar is more demanding technically, so expeditions tend not to use as many hired personnel at the higher altitudes where the danger of falls and avalanches is greater; but due to the few hired used, the low death rate is also not statistically significant. Cho Oyu is close to the limit of being significant.

The mean death rates for hired personnel are almost identical for both the 7000m and 8000m peaks. The reason for this will become more apparent in the discussion of avalanche deaths later in this chapter.

Deaths by Geographical Regions

Chart D-10 shows death rates by geographical region. The Khumbu-Rolwaling-Makalu region where the most climbing activity has taken place is also the safest. The most dangerous regions are in central Nepal from Langtang-Jugal to Dhaulagiri-Mukut, which is more prone to avalanching. The Manaslu-Ganesh region has almost three times the member death rate as the Khumbu region.

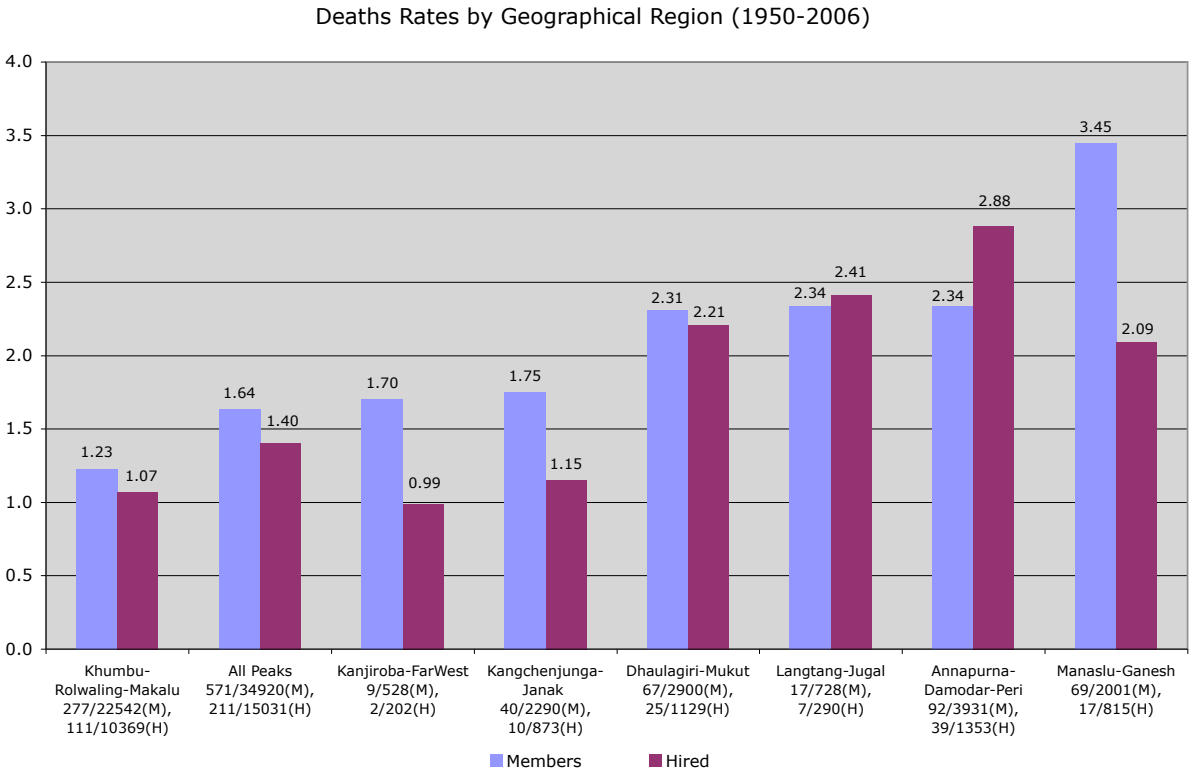


Chart D-10: Death rates by geographical region for all peaks from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

In general, death rates for hired follow a similar pattern for members except for the Kangchenjunga-Janak, Manaslu-Ganesh, and Kanjiroba-Far West regions where hired death rates are substantially lower than member death rates.

Deaths by Climbing Season

Chart D-11 shows death rates for members and hired personnel by climbing season for all peaks.

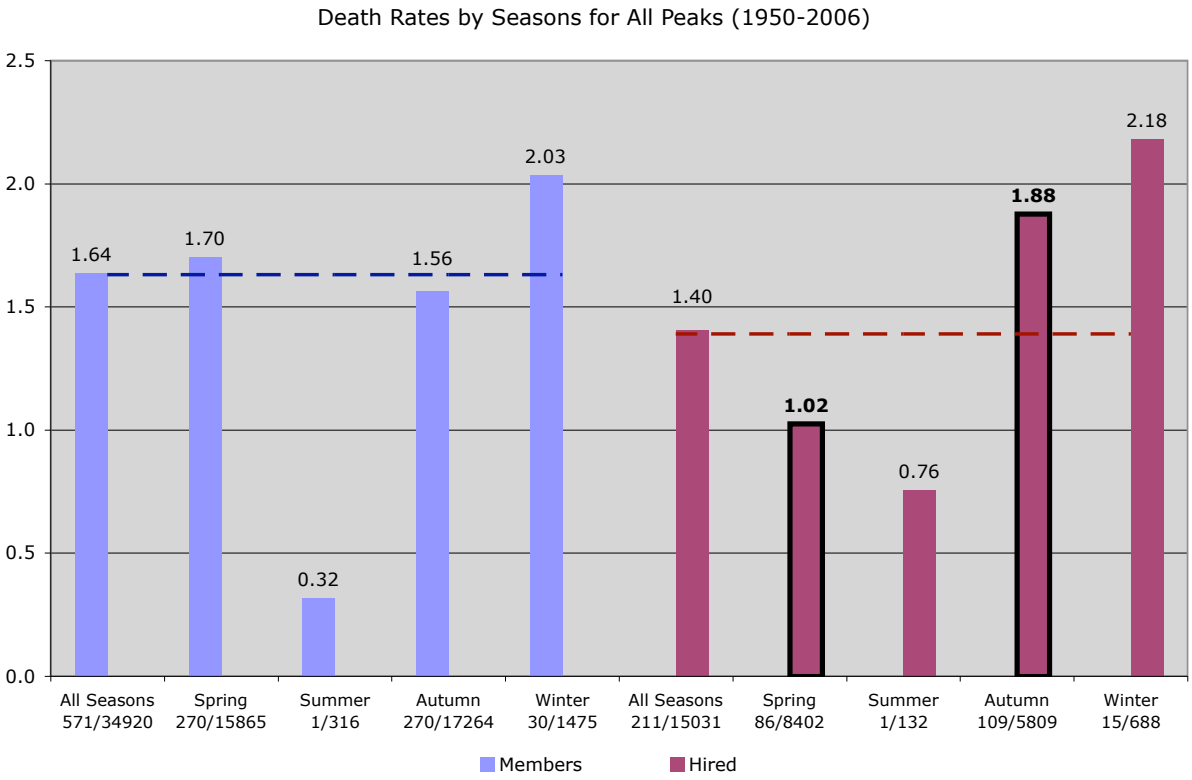


Chart D-11: Member and hired death rates by climbing season for all peaks from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

The columns outlined in black in the above chart represent seasons that statistically have either significantly higher or lower death rates than the mean death rate for all seasons. Statistical significance means that there is less than a 5% probability that the result occurred by chance. For the non-outlined peaks, the death rates can be considered as only anecdotal evidence of higher or lower death rates than the mean rate for all seasons.

The differences in member death rates between seasons are statistically insignificant, even though the summer and winter seasons are considerably lower and higher, respectively, than the mean death rate for all seasons.

The hired death rates for the autumn season of 1.88% and the spring season of 1.02% statistically are significantly higher and lower, respectively, than the mean ascent rate of 1.40% for all seasons. The hired winter death rate of 2.18% is nearly significant, but the lower death and above base camp counts keep it from being as significant as the spring and autumn seasons.

Whether significant or not, the death rates are the highest in the winter season for both members and hired as would be expected given the more difficult climbing conditions; but considering that only more skilled climbers are likely to attempt winter expeditions, the winter season is probably even more dangerous than what is shown in the chart.

Tables D-12 and D-13 show death counts and rates for members and hired personnel for selected peaks for the spring, autumn, and winter climbing seasons. The summer season is excluded due to the low number of expeditions during the monsoon season.

	Spring			Autumn			Winter		
	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate
All Peaks	15865	270	1.70	17264	270	1.56	1475	30	2.03
6000ers	1637	11	0.67	4114	26	0.63	485	3	0.62
7000ers	2651	62	2.34	5290	102	1.93	247	7	2.83
8000ers	11577	197	1.70	7860	142	1.81	743	20	2.69
KANG	648	13	2.01	131	8	6.11	26	3	11.54
MAKA	684	12	1.75	538	9	1.67	51	1	1.96
LHOT	605	4	0.66	303	5	1.65	37	0	0.00
EVER	5526	90	1.63	1978	35	1.77	274	3	1.10
CHOY	2040	17	0.83	2794	12	0.43	56	3	5.36
MANA	590	24	4.07	590	15	2.54	79	2	2.53
ANN1	403	13	3.23	490	25	5.10	139	5	3.60
DHA1	650	20	3.08	823	21	2.55	65	2	3.08
AMAD	559	5	0.89	2361	9	0.38	355	1	0.28
BARU	237	3	1.27	675	1	0.15	10	0	0.00
PUMO	374	9	2.41	827	19	2.30	53	4	7.55

Table D-12: Member deaths by season for selected peaks from 1950-2006

	Spring			Autumn			Winter		
	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate
All Peaks	8402	86	1.02	5809	109	1.88	688	15	2.18
6000ers	511	2	0.39	1075	18	1.67	138	0	0.00
7000ers	1061	16	1.51	1521	29	1.91	87	3	3.45
8000ers	6830	68	1.00	3213	62	1.93	463	12	2.59
KANG	292	4	1.37	55	2	3.64	10	1	10.00
MAKA	344	8	2.33	161	4	2.48	0	0	0.00
LHOT	376	1	0.27	154	0	0.00	62	0	0.00
EVER	4450	28	0.63	1307	35	2.68	224	4	1.79
CHOY	482	1	0.21	851	6	0.71	20	1	5.00
MANA	257	12	4.67	227	1	0.44	26	0	0.00
ANN1	172	5	2.91	156	10	6.41	67	0	0.00
DHA1	210	9	4.29	241	4	1.66	27	2	7.41
AMAD	104	0	0.00	529	3	0.57	92	0	0.00
BARU	94	0	0.00	150	5	3.33	7	0	0.00
PUMO	87	3	3.45	144	5	3.47	20	1	5.00

Table D-13: Hired deaths by season for selected peaks from 1950-2006

Charts D-12 and D-13 show death rates for members and hired personnel for selected peaks and peaks ranges for the spring and autumn climbing seasons. The winter and summer seasons are excluded due to the significantly lower climbing activity during those periods.

Overall, the spring death rates are similar to the autumn death rates, except for higher autumn death rates on Kangchenjunga and Annapurna I for both members and hired,

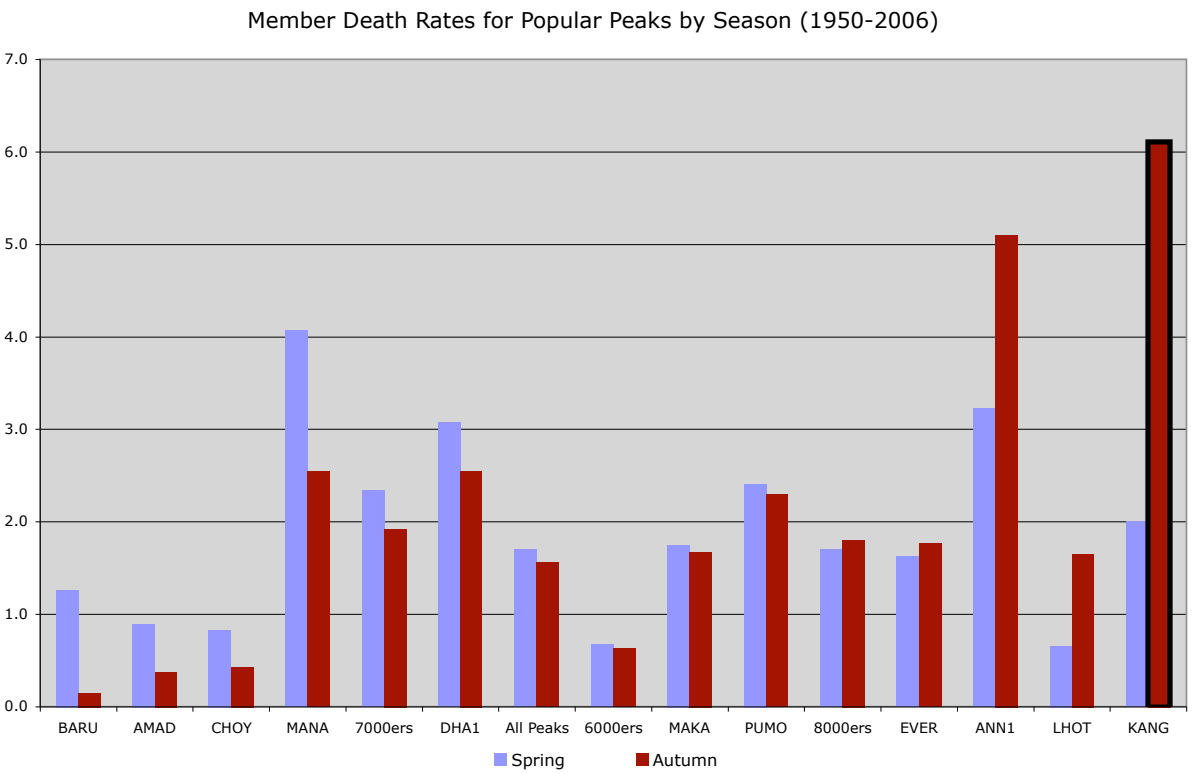


Chart D-12: Member death rates for selected peaks by season from 1950-2006 (ranked from left to right by difference in risk of death from spring to autumn)

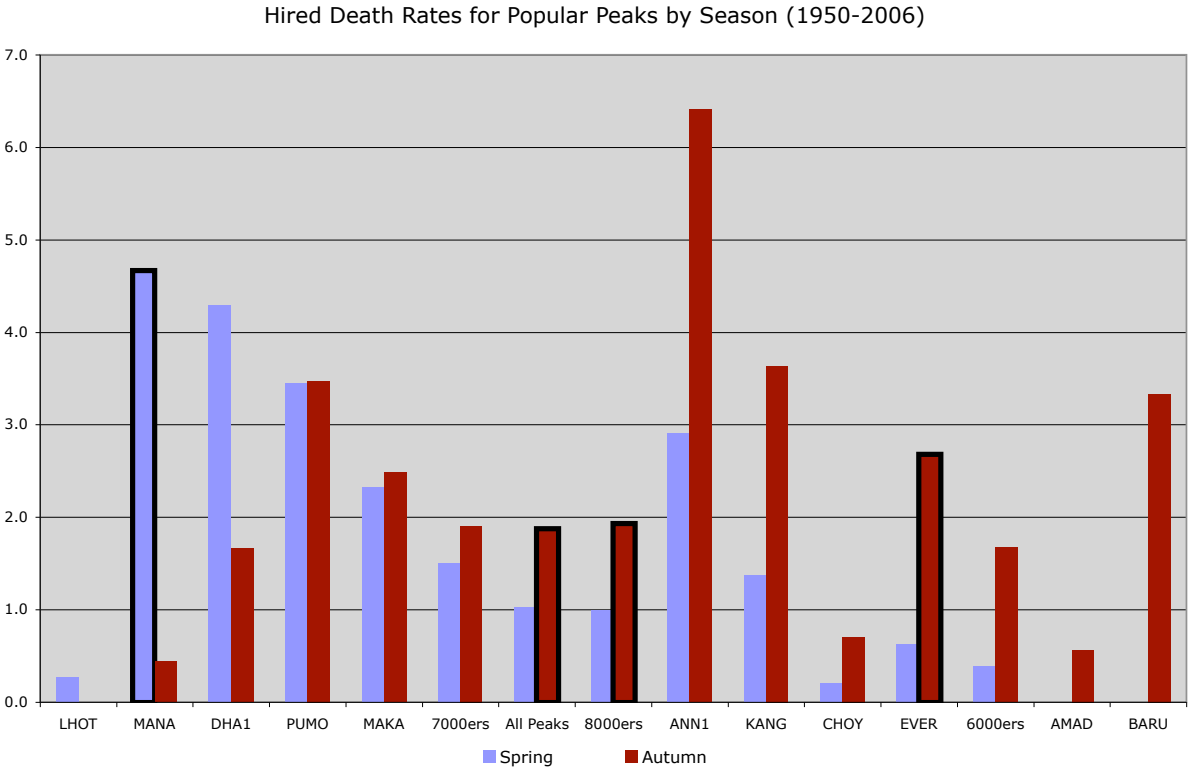


Chart D-13: Hired death rates for selected peaks by season from 1950-2006 (ranked from left to right by difference in risk of death from spring to autumn)

The columns outlined in black in the above charts represent seasons that statistically have significantly higher death rates than the corresponding season for that peak.

and higher spring death rates on Manaslu and Dhaulagiri I for both members and hired.

Altitudes of Death

Chart D-14 gives the death counts for altitudes of death for all climbers (members and hired personnel) for all peaks. Death counts are used instead of death rates in the charts below because it is not known how high each climber went above base camp (*The Himalayan Database* generally only tracks the altitudes of those who summited or reached the expedition high point).

Altitudes of death for avalanches and falls are added to Chart D-14. The **red** trend line for avalanche deaths mirrors the shape of the total death **blue** trend line illustrating the strong impact that avalanches have on overall deaths. The red line tops out at the intermediate altitudes (6500m-6900m) where the snow accumulations are the greatest, and then tapers off more rapidly because avalanches are fewer where snow accumulations are less.

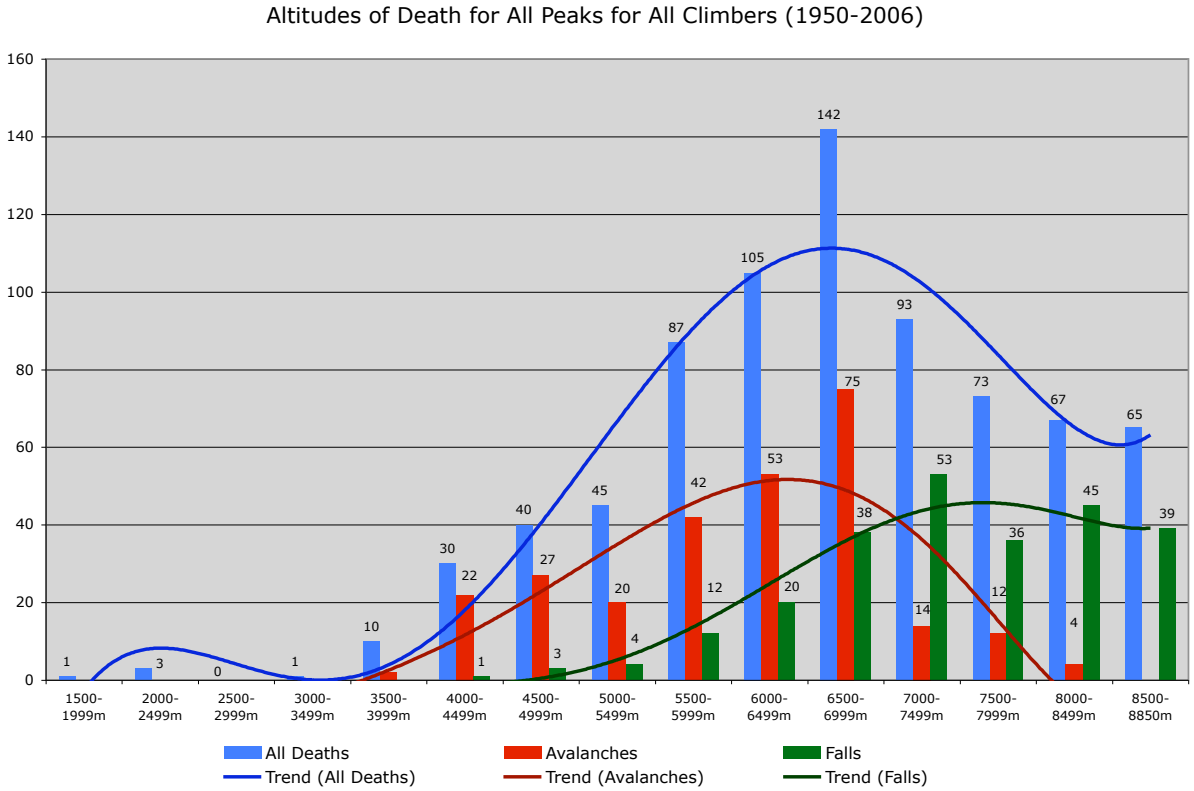


Chart D-14: Altitudes of death for all peaks from 1950-2006

The **green** trend line for falls generally increases illustrating the danger of falling as one gets higher on the mountain and becomes more fatigued. The flattening out of the fall trend line is due in part to the fewer number of climbers reaching altitudes above 7500m (the majority of the peaks are lower than 7500m).

Chart D-15 give the altitudes of death for all climbers for the 8000ers.

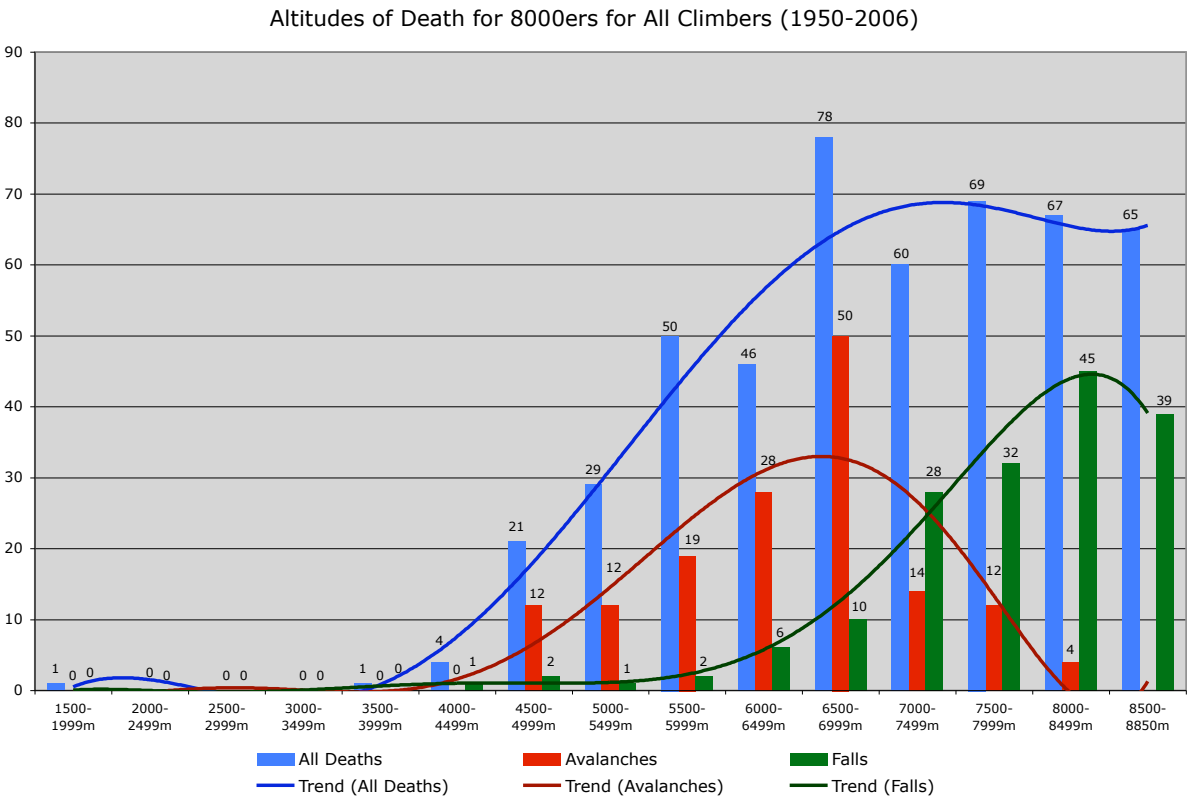


Chart D-15: Altitudes of death for all 8000ers from 1950-2006

When considering only the 8000m peaks, the **green** trend line for falls continues to rise as altitude increases better illustrating the danger of falling at the very high altitudes.

Causes of Death

Table D-16 gives the causes of death for members and hired personnel for all peaks from 6000m to 8850m. The last two rows of the table indicate the number of deaths where acute mountain sickness (AMS) or major storms were either the primary cause or a contributing factor. For example, the primary cause of death for Scott Fischer on Everest was exposure/frostbite with contributing factors of AMS and the disastrous storm of May 1996.

For both members and hired personnel, the majority of the deaths are due to falls or avalanches. For members, falling was the leading cause of death (39.1%), while for hired avalanches were the leading cause (48.3%), most likely because hired spent much of their time and energy establishing and supplying camps located in avalanche-prone zones.

Somewhat surprisingly, AMS did not figure as prominently as might be expected. AMS may be a hidden factor that was not known or accurately reported; for example, AMS may well have caused a few falls during descents from summit bids of the 8000m peaks, even though it went unreported.

Table D-16 also includes deaths that occurred on expedition approach or return marches or at base camp as a result of non-climbing events. These deaths often were the results of trail accidents, illnesses, heart attacks, etc. For example, two leaders

Cause of Death	Members		Hired		Total	
	Cnt	Pct	Cnt	Pct	Cnt	Pct
AMS	40	7.0	17	8.1	57	7.3
Exhaustion	18	3.2	2	0.9	20	2.6
Exposure/Frostbite	35	6.1	1	0.5	36	4.6
Fall	**223**	**39.1**	32	15.2	255	32.6
Crevasse	11	1.9	5	2.4	16	2.0
Icefall Collapse	3	0.5	14	6.6	17	2.2
Avalanche	170	29.8	**102**	**48.3**	272	34.8
Falling Rock/Ice	13	2.3	6	2.8	19	2.4
Disappearance	25	4.4	4	1.9	29	3.7
Illness (non-AMS)	19	3.3	13	6.2	32	4.1
Other	12	2.1	11	5.2	23	2.9
Unknown	2	0.4	4	1.9	6	0.8
	571	**100.0**	**211**	**100.0**	**782**	**100.0**
AMS-related	50	8.8	17	8.1	67	8.6
Weather/Storm-related	44	7.7	6	2.8	50	6.4

Table D-16: Causes of death for all deaths for all peaks from 1950-2006

of an autumn 1992 Makalu II expedition were killed in the PIA air crash while flying into Kathmandu to join their expedition (taking the concept of approach march to the extreme) and six staff members of a spring 2002 Spanish Makalu expedition were lost in a helicopter crash while returning to Kathmandu after their expedition ended.

Table D-17 classifies deaths based on the phase of the expedition at which the deaths occurred.

Death Classification for All Deaths	Members		Hired		Total	
	Cnt	Pct	Cnt	Pct	Cnt	Pct
Death enroute to/from BC	21	3.7	30	14.2	51	6.5
Death at BC	21	3.7	29	13.7	50	6.4
Route preparation	270	47.3	119	56.4	389	49.7
Ascending in Smt Bid	62	10.9	6	2.8	68	8.7
Descending from Smt Bid	169	29.6	21	10.0	190	24.3
Expedition evacuation	27	4.7	6	2.8	33	4.2
Other/Unknown	1	0.2	0	0.0	1	0.1
	571	**100.0**	**211**	**100.0**	**782**	**100.0**

Table D-17: Death classification for all deaths for all peaks from 1950-2006

Ascending and descending deaths on summit bids are recorded regardless of whether the actual summit was attained.

Route preparation, the phase when lower camps are established and stocked and the summit teams position themselves at their highest camp in anticipation of a summit bid, was the most dangerous phase of an expedition for both members and hired. The second most dangerous phase for members was descents from summit bids. But if danger is viewed on a per-day basis, then for the larger peaks summit day would be the most dangerous day since the number of summit days is far less that the number of route preparation days for most expeditions.

For hired, the second most dangerous phase was the approach or return march often because lowland porters were unable to adapt to the higher, colder climates due to inferior clothing and equipment or undetected illnesses (five died from AMS and seven

died from other illnesses). In addition, six died from avalanches below base camp, and six died in a helicopter crash after evacuating Makalu base camp in 2002 as noted above.

Table D-18 shows causes of death during route preparation for all peaks.

Cause of Death Route Preparation	Members		Hired		Total	
	Cnt	Pct	Cnt	Pct	Cnt	Pct
AMS	13	4.8	4	3.4	17	4.4
Exhaustion	4	1.5	0	0.0	4	1.0
Exposure/Frostbite	16	5.9	0	0.0	16	4.1
Fall	72	26.7	5	4.2	77	19.8
Crevasse	5	1.9	4	3.4	9	2.3
Icefall Collapse	2	0.7	14	11.8	16	4.1
Avalanche	137	50.7	79	66.4	216	55.5
Falling Rock/Ice	8	3.0	6	5.0	14	3.6
Disappearance	4	1.5	2	1.7	6	1.5
Illness (non-AMS)	8	3.0	2	1.7	10	2.6
Other	1	0.4	3	2.5	4	1.0
Unknown	0	0.0	0	0.0	0	0.0
	270	**100.0**	**119**	**100.0**	**389**	**100.0**

Table D-18: Causes of death during route preparation for all peaks from 1950-2006

For members during route preparation, avalanches followed by falls were the most prevalent. For hired, only avalanching posed much of a problem; icefall collapse was a distant second with the majority of those icefall collapses being in the Khumbu Icefall on Everest (six Sherpas died in one accident in 1970).

Table D-19 shows causes of death while ascending during a summit bid for all peaks. For members, falls followed by unexplained disappearances (also likely falls) were by far the most prevalent. For hired, there were minimal deaths during summit bid ascents.

Cause of Death Ascending in Smt Bid	Members		Hired		Total	
	Cnt	Pct	Cnt	Pct	Cnt	Pct
AMS	0	0.0	0	0.0	0	0.0
Exhaustion	1	1.6	0	0.0	1	1.5
Exposure/Frostbite	0	0.0	0	0.0	0	0.0
Fall	36	59.0	5	83.3	41	61.2
Crevasse	2	3.3	0	0.0	2	3.0
Icefall Collapse	0	0.0	0	0.0	0	0.0
Avalanche	8	13.1	0	0.0	8	11.9
Falling Rock/Ice	0	0.0	0	0.0	0	0.0
Disappearance	13	21.3	1	16.7	14	20.9
Illness (non-AMS)	1	1.6	0	0.0	1	1.5
Other	0	0.0	0	0.0	0	0.0
Unknown	0	0.0	0	0.0	0	0.0
	61	**100.0**	**6**	**100.0**	**67**	**100.0**

Table D-19: Causes of death during summit bid ascents for all peaks from 1950-2006

Table D-20 shows causes of death while descending from a summit bid for all peaks. For members, falls were by far the major cause of death, followed by exposure/frostbite, AMS, and exhaustion. This data supports the general consensus that descending from the summit late in the day when cold and exhausted is a particularly perilous time of

Cause of Death Descending in Smt Bid	Members		Hired		Total	
	Cnt	Pct	Cnt	Pct	Cnt	Pct
AMS	0	0.0	0	0.0	0	0.0
Exhaustion	1	1.6	0	0.0	1	1.5
Exposure/Frostbite	0	0.0	0	0.0	0	0.0
Fall	36	58.1	5	83.3	41	60.3
Crevasse	2	3.2	0	0.0	2	2.9
Icefall Collapse	0	0.0	0	0.0	0	0.0
Avalanche	9	14.5	0	0.0	9	13.2
Falling Rock/Ice	0	0.0	0	0.0	0	0.0
Disappearance	13	21.0	1	16.7	14	20.6
Illness (non-AMS)	1	1.6	0	0.0	1	1.5
Other	0	0.0	0	0.0	0	0.0
Unknown	0	0.0	0	0.0	0	0.0
	62	**100.0**	**6**	**100.0**	**68**	**100.0**

Table D-20: Causes of death during summit bid descents for all peaks from 1950-2006

a climb. For hired, falls were the primary cause of death during descent from a summit bid.

Table D-21 gives the causes of death for members on summit day (while ascending or descending in a summit bid). Across all altitudes, falls are by far and away the leading of cause of death, from 100% for the 6000ers down to 50% for Everest. In general as peaks become higher, other factors come into play. For the 7000ers, avalanches are more frequent and for the 8000ers, the physiological factors (AMS, exhaustion, and exposure-frostbite) become more important. Unexplained disappearances are also a factor, but many of those are likely due to falls. And across all altitudes, falls during descent are much more prevalent (two to three times the rate of falling during ascent).

