Applications of LAPS/STMAS as a high-resolution real-time 3D analysis tool

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A High-resolution analysis can be obtained combining NWP outputs with observations measured by dense meteorological networks. Such analysis takes advantage of the physical constrains of the NWP models and retrieves information at finer scales from the observational platforms. As a result, it proves a useful analysis tool for reanalysis and also for meteorological surveillance purposes when used in a real-time basis.

At the Meteorological Service of Catalonia (Meteo.cat) a three dimensional analysis system based on LAPS (Local Analysis and Prediction System) and STMAS (Space-Time Multiscale Analysis System) has been implemented. Analyses are updated every 30 minutes in a domain centered over Catalonia with a grid-length of 1 km. As a background, the system uses WRF-ARW outputs at 3 km resolution from a configuration intended for a very short range forecasts and updated every 3 hours. The main sources of observational data ingested in this system include AWS and radar (reflectivity and radial velocity) observations from a dense local network as well as satellite imagery of MSG (Meteosat Second Generation).

Focusing on its usefulness for meteorological surveillance, several examples and applications are presented, like low-level convergence and thermal inversions events, and virtual observations for current weather conditions where no station is available.