

Concept note for Working Group for Annual Updates in Weather and Climate Extremes under the Global Extremes Platform (GEP Annual Updates Working Group)

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Climate impacts are largely driven by weather and climate extremes such as floods, droughts, and heatwaves. Human-induced greenhouse gas emissions have increased the frequency and/or intensity of certain extremes, particularly temperature extremes, since pre-industrial times (Seneviratne et al. 2021¹). Understanding the status of these extremes globally—and in the context of a changing climate—is crucial for evaluating the losses and damages associated with human-induced climate change, as well as for climate risk reduction, climate change adaptation, and emergency preparedness.

Changes in weather and climate extremes have been assessed by the Intergovernmental Panel on Climate Change (IPCC) as part of their reports (e.g., IPCC 2021²). Yet, the public and policymakers increasingly seek more frequent updates. Recognizing the importance of this topic, the World Meteorological Organization began including a section on major weather and climate events worldwide in its annual State of the Global Climate report in 2015, recently renaming it to focus on extreme weather and climate events. Although these reports document significant events from each year, they do not attempt to place these events in historical context or examine possible human influences, despite similar historical contextualization for climate indicators like temperature. The demand for understanding human influence on recent extreme events has led to the development of many advances in attribution research. Several research organizations and groups now conduct rapid attribution assessments following extreme events, such as those by the World Weather Attribution³ initiative or the new climameter⁴ project. Research articles on single-event attribution are regularly published, both as part of special issues⁵ and as standalone studies. However, annual syntheses are not available.

Given the societal demand and the current state of knowledge, there is a need for a new type of policy-relevant, retrospective scientific syntheses on extreme weather and climate events, published annually. This synthesis should place events in a long-term historical perspective and in the context of human-induced climate change, with a comprehensive global focus that better encompasses the Global South than existing literature and reports. Such an initiative would deliver highly visible yearly reports on weather and climate extremes worldwide, building on IPCC-assessed methodologies and recent scientific literature, under the auspices of the World Climate Research Programme (WCRP)

¹ https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter11.pdf

² https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

³ <https://www.worldweatherattribution.org>

⁴ <https://www.climameter.org/>

⁵ <https://www.ametsoc.org/index.cfm/ams/publications/bulletin-of-the-american-meteorological-society-bams/explaining-extreme-events-from-a-climate-perspective/>

The WCRP is mandated to coordinate and facilitate international climate research to develop, share, and apply climate knowledge that promotes societal well-being. Given the growing societal demand for a comprehensive, global, and timely understanding of the current state of weather and climate extremes, it is essential for WCRP to establish a Working Group for Annual Updates on Weather and Climate Extremes under the Global Extreme Platform (“Working Group on Annual Updates in Weather and Climate Extremes”). The Working Group, composed of international experts in relevant fields, would prepare yearly reports to be released each May, providing a retrospective analysis of events of the past year.

Extensive cooperation is planned between this Working Group and the GEP Event Attribution Working Group, other WCRP initiatives, WMO Expert Team responsible for the State of Global Climate report, and other key organisations active in the field. It is anticipated that these yearly AUWCE reports will also inform the upcoming IPCC AR7 assessment.

Membership in the Working Group will be selected through an open call for self-nomination, aiming to ensure suitably diverse representation. The terms of reference for the Working Group will be developed in consultation with the community through a two-step process: initially drafted in discussions with community volunteers and then refined and finalized by the Working Group members.