Special Report on Global Warming of 1.5°C

Edits to the IPCC SR1.5 Final Draft

Disclaimer

This list is intended to cover all the substantive edits made to the report prior to publication and includes corrections of errors identified after the submission of the Final Draft and edits made to ensure consistency between individual Chapters/Technical Summary/Annexes as well as full consistency of the Summary for Policymakers and the underlying report. The list might not be fully comprehensive and copy edits are generally not part of this list.

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Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
1	4 : 12			over
1	4 : 22		average warming over land higher	higher average warming over land
1	5 : 47		have many systemic dimensions	are assessed across many dimensions of feasibility –
1	7 : 6		experienced greater regional-scale warming, with 20-40% of the global population (depending on the temperature dataset used) having experienced over 1.5°C of warming in at least one season (Figure 1.1 and Chapter 3 Section 3.3	greater regional-scale warming, with 20–40% of the global population (depending on the temperature dataset used) having experienced over 1.5°C of warming in at least one season (Figure 1.1; Chapter 3 Section 3.3.2.1
1	7 : 9		bringing increases in some types of extreme weather, droughts, floods, sea level rise and biodiversity loss, and causing unprecedented risks to vulnerable persons and populations (IPCC, 2012a, 2014b; Mysiak et al., 2016), Chapter 3 Section 3.4	including increases in droughts, floods, and some other types of extreme weather; sea level rise; and biodiversity loss – these changes are causing unprecedented risks to vulnerable persons and populations (IPCC, 2012a, 2014a; Mysiak et al., 2016; Chapter 3 Sections 3.4.5–3.4.13
1	7 : 12		already experienced a decline in food security, linked in turn	experienced a decline in food security, which in turn is partly linked
1	7 : 16		2014d	2014a
1	7 : 21		2014b	2014a
1	7 : 39		their link to	the problem of
1	7 : 42		different	
1	8 : 3		Colours	Different shades of pink to purple
1	8 : 9		Sustainable Development Goals.	
1	9 : 47		sustainable development and poverty eradication. Equity is a long-standing principle within international law and climate change law in particular (Dinah, 2008; Bodansky et al., 2017).	sustainable development and poverty eradication. Equity is a long- standing principle within international law and climate change law in particular (Shelton, 2008; Bodansky et al., 2017)
1	10 : 12			McKinnon, 2015;
1	10 : 43		2.2.3, 2.3.3.1, 3.4.5-3.4.11	3.4.2, 2.5, 3.4.5–3.4.13
1	11 : 15		shocks.	associated impacts.
1	11 : 23			(IPCC, 2014c)
1	11 : 25		will	would
1	11 : 31		UNGA	UN
1	11 : 33		enabling conditions	dimensions
1	11 : 48		(IPCC, 2014a)	
1	12 : 21		2014e)	2014b))
1	12 : 25			; Folland et al., 2018; Visser et al., 2018
1	12 : 28		Kirtman et al., 2013), the level of warming in 2017 is	likely range quoted in Kirtman et al., 2013 and supported by Folland et al., 2018), the level of warming in 2017 was
1	12 : 35		(±0.06°C 5–95% range based on observational uncertainties alone), and 2006-2015 was 0.87°C (±0.12°C likely range also accounting for the possible impact of natural fluctuations), warmer than 1850–1900.	warmer than 1850–1900 (with a 5–95% range of 0.57°C–0.69°C based on observational uncertainties alone), and 2006–2015 was 0.87°C warmer than 1850–1900 (with a likely range of 0.75°C–0.99°C, also accounting for the possible impact of natural fluctuations).
1	12 : 39			Note that the 5–95% intervals often quoted in square brackets in AR5 correspond to very likely ranges, while likely ranges correspond to 17–83%, or the central two-thirds, of the distribution of uncertainty.
1	12 : 47			or declining sea ice (Berger et al., 2017),

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
1	12 : 52		not for projection of future changes or for estimated emissions budgets consistent with future changes, particularly	with less absolute impact on projections of future changes, or estimated emissions budgets,
1	13 : 6		NOAA	NOAAGlobalTemp
1	13 : 20		Figure 1.2	blue lines in Figure 1.2 and
1	13 : 24		line shows monthly mean GMST in the HadCRUT4, NOAA, GISTEMP and Cowtan-Way datasets, expressed as departures from 1850–1900, with	shaded line shows monthly mean GMST in the HadCRUT4, NOAAGlobalTemp, GISTEMP and Cowtan-Way datasets, expressed as departures from 1850–1900, with varying grey
1	14 : 2		%.	% based on multiple lines of evidence.
1	14 : 20			Abram et al., 2016;
1	14 : 22		Marsicek et al., 2018), as	Lüning and Vahrenholt, 2017; Marsicek et al., 2018), which is
1	1 : 3		NOAA	NOAAGlobalTemp
1	15 : 4	Table 1.1 / 1 : 3	NOAA (7)	NOAAGlobalTemp (7)
1	15 : 17		NOAA	NOAAGlobalTemp
1	15 : 19		NOAA	NOAAGlobalTemp
1	16 : 10		±0.1°C, slightly greater than the 0.65°C observed warming over this period (Figures 10.4 & 10.5) and	(likely between 0.6°C and 0.8°C), which is slightly greater than the 0.65°C observed warming over this period (Figures 10.4 and 10.5) with
1	16 : 21			(see figure 1.SM.6).
1	16 : 32			), Folland et al. (2018
1	16 : 36		±0.2°C (reduced from 5–95% to account for additional forcing and model uncertainty), increasing at 0.2°C (±0.1°C) per decade (	0.8°C to 1.2°C (reduced from 5–95% to account for additional forcing and model uncertainty), increasing at 0.2°C per decade (with a likely range of 0.1°C to 0.3°C per decade:
1	16 : 44		,	(or, by 2030, for a longer period: Henley and King, 2017),
1	16 : 51		IPCC, 2013b).	Collins et al., 2013).
1	17 : 6		IPCC, 2013b).	Collins et al., 2013).
1	17 : 6		these	spatial and seasonal
1	18 : 34			an example of
1	18 : 36			the purposes of
1	18 : 43		1200±300 GtCO2 (using values from AR5: Myhre et al, 2013; Jenkins et al, 2018; Allen et al,	1100 GtCO2, with a range of 900-1500 GtCO2 (using values from AR5: Myhre et al., 2013; Allen et al., 2018; Jenkins et al.,
1	19 : 15		reduce emissions to zero on a pathway	reach zero emissions on a pathway still
1	19 : 22			relative to pre-industrial
1	19 : 29			pathways
1	19 : 49		Box 3.1	and Boxes 3.1 and 3.2
1	20 : 10		implementation	emission reductions
1	20 : 14		0.87°C above pre–industrial in 2010	1°C above pre-industrial in 2017
1	21 : 1			Cross-Chapter Box 1 |
1	21 : 44		over	involving
1	21 : 51			increase
1	22 : 1			(Section 1.2.3).
1	22 : 30		emissions, climate change and climate impact projections	projections of emissions, climate change, and climate impacts

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
1	22 : 32		assumptions about inherently uncertain socio-economic trends in the 21st century could influence future energy and land use, resulting in emissions, and climate change as well as human vulnerability and exposure to climate change.	socio-economic trends in the 21st century could influence future energy and land use, resulting emissions and the evolution of human vulnerability and exposure.
1	23 : 5		2014b	2014a
1	23 : 8		,	are
1	23 : 24			The radiative forcing impact of
1	23 : 46		has an effective atmospheric residence time of centuries to millennia (Eby et al., 2009), the multi-century warming commitment from emissions to date	takes hundreds of thousands of years to be fully removed from the atmosphere by natural processes following its emission (Eby et al., 2009; Ciais et al., 2013), the multi-century warming commitment from emissions to date in addition to warming already observed
1	24 : 1			Goodwin et al., 2015;
1	24 : 5			Sustained net zero anthropogenic emissions of CO2 and declining net anthropogenic non-CO2 radiative forcing over a multi-decade period would halt anthropogenic global warming over that period, although it would not halt sea level rise or many other aspects of climate system adjustment. The rate of decline of non-CO2 radiative forcing must be sufficient to compensate for the ongoing adjustment of the climate system to this forcing (assuming it remains positive) due to ocean thermal inertia. It therefore depends on deep ocean response time scales, which are uncertain but of order centuries, corresponding to decline rates of non-CO2 radiative forcing of less than 1% per year. In the longer term, Earth system feedbacks such as the release of carbon from melting permafrost may require net negative CO2 emissions to maintain stable temperatures (Lowe and Bernie, 2018).
1	24 : 7		(also sometimes referred to as short-lived climate pollutants, see Section 4.3.6)	
1	24 : 11		warming	increase in radiative forcing and warming (Figure 1.5, green lines)
1	24 : 14		).	) and the impact of other measures affecting aerosol loading (e.g., Fernández et al., 2017).
1	24 : 16			, driven by the removal of negative aerosol radiative forcing
1	25 : 1		/Different interpretations of warming commitment from past emissions	warming commitment from past emissions of greenhouse gases and aerosols
1	25 : 9			sensitivity, and
1	25 : 11		due to adjusting to the recent increase in	in response to constant
1	26 : 16		Supplementary Material 1.SM	Figure 1.5, Supplementary Material 1.SM.6
1	26 : 34			(Levasseur et al., 2016; Ocko et al., 2017).
1	27 : 36		constant	near-constant
1	27 : 53			; Cherubini and Tanaka, 2016).
1	28 : 38		2014e) ,	2014b),
1	29 : 12			or more
1	29 : 20			; Chevuturi et al., 2018

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
1	29 : 35		, rising sea levels, increasing ocean acidification, and extreme events, such as floods, droughts, and heat waves (IPCC, 2014e). For example, changes in rainfall affect the hydrological cycle and water availability (Schewe et al., 2014).	(Lee et al., 2018), rising sea levels, increasing ocean acidification, and extreme events, such as floods, droughts, and heat waves (IPCC, 2014b). changes in rainfall affect the hydrological cycle and water availability (Schewe et al., 2014; Döll et al., 2018; Saeed et al., 2018).
1	29 : 38		, for example	
1	30 : 8		2012c; World Bank, 2013; IPCC, 2014e	2012b; 2014b; World Bank, 2013
1	31 : 1			the assumption of a linear scaling of impacts with GMST used in many studies (Lewis et al., 2017; King et al., 2018b),
1	31 : 9		King et al., 2018	Barcikowska et al., 2018; King et al., 2018a
1	31 : 46		2014c	2014b
1	32 : 7		2014d	2014a
1	32 : 12		2014e	2014b
1	33 : 24		different	
1	33 : 47		a 1.5°C world	limiting warming to 1.5°C
1	34 : 11		The report starts by assessing which mitigation pathways	Assessment of feasibility in this report starts by evaluating the unavoidable warming from past emissions (Section 1.2.4) and identifying mitigation pathways that
1	34 : 50		locks-ins related to existing infrastructures, and possibilities of acceleration permitted by cumulative effects like learning-by-doing driving dramatic costs decreases	lock-ins related to existing infrastructures, and possibilities of acceleration permitted by cumulative effects (e.g., dramatic cost decreases driven by learning-by-doing)
1	35 : 1		their	
1	35 : 43		2014f	2014c
1	35 : 45		increase the likelihood of not achieving the Sustainable Development Goals (SDGs), while some strategies limiting warming towards 1.5°C are expected to significantly lower that risk and provide	decrease the likelihood of achieving the Sustainable Development Goals (SDGs). while some strategies limiting warming towards 1.5°C are expected to significantly increase the likelihood of meeting those goals while also providing
1	35 : 51		2014f	2014c
1	36 : 28		et al.,	and Theuer,
1	37 : 9		$100 billion	100 billion USD
1	38 : 13			Near-term refers to the coming decade, medium-term to the period 2030–2050, while long-term refers to 2050–2100.
1	39 : 3		the role of	
1	39 : 30		, which	and
1	40 : 23		2014d, e).	2014a, b).
1	40 : 29		2014e)	2014b),
1	40 : 34		2014e	2014b
1	41 : 8		, and not	in number, and those that do exist may not be
1	41 : 12			, potentially involving large-scale technological or societal transformation.
1	41 : 14		deemed likely	considered high
1	41 : 23		achieving	limiting warming to
1	41 : 30			(plus Supplementary Material for Chapters 1 through 4),
1	41 : 32		and a Glossary	, a Glossary, and several other Annexes

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
1	42 : 8		large-scale global scale	global-scale
1	45 : 29		conditions	temperature
1	45 : 35		temperature over land and	air temperature over land and water temperature
2	4 : 32		remaining below 1.5°C would depend on the geophysical response being towards the low end of the currently-	would only be expected to remain below the 1.5°C threshold if the actual geophysical response ends up being towards the low end of the currently
2	4 : 35		{2.2, 2.3.5, Cross-Chapter Box 9 in Chapter 4}	{2.2, 2.3.5, Cross-Chapter Box 11 in Chapter 4}
2	4 : 39		Available pathways that aim for no or limited (0–0.2°C) overshoot of 1.5°C keep GHG emissions in 2030 to 25–30 GtCO2e yr-1 in 2030 (interquartile range).	Available pathways that aim for no or limited (less than 0.1°C) overshoot of 1.5°C keep GHG emissions in 2030 to 25–30 GtCO2e yr−1 in 2030 (interquartile range).
2	4 : 41		NDCs of 50–58 GtCO2e yr-	unconditional NDCs of 52–58 GtCO2e yr−
2	5 : 13		limited evidence, high agreement). Investments in low-carbon energy technologies and energy efficiency would need to approximately double in the next 20 years, while investment in fossil-fuel extraction and conversion decrease by about a quarter.	medium confidence). Additional annual average energy- related investments for the period 2016 to 2050 in pathways limiting warming to 1.5°C compared to pathways without new climate policies beyond those in place today (i.e., baseline) are estimated to be around 830 billion USD2010 (range of 150 billion to 1700 billion USD2010 across six models). Total energy-related investments increase by about 12% (range of 3% to 24%) in 1.5°C pathways relative to 2°C pathways. Average annual investment in low-carbon energy technologies and energy efficiency are upscaled by roughly a factor of six (range of factor of 4 to 10) by 2050 compared to 2015, overtaking fossil investments globally by around 2025 (medium confidence).
2	5 : 29		for limiting warming to 1.5°C with a two-thirds chance of about 550 GtCO2, and of about 750	of about 420 GtCO2 for a two- thirds chance of limiting warming to 1.5°C, and of about 580
2	5 : 32		The remaining carbon budget is defined here as cumulative CO2 emissions from the start of 2018 until the time of net-zero global emissions.	The remaining carbon budget is defined here as cumulative CO2 emissions from the start of 2018 until the time of netzero global emissions for global warming defined as a change in global near-surface air temperatures.
2	5 : 38		750 GtCO2 implies that CO2 emissions reach carbon neutrality in about 35 years, reduced to 25 years for a 550	580 GtCO2 implies that CO2 emissions reach carbon neutrality in about 30 years, reduced to 20 years for a 420
2	6 : 26		{2.3.1, 2.5.3, 2.6, 4.3.7}	{2.3.1, 2.5.3, 2.6.3, 4.3.7}
2	6 : 47		36–97% (minimum-maximum range) across 1.5°C-consistent pathways	59–97% (minimum-maximum range) across 1.5°C pathways with no or limited overshoot
2	7 : 3		{2.3.4, 2.4.3}	{2.3.4, 2.4.3, 2.5.1}
2	9 : 24		there could be pathways without the characteristics in question.	there could be other 1.5°C-consistent pathways without the characteristics in question.
2	10 : 3		Su et al., 2017; Liu et al., 2017; Marcucci et al., 2017; Bauer et al., 2018; Strefler et al., 2018a; van Vuuren et al., 2018; Vrontisi et al., 2018; Zhang et al., 2018; Bertram et al., 2018; Grubler et al., 2018; Kriegler et al., 2018b; Luderer et al., 2018).	Marcucci et al., 2017; Su et al., 2017; Bauer et al., 2018; Bertram et al., 2018; Grubler et al., 2018; Holz et al., 2018b; Kriegler et al., 2018a; Liu et al., 2018; Luderer et al., 2018; Strefler et al., 2018a; van Vuuren et al., 2018; Vrontisi et al., 2018; Zhang et al., 2018).
2	10 : 14		Mitigation pathways were classified by four factors: consistency with a temperature limit	Mitigation pathways were classified by four factors: consistency with a temperature increase limit

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
2	11 : 5			** This chapter uses the term 1.5°C-consistent pathways to refer to pathways with no overshoot, with limited (low) overshoot, and with high overshoot. However, the Summary for Policymakers focusses on pathways with no or limited (low) overshoot.
2	12 : 25		Kriegler et al., 2018b	Kriegler et al., 2018a
2	15 : 20		Solid and dashed lines are indicative of the effective radiative forcing for CO2 and non-CO2 agents	The lines are indicative of the total effective radiative forcing from all anthropogenic sources (solid lines) and for non-CO2 agents only (dashed lines),
2	17 : 8		Scott et al., 2017	Scott et al., 2018
2	17 : 57		Since the AR5, many estimates of the remaining carbon budget for 1.5°C have been published (Friedlingstein et al., 2014a; MacDougall et al., 2015; Peters, 2016; Rogelj et al., 2016b; Matthews et al., 2017; Millar et al., 2017; Goodwin et al., 2018b; Kriegler et al., 2018a; Lowe and Bernie, 2018; Mengis et al., 2018; Millar and Friedlingstein, 2018; Rogelj et al., 2018; Schurer et al., 2018; Séférian et al., 2018; Tokarska et al., 2018; Tokarska and Gillett, 2018).	Since the AR5, many estimates of the remaining carbon budget for 1.5°C have been published (Friedlingstein et al., 2014a; MacDougall et al., 2015; Peters, 2016; Rogelj et al., 2016b, 2018; Matthews et al., 2017; Millar et al., 2017; Goodwin et al., 2018b; Kriegler et al., 2018b; Lowe and Bernie, 2018; Mengis et al., 2018; Millar and Friedlingstein, 2018; Schurer et al., 2018; Séférian et al., 2018; Tokarska and Gillett, 2018; Tokarska et al., 2018).
2	19 : 1		Solid lines with dots reproduce the temperature response to cumulative CO2 emissions	Solid lines with dots reproduce the globally averaged near-surface air temperature response to cumulative CO2 emissions
2	19 : 4		available Earth-system models and Earth-system models	15 Earthsystem models and 5 Earthsystem models
2	21 : 7		Comyn-Platt et al. (2018) include methane emissions from permafrost and suggest the 1.5°C remaining carbon budget is reduced by 180 GtCO2.	Comyn-Platt et al. (2018) include carbon and methane emissions from permafrost and wetlands and suggest the 1.5°C remaining carbon budget is reduced by 116 GtCO2.
2	23 : 6		This will require large-scale transformations	This would require large-scale transformations
2	23 : 13		Rogelj et al., 2015b; Akimoto et al., 2017; Liu et al., 2017; Löffler et al., 2017; Marcucci et al., 2017; Su et al., 2017; Bauer et al., 2018; Bertram et al., 2018; Grubler et al., 2018; Kriegler et al., 2018b; Luderer et al., 2018; Rogelj et al., 2018; Strefler et al., 2018a; van Vuuren et al., 2018; Vrontisi et al., 2018; Zhang et al., 2018) (Section 2.1	Section 2.1) (Rogelj et al., 2015b, 2018; Akimoto et al., 2017; Löffler et al., 2017; Marcucci et al., 2017; Su et al., 2017; Bauer et al., 2018; Bertram et al., 2018; Grubler et al., 2018; Holz et al., 2018b; Kriegler et al., 2018a; Liu et al., 2018; Luderer et al., 2018; Strefler et al., 2018a; van Vuuren et al., 2018; Vrontisi et al., 2018; Zhang et al., 2018
2	26 : 4		1.5°C-consistent pathways are pink, other pathways grey.	1.5°C-consistent pathways are blue, other pathways grey.
2	26 : 21		Liu et al., 2017; Bertram et al., 2018; Grubler et al., 2018;	Bertram et al., 2018; Grubler et al., 2018; Liu et al., 2018;
2	27 : 27		Liu et al., 2017; Bauer et al., 2018; Grubler et al., 2018; Holz et al., 2018b; Kriegler et al., 2018b	Bauer et al., 2018; Grubler et al., 2018; Holz et al., 2018b; Kriegler et al., 2018a; Liu et al., 2018
2	27 : 53		Jie Di and Cameron, 2016	Di and Cameron, 2016
2	28 : 18		Luderer et al., 2013; Rogelj et al., 2013; Bertram et al., 2015b; Kriegler et al., 2018b; Michaelowa et al., 2018	Luderer et al., 2013; Rogelj et al., 2013b; Bertram et al., 2015b; Kriegler et al., 2018a; Michaelowa et al., 2018
2	28 : 23		(Kriegler et al., 2018b	(Kriegler et al., 2018a
2	28 : 28		(Kriegler et al., 2018b	(Kriegler et al., 2018a
2	28 : 40		Liu et al., 2017; Bauer et al., 2018; Grubler et al., 2018; Holz et al., 2018b; Kriegler et al., 2018a	Bauer et al., 2018; Grubler et al., 2018; Holz et al., 2018b; Kriegler et al., 2018b; Liu et al., 2018
2	30 : 11		with annual CO2 emissions in 2017 slightly above 40	with annual CO2 emissions in 2017 around 42 ± 3
2	30 : 45		(Kriegler et al., 2018a	(Kriegler et al., 2018b
2	30 : 55		LUC	, AFOLU

