Trends in temperature, precipitation, potential evapotranspiration, and water availability across the Teesta River Basin under 1.5 and 2 °C temperature rise scenarios of CMIP6

Consequences of the rising temperature in the Teesta River Basin:

The rising temperature under the SSP126 scenario at the upper course of the Teesta river basin might hinder the glaciation process and escalate snow melt, which will inevitably accelerate the river discharge in the short term but reduce it in the long term. Furthermore, our study showed that in the near future, the monsoon and post-monsoon and in the far future, pre-monsoon and winter precipitation under both SSPs are likely to increase over the upper part of the basin, which, along with the glacier melted water, can trigger floods and flash floods over the basin and might also intensify the existing political turmoil downstream.

This journal sponsored the APC of "Trends in temperature, precipitation, potential evapotranspiration, and water availability across the Teesta River Basin under 1.5 and 2 °C temperature rise scenarios of CMIP6"

atmosphere

Impact of SDG 13 in MDPI publications

236 papers mention "SDG 13", "Sustainable Development 13" or "climate action" in MDPI publications between 2015-2022.

By extending the search to climate action, we find over 35000 papers were published in the same period in MDPI.

Impact of both scenarios on the production of rice and the farming communities[1]

Considering the near future scenarios of both the shared socioeconomic pathways, an expansion of irrigation might be needed since the High Yield Variety Boro rice (native Bengali language name of a typical wet variety of paddy sown in winter and harvested in the summer season) is cultivated widely (from November to May) in the central (66.5%) and lower course (81.2%) of the basin areas, which requires a high amount of water supply. In addition to this, the coarse soil texture (mainly sandy to sandy loam) of this region increases the likelihood of seepage, and as a result, the demand for irrigable water becomes higher. Imperatively, the farmers of the lower reach completely rely on groundwater for irrigation in the dry season. Therefore, further expansion of irrigation areas might lead to a substantial decline in groundwater levels in the near future. Such an alarming indication is already witnessed in the lower and central parts of the basin.

Where can research on climate be published?

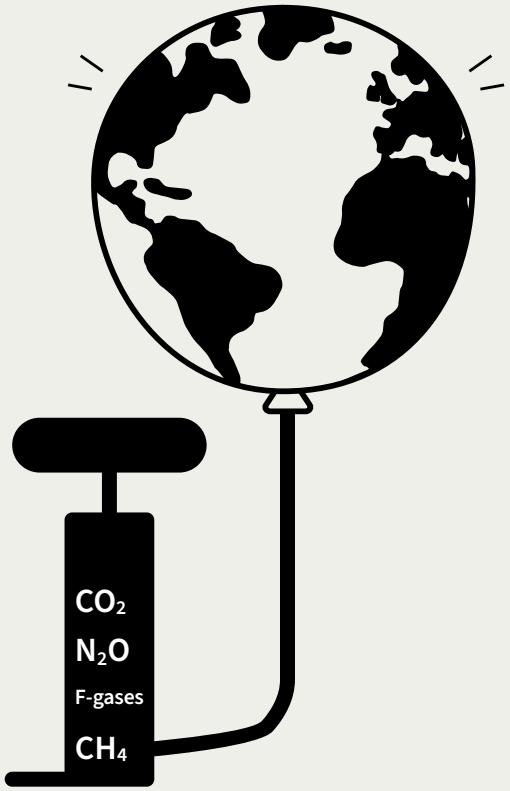
Climate is MDPI's flagship journal to disseminate knowledge about climate change. Atmosphere publishes research on climate, air quality and pollution Remote Sensing provides a forum for researchers to publish their findings on changes of rivers, land, forests and ice caps.

[1] Das, S.; Datta, P.; Sharma, D.; Goswami, K. Trends in Temperature, Precipitation, Potential Evapotranspiration, and Water Availability across the Teesta River Basin under 1.5 and 2 ◦ C Temperature Rise Scenarios of CMIP6. Atmosphere 2022, 13, 941. https://doi.org/10.3390/atmos13060941

[2] IPCC – Summary for Policymakers – Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC Climate Change 2022. Mitigation of Climate Change. Available online: www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_SPM.pdf (accessed on 01 November 2022).

[3] McKay, D.I.A., Staal, A., Abrams, J.F., Winkelmann, R., Sakschewski, B., Loriani, S., Fetzer, I., Cornell, S.E., Rockström, J., Lenton, T.M. Exceeding 1.5°C global warming could trigger multiple climate tipping points. Science 2022, 377, 6611. https://doi.org/10.1126/science.abn7950

[4] The Guardian – World on brink of five 'disastrous' climate tipping points, study finds. Available online: www.theguardian.com/environment/2022/sep/08/world-on-brink-five-climate-tipping-points-study-finds (accessed on 01 November 2022).



Global temperature change: an increase of 1.5°C is expected

"Trends in temperature, precipitation, potential evapotranspiration, and water availability across the Teesta River Basin under 1.5 and 2 °C temperature rise scenarios of CMIP6" is one of several publications that presents a realistic scenario of what will be the new normal in the next two decades. The Sixth Assessment Report of the Intergovernmental Panel on Climate Change[2] released in April 2022 provides a comprehensive overview of the future scenarios on climate, and the expected outcomes in terms of temperature increase. The report is available in its full form, with detailed scientific literature, as well as a technical summary, and as a summary for policy makers. It presents the main climate challenge the 21st century will face: an increase of at least 1.5°C in the global temperature above pre-industrial levels.

Based on solid scientific evidence, limiting the increase of global temperature to 1.5°C, or even a higher limit of 2°C, requires immediate action to decrease the emissions of green house gases.

The increasing temperature will likely cause irreversible effects on several eco-systems and landscapes. Researches have recently shown that exceeding 1.5°C global warming could trigger multiple climate tipping points[3,4], including Coral reef die off, West African monsoon shift, Mountain glaciers loss, among others. These irreversible changes affect the eco-systems depended on coral reefs, forests, glacial lakes, and other eco-systems.

Climate tipping points are a point of no return. Anthropogenic activity will stretch the limits of eco-systems until they are not able to recover without intervention.

Some examples of climate change effects on eco-systems:

The Condition of Four Coral Reefs in Timor-Leste before and after the 2016–2017 Marine Heatwave
www.mdpi.com/2673-1924/3/2/12

Uncertainties in the Annual Cycle of Rainfall Characteristics over West Africa in CMIP5 Models
www.mdpi.com/2073-4433/11/2/216

Recent Changes in Glaciers in the Northern Tien Shan, Central Asia
www.mdpi.com/2072-4292/14/12/2878

Extreme Drought Events over the Amazon Basin: The Perspective from the econstruction of South American Hydroclimate
www.mdpi.com/2073-4441/10/11/1594/htm

Greenhouse Gas Induced Changes in the Seasonal Cycle of the Amazon Basin in Coupled Climate-Vegetation Regional Model
www.mdpi.com/2225-1154/4/1/3

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