Cause of Death During Summit Bids	All Peaks		6000ers		7000ers		8000ers		Everest	
	Cnt	Pct	Cnt	Pct	Cnt	Pct	Cnt	Pct	Cnt	Pct
AMS	13	5.6	0	0.0	1	1.7	**12**	**7.4**	**4**	**5.4**
Exhaustion	12	5.2	0	0.0	0	0.0	**12**	**7.4**	**10**	**13.5**
Exposure/Frostbite	19	8.2	0	0.0	2	3.4	**17**	**10.4**	**14**	**18.9**
Fall	**140**	**60.6**	**8**	**88.9**	**37**	**62.7**	**95**	**58.3**	**36**	**48.6**
Crevasse	4	1.7	0	0.0	2	3.4	2	1.2	0	0.0
Icefall Collapse	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Avalanche	13	5.6	1	11.1	**7**	**11.9**	5	3.1	0	0.0
Falling Rock/Ice	2	0.9	0	0.0	2	3.4	0	0.0	0	0.0
Disappearance (Unexplained)	**21**	**9.1**	**0**	**0.0**	**8**	**13.6**	**13**	**8.0**	**7**	**9.5**
Illness (non-AMS)	3	1.3	0	0.0	0	0.0	3	1.8	1	1.4
Other	2	0.9	0	0.0	0	0.0	2	1.2	0	0.0
Unknown	2	0.9	0	0.0	0	0.0	2	1.2	2	2.7
	231	**100.0**	**9**	**100.0**	**59**	**100.0**	**163**	**100.0**	**74**	**100.0**
Ascending in summit bid	62	26.8	3	33.3	21	35.6	38	23.3	15	20.3
Descending from summit bid	**169**	**73.2**	**6**	**66.7**	**38**	**64.4**	**125**	**76.7**	**59**	**79.7**
AMS-related	18		0		2		16		6	
Weather/Storm-related	24		0		5		19		13	

Table D-21: Causes of death for members while ascending or descending in summit bids from 1950-2006

Charts D-21a-b show altitudes of death on summit day for the commercial routes on Everest. For the south side, falls are the leading cause (12) followed closely by physiological causes (8) with nearly half of the deaths occurring between the South

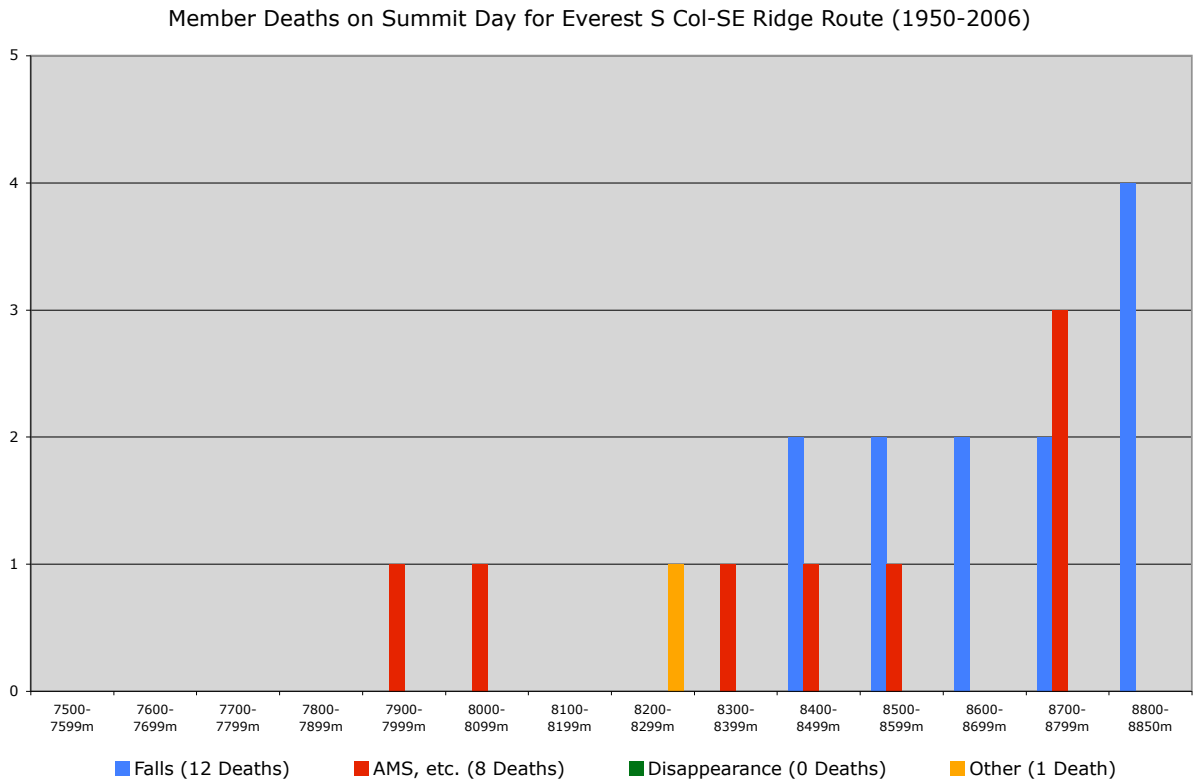


Chart D-21a: Causes of death for members while ascending or descending in summit bids on Everest South Col-SE Ridge commercial route from 1950-2006 (S Col=7900m, Balcony=8400m, S Summit=8750m, Hillary Step=8800m)

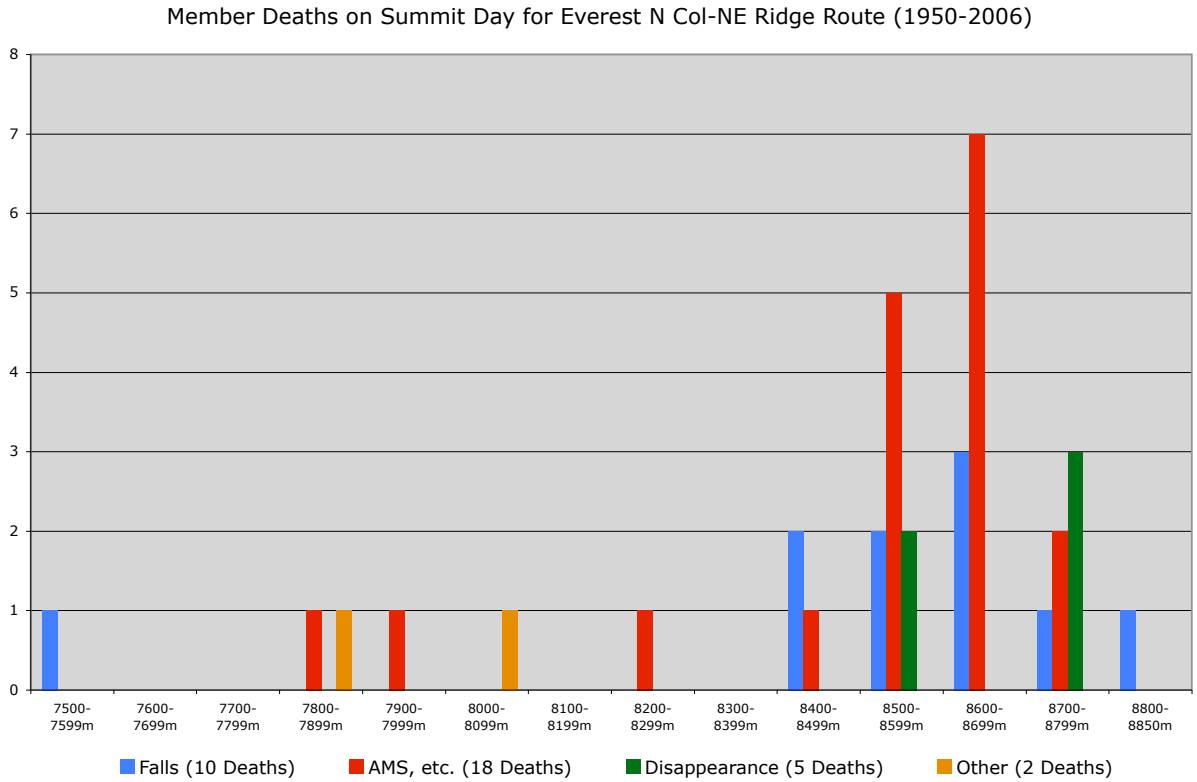


Chart D-21b: Causes of death for members while ascending or descending in summit bids on Everest North Col-NE Ridge commercial route from 1950-2006 (Normal high-camp=8300m, 1st Step=8450m, 2nd Step=8680m, 3rd Step=8700m)

Summit and the Hillary Step (9 of 21 deaths). For the north side, the reverse is true: physiological causes (18) outstrip falls (10) with more than half of the deaths occurring between the First and Second Steps (22 of 35 deaths). The five disappearances most likely are from falls or physiological causes leading to falls. The preponderance of physiological deaths on the north side may be due to climbers spending more time above 8000m since their highest camp is normally at 8300m, 400m higher than the high camp at 7900m on the South Col.

Avalanche Deaths

Avalanches have always been a major concern to Himalayan climbers. They can strike at anytime without warning, wreak havoc on camps, and they have snuffed out the lives of some of the world's most elite climbers including Claude Kogan on Cho Oyu in 1959, Reinhard Karl on Cho Oyu in 1982, and Anatoli Boukreev on Annapurna I on Christmas Day of 1997.

Hired personnel in particular also have born the brunt of some of the most deadly avalanche accidents: eleven on Kang Guru in 2005, ten on Manaslu in 1972, and six on Everest in 1970 as noted earlier, and seven on Everest in 1922 in an avalanche accident below the North Col that included George Mallory who narrowly escaped with his life.

Chart D-22 shows avalanche death rates for members and hired personnel by climbing season for all peaks. This chart illustrates the increased avalanche frequency that occurs during the autumn season due to the build up of snow during the summer monsoons.

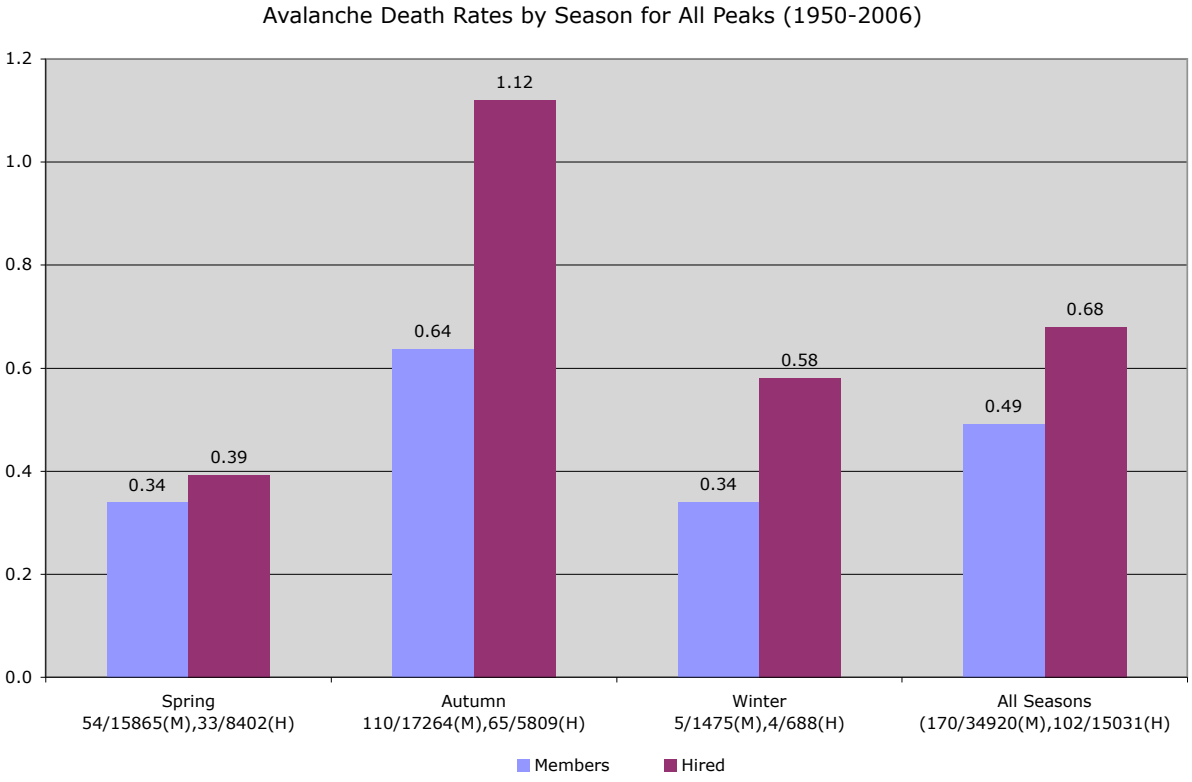


Chart D-22: Avalanche death rates by season for members and hired personnel for all peaks (the death rate is above the column bar; the death and above BC counts are below)

Double Trouble on Gangapurna

From *The Himalayan Database* notes of Elizabeth Hawley – October 1971

On October 15, Kiyoshi Shimizu, Takeshi Akahane, and Girme Dorje reached the summit of Gangapurna from C4 at 2:15 p.m. and then returned to C4 at 7 p.m. where a second summit team of four was waiting. They planned continue down to C3 that day where three teammates were waiting in support of the two summit teams, but heavy snows pinned all seven of them down at C4.

At 6 p.m. on October 16, the two higher camps failed to make radio contact with three more Japanese climbers and three Sherpas waiting for them down at C2. The next day Girme Dorje and Pemba Norbu went down to C2 from C4 to investigate. The following morning of October 18 at 8 a.m. Girme reported by radio to C3 from the C2 site that the camp had completely disappeared, presumably swept away by an avalanche on the afternoon of October 16 killing all six occupants.

After reporting this, Girme said that he and Pemba would return back up to C3, but the Japanese in C3 advised against this since the route between the two camps was avalanche prone. Girme and Pemba were not seen or heard from again. It is presumed that they were swept away by an avalanche or fell into a crevasse.

Chart D-23 shows the percentages of avalanche deaths out of total deaths for members and hired personnel by climbing season for all peaks. This chart illustrates in a different manner the increased avalanche risk during the autumn season, that is, the percentage of all deaths due to avalanching increases during that time. The summer season is omitted from the chart because there have been only two deaths during the

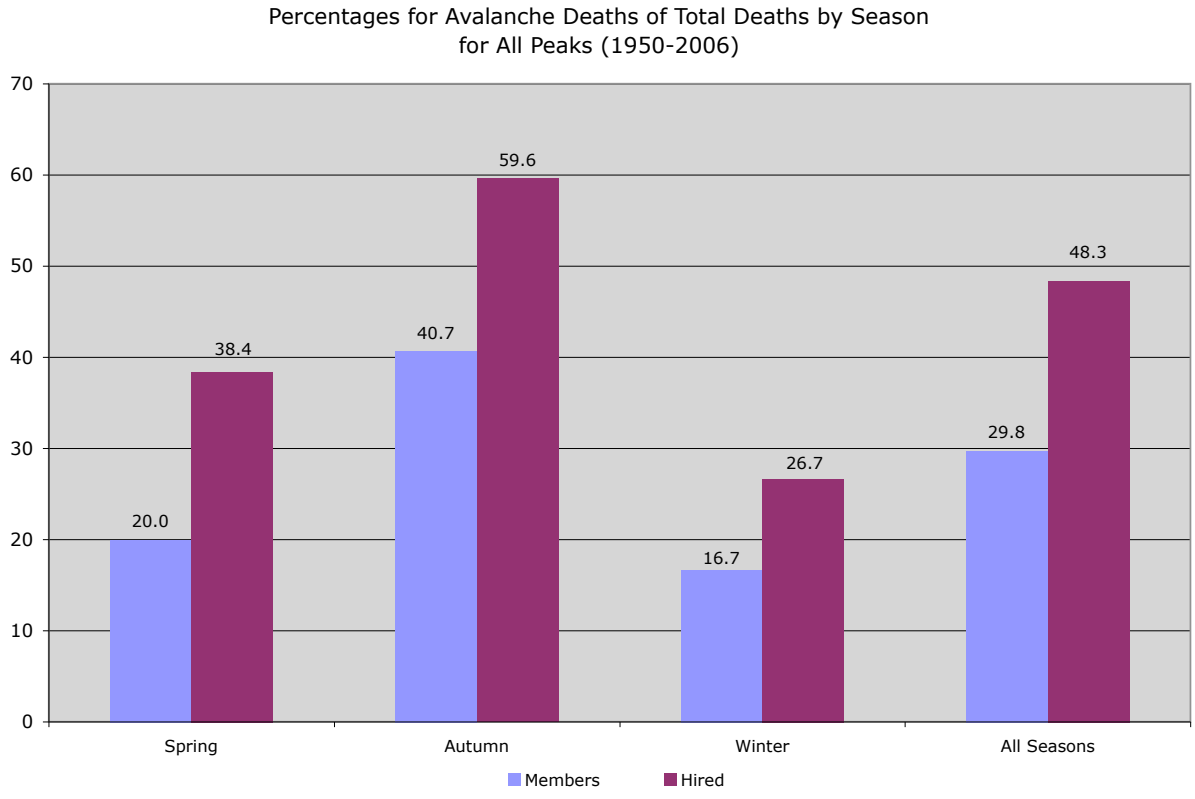


Chart D-23: Percentages for avalanche deaths out of total deaths by season for all peaks

summer season as very few climbers are willing to attempt expeditions during the heavy monsoon rains and snows.

Tables and Charts D-24 and D-25 show avalanche death rates for members and hired personnel for selected peaks and peaks ranges for the spring, autumn, and winter climbing seasons. For these charts, the winter season is excluded due to the low number of expeditions during that period.

Members	Spring			Autumn			Winter		
	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate
All Peaks	15865	54	0.34	17264	110	0.64	1475	5	0.34
6000ers	1637	2	0.12	4114	16	0.39	485	0	0.00
7000ers	2651	16	0.60	5290	46	0.87	247	1	0.41
8000ers	11577	36	0.31	7860	48	0.61	743	4	0.54
KANG	648	0	0.00	131	5	3.82	26	0	0.00
MAKA	684	0	0.00	538	2	0.37	51	0	0.00
LHOT	605	0	0.00	303	2	0.66	37	0	0.00
EVER	5526	7	0.13	1978	8	0.40	274	0	0.00
CHOY	2040	1	0.05	2794	2	0.07	56	0	0.00
MANA	590	12	2.03	590	3	0.51	79	0	0.00
ANN1	403	8	1.99	490	14	2.86	139	2	1.44
DHA1	650	8	1.23	823	6	0.73	65	2	3.08
AMAD	559	0	0.00	2361	4	0.17	355	0	0.00
BARU	237	0	0.00	675	0	0.00	10	0	0.00
PUMO	374	3	0.80	827	10	1.21	53	0	0.00

Table D-24: Member avalanche deaths by season from 1950-2006

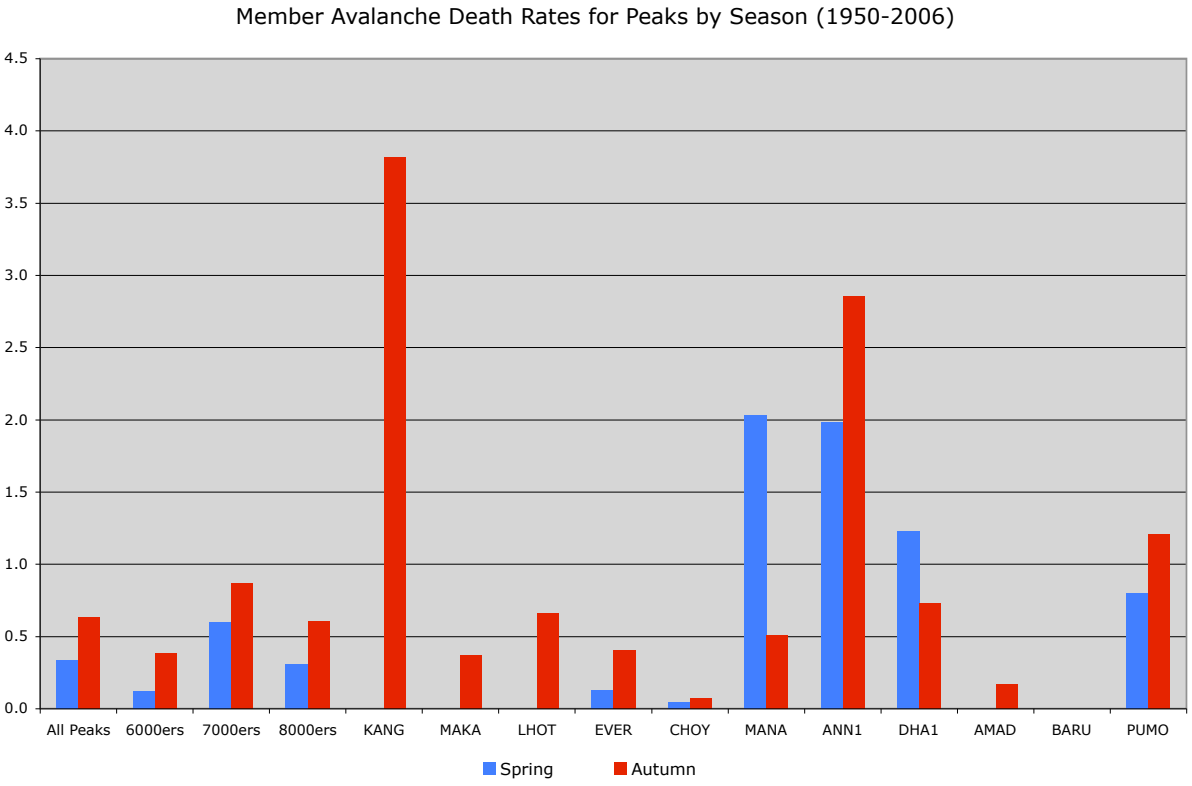


Chart D-24: Member avalanche death rates for peaks by season from 1950-2006

Hired	Spring			Autumn			Winter		
	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate
All Peaks	8402	33	0.39	5809	65	1.12	688	4	0.58
6000ers	511	2	0.39	1075	15	1.40	138	0	0.00
7000ers	1061	9	0.85	1521	11	0.72	87	2	2.30
8000ers	6830	22	0.32	3213	39	1.21	463	2	0.43
KANG	292	0	0.00	55	0	0.00	10	0	0.00
MAKA	344	0	0.00	161	0	0.00	0	0	0.00
LHOT	376	1	0.27	154	0	0.00	62	0	0.00
EVER	4450	1	0.02	1307	21	1.61	224	0	0.00
CHOY	482	0	0.00	851	5	0.59	20	0	0.00
MANA	257	11	4.28	227	1	0.44	26	0	0.00
ANN1	172	2	1.16	156	8	5.13	67	0	0.00
DHA1	210	7	3.33	241	4	1.66	27	2	7.41
AMAD	104	0	0.00	529	3	0.57	92	0	0.00
BARU	94	0	0.00	150	0	0.00	7	0	0.00
PUMO	87	1	1.15	144	5	3.47	20	0	0.00

Table D-25: Hired avalanche deaths by season from 1950-2006

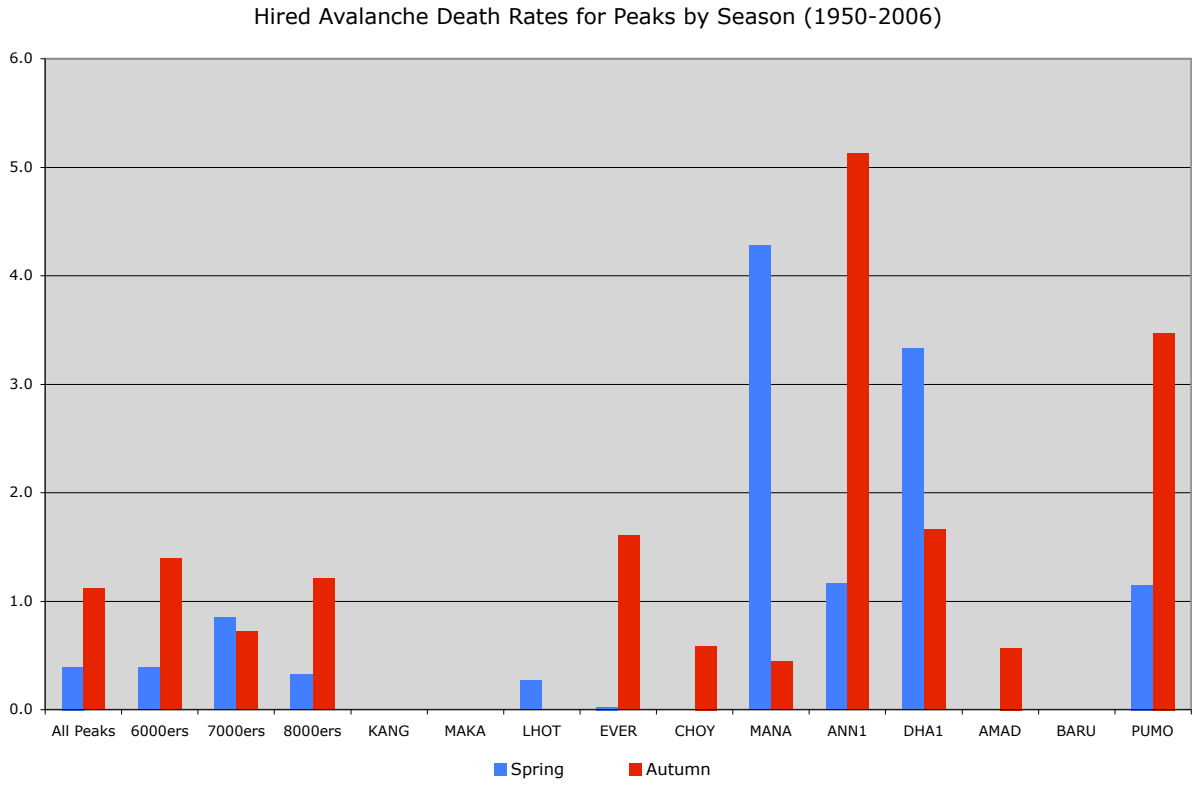


Chart D-25: Hired avalanche death rates for peaks by season from 1950-2006

Tables D-26 and D-27 and Charts D-26a and D-27a show avalanche death rates for members and hired personnel by geographic regions for the spring and autumn climbing seasons.

	Spring				Autumn			
	Members Above BC	Aval Death Cnt	Aval Death Rate	Pct Aval of Total Deaths	Members Above BC	Aval Death Cnt	Aval Death Rate	Pct Aval of Total Deaths
All Peaks	15865	54	0.34	20.0	17264	110	0.64	40.7
Kangchenjunga-Janak	1469	0	0.00	0.0	759	7	0.92	38.9
Khumbu-Makalu	10775	11	0.10	7.4	10641	37	0.35	32.5
Langtang-Jugal	281	6	2.14	100.0	376	6	1.60	66.7
Manaslu-Ganesh	916	14	1.53	43.8	989	15	1.52	44.1
Annapurna-Damodar-Peri	1196	14	1.17	53.8	2461	34	1.38	55.7
Dhaulagiri-Mukut	1076	8	0.74	24.2	1734	11	0.63	34.4
Kanjiroba-Far West	152	1	0.66	16.7	304	0	0.00	0.0

Table D-26: Member avalanche deaths for regions by season from 1950-2006

	Spring				Autumn			
	Hired Above BC	Aval Death Cnt	Aval Death Rate	Pct Aval of Total Deaths	Hired Above BC	Aval Death Cnt	Aval Death Rate	Pct Aval of Total Deaths
All Peaks	8402	33	0.39	38.4	5809	65	1.12	59.6
Kangchenjunga-Janak	648	0	0.00	0.0	202	0	0.00	0.0
Khumbu-Makalu	6216	3	0.05	7.3	3611	35	0.97	55.6
Langtang-Jugal	139	3	2.16	100.0	122	1	0.82	50.0
Manaslu-Ganesh	424	11	2.59	73.3	360	1	0.28	50.0
Annapurna-Damodar-Peri	492	4	0.81	57.1	732	22	3.01	73.3
Dhaulagiri-Mukut	412	12	2.91	80.0	679	6	0.88	75.0
Kanjiroba-Far West	71	0	0.00	0.0	103	0	0.00	0.0

Table D-27: Hired personnel avalanche deaths for regions by season from 1950-2006

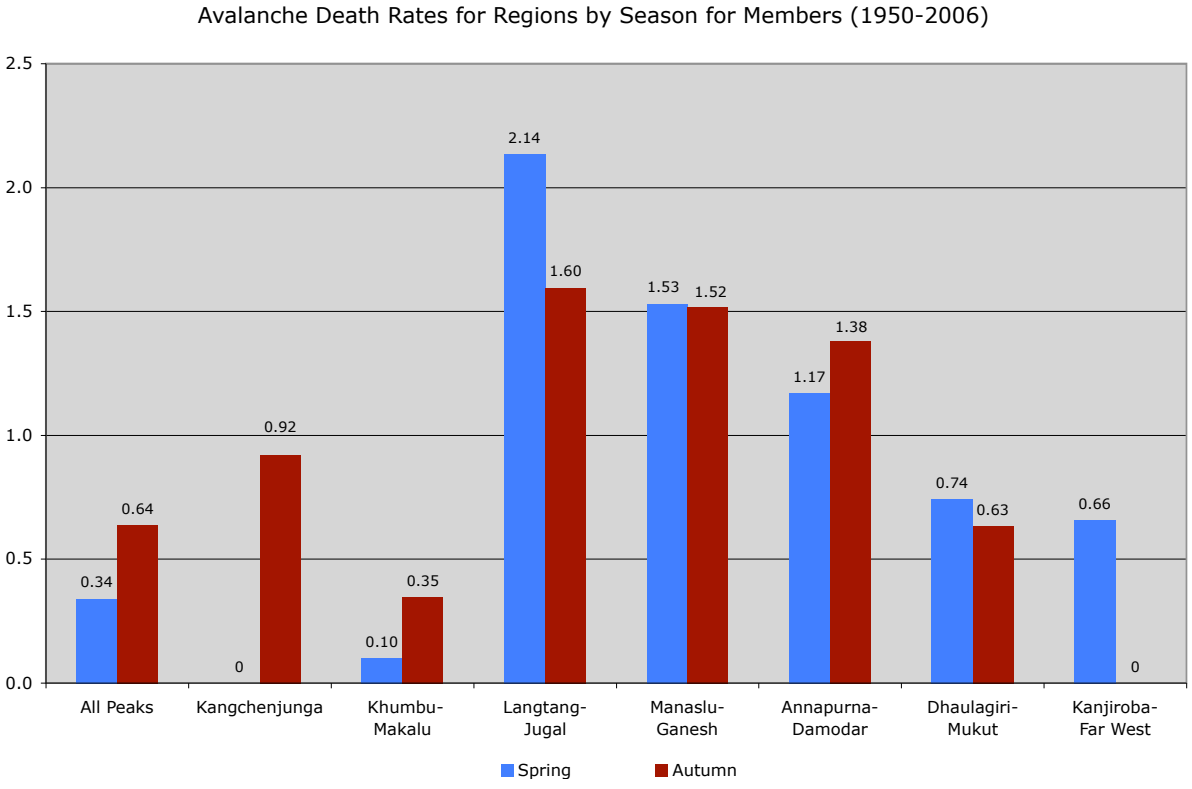


Chart D-26a: Member avalanche death rates for regions by season

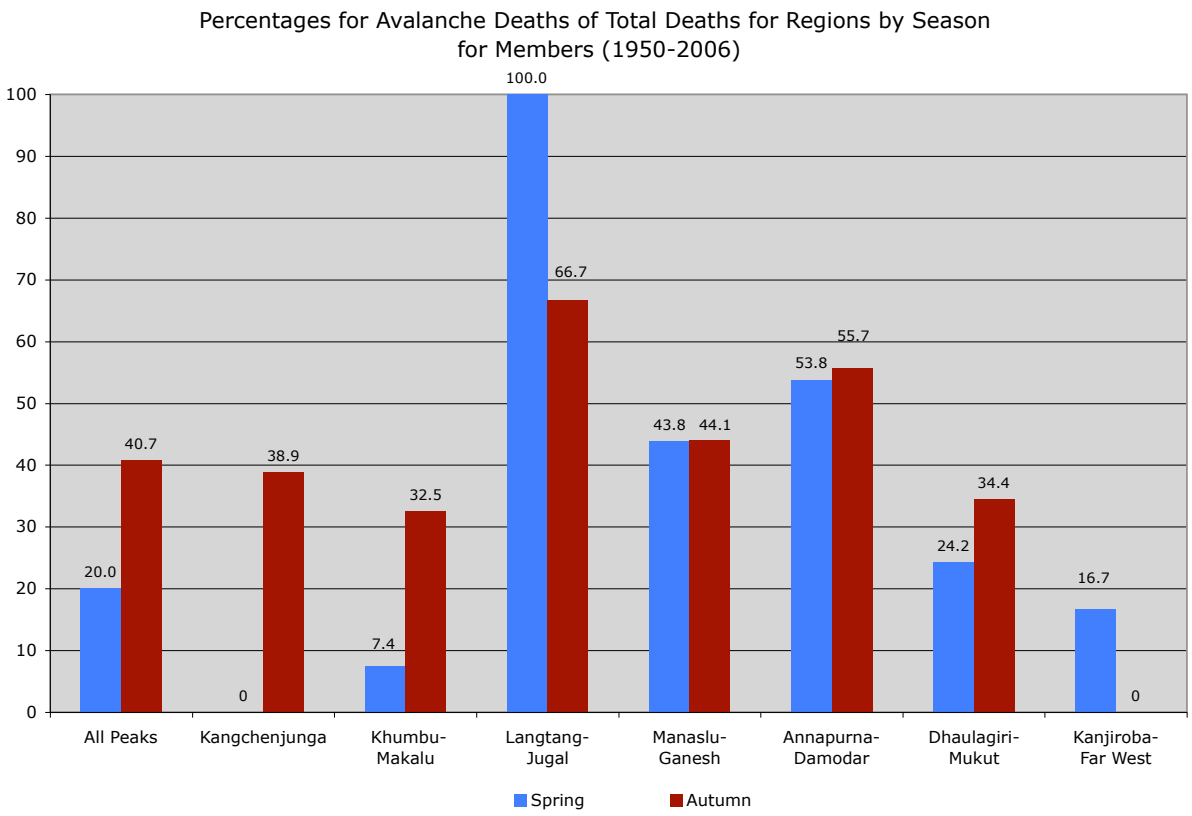


Chart D-26b: Percentages of avalanche out of total deaths for regions by season for members from 1950-2006

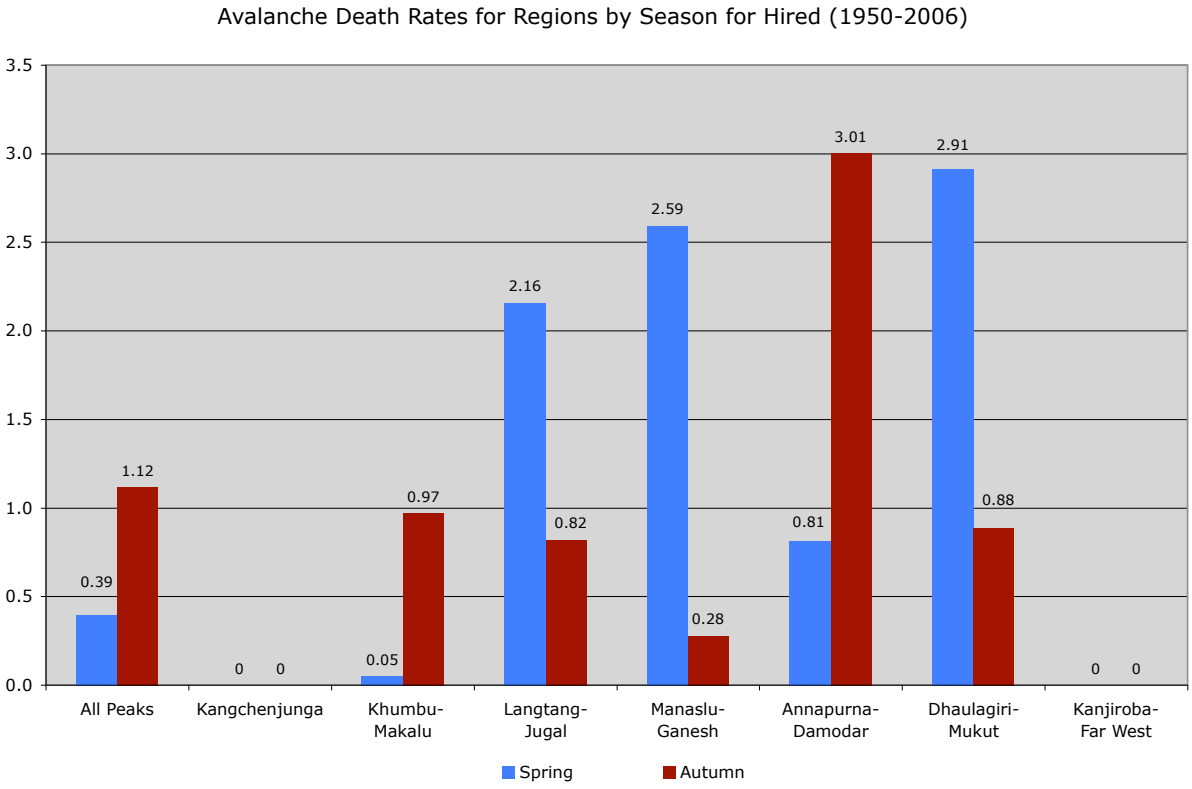


Chart D-27a: Hired avalanche death rates for regions by season

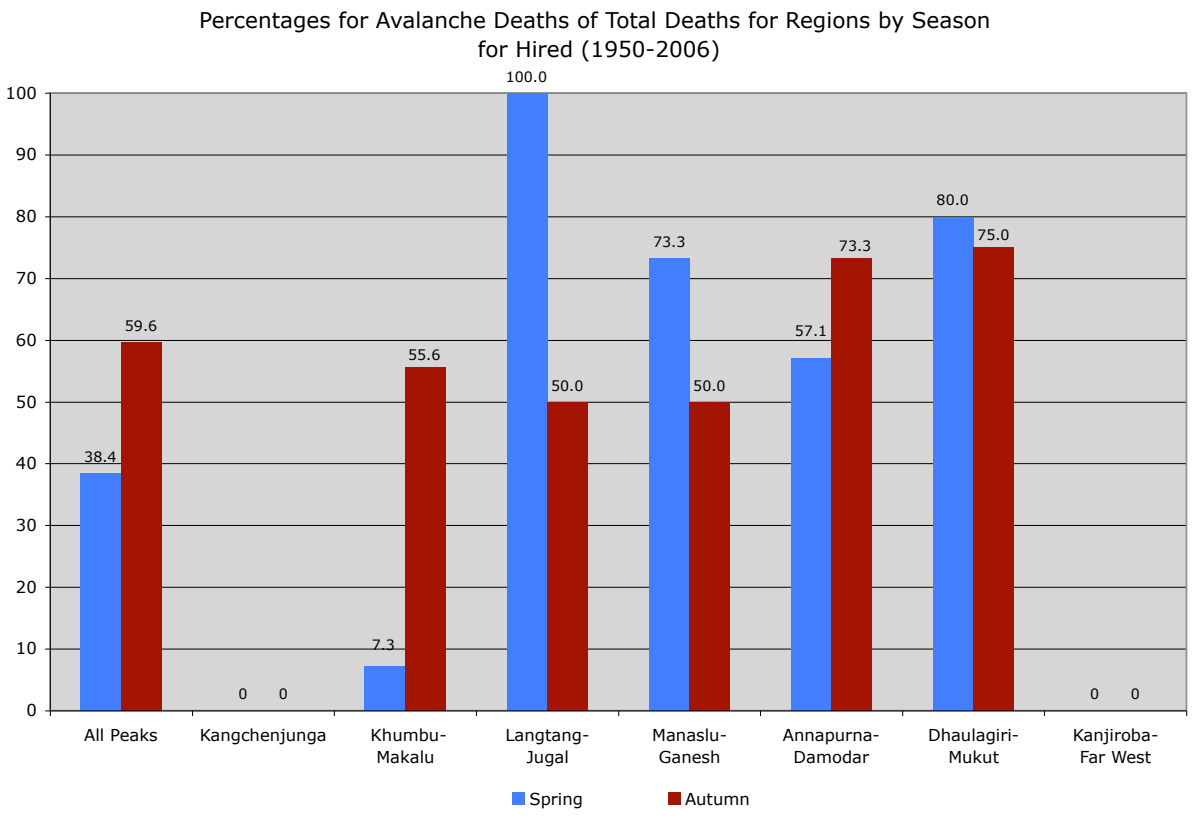


Chart D-27b: Percentages of avalanche out of total deaths for regions by season for hired from 1950-2006