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2	31 : 2		LUC	AFOLU
2	31 : 4		LUC	AFOLU
2	31 : 6		LUC CO2 emissions until the time they reach zero combine with the fossil-fuel and industry CO2 emissions to a total amount of gross emissions of 670–1430 GtCO2 for the period 2018–2100 (5th–95th percentile; median 1040 GtCO2	AFOLU CO2 emissions until the time they reach zero combine with the fossil-fuel and industry CO2 emissions to give a total amount of gross emissions of 650–1270 GtCO2 for the period 2018–2100 (5th–95th percentile; median 950 GtCO2) in 1.5°C pathways with no or limited overshoot.
2	31 : 10		two-in-three chance of limiting warming below 1.5°C without overshoot,	one-in-two chance of limiting warming below 1.5°C without overshoot,
2	31 : 10		including the low end of the hypothetical sensitivity analysis of Kriegler et al. (2018a), who assumes 75 GtCO2 LUC	including the low end of the hypothetical sensitivity analysis of Kriegler et al. (2018b), who assumes 75 Gt AFOLU CO2
2	31 : 13		via negative LUC	via net negative AFOLU
2	31 : 20		and/or negative LUC CO2 emissions are	, which may include net negative AFOLU CO2 emissions, is
2	31 : 35		Kriegler et al., 2018a	Kriegler et al., 2018b
2	31 : 41		However, the scenario database also contains nine non-overshoot pathways that remain below 1.5°C throughout the 21st century and that are assessed in the chapter.	However, the scenario database also contains nine non-overshoot pathways that remain below 1.5°C throughout the 21st century (Table 2.1).
2	32 : 4		Luderer et al., 2013; Rogelj et al., 2013b; Clarke et al., 2014; Fawcett et al., 2015; Riahi et al., 2015; Kriegler et al., 2018b) (see Cross-Chapter Box 3 in Chapter 1 for a discussion of feasibility concepts).	see Cross-Chapter Box 3 in Chapter 1 for a discussion of feasibility concepts) (Luderer et al., 2013; Rogelj et al., 2013b; Clarke et al., 2014; Fawcett et al., 2015; Riahi et al., 2015; Kriegler et al., 2018a).
2	32 : 15			about
2	32 : 19		above mentioned ranges.	above mentioned ranges. Due to the small number of 1.5°C pathways with no overshoot in the report's database (Table 2.4) and the potential for a downward bias in the selection of underlying scenario assumptions, the headline range for 1.5°C pathways with no or limited overshoot is also assessed to be of the order of 25–30 GtCO2e yr−1.
2	32 : 23		benchmark	emissions benchmark
2	32 : 27		Explicit choices or anticipation that CDR options are only deployed to a limited degree during the 21st century imply lower benchmarks over the coming decades that are achieved through lower CO2 emissions	On the other hand, pathways that assume or anticipate only limited deployment of CDR during the 21st century imply lower emissions benchmarks over the coming decades, which are achieved in models through further reducing CO2 emissions in the coming decades.
2	33 : 21		emissions	CO2 emissions
2	33 : 23		reach this point	, emissions reach the point of net zero GHG emissions
2	33 : 37		is mainly achieved by BECCS	is mainly achieved by BECCS and AFOLU-related CDR,
2	33 : 56		1.5°C-high-OS pathways show broadly similar emissions levels than	Below-1.5°C and 1.5°C-low-OS pathways combined show a decline in global net anthropogenic CO2 emissions of about 45% from 2010 levels by 2030 (40–60% interquartile range). Lower-2°C pathways show CO2 emissions declining by about 25% by 2030 in most pathways (10–30% interquartile range). The 1.5°C-high- OS pathways show emissions levels that are broadly similar to
2	34 : 12		net negative emissions	net negative CO2 emissions
2	34 : 13		net negative emissions	net negative CO2 emissions
2	34 : 14		net negative emissions	net negative CO2 emissions

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2	35 : 1		Kyoto-GHG emissions (top panel), and total CO2 emissions, CO2 emissions from the AFOLU sector, global N2O emissions, and CO2 emissions from fossil-	(a) Kyoto-GHG emissions, and (b) global total CO2 emissions, (c) CO2 emissions from the agriculture, forestry and other land use (AFOLU) sector, (d) global N2O emissions, and (e) CO2 emissions from fossil
2	35 : 4		emissions from the energy supply sector (electricity sector and refineries), and	(f) emissions from the energy supply sector (electricity sector and refineries) and (g)
2	36 : 16		having a strong warming effect (Myhre et al., 2013; Etminan et al., 2016), current 1.5°C-consistent pathways still project significant emissions of CH4 by 2050, indicating that only limited mitigation options are included and identified	the fact that methane has a strong warming effect (Myhre et al., 2013; Etminan et al., 2016), current 1.5°C-consistent pathways still project significant emissions of CH4 by 2050, indicating only a limited CH4 mitigation potential
2	36 : 20		roughly around 55–70% in 2030, and 60–80% in 2050 in 1.5°C-consistent pathways	around 55–70% in 2030, and 60–80% in 2050 in 1.5°C-consistent pathways
2	37 : 2		(25th and 75th percentile), across available scenarios.	and interquartile range across available scenarios (25th and 75th percentile given in brackets).
2	37 : 3		For the timing of global zero of total net CO2 and Kyoto-GHG emissions, the interquartile range is given.	
2	37 : 7		Scenarios with year-2010 Kyoto-GHG emissions outside the range assessed by IPCC AR5 WGIII are excluded (IPCC, 2014b).	Scenarios with year-2010 Kyoto-GHG emissions outside the range assessed by IPCC AR5 WGIII are excluded (IPCC, 2014b), as are scenario duplicates that would bias ranges towards a single study.
2	38 : 17		As a result, the net forcing contributions from all SLCFs combined are projected to increase slightly by about 0.2–0.4 W/m2, compared to 2010.	As a result, the net forcing contributions from all SLCFs combined are projected to increase slightly by about 0.2–0.3 W m−2, compared to 2010.
2	39 : 1		in 2010, 2030, 2050, and 2100,	in 2010, 2020, 2030, 2050, and 2100,
2	40 : 42		LUC	AFOLU CO2
2	40 : 47		emissions, this approximation is a lower-bound for terrestrial CDR in the AFOLU sector (including the factors that lead to net negative LUC	CO2 emissions, this approximation is a lower-bound for terrestrial CDR in the AFOLU sector (including all mitigation-policy-related factors that lead to net negative AFOLU CO2
2	40 : 55		Footnote: The median and percentiles of the sum of two quantities is in general not equal to the sum of the medians of the two quantitites	Footnote: The median and percentiles of the sum of two quantities is in general not equal to the sum of the medians and percentiles, respectively, of the two quantitites.
2	41 : 11		net negative emissions	net negative CO2 emissions
2	41 : 16		Liu et al., 2017; Marcucci et al., 2017; Grubler et al., 2018; Lehtilä and Koljonen, 2018; van Vuuren et al., 2018); and targeted analysis of deployment limits for (specific) CDR measures (Holz et al., 2018b; Kriegler et al., 2018b	Marcucci et al., 2017; Grubler et al., 2018; Lehtilä and Koljonen, 2018; Liu et al., 2018; van Vuuren et al., 2018); and targeted analysis of deployment limits for (specific) CDR measures (Holz et al., 2018b; Kriegler et al., 2018a
2	41 : 32		net negative emissions	net negative CO2 emissions
2	42 : 1		: (i) to move more rapidly towards the point of carbon neutrality and maintain it afterwards to stabilize global-mean temperature rise, and (ii) to produce net negative emissions drawing down anthropogenic CO2 in the atmosphere to enable temperature overshoot by declining global-mean temperature rise after its peak (Kriegler et al., 2018a	in mitigation pathways: (i) to move more rapidly towards the point of carbon neutrality and maintain it afterwards in order to stabilize globalmean temperature rise, and (ii) to produce net negative CO2 emissions, drawing down anthropogenic CO2 in the atmosphere in order to decline globalmean temperature after an overshoot peak (Kriegler et al., 2018b
2	42 : 5		Both uses are important in 1.5°C-consistent pathways (Figure 2.9).	Both uses are important in 1.5°C-consistent pathways (Figure 2.9 and 2.10).
2	42 : 14		total CDR deployment in the combined body of 1.5°C-consistent pathways	median levels of total CDR deployment in 1.5°C-consistent pathways

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
2	43 : 5		These remaining carbon budgets have been adjusted for the difference in starting year compared to Table 2.2	
2	43 : 16		in the 2nd half of the century.	in the 2nd half of the century. (Figure 2.5).
2	43 : 20		could equally feature in pathways with a low temperature peak but a fast temperature decline thereafter (see Figure 2.1	can also feature in pathways with low overshoot (see Figure 2.5 and 2.10
2	43 : 23		CDR	BECCS
2	43 : 30		Kriegler et al., 2018b	Kriegler et al., 2018a
2	44 : 11		Humpenöder et al., 2017	Humpenöder et al., 2018
2	44 : 16		Humpenöder et al., 2017	Humpenöder et al., 2018
2	44 : 51		Humpenöder et al., 2017	Humpenöder et al., 2018
2	45 : 2		Humpenöder et al., 2017	Humpenöder et al., 2018
2	45 : 46		finding ca. 70% of stored CO2 still retained after 10,000 years in these circumstances (Alcalde et al., 2018).	and find that about 70% of stored CO2 would still be retained after 10,000 years in these circumstances (Alcalde et al., 2018).
2	46 : 3			Changes in land for food crops, energy crops, forest, pasture and other natural land are shown, compared to 2010.
2	46 : 10		imply steeper and deeper reductions	would require steeper and deeper reductions in the longer term in order to meet specific warming targets
2	46 : 35		these NDCs are assessed to result in global Kyoto-GHG emissions on the order of 50–58	the unconditional (conditional) NDCs are assessed to result in global Kyoto-GHG emissions on the order of 52–58 (50–54)
2	46 : 38		available to this assessment show an interquartile range of about 26–38 (median 31) GtCO2e yr-1 in 2030, reducing to 26–31 (median 28) GtCO2e yr-1 if only pathways with low overshoot are taken into account , and still lower if pathways without overshoot are considered	with limited overshoot available to this assessment show an interquartile range of about 26–31 (median 28) GtCO2e yr−1 in 2030
2	47 : 1		Footnote: Note that aggregated Kyoto-GHG emissions implied by the NDCs from Cross-Chapter Box 4.3 and Kyoto-GHG ranges from the pathway classes in Chapter 2 are only approximately comparable, because this chapter applies GWP-100 values from the IPCC Fourth Assessment Report while the NDC Cross-Chapter Box 4.3 applies GWP-100 values from the IPCC Second Assessment Report. At a global scale, switching between GWP-100 values of the Second to the Fourth IPCC Assessment Report would result in an increase in estimated aggregated Kyoto-GHG emissions of about no more than 3% in 2030 (UNFCCC, 2016).	Footnote: Note that aggregated Kyoto-GHG emissions implied by the NDCs from Cross-Chapter Box 11 in Chapter 4 and Kyoto-GHG ranges from the pathway classes in Chapter 2 are only approximately comparable, because this chapter applies GWP-100 values from the IPCC Fourth Assessment Report while the NDC Cross-Chapter Box 11 applies GWP-100 values from the IPCC Second Assessment Report. At a global scale, switching between GWP-100 values of the Second to the Fourth IPCC Assessment Report would result in an increase in estimated aggregated Kyoto-GHG emissions of no more than about 3% in 2030 (UNFCCC, 2016).
2	47 : 2		Published estimates of the emissions gap between conditional NDCs and 1.5°C-consistent pathways in 2030 range from 16 (14–22) GtCO2e yr-1 (UNEP, 2017) for a greater than one-in-to chance of limiting warming below 1.5°C in 2100 to 25 (19–29) GtCO2e yr-1 (Vrontisi et al., 2018) for a greater than two-in-three chance of meeting the 1.5°C limit.	Based on these ranges, this report assesses the emissions gap for a two-in-three chance of limiting warming to 1.5°C to be 26 (19–29) and 28 (22–33) GtCO2e (median and interquartile ranges) for conditional and unconditional NDCs, respectively (Cross-Chapter Box 11, applying GWP-100 values from the IPCC Second Assessment Report).
2	47 : 30		NDC range of global Kyoto-GHG emissions in 2030 assessed in Cross-Chapter Box 11 in Chapter 4 is shown by black dotted lines	combined range of global Kyoto-GHG emissions in 2030 for the conditional and unconditional NDCs assessed in Cross-Chapter Box 11 is shown by the grey shaded area

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2	47 : 32		Kriegler et al., 2018a	Kriegler et al., 2018b
2	47 : 33		Numbers... (Kriegler et al., 2018a	Circles ... (Kriegler et al., 2018b
2	48 : 42		Kriegler et al., 2018b	Kriegler et al., 2018a
2	48 : 48		Kriegler et al., 2018b	Kriegler et al., 2018a
2	52 : 42		Xiao and Jiang, 2017	Xiao and Jiang, 2018
2	53 : 5		(OECD/IEA and IRENA, 2017)	(IEA, 2017d)
2	56 : 25		(IEAGHG, 2006; DOE/NETL, 2013).	(IEAGHG, 2006; NETL, 2013).
2	57 : 6		OECD/IEA and IRENA, 2017	IEA, 2017d
2	59 : 6		1.5DS = 1.5DS-OS: 1.5°C-consistent pathways with overshoot.	The label 1.5DS combines both high and low overshoot 1.5°C-consistent pathway.
2	60 : 33		steel, non-ferrous metals, chemicals, non-metallic minerals, and pulp and paper alone	together, the steel, non-ferrous metals, chemicals, non-metallic minerals, and pulp and paper industries
2	61 : 20		1.5DS = 1.5DS-OS: 1.5°C-consistent pathways with overshoot	The label 1.5DS combines both high and low overshoot 1.5°C-consistent pathways
2	64 : 17		1.5DS = 1.5DS-OS: 1.5°C-consistent pathways with overshoot	The label 1.5DS combines both high and low overshoot 1.5°C-consistent pathways
2	66 : 20		(58%) by 2050 in 1.5°C-overshoot pathways from IAMs	and 58% by 2050 in 1.5°C-overshoot pathways from IAMs and the IEA-B2DS pathway, respectively
2	67 : 6		1.5DS-L: 5 1.5°C-low-OS, 1.5DS = 1.5DS-OS: 1.5°C-consistent pathways with overshoot. Section 2.1 for descriptions.	1.5DS-L = 1.5°C-low-OS. The label 1.5DS combines both high and low overshoot 1.5°C-consistent pathways. Section 2.1 for descriptions.
2	68 : 55		FAOSTAT (2017)	FAOSTAT (2018)
2	70 : 7		FAOSTAT (2017)	FAOSTAT (2018)
2	70 : 10		FAOSTAT (2017)	FAOSTAT (2018)
2	74 : 16		Geels et al., 2017; Kuramochi et al., 2017; Rockström et al., 2017; Vogt-Schilb and Hallegatte, 2017; Kriegler et al., 2018b; Michaelowa et al., 2018)	Geels et al., 2017; Kuramochi et al., 2017; Rockström et al., 2017; Vogt-Schilb and Hallegatte, 2017; Kriegler et al., 2018a; Michaelowa et al., 2018
2	74 : 33		Kriegler et al., 2018b	Kriegler et al., 2018a
2	74 : 39		Carbon pricing,	Explicit Carbon pricing,
2	74 : 52		Kriegler et al., 2018b	Kriegler et al., 2018a
2	75 : 16		Horizontal issues	Common issues
2	75 : 42		Rogelj et al., 2013	Rogelj et al., 2013b
2	75 : 46		Not strengthening NDCs make it very challenging	Not strengthening NDCs would make it very challenging
2	76 : 11		Somanthan et al., 2014; Bataille et al., 2016a; Mundaca and Markandya, 2016; Baranzini et al., 2017; van den Bergh, 2017; Vogt-Schilb and Hallegatte, 2017; Chan et al., 2018; Holz et al., 2018a; Klinsky and Winkler, 2018; Michaelowa et al., 2018; Patterson et al., 2018	Bataille et al., 2016a; Mundaca and Markandya, 2016; Baranzini et al., 2017; MacDougall et al., 2017; van den Bergh, 2017; Vogt-Schilb and Hallegatte, 2017; Chan et al., 2018; Holz et al., 2018a; Klinsky and Winkler, 2018; Michaelowa et al., 2018; Patterson et al., 2018
2	77 : 15		For example, assumptions	For example, in CEA assumptions
2	78 : 8		Nordhaus, 2005	Nordhaus, 2007a
2	78 : 41		10–200 USD2010 tCO2-eq–1 in 2030, 45–960 USD2010 tCO2-eq –1 in 2050, 120–1000 USD2010 tCO2-eq –1 in 2070 and 160–2125	15–220 USD2010 tCO2-eq−1 in 2030, 45–1050 USD2010 tCO2-eq-1 in 2050, 120–1100 USD2010 tCO2-eq-1 in 2070 and 175–2340
2	78 : 43		5500 USD2010 tCO2-eq –1 in 2030, 245–13000 USD2010 tCO2-eq –1 in 2050, 420–17500 USD2010 tCO2-eq –1 in 2070 and 690–27000	6050 USD2010 tCO2-eq−1 in 2030, 245–14300 USD2010 tCO2-eq−1 in 2050, 420–19300 USD2010 tCO2-eq−1 in 2070 and 690–30100

