DeCaGloPreCEs: Decadal to multi-deCadal Global Predictions of Compound Events

Description

Compound events (CEs) can pose significant threats to societies, economies and ecosystems around the world, especially when amplified by anthropogenic climate change (ACC). There is therefore a strong need for skilled, reliable and actionable predictions of how CEs are expected to change in the next decades to help governments and stakeholders implement robust adaptation strategies.

In the DeCaGloPreCEs project, we will develop a method to improve near-term projections of CEs at the global scale, taking into account their response to both climate variability and long-term warming, and develop a sound physical mechanism understanding of theirmeteorological drivers. First, we will constrain climate projections with decadal climate predictions, from the Coupled Model Intercomparison Project Phase 6, with a novel method to reduce the uncertainty and increase accuracy of ACC predictions up to 30 years. We will then apply an innovative method grounded in dynamic systems theory for quantifying CEs and link them to physical extremes in the global regions where the prediction of events require high skill levels.

We will specifically focus on temperature-(low) precipitation as related to summer heat waves and precipitation-wind as a proxy for storms. The analysis will elucidate what drives CEsin the context of global warming and climate variability, to what extent they can be predicted on decadal to multi-decadal timescales, and how their frequency, intensity and persistence is expected to change in the future. We will furthermore explore theatmospheric drivers of the CEs, to elucidate specific physical mechanisms at the origin of the events. The outcomes of the project will be significant for the scientific community as it will improve their understanding of how CEs respond to ACC and climate variability, and is relevant for governments and stakeholders who aim to reduce losses from high-impact weather events, thereby benefiting societies and economies around the world.

Barcelona Supercomputing Center - Centro Nacional de Supercomputación