

**Climate Change 2021: The Physical Science Basis. Contribution of Working Group I (WG1) to the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC)**

The AR6 WG1 report is the latest in the series of the IPCC assessment reports that was released today. This report provides the most updated physical understanding of the climate system and climate change, by combining the latest advances in climate sciences and multiple lines of evidence from paleoclimate, observations, process understanding, global and regional climate simulations. Although it has been known for decades that the world is warming, this latest report clearly shows that the recent observed changes in the climate system are “*widespread, rapid and intensifying; and unprecedented in thousands of years*”.

This report also shows that human-caused climate change is already affecting every region on Earth in multiple ways. For example, the AR6 assessment brings out that human influence is increasing the frequency and severity of extreme weather and climate events, including heat waves, heavy rainfall, and droughts. A novel aspect of the AR6 report is that we can now attribute many more changes at the global and regional level to human influence--and better project future.

Global temperature over the past ten years was about 1.1°C warmer than in 1850-1900. Each of the past four decades has been the warmest on record since pre-industrial times. The AR6 report projects that climate changes will increase in all regions in the coming decades. For the 1.5°C of global warming – there will be increases in the intensity and frequency of heat waves, extreme precipitation and droughts. Coastal areas will experience continued sea level rise throughout the 21<sup>st</sup> century, contributing to more frequent and severe coastal flooding. Unless there are immediate, rapid, and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C will be beyond reach.

Climate change is intensifying the water cycle leading to more intense rainfall and associated flooding, as well as more severe droughts in many regions. Seasonal monsoon precipitation is

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projected to increase in the mid-to-long term at global scale, particularly over South and Southeast Asia, East Asia and West Africa apart from the far west Sahel. For the first time, a more detailed assessment of climate change with greater focus on regional climate information is presented in the AR6 report, which can be used for climate risk assessment, adaptation and decision-making.

Over 234 authors from 65 countries plus 517 contributing authors were involved in the preparation of the IPCC AR6 WG1 report. The AR6 WG1 team from India<sup>#</sup> comprises of 1 coordinating lead author (CLA), 6 lead authors (LAs), 2 Review Editors (REs), 1 Chapter Scientist (CS) and 10 Contributing Authors. Lead Authors from the Ministry of Earth Sciences (MoES), Government of India provided valuable contributions in the assessment of future global climate (Chapter 4), water cycle changes, including regional monsoons (Chapter 8) and the Summary for Policy Makers (SPM). A major highlight from India also comes from the inclusion of the IITM Earth System Model (IITM-ESM) climate projections (CMIP6) in the IPCC AR6 WG1 report – the first from India.

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