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2	78 : 46		One can also observe that values for 1.5°C-low-OS pathway are relatively higher than 1.5°C-high-OS pathway in 2030, but the difference decreases over time.	values for 1.5°C-low-OS pathway are relatively higher than 1.5°C-high-OS pathway in 2030, but the difference decreases over time, particularly between 2050 and 2070.
2	78 : 48		assuming a 5% annual discount rate	assuming a 5% annual discount rate, comparing to Below-1.5°C and 1.5°C-low-OS pathways
2	79 : 47		Nordhaus, 2007	Nordhaus, 2007b
2	80 : 3		Kriegler et al., 2018b	Kriegler et al., 2018a
2	80 : 14		carbon pricing,	explicit carbon pricing,
2	80 : 23		the price of carbon is central to prompt mitigation pathways compatible with 1.5°C-consistent	an explicit carbon pricing mechanism is central to prompt mitigation scenarios compatible with 1.5°C
2	81 : 12		requires	would require
2	82 : 18			Second, additional annual average energy-related investments for the period 2016 to 2050 in pathways limiting warming to 1.5°C compared to the baseline (i.e., pathways without new climate policies beyond those in place today) are estimated by the models employed in McCollum et al. (2018) to be around 830 billion USD2010 (range of 150 billion to 1700 billion USD2010 across six models). This compares to total annual average energy supply investments in 1.5°C pathways of 1460 to 3510 billion USD2010 and total annual average energy demand investments of 640 to 910 billion USD2010 for the period 2016 to 2050. Total energy- related investments increase by about 12% (range of 3% to 24%) in 1.5°C pathways relative to 2°C pathways. Average annual investment in low-carbon energy technologies and energy efficiency are upscaled by roughly a factor of six (range of factor of 4 to 10) by 2050 compared to 2015.
2	82 : 56		will	would
2	84 : 51		a large portion to	either a large portion or all
2	91 : 38		For example, a high-demand pathway increases	In particular, a pathway with high energy demand would increase
3	6 : 22		evidence that global warming has led to ...{3.3.1, 3.3.2, 3.3.3, 3.3.4}	evidence that human-induced global warming has led to ... {3.3.1, 3.3.2, 3.3.3, 3.3.4, Box 3.4}
3	6 : 34		and the nature of the regional and sub-regional risks (high confidence).	and the nature of the regional and sub-regional risks.
3	6 : 44		Substantial global differences in temperature and extreme events	Robust global differences in temperature means and extremes.
3	7 : 1		are higher	are projected to be higher
3	7 : 2		are higher	also projected to be higher
3	7 : 3			Robust increases in temperature means and extremes are also projected at 1.5°C compared to present-day values (high confidence) {3.3.1, 3.3.2}.
3	7 : 3		There are also substantial increases in temperature means and extremes at 1.5°C versus present (high confidence) {3.3.1, 3.3.2}.	There are decreases in the occurrence of cold extremes, but substantial increases in their temperature, in particular in regions with snow or ice cover (high confidence) {3.3.1}.
3	7 : 6		Particularly large differences are found	Large, robust and widespread differences are expected
3	7 : 10		found	projected to occur
3	7 : 12		increase	are expected to increase

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3	7 : 19		Limiting global warming to 1.5°C limits risks of increases in heavy precipitation events in several regions (high confidence).	Limiting global warming to 1.5°C would limit risks of increases in heavy precipitation events on a global scale and in several regions compared to conditions at 2°C global warming (medium confidence).
3	7 : 28		are substantially	are projected to be substantially
3	7 : 31		are lower	are expected to be lower
3	7 : 32		magnitudes of climate change,	magnitudes of climate change, associated with a 1.5°C temperature increase
3	7 : 34		Reduced rates of change enhance the ability of natural and human systems to adapt, with substantial benefits for a range of terrestrial, wetland, coastal and ocean ecosystems (including coral reefs and wetlands), freshwater systems, as well as food production systems, human health, tourism, energy systems, and transportation {3.3.1, 3.4}.	Lower rates of change enhance the ability of natural and human systems to adapt, with substantial benefits for a wide range of terrestrial, freshwater, wetland, coastal and ocean ecosystems (including coral reefs) (high confidence), as well as food production systems, human health, and tourism (medium confidence), together with energy systems and transportation (low confidence). {3.3.1, 3.4}
3	8 : 6		There is high confidence that the probability of a sea-ice-free Arctic Ocean during summer is substantially higher at 2°C when compared to 1.5°C. It is very likely that there will be at least one sea-ice-free Arctic summer out of 10 years for warming at 2°C, with the frequency decreasing to one sea-ice-free Arctic summer every 100 years at 1.5°C. There is also high confidence that an intermediate temperature overshoot will have no long-term consequences for Arctic sea-ice coverage and that hysteresis behaviour is not expected {3.3.8, 3.4.4.7}.	the probability of a sea-ice-free Arctic Ocean during summer is substantially higher at 2°C compared to 1.5°C of global warming (medium confidence). Model simulations suggest that at least one sea-ice-free Arctic summer is expected every 10 years for global warming of 2°C, with the frequency decreasing to one sea-ice-free Arctic summer every 100 years under 1.5°C (medium confidence). an intermediate temperature overshoot will have no long-term consequences for Arctic seaice coverage, and hysteresis is not expected (high confidence). {3.3.8, 3.4.4.7}
3	8 : 20		under 1.5° to 2°C of global warming {3.3.9, 3.6.3}.	at around 1.5°C to 2°C of global warming. {3.3.9, 3.4.5, 3.6.3}
3	8 : 30		There are larger risks	larger risks are expected
3	9 : 7		has strong benefits	is projected to have many benefits
3	9 : 25		water temperatures will	water temperatures are expected to
3	9 : 28		will	are projected to
3	9 : 29		of warmer water coral reefs that exist today (70-90%) will largely disappear when global warming exceeds	(70–90%) of warm water (tropical) coral reefs that exist today will disappear even if global warming is constrained to
3	9 : 31		will be reduced at 1.5ºC	are expected to be reduced at 1.5°C
3	10 : 11		and regions.	and regions (medium confidence).
3	10 : 15		International food trade is likely to be a potential adaptation response for alleviating hunger	Future economic and trade environments and their response to changing food availability (medium confidence) are important potential adaptation options for reducing hunger risk
3	10 : 18		Fisheries and aquaculture are important to global food security but are already facing increasing risks from ocean warming and acidification (medium confidence), which will increase at 1.5°C global warming. Risks are increasing for marine aquaculture and many fisheries at warming and acidification at 1.5°C (e.g., many bivalves such as oysters, and fin fish; medium confidence), especially at low latitudes (medium confidence).	Fisheries and aquaculture are important to global food security but are already facing increasing risks from ocean warming and acidification (medium confidence). These risks are projected to increase at 1.5°C of global warming and impact key organisms such as fin fish and bivalves (e.g., oysters), especially at low latitudes (medium confidence).
3	10 : 22		are at a high risk at 1.5°C	are expected to face growing risks at 1.5°C of warming
3	10 : 23		become greater	are projected to become greater
3	10 : 28		5oC (robust evidence, high agreement).	5°C (high confidence).
3	10 : 31		(robust evidence, high agreement)	(high confidence).

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3	10 : 34		medium evidence, high agreement	high confidence
3	10 : 34		results in adverse impacts, for example on biodiversity or food production, depends on the existence and effectiveness of measures to conserve land carbon stocks, measures to limit agricultural expansion so as to protect natural ecosystems, and the potential to increase agricultural productivity (high agreement, medium evidence	would result in adverse impacts, for example on biodiversity or food production, depends on the existence and effectiveness of measures to conserve land carbon stocks, measures to limit agricultural expansion in order to protect natural ecosystems, and the potential to increase agricultural productivity (medium agreement
3	11 : 34		The largest reductions in growth at 2°C compared to 1.5 °C of warming are projected for low- and middle-income countries and regions (the African continent, southeast Asia, India, Brazil and Mexico) (limited evidence, medium confidence){3.5}.	The largest reductions in economic growth at 2°C compared to 1.5 °C of warming are projected for low- and middle-income countries and regions (the African continent, southeast Asia, India, Brazil and Mexico) (low to medium confidence). Countries in the tropics and Southern Hemisphere subtropics are projected to experience the largest impacts on economic growth due to climate change should global warming increase from 1.5°C to 2°C (medium confidence). {3.5}
3	12 : 5		are lower compared to	projected to be lower compared to
3	12 : 8		increase	are projected to increase
3	12 : 16		are critically important in sensitive	are projected to be critically important in vulnerable
3	12 : 18		these effects {3.4.5.4}.	these effects.
3	12 : 19		{3.4.5.3, 3.4.5.7, Box 3.5, 5.4.5.4}.	{3.4.5.3, 3.4.5.4, 3.4.5.7, 5.4.5.4, Box 3.5}
3	12 : 23		and deltaic regions.	and deltaic regions. (medium confidence).
3	13 : 12		3ºC	3.6°C
3	13 : 15		as opposed to 1.9°C	as opposed to at 1.6°C
3	15 : 16		A detailed analysis of detection and attribution is not provided.	A detailed analysis of detection and attribution is not provided but will be the focus of the next IPCC assessment report (AR6).
3	20 : 10		Schleussner et al., 2016b),	Schleussner et al., 2017)
3	23 : 4		differences	robust differences
3	23 : 9		Projections for precipitation are more uncertain, but highlight significant increases in mean precipitation in the Northern Hemisphere high latitudes at 2°C versus 1.5°C global warming (medium confidence) (Figure 3.3).	Projections for precipitation are more uncertain, but they highlight robust increases in mean precipitation in the Northern Hemisphere high latitudes at 1.5°C global warming versus pre-industrial conditions, as well as at 2°C global warming versus pre-industrial conditions (high confidence) (Figure 3.3). There are consistent but less robust signals when comparing changes in mean precipitation at 2°C versus 1.5°C of global warming. Hence, it is assessed that there is medium confidence in an increase of mean precipitation in high-latitudes at 2°C versus 1.5°C of global warming (Figure 3.3).
3	23 : 12		Figure 3.4 displays changes in temperature extremes (the hottest day of the year, TXx, and the coldest day of the year TNn) and heavy precipitation (the annual maximum 5-day precipitation, Rx5day).	Figure 3.4 displays changes in temperature extremes (the hottest daytime temperature of the year, TXx, and the coldest night-time temperature of the year, TNn) and heavy precipitation (the annual maximum 5-day precipitation, Rx5day).
3	23 : 15		Differences at 1.5°C versus 2°C are significant across the globe.	Differences in TXx and TNn compared to pre-industrial climate are robust at both global warming levels. Differences in TXx and TNn at 2°C versus 1.5°C of global warming are robust across most of the globe.

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3	23 : 16		Changes in heavy precipitation are less robust, but display particularly strong differences in the high latitudes.	Changes in heavy precipitation are less robust, but particularly strong increases are apparent at high latitudes as well as in the tropics at both 1.5°C and 2°C of global warming compared to pre-industrial conditions. The differences in heavy precipitation at 2°C versus 1.5°C global warming are generally not robust at grid-cell scale, but they display consistent increases in most locations (Figure 3.4). However, as addressed in Section 3.3.3, statistically significant differences are found in several large regions and when aggregated over the global land area. We thus assess that there is high confidence regarding global-scale differences in temperature means and extremes at 2°C versus 1.5°C global warming, and medium confidence regarding global-scale differences in precipitation means and extremes. Further analyses, including differences at 1.5°C and 2°C global warming versus 1°C (i.e., present-day) conditions are provided in the Supplementary Material 3.SM.2
3	23 : 26		Note that the responses at 1.5°C Global Mean Surface Temperature (GMST) warming are similar for RCP2.6 simulations (see Supplemantary Material 3.SM.2).	Note that the responses at 1.5°C of global warming are similar for RCP2.6 simulations (see Supplementary Material 3.SM.2).
3	23 : 27			Differences compared to 1°C of global warming are provided in the Supplementary Material 3.SM.2.
3	24 : 1		Projected change in extreme at 1.5°C global warming (left) and 2°C global warming (middle) compared to pre-industrial time period (1861-1880), and difference (right; hatching highlights areas in which 2/3 of the models agree on the sign of change): temperature of annual hottest day, TXx (top), and annual coldest day, TNn, (middle), and annual maximum 5-day precipitation, Rx5day (bottom).	Projected changes in extremes at 1.5°C (left) and 2°C (middle) of global warming compared to the pre-industrial period (1861–1880), and the difference between 1.5°C and 2°C of global warming (right). Cross-hatching highlights areas where at least two-thirds of the models agree on the sign of change as a measure of robustness (18 or more out of 26): temperature of annual hottest day (maximum temperature), TXx (top), and temperature of annual coldest night (minimum temperature), TNn (middle), and annual maximum 5-day precipitation, Rx5day (bottom).
3	24 : 8		Global Mean Surface Temperature (GMST)	of global
3	24 : 9			Differences compared to 1°C of global warming are provided in the Supplementary Material 3.SM.2.
3	25 : 11		several types of hazards.	several types of hazards (high confidence).
3	25 : 14		Amir et al., 2014;	AghaKouchak et al.,
3	25 : 35		There is also (likely) that consistent changes	There is also high confidence (likely) that consistent changes
3	26 : 4		Supplemantary Material 3.SM Annex 3-3 (Figure S3.63.SM.6)	Supplementary Material 3.SM, Figure 3.SM.6. It should be noted that assessments of attributed changes in the IPCC SREX and AR5 reports were generally provided since 1950, for time frames also approximately corresponding to a 0.5°C global warming (3.SM
3	26 : 15		(e.g., Dosio et al., 2018)	(e.g., Dosio et al., 2018; Kjellström et al., 2018)
3	26 : 45		(Figures 3.4 and 3.5).	(Figures 3.4 and 3.5) (medium confidence).
3	26 : 46		a reduction in evaporative cooling and thus added warming in the projections.	a reduction in evaporative cooling in the projections.

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3	27 : 12		For the NHD, the largest differences are found in the tropics due to the lower interannual temperature variability (Mahlstein et al., 2011), and despite the tendency for higher absolute changes in hot temperature extremes in mid-latitudes (Figures 3.4 and 3.5).	For the NHD, the largest differences are found in the tropics (high confidence), owing to the low interannual temperature variability there (Mahlstein et al., 2011), although absolute changes in hot temperature extremes tended to be largest at mid-latitudes (high confidence) (Figures 3.4 and 3.5).
3	27 : 46			For this reason, we assess that there is medium confidence in their conclusions.
3	28 : 1		In summary, there are statistically significant differences in temperature means and extremes at 1.5°C versus 2°C global warming, both in the global average as well as in near all land regions1 and the ocean (likely).	In summary, there is high confidence that there are robust and statistically significant differences in the projected temperature means and extremes at 1.5°C versus 2°C of global warming, both in the global average and in nearly all land regions4 (likely).
3	28 : 4		warming of 2°C versus 1.5°C leads	global warming of 2°C versus 1.5°C would lead
3	28 : 7		happens	are projected
3	28 : 9		Extreme hot days in mid-latitudes display an up to two-fold higher warming than the GMST (likely).	Temperature increases of Extreme hot days in mid-latitudes are projected to be up to two times the increase in GMST, that is, 3°C at 1.5°C GMST warming (high confidence).
3	28 : 11		(likely).	(medium confidence).
3	28 : 13		(likely).	(medium confidence).
3	28 : 16		(likely). The NHD shows the largest differences between 1.5°C and 2.0°C in the tropics because of their low interannual temperature variability (likely); the emergence of extreme heatwaves is thus earliest in these regions, where they become already widespread at 1.5°C global warming (high confidence).	(high confidence). NHD shows the largest differences between 1.5°C and 2°C in the tropics, because of the low interannual temperature variability there (high confidence); extreme heatwaves are thus projected to emerge earliest in these regions, and they are expected to become widespread already at 1.5°C of global warming (high confidence).
3	30 : 13			Differences compared to 1°C global warming are provided in the Supplementary Material 3.SM.2.
3	31 : 13			White shading indicates when an index is the same at the two global warming levels (i.e., zero changes).
3	32 : 16		robust increases in observed precipitation extremes can be identified for annual maximum 1-day precipitation (RX1day) and consecutive 5-day precipitation (RX5day) for GMST changes of this magnitude (	increases in precipitation extremes can be identified for annual maximum 1-day precipitation (RX1day) and consecutive 5-day precipitation (RX5day) for GMST changes of this magnitude (Supplementary Material 3.SM.2, Figure 3.SM.7; Schleussner et al., 2017). It should be noted that assessments of attributed changes in the IPCC SREX and AR5 reports were generally provided since 1950, for time frames also approximately corresponding to a 0.5°C global warming (3.SM).

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	32 : 22		Figure 3.3 (Section 3.3.1) summarizes the projected changes in mean precipitation at 1.5°C versus 2°C. Some regions display substantial changes in mean precipitation between 1.5°C versus 2°C global warming, in particular decreases in the Mediterranean area, including Southern Europe, the Arabian Peninsula and Egypt. Some studies are also available for other regions across the world.	Figure 3.3 in Section 3.3.1 summarizes the projected changes in mean precipitation at 1.5°C and 2°C of global warming. Both warming levels display robust differences in mean precipitation compared to the pre-industrial period. Regarding differences at 2°C vs 1.5°C global warming, Some regions are projected to display changes in mean precipitation at 2°C compared with that at 1.5°C of global warming in the CMIP5 multimodel average, such as decreases in the Mediterranean area, including Southern Europe, the Arabian Peninsula and Egypt, or increases in high latitudes. The results, however, are less robust across models than for mean temperature.
3	32 : 47		The differences in heavy precipitation are generally small between 1.5°C and 2°C global warming	Robust changes in heavy precipitation compared to pre-industrial conditions are found at both 1.5°C and 2°C global warming
3	33 : 1		3.9 and Supplemantary Material 3.SM.2 Figure 3.SM.10). Some regions display substantial increases, for instance in Southern Asia, but generally in less than 2/3 of the CMIP5 models (Supplemantary Material 3.SM.2, Figure 3.SM.10). Wartenburger et al. (2017) suggests that for Eastern Asia, there are substantial differences in heavy precipitation at 1.5°C versus 2°C.	3.4). This is also consistent with results for, for example, the European continent, although different indices for heavy precipitation changes have been analysed.
3	33 : 6		Based on regional climate simulations, Vautard et al. (2014) found a robust increase in heavy precipitation everywhere in Europe and in all seasons, except Southern Europe in summer, consistent with the analysis of Jacob et al. (2014) which used more recent downscaled climate scenarios (EURO-CORDEX) and a higher resolution (12km) for +2°C global warming.	Based on regional climate simulations, Vautard et al. (2014) found a robust increase in heavy precipitation everywhere in Europe and in all seasons, except Southern Europe in summer at 2°C versus 1971–2000. Their findings are consistent with those of Jacob et al. (2014), who used more recent downscaled climate scenarios (EURO-CORDEX) and a higher resolution (12 km), but the change is not so pronounced in Teichmann et al. (2018).
3	33 : 7		There is a consistent agreement in the direction of change for +1.5°C global warming over much of Europe (Jacob et al., 2018). While there are variations between regions, the global tendency for heavy precipitation suggests an increase at 2°C versus 1.5°C (see also Fischer and Knutti, 2015), and Kharin et al., 2018), Figure 3.10, as well as Betts et al., 2018).	There is consistent agreement in the direction of change in heavy precipitation at 1.5°C of global warming over much of Europe, compared to 1971–2000 (Jacob et al., 2018).
3	33 : 13			Differences in heavy precipitation are generally projected to be small between 1.5°C and 2°C GMST warming (Figure 3.4 and 3.9 and Supplementary Material 3.SM.2, Figure 3.SM.10). Some regions display substantial increases, for instance southern Asia, but generally in less than two-thirds of the CMIP5 models (Figure 3.4, Supplementary Material 3.SM.2, Figure 3.SM.10). Wartenburger et al. (2017) suggested that there are substantial differences in heavy precipitation in eastern Asia at 1.5°C versus 2°C. Overall, while there is variation among regions, the global tendency is for heavy precipitation to increase at 2°C compared with at 1.5°C (see e.g., Fischer and Knutti, 2015 and Kharin et al., 2018, as illustrated in Figure 3.10 from this chapter; see also Betts et al., 2018).
3	33 : 37		likely	high confidence

