Vers une amélioration du déclenchement de la convection dans un modèle climatique régional tenant compte des caractéristiques orographiques de petite échelle

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Most regional climate models (RCMs) face difficulties in representing a reasonable precipitation probability density function in the Mediterranean area and especially over land. Intensity of heavy precipitating events is underestimated and not well located by most state-of-the-art RCMs using parameterized convection (resolution from 10 to 42.5 km). Convective parameterization is a key point for the representation of such events and recently, the new physics implemented in the CNRM-RCM has been shown to remarkably improve it, even at a 50-km scale.

The present study seeks to further analyse the representation of heavy precipitating events by this new version of CNRM-RCM using a processes oriented approach. We focus on one particular event in the south-east of France, over the Cévennes. One hindcast experiment with the CNRM-RCM (42.5 km) is performed and compared with a simulation based on the convection-permitting model Méso-NH, which makes use of a very similar setup as CNRM-RCM hindcasts. The role of small-scale features of the regional topography and its interaction with the impinging large-scale flow in triggering the convective event are investigated and have been shown to be of importance. A diagnostic of pertinent subgrid-scale elements favourable to convection is suggested. This study provides guidance in the ongoing implementation and use of a specific parameterization dedicated to account for subgrid-scale orography in the triggering and closure conditions of the CNRM-RCM convection scheme.