



How does MeteoSwiss serve society with better weather forecasting information?

Guy de Morsier, Marco Arpagaus, and Oliver Fuhrer

Federal Office of Meteorology and Climatology (MeteoSwiss), Zurich-Airport, Switzerland (guy.demorsier@meteoswiss.ch)

We present the new NWP forecasting system of MeteoSwiss based on the COSMO model and implemented in 2016. The main components are a high resolution deterministic forecast and an ensemble prediction system (EPS) with respectively a mesh-size of 1km and 2km. The increased resolution is crucial for a country where the topography is complex as in Switzerland. The EPS uses 21 members and is started from an ensemble data assimilation system (EDA) which randomly perturbs the parametrized physical tendencies (SPPT) and includes soil moisture perturbations and by these means provides an optimal combination of model and observations based on error statistics (KENDA). This method features flow-dependent errors for the 40 computed first guesses and therefore generates an initial spread to the EPS forecasts. Apart from a very much increased amount of computer power needed, this new system allows forecasters to inspect the forecasted weather with much more details and with probabilistic information. This is particularly useful in weather situations where the exact location of convection or when the occurrence of an extreme precipitation or wind storm event needs to be assessed.

We show how the components of the system are configured and how they are operated on the new hybrid high performance computer system we are using at the Swiss National Supercomputer Centre (CSCS) in Lugano. Compared to the old deterministic systems at 2 and 7 km mesh-sizes the COSMO code had to be optimized (physics) and in certain parts re-written (dynamics) to be able to use the full advantage of the many built-in graphics processing units (GPUs). Additionally the model is able to run in “single precision” mode which further increases the code efficiency. Finally, examples of meteorological results illustrate how customers can be informed.