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	33 : 38		Several regions display statistically significant differences in heavy precipitation at 1.5°C vs. 2°C warming (with stronger increase at 2°C), and there is a global tendency towards increases in heavy precipitation on land between these two temperature levels (likely).	Several large regions display statistically significant differences in heavy precipitation at 1.5°C versus 2°C GMST warming, with stronger increases at 2°C global warming, and there is a global tendency towards increases in heavy precipitation on land at 2°C compared with 1.5°C warming (high confidence).
3	36 : 1		(see Figure 3.3 for definition).	(see Figure 3.2 for definition).
3	36 : 11		(likely)	high confidence in observed
3	36 : 47		display	are projected to display
3	37 : 13		is mainly driven	is expected to be mainly driven
3	39 : 11		The analysis for the mean response is also qualitatively consistent with results from Wartenburger et al. (2017)	The findings from the analysis for the mean response by Greve et al. (2018) are qualitatively consistent with results from Wartenburger et al. (2017)
3	40 : 3		and decreases in P-E	and/or decreases in P-E
3	41 : 14		Overall the available literature, consistent with this analysis, reports particularly strong increases in dryness and decreases in water availability in Southern Europe and the Mediterranean when shifting from a 1.5°C to a 2°C global warming (Schleussner et al., 2016b; Lehner et al., 2017; Wartenburger et al., 2017; Greve et al., 2018; Samaniego et al., 2018; Figure 3.13). The fact that this is a region that is also already displaying substantial drying in the observational record (Seneviratne et al., 2012; Sheffield et al., 2012; Greve et al., 2014; Gudmundsson and Seneviratne, 2016; Gudmundsson et al., 2017) provides additional evidence supporting this tendency, suggesting that it is a hot spot of dryness change above 1.5°C (see also Box 3.2).	Consistent with this analysis, the available literature particularly supports robust increases in dryness and decreases in water availability in Southern Europe and the Mediterranean with a shift from 1.5°C to 2°C of global warming (medium confidence) (Figure 3.13; Schleussner et al., 2016b; Lehner et al., 2017; Wartenburger et al., 2017; Greve et al., 2018; Samaniego et al., 2018). This region is already displaying substantial drying in the observational record (Seneviratne et al., 2012; Sheffield et al., 2012; Greve et al., 2014; Gudmundsson and Seneviratne, 2016; Gudmundsson et al., 2017), which provides additional evidence supporting this tendency and suggests that it will be a hotspot of dryness change at global warming levels beyond 1.5°C (see also Box 3.2).
3	41 : 22		and South Africa at 2°C versus 1.5°C global warming, because these regions display significant changes in two dryness indicators (CDD and SMA) at these two global warming levels (Figure 3.14	and Southern Africa at 2°C versus 1.5°C of global warming because these regions display significant changes in two dryness indicators (CDD and SMA) between these two global warming levels (Figure 3.14); the strongest effects are expected for extreme droughts (medium confidence) (Figure 3.12).
3	41 : 26		However, in many regions, there is medium confidence that most extreme risks of changes in dryness are avoided at 2°C versus 1.5°C (Figure 3.12).	However, in many regions there is medium confidence that most extreme risks of changes in dryness are avoided if global warming is constrained at 1.5°C instead of 2°C (Figure 3.12).
3	42 : 26		can	could
3	43 : 43		Zhai et al., 2017	Zhai et al., 2018
3	44 : 10		in the majority of the basins	
3	44 : 13		.	(Betts et al. 2018).
3	44 : 23		will decrease	is projected to decrease
3	47 : 23		Wehner et al. 2017	Wehner et al. 2018a
3	48 : 7		become	are projected to become greater
3	48 : 12		is to be	would be clearly
3	48 : 21		, AR5 Chapter 30	
3	48 : 30			(Section 3.5.2.5).
3	48 : 31			(Section 3.3.6)

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	48 : 34		, as induced by higher rates of continental warming compared to the surrounding oceans under climate change,	
3	48 : 43		likely to occur.	projected to occur (medium confidence).
3	49 : 3		by 30% since the late 1950s (Srokosz and Bryden, 2015; Caesar et al., 2018).	since the late 1950s (Rahmstorf et al., 2015b; Srokosz and Bryden, 2015; Caesar et al., 2018).
3	49 : 14			(summer)
3	49 : 31		The Arctic is very likely to have experienced at least one ice-free Arctic summer after about 10 years of stabilized warming at 2°C compared to after about 100 years of stabilized warming at 1.5°C	Model simulationssuggest that there will be at least one sea ice-free Arctic summer after approximately 10 years of stabilized warming at 2°C, as compared to one sea ice-free summer after 100 years of stabilized warming at 1.5°C above pre-industrial temperatures
3	49 : 47		disappears	would disappear
3	50 : 29		very likely	medium confidence
3	50 : 32			with regrowth on decadal time scales
3	53 : 6			(high confidence).
3	53 : 27		temperature in the tropics changed little.	temperature in the tropics changed little (Marcott et al., 2013).
3	55 : 5			. (Adapted from Fischer et al., 2018.)
3	55 : 13		Ocean chemistry is also changing with global temperature, with impacts projected at 1.5°C and, more so, at 2°C (high agreement, medium evidence).	Ocean chemistry is changing alongside increasing global temperature, with impacts projected at 1.5°C and, more so, at 2°C of global warming (Doney et al., 2014) (medium to high confidence).
3	55 : 19		has been absorbed by the ocean where it has combined with water to produce a dilute acid that dissociates and drives ocean acidification (Cao et al., 2007; Stocker et al., 2013).	has been absorbed by the upper layers of the ocean, where it has combined with water to produce a dilute acid that dissociates and drives ocean acidification (high confidence) (Cao et al., 2007; Stocker et al., 2013).
3	55 : 25		Ocean acidification is most pronounced where temperatures are lowest (e.g. Polar regions) or where CO2-rich water is brought to the ocean surface by upwelling (Feely et al., 2008).	Ocean acidification is a result of increasing CO2 in the atmosphere (very high confidence) and is most pronounced where temperatures are lowest (e.g., Polar regions) or where CO2-rich water is brought to the ocean surface by upwelling (Feely et al., 2008).
3	55 : 32		although these are poorly understood (	although they are currently poorly documented and understood (low confidence)
3	55 : 46		(i.e. evaporation and inundation)	(i.e., precipitation versus evaporation)
3	56 : 12	Table 3.2 / 3 : 06	[Section 3.3.3]	[Section 3.3.3 AR5 Chapter 10 (Bindoff et al., 2013a)]
3	56 : 12	Table 3.2 / 6 : 06	(…) when averaded on global on land at 2°C versus 1.5°C *(high confidence)*	(…) when averaged over global land, with positive trends in several regions *(medium confidence)*
3	56 : 12	Table 3.2 / 6 : 06	(…) heavy precipitation at 2°C warming versus 1.5°C *(high confidence)*	heavy precipitation at 2°C versus 1.5°C *(medium confidence)*
3	56 : 12	Table 3.2 / 6 : 08	(…) and South Africa at 2°C versus 1.5°C global warming.	and Southern Africa.
3	56 : 12	Table 3.2 / 2 : 12	*High confidence* in observed warming of upper ocean, with slightly lower rates tha global warming	Observed warming of upper ocean, with slightly lower rates tha global warming *(virtually certain)*
3	56 : 12	Table 3.2 / 3 : 12		[Section 3.3.7]
3	56 : 12	Table 3.2 / 4 : 12		[Section 3.3.7]
3	56 : 12	Table 3.2 / 4 : 13	*(very likely)*	*(medium confidence)*
3	56 : 12	Table 3.2 / 5 : 13	*(very likely)*	*(medium confidence)*
3	56 : 12	Table 3.2 / 6 : 13	*(high confidence)*	*(medium confidence)*
3	56 : 12	Table 3.2 / 2 : 15	(…) in the last 35 Ma	in the last 65 Ma

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	56 : 12	Table 3.2 / 3 : 15	*It is very likely* that oceanic uptake of anthropogenic CO_2 has resulted in acidification of surface waters.	The oceanic uptake of anthropogenic CO_2 has resulted in acidfication of surface waters *(very high confidence)*
3	56 : 12	Table 3.2 / 4 : 15	(…) and, more so, at 2°C *(high agreement, medium evidence)*	and, more so, at 2°C warming *(high confidence)*
3	62 : 16		can	could
3	62 : 17		In particular, risks were observed by AR5 to be increasing for natural ecosystems as climate extremes increase in frequency and intensity, as well as those associated with fauna and flora shifting their biogeographical ranges to higher latitudes and altitudes, with consequences for ecosystem services and human dependence.	In particular, AR5 attributed observed impacts in natural ecosystems to anthropogenic climate change, including changes in phenology, geographic and altitudinal range shifts in flora and fauna, regime shifts and increased tree mortality, all of which can reduce ecosystem functioning and services thereby impacting people.
3	62 : 32		Cramer et al., 2014	Oppenheimer et al., 2014
3	62 : 41		understanding	an improved understanding
3	63 : 6		Vörösmarty et al., 2010	Jiménez Cisneros et al., 2014
3	63 : 31		(medium evidence, medium agreement)	(medium confidence)
3	63 : 34		will be exposed	would be exposed
3	64 : 10		are available. Hanasaki et al. (2013) conclude that the projected ranges of changes in global irrigation water withdrawal with human configuration fixing non-meteorological variables at about 2000 are 1.1–2.3% at about 1.5ºC, which is projected by Geophysical Fluid Dynamic Laboratory (GFDL) model (Representative Concentration Pathway (RCP)2.6 in 2071-2100 and RCP4.5 in 2011-2040), and 0.6–2.0% at about 2ºC according to the projection using the Hadley Centre New Global Environmental Model (HadGEM) and Model for Interdisciplinary Research on Climate (MIROC) models (RCP4.5 and RCP8.5 in 2011-2040, respectively).	is available.
3	64 : 21		will have the most positive impacts on production.	are projected to experience the most positive impacts on hydropower production.
3	64 : 22		can	could
3	64 : 24		will decrease hydropower potential below 10%, while limiting to 1.5°C warming will	is projected to decrease hydropower potential below 10%, while limiting global warming to 1.5°C would
3	64 : 31		will have the largest reduction at 2°C	are projected to have the largest reduction at 2°C
3	64 : 36		will be substantial divergence in water withdrawal for thermal power plant cooling under a condition in which the distribution of future cooling technology for energy generation is fixed, whereas adopting alternative cooling technologies and water resources will	would be substantial divergence in water withdrawal for thermal power plant cooling under conditions in which the distribution of future cooling technology for energy generation is fixed, whereas adopting alternative cooling technologies and water resources would
3	65 : 14		limited evidence, medium agreement	low to medium confidence
3	65 : 19		high confidence), and in flood hazard in some regions (high confidence), can be expected at warming of 1.5°C level with an overall increase in the area affected by flood hazard at 2°C (high confidence)	medium confidence), and in flood hazard in some regions (medium confidence), can be expected at global warming of 1.5°C, with an overall increase in the area affected by flood hazard at 2°C (medium confidence)
3	65 : 23		can be larger in some region (Arnell and Lloyd-Hughes, 2014; Winsemius et al., 2016; Alfieri et al., 2017; Arnell et al., 2018; Kinoshita et al., 2018) (limited evidence, medium agreement	could be larger in some regions (Arnell and Lloyd-Hughes, 2014; Winsemius et al., 2016; Alfieri et al., 2017; Arnell et al., 2018; Kinoshita et al., 2018)

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	65 : 31		in European states, specifically Central and Western Europe, and found that the population affected can	using three case studies in European states, specifically Central and Western Europe, and found that the population affected could
3	65 : 40		are larger than the variation between the extent	is projected to be larger than variation between the two levels
3	65 : 45		is	could be
3	66 : 1		under 1.5ºC can be reduced compared to the hazards at 2ºC	at 1.5°C could be reduced compared to the hazards at 2°C in some regions, in particular in the Mediterranean region and southern Africa
3	66 : 3		5ºC (Smirnov et al., 2016; Sun et al., 2017; Arnell et al., 2018; Liu et al., 2018) (limited evidence, medium agreement).	5°C (low to medium confidence) (Smirnov et al., 2016; Sun et al., 2017; Arnell et al., 2018; Liu et al., 2018).
3	66 : 10		and around the globe for 1.5ºC and 2ºC warming using the SSP1 population scenario, compared to the baseline period of 1986-2005, and conclude that urban population exposure in most regions can	around the globe for 1.5°C and 2°C of warming using the SSP1 population scenario compared to the baseline period of 1986–2005 based on the Palmer Drought Severity Index (PDSI). They concluded that the drought exposure of urban populations in most regions would
3	66 : 14		will be exposed to severe droughts in Central Europe, Southern Europe, the Mediterranean, West Africa, East and West Asia and Southeast Asia, and the number of the affected people will escalate further in these regions at 2ºC.	would be exposed to severe droughts at 1.5°C in Central Europe, Southern Europe, the Mediterranean, West Africa, East and West Asia, and Southeast Asia, and that number of affected people would increase further in these regions at 2°C. However, it should be noted that the PDSI is known to have limitations (IPCC SREX, Seneviratne et al., 2012), and drought projections strongly depend on considered indices (Section 3.3.4); thus only medium confidence is assigned to these projections.
3	66 : 16		the proportion of the population exposed to droughts at 1.5ºC is projected to be reduced by 30.4%, but increased by 74.8% at 2°C relative to 339.65 million people in the 1986–2005 period	a study has suggested that the proportion of the population exposed to droughts is projected to be reduced by 30.4% at 1.5°C but increased by 74.8% at 2°C relative to the baseline value of 339.65 million people in the 1986–2005 period, when assessing changes in droughts using the Standardized Precipitation-Evaporation Index, using a Penman–Monteith estimate of potential evaporation
3	66 : 42		robust evidence, high agreement	high confidence
3	67 : 2		5ºC (limited evidence, low agreement)	5°C (low confidence)
3	67 : 7		is	would be
3	67 : 16		medium evidence, high agreement;	medium to high confidence
3	67 : 25		Bonte and Zwolsman, 2010; Hosseini et al., 2017) (limited evidence, low agreement	low confidence) (Bonte and Zwolsman, 2010; Hosseini et al., 2017
3	67 : 43		limited evidence, medium agreement	low to medium confidence
3	68 : 7		limited evidence, low agreement	low confidence
3	68 : 12			Cross-Chapter Box 6 in this chapter,
3	70 : 44		a few days of advance in spring phenology	advance in spring phenology (high confidence) by perhaps a few days (medium confidence)
3	71 : 10		IUCN (2017)	IUCN (2018)
3	71 : 26		(Warren et al., 2018b)	(Warren et al., 2018a) (medium confidence).
3	72 : 14		(medium confidence).	(high confidence).
3	72 : 44		CO2 will	atmospheric CO2 concentrations are expected to
3	72 : 47		CO2 and climate	elevated CO2 and altered climate
3	73 : 2		decomposition processes	increase the rate of decomposition

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3	73 : 4		The net effect of climate change	The projected net effect of climate change
3	73 : 16		Figure 3.16	Figure 3.17
3	73 : 27		will	are projected to
3	73 : 34		will increase with temperature,	is expected to increase with increasing temperature, thus
3	73 : 35		will	is expected to
3	75 : 4		approximately 2 million km2 of permafrost compared with stabilisation at 2°C (Chadburn et al., 2017), but the timescale for release of thawed carbon as CO2 or CH4 is likely to	the thawing of approximately 1.5 to 2.5 million km2 of permafrost (medium confidence) compared with stabilization at 2°C (Chadburn et al., 2017), but the time scale for release of thawed carbon as CO2 or CH4 should
3	75 : 10		global warming).Long-term absence of snow reduces vascular plant cover in the understorey by 92%, reduces fine root biomass by 39% (Blume-Werry et al., 2016)	of global warming).
3	75 : 16			Particularly vulnerable regions are Central and South America, Mediterranean Basin, South Africa, South Australia where the drought risk will increase (see Figure 3.12).
3	75 : 24		FOOTNOTE 2: *The approximate temperatures are derived from (Figure 10.5 panel A, Meehl et al. 2007), which indicates an ensemble average projection of 0.7 ºC or 3ºC above 1980-1999, which is itself 0.5ºC above pre-industrial) (Figure 10.5 panel A, Meehl et al. 2007).*	Footnote 6: *The approximate temperatures are derived from Figure 10.5a in Meehl et al. (2007), which indicates an ensemble average projection of 0.7°C or 3°C above 1980–1999 temperatures, which were already 0.5°C above pre-industrial values.*
3	76 : 12			for tropical rainforests of Central America
3	76 : 18		In the Congo Basin (Dargie et al., 2017) and in the Amazonian Basin (Draper et al., 2014), the peatlands store the equivalent of the	When drained, this carbon is released to the atmosphere. At least 15% of peatlands have drained, mostly in Europe and Southeast Asia, and are responsible for 5% of human derived CO2 emissions (Green and Page, 2017). Moreover, In the Congo Basin (Dargie et al., 2017) and in the Amazonian Basin (Draper et al., 2014), the peatlands store the equivalent carbon as that of a
3	76 : 24		(Herbert et al., 2015).	(Section 3.3.6; Herbert et al., 2015).
3	76 : 37		of biome transformations, species range losses, increased extinction risks (all medium confidence),	or reduction of changes such as biome transformations, species range losses, increased extinction risks (all high confidence)
3	76 : 43		some sources of food, and recreation.	sources of food, and recreation.
3	77 : 33		Hughes and Narayanaswamy, 2013; Levin and Le Bris, 2015; Yasuhara and Danovaro, 2016; Sweetman et al., 2017) (high agreement, robust evidence; Sections 3.3.1.2 and 3.3.7).	high confidence) (Sections 3.3.7; Hughes and Narayanaswamy, 2013; Levin and Le Bris, 2015; Yasuhara and Danovaro, 2016; Sweetman et al., 2017).
3	77 : 38		(high agreement, robust evidence).	(high confidence).
3	77 : 41		(medium agreement, medium evidence).	high confidence)
3	77 : 45		(high agreement, robust evidence).	(very high confidence)
3	78 : 7		agreement, medium evidence;	medium confidence
3	78 : 19		5°C (low agreement, limited evidence).	5°C.
3	78 : 30		decreased (medium agreement, limited evidence; Section 3.3.6	remained the same or decreased (medium confidence)
3	78 : 33		medium agreement, limited evidence;	low to medium confidence
3	78 : 37		(reduced water quality and sediment run-off; high agreement, medium evidence	, such as flooding, reduced water quality and increased sediment runoff (medium-high confidence
3	79 : 4		(high agreement, medium evidence).	high confidence

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3	79 : 19		(medium agreement, medium evidence)	(medium confidence).
3	79 : 29		(medium agreement, limited evidence).	low-medium confidence
3	79 : 31		high agreement, robust evidence	high confidence
3	79 : 34		likely to become greater at 1.5°C and further so at 2°C (medium agreement, medium evidence,	projected to become greater at 1.5°C, and more so at 2°C (medium confidence)
3	79 : 39			(Collins et al., 2013).
3	79 : 41		low agreement, limited evidence	low confidence
3	80 : 3		high agreement, limited evidence	medium confidence
3	80 : 7		high agreement, robust evidence	high confidence
3	80 : 17		reaches the surface from 2030 onwards and with poorly understood impacts and consequences for ocean organisms, ecosystems and people (Orr et al., 2005; Roberts et al., 2008	is projected to reach the surface by 2030 onwards, with a growing list of impacts and consequences for ocean organisms, ecosystems and people (Orr et al., 2005
3	80 : 23		linearly with SST, reaching 1.72°C and a decrease of 0.22 pH units (	while sea temperature will increase, reaching 1.7°C and a decrease of 0.2 pH units (by 2100
3	80 : 24		linear correlation of SST	negative correlation of temperature
3	80 : 30		medium agreement, medium evidence	medium confidence
3	80 : 39		medium agreement, limited evidence	low to medium confidence
3	80 : 45		high agreement, robust evidence) ... (high agreement, robust evidence	high confidence) ...(high confidence
3	81 : 6		, which increase the metabolic rate of coastal microbial communities by supplying greater amounts of organic carbon	as a result of the increased concentration of dissolved nutrients. Increased supply of organic carbon molecules from coastal run-off can also increase the metabolic activity of coastal microbial communities
3	81 : 15		medium agreement, limited evidence	low- medium confidence
3	81 : 21		medium agreement, medium evidence	medium confidence
3	81 : 24		(high agreement, medium evidence)	(high confidence)
3	81 : 28		(high agreement, limited evidence).	(medium confidence).
3	81 : 29		highly likely to reduce the decline in the oxygen concentrations in coastal waters and in hypoxic areas in general	expected to reduce the loss of oxygen in coastal waters and hypoxic areas in general (high confidence)
3	81 : 39		high agreement, robust evidence	high confidence
3	82 : 4		are likely to increase at 1.5°C*	which increase at 1.5°C and further
3	82 : 5			Some of these changes are described briefly here.
3	82 : 8			medium confidence
3	82 : 9		) (medium agreement, medium evidence).	).
3	82 : 9		very likely to stimulate fisheries productivity in high latitude regions by mid-century (	expected to stimulate fisheries productivity in high -latitude regions by mid-century (high confidence) (
3	82 : 14			in turn
3	82 : 24		high agreement, robust evidence	Wong et al., 2014) (high confidence)
3	82 : 28		medium agreement, medium evidence,	medium confidence
3	82 : 33			(e.g., dams)
3	82 : 45		These and other issues and options are explored in Section 3.4.5.	

