AEMET-γSREPS: The Spanish Convection-permitting LAM-EPS

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Since 26th April of 2016 the Spanish Meteorological Agency (AEMET) is operating a mesoscale Ensemble Prediction System called AEMET-γSREPS. Currently γSREPS is daily integrated up to 48 hours over Iberian Peninsula twice per day at 00 and 12 UTC and once over Canary Islands at 00 UTC. It is run as well at 00 UTC around the Livingston Island during the Spanish Antarctic Campaign from 1st December to 31st March.

The main γSREPS goal is to improve operational forecasts with a measure of their predictability: on one hand of the severe weather events as heavy precipitation ones, and the other hand, the local surface variables with social impact. For this reason mesoscale horizontal and vertical resolutions of the system are essential to take into consideration the effect of soil characteristics and orography, and to resolve explicitly some physical processes which may become very important in forecasting the location and intensity of the events, as for instance, deep and organized convection around Mediterranean basin. Currently γSREPS is finishing its test phase by AEMET forecasting offices and 1st October will become fully operational.

AEMET- γSREPS is a 20-members multi-NWP model and multi-boundaries LAM-EPS system which comes up crossing four non-hydrostatic convection-permitting NWP models at 2.5 Km: HARMONIE-AROME (HIRLAM), ALARO (ALADIN), WRF-ARW (NCAR-NOAA) and NMMB (NCEP-NOAA); with five global NWP models' boundary conditions: ECMWF-IFS, NCEP-GFS, MétéoFrance-ARPÈGE, JMA-GSM (Japanese) and CMC-GEM (Canadian). Multi-model and multi-boundaries approaches have been selected to take into account the NWP model and boundary conditions uncertainties respectively due to hold a better skill-spread relationship than other EPS techniques.

γSREPS performance is shown through case studies and an objective verification with standard probabilistic verification scores comparing it with ECMWF EPS, used as a proxy, and with MétéoFrance AROME-EPS.

Current and foreseeable AEMET-γSREPS system developments are going to be: include assimilation, LETKF or a 3DVAR EDA, include GEM-LAM 2.5 km as a fifth mesoscale model increasing the number of members to 25, calibration of surface parameters as precipitation, wind and 2m temperature in relevant locations, and an automatic monthly verification compared to ECMWF EPS.