Geophysical Research Abstracts
Vol. 21, EGU2019-14780, 2019
EGU General Assembly 2019

The added value of convection-permitting model in simulation of extreme precipitation events in the South of France and surroundings

Linh Luu-Nhat, Robert Vautard, and Pascal Yiou

Laboratoire des Sciences du Climat et de l'Environnement, UMR 8212 CEA-CNRS-UVSQ, IPSL and Université Paris-Saclay, Gif-sur-Yvette, France (linh.luu@lsce.ipsl.fr)

Climate simulations at convection-permitting resolution have been used more frequently thanks to the development of computational power. Those simulations can produce realistic surface fields in regions of complex orography that play a vital role in initializing convective processes. They also resolve physically deep convection system in sub-grid scale. Consequently, the simulation of downpour events, especially in sub-daily time scale, is expected to be enhanced and better represented in a changing climate, which is necessary for climate impact studies. In this research, we investigate the advantages of using two ensembles of high resolution (approx. 3 km) simulations in replicating extreme precipitation in both daily and shorter time scale over the South of France during a historical period (1951-1980). These two convection-permitting simulations (CPS) are performed with the Weather Research and Forecasting Model (WRF). They are forced by EURO-CORDEX simulations, which are also downscaled with WRF at the resolution of 12-km and driven by HADGEM and IPSL models (i.e. the 3-km is not nested simultaneously within 12-km downscaling from GCMs). All simulations are evaluated using a metric of extreme indices against in-situ and gridded observations to quantify the added value of CPSs compared to convection-parameterized simulations. In addition, the analysis of the dependence of water holding capacity on temperature is also considered. These assessments would facilitate a more reliable attribution of extreme hourly precipitation to climate change, which has been a big challenge to scientific community so far.