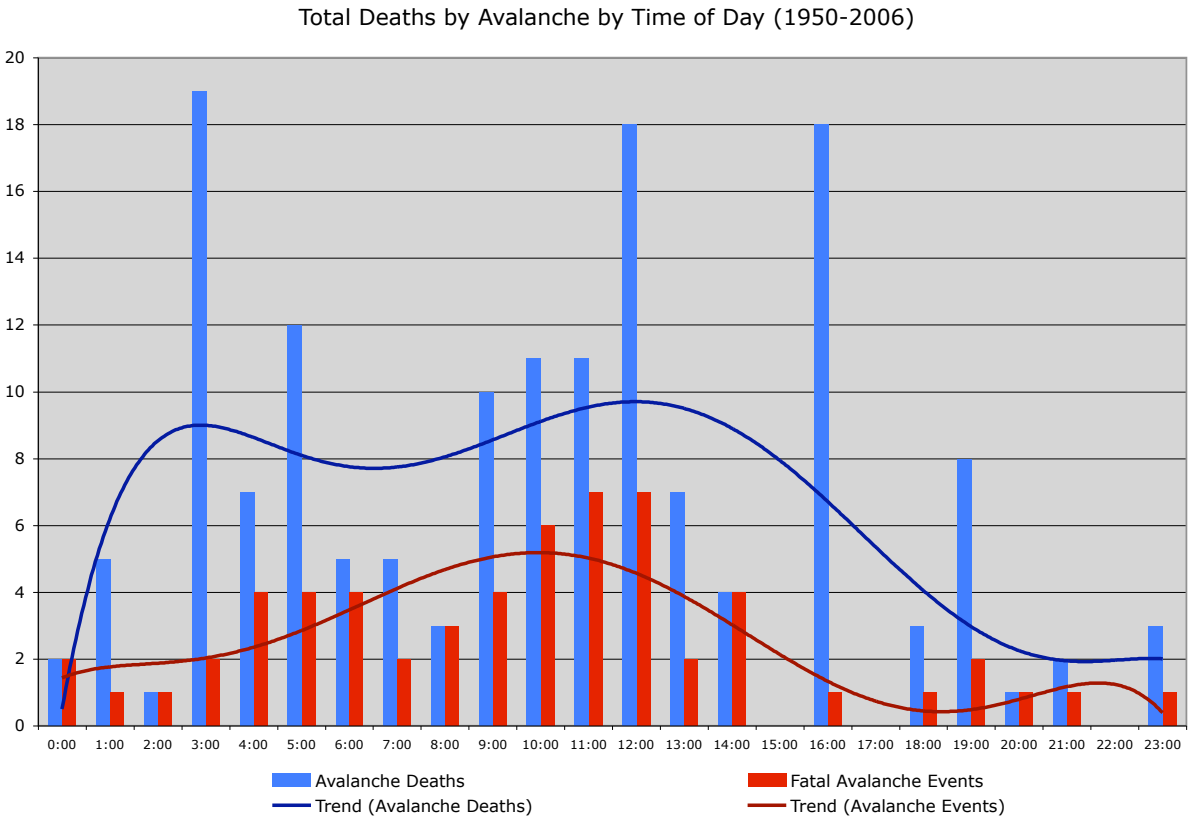


Chart D-27c: Avalanche deaths and fatal avalanche events by time of day for members and hired personal from 1950-2006

Charts D-26b and D-27b show avalanche death to total death ratios for members and hired personnel by geographic regions for the spring and autumn climbing seasons.

Icefall and serac collapses, a related form of avalanching but not included in the data above, have been largely confined to the Khumbu Icefall on Everest. The worst icefall collapse was on the 1970 Japanese Everest ski expedition led by Yuichiro Miura when 6 Sherpas were killed by an early morning serac collapse at 5700m. This was the third deadliest accident for Sherpas, the worst being the 1972 Manaslu avalanche described earlier that killed ten Sherpas and a 1922 Everest expedition avalanche below the North Col that killed seven Sherpas.

Chart D-27c shows by time of day the number of fatal avalanche events and total deaths for both members and hired personnel (a fatal avalanche event is an avalanche that kills one or more climbers). As shown, the majority of the fatal avalanches occur in the very early morning hours when temperatures are the lowest or during the late morning hours after the sun has warmed up the snow pack. But the two worst avalanches occurred at 3:15 a.m. (15 killed on Manaslu in 1972) and 4:00 p.m. (18 killed on Kang Guru in 2005), both outside of the primary avalanche times, illustrating that no time of day is completely safe.

One of Nepal's Deadliest Avalanches Hits Manaslu

From a Reuter's Dispatch by Elizabeth Hawley – April 14, 1972

One Korean Kim Yae-Sup and two Sherpas survived a huge avalanche that completely destroyed the Koreans' C3 (6500m) on Manaslu early in the morning of April 10. Kim who actually survived five avalanches and gale force winds that terrible morning briefly recounted his horror to Reuter's this morning in Shanta Bhawan Hospital while nurses gently bathed his badly frostbitten feet in warm water. He was brought to Kathmandu ex-basecamp by helicopter.

The avalanche took the lives of four Koreans, one Japanese and ten Sherpas. One Korean dead was the climbing leader Kim Ho-Sup, who had vowed to conquer Manaslu this time and recover the body of another brother Kim Ki-Sup, who died last spring at 7600m on the same side of Manaslu from fierce winds that swept him off his feet.

Kim said he woke about midnight that fatal night to make some hot water and to prepare for an early climbing start. Two Sherpas commented to him that there had been too much snowfall. They were worried about the snow conditions on the mountainside. At about 3:15 a.m., Kim heard the terrible noise of the huge avalanche and woke two members, Park Chang-Hee and Kazunari Yasuhisha, in the same tent. They tried to get outside, but the avalanche struck first and they were carried 800m downwards from C3 (at 6500m) with three shattering bounces before on the 4th bound they stopped moving.

Both Kim's companions were still alive and spoke to him: Park said the whole midsection of his torso was crushed and his spine was broken; Yasuhisha told Kim his left rib and right shoulder were broken. Then another avalanche struck them, fatally burying Kim's two friends and carrying him 300m further down. Three more avalanches hit Kim, but he survived with frostbitten feet and fingers; possible internal injuries are not yet known. "I think I am a very lucky boy and God is with me," Kim said this morning in his hospital bed. Kim's family is Christian.

There were four other tents in C3. In one were three Koreans, Kim Ho-Sup, Oh Sae-Keun, and Song Joon-Haeng and two other tents held ten Sherpas. All perished in this disaster.

Deaths by Falling

While avalanching is the leading cause of death for hired personnel, falls are the leading cause of death for members. Some of the world's best ended their careers with fatal falls: Jerzy Kukuczka fell off the south face of Lhotse at 8350m in 1989 while going for the summit alone, and Pierre Beghin fell to his death on Annapurna I at 7100m in 1992 while climbing with Jean-Christophe Lafaille (who subsequently disappeared on Makalu in January 2006 perhaps also due to a fall).

Death Classification Deaths by Falling	Members		Hired		Total	
	Cnt	Pct	Cnt	Pct	Cnt	Pct
Death enroute BC	3	1.3	2	6.3	5	2.0
Death at BC	0	0.0	0	0.0	0	0.0
Route preparation	72	32.3	5	15.6	77	30.2
Ascending in Smt Bid	**36**	**16.1**	**5**	**15.6**	41	16.1
Descending from Smt Bid	**104**	**46.6**	**19**	**59.4**	123	48.2
Expedition evacuation	8	3.6	1	3.1	9	3.5
Other/Unknown	0	0.0	0	0.0	0	0.0
	223	**100.0**	**32**	**100.0**	**255**	**100.0**
AMS-related	5	2.2	1	3.1	6	2.4
Weather/Storm-related	16	7.2	2	6.3	18	7.1

Table D-28: Death classification for deaths by falling for all peaks from 1950-2006

As shown in Table D-28 above, the majority of fatal falls occur on summit day (62.8% for members and 75% for hired personnel). The most critical phase, descending from a summit bid, is where most of the fatal falls occur (46.6% for members and 59.4% for hired).

Charts D-29a–d show altitudes of falls for all peaks and for peaks in the 7500-7999m, 8000-8499m, and 8500-8850m ranges, the groups in which the majority of falls occur.

The trend lines suggest that most falls occur on summit day and within 500m of the summit. At the higher altitudes (the right side at each of the four charts), those descending from a successful summit bid in general have the most fatalities, most likely because they are exhausted from climbing the farthest and for the longest time.

The spike in deaths in the 7000-7249m range is due in part to three multiple-fatality falls during route preparation: three Japanese deaths at 7000m on Dhaulagiri V (1971) when one climber slipped and pulled his two rope-mates with him, two Swiss deaths at 7100m on Lhotse Shar (1981) when two climbers disappeared and were later found dead at 6000m, and three Russian deaths at 7200m on Manaslu (1990). In addition, there were three multiple-fatality falls on summit day: two deaths each at 7000m on Tilicho (1988) and Annapurna I (1989) and two deaths at 7200m on Nuptse (1975). These six accidents account for 14 of the 33 deaths by falling at 7000-7249m. Taking away these 14 deaths would still leave a spike at 7000-7249m, but a much smaller one.

Chart D-29e shows for all peaks the location of fatal falls as measured by the vertical distance from the summit.

The spikes in deaths in the 500-599m and 600-699m ranges are due in part to four multiple-fatality falls on summit day: three Slovakian deaths at 6650m on Pumori

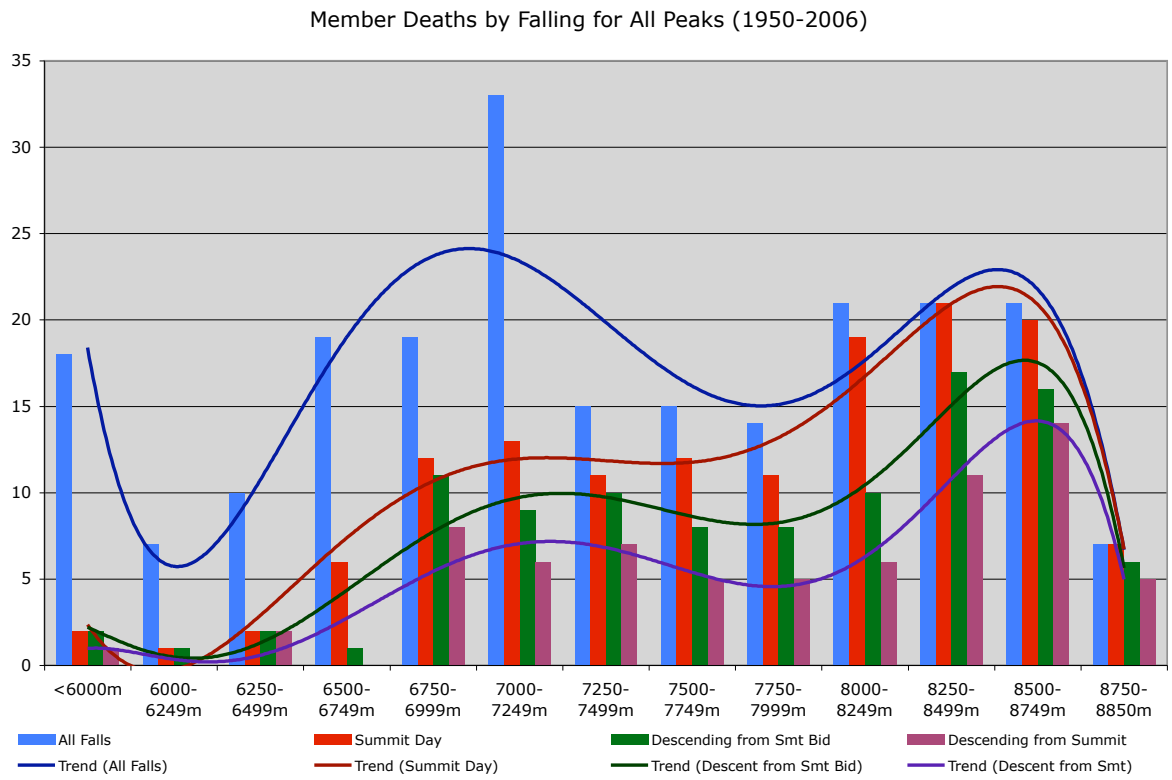


Chart D-29a: Member deaths by falling for all peaks from 1950-2006 (measured as altitude of fall)

Blue trend line – all deaths by falling.
Red trend line – all deaths on summit day (ascending or descending).
Green trend line – all deaths descending from all summit bids.
Purple trend line – all deaths descending from a successful summit bid.
Under the **purple** line represents all deaths descending from the summit.
Between the **green** and **purple** lines are all deaths descending from a failed summit bid.
Between the **red** and **green** lines are all deaths while ascending in a summit bid.
Between the **blue** and **red** lines are all deaths during route preparation or evacuation.

(1997) during ascent to the summit, four Czech deaths at 8300m on Everest (1988) during descent from the summit, two Yugoslav deaths at 8000m on Kangchenjunga (1991) after turning back from a summit bid, and two British deaths at 7200m on Nuptse (1975). There was also one accident during route preparation: the three Japanese deaths at 7000m on Dhaulagiri V (1971) mentioned above. These five accidents account for 14 of the 45 deaths by falling at a distance of 500 to 699m from the summit. Taking away these 14 deaths will still leave spikes at 500-599m and 600-699m, but much smaller ones.

Table D-30 and Charts D-30a-b show the time of day for all deaths by falling and deaths by falling while descending from a summit bid. There are two particularly dangerous times, mid-morning from about 9 to 11 a.m. and late afternoon from 3 to 6 p.m. But for falls while descending from a summit bid, only the afternoon period is particularly dangerous, probably because those still descending late in the afternoon have been climbing for more hours, are on longer summit-day routes, or are slower due to age or lack of climbing skills.

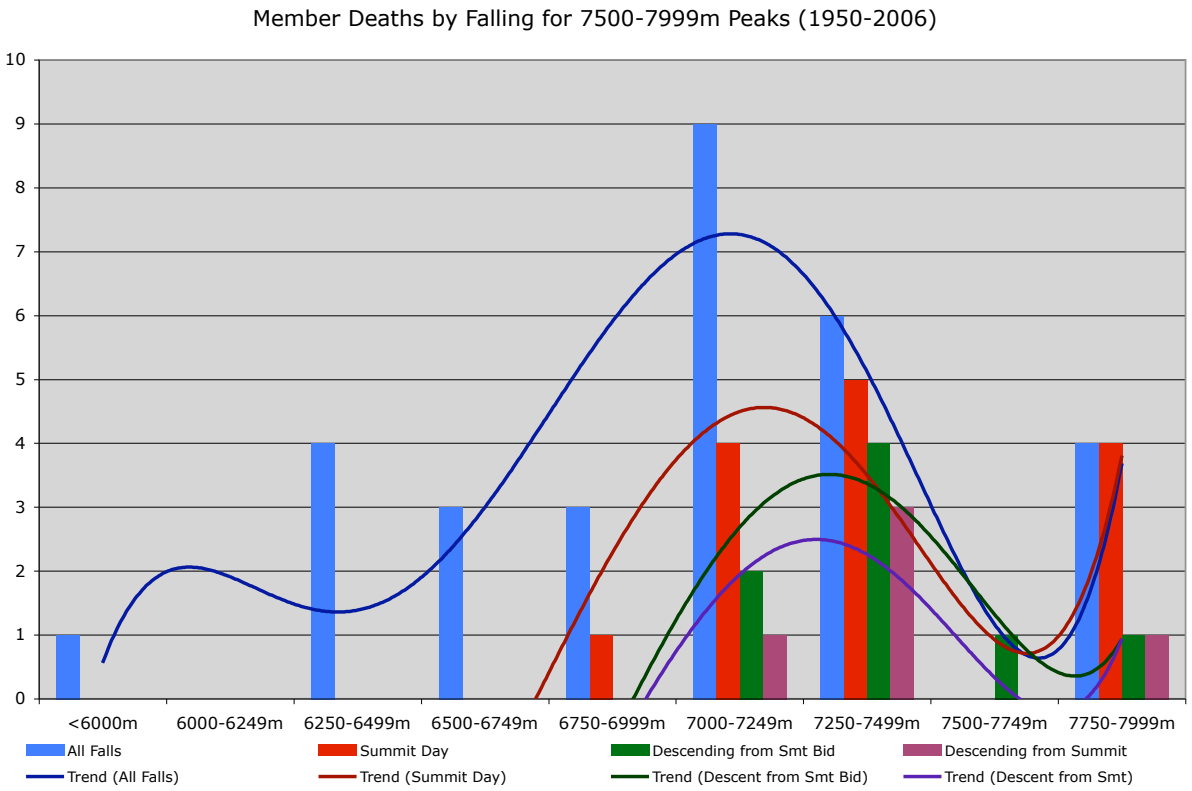


Chart D-29b: Member deaths by falling for 7500-7999m peaks from 1950-2006 (measured as altitude of fall)

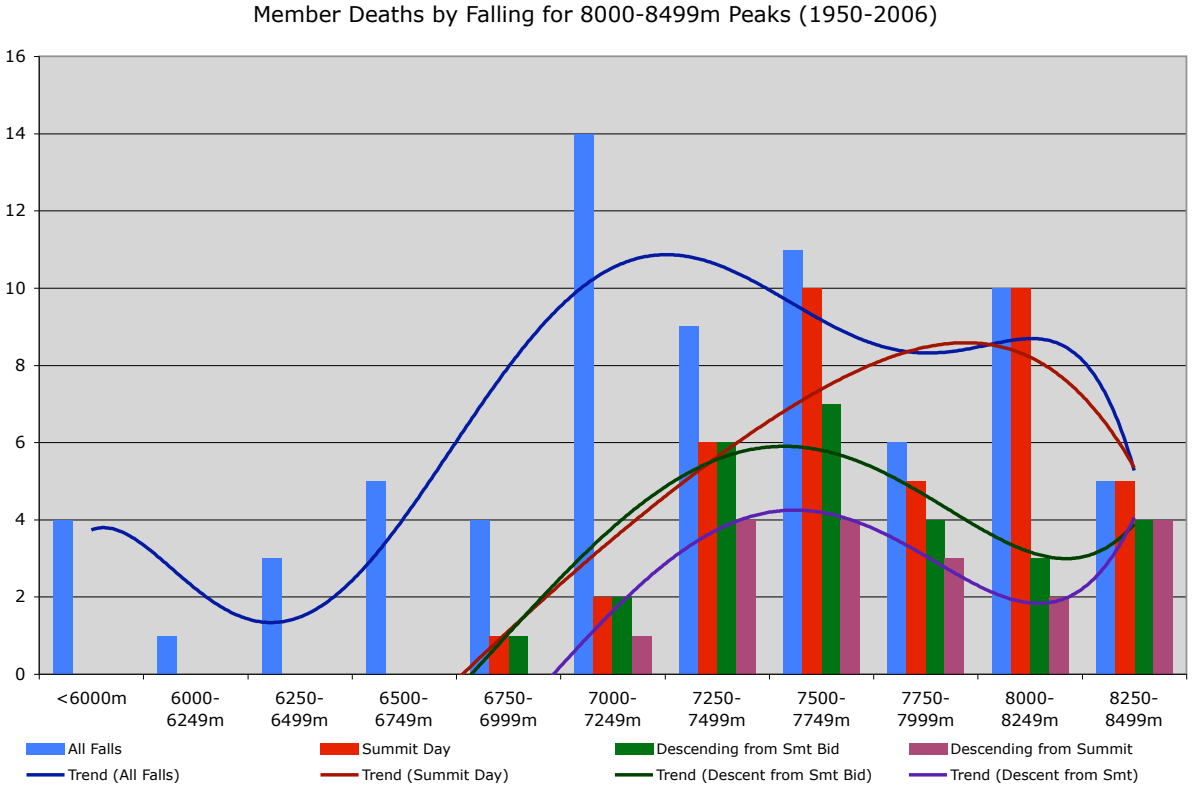


Chart D-29c: Member deaths by falling for 8000-8499m peaks from 1950-2006 (measured as altitude of fall)

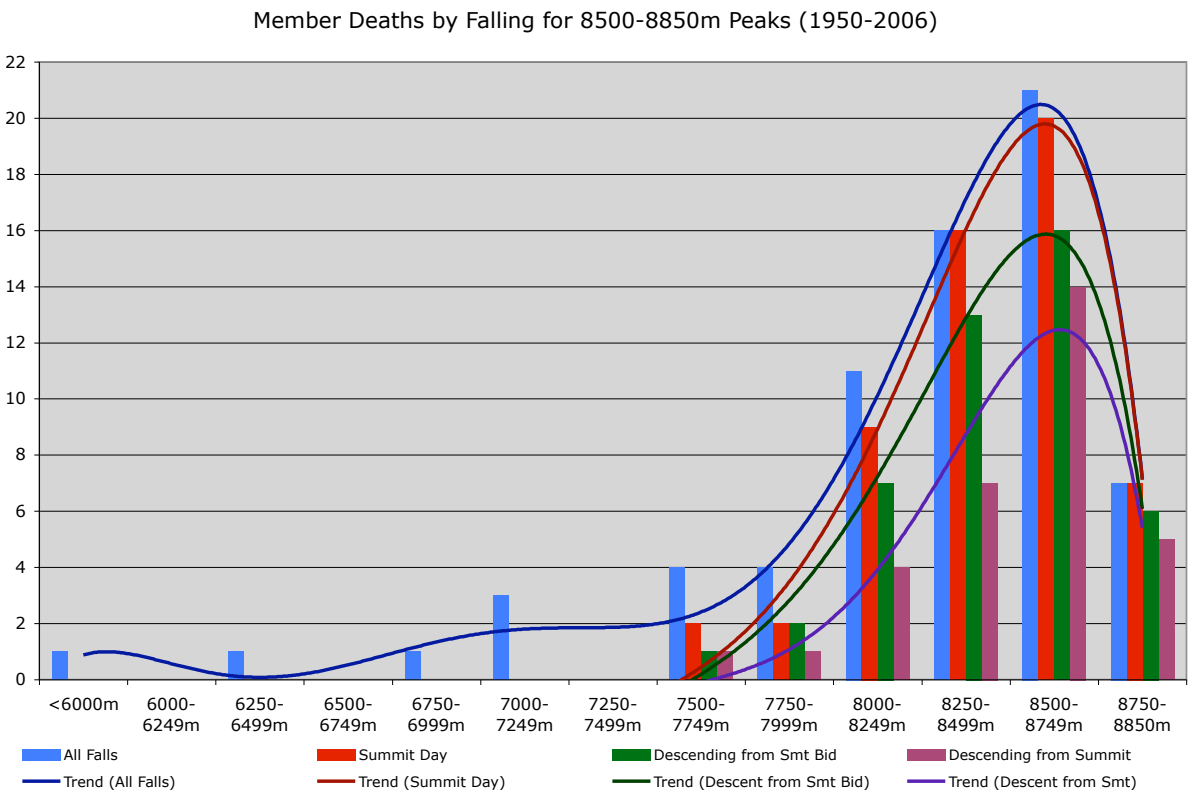


Chart D-29d: Member deaths by falling for 8500-8850m peaks from 1950-2006 (measured as altitude of fall)

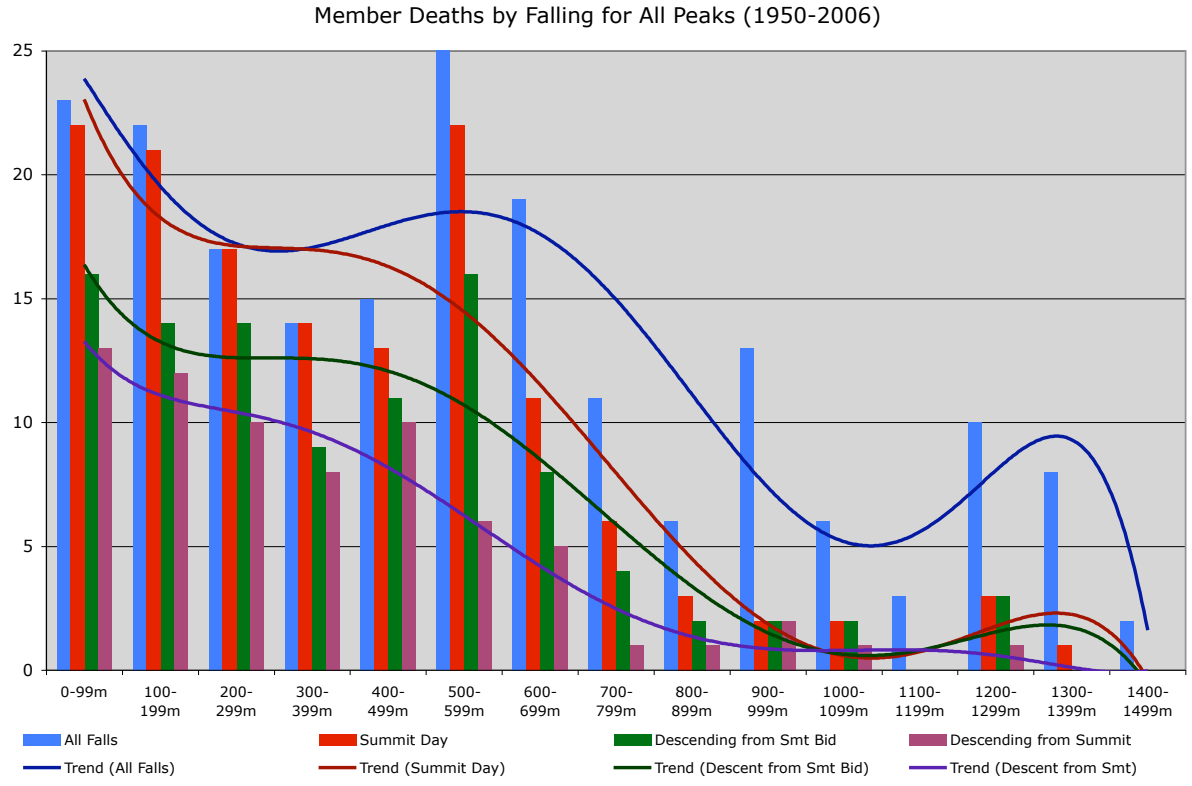


Chart D-29e: Member deaths by falling for all peaks from 1950-2006 (measured as distance from summit in vertical meters)

Time of Day	All Falls					Falls Descending from Smt Bids				
	All Peaks	6000ers	7000ers	8000ers	EVER	All Peaks	6000ers	7000ers	8000ers	EVER
Unknown	92	6	21	65	19	45	1	11	33	11
00:00-00:59	1	0	0	1	0	1	0	0	1	0
01:00-01:59	0	0	0	0	0	0	0	0	0	0
02:00-02:59	0	0	0	0	0	0	0	0	0	0
03:00-03:59	0	0	0	0	0	0	0	0	0	0
04:00-04:59	1	0	1	0	0	0	0	0	0	0
05:00-05:59	1	1	0	0	0	1	1	0	0	0
06:00-06:59	6	1	0	5	4	1	0	0	1	1
07:00-07:59	3	0	2	1	1	2	0	2	0	0
08:00-08:59	6	2	0	4	2	0	0	0	0	0
09:00-09:59	10	2	2	6	1	3	1	0	2	1
10:00-10:59	12	0	5	7	3	1	0	0	1	0
11:00-11:59	4	0	1	3	1	1	0	0	1	1
12:00-12:59	6	0	3	3	0	1	0	0	1	0
13:00-13:59	9	1	3	5	2	6	1	1	4	2
14:00-14:59	10	2	4	4	3	2	0	1	1	1
15:00-15:59	10	1	7	2	1	8	1	5	2	1
16:00-16:59	14	1	6	7	0	7	0	1	6	0
17:00-17:59	13	0	1	12	7	8	0	1	7	5
18:00-18:59	7	0	0	7	2	3	0	0	3	2
19:00-19:59	8	1	4	3	0	7	1	3	3	0
20:00-20:59	9	2	2	5	1	6	0	1	5	1
21:00-21:59	1	0	0	1	0	1	0	0	1	0
22:00-22:59	0	0	0	0	0	0	0	0	0	0
23:00-23:59	0	0	0	0	0	0	0	0	0	0
Totals	**223**	**20**	**62**	**141**	**47**	**104**	**6**	**26**	**72**	**26**

Table D-30: Deaths by falling by time of day for all peaks from 1950-2006

5 of the 12 deaths in the 10 a.m. bracket were the result of two accidents while ascending in summit bids: Gerry Owens and Richard Summerton (both UK) at 7200m on Nuptse in spring 1975, and Pavol Dzurman, Peter Lenco, and Frantisek Miscak (all Slovaks) at 6550m on Pumori in autumn 1997. The remainder of the accidents in the 9 to 11 a.m. brackets were all single fatalities, one being Pierre Beghin's fall off the south face of Annapurna I.

The other major falling accident was in autumn 1988 when Dusan Becik, Peter Bozik, Jaroslav Jasko, and Jozef Just (all Czechs) fell in descent near 8300m on the southeast ridge of Everest shortly after their last radio contact at 5:30 p.m.

The worst falling accident occurred in November 1994 when three rope teams of nine Germans, one Swiss, and a Sherpa guide plunged off the west ridge of Pisang Peak apparently after becoming entangled when one team member slipped. This accident is not included in the above Table D-30 above since it occurred on a trekking peak.

Other notable falls include Jerzy Kukuczka falling on the south face of Lhotse at 6 a.m., Marco Siffredi disappearing at 8600m around 3 p.m. while attempting to snowboard down the Great Couloir on north face of Everest, and Benoit Chamoux disappearing down the north face of Kangchenjunga around 5 p.m.

The chart pattern for deaths by falling in descent from a successful summit bid are very similar to the above chart pattern for descents for all summit bids.

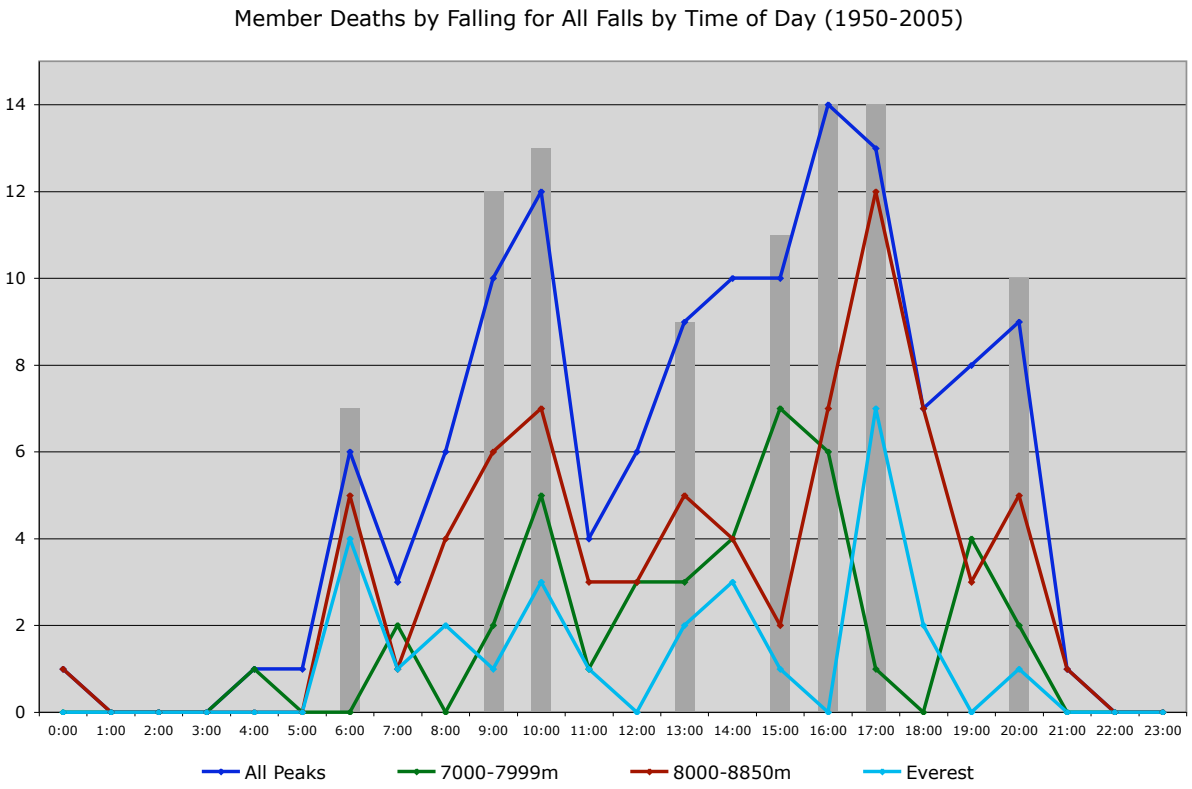


Chart D-30a: Member deaths by falling for all falls by time of day from 1950-2006

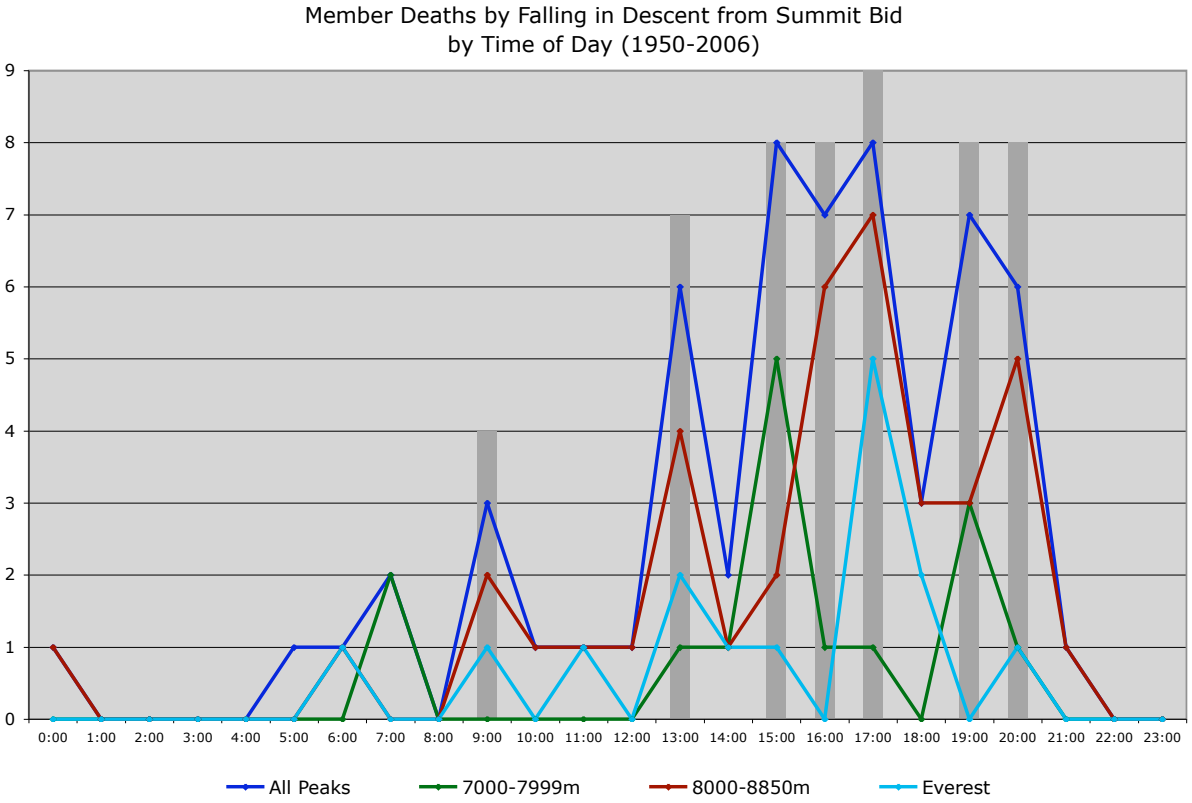


Chart D-30b: Member deaths by falling in descent from summit bid by time of day from 1950-2006

Deaths by Physiological Causes

Physiological factors (AMS, exhaustion, and exposure-frostbite) are the third leading cause of death for members (over 16% as shown in table D-16). 78 of those 93 deaths have occurred over 6000m (most of the others have occurred at base camp or lower shortly after expedition arrival). Of the 78 deaths above 6000m, more than half have occurred on Everest at high altitudes as shown in Chart D-31.

