

Reduced inequities in extreme climate hazards with the 1.5 °C goal of the Paris Agreement

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Clarifying the characteristics of extreme events at 2°C and 1.5°C stabilizations is important for understanding the implications of the Paris Agreement. Based on large ensembles of multiple models simulating 2°C and 1.5°C global mean temperature warming, we show that frequencies of extreme hot days and heavy rains dramatically increase with a 2°C warming. For example, about half of the world's population will experience a 1-in-10 year hot day event every other year at 2°C warming. Using well-established inequity indices, we reveal that most affected regions largely coincide with countries characterized by small per-capita CO₂ emissions (i.e., low responsibilities), high vulnerabilities and limited capacities for adaptation under poverties and weak governances. However, an additional half a degree mitigation can significantly suppress the increases in frequencies of extreme events in those regions, alleviating the inequities in the occurrences of climate-related hazards. This is the first study to investigate the inequities regarding the distribution of hot days and heavy rains with the goals of the Paris agreement and clearly shows the benefits of the 1.5°C goal for enhancing climate justice as compared with the 2°C goal.

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