COSMO-SREPS analysis over the alpine area.

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The SREPS Priority Project focussed on the building up of a high-resolution ensemble system for the short-range. The project main tasks were to implement such an ensemble, to run it over extensive testing period and to evaluate the system features and performances over those periods.
Aiming at a statistically robust testing, COSMO-SREPS was run for the whole MAP D-PHASE DOP (June to November 2007). At ARPA-SIM, an evaluation of the system over this period over an alpine area was carried out, addressing two main issues: 1) how the different perturbations contribute to the spread and to the skill of the system 2) which is the ensemble skill in the forecast of surface weather parameters.
The relationship between the ensemble spread and skill is analysed in terms of some parameters, both surface and upper air (e.g. 2-meter temperature, mean sea level pressure, temperature at 850 hPa, geopotential height at 500 hPa,...). Results show that there is a correlation between spread and error, though the system turns out to be underdispersive.
The relative impact of driving-model and limited-area model perturbations is also investigated. Results show that the inclusion of the limited-area model error allow to increase the spread of the ensemble to values closer to the error, in terms of surface variables. It is also shown that, while different driving models contribute differently to the ensemble skill, the different parameters are almost equivalent.
Finally, an experimental suite (CSPERT) was run over a 3 month period (Autumn 2007), where the COSMO model was perturbed by applying 16 different physics parameter perturbations, aiming at defining a suitable set of model perturbation to be adopted for the future system implementation. The analysis of this suite has shown that some parameter perturbations do not affect significantly the model performances, while other parameter perturbations seem promising in further improving the spread of the system.