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3	83 : 11		This section refers heavily to the review, analysis and literature presented in the Supplemantary Material that accompanies this report.	The section draws on the extensive analysis and literature presented in the Supplementary Material of this report (3.SM.3.2, 3.SM.3.3) and has a summary in Figures 3.18 and 3.20 which outline the added relative risks of climate change.
3	83 : 19		(Bell et al., 2011, 2017	(Bell et al., 2011, 2018
3	83 : 35		Present-day risks from climate change (i.e. sea level rise, heat stress, intensifying storms) are medium for seagrass and high to very high for reef building corals (Figure 3.20, Supplemantary Material 3.SM.3.2) with evidence of strengthening of concern since the AR5 and the conclusion that tropical corals may be even more vulnerable to climate change than indicated in assessments done in 2014 (Hoegh-Guldberg et al., 2014; Gattuso et al., 2015).	climate change (e.g., sea level rise, heat stress, storms) presents risk for coastal ecosystems such as seagrass (high confidence) and reef- building corals (very high confidence) (Figure 3.18, Supplementary Material 3.SM.3.2), with evidence of increasing concern since AR5 and the conclusion that tropical corals may be even more vulnerable to climate change than indicated in assessments made in 2014 (Hoegh-Guldberg et al., 2014; Gattuso et al., 2015).
3	83 : 43		has under-estimated climate risks for coral reefs.	may have underestimated climate risks for coral reefs
3	84 : 2		8°C).	8°C; medium confidence).
3	84 : 3		will be moderate, while tropical coral reefs are virtually certain to experience high risks of impacts such as very frequent mass mortalities (at least while populations of corals persist).	are projected to be moderate (Figure 3.18) while tropical coral reefs will have reached a high level of risk as examplified by increasing damage from heat stress since the early 1980s.
3	84 : 8		will remain medium (e.g. risks of not keeping up with SLR; more frequent heat stress mortality) (Figure 3.17).	are projected to remain moderate (e.g., not keeping up with sea level rise, and more frequent heat stress mortality) although there is low certainty as to when or if this important ecosystem is likely to transition to higher levels of additional risk from climate change (Figure 3.18).
3	84 : 11		At the current GMST, tropical coral reefs will reach a very high risk of impact at 2ºC (Figure 3.17) with most available evidence suggesting that coral dominated ecosystems will be non-existent at this temperature or higher (e.g., coral abundance near zero in most locations, intensifying storms ‘flattening’ reefs’ 3-dimensional structure; Alvarez-Filip et al., 2009) (high agreement, robust evidence). Impacts at this point (coupled with ocean acidification) are likely to undermine the ability of tropical coral reefs to provide habitat for the current high levels of biodiversity as well as a range of ecosystem services important for millions of people (e.g., food, livelihoods, coastal protection, cultural services)	Warm water (tropical) coral reefs are projected to reach a very high risk of impact at 1.2°C (Figure 3.18), with most available evidence suggesting that coral -dominated ecosystems will be non-existent at this temperature or higher (high confidence). At this point, coral abundance will be near zero at many locations and storms will contribute to ‘flattening’ the three-dimensional structure of reefs without recovery, as already observed for some coral reefs (Alvarez-Filip et al., 2009). The impacts of warming, coupled with ocean acidification, are expected to undermine the ability of tropical coral reefs to provide habitat for thousand of species, which together provide a range of ecosystem services (e.g., food, livelihoods, coastal protection, cultural services) that are important for millions of people (high confidence)
3	84 : 27		to non-climate stresses is important (Bongaerts et al., 2010; Chollett et al., 2013, 2014; Fine et al., 2013; van Hooidonk et al., 2013; Cacciapaglia and van Woesik, 2015) but see (Chollett et al., 2010; Bongaerts et al., 2017; Beyer et al., 2018; Hoegh-Guldberg et al., 2018).	resulting from other stresses are important (Bongaerts et al., 2010, 2017; Chollett et al., 2010, 2014; Chollett and Mumby, 2013; Fine et al., 2013; van Hooidonk et al., 2013; Cacciapaglia and van Woesik, 2015; Beyer et al., 2018).
3	84 : 30		utility and feasibility of the role of refugia in reducing the loss of ecosystems has yet to be developed (medium agreement, limited evidence	role of refugia in reducing the loss of ecosystems has yet to be developed (low to medium confidence
3	84 : 36		low agreement, limited evidence	low confidence
3	84 : 38			High levels of adaptation are expected to be required to prevent impacts on food security and livelihoods in coastal populations (medium confidence).

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	84 : 38		ecosystems dependent on mangroves, seagrasses and salt marsh such that they are able to shift shoreward as sea levels rise.	changing ecosystems such as mangroves, seagrasses and salt marsh, may offer adaptation strategies as they shift shoreward as sea levels rise (high confidence).
3	84 : 39		will enable	would also assist
3	84 : 46		High levels of adaptation will be required to prevent impacts on food security and livelihoods in general (medium agreement, medium evidence).	
3	85 : 10		) as well as through other food web interactions.	and commercially important species such as tuna.
3	85 : 30		Figure 3.17	Figure 3.18
3	85 : 36		face high risks of impact at 1.5°C and increasing risks of impacts at average global temperatures of 2°C or more above the preindustrial period (medium agreement, medium evidence).	are projected to face high risks of impact at average global temperatures 1.5°C above pre-industrial levels and increasing risks of impacts at 2°C (medium confidence).
3	85 : 40		remain moderate to high except in the case of bivalves (mid latitude) where the risks of impacts become high to very high.	are expected to be moderate to high, except in the case of bivalves (mid-latitudes) where the risks of impacts are projected to be high to very high (Figure 3.18).
3	85 : 45		mortality after exposure (Q.	increased mortality after exposure to these conditions (medium to high confidence) (Q.
3	85 : 46		) (medium agreement, robust evidence).	
3	85 : 47		accumulate at higher temperatures for bivalve molluscs	are expected to accumulate at higher temperatures for bivalve molluscs
3	86 : 1		acquiring medium to high risks of impact (medium agreement, medium evidence) when average global surface temperatures reach 1.3°C above the pre-industrial period, and very high risks at 1.8°C (Figure 3.17; medium agreement, medium evidence).	, which are expected to experience moderate to high risks of impact at 1.3°C of global warming (medium confidence), and very high risks at 1.8°C at low latitudes (medium confidence) (Figure 3.18).
3	86 : 9			(low-medium confidence).
3	86 : 27		oceanography	biology
3	86 : 32		(medium agreement, medium evidence) and coastal upwelling systems (medium agreement, medium evidence, (Lluch-Cota et al., 2014; Sydeman et al., 2014; Bakun et al., 2015) as well as subtropical gyre systems (Signorini et al., 2015, low agreement, limited evidence).	and coastal upwelling systems (medium confidence) (Lluch-Cota et al., 2014; Sydeman et al., 2014; Bakun et al., 2015), as well as subtropical gyre systems (low confidence) (Signorini et al., 2015).
3	86 : 36		(medium agreement, medium evidence).	medium confidence
3	86 : 39		(medium agreement, limited evidence).	(low confidence).
3	86 : 41		remain moderate, while the climate risks associated with reduced coastal protection and recreation on tropical coral reefs are high, especially given the vulnerability of this ecosystem and others (e.g. seagrass, mangroves) to climate change (Figure 3.17	are high (high confidence), while the risks associated with reduced coastal protection and recreation on tropical coral reefs are high, especially given the vulnerability of this ecosystem type, and others (e.g., seagrass and mangroves), to climate change (medium confidence) (Figure 3.18
3	86 : 46		waves and intensifying storms	larger waves and intensifying storms (high confidence)
3	87 : 12		).	(medium confidence).
3	89 : 21		Tropical coral reefs face very high risks (Figure 3.19) of becoming unsustainable as coral dominated ecosystems if warming exceeds 1.5oC.	Warm-water coral reefs face very high risks (Figure 3.18) from climate change.
3	89 : 26		In the last 3 years alone,	In the last three years alone (2016–2018),
3	90 : 2		such as macroalgae	such as macroalgae or seaweeds
3	90 : 9		medium agreement, limited evidence).	low to medium confidence
3	90 : 14		over 2015-	in the summers of 2016–

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	90 : 20		loss of 90% of reef-building corals	loss of 70–90% of reef-building corals
3	90 : 31			(high confidence)
3	90 : 42		will be very challenging	are expected to be extremely damaging
3	90 : 43		90% of today's coral reefs	70–90% of today's coral reefs... (Cross-Chapter Box 6;
3	91 : 5			, specially for SIDS and low-lying tropical nations
3	91 : 12		is producing significant impacts (high agreement, robust evidence).	will produce significant impacts (high confidence).
3	91 : 20		change will result in salinization, flooding and erosion and affect human and ecological systems, including health, heritage, freshwater, biodiversity, agriculture, fisheries and other services (very high agreement, robust evidence). Due to the commitment to SLR, there is an overlapping uncertainty in projections	changes are already resulting in salinization, flooding, and erosion and in the future are projected to affect human and ecological systems, including health, heritage, freshwater availability, biodiversity, agriculture, fisheries and other services, with different impacts seen worldwide (high confidence). Owing to the commitment to SLR, there is an overlapping uncertainty in projections at 1.5°C and 2°C
3	91 : 35			compared with a mitigation scenario
3	91 : 36		is	is projected to be
3	91 : 39		greater opportunity for adaptation (medium confidence), which can	a greater opportunity for adaptation (medium confidence), which could
3	91 : 42		(very high confidence, robust evidence).	(very high confidence).
3	91 : 47		.	(medium confidence).
3	92 : 1		55-94 million people / year are at risk from flooding increasing to 115-188 million people per year in 2300 (50th percentile,	62.7 million people per year are at risk from flooding, with this value increasing to 137.6 million people per year in 2300 (50th percentile, average accross
3	92 : 7		, particularly in the second half of the twentieth	. Additionally, impacts increased in the second half of the 21st
3	92 : 16		similar countries at high exposure from SLR.	that similar countries would have high exposure to SLR in the 21st century using 1.5°C and 2°C scenarios.
3	92 : 22		, and this will continue (Araos et al., 2016; Nicholls et al., 2018), whilst other cities are yet to prepare (see Section Cross-chapter Box 4.1) (high confidence, medium to robust evidence).	in some cities (Araos et al., 2016; Nicholls et al., 2018), whilst other cities have yet to prepare for these impacts (high confidence) (see Section 3.4.8 and Cross-chapter Box 9 in Chapter 4).
3	92 : 36		will	could
3	93 : 5		(high confidence, robust evidence)	(high confidence)
3	93 : 24		(high agreement, robust evidence)	(high confidence)
3	93 : 36			(high confidence)
3	93 : 38		for longer time periods at the sea level rise associated with 1.5ºC and 2ºC.	in reducing damage due to SLR at 1.5°C and 2°C. Additionally, damage was also reduced under mitigation scenarios compared with non-mitigation scenarios.
3	93 : 39		threaten	are projected to threaten
3	93 : 42		(medium agreement)	(medium confidence)
3	93 : 45		remain	are projected to remain
3	94 : 29		world, deltas, which are home to millions of people, are highly threatened from SLR and localised subsidence today, and over long time scales (high confidence, medium evidence	warmer world, deltas, which are home to millions of people, are expected to be highly threatened from SLR and localized subsidence (high confidence
3	94 : 35		Wong et al., 2014; Lovelock et al., 2015; Section 5.4.2.4; Section 3.4.4.8	Sections 3.4.4.8; Wong et al., 2014; Lovelock et al., 2015
3	94 : 41		, affecting freshwater wetlands	

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	94 : 43		(e.g., Cui et al., 2015 with a 2.6 mm yr-1 rise (aligning with AR5) in the Yangtze Estuary; Blankespoor et al., 2014) 1 m rise in multiple countries; Arnell et al. (2016) using an A1 SRES scenario of up to 0.48 m by 2050 on a global scale; drowning of 60% of marshes studied world-wide (with a rate of sea-level rise of 4.4 mm yr-1) by 2100 (	of wetlands in the 21st century (e.g., Blankespoor et al., 2014; Cui et al., 2015; Arnell et al., 2016;
3	95 : 8		(medium confidence, medium evidence) (Sections 4.3.2 and 4.3.3.3).	(medium confidence) (Sections 4.3.2.2 and 4.3.2.3).
3	95 : 15		ecosystems	coastal ecosystems
3	95 : 15		effects	potentially affects
3	95 : 28		high agreement, robust evidence	high confidence
3	95 : 33		(high agreement, robust evidence)	high confidence)
3	96 : 6		Wong et al., 2014, Section 5.5.8; Nicholls et al. 2015; Section 4.2.2.3). SLR poses a long-term threat (Section 3.3.9), even with 1.5°C and 2°C of warming centennial scale adaptation remains essential (high confidence, robust evidence	AR5-Section 5.5 of Wong et al., 2014; Nicholls et al., 2015). Sea level rise poses a long-term threat (Section 3.3.9), and adaptation will remain essential at the centennial scale under 1.5°C and 2°C of warming (high confidence
3	96 : 14		*Population is held static after 2300.	*:Population held constant at 2100 level.
3	96 : 19			(high confidence).
3	96 : 21		high agreement, medium evidence	medium to high confidence
3	96 : 22		high agreement, medium evidence).	medium to high confidence).
3	97 : 2		high agreement, robust evidence).	high confidence).
3	97 : 12		high agreement, medium evidence).	medium to high confidence).
3	97 : 15		can	could
3	97 : 25		will	are projected to
3	97 : 41		Wehner et al., 2017	Wehner et al., 2018a
3	98 : 7		are	would be
3	98 : 11		high agreement, medium evidence).	medium to high confidence).
3	98 : 15		(Schleussner et al., 2016b).	(Frieler et al., 2013; Schleussner et al., 2016b).
3	98 : 22		high agreement, robust evidence).	high confidence).
3	98 : 28		spares	would spare
3	98 : 32		higher at 1.5°C as compared to the present, and will further increase at 2°C (high agreement, medium evidence	projected to be higher at 1.5°C compared to the present, and will further increase at 2°C (medium to high confidence
3	99 : 31		would be expected to increase	were found to increase
3	100 : 8		Ricke et al. (2015)	Ricke et al. (2016)
3	100 : 29		).	; Cross-Chapter Box 6: Food Security in this chapter).
3	101 : 17		or	and
3	101 : 20		Future	
3	101 : 29		more 7.5-9.6% is expected at about 2°C warming, with associated economic losses of between $9.7 and $12.6 billion (Boone et al., 2017).	7–10% is expected at about 2°C of warming, with associated economic losses between $9.7 and $12.6 billion (Boone et al., 2018).
3	101 : 46		Bell et al., 2017	Bell et al., 2018
3	102 : 7		Bell et al., 2013; 2017	Bell et al., 2013; 2018
3	102 : 13		fin fisheries are low today, but are expected to reach very high levels under all RCPs especially at low latitudes (high confidence) by 1.1ºC.	small-scale fin fisheries are moderate today but are expected to reach very high levels by 1.1°C of global warming.
3	102 : 18		risk of disease and invasive species	production yet a greater risk of disease and invasive species; low confidence

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	102 : 23		are low up to 1.3ºC, moderate at 1.3ºC, and moderate to high up to 1.9ºC (Figure 3.17	become undetectible up to 1.1°C of global warming, moderate at 1.3°C, and moderate to high up to 1.9°C (Figure 3.18
3	102 : 28		risks at 1.5°C and 2°C	above 0.9°C and very high at 2°C of global warming
3	102 : 29		remains at moderate at 1.5°C and 2°C (Figure 3.3).	is projected to remain moderate at 1.5°C and 2°C (Figure 3.18).
3	102 : 38		Bell et al., 2013, 2017	Bell et al., 2013, 2018
3	103 : 25		(Cheung et al., 2010; Rosenzweig et al., 2013; Porter et al., 2014; Rosenzweig and Hillel, 2015; Lam et al., 2016) with warming of 2°C projected to result in a greater reduction in global crop yields and global nutrition than a global warming of 1.5°C (high confidence, Section 3.4.6) owing to the combined effects of changes in temperature, precipitation, and changes in extreme weather events and in	(medium confidence) (Cheung et al., 2010; Rosenzweig et al., 2013; Porter et al., 2014; Rosenzweig and Hillel, 2015; Lam et al., 2016), with warming of 2°C projected to result in a greater reduction in global crop yields and global nutrition than warming of 1.5°C (high confidence) (Section 3.4.6), owing to the combined effects of changes in temperature, precipitation and extreme weather events, as well as increasing
3	103 : 30		Cramer et al., 2014; Springmann et al., 2016)	(Cramer et al., 2014; Zhu et al., 2018).
3	103 : 31		reduced at 1.5°C versus 2°C (Cheung et al., 2016a; Betts et al., 2018) , whilst at 2°C these are expected to be exacerbated especially in regions such as the African Sahel, the Mediterranean, central Europe, the Amazon, and western and southern Africa (Sultan and Gaetani, 2016; Lehner et al., 2017; Betts et al., 2018; Byers et al., 2018; Rosenzweig et al., 2018) (high confidence).	projected to be reduced at 1.5°C versus 2°C (Cheung et al., 2016a; Betts et al., 2018), especially in regions such as the African Sahel, the Mediterranean, central Europe, the Amazon, and western and southern Africa (medium confidence) (Sultan and Gaetani, 2016; Lehner et al., 2017; Betts et al., 2018; Byers et al., 2018; Rosenzweig et al., 2018).
3	104 : 23		very likely to decrease agricultural yield, the consequences could be reduced substantially at 1.5oC with appropriate investment	projected to decrease agricultural yield, the consequences could be reduced substantially at 1.5°C versus 2°C with appropriate investment (high confidence)
3	104 : 31		negatively affect childhood undernutrition and stunting through reduced food availability, and will negatively affect	exacerbate current levels of childhood undernutrition and stunting through reduced food availability. As well, climate change can drive
3	104 : 35		are	would be
3	104 : 39		are reducing the protein and micronutrient content of major cereal crops, which is expected to further affect food	are projected to reduce the protein and micronutrient content of major cereal crops, which is expected to further affect food and nutritional
3	104 : 47			in the Mekong
3	105 : 2		will be on ecosystem health through salinity intrusion, biomass reduction, and biodiversity losses (Le Dang et al., 2014	are expected to be on ecosystem health, through salinity intrusion, biomass reduction and biodiversity losses (Le Dang et al., 2013
3	105 : 32		2017	2018
3	106 : 24		Li et al., 2016; Chung et al., 2017; Kendrovski et al., 2017; Arnell et al., 2018; Mitchell, 2018).	Li et al., 2016; Chung et al., 2017; Kendrovski et al., 2017; Mishra et al., 2017; Arnell et al., 2018; Mitchell et al., 2018b).
3	106 : 26		increase varies by region,	are projected to increase varies by region,
3	106 : 42		medium agreement, low evidence) (Dunne et al., 2013; Kjellstrom et al., 2013, 2017	medium confidence) (Dunne et al., 2013; Kjellstrom et al., 2013, 2018
3	107 : 20		high agreement, medium evidence	medium to high confidence
3	107 : 30		will	is projected to
3	107 : 37		will	could
3	107 : 38		The changes	The projected changes
3	107 : 46		will	could
3	107 : 47		will increase if precursor emissions remain the same, and that warmer temperatures will	could increase if precursor emissions remain the same, and that higher temperatures could