Closer examination of the Everest deaths in Charts D-32a-b shows that 14 deaths have occurred between the First and Second Steps (8450-8680m) on the NE ridge. These 14 deaths represent 18% of all the deaths above 6000m and make this portion of the N Col-NE Ridge route on Everest extremely dangerous.

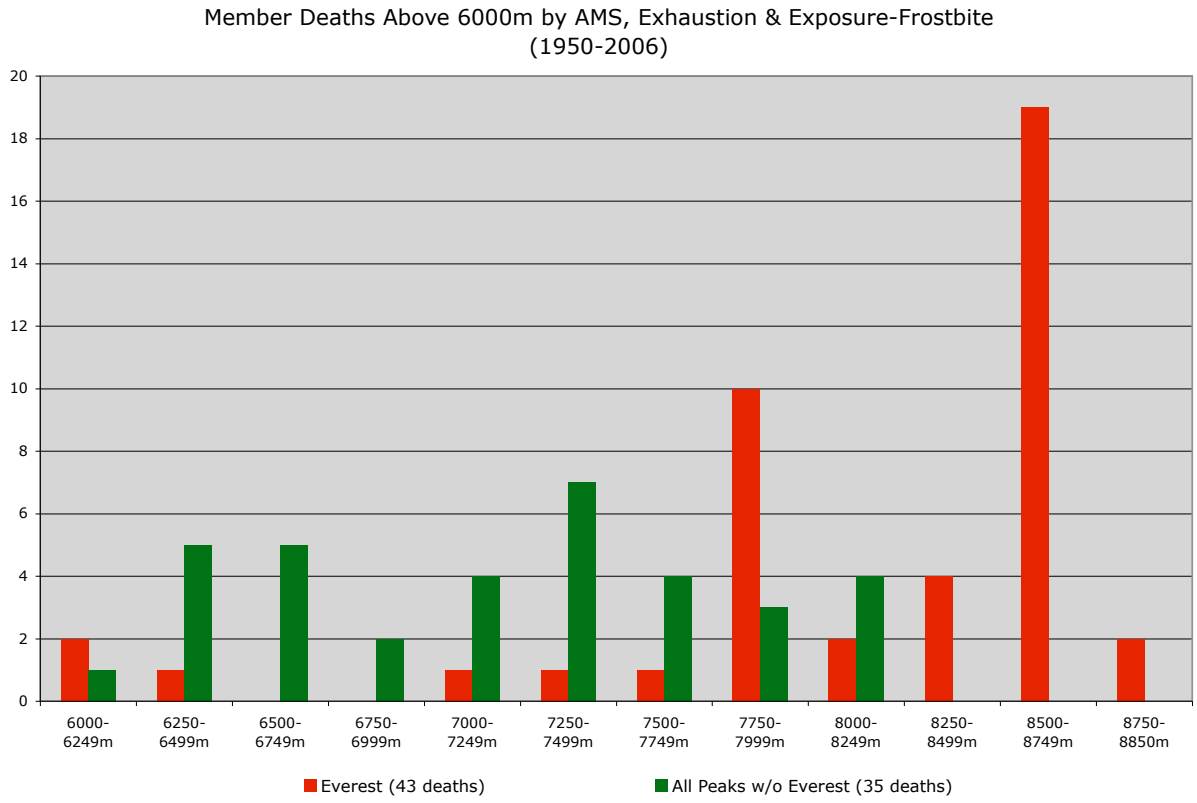


Chart D-31: Member deaths above 6000m from AMS, exhaustion, and exposure-frostbite from 1950-2006

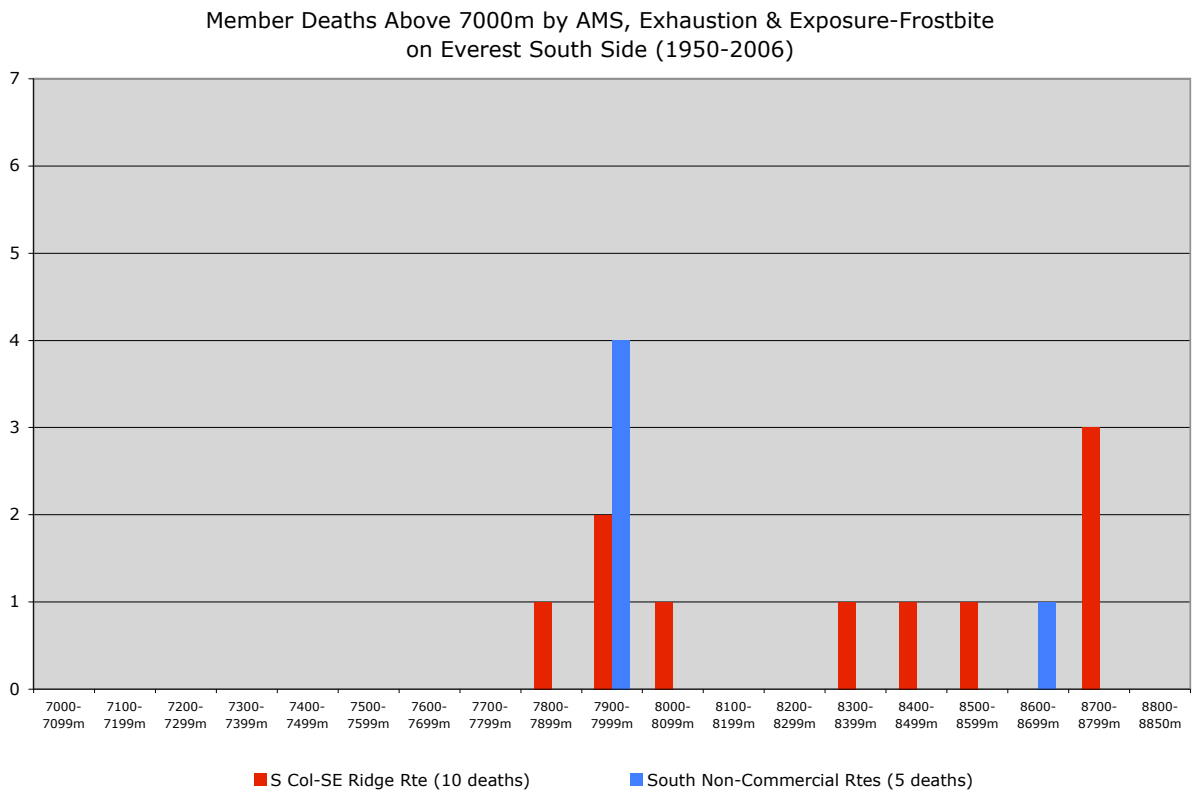


Chart D-32a: Member deaths above 7000m from AMS, exhaustion, and exposure-frostbite on the south side of Everest from 1950-2006

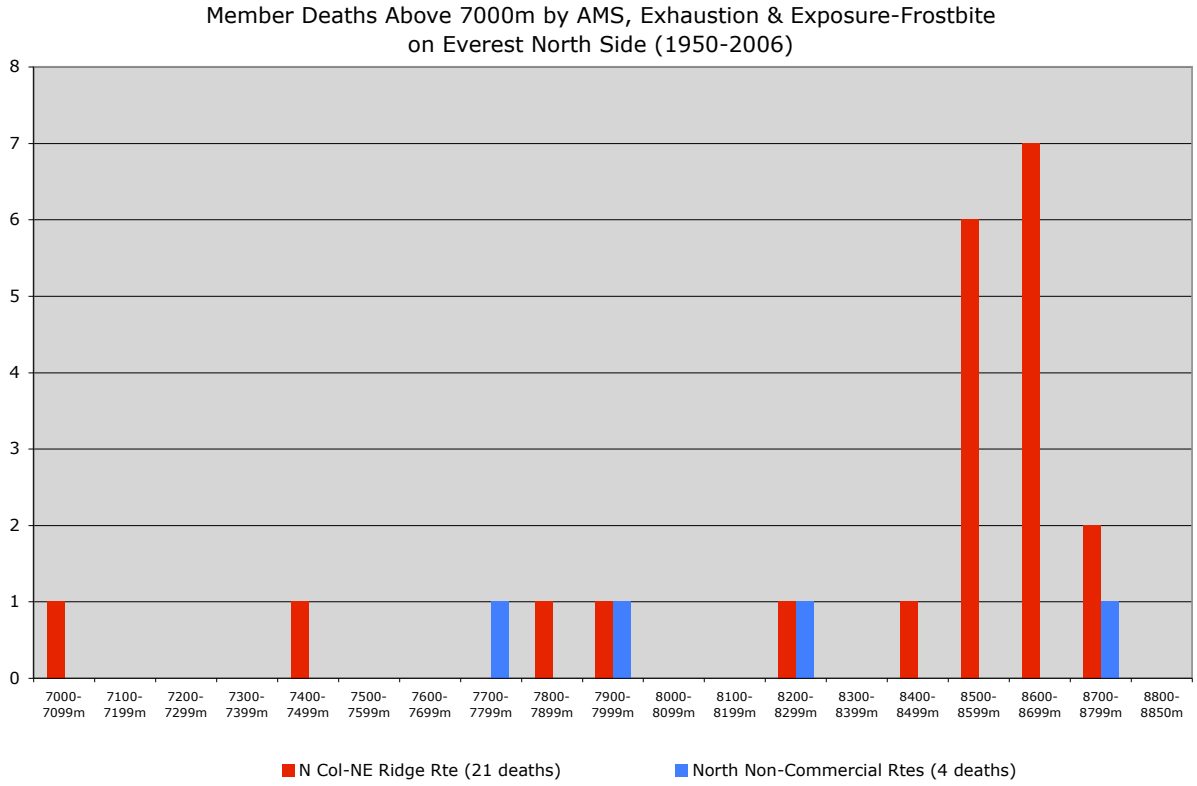


Chart D-32b: Member deaths above 7000m from AMS, exhaustion, and exposure-frostbite on the north side of Everest from 1950-2006

Deaths by Age Groups

Table and Chart D-33 show death counts and rates by age groups in 5-year intervals for members.

Age Groups	All Peaks 1950-2006			All Peaks 1950-2006 without Ama Dablam-Cho Oyu-Everest commercial routes 1990-2006			Ama Dablam-Cho Oyu-Everest commercial routes 1990-2006		
	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate
Unknown	1540	38	2.47	1377	37	2.69	163	1	0.61
10-14	5	0	0.00	2	0	0.00	3	0	0.00
15-19	130	3	2.31	87	3	3.45	43	0	0.00
20-24	2410	56	2.32	1922	53	2.76	488	3	0.62
25-29	6804	122	1.79	5305	111	2.09	1499	11	0.73
30-34	7553	126	1.67	5199	113	2.17	2354	13	0.55
35-39	6170	103	1.67	3864	77	1.99	2306	26	1.13
40-44	4475	51	1.14	2591	38	1.47	1884	13	0.69
45-49	2737	37	1.35	1464	26	1.78	1273	11	0.86
50-54	1625	17	1.05	794	10	1.26	831	7	0.84
55-59	863	8	0.93	430	5	1.16	433	3	0.69
60-64	413	8	1.94	195	4	2.05	218	4	1.84
65-69	139	2	1.44	76	0	0.00	63	2	3.18
70-74	46	0	0.00	22	0	0.00	24	0	0.00
75-79	10	0	0.00	7	0	0.00	3	0	0.00

Table D-33: Member deaths by age groups from 1950-2006

The table is divided into three sections: all peaks from 1950 to 2006, all peaks from 1950 to 2006 without the Ama Dablam, Cho Oyu, and Everest commercial routes from 1990 to 2006, and finally the Ama Dablam, Cho Oyu, and Everest commercial routes during the 1990-2006 period.

Chart D-33 shows a striking difference between commercial and non-commercial climbing.

The **blue** trend line for all peaks without the Ama Dablam, Cho Oyu, and Everest commercial routes shows a steady decline in the death rates by age, indicating that Himalayan climbing becomes relatively safer as one become older (and presumably more skilled, experienced, and perhaps more conservative sticking to easier routes).

The **red** trend line for the Ama Dablam, Cho Oyu, and Everest commercial routes shows a reasonably flat death rate up to about age 60, then a sharp increase due to a very high death rate of 3.18 for the age 65-69 group. This may be due to a combination of age and lack of climbing skills and experience for some older commercial climbers.

As shown in Table D-34 below, this higher death rate may be somewhat of an anomaly since is it based only on 6 deaths.

	Ama Dablam			Cho Oyu			Everest		
	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate
60-64	42	1	2.38	95	1	1.05	81	2	2.47
65-69	18	0	0.00	19	0	0.00	26	2	7.69
Peak Totals	2696	8	0.30	4340	22	0.51	4549	64	1.41

Table D-34: Deaths for members of age 60-69 on commercial routes from 1950-2006

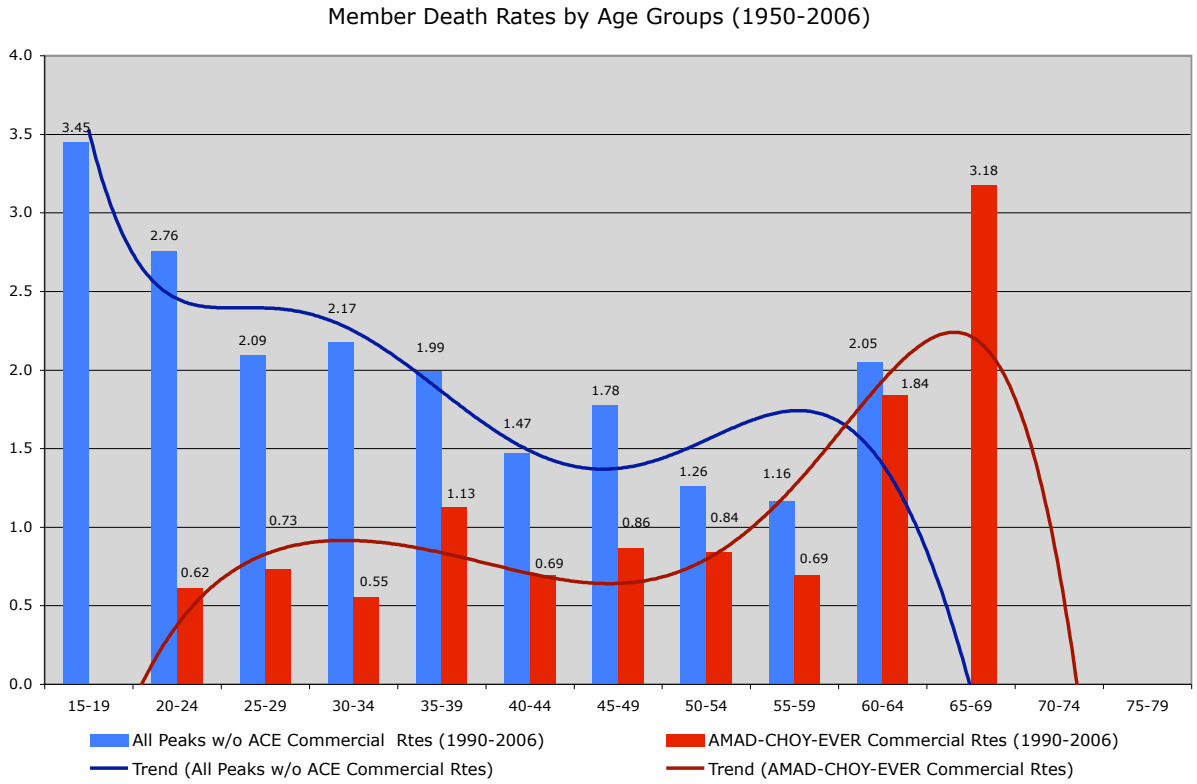


Chart D-33: Member death rates by age groups from 1950-2006 for all peaks w/o Ama Dablam, Cho Oyu, and Everest commercial routes from 1990-2006 (in blue) and for Ama Dablam, Cho Oyu, and Everest commercial routes from 1990-2006 (in red)

Two deaths on Everest occurred in 2004 when 68-year old Nils Antezana died of exhaustion below the South Summit of Everest at 8500m while descending from the summit and 63-year old Shoka Ota died at 8600m while descending from the summit on the north side. The other deaths occurred on the north side of Everest in 1993 when 66-year old Karl Henize (a former NASA astronaut) died of pulmonary edema during the night at 6000m after being carried down from advanced base camp at 6400m, and on the south side of Everest when 63-year old Sean Egan collapsed at Dugla while descending for treatment after suffering cardiac problems when returning to base camp from Camp 1 two days earlier.

On Cho Oyu, 63-year old Fritz Zintl died at base camp from illness (an infection contracted in Tibet), and on Ama Dablam, 60-year old Jean Corniglion died from AMS while being evacuated from base camp after spending one night at Camp 1 at 5800m.

The youngest member death was 18-year-old Brahim Saidi who perished in an avalanche at 6600m on Pumori in 1991 on a commercial expedition.

Since the ages of most hired personnel are generally unknown, their death rates by age groups cannot be accurately calculated. There have been no recorded deaths of hired personnel under the age of 20; the oldest hired death recorded was Tsering Tarke Sherpa (age 50), who died in the Khumbu Icefall during the 1970 Japanese Everest skiing expedition.

Deaths by Expedition Years

Chart D-35 shows the member and hired personnel death rates by expedition year in 5-year steps for all peaks.

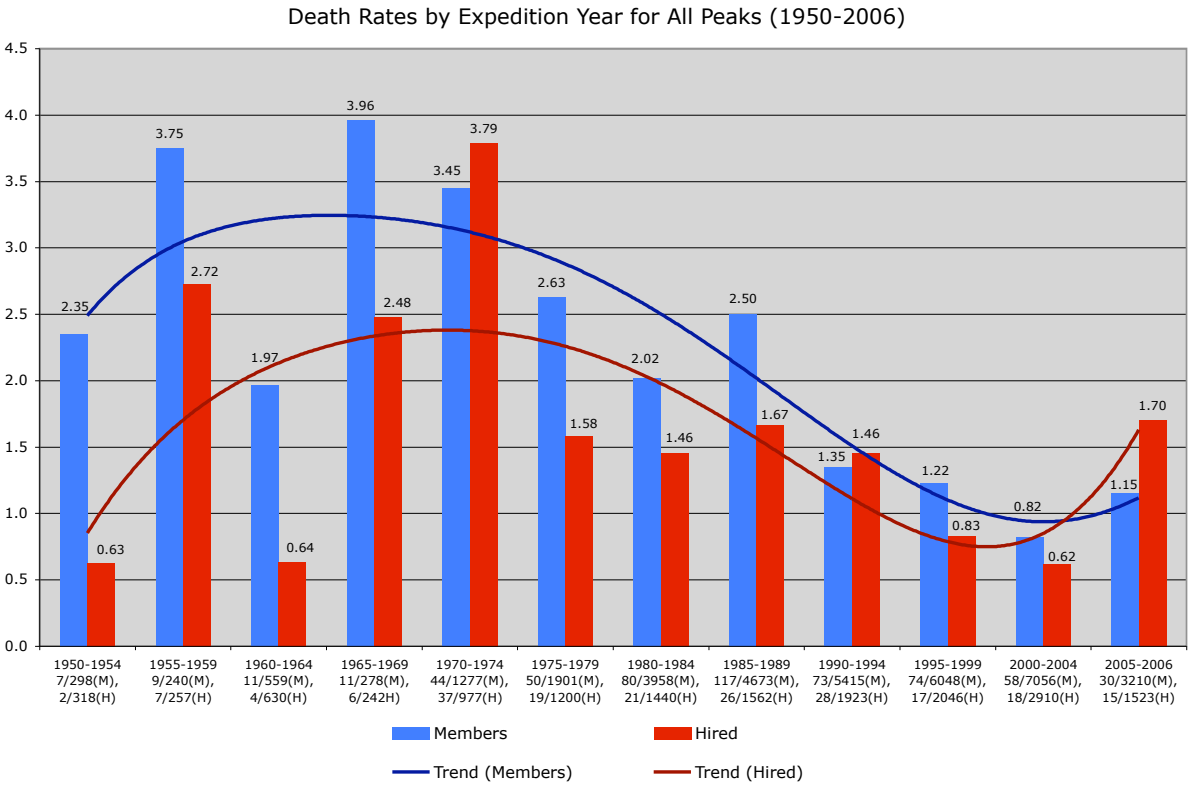


Chart D-35: Member and hired death rates by expedition year for all peaks from 1950-2006

The results from the early years from 1950 to 1970 are more erratic due to the lower numbers of expeditions especially in the late 1960s when Himalayan climbing was suspended in Nepal and before the Chinese side of the border was opened to foreign climbers in 1980. From the 1970s onward, the data in Chart D-35 show more consistent results. The trend lines show a steady decrease in fatalities and death rates starting about 1975 for both members and hired until 2005. The 2005 Kang Guru avalanche

Exp Years	All Peaks			Everest			8000ers		
	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate	Above BC	Death Cnt	Death Rate
1950-1954	298	7	2.35	38	0	0.00	128	1	0.78
1955-1959	240	9	3.75	9	0	0.00	110	4	3.64
1960-1964	559	11	1.97	109	3	2.75	138	5	3.62
1965-1969	278	11	3.96	70	1	1.43	105	6	5.71
1970-1974	1277	44	3.45	269	4	1.49	567	23	4.06
1975-1979	1901	50	2.63	295	6	2.03	865	27	3.12
1980-1984	3958	80	2.02	653	17	2.60	1952	50	2.56
1985-1989	4673	117	2.50	1163	23	1.98	2783	63	2.26
1990-1994	5415	73	1.35	1424	16	1.12	3385	53	1.57
1995-1999	6048	74	1.22	1242	27	2.17	3852	63	1.64
2000-2004	7056	58	0.82	1728	19	1.10	4273	46	1.08
2005-2006	3217	37	1.15	928	13	1.40	2207	19	0.86
	34920	**571**	**1.64**	**7928**	**129**	**1.63**	**20365**	**360**	**1.77**

Table D-36: Member deaths by expedition year for all peaks, Everest, and the 8000ers from 1950-2006 (includes the 2005 Kang Guru accident)

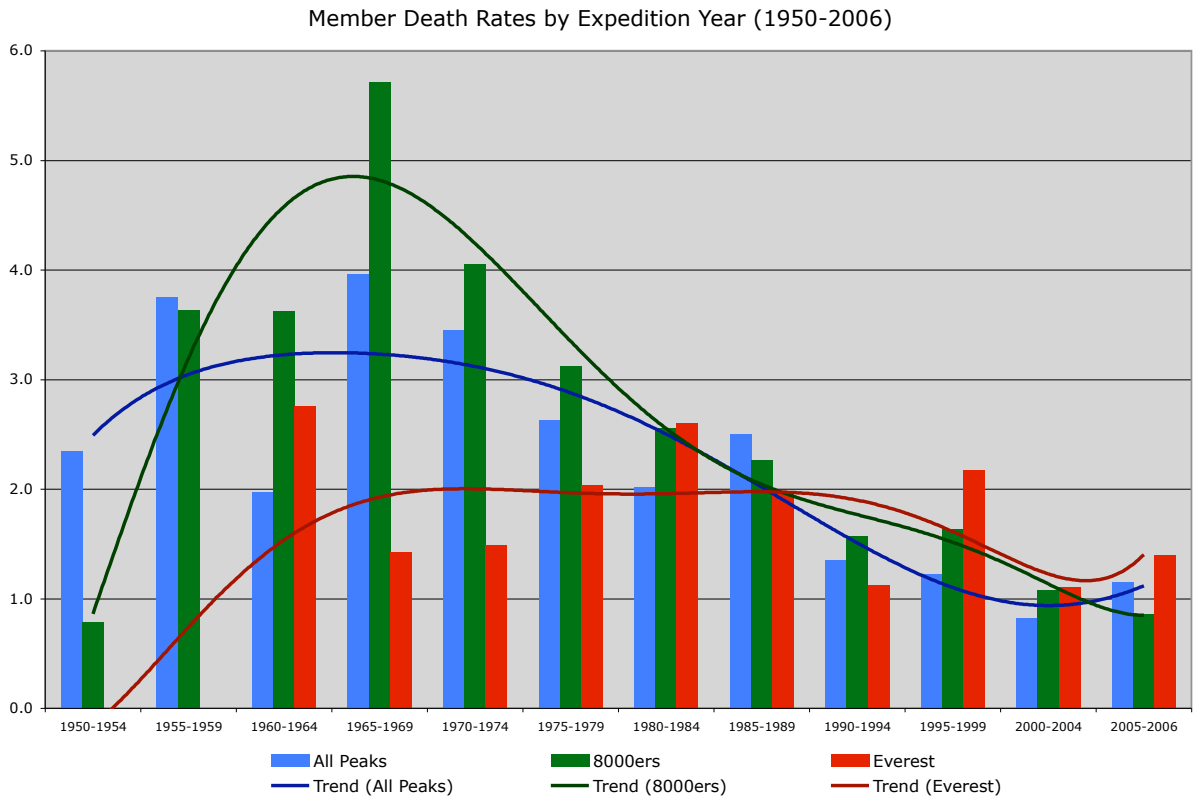


Chart D-36: Member death rates by expedition year from 1950-2006

that killed 7 members and 11 hired personnel, and three separate avalanches on Ama Dablam, Ganesh VII, and Pumori in 2006 that killed 14 (7 members and 7 hired) have now reversed the long term downward trend.

As shown in Table and Chart D-36, the decline of member death rates holds true across the board for all peaks (**blue**), all 8000ers (**green**), and Everest (red).

Deaths by Citizenship

Table D-37 shows *member* death rates by citizenship for all peaks and Everest for those nationalities that had a substantial number of members above base camp (50 or more for all peaks and 20 or more for Everest). Citizens from countries that had fewer than the 50 or 20 cutoff points are grouped into the "**All Others**" category. Note that there have been no deaths on Everest for countries that had fewer than 20 members.

The citizens of Nepal and China are split into two groups: Sherpas/non-Sherpas and Tibetans/non-Tibetans, respectively, in order to differentiate the higher-altitude from the lower-altitude residents. Also for the Nepalese Sherpas and Chinese Tibetans, the numbers above base camp include only those who were actual members of an expedition, not those who were hired as high-altitude assistants. The non-Tibetan Chinese death rates may be misleading due to the lack of reliable information regarding the actual number of members that went above base camp for large Chinese expeditions on the north side of Everest.

Many eastern European countries (e.g., Czechoslovakia, Poland, Bulgaria, Hungary) have much higher death rates than the mean death rates, perhaps a result of more

All Peaks			
Citizenship	Above BC	Death Cnt	Death Rate
Slovakia	96	7	7.29
Greece	107	5	4.67
Bulgaria	163	7	4.29
Hungary	75	3	4.00
Czechoslovakia	317	11	3.47
Taiwan	59	2	3.39
Poland	869	27	3.11
Denmark	108	3	2.78
Kazakhstan	72	2	2.78
China (non-Tibetan)	257	7	2.72
Australia	606	16	2.64
Russia	621	16	2.58
Argentina	117	3	2.56
India	915	22	2.40
Japan	4689	103	2.20
Slovenia	369	8	2.17
W Germany	712	15	2.11
USSR	241	5	2.08
Colombia	51	1	1.96
S Korea	1957	38	1.94
Belgium	268	5	1.87
Yugoslavia	438	8	1.83
Ukraine	181	3	1.66
Austria	1271	21	1.65
Finland	64	1	1.56
Brazil	65	1	1.54
France	2879	42	1.46
All others	622	9	1.45
Mexico	140	2	1.43
Sweden	210	3	1.43
New Zealand	452	6	1.33
Switzerland	1480	19	1.28
Spain	2291	29	1.27
UK	2689	34	1.26
Netherlands	416	5	1.20
Germany	1339	16	1.20
Italy	1809	19	1.05
Chile	99	1	1.01
USA	3618	35	0.97
Canada	550	5	0.91
Nepal (non-Sherpa)	367	3	0.82
Czech Republic	288	2	0.69
Nepal (Sherpa)	224	1	0.45
China (Tibetan)	204	0	0.00
Georgia	54	0	0.00
Indonesia	51	0	0.00
Iran	101	0	0.00
Ireland	90	0	0.00
Norway	198	0	0.00
S Africa	61	0	0.00
Mean Death Rate			**1.65**

Everest			
Citizenship	Above BC	Death Cnt	Death Rate
Czechoslovakia	62	5	8.07
Poland	91	7	7.69
Bulgaria	42	3	7.14
Slovenia	21	1	4.76
Taiwan	43	2	4.65
India	374	14	3.74
Germany	113	4	3.54
Australia	145	5	3.45
Denmark	29	1	3.45
Ukraine	30	1	3.33
China (non-Tibetan)	181	6	3.32
Russia	213	6	2.82
Hungary	39	1	2.56
Yugoslavia	83	2	2.41
Brazil	42	1	2.38
New Zealand	134	3	2.24
W Germany	47	1	2.13
Japan	687	14	2.04
Chile	55	1	1.82
Canada	171	3	1.75
Nepal (non-Sherpa)	116	2	1.72
UK	719	12	1.67
Belgium	60	1	1.67
Austria	126	2	1.59
France	411	6	1.46
S Korea	525	7	1.33
Sweden	80	1	1.25
Nepal (Sherpa)	119	1	0.84
Spain	520	4	0.77
USA	1237	9	0.73
Italy	285	2	0.70
Switzerland	205	1	0.49
Argentina	28	0	0.00
China (Tibetan)	107	0	0.00
Czech Republic	49	0	0.00
Greece	25	0	0.00
Indonesia	24	0	0.00
Iran	34	0	0.00
Ireland	35	0	0.00
Kazakhstan	23	0	0.00
Malaysia	21	0	0.00
Mexico	52	0	0.00
Netherlands	75	0	0.00
Norway	65	0	0.00
S Africa	43	0	0.00
USSR	64	0	0.00
All others	278	0	0.00
Mean Death Rate			**1.71**

Table D-37: Member deaths by citizenship from 1950-2006
(minimum 50 Above BC for all peaks, minimum 20 Above BC for Everest)
(blue rows are above the mean death rate, black rows are below the mean death rate)

climbers attempting difficult routes and fewer climbers participating as commercial clients on the safer commercial routes on Everest, Cho Oyu, and Ama Dablam. Most expeditions from eastern Europe and Russia have attempted either the 8000m peaks or more difficult routes on the 7000m peaks such as Jannu and Himalchuli; fewer have ventured to the 6000m peaks.

Deaths by Gender

As shown in Table and Chart D-38, men have a significantly higher death rate than women for all peaks and for the 7000ers. For the other categories, the differences in the death rates are statistically insignificant.

	Total Above BC	Males Above BC	Females Above BC	Total Deaths	Male Deaths	Female Deaths	Total Death Rate	Male Death Rate	Female Death Rate
All Peaks	34920	32055	2865	571	539	32	1.64	1.68	1.12
All 8000ers	20365	18831	1534	360	333	27	1.77	1.77	1.76
All 7000ers	8197	7537	660	171	169	2	2.09	2.24	0.30
All 6000ers	6358	5687	671	40	37	3	0.63	0.65	0.45
Ama Dablam	3275	2905	370	15	13	2	0.46	0.45	0.54
Cho Oyu	4920	4445	475	32	29	3	0.65	0.65	0.63
Everest	7928	7303	625	129	122	7	1.63	1.67	1.12

Table D-38: Member deaths by gender from 1950-2006

Statistical significances of death rates for men and women:

All peaks:	**M (1.68), F (1.12), *p*=.027**
8000ers:	M (1.77), F (1.76), *p*=.938
7000ers:	**M (2.24), F (0.30), *p*=.001**
6000ers:	M (0.65), F 0.45), *p*=.709
Ama Dablam:	M (0.45), F (0.54), *p*=.874
Cho Oyu:	M (0.65), F (0.63), *p*=.804
Everest:	M (1.67), F (1.12), *p*=.379

p-values for statistically significant differences ($p <= .05$) are shown in **red** above and their columns are outlined in black in Chart D-38. All others are statistically insignificant.

Chart D-39 shows female death rates for the most popular peaks climbed by women, those peaks with 40 or more women above base camp. Four of these peaks (Kangchenjunga, Dhaulagiri I, Annapurna I, and Manaslu) have female death rates much higher than the mean male death rate of 1.68, but only Kangchenjunga is statistically significant when comparing the female death rates to the corresponding male death rates for each of these peaks.

The deaths of some very accomplished women climbers are in this group of peaks: Wanda Rutkiewicz on Kangchenjunga in 1992, and Chantal Mauduit and Ginette Harrison on Dhaulagiri I in 1998 and 1999.

Tables D-40 and D-41 compare the causes of death and death classification rates for women to the rates for males.

The data in the two tables show that women have experienced a higher rate of fatal falls and have had more deaths on summit days than average. Of the 15 summit day deaths, 5 have been while ascending in a summit bids and 10 while descending from a summit bids. However, both of these differences are statistically insignificant.

