Plinius Conference Abstracts
Vol. 16, Plinius16-40, 2018
16th Plinius Conference on Mediterranean Risks

Performance Assessment of two Land Surface Models in WRF during Convective Summer Storms over the Túria River Basin (Eastern Spain)

Pau Benetó-Vallés, Jose Luis Palau, and Francisco Pastor

Mediterranean Center for Environmental Studies (CEAM), Meteorology and Pollutant Dynamics, Paterna (Valencia), Spain (pau@ceam.es)

The typical atmospheric conditions during the late spring and summer in the eastern coast of the Iberian Peninsula favor the development and triggering of convective and orographically aided storms. These type of meteorological phenomena, commonly known as summer storms, are typically associated with sea-breeze entrance and instability at higher atmospheric levels, and they are usually short-lived and localized events that can produce intense rainfall and floods. The prediction of summer storms using mesoscale models still represents a challenge in numerical weather prediction. Thus, this study analyzes the performance of two soil-vegetation-atmosphere exchange models implemented in the Weather Research and Forecasting (WRF) model in order to enhance storm prediction systems.

A total of seven convective precipitation episodes within the Túria River Basin (eastern Spain) were identified in the period from May 1st to October 31st, 2015. The most significant events occurred on July 22nd, July 31st and August 22nd with maximum rainfall measurements of 41, 89 and 81 mm in less than three hours, respectively. These three rain episodes are analyzed using two-domain simulations of 1.1km (Valencia region) and 380m (Túria River Basin) horizontal resolutions for two different Land Surface Model (LSM) configurations: Pleim-Xiu and Noah-MP. High-resolution simulations are initialized with a long-term (May-October 2015) simulation covering the Iberian Peninsula with a horizontal resolution of 3.4km and 44 levels in the vertical.

In order to determine the most suitable LSM for summer storms forecasting in this Mediterranean region, this study presents an identification and quantification of the role that soil-vegetation-atmosphere energetic exchanges play in the formation, development and triggering of the selected precipitation episodes for each WRF configuration.

ACKNOWLEDGEMENTS
The CEAM Foundation is supported by the Generalitat Valenciana (Spain). This study is partially funded by the Spanish Ministry of Science and Technology, through the research project “VERSUS” – CGL2015-67466-R and by the Conselleria de Cultura (Generalitat Valenciana, SPAIN) research project “DESESTRES”–PROMETEOII/2014/038