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3	109 : 6		(coastal or non-coastal), infrastructure sectors (energy, water, transport)	(coastal or non-coastal) (high confidence), businesses, infrastructure sectors (energy, water and transport)
3	109 : 12		will affect tourism,	could affect tourism,
3	109 : 26		chance'	chance to see'
3	109 : 46		will	could
3	110 : 39		will	are projected to
3	110 : 42		will	is expected to
3	110 : 47		will likely increase the demand for air conditioning in most tropical and sub-tropical regions (Arent et al., 2014; Hong and Kim, 2015	is projected to lead to an increased demand for air conditioning in most tropical and subtropical regions (Arent et al., 2014; Hong and Kim, 2015) (high confidence)
3	111 : 5		In the Zambezi River basin, hydropower may fall by 10% by 2030 (about 1.5(C) and by 35% by 2050 under the driest scenario (Strzepek et al., 2012).	
3	111 : 13		total energy	projected total energy
3	111 : 14		There is, however, a high degree of variability	a high degree of variability is projected
3	111 : 40		will undergo changes up to 15% in magnitude at country and local scales and a 5% change in magnitude at	are projected to undergo changes of up to 15% in magnitude at country and local scales and of 5% at the
3	112 : 30		will	is expected to
3	112 : 33		could force more than 100 million people into extreme poverty, with the numbers attributed to climate change alone between 3 million and 16 million	alone could force more than 3 million to 16 million people into extreme poverty
3	114 : 1		stability were reported from local to global scales and from hours to millennium	instability were reported from local to global scales and from hour to millennium time frames
3	114 : 7		1.5ºC are likely to increase poverty and disadvantage in many populations globally.	1.5°C are projected to increase poverty and disadvantage in many populations globally (medium confidence).
3	114 : 21		approximately double between 1.5°C and 2°C, and the land area affected by climate risks increases	are projected to approximately double between 1.5°C and 2°C, and the land area affected by climate risks is expected to increase
3	114 : 23		is	could be
3	114 : 27		Figure 3.18	Figure 3.19
3	116 : 7		Table 3.5: Summary of projected risks at 1.5oC and 2oC of global warming	Table 3.5 | Summary of projected risks to natural and human systems at 1.5°C and 2°C of global warming, and of the potential to adapt to these risks. Table summarizes the chapter text and with references supporting table entries found in the main chapter text. Risk magnitude is provided either as assessed levels of risk (very high: vh, high: h, medium: m, or low: l) or as quantitative examples of risk levels taken from the literature. Further compilations of quantified levels of risk taken from the literature may be found Tables 3.SM1-5 in the Supplementary Material. Similarly, potential to adapt is assessed from the literature by expert judgement as either high (h), medium (m), or low (l). Confidence in each assessed level/quantification of risk, or in each assessed adaptation potential, is indicated as very high (VH), high (H), medium (M), or low (L). Note that the use of l, m, h and vh here is distinct from the use of L, M, H and VH in Figures 3.18, 3.20 and 3.21.
3	117 : 2	Table 3.5 /8 : 03		based on PDSI estimate

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3	117 : 2	Table 3.5 / 7 : 04	H	M
3	117 : 2	Table 3.5 / 11 : 05		4
3	117 : 2	Table 3.5 / 7 : 06	H	M
3	117 : 2	Table 3.5 / 6 : 07	L	Increased risk
3	117 : 2	Table 3.5 / 5 : 08	H	vh
3	117 : 2	Table 3.5 / 6 : 08	3	Greater rate of loss: from 70–90% loss at 1.5°C to 99% loss at 2°C and above
3	117 : 2	Table 3.5 / 6 : 09	5	Increase in risk
3	117 : 2	Table 3.5 / 7 : 09	H/veryH	M
3	117 : 2	Table 3.5 / 4 : 10	M/H	m
3	117 : 2	Table 3.5 / 6 : 10	3	Uncertain and depends on other human activities
3	117 : 2	Table 3.5 / 14 : 10	H	L/M
3	117 : 2	Table 3.5 / 5 : 11	M/H	h
3	117 : 2	Table 3.5 / 4 : 11	H	vh
3	117 : 2	Table 3.5 / 6 : 11	5	large increase in risk
3	117 : 2	Table 3.5 / 6 : 12	3	large increase in risk
3	117 : 2	Table 3.5 / 5 : 13	M/H	h
3	117 : 2	Table 3.5 / 4 : 13	M/H	h/vh
3	117 : 2	Table 3.5 / 6 : 13	5	large increase in risk
3	117 : 2	Table 3.5 / 10 : 13	deep sea	deep sea upwelling systems
3	117 : 2	Table 3.5 / 5 : 14	L/M	m
3	117 : 2	Table 3.5 / 4 : 14	M	h
3	117 : 2	Table 3.5 / 6 : 14	5	increase in risk
3	117 : 2	Table 3.5 / 5 : 15	M	m/h
3	117 : 2	Table 3.5 / 4 : 15	M	h/vh
3	117 : 2	Table 3.5 / 6 : 15	3	large increase in risk
3	117 : 2	Table 3.5 / 6 : 16	3	increase in risk
3	117 : 2	Table 3.5 / 6 : 17	5	large increase in risk
3	117 : 2	Table 3.5 / 12 : 17	L	m
3	117 : 2	Table 3.5 / 6 : 18	5	increase in risk
3	117 : 2	Table 3.5 / 6 : 19	5	large increase in risk
3	117 : 2	Table 3.5 / 6 : 20	5	large increase in risk
3	117 : 2	Table 3.5 / 6 : 21	5	large increase in risk
3	117 : 2	Table 3.5 / 6 : 22	5	large increase in risk
3	117 : 2	Table 3.5 / 5 : 25	2.3-27.8 million	2–28 million

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3	117 : 2	Table 3.5 / 4 : 25	14.9-52,3 million	15–53 million people yr–1
3	117 : 2	Table 3.5 / 6 : 26	M/H	large increase
3	117 : 2	Table 3.5 / 6 : 27	M	moderate increase
3	128 : 1			# PDSI-based drought estimates tend to overestimate drought impacts (see Section 3.3.4); hence projections with other drought indices may differ. Further quantifications may be found in Table 3.SM.11 Gerten et al. 2013; 2 Alfieri et al. 2017; 3 Liu et al. 2018; 4 Warren et al. 2018a; 5 Warzawski et al 2013; 6 Brown et al. 2018a; 7 Rasmussen et al. (2018); 8 Yokoki et al (2018); 9 Nicholls et al. 2018 3.4.13
3	128 : 3		are synthesised in a single diagram (Figure 3.19) that indicates the overall risk in five broad categories for natural and human systems as a result of anthropogenic climate change and increases in Global Mean Surface Temperature (GMST).	were synthesized into Figure 3.18 and 3.20, indicating the overall risk for a representative set of natural and human systems from increases in Global Mean Surface Temperature (GMST) and anthropogenic climate change.
3	128 : 7		The format for figure 3.19 matches that of Figure 19.4 of WGII AR5 Chapter 19 (Oppenheimer et al., 2014) and Figure 3.19) by indicating the levels of the transition of risk from undetectable to moderate (detected and attributed), from moderate to high (severe and widespread) and from high to very high, the latter indicating significant irreversibility or persistence of climate-related hazards combined with a much reduced capacity to adapt.	The format for Figures 3.18 and 3.20 match that of Figure 19.4 of WGII AR5 Chapter 19 (Oppenheimer et al., 2014) indicating the levels of additional risk as colours: undetectable (white) to moderate (detected and attributed; yellow), from moderate to high (severe and widespread; red), and from high to very high (purple), the last of which indicates significant irreversibility or persistence of climate-related hazards combined with a much reduced capacity to adapt.
3	128 : 23		This figure	Figures 3.18 and 3.20
3	128 : 26		A fuller account is in the Supplemantary Material 3.SM S3-4-12.	In this regard, the assessed confidence in assigning the transitions between risk levels are as follows: L=Low, M=Medium, H=High, and VH=Very high levels of confidence. A detailed account of the procedures involved is provided in the Supplementary Material (3.SM.3.2 and 3.SM.3.3).
3	128 : 32		are generally higher	are generally projected to be higher under warming of 2°C compared to 1.5°C (Section 3.5.2.1), while at the global scale severe and widespread risks
3	128 : 35		are unable to adapt	are projected to be unable to adapt
3	128 : 37		escalate to very high levels	are expected to escalate to very high levels
3	128 : 43		considered unable to adapt,	projected to be unable to adapt.
3	128 : 46		coral reefs, there is high confidence in the transitions between colour assignments, especially in the growing impacts in the transition of warming from 0.4°C to 0.6°C, and in projections of change from 0.6ºC to 1.3ºC	warm-water coral reefs, there is high confidence in the transitions between risk levels, especially in the growing impacts in the transition of warming from non-detectable (0.2°C to 0.4°C), and then successively higher levels risk until high and very high levels of risks by 1.2°C
3	129 : 3			losses at
3	129 : 3		Together with sequential mass coral bleaching and mortality events on the Great Barrier Reef (Hoegh-Guldberg, 1999; Hughes et al., 2017b, 2018), suggest that climate risks are very high for	The major increase in the size and loss of coral reefs over the past three years, plus sequential mass coral bleaching and mortality events on the Great Barrier Reef, (Hoegh-Guldberg, 1999; Hughes et al., 2017b, 2018), have reinforced the scale of climate-change related risks to
3	129 : 13		by 1.1°C	around 0.9°C–1.1°C

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3	129 : 19		regional risks become	regional risks are projected to become
3	129 : 23		Risks posed by 1.5°C warming continue to increase	Moderate Risks posed by 1.5°C of warming are expected to continue to increase
3	129 : 34		would be exceeded in sensitive areas	are expected to be exceeded in sensitive areas
3	130 : 2		chance’	chance to see’
3	130 : 5		higher	projected to be larger
3	130 : 6		will increase the risks to coastal tourism	is expected to increase the risks to coastal tourism
3	132 : 21		Figure 3.20	Figure 3.21
3	132 : 29		The dependence of risk	The dependence of risks and/or impacts
3	133 : 29		(Sections 3.4.2.2, 3.4.2.3, and 3.4.2.5), whilst new evidence has also accumulated about increased risks at 1.5ºC vs 2°C warming in Arctic ecosystems (Section 3.3.9), coral reefs (Section 3.4.3), some other unique ecosystems (Section 3.4.2)	(Sections 3.4.2, 3.4.4 and 3.4.5), whilst new evidence has also accumulated for reduced risks at 1.5°C compared to 2°C of warming in Arctic ecosystems (Section 3.3.9), coral reefs (Section 3.4.4) and some other unique ecosystems (Section 3.4.3),
3	133 : 39		.	(Frieler et al., 2013).
3	133 : 45		Figure 3.20	Figure 3.18
3	134 : 21		(Section 3.4.2)	(Section 3.4.3)
3	134 : 41		see Section 3.3 and below).	Section 3.3 and below; Figure 3.21).
3	135 : 1		very likely that further increases in number of warm days/nights and decrease in number of cold days/nights and in overall temperature of hot and cold extremes will occur under 1.5ºC of global warming compared to	expected that further increases in the number of warm days/nights and decreases in the number of cold days/nights, and an increase in the overall temperature of hot and cold extremes would occur under 1.5°C of global warming relative to pre-industrial levels (high confidence) compared to under the
3	135 : 6		will occur over most land regions in terms of extreme temperatures (on average between 3 and 8°C depending on region and considered extreme index) (Section 3.3.2	would occur over most land regions in terms of extreme temperatures (up to 4°C–6°C depending on region and considered extreme index) (Section 3.3.2, Table 3.2
3	135 : 8		under 1.5°C of global warming, can be reduced to 2–6°C (Section 3.3.2	can be robustly limited if global warming is constrained to 1.5°C, with regional warmings of up to 3°C–4.5°C (Section 3.3.2, Table 3.2
3	135 : 16		.	, for a global warming of approximately 0.5°C (Section 3.3.3).
3	135 : 27			in some regions
3	135 : 27		to benefit include much of South America, southern Africa, Australia and the Mediterranean.	projected to benefit most robustly from restricted warming include the Mediterranean and southern Africa (Section 3.3.4).
3	136 : 4		(medium to high confidence)	(medium to high confidence; Figure 3.20),
3	136 : 12		(medium confidence).	(medium confidence) (Figure 3.20).
3	136 : 17		70% of global coastlines will	90% of global coastlines are projected to
3	136 : 20		spread	are projected to spread
3	136 : 25		(high confidence).	(high confidence; Figure 3.21).
3	136 : 46		are greater	projected to be greater
3	137 : 30		7% at 1.5°C warming	7% at 1.5°C (medium confidence)
3	137 : 34		(Warren et al., 2011; Warren et al., 2018b)	(Warren et al., 2013, 2018a)
3	137 : 37		impacts already on global ecosystem functioning at 2ºC warming.	that there will be impacts on global ecosystem functioning already at 2°C of warming, whilst species that lose large proportions of their range are considered to be at increased risk of extinction (Section 3.4.3.3).

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	137 : 42		no impacts detected (white) to moderate impacts (yellow) was considered to occur between 1ºC and 2°C global warming, reflecting the impacts on the economy and on biodiversity globally; whereas high risks (red) were associated with 3°C	undetectable to moderate impacts was considered to occur between 1.6°C and 2.6°C of global warming reflecting impacts on the economy and on biodiversity globally, whereas high risks were associated with 3.6°C of
3	138 : 1		(yellow) already by 1.5°C; and higher risks than previously thought on the global aggregate economy and global biodiversity by 2°C global warming warming; suggesting that risks transition to high between 2°C and 3°C warming, as opposed to at 3	to 1.5°C (Figure 3.21). Further, recent literature points to higher risks than previously assessed for the global aggregate economy and global biodiversity by 2°C of global warming, suggesting that the transition to a high risk level is located between 1.5°C and 2.5°C of warming (Figure 3.21), as opposed to at 3.6
3	139 : 3		(Srokosz and Bryden, 2015; Caesar et al., 2018).	(Rahmstorf et al., 2015b; Srokosz and Bryden, 2015; Caesar et al., 2018).
3	139 : 26		risks are located 2ºC, as opposed to 1.9ºC (moderate	risk is located at 2.5°C (Figure 3.21), as opposed to at 1.6°C (moderate risk
3	139 : 39		limited evidence, medium confidence	low to medium confidence
3	140 : 2		Hasegawa et al., 2016	IFPRI, 2018
3	140 : 6		limited evidence, medium confidence	low to medium confidence
3	140 : 12		(limited evidence, medium confidence).	(low to medium confidence).
3	140 : 14		to benefit substantially	are projected to benefit substantially
3	140 : 26		(limited evidence, low confidence)	under 1.5°C of global warming in comparison to present-day conditions, but under 2°C of global warming impacts on GDP are projected to be generally negative (low confidence)
3	141 : 16		Figure 3.SM.6	Figure 3.SM.5
3	141 : 22		will	are projected to
3	141 : 40		rise from	are projected to rise from
3	142 : 10		projected substantial decreases in mean precipitation with associated substantial increases in dry spells. The latter is projected to increase from 7% to 11% when comparing regional impacts at 1.5°C versus 2°C of global warming, respectively (Schleussner et al., 2016b	in terms of of robust increases in the probability of occurrence of extreme droughts at 2°C vs 1.5°C global warming (Section 3.3.4
3	142 : 15		almost double	is projected to almost double
3	143 : 13			compared to under higher levels
3	143 : 19		Boone et al., 2017	Boone et al., 2018
3	143 : 30		found	projected to occur
3	143 : 41		(high agreement, robust evidence)	(high confidence)
3	143 : 47		40,000 less people	60,000 less people
3	144 : 17		will be 3.2–4°C and under 1.5°C of global warming, mean warming in drylands will	is projected to be 3.2°C–4°C, and under 1.5°C of global warming, mean warming in drylands is projected to
3	144 : 26	Table 3.6 / 2 : 2	Cold extremes warm by a factor of 2.5-3, reaching up to 5.5 °C (high confidence)	Cold extremes warm by a factor of 2–3, reaching up to 4.5°C (high confidence)
3	144 : 26	Table 3.6 / 3 : 2	Reduced grassland net primary productivity	
3	144 : 26	Table 3.6 / 3 : 3	Increased risks for reduced grassland net primary productivity	
3	144 : 26	Table 3.6 / 3 : 4	Increased risks for significantly reduced grassland net primary productivity	

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3	144 : 26	Table 3.6 / 6 : 2	Increase (about 7%) in dry-spells Reduction in runoff of about 9% (likely range: 4.5–15.5%) Risk of water deficit	Increase in probability of extreme drought (medium confidence) Medium confidence in reduction in runoff of about 9% (likely range 4.5–15.5%) Risk of water deficit (medium confidence)
3	144 : 26	Table 3.6 / 6 : 3	High confidence of further increases (11%) in dry spells High confidence of further reductions (about 17%) in runoff (likely range 8–28%) Higher risks for water deficit	Robust increase in probability of extreme drought (medium confidence) Medium confidence in further reductions (about 17%) in runoff (likely range 8–28%) Higher risks of water deficit (medium confidence)
3	144 : 26	Table 3.6 / 6 : 4	Substantial reductions in precipitation and reductions in runoff very likely Very high risks for water deficit	Robust and large increases in extreme drought. Substantial reductions in precipitation and in runoff (medium confidence) Very high risks of water deficit (medium confidence)
3	144 : 26	Table 3.6 / 7 : 2		Increases in the number of hot nights and longer and more frequent heatwaves are likely
3	144 : 26	Table 3.6 / 7 : 3	Negative impacts on maize and sorghum production likely larger than at 1.5 °C	Further increases in number of hot nights and longer and more frequent heatwaves are likely Negative impacts on maize and sorghum production likely larger than at 1.5°C; medium confidence that vulnerabilities to food security in the African Sahel will be higher at 2°C compared to 1.5°C
3	144 : 26	Table 3.6 / 7 : 4		Substantial increases in the number of hot nights and heatwave duration and frequency (very likely)
3	144 : 26	Table 3.6 / 8 : 2	Likely reductions in water availability High risks for increased mortality from heat-waves; High risk for undernutrition in communities dependent on dryland agriculture and livestock	Reductions in water availability (medium confidence) Increases in number of hot nights and longer and more frequent heatwaves (high confidence), increased High risks of increased mortality from heatwaves High risk of undernutrition in communities dependent on dryland agriculture and livestock
3	144 : 26	Table 3.6 / 8 : 3	Even larger reductions in rainfall and water availability likely; Higher risks for increased mortality from heat-waves (high confidence); Higher risks for undernutrition in communities dependent on dryland agriculture and livestock	Larger reductions in rainfall and water availability (medium confidence) Further increases in number of hot nights and longer and more frequent heatwaves (high confidence), associated increases in risks of increased mortality from heatwaves compared to 1.5°C warming (high confidence) Higher risks of undernutrition in communities dependent on dryland agriculture and livestock

