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Exploiting the FinisTerrae supercomputer to improve the characterization of spatio-temporal predictability of severe weather events

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The accuracy in the spatio-temporal modeling of atmospheric scenarios inducing intense rainfall processes is very important in studying and forecasting extreme events. Nowadays available tools for weather forecast include numerical weather prediction models and meteorological observations, however it is often missed an adequate and dedicated infrastructure of computation to enable their connection. An attempt to fill this gap has been made by exploiting the FinisTerrae resource hosted at CESGA, access funded by the Spanish Ministry of Science and Innovation (ref.: ICTS-2009-40).
FinisTerrae has been utilized to investigate the Weather Research and Forecasting model (WRF) for a library of extreme precipitation events already occurred in Mediterranean areas. Using FinisTerrae, we run WRF on larger domains at finer resolution, improving the simulated spatial description of storm structure for the aforementioned library. In this scenario, we evaluate several configurations for the simulation of the same event considering different turbulent and microphysical parameterizations and varying the nesting-scheme. The final aim is the comparison of simulation data and corresponding available observations to estimate the impact of various parameterization schemes to the forecast error growth rate, optimize the set of model parameters and evaluate the role of mesoscale model. In this way, we would provide a contribution in the identification of the main sources of uncertainty associated with predictions.