



## **A methodology to determine the optimum WRF-ARW configuration over Andalusia (Spain)**

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There is an inherent uncertainty in NWP modelling results. The objective of this study is to present a methodology to find the optimum Weather Research and Forecast (WRF-ARW) configuration which reduces this uncertainty. The project is located over a coastal region in Andalusia (South Spain).

Different dynamical (diffusion and damping options) and physical (microphysics, long- and short-wave radiation, cumulus and planetary boundary layer schemes) configurations have been tested in order to evaluate the sensitivity of the model. We have also studied the influence of different vertical levels distributions as well as the impact of different high resolution elevation (ASTER and SRTM) and land use (CLC2006 and CCI-LC) data inputs. Finally, we have realized experiments using 3-dimensional variation data assimilation.

Each configuration has been modelled for four chosen months in 2014. Each month selected belongs to a different season. The best configuration has been selected using the results from a numerical deterministic validation (RMSE, MB, MAGE). The optimum configuration is the one which reduces the uncertainty in all the meteorological variables evaluated.

The optimum configuration obtained has been validated using a two years period (2012 and 2013). We have done a numerical deterministic validation and also a categorical validation for the wind speed using the Beaufort scale as categories.

A significant reduction in the model uncertainty is found comparing the results of the final configuration and the results of WRF default configuration.