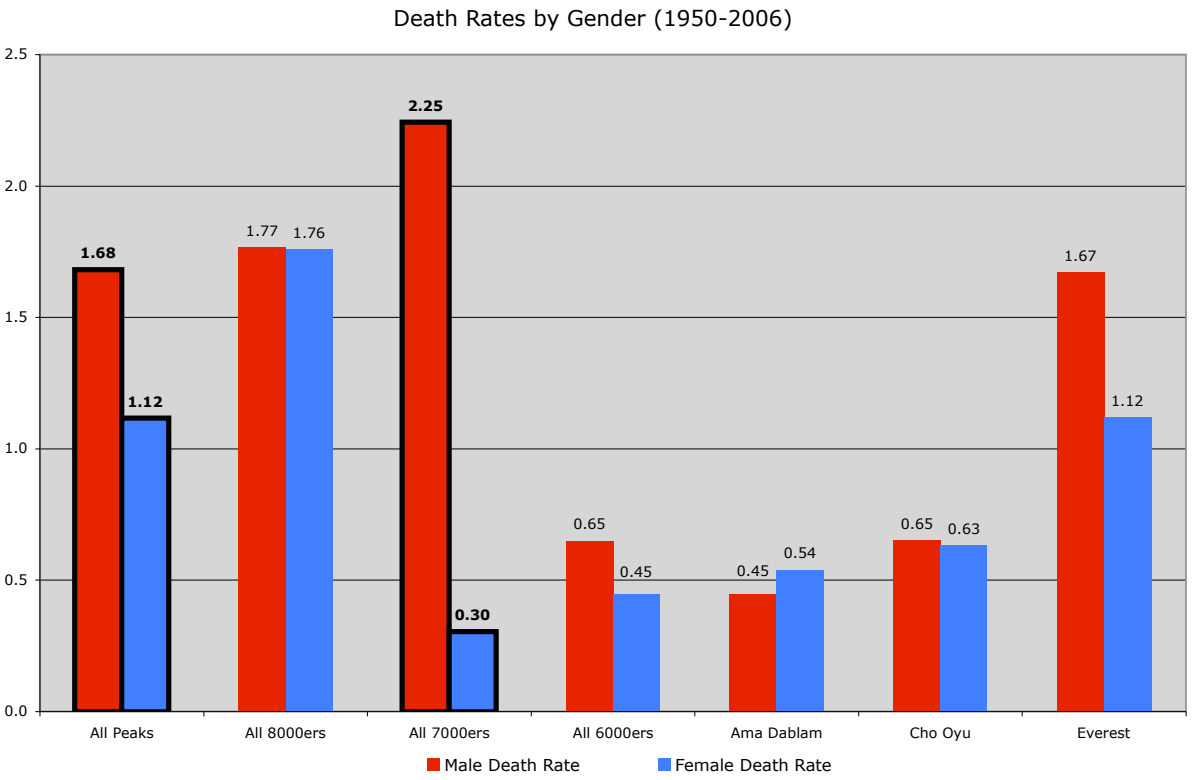


Chart D-38: Member death rates by gender from 1950-2006
(the columns outlined in black are statistically significant)

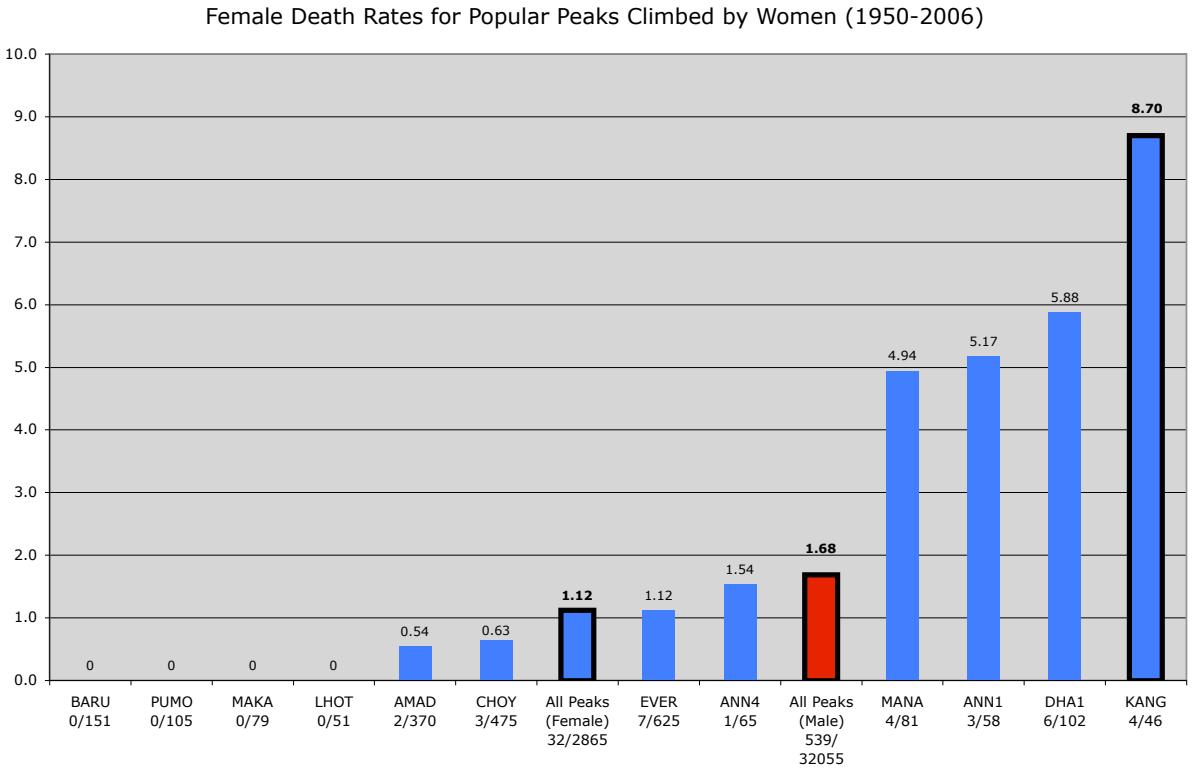


Chart D-39: Female death rates for peaks with 40+ women above base camp from 1950-2006
(the death rate is above the column bar; the death and above BC counts are below)
(the columns outlined in black are statistically significant)

Cause of Death	Females		Males	
	Cnt	Pct	Cnt	Pct
AMS	0	0.0	40	0
Exhaustion	2	6.3	16	2
Exposure/Frostbite	2	6.3	33	2
Fall	13	40.6	210	13
Crevasse	1	3.1	10	1
Icefall Collapse	0	0.0	3	0
Avalanche	9	28.1	161	9
Falling Rock/Ice	1	3.1	12	1
Disappearance	4	12.5	21	4
Illness (non-AMS)	0	0.0	19	0
Other	0	0.0	12	0
Unknown	0	0.0	2	0
	32	**100.0**	**539**	**32**
AMS-related	0	0.0	50	0
Weather/Storm-related	1	3.1	43	1

Table D-40: Causes of death for all peaks from 1950-2006

Death Classification	Females		Males	
	Cnt	Pct	Cnt	Pct
Death enroute BC	0	0.0	21	3.9
Death at BC	1	3.1	20	3.7
Route preparation	15	46.9	255	47.3
Ascending in Smt Bid	5	15.6	57	10.6
Descending from Smt Bid	10	31.3	159	29.5
Expedition evacuation	1	3.1	26	4.8
Other/Unknown	0	0.0	1	0.2
	32	**100.0**	**539**	**100.0**

Table D-41: Death classification for all peaks from 1950-2006

The difference in death rates between men and women for falling is statistically insignificant (p=1.0); the difference in death rates between men and women for all deaths on summit days is also insignificant (p=.56).

Only two of the women who died were commercial clients: Karine Van Dooren by falling at 6000m on Ama Dablam during route preparation, and Yasuko Namba by exposure at the South Col on Everest during descent from the summit in the tragic storm of May 1996.

Deaths by Team Composition

In this section, we look at death rates by expedition team size in the same manner as we did for ascent rates, that is, how do the number of members and hired personnel that went above base camp per expedition and the inter-relationship between the two affect death rates.

Table and Chart D-42 below show *member* death rates by the number of members above base camp per expedition for all peaks without Everest and for Everest from 1950 to 2006.

Members	All Peaks without Everest			Everest		
	Total Mbrs Above BC	Death Cnt	Death Rate	Total Mbrs Above BC	Death Cnt	Death Rate
1	718	10	1.39	324	10	3.09
2- 3	2075	44	2.12	407	8	1.97
4- 5	3820	44	1.15	525	8	1.52
6- 7	5311	95	1.79	823	21	2.55
8- 9	4297	66	1.54	836	10	1.20
10-11	3610	74	2.05	874	14	1.60
12-13	2233	36	1.61	766	5	0.65
14-15	1571	29	1.85	682	3	0.44
16-19	1773	25	1.41	866	11	1.27
20-23	794	12	1.51	679	15	2.21
24-27	241	1	0.41	440	8	1.82
28-31	235	1	0.43	275	5	1.82
32-35	132	1	0.76	105	4	3.81
>35	182	4	2.20	326	7	2.15
	26992	**442**	**1.64**	**7928**	**129**	**1.63**

Table D-42: Member deaths by number of members above base camp per expedition from 1950-2006

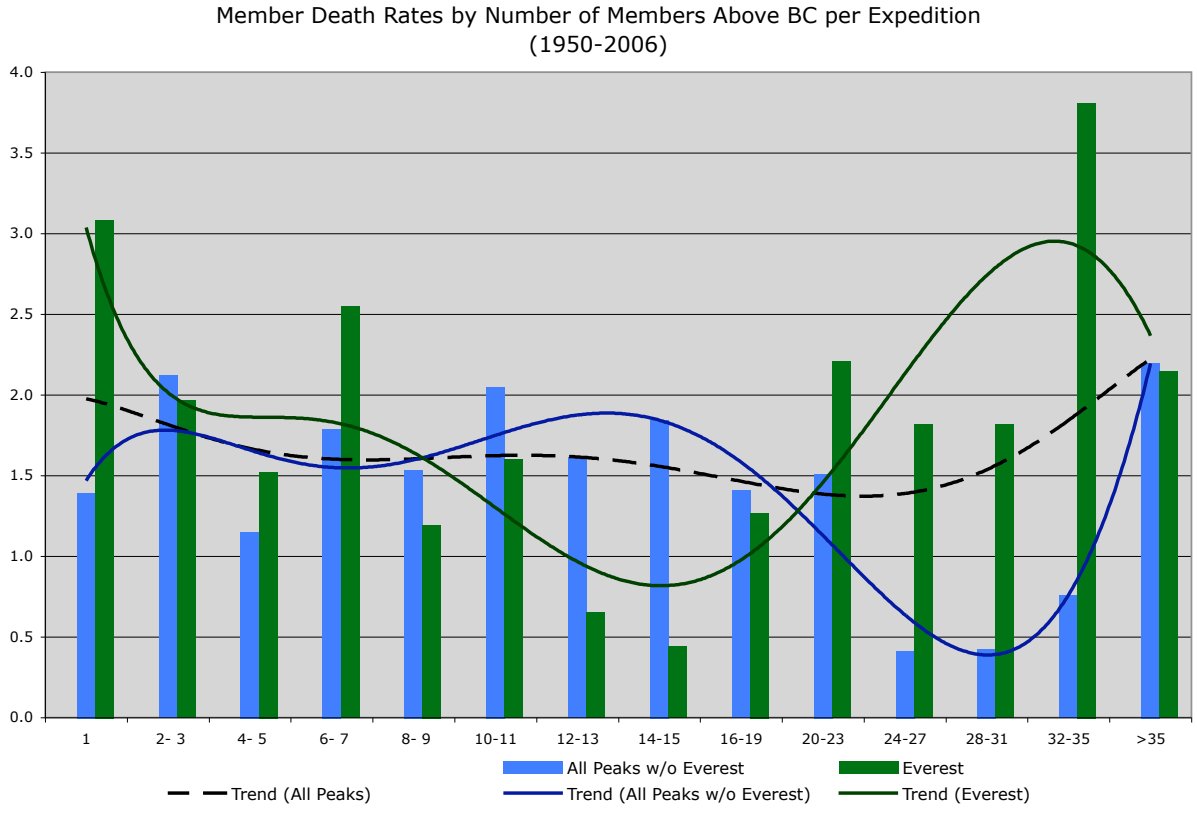


Chart D-42: Member death rates by number of members above base camp per expedition from 1950-2006

Table and Chart D-43 below show *member* death rates by the number of hired personnel above base camp per expedition for all peaks without Everest and for Everest from 1950 to 2006.

Hired	All Peaks without Everest			Everest		
	Total Mbrs Above BC	Death Cnt	Death Rate	Total Mbrs Above BC	Death Cnt	Death Rate
Unknown	483	21	4.35	150	1	0.67
None	8513	126	1.48	1203	26	2.16
1	2635	50	1.90	265	8	3.02
2- 3	7782	102	1.31	962	17	1.77
4- 5	3630	56	1.54	1101	16	1.45
6- 7	1509	35	2.32	709	7	0.99
8- 9	850	10	1.18	668	10	1.50
10-11	544	24	4.41	610	8	1.31
12-13	281	12	4.27	378	4	1.06
14-15	278	4	1.44	361	3	0.83
16-19	127	0	0.00	288	1	0.35
20-23	130	0	0.00	415	13	3.13
24-27	58	1	1.72	253	3	1.19
28-31	130	0	0.00	80	2	2.50
32-35	33	1	3.03	55	0	0.00
>35	9	0	0.00	430	10	2.33
	26983	**442**	**1.64**	**7498**	**129**	**1.72**

Table D-43: Member deaths by number of hired above base camp per expedition from 1950-2006

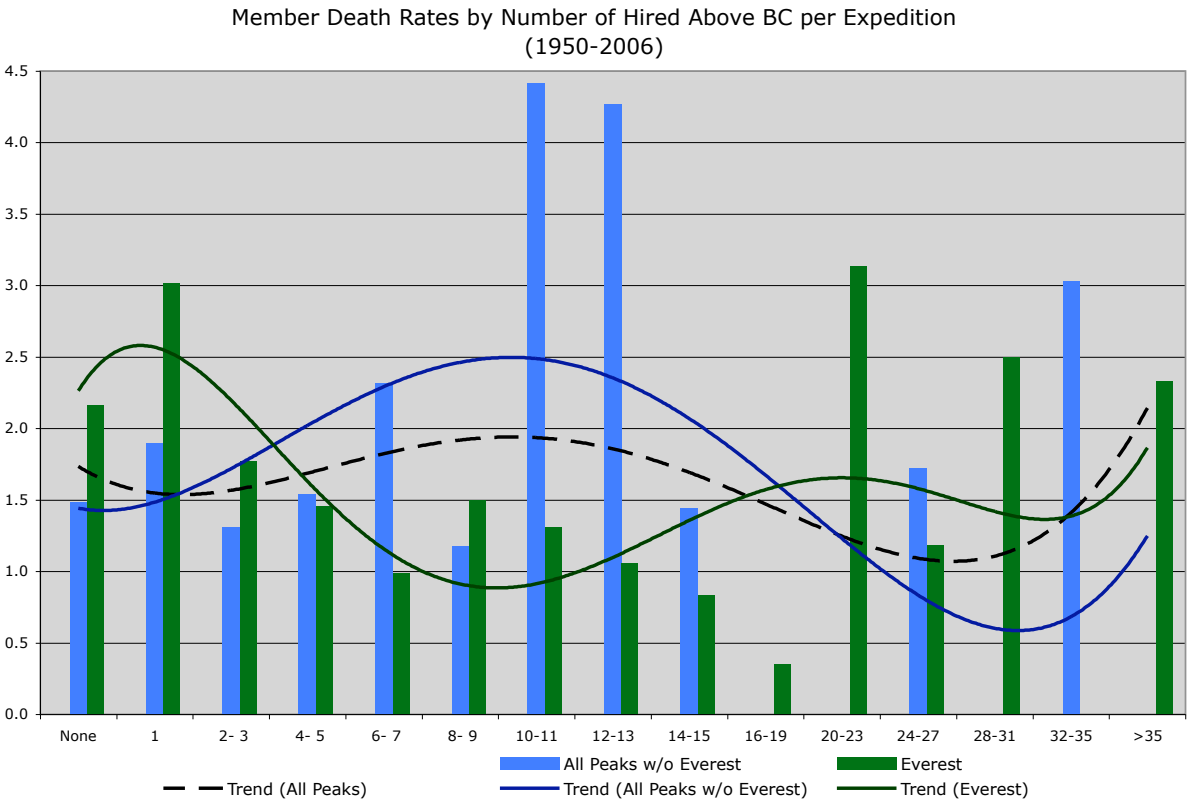


Chart D-43: Member death rates by number of hired above base camp per expedition from 1950-2006

Table and Chart D-44 below show *member* death rates by the ratio of the number of hired personnel to the number of members above base camp per expedition for all peaks without Everest and for Everest from 1950 to 2006.

	All Peaks without Everest			Everest		
	Total Mbrs Above BC	Death Cnt	Death Rate	Total Mbrs Above BC	Death Cnt	Death Rate
Unknown	483	21	4.35	150	1	0.67
No Hired	8948	134	1.50	1247	26	2.09
0.1- 0.4	10682	149	1.39	1870	30	1.60
0.5- 0.9	4696	91	1.94	2392	34	1.42
1.0- 1.4	1627	37	2.27	1291	17	1.32
1.5- 1.9	289	3	1.04	512	5	0.98
2.0- 2.4	134	3	2.24	202	5	2.48
2.5- 2.9	77	2	2.60	193	5	2.59
3.0- 3.4	26	1	3.85	33	5	15.15
3.5- 3.9	2	0	0.00	7	0	0.00
4.0- 4.4	6	0	0.00	19	1	5.26
4.5- 4.9	7	1	14.29	2	0	0.00
>5.0	15	0	0.00	10	0	0.00
	26992	**442**	**1.64**	**7928**	**129**	**1.63**

Table D-44: Member deaths of by the ratio of number of hired to number of members above base camp per expedition from 1950-2006

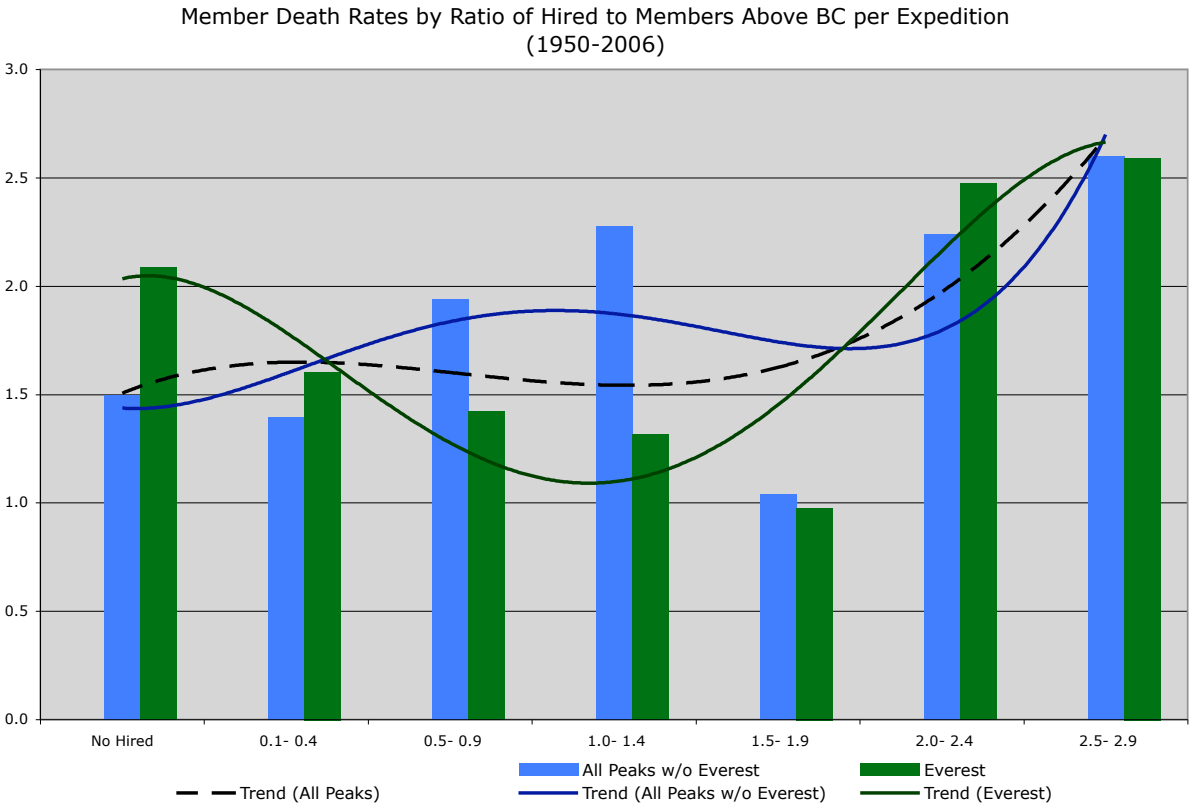


Chart D-44: Member death rates by the ratio of the number of hired to number of members above base camp per expedition from 1950-2006

Major Accidents

Table D-45 lists the major accidents where five or more persons were killed in one or more related accidents:

Peak	Season	Nation	Leaders	Mbrs	Hired	Total
Kang Guru	Autumn 2005	France	Daniel Stolzenberg	7	11	18
Manaslu	Spring 1972	S Korea	Kim Jung-Sup	5	10	15
Pisang	Autumn 1994	Germany	Stefan Hasenkopf	10	1	11
Gangapurna	Autumn 1971	Japan	Kiyoshi Shimizu	3	5	8
Everest	Spring 1996		Multiple teams	8	0	8
Everest	Spring 1922	UK	Charles G. Bruce	0	7	7
Dhaulagiri I	Spring 1969	USA	Boyd Nixon Everett Jr.	5	2	7
Dhaulagiri IV	Autumn 1969	Austria	Richard Hoyer	5	1	6
Everest	Spring 1970	Japan	Yuichiro Miura	0	6	6
Everest	Autumn 1974	France	Gerard Devouassoux	1	5	6
Annapurna I	Autumn 1991	S Korea	Ko Yong-Chul	2	4	6
Makalu	Spring 2002	Spain	Juanito Oiarzabal	0	6	6
Ama Dablam	Autumn 2006	Sweden, UK	Two teams	3	3	6
Annapurna I	Spring 1973	Japan	Shigeki Tsukamoto	4	1	5
Dhaulagiri I	Spring 1975	Japan	Takashi Amemiya	2	3	5
Everest	Autumn 1985	India	Prem Chand, Jagit Singh	5	0	5
Everest	Spring 1989	Poland	Eugeniusz Chrobak	5	0	5
Pumori	Autumn 2001	Spain	Aritz Artieda	5	0	5

Table D-45: Major accidents (5 or more killed in one or more related events)

Kang Guru, Autumn 2005

A late afternoon avalanche completely destroyed base camp at 4200m taking the lives of seven French and eleven Nepali staff (mostly Gurungs). Only four porters survived and were able to walk out for assistance. This is now the most deadly mountaineering accident in the Nepal Himalaya.

Manaslu, Spring 1972

A huge early morning avalanche completely destroyed Camp 3 at 6500m taking the lives of four Koreans, one Japanese and ten Sherpas. Only one Korean and two Sherpas survived. This was the most deadly mountaineering accident in the Nepal Himalaya until 2005.

Pisang Peak, Autumn 1994

Eleven members of a German trekking party fell to their deaths while descending from the summit of Pisang Peak. It is believed that a member of one of the three rope teams slipped dragging the team down through the lines of the other two rope teams and sweeping them all down the mountain to their deaths. This accident is excluded from the above death count tables since it occurred on a trekking peak.

Gangapurna, Autumn 1971

Three Japanese and three Sherpas were swept away by an afternoon avalanche that completely destroyed their Camp 2 at 5900m. The two Sherpas sent down from Camp 3 to investigate the disappearance of the six climbers the next morning also disappeared presumably swept away by another avalanche.

Everest, Spring 1996

A total of eight climbers perished as a result of a massive storm that hit the top of Everest on the afternoon of May 10, 1996. Five climbers including expedition leaders Rob Hall and Scott Fischer died on the south side while three Indians died on the north side. All died of exposure and frostbite, except for Andy Harris who is presumed to have fallen off the southeast ridge.

Everest, Spring 1922

A party of three climbers (including George Mallory) and fourteen Sherpas were swept away by an avalanche while approaching the North Col. Nine of the Sherpas slid over an ice cliff into a crevasse. Only two could be saved; the other seven Sherpas were buried by tons of snow and ice.

Dhaulagiri I, Spring 1969

A massive ice avalanche hit a party of six Americans and two Sherpas at noon as they were preparing to place poles to bridge a crevasse at 5335m. Only one climber Lou Reichardt survived, but was unable to dig out the remainder of the group.

Dhaulagiri IV, Autumn 1969

A team of five Austrians and one Sherpa disappeared above 6900m on their summit attempt. Continuous bad weather prevented search and rescue attempts.

Everest, Spring 1970

Six Sherpas were killed by an ice serac collapse in the Khumbu Icefall while carrying loads for the Japanese Everest ski expedition.

Everest, Autumn 1974

French leader Gerard Devouassoux and four Sherpas were buried by the concussive blast of a nearby avalanche that dumped dislodged snow on their tents in Camp 2 at 6400m. A fifth Sherpa was simultaneously killed at Camp 1 at 5800m.

Annapurna I, Autumn 1991

Two Koreans and six Sherpas were carried 1000m down the mountain by a slab avalanche at 7500m. Only two Sherpas survived.

Makalu, Spring 2002

Six staff members from a Spanish expedition were lost in a helicopter crash while evacuating base camp. The crash site has not been found to date.

Ama Dablam, Autumn 2006

Two Swedes, one Briton, and three Sherpas were killed while sleeping in their tents when a huge ice serac broke off the "dablam" and obliterated Camp 3 in the middle of the night. This was the first fatality for Sherpas on Ama Dablam.

Annapurna I, Spring 1973

Four Japanese and one Sherpa were killed by a pair of avalanches while descending to Camp 2 from higher camps.

Dhaulagiri I, Spring 1975

An avalanche in the middle of the night buried two Japanese and three Sherpas in their tents at Camp 1 at 4500m.

Everest, Autumn 1985

A mid-October snowstorm killed five Indians after their summit bid. One fell while descending to the South Col and the other four died from exposure at the Col while attempting to wait out the storm.

Everest, Spring 1989

Fives Poles were killed by an avalanche at 6000m on Khumbutse while returning from a successful summit attempt on Everest via the west ridge and the Hornbein Couloir two days earlier.

Pumori, Autumn 2001

Five Spanish were killed 50m above Camp 1 by a serac avalanche.

In addition to the above incidents, there have been seven other accidents that have killed four members and/or hired personnel (six avalanches and one group fall).

The Strange Tale of Roger Buick

From the Elizabeth Hawley interviews with Russell Brice and Jim Findley – June 1998

Roger Buick was a 52-year old climber from New Zealand who attempted Everest from the north side in the spring of 1998. He was listed on the permit of Russell Brice, but was climbing entirely independently. He died from exposure on May 26 at 7400m.

The following comments are excerpted from Russell Brice's letter to Buick's solicitor on June 4, 1998.

Buick arrived at BC on 4 May and spent 3 nights there, eating in my camp for some strange reason, rather than his own Asian Trekking camp. He pitched one of his tents here, which stayed here for the entire expedition. When he departed for ABC, he left all of his personal things in my mess tent, again I am not sure why because he was not part of my team. At this stage some Americans advised him not to rush so quickly to ABC.

On the evening of 6th it started to blow at ABC. I had already been to 8300m and had installed all of my camps, so we decided to return to BC for a rest before attempting the summit. We wanted to take advantage of this time that the wind was blowing, as it is not possible to work high up on the mountain in these winds. As I mentioned I passed Roger at approximately 5600m just below the interim camp. I passed a man wearing shorts!!! and behind were 7 yaks with loads of gas for another expedition, and Asian Trekking kit bags, so I assumed that it was Roger.

Upon arrival at BC I found Roger's things in my camp, which I removed and put back into his own camp (which was manned by a Sherpa for the duration of the expedition). I later learned that Roger went to my (manned) interim camp and told the yak man there that he was a friend of mine and that he could stay. He then went to the ABC on the 8th.

On the 15th I went to C1 at the North Col (7000m), a trip that takes my Sherpas and me about 2 hours with full loads. There was a traditional afternoon snow shower, which lasted about 3 hours with a little more wind associated with this than normal, but nothing to really worry about. I did not know that Roger was in fact already at the Col in his tent. However after I had been in my tent for a while I heard Roger talking to some Sherpas (not sure who's but maybe from the Japanese team).

He told them that he thought that this storm was going to last for about 3-4 days and that he was going down to ABC. This was at about 17:00. It takes me about 1 hour to go from C1 to ABC so this was a reasonable thing to do. I have since heard that he took 7 hours, and says that he fell into 4 crevasses, and got lost in the snowstorm. I cannot understand this as there were only 4 crevasses on the entire route and there was fixed rope from the door of Roger's tent to the flat part of the glacier, and along the flat section flags marked the route.

I was working on the mountain again repairing my damaged tents with another trip to 8300m between 16-18th and returning to ABC late on the evening of 18th. Sometime during this time Roger returned to BC, trying to use my interim camp on the way down, but was refused entry by my yak man that looks after this camp for me.

During this time at BC Roger continually went to the American camp, again only a few meters from his and my camp to listen to our radio contacts and weather forecasting. The Americans and I had already agreed to work closely together before we left home. The weather forecasting was relayed by radio from the South (Nepal) side where we were sharing the costs with 4 other expeditions. Roger was imposing on our teams. They were pretty pissed off and so was I and we told him so by radio, hence a letter of apology. I thought that Roger would have known better, especially as he had spoken to Mark Whetu about such matters. Still these are all bygones. Despite this the Americans after hearing his epic descent story, advised him that Everest was not the place to start learning about climbing and that he should abandon his attempt.

I started my summit attempt on 21st leaving ABC for C1 (7000m), C2 (7500m), C3 (7900m), and C4 (8300m) and went to the summit on the 25th returning to C4. Most teams only put 3 camps in C1 (7000m), C2 (7700m) and C3 (8300m). On the morning of 25th I left my top camp to return to ABC. I assume that Roger had gone to C1 on the 25th and that he started for C2 quite late on the 26th.

I stopped at my C2 to make tea for my client. From here there is a clear view of the entire snow slope right down to C1. I spent over 1 hour here looking at a solitary figure moving up the hill. This figure was moving extremely slowly and I figured that this could only be Roger as practically every team had already left ABC. High on the mountain there were still 3 members of the American team who I had passed as they went to the top camp, and two Austrians who were going to the summit on 26th. Apart from that, everyone else was coming down, clearing the camps as they went.

As I mentioned I passed Roger at about 7200m and again I stopped at C1 and spent about 2 hours there making tea and packing. Again I could see Roger moving so slowly. In all that time, 2-1/2 hours in total, I never saw him take more than 5 steps. Besides this there were at least 8-9 other people (many Sherpas) who passed Roger and told him to turn back. We all talked about how crazy he must be not to see that he was never going to get anywhere at the speed he was moving. George, one of his team members, spent more than half an hour trying to tell him to return.

We all went down to ABC that evening. Next morning I was concerned about Roger and looked for him through my telescope and sure enough I could see his body lying on the snow slope still attached to the fixed rope. I was very busy with my own expedition, and as Roger did not move all day long, we assumed that he was dead and that there was nothing that anyone could do to help. Later that day I met with the two Austrians who confirmed that they had passed his body during the day.

The following morning 28th I left ABC early and went up to C1 in 2 hours and then went on up to Roger's body at 7400m in another 1 hour. On the way up I noticed that one of his overboots was on the rock to my right. This was strange as the prevailing wind is from right to left, so anything that he may have dropped would have gone the other way. There was quite a strong wind blowing that day, so much that I needed to wear my down suit with the hood up.

Roger was slumped over his pack, with no gloves on, wearing a lightweight ski suit and Dynafit ski touring boots. None of this clothing was adequate for the conditions one would expect on Everest. He had secured himself onto the fixed ropes by a complicated array of ascender and carabiners (not really required); his thermos was secured to him, but broken, as was his headlamp. I took photos of his body and the surrounding area for insurance purposes. Because of his position I could not roll him over, so had to cut the tape sling that held him to the rope. His body slid down for about 100m onto the rocks. I went down and moved him again so as he ended up on a long snow slope where he slid for several hundred meters.

I went back up and collected his pack, and went down to his overboot to collect that. It was at this stage that I found one of his gloves about another 50m lower, also on the rock, but with a rock sitting on top of it. About another 50m lower there is another dead body that has been there since 1986. This had become exposed over the last few years, so I thought that I would cover him over again since I was in the business of removing bodies this day. To my surprise I found new crampons marks in the snow, so I suspect that Roger had visited him on his way up. I was especially surprised to find Roger's other overboot lying in the rocks not far away.

This may all be circumstantial, but it sure does not make sense to me.

I still had a camp about 100m (vertical) above where Roger was, but this was of no use to him at the rate that he was traveling. However it took me less than an hour to return to C1, and that was with a broken crampon as I had broken one whilst pushing him over the rocks.

Again none of us can understand why he did not turn back, especially when so many people had told him not to continue. He also knew that another man had already died that day.

Since returning and looking through his equipment, I see that he was so totally under prepared for an ascent of Everest. He had several items, which are good for skiing, but are of no use on Everest. He had practically no substantial food, and only one canister of cooking gas with him. I suspect that he was planning on using everyone else's camps, except we had taken them all out the day that he was going up. He may have reached my

camp at 7500m but there was nothing inside so he would have still had problems.

Jim Findley of the American expedition led by David Hahn – June 4, 1998

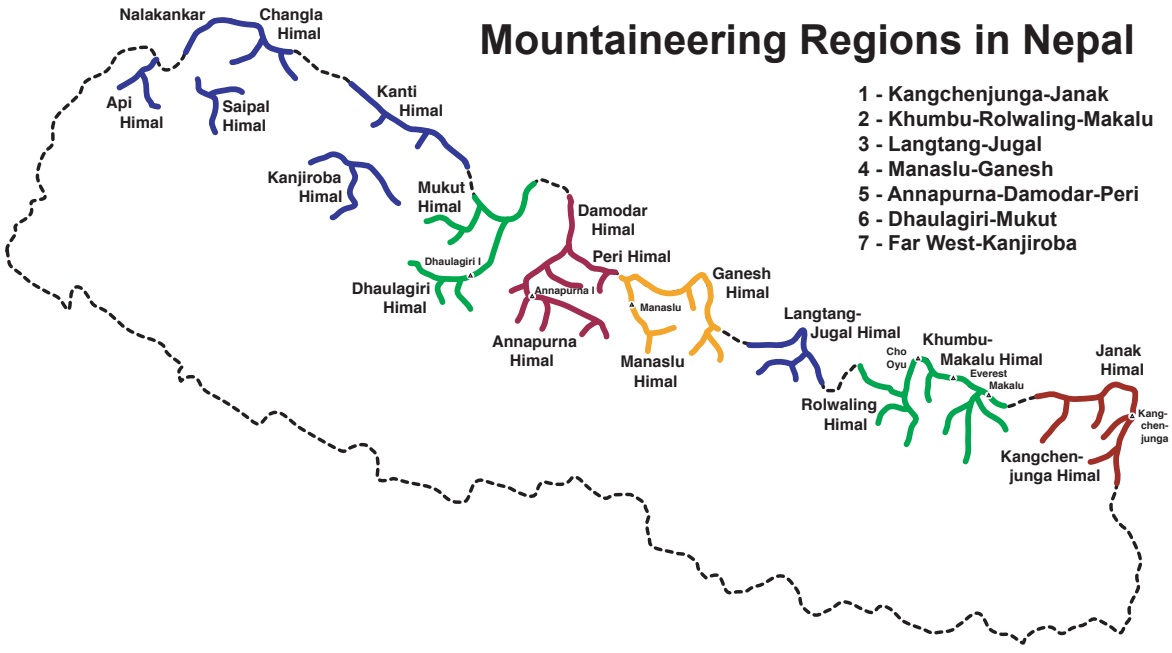
Buick was "a determined man in all the wrong ways" and never changed his actions despite all advice from others on numerous occasions. Hahn: "he was extremely ignorant of the mountains and never could understand how they could kill him." Hahn was one of the last to talk to Buick. Hahn, et al: he thought everyone else was doing the climb much too expensively and elaborately and he had great disdain for guides. He was convinced that in life and climbing Everest, you learn as you go along, but he took 72 hours to descend from North Col to ABC while Hahn's client took 1-1/2 hours. Is it possible that he wanted to die on Everest? Nothing else makes sense.

