EGU23-11196, updated on 23 Apr 2024
https://doi.org/10.5194/egusphere-egu23-11196
EGU General Assembly 2023

Detection of disastrous convective events in the great alpine region and analysis of their sensitivity to the climate change

Emanuela Pichelli[1] and the CORDEX-FPSCONV Team[*]
[1]Abdus Salam International Centre for Theoretical Physics, Trieste, Italy
[*]A full list of authors appears at the end of the abstract

An abnormal episode of high rain or snow is classified as heavy precipitation; its extreme intensity and driver mechanisms can vary a lot depending on location and season. The most extreme events can turn into a severe impact at ground (in terms of flood or flash-flood, human casualties and injuries, ecosystem and economy damages and losses).

We have implemented a method to detect the most extreme precipitation events trough 10-year long dataset of high-resolution observations and built on a list of the most disastrous ones occurred between 2000 and 2009 within the so called great alpine region (1°–17° East, 40°–50° North).

The method is then applied to the models belonging to the coordinated experiment CORDEX-FPS dedicated to convection and the ensemble at the convection permitting scale is able to represent the 70% of such kind of extreme events. The main drivers of the extreme precipitation are analysed and the factors affecting the model ability in correctly reproducing the unsuccessful cases are also investigated.

The same framework has been applied also to the model projections under the RCP8.5 scenario to study the sensitivity of such episodes and of their driving mechanisms to the climate change. The extreme events are projected to increase in frequency especially in the fall season over sub-regions with prevailing orographic forcing, whereas the events related to complex mesoscale interactions are projected to affect larger areas at the end of the century, posing the conditions of increased flood risk.

CORDEX-FPSCONV Team: Nikolina Ban, Sophie Bastin, Segolene Berthou, Susanne Brienen, Erwan Brisson, Cecile Caillaud, Rita M. Cardoso, Steven Chan, Ole Bøssing Christensen, Marie-Estelle Demory, Hylke de Vries, Andreas Dobler, Hendrik Feldmann, Klaus Gorgen, Eleni Katragkou, Klaus Keuler, Torge Lorenz, Sebastian K. Muller, Hans□Juergen Panitz, Mario Raffa, Pedro M. M. Soares, Kirsten Warrach-Sagi and al.