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	144 : 26	Table 3.6 / 8 : 4	Large reductions in rainfall and water availability are likely Very high risks for undernutrition in communities dependent on dryland agriculture and livestock	Large reductions in rainfall and water availability (medium confidence) Drastic increases in the number of hot nights, hot days and heatwave duration and frequency to impact substantially on agriculture, livestock and human health and mortality (high confidence) Very high risks of undernutrition in communities dependent on dryland agriculture and livestock
3	144 : 26	Table 3.6 / 9 : 2	Accumulated heat-wave duration up to two months (high confidence); 3% reduction in maize crop yield.	Increases in the number of hot days and hot nights as well as longer and more frequent heatwaves (high confidence) Risks to tropical crop yields in West Africa, Southeast Asia and Central and South America are significantly less than under 2°C of warming
3	144 : 26	Table 3.6 / 9 : 3	Accumulated heat-wave duration up to three months (high confidence); 7% reduction in maize crop yield.	The largest increase in hot days under 2°C compared to 1.5°C is projected for the tropics. Risks to tropical crop yields in West Africa, Southeast Asia and Central and South America could be extensive
3	144 : 26	Table 3.6 / 5 : 3	Freshwater stress reduced by 25% compared to 2°C of global warming	
3	147 : 8		and opportunities from mitigation.	associated with different degrees of global warming.
3	148 : 2			with mean air temperature
3	148 : 19		0.12-0.25 Gt C a-1 to the atmosphere in a 2ºC world, and to 0.08-0.16 Gt C a-1for 1.5ºC (Burke et al., 2006), and thus do	0.09–0.19 Gt C yr–1 at 2°C of global warming and to 0.08–0.16 Gt C yr–1 at 1.5°C (E.J. Burke et al., 2018), which does
3	148 : 26		is	would be
3	148 : 36			over India
3	149 : 21		productivity being reduced by more than 50%, and	being reduced by about 40%, which can lead to
3	149 : 34		will	would
3	150 : 34	Table 3.7 / 2 : 3	21-37% reduction in permafrost	17-44% reduction in permafrost
3	150 : 34	Table 3.7 / 2 : 3	0.08-0.16 Gt a-1 released	
3	150 : 34	Table 3.7 / 3 : 3	0.12-0.25 Gt C a-1	
3	150 : 34	Table 3.7 / 3 : 3		Reduced extent of tropical rainforest in Central America and large replacement of rainforest by savanna and grassland
3	150 : 34	Table 3.7 / 4 : 7	Potential tipping point for significant dieback of boreal forest	Potential tipping point at 3°C-4°C for significant dieback of boreal forest
3	150 : 34	Table 3.7 / 2 : 8	midrange population growth scenario	midrange population growth scenario *(likely)*
3	150 : 34	Table 3.7 / 10 : 4	in Africa *(high confidence)* , of 20% or more; potential tipping point	in Africa *(high confidence)* potential tipping point
3	153 : 13		are	are projected to be
3	153 : 28		Although not specifically related to 1.5°C warming, Hsiang et al. (2017) concluded that the USA could lose 2.3% Gross Domestic Product (GDP) per degree of global	Hsiang et al. (2017) shows that the USA stand to lose -0.1 to 1.7% of the Gross Domestic Product (GDP) at 1.5°C
3	155 : 15		would have	has

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
3	156 : 6		through 2030 consistent with	by southern Europe and the Mediterranean by 2030 – in order to have
3	157 : 5		Hirsch et al., 2017, Figure 3.21; Seneviratne et al., 2018a	Figure 3.22; Hirsch et al., 2017; Seneviratne et al., 2018a,c
3	159 : 37		results	would result
3	161 : 4		(high agreement, robust evidence).	(high confidence).
3	161 : 6		(high agreement, robust evidence).	(high confidence).
3	161 : 8		(high agreement, medium evidence)	(high confidence).
3	161 : 10		(high agreement, medium evidence	(medium confidence
3	161 : 15		scale (medium agreement, medium evidence).	large scales (medium confidence).
3	163 : 8		~6 m to SLR).	about 6 m to SLR). Church et al. (2013) were unable to quantify a likely range for this threshold. They assigned medium confidence to a range greater than 2°C but less than 4°C, and had low confidence in a threshold of about 1°C. There is insufficient new literature to change this assessment.
3	164 : 34			as well as coastal and oceanic
3	171 : 1		would be the	is the projected
3	171 : 24			Impacts can vary strongly for different worlds characterized by a 1.5°C global warming.
3	171 : 26		global surface temperature at 1.5°C is	the increase in global surface temperature at 1.5°C could be
3	171 : 32		many	some
3	171 : 41		would	will
3	172 : 2			Updated from (Seneviratne et al., 2018b
3	177 : 36		impacts make the poor poorer	impacts are expected to make the poor poorer
3	177 : 46		oceans, resulting from the delayed ocean mixing, means sea level will continue to rise even if global temperature is limited to 1.5°C, but this would be lower than in a 2°C	ocean means sea level will continue to rise even if the increase in global temperature is limited to 1.5°C, but this rise would be lower than in a 2°C warmer
4	6 : 29		Dietary choices towards foods	Shifts in dietary choices towards foods
4	6 : 40		to 1.5°C worlds	consistent with limiting warming to 1.5°C
4	6 : 53		{4.3.3}	{4.3.3, 4.4.3, 4.4.4}
4	7 : 15		and appropriate sequencing and timing of interventions.	and attempting appropriate sequencing and timing of interventions.
4	7 : 20		significantly to limiting warming to 1.5°C.	significantly to limiting warming to 1.5°C above pre-industrial levels.
4	8 : 3		The speed and scale of transitions	The speed of transitions
4	8 : 37		needs large investments in low-emission infrastructure and buildings that are currently underinvested	would require large increases of investments in low-emission infrastructure and buildings
4	8 : 39		annual incremental investment of 1% to 1.5% of global Gross Fixed Capital Formation (GFCF) for the energy sector is indicated;	mean annual incremental investment of around 1.5% of global Gross Fixed Capital Formation (GFCF) for the energy sector is indicated between 2016 and 2035
4	8 : 42		they cannot substitute for these investments.	they cannot fully substitute for these investments.
4	8 : 43		{2.5.2, 4.2.1}	{2.5.2, 4.2.1, 4.4.5}
4	8 : 52		cannot reach the levels needed to trigger system transitions	cannot reach the incentive levels needed to trigger system transitions
4	9 : 4		is necessary	is necessary for limiting warming to 1.5°C
4	10 : 8		far-reaching global response	far-reaching global response of limiting warming to 1.5°C
4	10 : 17		(UN, 2017)	(UN DESA, 2017)
4	11 : 36		in section 4.3.	in section 4.5.

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4	11 : 50		The pace of these transitions are particularly significant for the supply mix and electrification, with sectoral studies projecting a higher pace of change compared to IAMs (Table 4.1).	The pace of these transitions is particularly significant for the supply mix and electrification (Table 4.1). Individual, sectoral studies may show higher rates of change compared to IAMs (Figueres et al., 2017; Rockström et al., 2017; WBCSD, 2017; Kuramochi et al., 2018).
4	12 : 3		and sectoral studies	and several other studies
4	13 : 7		overtake	would overtake
4	16 : 20		(Hsu et al., 2017; Shrivastava and Persson, 2018),	(Shrivastava and Persson, 2018)
4	16 : 27		(Cole, 2015; Geels et al., 2016b; Hallegatte and Mach, 2016; Peters et al., 2017)	(Cole, 2015; Geels et al., 2016b; Hallegatte and Mach, 2016)
4	17 : 41		REN21, 2012; IEA, 2017c; IRENA, 2017b).	IEA, 2017c; IRENA, 2017b; REN21, 2017).
4	17 : 44		(REN21, 2012).	(REN21, 2017).
4	18 : 20		REN21, 2012; Ghorbani et al., 2017	Ghorbani et al., 2017; REN21, 2017
4	18 : 23		(REN21, 2012).	(REN21, 2017).
4	18 : 34		Smith et al., 2014; Creutzig et al., 2015).	Smith et al., 2014; Creutzig et al., 2015b).
4	19 : 30		(Kim and Chung, 2017)	
4	20 : 12		(REN21, 2012).	(REN21, 2017).
4	22 : 48		Smith et al., 2017b).	H. Smith et al., 2017).
4	23 : 2		7.1 GtCO2	7.1 GtCO2 per year
4	24 : 3		Herwehe and Scott, 2017).	Herwehe and Scott, 2018).
4	24 : 20		Herwehe and Scott, 2017	Herwehe and Scott, 2018;
4	25 : 49		and Degradation	and forest Degradation
4	26 : 8		Restoration	Forest restoration
4	26 : 20		targets	limits
4	27 : 42		(UN, 2014)	(UN DESA, 2014)
4	27 : 48		Revi and Rosenzweig, 2013	SDSN, 2013
4	27 : 51		Floater et al., 2014; Revi et al., 2014a; Villarroel Walker et al., 2014; Kennedy et al., 2015; Rodríguez, 2015; Newman et al., 2017; UN-Habitat, 2017; Westphal et al., 2017) (Solecki et al. 2013; Ahern et al. 2014; McGranahan et al. 2016; Dodman et al. 2017a).	Solecki et al., 2013; Ahern et al., 2014; Villarroel Walker et al., 2014; Floater et al., 2014; Revi et al., 2014a; Kennedy et al., 2015; Rodríguez, 2015; McGranahan et al., 2016; Dodman et al., 2017a; Westphal et al., 2017; Newman et al., 2017; UN-Habitat, 2017).
4	28 : 48		(Kuramochi et al., 2017)	Kuramochi et al. (2018)
4	29 : 43		(Kuramochi et al., 2017).	(Kuramochi et al., 2018).
4	30 : 1		OECD, 2016b	AfDB/OECD/UNDP, 2016
4	31 : 2			The grey line is battery electric vehicles (BEV) only while the black line includes both BEV and plug-in hybrid vehicles (PHEV).
4	31 : 18		Newman, 2018b	Newman, 2018
4	32 : 24		further marginalises	may further marginalize
4	33 : 43		climate change	warming
4	34 : 28		Overview of different mitigation options potentially consistent with 1.5ºC	Overview of different mitigation options potentially consistent with limiting warming to 1.5°C
4	34 : 32			4.3.4.1▯
4	34 : 37		Aden, 2017	Aden, 2018
4	35 : 28		Bio-based feedstock processes could be partly seen	Bio-based feedstock processes could be seen as part

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4	35 : 29		In several sectors, bio-based feedstocks	In several sectors, bio-based▯60%, from 5 GJ tCO −1 in 2005 to 2 GJ tCO −1 in the best-performing feedstocks
4	35 : 40		Electrification of manufacturing processes would constitute a significant technological challenge and a more disruptive innovation in industry	Electrification of manufacturing processes would constitute a significant technological challenge and would entail a more disruptive innovation in industry
4	36 : 12		IPCC, 2005	IPCC, 2005b
4	36 : 15		can decrease by around 60%, from 5 GJ tCO2–1 in 2005 to 2 GJ tCO2–1 in the best-performing pilot plants	can decrease by around current pilot plants
4	36 : 25		IPCC, 2005	IPCC, 2005b
4	36 : 26		However, there are new developments, in particular in CO2 use as a feedstock for carbon-based materials that would isolate CO2 from the atmosphere for a long time and greater availability of low-cost, low-emission electricity.	However, new developments could make CCU more feasible, in particular in CO2 use as a feedstock for carbon-based materials that would isolate CO2 from the atmosphere for a long time, and in low-cost, low-emission electricity that would make the energy use of CO2 capture more sustainable.
4	36 : 55		the potential to increase the demand for options that share and spread financial burdens.	may increase the demand for options that share and spread financial burdens.
4	37 : 27		Until mid-century, climate change will exacerbate	Climate change will exacerbate
4	39 : 32		Ford et al., 2015a	Ford et al., 2015b
4	39 : 36		In Alaska, the economic impacts of climate change on public infrastructure are significant, estimated at 5.5 billion USD to 4.2 billion USD from 2015 to 2099	In Alaska, the cumulative economic impacts of climate change on public infrastructure are projected at 4.2 billion USD to 5.5 billion USD from 2015 to 2099
4	40 : 15		Mycoo, 2017	Mycoo and Donovan, 2017
4	41 : 40		The City of New York, 2013	PlaNYC, 2013
4	41 : 43		HUD, 2013	HRSTF, 2013
4	41 : 44		The City of New York, 2013	PlaNYC,2013
4	41 : 47		The City of New York, 2017).	ORR, 2018).
4	42 : 39		Section 2.3.3.1	Section 2.3.3.2
4	42 : 48		However, it is uncertain whether such strategies would lead to additional long-term climate benefits compared to BC emissions reductions achieved through CO2 mitigation and associated co-control on BC-rich sectors in 1.5°C and 2°C pathways (Rogelj et al., 2014).	The benefits of such strategies depend greatly upon the assumed level of progression of access to modern energy for the poorest populations who still rely on biomass fuels, as this affects the reference level of BC emissions (Rogelj et al., 2014).
4	42 : 55		of cooling effects	of aerosol cooling effects
4	43 : 1		Recent studies have also found lower temperature effects of BC than what can be expected from the direct radiative forcing alone, thus questioning the effectiveness of targeted BC mitigation for climate change mitigation (Myhre et al., 2013; Baker et al., 2015; Stjern et al., 2017; Samset et al., 2018).	While some studies have found a lower temperature effect from BC mitigation, thus questioning the effectiveness of targeted BC mitigation for climate change mitigation (Myhre et al., 2013; Baker et al., 2015; Stjern et al., 2017; Samset et al., 2018), other models and observationally constrained estimates suggest that these widely-used models do not fully capture observed effects of BC and co-emissions on climate (e.g. Bond et al., 2013; Cui et al., 2016; Peng et al., 2016).
4	43 : 9	Table 4.5 / 5 : 2	see Sections 4.3.2 and 4.3.3	see Section 4.3.2
4	43 : 9	Table 4.5 / 5 : 4	For more see Section 4.3.4	For more see Section 4.3.3
4	43 : 19		Shindell et al.. 2017b).	Shindell et al. ., 2017a).
4	43 : 24		Shindell et al., 2017a	Shindell et al., 2017b

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4	44 : 1		Section 5.4.1.2	Section 5.4.2.1
4	44 : 42		IPCC, 2005;	IPCC, 2005b, 2014b
4	44 : 43		In the meantime, 1.5°C pathways without BECCS have emerged	, but also 1.5°C-consistent pathways without BECCS have emerged
4	44 : 50		Fuss et al. (2018) narrow this range to 0.5–5 GtCO2 yr–1 (medium agreement, high evidence) (Figure 4.3), thus falling below the upper end of 1.5°C pathways.	Fuss et al. (2018) narrow this range to 0.5–5 GtCO2 yr−1 (medium agreement, high evidence) (Figure 4.3), meaning that BECCS mitigation potentials are not necessarily sufficient for 1.5°C-consistent pathways.
4	45 : 3		Assessing BECCS deployment in 2°C pathways (of about 12 GtCO2-eq yr–1, here considered as a lower deployment limit for 1.5°C, Smith et al. (2016b) estimate a land-use intensity of 0.3–0.5 ha tCO2-eq–1 yr–1 using forest residues, 0.16 ha CO2-eq–1 yr–1 for agricultural residues, and 0.03–0.1 ha tCO2-eq–1 yr–1 for purpose-grown energy crops.	Assessing BECCS deployment in 2°C pathways (of about 12 GtCO2-eq yr−1 by 2100, considered as a conservative deployment estimate for BECCS-accepting pathways consistent with 1.5°C), Smith et al. (2016b) estimate a land-use intensity of 0.3–0.5 ha tCO2-eq−1 yr−1 using forest residues, 0.16 ha CO2-eq−1 yr−1 for agricultural residues, and 0.03–0.1 ha tCO2-eq−1 yr−1 for purpose-grown energy crops.
4	45 : 25		There is uncertainty about the feasibility of timely upscaling.	There is uncertainty about the feasibility of timely upscaling (Nemet et al., 2018).
4	47 : 7		and cost challenges.	and cost challenges (Nemet et al., 2018).
4	47 : 8		footnote 3	footnote 4
4	47 : 43		with native species have positive social and environmental impacts	with native species can have positive social and environmental impacts
4	48 : 2		–40–100 USD tCO2-1	−45–100 USD tCO −1
4	48 : 3		and 2050 potentials are estimated between 1–11 GtCO2 yr-1, narrowed down to 2–5	and 2050 potentials are estimated at between 0.5 and 11 GtCO2 yr−1, narrowed down to 2.3–5.3
4	48 : 36		IPCC, 2005	IPCC, 2005a
4	49 : 2		Strefler et al., 2018	Strefler et al., 2018a) and mining (NRC, 2015a; Strefler et al., 2018a) .
4	49 : 45		The interquartile range (see Figure 4.2) is 40–449 USD tCO2–1; there is lower agreement and a smaller evidence base at the lower end of the cost range.	There is lower agreement and a smaller evidence base at the lower end of the cost range. Fuss et al. (2018) narrow this range to 100–300 USD tCO -1.
4	50 : 1		(Wilcox et al., 2018)	(Wilcox et al., 2017)
4	50 : 1		Strefler et al. 2018a	Strefler et al., 2018b
4	50 : 17		to 4.4 GtCO2 yr–1 (Sarmiento and Orr 1991) following a modelling approach, but Fuss et al. (2018b)	up to 44 GtCO2 yr−1 (Sarmiento and Orr, 1991) following a modelling approach, but Fuss et al. (2018)
4	50 : 41	Table 4.6 / 2 : 7	see also Section 2.2.2 and 2.6.2	see also Chapter 2, Section 2.2.2.2
4	52 : 4		Table 4.6	Table 4.7
4	52 : 15	Table 4.7 / 1 : 1	-	SRM indicator
4	53 : 15		(Heyen et al., 2015; Robock, 2016)	(Heyen et al., 2015)
4	53 : 33		UNCBD, 2010	CBD, 2010
4	54 : 30		SRM might motivate individuals (as opposed to policymakers) to reduce their GHG emissions (Merk et al., 2016), but even a subtle difference in the articulation of information about SRM can influence subsequent judgements of favourability (Corner and Pidgeon, 2014).	SRM might motivate individuals (as opposed to policymakers) to reduce their GHG emissions, but even a subtle difference in the articulation of information about SRM can influence subsequent judgements of favourability (Merk et al., 2016).
4	54 : 32		(Parker, 2014; Quaas et al., 2017; Bellamy and Healey, 2018)	Quaas et al., 2017), but some also found an opposite effect (Bellamy and Healey, 2018).
4	55 : 18		Table 4.6.	Table 4.7
4	57 : 1		and in particular reduce hot extremes	and in particular would reduce hot extremes

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
4	57 : 11		or even worsen	or could even worsen
4	57 : 16		(Jones et al., 2013; Izrael et al., 2014; McCusker et al., 2014; Robock, 2016)	(Jones et al., 2013; Izrael et al., 2014; McCusker et al., 2014)
4	58 : 24		Examples from diverse regions and sectors are provided	Examples from diverse regions and sectors are provided in Boxes 4.1 to 4.10
4	58 : 30		OECD/IEA/NEA/ITF, 2015	OECD, 2015a
4	58 : 40		will need to engage with	would require engagement between
4	59 : 38		determining policy (Section 4.4.5) priorities	determining policy priorities
4	59 : 55		(Shukla, 2005; Winkler et al., 2011)	(Shukla, 2005; BASIC experts, 2011)
4	63 : 50		numerous stakeholders will be required	numerous stakeholders would be required
4	65 : 4		Kuramochi et al., 2017; UNEP, 2017b	UNEP, 2017b; Kuramochi et al., 2018
4	67 : 2		Lahn and Sundqvist, 2017	Sundqvist, 2017; Lahn, 2018
4	67 : 50		Thieme, 2017	Thieme, 2018
4	68 : 40		UNFCCC, 2015	UNFCCC, 2016
4	68 : 54		Yax L. and Álvarez, 2016	López and Álvarez, 2016
4	70 : 19		UNFCCC, 2015	UNFCCC, 2016
4	70 : 27		UNFCCC, 2015	UNFCCC, 2016
4	76 : 32		Steg et al., 2017	Steg et al., 2018
4	80 : 24		W.N. Adger et al., 2003	Adger et al., 2003
4	81 : 2		support for climate policy.	support for climate policy (see Box 4.8).
4	83 : 1	Table 4.9 / 3 : 3	IoT, AI, nanotechnology	IoT, AI
4	83 : 1	Table 4.9 / 3 : 7	IoT, AI, nanotechnology	Biotechnology
4	83 : 1	Table 4.9 / 3 : 8	Biotechnology	ICT, biotechnology
4	83 : 1	Table 4.9 / 3 : 9	ICT, biotechnology	biotechnology
4	83 : 1	Table 4.9 / 3 : 10	IoT, AI	ICT, biotechnology
4	83 : 1	Table 4.9 / 3 : 11	ICT	Biotechnology
4	83 : 1	Table 4.9 / 2 : 17	Methane inhibitors (methanogenic vaccines) that reduce dairy livestock emissions (Wollenberg et al., 2016)	Methane inhibitors (and methane suppressing vaccines) that reduce livestock emissions from enteric fermentation (Hristov et al. 2015 Wedlock et al. 2013; Wollenberg et al. 2016)
4	85 : 23		UNFCCC, 2015	UNFCCC, 2016
4	85 : 39		an initiative	an innovation initiative
4	85 : 55		UNFCCC, 2015	UNFCCC, 2016
4	86 : 37		needs to scale up the response to limit warming to 1.5°C is	needs over the next two decades to scale up the response to limit warming to 1.5°C is very
4	86 : 39		the order of magnitude of these investments to provide	the order of magnitude of these investments, after consultation with the makers of those estimates, to provide
4	86 : 43		six integrated assessment models	four integrated assessment models (here denoted IAM,
4	86 : 46		The OECD estimate also covers	They give a mean value of 2.38 trillion USD of yearly investments in the energy sector over the period, with minimum and maximum values of 1.38 and3.25 respectively. We also report. The OECD estimate for 2°C because it also covers