Appendix A: Peak Summary

The table in this appendix summarizes the peak data for the period from 1950 to 2006. The columns are defined as follows:

Peak ID – Peak ID used in *The Himalayan Database*
Region – geographical region codes for peak location (see map below)
Exp Cnt – number of expeditions to the peak
… Above BC – number of members, women members, or hired personnel that went above base camp or advanced base camp
… Smts – number of members, women members, or hired personnel that summited
Mbr Smt Rate – success rate for members (Mbr Smts / Mbrs Above BC)
… Deaths – number of members, women members, or hired personnel that died
… Death Rate – death rate for members and hired (e.g., Mbr Deaths / Mbrs Above BC)
Exp Days Avg. – average number of days for all expeditions to peak
Suc Exp Days Avg. – average number of days for all successful expeditions to peak
Smt Days Avg. – average number of days to summit for all successful expeditions to peak
Min Smt Days – minimum number of days to first summit (fastest expedition)
Max Smt Days – maximum number of days to first summit (slowest expedition)

Descriptions of all expeditions to the peaks listed in this table along with their member biodata are available in *The Himalayan Database*.



Peak ID	Peak Name	Alt (m)	Re-gion	Exp Cnt	Mbrs Above BC	Women Above BC	Hired Above BC	Mbr Smts	Women Smts	Hired Smts
AMAD	Ama Dablam	6814	2	586	3275	370	725	1781	186	357
AMOT	Amotsang	6393	5	1	3	1	1	0	0	0
ANN1	Annapurna I	8091	5	145	1037	58	397	121	6	29
ANN2	Annapurna II	7937	5	27	168	7	77	11	0	1
ANN3	Annapurna III	7555	5	31	218	22	63	20	3	11
ANN4	Annapurna IV	7525	5	70	560	65	198	72	1	34
ANNE	Annapurna I - East	8026	5	3	26	0	10	8	0	0
ANNM	Annapurna I - Middle	8051	5	6	32	1	16	11	1	4
ANNS	Annapurna South	7219	5	32	194	13	58	29	0	3
APIM	Api Main	7132	7	12	88	0	29	17	0	3
ARNK	Arniko Chuli	6034	6	2	10	3	3	8	3	0
BARU	Baruntse	7152	2	144	922	151	251	229	25	62
BAUD	Baudha	6672	4	3	18	0	10	5	0	3
BHEM	Bhemdang Ri	6150	3	1	3	0	1	2	0	1
BHRI	Bhrikuti	6361	5	11	74	11	20	37	3	14
BOBA	Bobaye	6808	7	1	12	0	2	1	0	0
BOKT	Boktoh	6114	1	2	5	0	0	3	0	0
BTAK	Bhairab Takura	6799	3	2	3	0	4	2	0	1
CHAG	Chago	6893	2	3	6	0	1	6	0	1
CHAM	Chamlang	7321	2	10	66	13	20	11	0	4
CHAN	Changla Himal	6563	7	2	11	6	9	0	0	0
CHAR	Chamar	7161	4	4	26	1	9	2	0	2
CHEK	Chekigo	6257	2	1	1	0	1	0	0	0
CHEO	Cheo Himal	6820	5	2	14	0	10	4	0	0
CHIV	Chhiv Himal	6650	5	1	5	1	0	4	1	0
CHOB	Chobuje	6686	2	5	32	4	2	11	0	0
CHOL	Cholatse	6440	2	14	83	3	6	40	2	2
CHOP	Cho Polu	6700	2	5	17	4	7	5	0	0
CHOY	Cho Oyu	8188	2	829	4920	475	1366	1859	185	596
CHRE	Churen Himal East	7371	6	7	56	3	25	3	0	1
CHRW	Churen Himal West	7371	6	12	79	0	38	7	0	4
CHUE	Chulu East	6584	5	1	4	0	0	4	0	0
CHUG	Chugimago	6258	2	3	11	1	5	4	0	3
CHUR	Churen Himal Cntrl	7371	6	6	39	0	28	9	0	4
CHUW	Chulu West	6419	5	1	6	0	6	6	0	0
CHWT	Changwatang	6130	7	1	12	4	4	4	0	2
DANG	Danga	6355	1	1	4	0	0	3	0	0
DHA1	Dhaulagiri I	8167	6	233	1538	102	478	294	13	47
DHA2	Dhaulagiri II	7751	6	14	93	1	57	17	0	6
DHA3	Dhaulagiri III	7715	6	3	34	0	28	13	0	1
DHA4	Dhaulagiri IV	7661	6	11	110	3	61	13	0	0
DHA5	Dhaulagiri V	7618	6	5	48	1	40	10	0	1
DHA6	Dhaulagiri VI	7268	6	7	42	0	27	18	0	4
DHAM	Dhampus	6012	6	14	91	26	23	66	17	16
DING	Dingjung Ri	6249	2	1	2	0	0	2	0	0
DOGA	Dogari	6536	6	1	1	0	1	1	0	1
DOMB	Dome Blanc	6830	3	3	4	0	6	2	0	4
DOMK	Dome Kang	7264	1	2	11	2	7	0	0	0
DORJ	Dorje Lhakpa	6966	3	25	143	14	66	51	2	26
DRAN	Drangnag Ri	6757	2	3	23	1	13	4	0	2
DROM	Drohmo	6881	1	4	16	0	5	2	0	0
DZAS	Dzasampatse	6295	2	1	6	0	0	2	0	0
EVER	Everest	8850	2	1015	7928	625	6033	1773	151	1280
FANG	Fang	7647	5	8	68	0	26	2	0	1

Peak ID	Mbr Smt Rate	Mbr Deaths	Women Deaths	Hired Deaths	Mbr Death Rate	Hired Death Rate	Exp Days Avg.	Suc Exp Days Avg.	Smt Days Avg.	Min Smt Days	Max Smt Days
AMAD	54.38	15	2	3	0.46	0.41	13.8	13.8	10.3	1	42
AMOT	0.00	0	0	0	0.00	0.00	5.0	0.0	0.0	0	0
ANN1	11.67	43	3	15	4.15	3.78	30.4	31.4	27.7	3	62
ANN2	6.55	6	0	0	3.57	0.00	35.7	48.6	44.4	27	63
ANN3	9.17	8	0	1	3.67	1.59	28.2	30.2	26.2	16	46
ANN4	12.86	3	1	1	0.54	0.51	21.1	25.2	21.5	8	64
ANNE	30.77	1	0	0	3.85	0.00	43.0	43.0	35.0	25	44
ANNM	34.38	1	0	2	3.13	12.50	36.0	36.0	30.7	10	53
ANNS	14.95	6	0	2	3.09	3.45	27.4	34.6	28.3	19	38
APIM	19.32	4	0	0	4.55	0.00	26.3	23.0	17.7	14	19
ARNK	80.00	0	0	0	0.00	0.00	2.5	2.5	2.0	2	2
BARU	24.84	4	0	5	0.43	1.99	13.3	15.9	11.7	1	33
BAUD	27.78	1	0	0	5.56	0.00	36.5	35.0	28.0	28	28
BHEM	66.67	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
BHRI	50.00	0	0	0	0.00	0.00	5.8	5.6	3.8	1	8
BOBA	8.33	0	0	0	0.00	0.00	24.0	24.0	17.0	17	17
BOKT	60.00	0	0	0	0.00	0.00	2.0	2.0	1.0	1	1
BTAK	66.67	0	0	0	0.00	0.00	23.0	43.0	19.0	19	19
CHAG	100.00	0	0	0	0.00	0.00	40.0	40.0	24.0	24	24
CHAM	16.67	0	0	0	0.00	0.00	23.0	25.4	21.4	15	28
CHAN	0.00	0	0	0	0.00	0.00	8.0	0.0	0.0	0	0
CHAR	7.69	1	0	0	3.85	0.00	13.0	0.0	0.0	0	0
CHEK	0.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
CHEO	28.57	0	0	1	0.00	10.00	37.0	37.0	35.0	35	35
CHIV	80.00	0	0	0	0.00	0.00	14.0	14.0	10.0	10	10
CHOB	34.38	2	0	0	6.25	0.00	18.6	21.0	18.3	3	36
CHOL	48.19	0	0	0	0.00	0.00	19.2	19.4	13.1	2	23
CHOP	29.41	0	0	0	0.00	0.00	12.3	13.5	19.0	19	19
CHOY	37.78	32	3	9	0.65	0.66	25.8	26.2	21.1	1	52
CHRE	5.36	1	0	0	1.79	0.00	41.0	44.0	41.0	41	41
CHRW	8.86	2	0	2	2.53	5.26	29.1	28.0	24.5	4	39
CHUE	100.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
CHUG	36.36	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
CHUR	23.08	0	0	0	0.00	0.00	23.7	27.7	24.7	19	30
CHUW	100.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
CHWT	33.33	0	0	0	0.00	0.00	7.0	7.0	5.0	5	5
DANG	75.00	0	0	0	0.00	0.00	22.0	22.0	19.0	19	19
DHA1	19.12	43	6	15	2.80	3.14	31.2	32.6	27.5	3	64
DHA2	18.28	1	0	2	1.08	3.51	34.4	39.3	32.0	28	36
DHA3	38.24	0	0	0	0.00	0.00	42.7	47.5	36.0	29	43
DHA4	11.82	9	0	5	8.18	8.20	53.0	53.0	47.0	46	48
DHA5	20.83	4	0	0	8.33	0.00	62.5	62.5	49.0	37	61
DHA6	42.86	0	0	0	0.00	0.00	32.5	32.5	28.0	16	43
DHAM	72.53	0	0	0	0.00	0.00	12.7	12.7	3.6	1	13
DING	100.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
DOGA	100.00	0	0	0	0.00	0.00	31.0	31.0	29.0	29	29
DOMB	50.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
DOMK	0.00	0	0	0	0.00	0.00	28.0	0.0	0.0	0	0
DORJ	35.66	2	0	0	1.40	0.00	19.4	20.9	17.3	7	36
DRAN	17.39	0	0	0	0.00	0.00	18.3	19.5	17.5	16	19
DROM	12.50	0	0	0	0.00	0.00	17.3	8.0	7.0	7	7
DZAS	33.33	0	0	0	0.00	0.00	22.0	22.0	15.0	15	15
EVER	22.36	129	7	67	1.63	1.11	46.3	47.1	41.9	7	75
FANG	2.94	2	0	1	2.94	3.85	32.8	41.0	35.0	35	35

Peak ID	Peak Name	Alt (m)	Re-gion	Exp Cnt	Mbrs Above BC	Women Above BC	Hired Above BC	Mbr Smts	Women Smts	Hired Smts
FIRN	Firnkopf	6730	7	2	11	0	9	0	0	0
FIRW	Firnkopf West	6745	7	1	3	0	2	2	0	1
GAJA	Gajang	6111	5	1	1	0	1	0	0	0
GAMA	Gama Peak	7149	6	2	17	0	15	4	0	2
GAN1	Ganesh I	7422	4	8	51	6	32	3	1	0
GAN2	Ganesh II	7118	4	10	61	1	24	4	0	5
GAN3	Ganesh III	7043	4	6	43	1	9	9	0	2
GAN4	Ganesh IV	7104	4	9	66	1	17	20	1	2
GAN5	Ganesh V	6770	4	3	20	0	8	12	0	7
GAN6	Ganesh VI	6908	4	2	16	0	8	4	0	0
GANC	Ganchempo	6387	3	13	53	4	19	15	2	4
GANG	Gangapurna	7455	5	22	144	6	56	32	2	6
GAUG	Gaugiri	6110	5	4	8	2	4	6	1	3
GAUR	Gaurishankar	7135	2	21	142	5	30	4	0	2
GHEN	Ghenge Liru	6596	3	1	1	0	2	1	0	2
GHUN	Ghustang North	6529	6	4	9	0	17	9	0	6
GHUS	Ghustang South	6465	6	1	1	0	5	0	0	0
GIME	Gimmigela Chuli East	7007	1	2	24	0	6	18	0	6
GIMM	Gimmigela Chuli	7350	1	6	66	1	24	17	0	8
GLAC	Glacier Dome	7193	5	25	177	11	74	52	2	13
GURJ	Gurja Himal	7193	6	8	66	9	27	19	3	11
GURK	Gurkarpo Ri	6889	3	5	35	2	10	0	0	0
GYAC	Gyachung Kang	7952	2	12	90	3	42	21	0	5
GYAJ	Gyajikang	7074	5	6	49	4	17	26	0	11
GYAL	Gyalzen	6733	3	4	10	4	13	6	2	7
HCHI	Hunchi	7029	2	6	27	0	16	8	0	4
HIME	Himalchuli East	7893	4	24	189	3	91	17	0	4
HIMJ	Himjung	7092	5	1	3	0	0	0	0	0
HIML	Himlung Himal	7126	5	22	154	25	41	50	6	19
HIMN	Himalchuli North	7371	4	3	24	0	8	3	0	4
HIMW	Himalchuli West	7540	4	5	27	0	15	7	0	0
HIUP	Hiunchuli	6441	5	2	12	2	0	5	0	0
HNKU	Hongku Chuli	6833	2	1	2	0	3	0	0	0
HONG	Hongde	6556	6	3	9	0	9	4	0	2
IMJA	Imjatse	6165	2	6	12	0	7	7	0	6
JANK	Janak	7041	1	3	6	0	4	2	0	0
JANU	Jannu	7711	1	44	280	7	112	63	0	9
JETH	Jethi Bahurani	6850	7	3	17	0	4	3	0	0
JOMS	Jomsom	6120	5	1	5	1	1	4	1	1
JONG	Jongsang	7462	1	5	70	0	6	3	0	0
JUNC	Junction Peak	7108	6	1	9	0	8	0	0	0
KABN	Kabru North	7338	1	3	31	0	3	4	0	0
KABR	Kabru Main	7412	1	1	27	0	0	4	0	0
KABS	Kabru South	7318	1	2	31	0	2	6	0	0
KAN1	Kande Hiunchuli N I	6521	7	3	11	0	2	0	0	0
KAN2	Kande Hiunchuli N II	6471	7	2	9	0	1	2	0	0
KANB	Kangbachen	7902	1	5	57	0	18	14	0	1
KANC	Kangchenjunga Cntrl	8473	1	7	103	1	56	27	0	0
KAND	Kande Hiunchuli	6627	7	5	28	5	12	2	0	0
KANG	Kangchenjunga	8586	1	97	805	46	357	183	2	26
KANS	Kangchenjunga South	8476	1	5	79	0	39	26	0	0
KANT	Kanti Himal	6859	7	4	17	0	8	5	0	3
KARY	Karyolung	6511	2	5	29	4	9	15	2	3
KCHO	Kangcho Nup	6043	2	3	8	0	12	8	0	3

Peak ID	Mbr Smt Rate	Mbr Deaths	Women Deaths	Hired Deaths	Mbr Death Rate	Hired Death Rate	Exp Days Avg.	Suc Exp Days Avg.	Smt Days Avg.	Min Smt Days	Max Smt Days
FIRN	0.00	1	0	0	9.09	0.00	23.5	0.0	0.0	0	0
FIRW	66.67	0	0	0	0.00	0.00	10.0	10.0	8.0	8	8
GAJA	0.00	0	0	0	0.00	0.00	14.0	0.0	0.0	0	0
GAMA	23.53	0	0	0	0.00	0.00	45.0	45.0	42.0	42	42
GAN1	5.88	1	0	0	1.96	0.00	24.8	37.0	34.0	34	34
GAN2	6.56	3	0	0	4.92	0.00	35.7	31.0	28.0	27	29
GAN3	20.93	1	0	0	2.33	0.00	27.5	31.5	26.0	17	35
GAN4	30.30	4	0	0	6.06	0.00	24.1	27.0	24.0	16	40
GAN5	60.00	0	0	0	0.00	0.00	31.0	31.0	25.7	22	30
GAN6	25.00	0	0	0	0.00	0.00	50.0	50.0	43.0	42	44
GANC	28.30	0	0	0	0.00	0.00	19.4	19.3	16.0	6	28
GANG	22.22	5	0	5	3.47	8.93	27.7	37.4	30.6	19	44
GAUG	75.00	0	0	0	0.00	0.00	4.8	3.0	2.0	2	2
GAUR	2.82	1	0	0	0.70	0.00	27.4	34.0	31.7	30	34
GHEN	100.00	0	0	0	0.00	0.00	10.0	10.0	5.0	5	5
GHUN	100.00	0	0	0	0.00	0.00	26.3	26.3	22.5	17	28
GHUS	0.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
GIME	75.00	0	0	0	0.00	0.00	23.5	23.5	20.5	16	25
GIMM	25.76	3	0	0	4.55	0.00	31.5	36.7	29.7	26	37
GLAC	29.38	0	0	0	0.00	0.00	20.6	22.4	19.0	7	53
GURJ	28.79	4	1	0	6.06	0.00	23.6	24.9	20.7	9	28
GURK	0.00	0	0	0	0.00	0.00	12.5	0.0	0.0	0	0
GYAC	23.33	2	0	0	2.22	0.00	31.2	31.0	25.0	21	32
GYAJ	53.06	0	0	0	0.00	0.00	12.8	18.3	12.7	8	18
GYAL	60.00	0	0	0	0.00	0.00	29.3	35.7	22.3	19	26
HCHI	29.63	0	0	0	0.00	0.00	25.2	23.0	21.0	18	24
HIME	8.99	10	0	3	5.29	3.30	40.6	44.2	39.0	28	49
HIMJ	0.00	1	0	0	33.33	0.00	18.0	0.0	0.0	0	0
HIML	32.47	0	0	0	0.00	0.00	13.7	15.3	9.2	4	17
HIMN	12.50	3	0	0	12.50	0.00	31.3	32.5	29.5	25	34
HIMW	25.93	0	0	0	0.00	0.00	35.6	35.3	30.7	21	40
HIUP	41.67	0	0	0	0.00	0.00	19.0	19.0	17.0	17	17
HNKU	0.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
HONG	44.44	0	0	0	0.00	0.00	4.5	4.5	2.5	2	3
IMJA	58.33	0	0	0	0.00	0.00	2.0	2.0	1.0	1	1
JANK	33.33	0	0	0	0.00	0.00	26.3	26.0	25.0	25	25
JANU	22.50	6	0	1	2.14	0.89	33.5	37.2	33.9	6	60
JETH	17.65	0	0	1	0.00	25.00	29.0	22.0	20.0	20	20
JOMS	80.00	0	0	0	0.00	0.00	7.0	7.0	5.0	5	5
JONG	4.29	1	0	0	1.43	0.00	29.0	0.0	0.0	0	0
JUNC	0.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
KABN	12.90	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
KABR	14.81	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
KABS	19.35	0	0	0	0.00	0.00	22.0	0.0	0.0	0	0
KAN1	0.00	1	0	0	9.09	0.00	22.5	0.0	0.0	0	0
KAN2	22.22	0	0	0	0.00	0.00	22.5	28.0	22.0	22	22
KANB	24.56	0	0	0	0.00	0.00	35.3	39.5	30.5	21	40
KANC	26.21	0	0	0	0.00	0.00	39.5	47.8	42.0	19	71
KAND	7.14	0	0	0	0.00	0.00	16.3	20.0	18.0	18	18
KANG	22.73	24	4	7	2.98	1.96	41.9	43.6	38.0	19	71
KANS	32.91	0	0	0	0.00	0.00	43.8	47.5	41.3	18	72
KANT	29.41	0	0	0	0.00	0.00	12.3	18.0	16.0	16	16
KARY	51.72	0	0	0	0.00	0.00	18.3	23.0	18.5	15	22
KCHO	100.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0

Peak ID	Peak Name	Alt (m)	Re-gion	Exp Cnt	Mbrs Above BC	Women Above BC	Hired Above BC	Mbr Smts	Women Smts	Hired Smts
KGRI	Khangri Shar	6811	2	2	8	0	6	0	0	0
KGUR	Kang Guru	6981	5	30	172	16	68	55	2	27
KHAT	Khatang	6790	2	5	49	7	3	24	1	1
KHUM	Khumbutse	6639	2	1	1	0	0	1	0	0
KIRA	Kirat Chuli	7362	1	6	56	4	3	0	0	0
KJER	Kanjeralwa	6612	7	4	20	2	9	5	0	3
KJRN	Kanjiroba North	6858	7	1	7	0	2	0	0	0
KJRS	Kanjiroba South	6883	7	6	36	2	17	17	0	5
KOTA	Kotang	6148	1	12	85	8	32	26	0	10
KTEG	Kangtega	6783	2	21	110	12	31	39	6	3
KTOK	Kangtokal	6294	6	3	10	0	0	7	0	1
KTSU	Kangtsune	6443	7	1	6	1	3	0	0	0
KTUN	Khatung Kang	6484	5	2	11	3	4	2	1	0
KWAN	Kwangde	6186	2	1	5	0	0	0	0	0
KYAS	Kyashar	6770	2	3	8	0	0	3	0	0
LAMJ	Lamjung Himal	6983	5	8	63	8	24	29	4	12
LAMP	Lampo	6460	4	1	4	0	0	0	0	0
LANG	Langtang Lirung	7227	3	39	263	21	81	40	3	8
LANR	Langtang Ri	7205	3	7	35	1	16	17	0	4
LASH	Lashar I	6842	1	1	2	0	1	2	0	0
LEON	Leonpo Gang	6979	3	7	52	0	43	13	0	3
LHAS	Lha Shamma	6412	7	2	11	6	10	4	4	3
LHOM	Lhotse Middle	8410	2	1	12	0	4	9	0	0
LHOT	Lhotse	8516	2	145	945	51	592	252	10	57
LIK1	Likhu Chuli I	6719	2	1	6	1	1	1	1	1
LOBE	Lobuje East	6119	2	1	3	0	4	0	0	0
LOBW	Lobuje West	6145	2	2	10	2	2	5	0	2
LSHR	Lhotse Shar	8382	2	30	234	7	97	18	0	2
LSIS	Langsisa Ri	6412	3	11	65	9	11	22	2	6
MACH	Machhapuchhare	6993	5	1	5	0	3	0	0	0
MAK2	Makalu II	7678	2	43	266	28	105	59	4	18
MAKA	Makalu	8485	2	178	1273	79	516	208	10	26
MANA	Manaslu	8163	4	190	1259	81	510	228	13	61
MANN	Manaslu North	7157	4	9	80	12	21	19	1	5
MANP	Manapathi	6380	6	2	5	0	1	5	0	1
MELA	Melanpulan	6573	2	1	2	1	0	2	1	0
MERA	Mera Peak	6470	2	4	8	0	5	7	0	4
MERR	Merra	6334	1	2	4	0	1	1	0	0
MING	Mingbo Ri	6187	2	1	8	0	2	0	0	0
MOJC	Mojca	6024	1	1	2	0	0	2	0	0
MUKT	Mukut Himal	6639	6	2	8	0	5	2	0	2
MUST	Mustang Peak	6229	6	1	5	1	3	4	0	3
NAG1	Nangpai Gosum I	7321	2	1	2	0	0	0	0	0
NAG2	Nangpai Gosum II	7287	2	1	6	1	1	0	0	0
NALA	Nalakankar North	6062	7	1	12	4	4	1	0	1
NALS	Nalakankar South	6024	7	1	12	4	5	9	4	5
NAMP	Nampa	6829	7	4	31	3	5	4	0	0
NAUL	Naulekh	6262	2	1	2	0	1	2	0	1
NCHU	Nupchu	6044	1	1	9	1	6	7	0	3
NEPA	Nepal Peak	7177	1	5	57	5	5	3	1	0
NGO2	Ngojumba Kang II	7643	2	3	22	1	8	7	0	1
NGOJ	Ngojumba Kang I	7916	2	6	47	3	29	5	0	2
NILC	Nilgiri Central	6940	5	3	19	0	10	8	0	2
NILN	Nilgiri North	7061	5	13	80	10	24	19	1	7

Peak ID	Mbr Smt Rate	Mbr Deaths	Women Deaths	Hired Deaths	Mbr Death Rate	Hired Death Rate	Exp Days Avg.	Suc Exp Days Avg.	Smt Days Avg.	Min Smt Days	Max Smt Days
KGRI	0.00	0	0	0	0.00	0.00	11.5	0.0	0.0	0	0
KGUR	31.98	8	1	11	4.65	16.18	15.3	16.9	13.7	7	36
KHAT	48.98	0	0	0	0.00	0.00	17.5	21.5	19.0	16	22
KHUM	100.00	0	0	0	0.00	0.00	54.0	54.0	48.0	48	48
KIRA	0.00	0	0	0	0.00	0.00	23.0	0.0	0.0	0	0
KJER	25.00	0	0	0	0.00	0.00	15.5	28.0	18.0	18	18
KJRN	0.00	1	0	0	14.29	0.00	39.0	0.0	0.0	0	0
KJRS	47.22	0	0	0	0.00	0.00	25.8	25.8	20.6	7	43
KOTA	30.59	1	0	0	1.18	0.00	12.5	13.0	9.5	6	13
KTEG	35.45	0	0	1	0.00	3.23	18.6	20.1	17.1	11	27
KTOK	70.00	0	0	0	0.00	0.00	10.7	10.7	8.3	3	16
KTSU	0.00	0	0	0	0.00	0.00	39.0	0.0	0.0	0	0
KTUN	18.18	0	0	0	0.00	0.00	2.0	0.0	0.0	0	0
KWAN	0.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
KYAS	37.50	0	0	0	0.00	0.00	12.3	18.0	15.0	15	15
LAMJ	46.03	0	0	0	0.00	0.00	31.6	31.2	28.7	19	38
LAMP	0.00	0	0	0	0.00	0.00	7.0	0.0	0.0	0	0
LANG	15.21	11	0	4	4.18	4.94	26.0	33.2	29.8	12	58
LANR	48.57	0	0	1	0.00	6.25	18.7	23.5	20.0	6	29
LASH	100.00	0	0	0	0.00	0.00	23.0	23.0	13.0	13	13
LEON	25.00	1	0	2	1.92	4.65	37.3	38.7	32.7	24	40
LHAS	36.36	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
LHOM	75.00	0	0	0	0.00	0.00	60.0	60.0	55.0	55	55
LHOT	26.67	9	0	1	0.95	0.17	38.9	37.8	32.6	4	58
LIK1	16.67	0	0	0	0.00	0.00	17.0	17.0	15.0	15	15
LOBE	0.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
LOBW	50.00	0	0	0	0.00	0.00	9.0	9.0	8.5	3	14
LSHR	7.69	10	0	0	4.27	0.00	43.3	45.9	40.9	31	50
LSIS	33.85	3	0	0	4.62	0.00	15.0	13.7	10.7	5	21
MACH	0.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
MAK2	22.18	10	0	3	3.76	2.86	25.9	30.6	24.6	12	52
MAKA	16.34	22	0	12	1.73	2.33	38.5	39.6	34.4	5	65
MANA	18.11	41	4	13	3.26	2.55	31.6	32.6	28.1	6	63
MANN	23.75	0	0	0	0.00	0.00	19.6	26.8	22.2	8	28
MANP	100.00	0	0	0	0.00	0.00	37.0	37.0	19.0	19	19
MELA	100.00	0	0	0	0.00	0.00	20.0	20.0	15.0	15	15
MERA	87.50	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
MERR	25.00	0	0	0	0.00	0.00	14.0	5.0	4.0	4	4
MING	0.00	0	0	0	0.00	0.00	5.0	0.0	0.0	0	0
MOJC	100.00	0	0	0	0.00	0.00	34.0	34.0	33.0	33	33
MUKT	25.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
MUST	80.00	0	0	0	0.00	0.00	5.0	5.0	3.0	3	3
NAG1	0.00	0	0	0	0.00	0.00	4.0	0.0	0.0	0	0
NAG2	0.00	0	0	1	0.00	100.00	26.0	26.0	23.0	23	23
NALA	8.33	0	0	0	0.00	0.00	5.0	5.0	3.0	3	3
NALS	75.00	0	0	0	0.00	0.00	6.0	6.0	4.0	4	4
NAMP	12.90	1	0	0	3.23	0.00	28.0	31.0	26.5	18	35
NAUL	100.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
NCHU	77.78	0	0	0	0.00	0.00	15.0	15.0	13.0	13	13
NEPA	5.26	0	0	0	0.00	0.00	22.8	19.0	17.0	17	17
NGO2	31.82	1	0	0	4.55	0.00	33.3	33.3	28.7	19	34
NGOJ	10.64	0	0	0	0.00	0.00	33.8	34.7	31.7	21	37
NILC	42.11	0	0	0	0.00	0.00	25.3	22.0	13.0	13	13
NILN	23.75	0	0	0	0.00	0.00	22.5	26.2	21.6	13	32

Peak ID	Peak Name	Alt (m)	Re-gion	Exp Cnt	Mbrs Above BC	Women Above BC	Hired Above BC	Mbr Smts	Women Smts	Hired Smts
NILS	Nilgiri South	6839	5	7	35	0	2	6	0	0
NORB	Norbu Kang	6005	7	1	5	1	3	4	1	2
NUMB	Numbur	6958	2	15	93	1	30	21	0	7
NUMR	Numri	6635	2	1	7	2	0	3	1	0
NUPE	Nuptse East I	7795	2	8	29	1	4	2	0	0
NUPT	Nuptse	7864	2	32	169	7	58	15	0	3
OHMI	Ohmi Kangri	6839	1	3	29	4	9	10	0	4
OMBG	Ombigaichen	6340	2	1	2	0	2	2	0	2
PANB	Panbari	6905	5	1	6	2	0	5	2	0
PAND	Pandra	6850	1	1	4	0	0	3	0	0
PANG	Pangbuk Ri	6625	2	3	7	0	4	0	0	0
PANT	Panalotapa	6687	2	1	2	0	0	2	0	0
PARC	Parchamo	6279	2	6	31	3	1	11	2	0
PASA	Pasang Lhamu Chuli	7351	2	7	47	3	14	17	0	3
PBUK	Pabuk Kang	6244	1	1	2	0	1	0	0	0
PETH	Pethangtse	6739	2	5	12	0	6	11	0	6
PHUR	Phurbi Chhyachu	6637	3	1	19	3	0	16	2	0
PIMU	Pimu	6344	2	3	10	1	1	6	0	0
PISA	Pisang	6091	5	1	1	0	0	1	0	0
PK29	Peak 29	7871	4	8	87	4	46	2	0	0
PK41	Peak 41	6648	2	2	5	0	1	2	0	0
POKR	Pokharkan	6372	5	2	10	2	5	3	0	2
PUMO	Pumori	7165	2	208	1254	105	251	405	29	67
PURK	Purkhang	6120	5	1	11	2	11	7	1	6
PUTH	Putha Hiunchuli	7246	6	29	235	25	80	74	10	30
PUTR	Putrung	6500	5	1	7	0	1	0	0	0
PYRM	Pyramid Peak	7140	1	5	32	1	7	10	0	0
RAKS	Raksha Urai	6609	7	5	37	6	10	3	1	1
RAMC	Ramtang Chang	6802	1	2	4	0	0	3	0	0
RAMT	Ramtang	6601	1	4	33	2	7	0	0	0
RANI	Rani Peak	6693	4	2	10	0	6	9	0	5
RATC	Ratna Chuli	7035	5	4	42	6	15	18	2	11
RATH	Rathong	6682	1	4	60	0	2	24	0	0
ROCN	Roc Noir	7485	5	8	66	1	21	25	0	0
ROKA	Rokapi	6468	7	1	3	0	1	2	0	0
SAIP	Saipal	7030	7	11	63	5	26	15	0	3
SARI	Saribung	6328	5	4	11	2	3	8	1	3
SHAL	Shalbachum	6707	3	2	14	0	8	4	0	2
SHAN	Shanti Shikhar	7591	2	2	15	2	0	0	0	0
SHAR	Shartse II	7457	2	4	16	1	8	4	0	1
SHER	Sherson	6422	2	2	19	1	4	18	1	3
SHEY	Shey Shikhar	6139	7	2	12	1	6	0	0	0
SIMN	Simnang Himal	6251	4	2	19	0	0	8	0	0
SING	Singu Chuli	6501	5	1	2	0	0	2	0	0
SITA	Sita Chuchura	6611	6	6	27	2	2	7	0	1
SNOW	Snow Peak	6350	6	1	20	1	23	0	0	0
SPHN	Sphinx	6825	1	2	23	0	6	21	0	0
SPHU	Sharphu I	6433	1	1	10	0	4	10	0	4
SRKU	Serku Dolma	6227	7	1	6	0	3	2	0	1
SWAK	Swaksa Kang	6405	7	1	4	0	0	0	0	0
SWEL	Swelokhan	6180	4	1	1	0	1	0	0	0
TAKP	Takphu Himal	6395	7	1	12	4	4	0	0	0
TAPL	Taple Shikhar	6447	1	2	8	1	12	1	1	3
TASH	Tashi Kang	6386	6	5	30	8	5	12	2	1

