Aladin LAEF

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Many National Meteorological Centers (NMCs) in Europe already integrate their deterministic limited area models on scales around 5 km or even smaller. The small scales are naturally bound to the higher uncertainties, especially when related to the unstable situations with low predictability. To tackle the above phenomenon, the ensemble numerical weather prediction systems are used. However, to operate such a system is computationally very demanding task. Small NMCs seldom have the means to run it on their own. Hence, the operational ensemble forecasting remains in the realm of large forecasting centers, often using global models and focusing on the longer forecast ranges. Therefore, a meso-scale ensemble system ALADIN-LAEF based on the limited area model ALADIN has been developed in frame of RC LACE cooperation, focusing rather on short range probabilistic forecast and profiting from advanced multi-scale ALARO physics. Its main purpose is to provide probabilistic forecast on daily basis for the national weather services of RC LACE partners who could not achieve that on their own. It also serves as a reliable source of probabilistic information applied further into the downstream models of hydrology, energy industry and even in the nowcasting. It became operational in 2011, at that time having horizontal resolution of 18 km and 37 vertical levels. In 2013 the first substantial upgrade was made, containing the increase of horizontal and vertical resolutions to 11 km and 45 vertical levels respectively, geographically bigger computational domain, optimized model errors simulation and new ensemble of surface data assimilations involving perturbed screen-level conventional observations. Nowadays, the ALADIN-LAEF system faces its further enhancement going towards even finer horizontal and vertical resolutions: 5 km and 60 vertical levels respectively, with several other upgrades. The ALADIN-LAEF system runs operationally on High Performance Computer Facility at ECMWF twice a day with the integration starting at 00 and 12 UTC going upto 72 hours. The ensemble consists of 1 unperturbed control run and 16 perturbed members involving initial condition (IC) uncertainty, model error simulation and coupling to perturbed lateral boundary conditions rendered by ECMWF ENS.