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
4	86 : 51		Box 4.8, Table 1: Estimated annualised mitigation investment needed to stay well below 2°C (2015–2035 in trillion USD at market exchange rates)	Box 4.8, Table 1 | Estimated annualized world mitigation investment needed to limit global warming to 2°C or 1.5°C (2015–2035 in trillions of USD at market exchange rates) from different sources. The top four lines indicate the results of Integrated Assessment Models (IAMs) as reported in Chapter 2 for their Baseline, Nationally Determined Contributions (NDC), 2°C- and 1.5°C-consistent pathways. These numbers only cover the energy sector and the second row includes energy efficiency in all sectors. The final two rows indicate the mitigation investment needs for the energy, transport and other infrastructure according to the Organization for Economic Co-operation and Development (OECD) for a Baseline pathway and a 2°C-consistent pathway. Sources: OECD, 2017a; IEA, 2016c.
4	87 : 1	Box 4.8, Table 1 / 2 : 11	1,91	-
4	87 : 1	Box 4.8, Table 1 / 3 : 11	0,36	-
4	87 : 1	Box 4.8, Table 1 / 4 : 6	0,35	-
4	87 : 1	Box 4.8, Table 1 / 4 : 7	0,55	-
4	87 : 1	Box 4.8, Table 1 / 4 : 11	2,46	-
4	87 : 9		Given the uncertainty in these estimates, decision-makers could lower the probability of the most pessimistic assumptions by implementing policies to accelerate technical change (Section 4.4.5).	As the higher ends of these ranges reflect pessimistic assumptions in 1.5°C-consistent pathways on technological change, the implementation of policies to accelerate technical change (see the remainder of Section 4.4.5) could lower the probability of higher incremental investment.
4	87 : 12		While total incremental investment for a 2°C-consistent pathway, including for transportation and other infrastructure, is estimated at 2.5% of global GFCF, there is no comprehensive study or estimate of these investments for a 1.5°C limit. For a 1.5°C-consistent pathway, the anticipated incremental 'other investments' might be lower thanks to lower investment needs in adaptation.	If we assume the amounts of investments given by the OECD for transportation and other infrastructure for warming of 2°C to be a lower limit for an 1.5°C pathway, then total incremental investments for all sectors for a 1.5°C-consistent pathway would be estimated at 2.4% of total world investments. This total incremental investment reaches 2.53% if the investments in transportation are scaled up proportionally with the investments in the energy sector and if all other investments are kept constant. Comparing this 2.4% or 2.53% number for all sectors to the 1.5% number for energy only (see previous paragraph) suggests that the investments in sectors other than energy contribute significantly to incremental world investments, even though a comprehensive study or estimate of these investments for a 1.5°C limit is not available.
4	87 : 20		a constant saving ratio, this can be enabled by	conversely a constant savings ratio, this would necessitate
4	87 : 28		The World Bank Data, 2018	World Bank, 2018b
4	87 : 30		cost of	return on
4	87 : 33		the estimated financial capital revenues	the estimated yearly financial capital revenues
4	88 : 13		1.5% of the global Gross Fixed Capital Formation (GFCF)	1.5% of the total world investment

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
4	88 : 35		The main challenge is thus not just a lack of mobilisation of aggregate resources but of redirection of savings towards infrastructure, and the further redirection of these infrastructure investments towards low-emission options.	The main challenge is thus not just a lack of mobilization of aggregate resources but of redirection of savings towards infrastructure, and the further redirection of these infrastructure investments towards opportunities (GCEC, 2014; NCE, 2016). By offsetting the crowding-out of other private and public investments (Pollitt and Mercure, 2017), the ensuing ripple effect could reinforce growth and the sustainability of development (King, 2011; Teulings and Baldwin, 2014) and potentially trigger a new growth cycle (Stern, 2013, 2015). In this case, a massive mobilization of low-emission investments would require a significant effort but may be complementary to sustainable development investments.This uncertain but potentially positive outcome might be constrained by the higher energy costs of low-emission options in the energy and transportation sectors. The envelope of worldwide marginal abatement costs for 1.5°C-consistent pathways reported in Chapter 2 is 135–5500USD2010 tCO −1 in 2030 and 245–13000 USD2010 tCO −1 in 2050, low-emission options.
4	89 : 4		475 USD tCO2–1 in 2030 and 245–1100 USD	5500 USD2010 tCO2–1 in 2030 and 245–13000 USD2010
4	89 : 48		OECD/IEA/NEA/ITF, 2015	OECD , 2015a
4	90 : 28		Gao and Kenworthy, 2015	Gao et al., 2015
4	90 : 29		However, recent data (Gao and Newman, 2018)	However, recent data (Gao and Newman, 2018) (expressed as a percentage of daily trips)
4	91 : 27		In the absence of transfers targeted in function of countries market structures (Boeters, 2014), carbon prices are no longer optimal (Böhringer et al. 2009; Böhringer and Alexeeva-Talebi 2013) and need to be differentiated by jurisdiction (Chichilnisky and Heal, 2000; Sheeran, 2006) in function of the countries' social welfare function.	In the absence of such transfers, carbon prices would have to be differentiated by jurisdiction (Chichilnisky and Heal, 2000; Sheeran, 2006; Böhringer et al., 2009; Böhringer and Alexeeva-Talebi, 2013).
4	91 : 33		it could restrain	a uniform carbon price would limit
4	92 : 1		compensates	would compensate for
4	92 : 24		social policies.	social policies. This is specifically critical in the context of the 1.5°C limit (Michaelowa et al., 2018).
4	92 : 36		they represent 25–30% of government revenues	these subsidies represent 25–30% of government expenditures
4	92 : 41		Explicit carbon prices are thus a necessary 'lubricant' to accommodate the general equilibrium effects of higher energy prices but may not suffice to trigger the low-carbon transition because of a persistent 'implementation gap' between the aspirational carbon prices and those that can practically be enforced.	Explicit carbon prices remain a necessary condition of ambitious climate policies, and some authors highlight the potential benefit brought by coordination among groups of countries (Weischer et al., 2012; Hermwille et al., 2017; Keohane et al., 2017). They could take the form of carbon pricing corridors (Bhattacharya et al., 2015). They are a necessary 'lubricant' through fiscal reforms or direct compensating transfers to accommodate the general equilibrium effects of higher energy prices but may not suffice to trigger the low-carbon transition because of a persistent 'implementation gap' between the aspirational carbon prices and those that can practically be enforced.
4	94 : 18		The estimated value of the Green bonds market in 2017 is USD 200 billion (BNEF, 2017	The estimated value of the Green bonds market in 2017 is 155 billion USD (BNEF, 2018

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
4	94 : 36		Froud et al., 2000; Roe, 2001	Roe, 1996; Froud et al., 2000
4	94 : 41		secure high leverage of public financing. They imply	increase the leverage effect of public financing on private financing. Such de-risking instruments imply indeed
4	95 : 42		Climate Analytics, 2015	UNEP/Climate Analytics, 2015
4	95 : 45		OECD, 2015, 2016a	OECD, 2015b, 2016
4	96 : 32		(ETS; Koch et al., 2014; 2016)	(Koch et al., 2014, 2016).
4	98 : 18		there are some barriers	there are mixed or moderate but still existent barriers
4	98 : 24		local context and constraints.	local context and constraints. Some contextual factors are indicated in the rightmost column in Tables 4.11 and 4.12.
4	100 : 3	Table 4.11 / 6 : 11	Dark brown	Medium brown
4	100 : 8			Abbreviations used: Ec: Economic - Tec: Technological - Inst: Institutional - Soc: Socio-cultural - Env: Environmental/Ecological - Geo: Geophysical4.5.2.2▯
4	103 : 25		challenges	would challenge
4	103 : 50		UNFCCC, 2015	UNFCCC, 2016
4	105 : 2	Table 4.12 / 7 : 14	Light brown	White
4	105 : 2	table 4.12 / 10 : 22	Light brown	White N/A
4	105 : 3		, nor a negative effect on the feasibility of the option,	or negative effect on the feasibility of the option, or the evidence is mixed,
4	105 : 6			Abbreviations used: Ec: Economic - Tec: Technological - Inst: Institutional - Soc: Socio-cultural - Env: Environmental/Ecological - Geo: Geophysical
4	107 : 25		Given the structural changes these options may require, transformational adaptation may be implied in some regions, involving enhanced multi-level	Scaling community-based adaptation may require structural changes, implying the need for transformational adaptation in some regions. This would involve enhanced multilevel
4	108 : 5		Hurricane	Superstorm
4	108 : 37		Lesnikowski et al. 2016; Ford et al. 2015),	Ford et al., 2015b; Lesnikowski et al., 2016), a
4	109 : 1		increase other GHG emissions	can increase other GHG emissions,
4	109 : 36		Bhutan has three national goals, improving: its Gross National Happiness Index (GNHI), economic growth (Gross Domestic Product, GDP) and carbon neutrality.	Bhutan has three national goals: improving its Gross National Happiness Index (GNHI), improving its economic growth (Gross Domestic Product, GDP) and maintaining its carbon neutrality.
4	109 : 45		(CBS, 2016).	(CBS & GNH, 2016).
4	109 : 47		2011 at COP 19	2009 at COP15
4	110 : 1		threatened by 2037	threatened by 2044
4	124 : 11		FAQ4.3, Figure 1: Examples of adaptation	FAQ 4.3, Figure 1: Why is adaptation important in a world with global warming of 1.5°C? Examples of adaptation
5	4 : 20		between 1.5°C and 2°C warming would also make it easier to achieve certain SDGs, such as those that relate to poverty, hunger, health, water and sanitation, cities, and ecosystems (SDGs 1, 2, 3, 6, 12	expected to occur between 1.5°C and 2°C warming would also make it easier to achieve certain SDGs, such as those that relate to poverty, hunger, health, water and sanitation, cities and ecosystems (SDGs 1, 2, 3, 6, 11
5	12 : 32		will make it markedly easier to achieve the SDGs for poverty eradication, water access, safe cities, food security, healthy lives, and inclusive economic growth, and will	would make it markedly easier to achieve the SDGs for poverty eradication, water access, safe cities, food security, healthy lives and inclusive economic growth, and would

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
5	14 : 3		2010). Conference of the Parties (COP) 19 in 2013 established the Warsaw International Mechanism for Loss and Damage (WIM) as a formal part of the United Nations Framework Convention on Climate Change (UNFCCC) architecture (UNFCCC, 2013	2011). In 2013, the Conference of the Parties (COP) 19 established the Warsaw International Mechanism for Loss and Damage (WIM) as a formal part of the United Nations Framework Convention on Climate Change (UNFCCC) architecture (UNFCCC, 2014
5	14 : 13		2011, 2013	2011b, 2014
5	14 : 14		2011, 2013	2011b, 2014
5	15 : 17			Table 3.5,
5	17 : 7		et al., 2015; K. O’Brien, 2016	, 2016; O’Brien et al., 2017
5	21 : 29		2017	2018
5	22 : 34		service value enhancement	protection and restoration
5	23 : 45		Cross-Chapter Box 12, Table 1	Table 5.2
5	25 : 30		Grubert et al., 2014; Grill et al., 2015; Zhang and Chen, 2015; Fricko et al., 2016; Johansson et al., 2016; Aha and Ayitey, 2017; De Stefano et al., 2017; Shi et al., 2017) (Section 5.4.2.2, Table 5.3 (available as a supplementary pdfat the end of the chapter), Figure 5.3) (robust evidence, high agreement).	robust evidence, high agreement) (Section 5.4.2.2, Table 5.2, Figure 5.2) (Grubert et al., 2014; Grill et al., 2015; Zhang and Chen, 2015; Fricko et al., 2016; Johansson et al., 2016; Aha and Ayitey, 2017; De Stefano et al., 2017; Shi et al., 2017).
5	27 : 27		US$2015 per year to 2030 in 1.5°C pathways) (	USD2010 per year to 2030 in 1.5°C pathways;
5	28 : 23		120 billion	120 billion USD2010
5	30 : 6		13 (climate),	12 (resources), SDG 13/14 (climate/ocean)
5	31 : 15		not affected	not disproportionately affected
5	34 : 19		possible pathways (see Figure 5.65	possible pathways (high confidence) (see Figure 5.5)
5	35 : 10		Haider et al., 2017; Lade et al., 2017	Lade et al., 2017; Haider et al., 2018
5	36 : 4		CSO Review, 2015; Meinshausen et al., 2015; Okereke and Coventry, 2016; Anand, 2017; Bexell and Jönsson, 2017; Holz et al., 2017; Otto et al., 2017; Pan et al., 2017; Robiou du Pont et al., 2017; Kartha et al., 2018; Winkler et al., 2018	Anand, 2004; CSO Equity Review, 2015; Meinshausen et al., 2015; Okereke and Coventry, 2016; Bexell and Jönsson, 2017; Otto et al., 2017; Pan et al., 2017; Robiou du Pont et al., 2017; Winkler et al., 2018; Holz et al., 2018; Kartha et al., 2018).
5	36 : 16		Review, 2015; Mace, 2016; Holz et al., 2017; Pan et al., 2017; Robiou du Pont et al., 2017	Equity Review, 2015; Mace, 2016; Pan et al., 2017; Robiou du Pont et al., 2017; Holz et al., 2018
5	36 : 22		2017	2018
5	37 : 16		2017	2018
5	37 : 34		UN, 2014a;	UNGA, 2014;
5	37 : 49		MCCA	MoCC
5	37 : 54		disasters	climate hazards and disasters
5	39 : 31		2014b	2014
5	39 : 38		risk, and impacts	and risk
5	39 : 50		growing	a growing informal sector and settlements (
5	41 : 51		Ficklin et al., 2017; Phillips et al., 2017	Phillips et al., 2017; Ficklin et al., 2018
5	43 : 3		Fook, 2017; Maor et al., 2017), and create space for negotiating diverse interests and preferences (O’Brien et al., 2015; Gillard et al., 2016; DeCaro et al., 2017; Harris et al., 2017; Lahn, 2017) (robust evidence, high agreement	Chung Tian Fook, 2017; Maor et al., 2017), and create space for negotiating diverse interests and preferences (robust evidence, high agreement) (O’Brien et al., 2015; Gillard et al., 2016; DeCaro et al., 2017; Harris et al., 2017; Lahn, 2018
5	43 : 16		Ficklin et al., 2017; Phillips et al., 2017; Stringer et al., 2017; Wood, 2017;	Phillips et al., 2017; Stringer et al., 2017; Wood, 2017; Ficklin et al., 2018;

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
Glossary	2 : 1		1.5°C-consistent emissions pathways	1.5°C pathway
Glossary	2 : 44			In some cases, incremental adaptation can accrue to result in transformational adaptation (Termeer et al., 2017; Tàbara et al., 2018).
Glossary	2 : 44			Remove footnote: This definition builds from the definition used in Park et al. (2012).
Glossary	4 : 37		, snow, ice, leaf area and land cover changes.	and changes in snow, ice, leaf area and land cover.
Glossary	8 : 23		See also Land use and land-use change. See also Global Warming Potential (GWP).	
Glossary	8 : 32		, and Sequestration	and Uptake
Glossary	9 : 1		, Sink.	, Direct air carbon dioxide capture and storage (DACCS) and Sink.
Glossary	9 : 10			Replace definition for Carbon neutrality with 'See Net zero CO2 emissions'
Glossary	11 : 46		See also Carbon neutrality.	See also Net zero CO2 emissions.
Glossary	15 : 12		See also Integrated models	
Glossary	17 : 15		(see Box 3-3)	
Glossary	20 : 33		See also Pathways	See also Emission pathways (under Pathways).
Glossary	25 : 26		, and Sea surface temperature (SST)	, Sea surface temperature (SST) and Global mean surface air temperature (GSAT).
Glossary	27 : 7		, and Ozone (O3).	, Nitrous oxide (N2O) and Ozone (O3).
Glossary	28 : 37		self-determination (based upon the definition by the UN Office of the High Commissioner).	self-determination. Based upon the definition by the UN Office of the High Commissioner for Human Rights (UNOHCHR, 2018).
Glossary	32 : 27			(MRFCJ, 2018)
Glossary	33 : 52		See Land use, land-use change and forestry (LULUCF).	See Land-use change (LUC).
Glossary	35 : 31		Source: UN REDD	UN-REDD, 2009
Glossary	35 : 36		Source: UN REDD	UN-REDD, 2009
Glossary	35 : 40		Source: UN REDD	UN-REDD, 2009
Glossary	36 : 38		See also Policies (for mitigation and adaptation).	See also Mitigation option, and Policies (for climate change mitigation and adaptation).
Glossary	37 : 14		arise from outside (extrinsic) or inside	come from outside (extrinsic) or from inside
Glossary	38 : 12		Conditions in which any remaining anthropogenic carbon dioxide (CO2) emissions are balanced globally by anthropogenic CO2 removals. Net-zero CO2 emissions are also referred to as carbon neutrality.	Net zero carbon dioxide (CO2) emissions are achieved when anthropogenic CO2 emissions are balanced globally by anthropogenic CO2 removals over a specified period. Net zero CO2 emissions are also referred to as carbon neutrality. See also Net zero emissions and Net negative emissions.
Glossary	38 : 20		emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals.	anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.
Glossary	38 : 26		See also Net-zero CO2 emissions, Negative emissions, Net negative emission, and Carbon neutrality	See also Net zero CO2 emissions, Negative emissions and Net negative emissions.

Chapter	FGD Page : Line	FGD Table Column : Row	Original text	New text
Glossary	38 : 36			Add definition for 'Non-CO2 emissions and radiative forcing': Non-CO2 emissions included in this report are all anthropogenic emissions other than CO2 that result in radiative forcing. These include short-lived climate forcers, such as methane (CH4), some fluorinated gases, ozone (O3) precursors, aerosols or aerosol precursors, such as black carbon and sulphur dioxide, respectively, as well as long-lived greenhouse gases, such as nitrous oxide (N2O) or other fluorinated gases. The radiative forcing associated with non-CO2 emissions and changes in surface albedo is referred to as non-CO2 radiative forcing.
Glossary	39 : 48		1.5°C-consistent pathway	1.5°C pathway
Glossary	39 : 51			See also Temperature overshoot.
Glossary	40 : 10			Add definition for 'Emission pathways': Modelled trajectories of global anthropogenic emissions over the 21st century are termed emission pathways.
Glossary	40 : 19		See also Overshoot.	See also Temperature overshoot.
Glossary	44 : 15		Cumulative global CO2 emissions from the start of 2018 to the time that CO2 emissions reach net-zero that would result in a given level of global warming. See also Carbon budget.	Estimated cumulative net global anthropogenic CO2 emissions from the start of 2018 to the time that anthropogenic CO2 emissions reach net zero that would result, at some probability, in limiting global warming to a given level, accounting for the impact of other anthropogenic emissions.
Glossary	46 : 17		, the private sector and other stakeholders, with the aim for the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.	and the private sector. Its aim is to achieve 'substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.'
Glossary	47 : 2		See also Sequestration, and Uptake.	See also Uptake.
Glossary	48 : 12		See also Reference scenario	See also Baseline scenario
Glossary	49 : 23			Global mean surface air temperature (GSAT)
Glossary	50 : 40		. This requires more than technological change to	that requires more than technological change through