Peak ID	Mbr Smt Rate	Mbr Deaths	Women Deaths	Hired Deaths	Mbr Death Rate	Hired Death Rate	Exp Days Avg.	Suc Exp Days Avg.	Smt Days Avg.	Min Smt Days	Max Smt Days
NILS	17.14	0	0	0	0.00	0.00	20.4	26.0	24.0	24	24
NORB	80.00	0	0	0	0.00	0.00	6.0	6.0	5.0	5	5
NUMB	22.58	0	0	0	0.00	0.00	18.7	20.6	18.3	12	28
NUMR	42.86	0	0	0	0.00	0.00	26.0	26.0	17.0	17	17
NUPE	6.90	0	0	0	0.00	0.00	40.0	47.0	42.0	42	42
NUPT	8.88	5	0	0	2.96	0.00	26.5	43.2	33.4	20	46
OHMI	34.48	0	0	0	0.00	0.00	24.0	24.0	20.0	18	22
OMBG	100.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
PANB	83.33	0	0	0	0.00	0.00	27.0	27.0	22.0	22	22
PAND	75.00	0	0	0	0.00	0.00	22.0	22.0	15.0	15	15
PANG	0.00	0	0	0	0.00	0.00	2.0	0.0	0.0	0	0
PANT	100.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
PARC	35.48	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
PASA	36.17	1	0	0	2.13	0.00	20.7	23.3	21.0	13	29
PBUK	0.00	0	0	0	0.00	0.00	2.0	0.0	0.0	0	0
PETH	91.67	0	0	0	0.00	0.00	20.0	20.0	27.5	25	30
PHUR	84.21	0	0	0	0.00	0.00	31.0	31.0	29.0	29	29
PIMU	60.00	0	0	0	0.00	0.00	26.0	26.0	24.0	24	24
PISA	100.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
PK29	2.30	4	0	1	4.60	2.17	37.7	35.0	32.0	32	32
PK41	40.00	0	0	0	0.00	0.00	7.0	0.0	0.0	0	0
POKR	30.00	0	0	0	0.00	0.00	11.5	11.5	9.0	6	12
PUMO	32.30	32	0	9	2.55	3.59	16.2	18.2	14.6	2	45
PURK	63.64	0	0	0	0.00	0.00	11.0	11.0	9.0	9	9
PUTH	31.49	2	0	1	0.85	1.25	16.6	18.1	14.3	6	36
PUTR	0.00	0	0	0	0.00	0.00	5.0	0.0	0.0	0	0
PYRM	31.25	0	0	0	0.00	0.00	22.8	41.0	38.0	38	38
RAKS	8.11	1	0	1	2.70	10.00	14.2	9.0	6.0	6	6
RAMC	75.00	0	0	0	0.00	0.00	27.0	0.0	0.0	0	0
RAMT	0.00	0	0	0	0.00	0.00	11.3	0.0	0.0	0	0
RANI	90.00	0	0	0	0.00	0.00	24.0	24.0	21.0	21	21
RATC	42.86	0	0	0	0.00	0.00	17.5	17.5	13.3	8	24
RATH	40.00	0	0	0	0.00	0.00	8.0	8.0	6.0	6	6
ROCN	37.88	0	0	0	0.00	0.00	31.6	43.0	33.0	19	44
ROKA	66.67	0	0	0	0.00	0.00	19.0	19.0	13.0	13	13
SAIP	23.81	0	0	0	0.00	0.00	26.2	30.0	25.8	19	37
SARI	72.73	0	0	0	0.00	0.00	7.8	8.3	6.0	3	11
SHAL	28.57	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
SHAN	0.00	0	0	0	0.00	0.00	22.0	0.0	0.0	0	0
SHAR	25.00	1	0	0	6.25	0.00	36.0	36.0	34.5	21	48
SHER	94.74	0	0	0	0.00	0.00	47.0	47.0	15.0	4	26
SHEY	0.00	0	0	0	0.00	0.00	7.5	0.0	0.0	0	0
SIMN	42.11	0	0	0	0.00	0.00	32.0	32.0	27.0	9	45
SING	100.00	0	0	0	0.00	0.00	52.0	52.0	50.0	50	50
SITA	25.93	0	0	0	0.00	0.00	12.7	12.0	7.0	7	7
SNOW	0.00	0	0	0	0.00	0.00	54.0	0.0	0.0	0	0
SPHN	91.30	0	0	0	0.00	0.00	33.5	33.5	25.5	17	34
SPHU	100.00	0	0	0	0.00	0.00	16.0	16.0	10.0	10	10
SRKU	33.33	0	0	0	0.00	0.00	43.0	43.0	32.0	32	32
SWAK	0.00	0	0	0	0.00	0.00	3.0	0.0	0.0	0	0
SWEL	0.00	0	0	0	0.00	0.00	14.0	0.0	0.0	0	0
TAKP	0.00	0	0	0	0.00	0.00	0.0	0.0	0.0	0	0
TAPL	12.50	0	0	0	0.00	0.00	18.0	18.0	15.0	15	15
TASH	40.00	0	0	0	0.00	0.00	8.0	8.8	4.5	2	7

Peak ID	Peak Name	Alt (m)	Re-gion	Exp Cnt	Mbrs Above BC	Women Above BC	Hired Above BC	Mbr Smts	Women Smts	Hired Smts
TAWO	Tawoche	6495	2	16	74	2	7	24	0	1
TENG	Tengkoma	6215	1	7	34	6	10	20	2	6
TENR	Tengi Ragi Tau	6938	2	2	11	3	9	4	2	3
THAM	Thamserku	6618	2	13	55	2	11	14	0	2
TILI	Tilicho	7134	5	55	428	44	86	94	10	24
TKPO	Tengkangpoche	6487	2	11	49	7	1	2	0	0
TLNG	Talung	7349	1	10	47	4	26	3	0	1
TONG	Tongu	6187	6	2	8	0	9	7	0	0
TRIP	Tripura Hiunchuli	6553	7	3	14	1	2	2	0	1
TSAR	Tsartse	6343	6	1	3	0	0	0	0	0
TSOK	Tso Karpo Kang	6556	7	2	11	0	5	5	0	3
TUKU	Tukuche	6920	6	35	256	30	71	72	6	12
TUTS	Tutse	6758	2	1	3	1	1	0	0	0
URKM	Urkinmang	6151	3	6	22	4	7	19	3	6
WHIT	White Peak	6395	6	4	41	0	40	33	0	2
YALU	Yalung Kang	8505	1	18	174	8	102	47	1	6
YANS	Yansa Tsenji	6567	3	1	6	1	3	0	0	0
YAUP	Yaupa	6432	2	1	3	0	0	3	0	0
YEMK	Yemelung Kang	6024	7	2	7	1	5	5	1	2

Peak ID	Mbr Smt Rate	Mbr Deaths	Women Deaths	Hired Deaths	Mbr Death Rate	Hired Death Rate	Exp Days Avg.	Suc Exp Days Avg.	Smt Days Avg.	Min Smt Days	Max Smt Days
TAWO	32.43	1	0	0	1.35	0.00	19.0	16.4	12.6	2	21
TENG	58.82	0	0	0	0.00	0.00	9.7	13.7	6.0	1	10
TENR	36.36	0	0	0	0.00	0.00	29.0	35.0	31.0	31	31
THAM	25.45	0	0	0	0.00	0.00	19.5	20.6	18.8	2	33
TILI	21.96	8	0	0	1.87	0.00	13.3	14.7	10.9	3	23
TKPO	4.08	0	0	0	0.00	0.00	16.9	0.0	0.0	0	0
TLNG	6.38	0	0	0	0.00	0.00	22.2	21.0	16.3	8	22
TONG	87.50	0	0	0	0.00	0.00	5.0	5.0	3.0	3	3
TRIP	14.29	0	0	0	0.00	0.00	25.0	25.0	23.0	23	23
TSAR	0.00	0	0	0	0.00	0.00	13.0	0.0	0.0	0	0
TSOK	45.45	0	0	0	0.00	0.00	24.0	24.0	16.5	8	25
TUKU	28.13	1	0	0	0.39	0.00	12.1	13.5	11.7	5	20
TUTS	0.00	0	0	0	0.00	0.00	9.0	0.0	0.0	0	0
URKM	86.36	0	0	0	0.00	0.00	14.0	14.0	13.0	13	13
WHIT	80.49	0	0	0	0.00	0.00	51.3	51.3	37.3	27	43
YALU	27.01	5	0	2	2.87	1.96	40.8	40.3	34.4	23	54
YANS	0.00	0	0	0	0.00	0.00	10.0	0.0	0.0	0	0
YAUP	100.00	0	0	0	0.00	0.00	54.0	54.0	0.0	0	0
YEMK	71.43	0	0	0	0.00	0.00	2.0	2.0	1.0	1	1

Appendix B: Supplemental Charts and Tables

This appendix provides supplementary information relating to the statistical significance of the data in the tables and charts presented in the chapters throughout this book.

The charts and tables below include the estimated rates of ascent and of death for peaks, as well as the 95% confidence intervals for each rate. The width of a confidence interval is a measure of the reliability of an estimated rate. A 95% confidence interval indicates in essence that there is a 95% probability that the true rate falls within that interval. Confidence intervals can be calculated in various ways, and we used the adjusted Wald method. For example in the ANN1 entry in Chart A-3 below, the estimated ascent rate for Annapurna I is 11.7% with a 95% probability that the actual ascent rate lies between 9.9% and 13.8%.

Sample size plays a major role in the calculation of confidence intervals: a larger sample size reduces the width of the interval, and thus the calculated result is more certain. In Chart A-3, the width of the confidence interval for all peaks is narrower than the interval for Kangchenjunga (comparing a sample of 34,920 against a sample of 805 members above BC), thus the mean ascent rate of 27.9 for all peaks is more certain than the mean rate of 22.7 for Kangchenjunga.

If one wants to estimate whether ascent rates differ for two peaks, a quick-and-dirty way is to see whether the confidence intervals for two rates overlap: if they do, this suggests that the two rates do not differ significantly. For a more formal evaluation of statistical significance of rates for two peaks, we use chi square tests with Yates' correction for continuity. If the calculated p-value is 0.05, then the probability is only 5% that the observed difference between the two peaks could have occurred by chance: a probability this unlikely is considered statistically significant. If the p-value is much smaller than 0.05, then the difference between the two peaks is even less likely to have occurred by chance. Using 0.05 as the cutoff for statistical significance is arbitrary, but most statisticians use this as a standard for analysis. We did not adjust p-values for having done multiple comparisons.

Each of the confidence interval charts has one or two horizontal dashed lines, which represent the composite rate for some group of peaks. If the width of the confidence interval is small, only one dashed line is present; otherwise, two dashed lines represent the confidence interval of the composite group. In Chart A-3, for example, the horizontal dashed line at 27.9% represents the member ascent rate for all peaks combined. If the confidence interval for a given peak is far from that line, this suggests that the ascent rate of the peak in question is highly significantly different from the overall rate. For example, ANN1 and MAKA are well below the dashed line indicating a much lower ascent rate than the mean rate for all peaks, while AMAD and all 6000ers are well above indicating a much higher ascent rate. BARU and LHOT are very close to (and crossing) the dashed line, indicating a similar ascent rate to the mean rate for all peaks (thus a statistically insignificant difference). Note that the associated Table A-3 gives the formal statistical probability of that difference. In each case, the rate for a given peak is compared against the rate for all other peaks in the sample. Thus the rate for ANN1 is compared against that of all other peaks.

In Chart D-4, the sample sizes are so small that the resulting confidence intervals become vary large and indicate no statistical significance for most of the peaks. This makes good intuitive sense since the occurrence of a single death can dramatically alter the results.

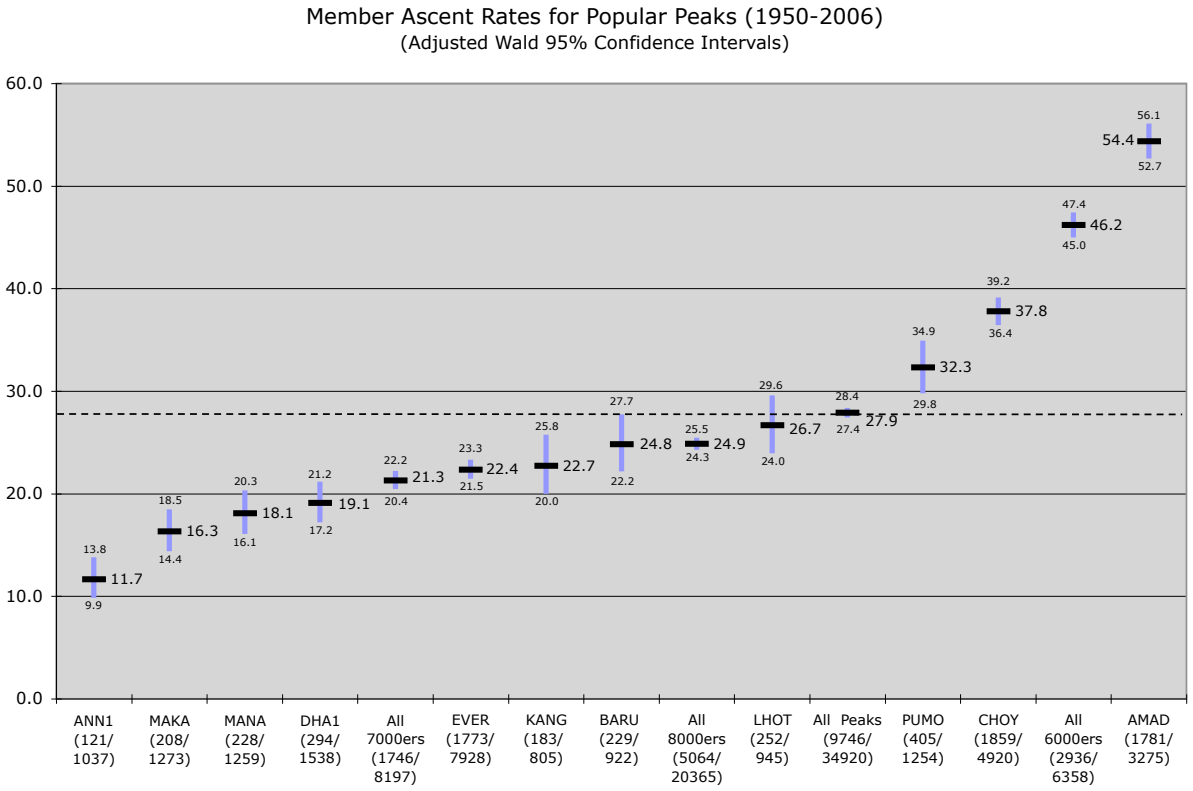


Chart A-3: Member ascent rates for popular peaks from 1950-2006 with more than 700 members above base camp

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Ascent Count	Failure Count	Ascent Rate	Lower	Upper	p-value
Annapurna I	1037	121	916	11.7	9.9	13.8	**<0.001**
Makalu	1273	208	1065	16.3	14.4	18.5	**<0.001**
Manaslu	1259	228	1031	18.1	16.1	20.3	**<0.001**
Dhaulagiri I	1538	294	1244	19.1	17.2	21.2	**<0.001**
All 7000ers	8197	1746	6451	21.3	20.4	22.2	**<0.001**
Everest	7928	1773	6155	22.4	21.5	23.3	**<0.001**
Kangchenjunga	805	183	622	22.7	20.0	25.8	**0.001**
Baruntse	922	229	693	24.8	22.2	27.7	**0.038**
All 8000ers	20365	5064	15301	24.9	24.3	25.5	**<0.001**
Lhotse	945	252	693	26.7	24.0	29.6	0.408
All Peaks	34920	9746	25174	27.9	27.4	28.4	
Pumori	1254	405	849	32.3	29.8	34.9	**<0.001**
Cho Oyu	4920	1859	3061	37.8	36.4	39.2	**<0.001**
All 6000ers	6358	2936	3422	46.2	45.0	47.4	**<0.001**
Ama Dablam	3275	1781	1494	54.4	52.7	56.1	**<0.001**

Table A-3: Member ascent rates for popular peaks from 1950-2006 with more than 700 members above base camp

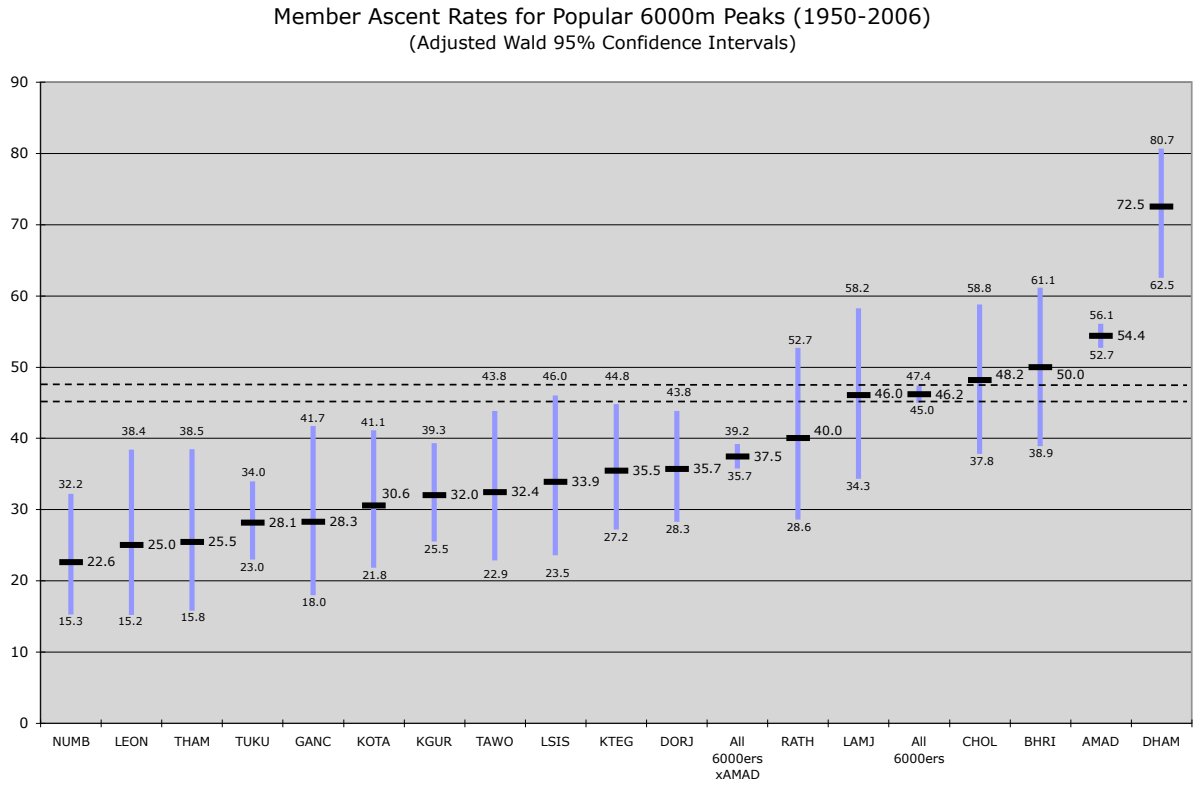


Chart A-4: Member ascent rates for selected 6000m peaks with 50+ members above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Ascent Count	Failure Count	Ascent Rate	Lower	Upper	p-value
Numbur	93	21	72	22.6	15.3	32.2	**<0.001**
Leonpo Gang	52	13	39	25.0	15.2	38.4	**0.003**
Thamserku	55	14	41	25.5	15.8	38.5	**0.003**
Tukuche	256	72	184	28.1	23.0	34.0	**<0.001**
Ganchempo	53	15	38	28.3	18.0	41.7	**0.013**
Kotang	85	26	59	30.6	21.8	41.1	**0.005**
Kang Guru	172	55	117	32.0	25.5	39.3	**<0.001**
Tawoche	74	24	50	32.4	22.9	43.8	**0.023**
Langsisa Ri	65	22	43	33.9	23.5	46.0	0.060
Kantega	110	39	71	35.5	27.2	44.8	**0.029**
Dorje Lhakpa	143	51	92	35.7	28.3	43.8	**0.014**
All 6000ers w/o AMAD	3083	1155	1928	37.5	35.7	39.2	**<0.001**
Rathong	60	24	36	40.0	28.6	52.7	0.404
Lamjung	63	29	34	46.0	34.3	58.2	0.916
All 6000ers	6358	2936	3422	46.2	45.0	47.4	
Cholatse	83	40	43	48.2	37.8	58.8	0.796
Bhrikuti	74	37	37	50.0	38.9	61.1	0.585
Ama Dablam	3275	1781	1494	54.4	52.7	56.1	**<0.001**
Dhampus	91	66	25	72.5	62.5	80.7	**<0.001**

Table A-4: Member ascent rates for selected 6000m peaks with 50+ members above base camp from 1950-2006

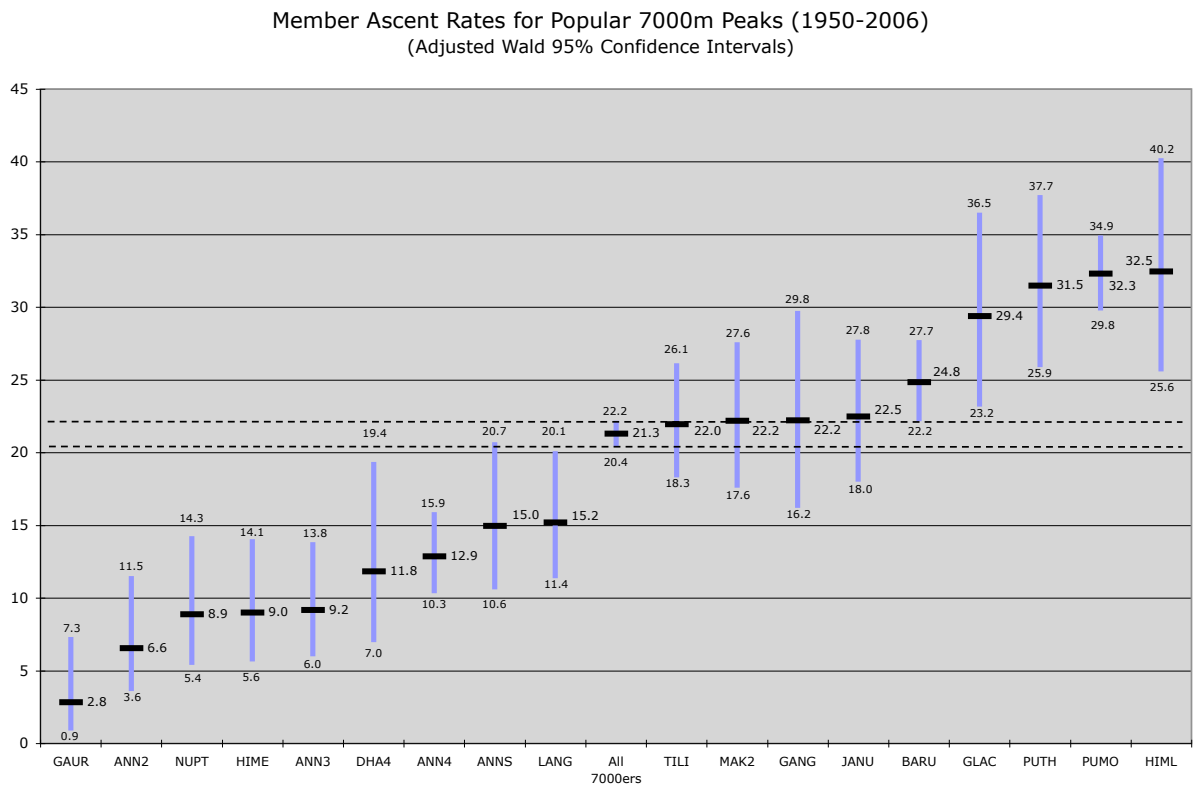


Chart A-5: Member ascent rates for selected 7000m peaks with 100+ members above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Ascent Count	Failure Count	Ascent Rate	Lower	Upper	p-value
Gaurishankar	142	4	138	2.8	0.9	7.3	<0.001
Annapurna II	168	11	157	6.6	3.6	11.5	<0.001
Nuptse	169	15	154	8.9	5.4	14.3	<0.001
Himalchuli East	189	17	172	9.0	5.6	14.1	<0.001
Annapurna III	218	20	198	9.2	6.0	13.8	<0.001
Dhaulagiri IV	110	13	97	11.8	7.0	19.4	0.020
Annapurna IV	560	72	488	12.9	10.3	15.9	<0.001
Annapurna South	194	29	165	15.0	10.6	20.7	0.036
Langtang Lirung	263	40	223	15.2	11.4	20.1	0.008
All 7000ers	8197	1746	6451	21.3	20.4	22.2	
Tilicho	428	94	334	22.0	18.3	26.1	0.777
Makalu II	266	59	207	22.2	17.6	27.6	0.779
Gangapurna	144	32	112	22.2	16.2	29.8	0.865
Jannu	280	63	217	22.5	18.0	27.8	0.671
Baruntse	922	229	693	24.8	22.2	27.7	0.006
Glacier Dome	177	52	125	29.4	23.2	36.5	0.010
Putha Hiunchuli	235	74	161	31.5	25.9	37.7	<0.001
Pumori	1254	405	849	32.3	29.8	34.9	<0.001
Himlung	154	50	104	32.5	25.6	40.2	<0.001

Table A-5: Member ascent rates for selected 7000m peaks with 100+ members above base camp from 1950-2006

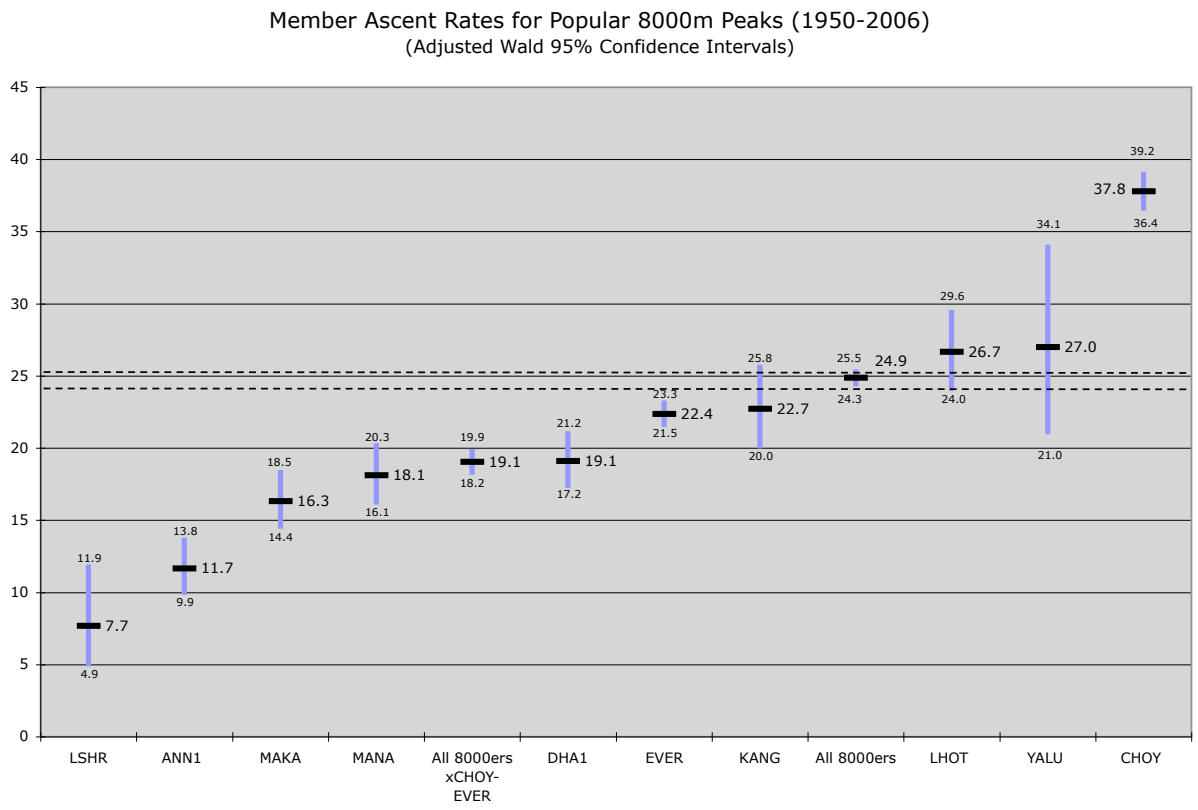


Chart A-6: Member ascent rates for 8000m peaks with 150+ members above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Ascent Count	Failure Count	Ascent Rate	Lower	Upper	p-value
Lhotse Shar	234	18	216	7.9	5.0	12.2	<0.001
Annapurna I	1037	121	916	11.1	9.3	13.2	<0.001
Makalu	1273	208	1065	16.0	14.1	18.2	<0.001
Manaslu	1259	228	1031	16.6	14.6	18.8	<0.001
All 8000ers w/o EVER-CHOY	7517	1432	6085	18.6	17.7	19.5	<0.001
Dhaulagiri I	1538	294	1244	19.3	17.4	21.4	<0.001
Everest	7928	1773	6155	20.5	19.6	21.5	<0.001
Kangchenjunga	805	183	622	22.0	19.3	25.1	0.165
All 8000ers	20365	5064	15301	23.5	22.9	24.1	
Lhotse	945	252	693	26.7	23.9	29.8	0.203
Yalung Kang	174	47	127	27.0	21.0	34.1	0.569
Cho Oyu	4920	1859	3061	36.8	35.4	38.2	<0.001

Table A-6: Member ascent rates for 8000m peaks with 150+ members above base camp from 1950-2006

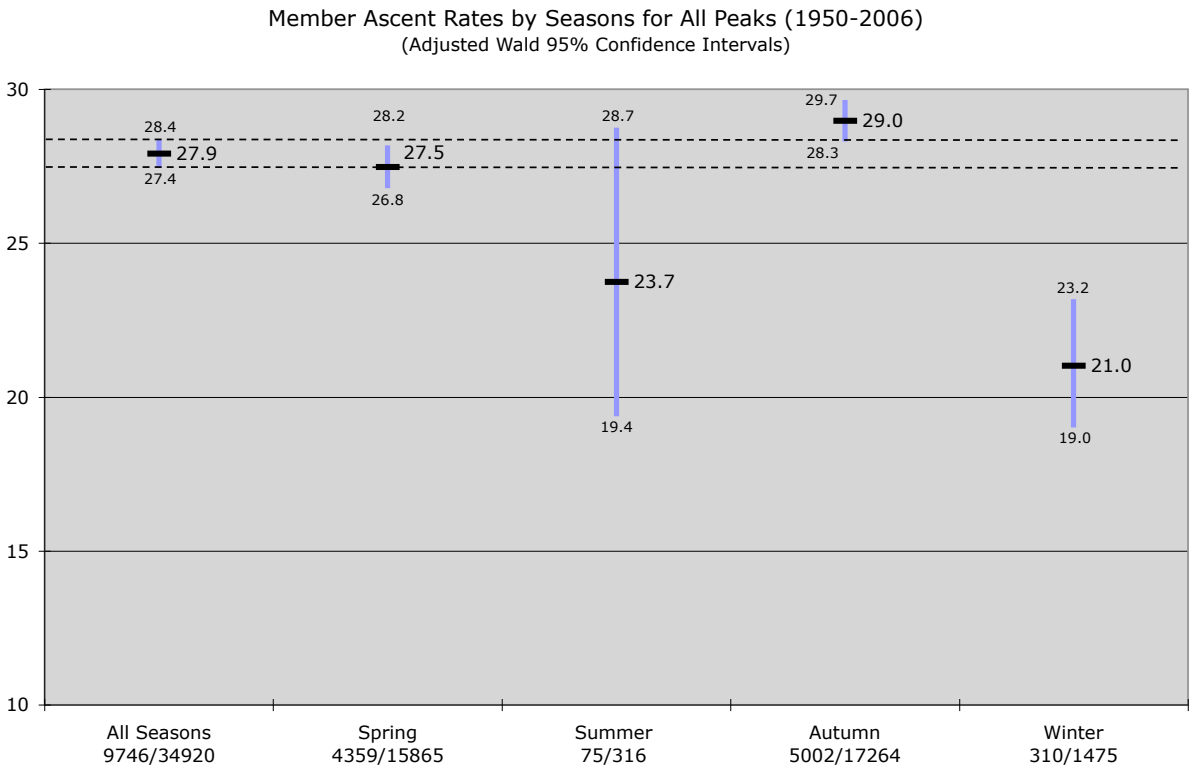


Chart A-7: Member ascent rates by climbing season for all peaks from 1950-2006 (the ascent rate is above the column bar; the ascent and above BC counts are below)

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Ascent Count	Failure Count	Ascent Rate	Lower	Upper	p-value
All Seasons	34920	9746	25174	27.9	27.4	28.4	
Spring	15865	4359	11506	27.5	26.8	28.2	0.101
Summer	316	75	241	23.7	19.4	28.7	0.109
Autumn	17264	5002	12262	29.0	28.3	29.7	**<0.001**
Winter	1475	310	1165	21.0	19.0	23.2	**<0.001**

Table A-7: Member ascent rates by climbing season for all peaks from 1950-2006 (the ascent rate is above the column bar; the ascent and above BC counts are below)

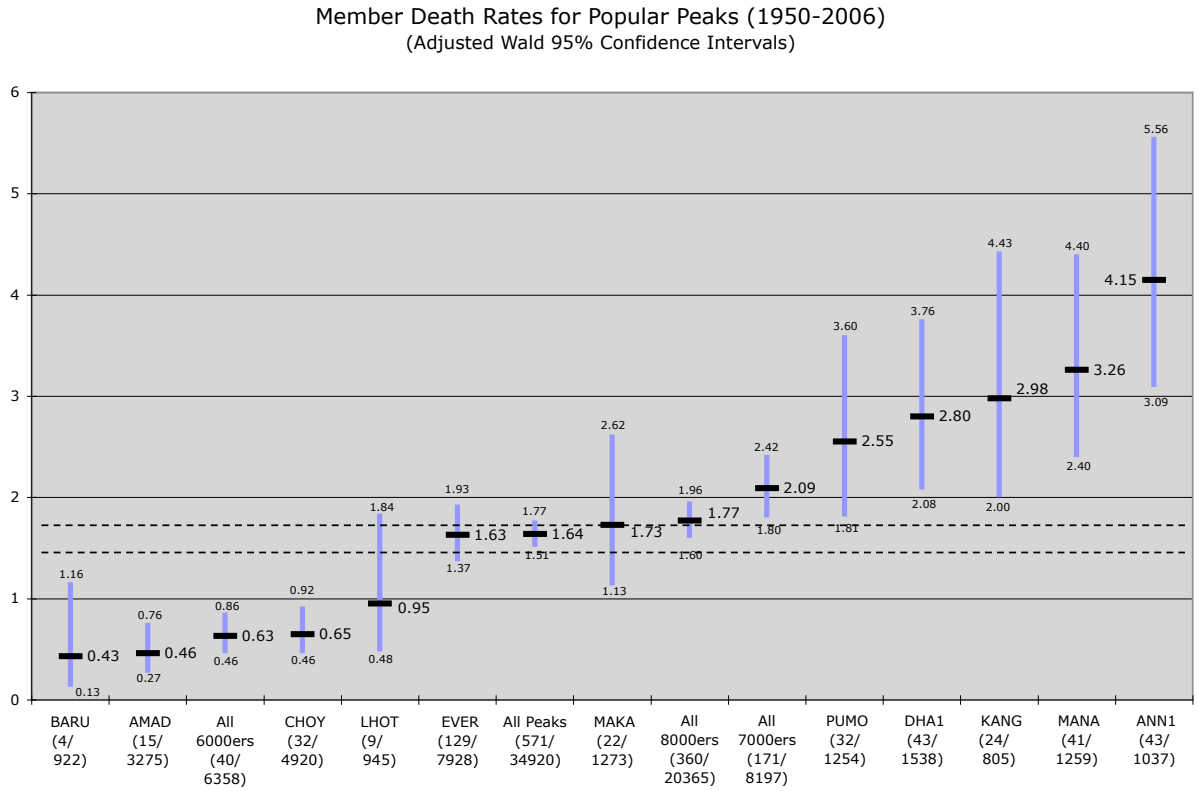


Chart D-3: Member death rates for popular peaks from 1950-2006 with more than 500 member climbers above base camp

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
Baruntse	922	4	918	0.43	0.13	1.16	0.005
Ama Dablam	3275	15	3260	0.46	0.27	0.76	<0.001
All 6000ers	6358	40	6318	0.63	0.46	0.86	<0.001
Cho Oyu	4920	32	4888	0.65	0.46	0.92	<0.001
Lhotse	945	9	936	0.95	0.48	1.84	0.122
Everest	7928	129	7799	1.63	1.37	1.93	0.732
All Peaks	34920	571	34349	1.64	1.51	1.77	
Makalu	1273	22	1251	1.73	1.13	2.62	0.877
All 8000ers	20365	360	20005	1.77	1.60	1.96	0.023
All 7000ers	8197	171	8026	2.09	1.80	2.42	<0.001
Pumori	1254	32	1222	2.55	1.81	3.60	0.013
Dhaulagiri I	1538	43	1495	2.80	2.08	3.76	<0.001
Kangchenjunga	805	24	781	2.98	2.00	4.43	0.004
Manaslu	1259	41	1218	3.26	2.40	4.40	<0.001
Annapurna I	1037	43	994	4.15	3.09	5.56	<0.001

Table D-3: Member death rates for popular peaks from 1950-2006 with more than 500 member climbers above base camp

