Plinius Conference Abstracts
Vol. 16, Plinius16-74, 2018
16th Plinius Conference on Mediterranean Risks

Characterization of French heavy precipitating events systematic rainfall error patterns and link with typical synoptic environments with a 30 years ensemble hindcast dataset

Matteo Ponzano, Bruno Joly, Philippe Arbogast, and Laurent Descamps
CNRM, Toulouse, France (matteo.ponzano@meteo.fr)

The western Mediterranean region is prone to devastating flash-flood events induced by heavy precipitation events (HPEs), which are responsible for considerable human and material damage. Quantitative precipitation forecast has improved dramatically in the recent years to produce realistic accumulated rainfall estimation. Nevertheless, reducing uncertainties of initial conditions analysis and physical processes modeling remain challenging issues. The predictability of HPEs could be improved through an improved characterization of systematic errors in numerical modeling. Météo-France operational ensemble system is a 35 members short-range ensemble model, PEARP (Prévision d'Ensemble ARPEGE, Descamps et al., 2015). Based on PEARP multiphysics framework, a 30-year hindcast data set (1981-2010) with a reduced number of members (10) and 4.5 days leadtime, as well as a daily rainfall database produced by interpolation methods, have been set up. A verification of quantitative precipitation by means of probabilistic and deterministic scores of daily precipitation over a 0.1° grid has been performed on the French Mediterranean region over the 30 years. As expected it shows that forecast errors depend mainly on amplitude, location and leadtime. Two calibration tests, quantile mapping (Gudmundsson et al., 2012) and extended logistic regression (Roulin et al., 2012), are applied to the operational ensemble where the reforecast data set is used as training data set. The calibrated model shows that the improvement of predictability is significant only for daily rainfall below 40 mm. This result arises mainly from the double penalty in the verification scores due to a spatial/temporal lag between forecast and observed rainfall field. Therefore, a verification of model error based on SAL measure (Wernli et al., 2008) is used in order to estimate the model error as a function of the rainfall field structure properties. Further, the perspective to project these rainfall patterns onto large scale patterns computed from a clustering analysis that takes into account physical variables correlated to HPE is addressed.