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Climate change impacts on extreme rainfalls, discharges and floods in Mediterranean mesoscale catchments

Antoine Colmet-Daage (1,2,3), Emilia Sanchez-Gomez (1), Sophie Ricci (1), Cécile Llovel (2), Valérie Borrell-Estupina (3), and Eric Servat (4)

(1) CECI, CERFACS – CNRS TOULOUSE, Toulouse, France , (2) WSP France, Toulouse, France, (3) Hydrosciences Montpellier, Univ. Montpellier, Montpellier, France, (4) Institut Montpelliérain de l'Eau et de l'Environnement – IRD, Montpellier, France

Northern mediterranean meso-scale river catchments are submitted to extremes floods events linked to intense convective precipitation and local hydrologic features. The Mediterranean region is known to be one of the most affected areas by global warming, and it is likely that changes can be expected in the hydrological cycle. The aim of this study is to assess the climate change impacts on extreme precipitation events using a so-called "futurization" method, in which a transfer function is built by comparing the quantiles of distribution for both present and future climate precipitation. The climate change impact on extreme precipitation events is assessed over high resolution EuroCORDEX and MedCORDEX simulations. The focus is made on three catchments, the Lez and the Aude located in France, and the Muga, located in northeastern Spain. Eight pairs of global and regional climate models are analyzed with respect to the SAFRAN product. Firstly, the model skills are evaluated in terms of mean and extreme precipitation over past period. Then future changes in extreme precipitation, under two emission scenarios, are estimated through the computation of past/future change coefficients of quantile-ranked model precipitation outputs. It was highlighted that extreme precipitation events are intensified over the three catchments with a smaller ensemble spread under RCP8.5 revealing more evident changes, especially in the last part of the 21th century. A set of historical precipitation leading to recorded flood events, are "futurized" using the past/future change coefficients. Finally, the hydrological impacts of those future counterpart precipitation events would be assessed through hydrological models.