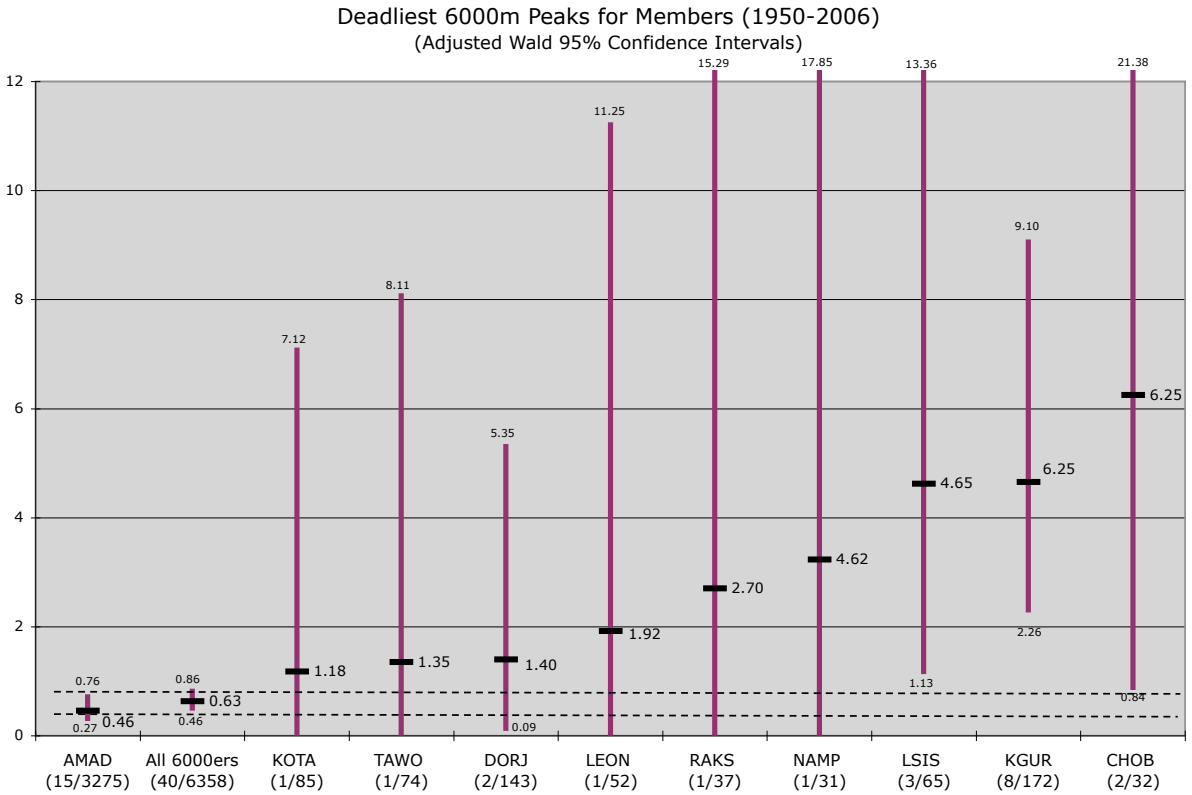


Chart D-4: Member death rates for selected 6000m peaks with 25+ members above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
Ama Dablam	3275	15	3260	0.46	0.27	0.76	0.105
All 6000ers	6358	40	6318	0.63	0.46	0.86	
Kotang	85	1	84	1.18	0.00	7.12	0.964
Tawoche	74	1	73	1.35	0.00	8.11	0.956
Dorje Lhakpa	143	2	141	1.40	0.09	5.35	0.521
Leonpo Gang	52	1	51	1.92	0.00	11.25	0.760
Raksha Urai	37	1	36	2.70	0.00	15.29	0.577
Nampa	31	1	30	3.23	0.00	17.85	0.488
Langsisa Ri	65	3	62	4.62	1.13	13.36	**<0.001**
Kang Guru	172	8	164	4.65	2.26	9.10	**<0.001**
Chobutse	32	2	30	6.25	0.84	21.38	**0.004**

Table D-4: Member death rates for selected 6000m peaks with 25+ members above base camp from 1950-2006

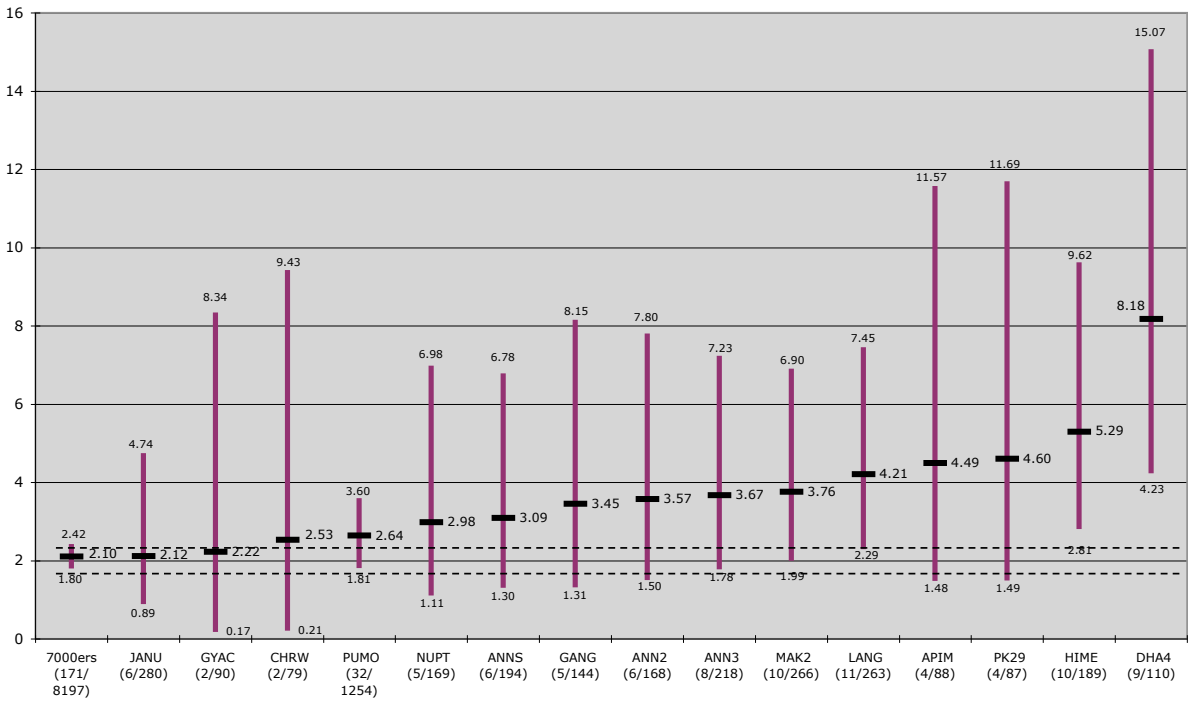


Chart D-5: Member death rates for selected 7000m peaks with 75+ members above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
All 7000ers	8197	171	8026	2.10	1.80	2.42	
Jannu	280	6	274	2.12	0.89	4.74	0.885
Gyachung Kang	90	2	88	2.22	0.17	8.34	0.780
Churen West	79	2	77	2.53	0.21	9.43	0.906
Pumori	1254	32	1222	2.64	1.81	3.60	0.252
Nuptse	169	5	164	2.98	1.11	6.98	0.596
Annapurna South	194	6	188	3.09	1.30	6.78	0.460
Gangapurna	144	5	139	3.45	1.31	8.15	0.379
Annapurna II	168	6	162	3.57	1.50	7.80	0.277
Annapurna III	218	8	210	3.67	1.78	7.23	0.156
Makalu II	266	10	256	3.76	1.99	6.90	0.085
Langtang Lirung	263	11	252	4.21	2.29	7.45	**0.028**
Api Main	88	4	84	4.49	1.48	11.57	0.212
Peak 29	87	4	83	4.60	1.49	11.69	0.208
Himalchuli East	189	10	179	5.29	2.81	9.62	**0.004**
Dhaulagiri IV	110	9	101	8.18	4.23	15.07	**<0.001**

Table D-5: Member death rates for selected 7000m peaks with 75+ members above base camp from 1950-2006

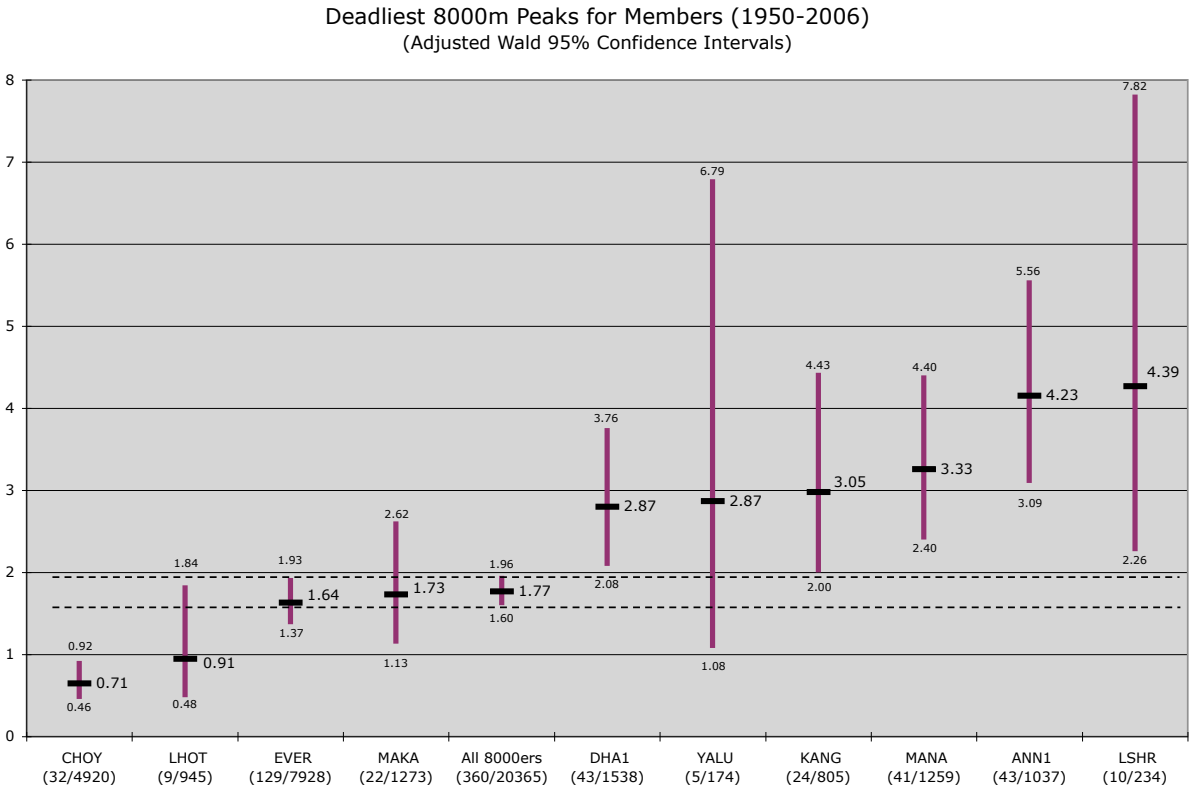


Chart D-6: Member death rates for 8000m peaks with 150+ members above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
Cho Oyu	4920	32	4888	0.65	0.46	0.92	**<0.001**
Lhotse	945	9	936	0.95	0.48	1.84	**0.069**
Everest	7928	129	7799	1.63	1.37	1.93	0.246
Makalu	1273	22	1251	1.73	1.13	2.62	1.000
All 8000ers	20365	360	20005	1.77	1.60	1.96	
Dhaulagiri I	1538	43	1495	2.80	2.08	3.76	**0.002**
Yalung Kang	174	5	169	2.87	1.08	6.79	0.411
Kangchenjunga	805	24	781	2.98	2.00	4.43	**0.011**
Manaslu	1259	41	1218	3.26	2.40	4.40	**<0.001**
Annapurna I	1037	43	994	4.15	3.09	5.56	**<0.001**
Lhotse Shar	234	10	224	4.27	2.26	7.82	**0.007**

Table D-6: Member death rates for 8000m peaks with 150+ members above base camp from 1950-2006

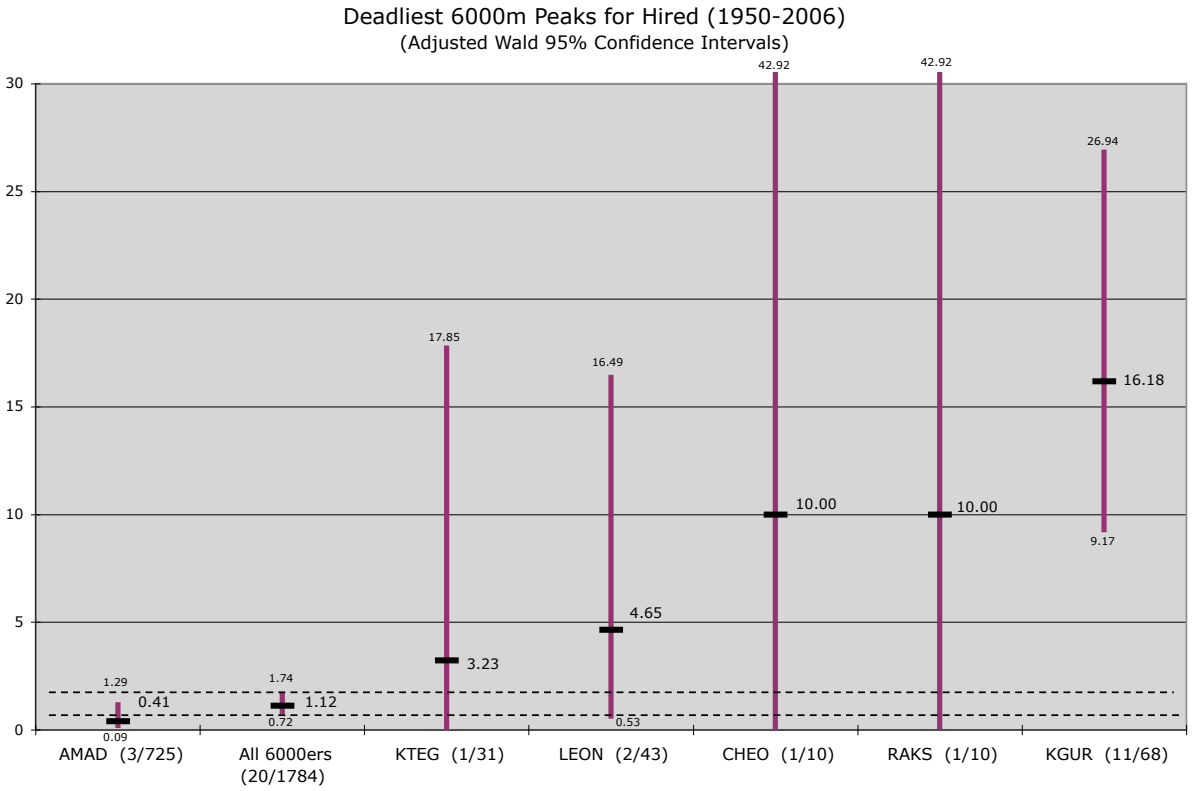


Chart D-7: Hired death rates for selected 6000m peaks with 10+ hired above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Hired Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
Ama Dablam	725	3	722	0.41	0.09	1.29	**0.034**
All 6000ers	1784	20	1764	1.12	0.72	1.74	
Kantega	31	1	30	3.23	0.00	17.85	0.793
Leonpo Gang	43	2	41	4.65	0.53	16.49	0.136
Cheo Himal	10	1	9	10.00	0.00	42.92	0.243
Raksha Urai	10	1	9	10.00	0.00	42.92	0.243
Kang Guru	68	11	57	16.18	9.17	26.94	**<0.001**

Table D-7: Hired death rates for selected 6000m peaks with 10+ hired above base camp from 1950-2006

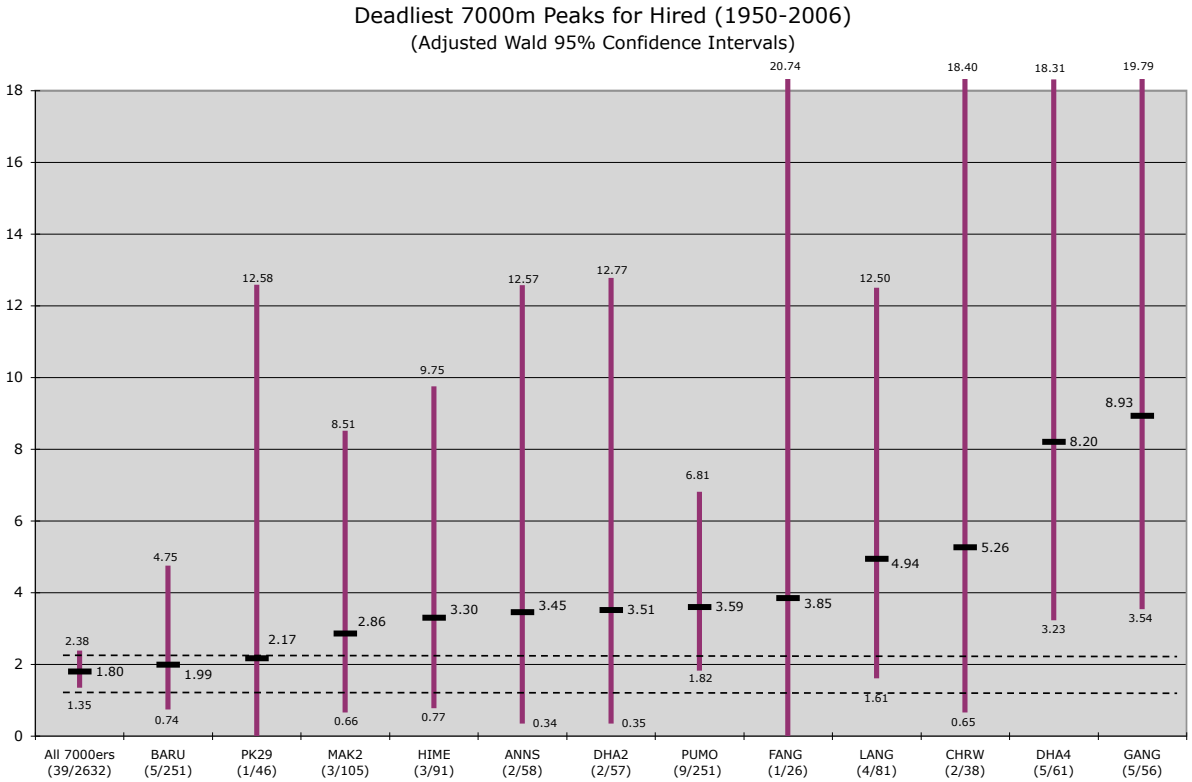


Chart D-8: Hired death rates for selected 7000m peaks with 25+ hired above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Hired Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
All 7000ers	2674	48	2626	1.80	1.35	2.38	
Baruntse	251	5	246	1.99	0.74	4.75	0.933
Peak 29	46	1	45	2.17	0.00	12.58	0.715
Makalu II	105	3	102	2.86	0.66	8.51	0.644
Himalchuli East	91	3	88	3.30	0.77	9.75	0.486
Annapurna South	58	2	56	3.45	0.34	12.57	0.647
Dhaulagiri II	57	2	55	3.51	0.35	12.77	0.631
Pumori	251	9	242	3.59	1.82	6.81	**0.046**
Fang	26	1	25	3.85	0.00	20.74	0.964
Langtang Lirung	81	4	77	4.94	1.61	12.50	0.082
Churen Himal West	38	2	36	5.26	0.65	18.40	0.314
Dhaulagiri IV	61	5	56	8.20	3.23	18.31	**<0.001**
Gangapurna	56	5	51	8.93	3.54	19.79	**<0.001**

Table D-8: Hired death rates for selected 7000m peaks with 25+ hired above base camp from 1950-2006

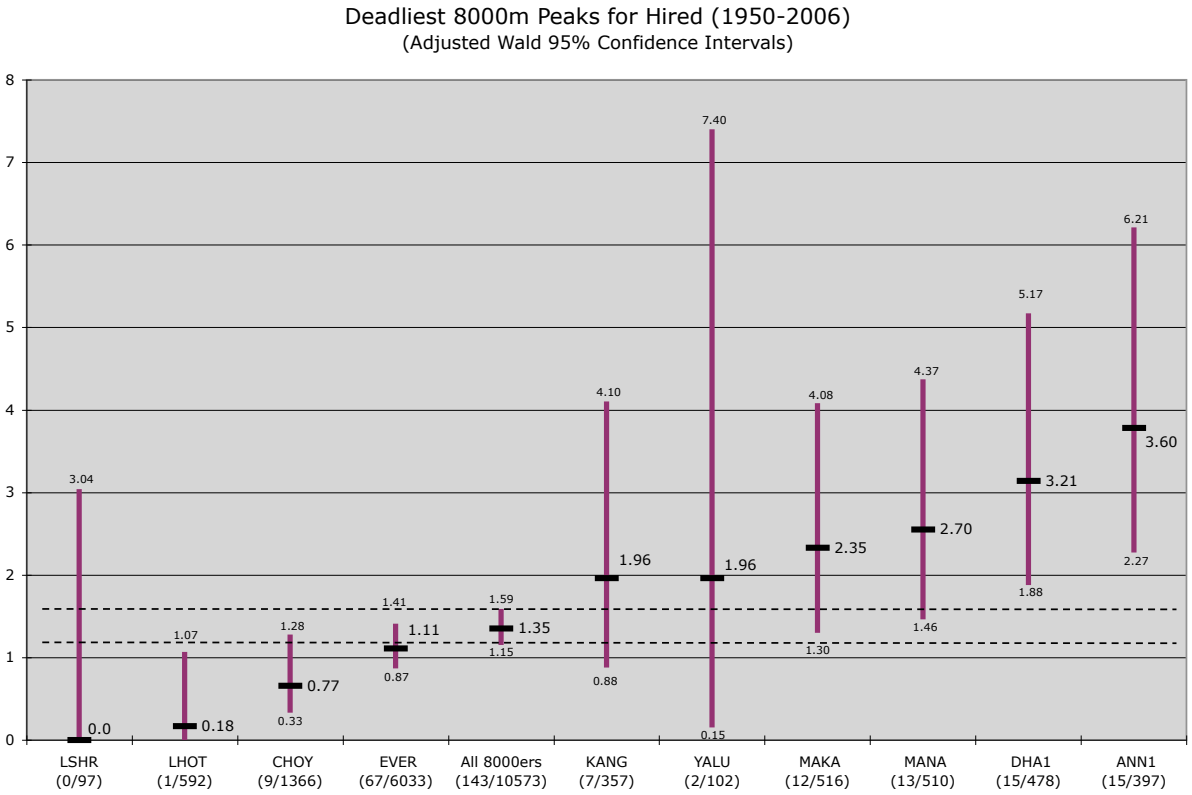


Chart D-9: Hired death rates for 8000m peaks with 75+ hired above base camp from 1950-2006

					95% Confidence Interval		Yates' Chi Square
	Hired Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
Lhotse Shar	97	0	97	0.00	0.00	3.04	0.473
Lhotse	592	1	591	0.17	0.00	1.07	**0.017**
Cho Oyu	1366	9	1357	0.66	0.33	1.28	**0.024**
Everest	6033	67	5966	1.11	0.87	1.41	**0.016**
All 8000ers	10573	143	10430	1.35	1.15	1.59	
Kangchenjunga	357	7	350	1.96	0.88	4.10	0.436
Yalung Kang	102	2	100	1.96	0.15	7.40	0.916
Makalu	516	12	504	2.33	1.30	4.08	0.077
Manaslu	510	13	497	2.55	1.46	4.37	**0.021**
Dhaulagiri I	478	15	463	3.14	1.88	5.17	**0.001**
Annapurna I	397	15	382	3.78	2.27	6.21	**<0.001**

Table D-9: Hired death rates for 8000m peaks with 75+ hired above base camp from 1950-2006

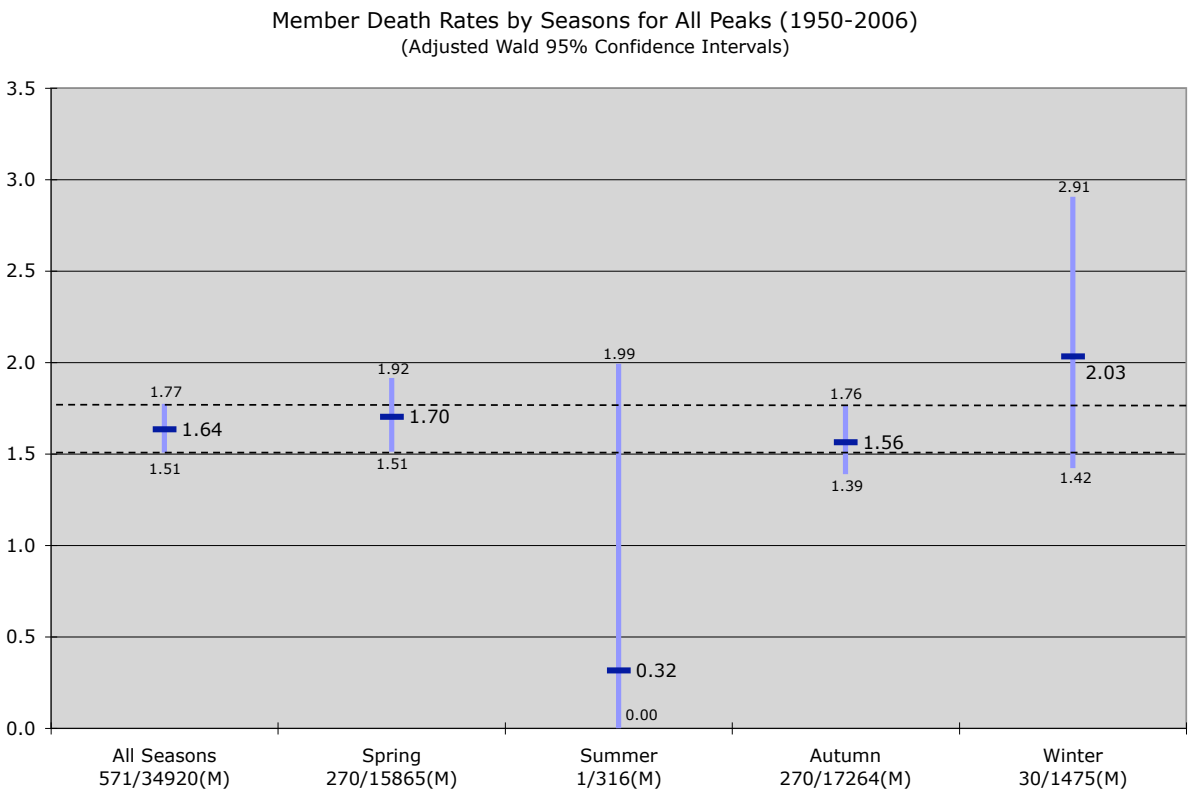


Chart D-11a: Member death rates by climbing season for all peaks from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

					95% Confidence Interval		Yates' Chi Square
	Members Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
All Seasons	34920	571	34349	1.64	1.51	1.77	
Spring	15865	270	15595	1.70	1.51	1.92	0.393
Summer	316	1	315	0.32	0.00	1.99	0.102
Autumn	17264	270	16994	1.56	1.39	1.76	0.319
Winter	1475	30	1445	2.03	1.42	2.91	0.259

Table D-11a: Member death rates by climbing season for all peaks from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

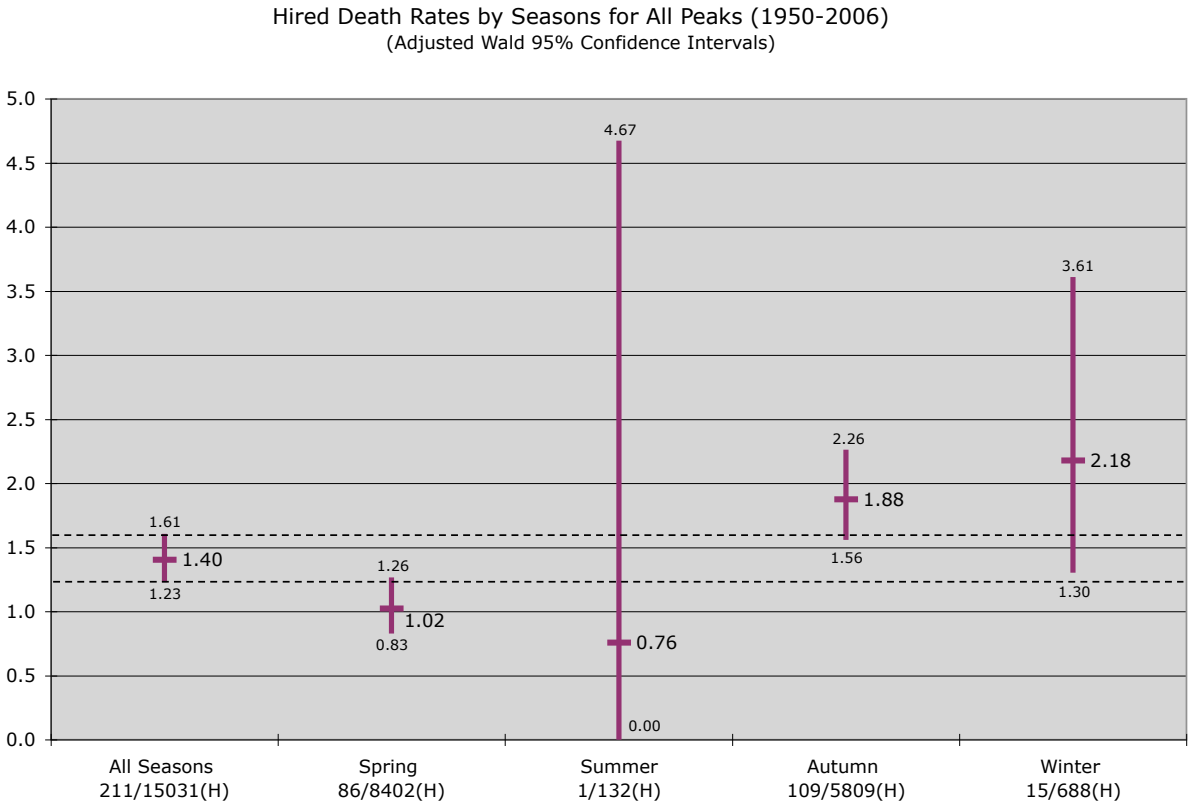
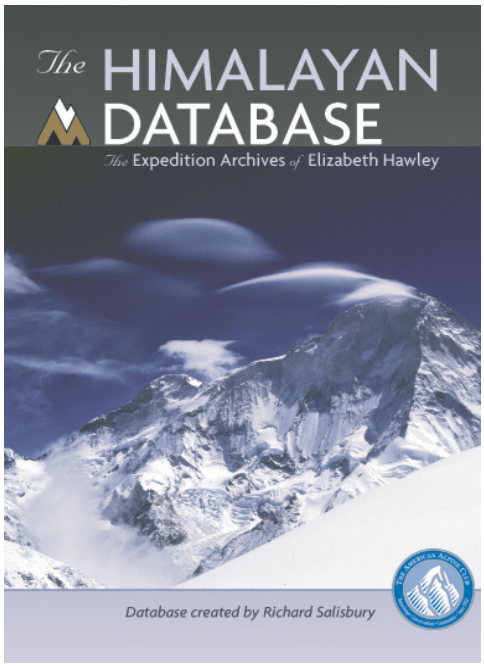


Chart D-11b: Hired death rates by climbing season for all peaks from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)

					95% Confidence Interval		Yates' Chi Square
	Hired Above BC	Death Count	Survival Count	Death Rate	Lower	Upper	p-value
All Seasons	15031	211	14820	1.40	1.23	1.61	
Spring	8402	86	8316	1.02	0.83	1.26	**<0.001**
Summer	132	1	131	0.76	0.00	4.67	0.793
Autumn	5809	109	5700	1.88	1.56	2.26	**<0.001**
Winter	688	15	673	2.18	1.30	3.61	0.108

Table D-11b: Hired death rates by climbing season for all peaks from 1950-2006 (the death rate is above the column bar; the death and above BC counts are below)



The HIMALAYAN DATABASE

The Expedition Archives of Elizabeth Hawley

Database created by Richard Salisbury
Published by The American Alpine Club, October 2004 (updated bi-anually)

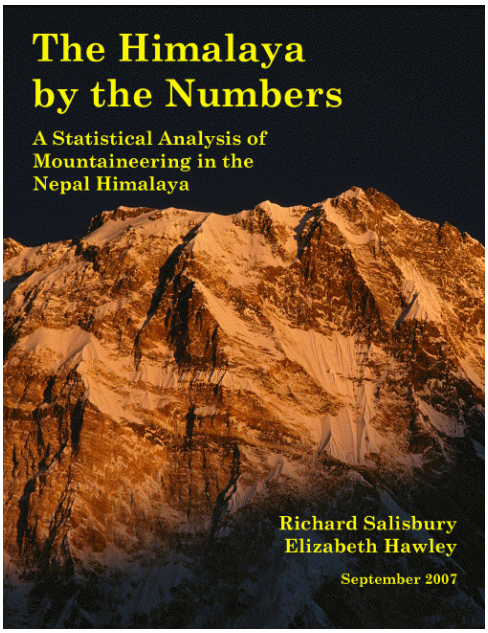
Updates for the 2004, 2005, and 2006 climbing seasons are available gratis at *www.himalayandatabase.com*

The Himalayan Database is a compilation of records for all expeditions that have climbed in the Nepalese Himalaya. The database is based on the expedition archives of Elizabeth Hawley, a longtime journalist based in Kathmandu, and it is supplemented by information gathered from books, alpine journals, and correspondence with Himalayan climbers.

The data cover all expeditions from 1905 through 2003 to more than 300 significant Nepalese peaks. Also included are expeditions to both sides of border peaks such as Everest, Cho Oyu, Makalu, and Kangchenjunga as well as to some smaller border peaks. Data on expeditions to trekking peaks are included for early attempts, first ascents, and major accidents.

The database is searchable by peak, climber, expedition, nationality, season, mortality rates and causes, and more. There are selected preset reports plus the capability for custom searches and analyses. There are literature references to journals, books, and published expedition reports. The database is on a CD and includes an 80-page printed user guide. The program is a Microsoft Visual Foxpro application and is compatible for both PC PC (Windows 9x, 2000, XP, Vista) and Power Macintosh.

Elizabeth Hawley was trained as a journalist, and reports on mountaineering for international magazines and journals. She is executive officer of Sir Edmund Hillary's Himalayan Trust. Richard Salisbury has been trekking and climbing in the Himalayas for 25 years. He is a retired computer analyst from the University of Michigan who specialized in databases.



The Himalaya by the Numbers

A Statistical Analysis of Mountaineering in the Nepal Himalaya

September 2007
By Richard Salisbury and Elizabeth Hawley

What are the most dangerous peaks to climb? What are the safest? When is the best time of year to climb?

These and many other questions are answered by *The Himalaya by the Numbers*, a comprehensive statistical analysis of climbing activity, ascents and fatalities in the Nepal Himalaya.

The analyses cover three periods of climbing:

1950-1969 – the expeditionary period,
1970-1989 – the transitional period, and
1990-2006 – the commercial period

The data are analyzed in several categories including climbing season, expedition years (changes over time), geographical regions of Nepal, age groups, gender, citizenship, and team size and composition. In addition, fatalities are analyzed for both members and hired personnel by causes of death with special emphasis given to avalanches, falls and physiological factors. Time of day and distance from the summit also also examined for climbing accidents. Special emphasis is given to the most popular commercial peaks, Ama Dablam, Cho Oyu, and Everest.

162 pages with charts and tables. Published by the authors in e-Book format. Available for download gratis at *www.himalayandatabase.com*