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A Quality-Controlled Global Sub-daily Precipitation Dataset and Sub-daily Precipitation Indices

Hayley Fowler¹, Liz Lewis¹, Stephen Blenkinsop¹, David Pritchard¹, Selma Guerreiro¹, Roberto Villalobos Herrera¹, and Andreas Becker²

¹Newcastle University, School of Engineering, Newcastle upon Tyne, United Kingdom of Great Britain and Northern Ireland (h.j.fowler@ncl.ac.uk)

²DWD, Germany

Extremes of precipitation can cause flooding and droughts which can lead to substantial damages to infrastructure and ecosystems and can result in loss of life. It is still uncertain how hydrological extremes will change with global warming as we do not fully understand the processes that cause extreme precipitation under current climate variability. Progress has been limited so far in this area due to the lack of data available to researchers. The INTENSE project, part of the with the World Climate Research Programme (WCRP)'s Grand Challenge on 'Understanding and Predicting Weather and Climate Extremes', has used a novel and fully-integrated data-modelling approach to provide a step-change in our understanding of the nature and drivers of global sub-daily precipitation extremes and change on societally relevant timescales.

The first step towards achieving this was to construct a new global sub-daily precipitation dataset. The dataset contains hourly rainfall data from ~25,000 gauges across >200 territories from a wide range of sources. A rigorous, flexible quality-control algorithm has been developed to ensure that the data collected is as accurate as possible. The QC methodology combines a number of checks against neighbouring gauges, known biases and errors, and thresholds based on the Expert Team on Climate Change Detection and Indices (ETCCDI) Climate Change Indices. An open source version of the QC software will set a new standard for verifying sub-daily precipitation data.

A set of global sub-daily precipitation indices have also been produced (and will be made freely available later this year) based upon stakeholder recommendations including indices that describe maximum rainfall totals and timing, the intensity, duration and frequency of storms, frequency of storms above specific thresholds and information about the diurnal cycle. The talk will discuss the major findings from the production of these new global sub-daily precipitation indices.