Minutes of the meeting of COSMO WG7 (WG on Predictability and Ensemble Methods) and SPRED Priority Project, Offenbach, 10th March 2016

Participants:
Dmitri Alferov (RHM), Marco Arpagaus (MeteoSwiss), Elena Astakhova (RHM), Zied Ben Bouallegue (DWD), Grzegorz Duniec (IMGW), Christoph Gebhardt (DWD), Michael Buchhold (DWD), Regina Kohlhepp (DWD), Chiara Marsigli (Arpae-SIMC, WG7 coordinator), Andrzej Mazur (IMGW), Andrea Montani (Arpae-SIMC), Susanne Theis (DWD).

Minutes:

The agenda of the meeting includes some presentation and discussion moments.

Andrea Montani presents some results about COSMO-LEPS updates.

1) the impact of using ICON-EU soil fields instead of COSMO-EU soil fields on a 30-day period: no noticeable impact found
2) test of SPPT (June-July 2015): positive impact according to several skill indices.
3) the plan is to upgrade COSMO-LEPS at 20 members, running the model in single precision, after a test period during April/May. The implementation is planned for the end of the summer (before the GM).

MA reports that the SP model version has problems when running the nudging DA and that at MCH they use a private version of the COSMO code.
EA reports that they had problem in the cloud cover using the model in SP on one case (shown later).
CM reports that the impact of SPPT in COSMO-IT-EPS (2.8 km) were not as good as for COSMO-LEPS (shown in the plenary)

Christoph Gebhardt presents the recent results from COSMO-DE-EPS.

1) test of ICs from KENDA
2) test of the scheme for model error developed by Ekaterina Machulskaya (3 week period): in 2m temperature there is an increase of the spread while keeping the same rms error,but it has been noticed that one member was producing a very localised cold spot (similar error found at MCH with SPPT), solved by decreasing the size of the perturbation. More testing is needed.

MA underlines that the SPPT perturbs the tendencies of the different variables in the same way, while the EM scheme perturb them independently, affecting the balances.

3) The value of rlam_heat x rat_sea is kept fix in the parameter perturbations, otherwise there a detrimental effect in 2m temperature was observed (too high spread over sea).
4) KENDA will be operational between end of this year and beginning of next, COSMO-D2-EPS is postponed to 2017, 40 member ensemble is also postponed.

ST and all: we should look also the day-by-day variation of the spread, which should follow the day-by-day variation of the error.

ST informs about the work of K. Kober, about process perturbation for COSMO (perturbations proportional to the variance of the tendencies coming from the turbulence scheme): it is not ready

for being implemented and tested in a full ensemble framework, we can follow the developments of the process study and consider its testing at a later stage.

Regina Kohlhepp presents her work on model parameter perturbation for energy applications (within ORKA project).

1) Randomization of parameter perturbation has been tested, together with the perturbation of new parameters (thick_sc, radqx_fact, a_stab, c_diff). An positive impact on the wind has been found.

Zied Ben Bouallegue presents a calibration method based on the method dECC (dynamic ensemble copula coupling), carried out within the EWeLiNE project.

1) The copula is a sort of meta-model which brings back into the ensemble the inter-dependencies between the variables after they have been calibrated independently.
2) The verification is product oriented, in terms of daily mean (mean wind speed over a day) and wind ramp (maximal upward wind ramp over a day)

Marco Arpagaus presents the recent results obtained with COSMO-E.

1) There are problems in t and td in the first hours of the forecast due to the use of KENDA, which are under investigation.
2) The improvement of COSMO-E over COSMO-LEPS is particularly evident in summer.
3) itype_qxpert_rn should be set to 2, indicating that all microphysics species should be perturbed.
4) Problem is SPPT decreases too much the contribution of the physics tendencies, solved by not applying SPPT at the 2 lowest model levels
5) COSMO-LEPS reforecast will be discontinued at the end of the year

Elena Astakhova presents results from SPPT application in the ensemble (SPRED PP).

1) the spread skill relation of the ensemble is evaluated for both 7 and 2.8 km ensemble, showing also stamp maps of spread evolution
2) in a case over the Arctic region it has been found a very large difference between the SP and DP ensemble runs with SPPT.
3) It is planned to use GEFS for the Boundary Conditions of the ensemble (problems with int2lm at the moment)

Andrzej Mazur presents results from their ensemble (TLE-MVE), SPRED PP.

1) ICs and BCs are provided by 4 successive ICON deterministic run (intermediate step with COSMO 7 km), then soil perturbations are applied to each member
2) Rmse and spread maps are shown and compared. Rmse is computed on observation points and then interpolated with a Kriging, to be compared with spread, computed in the same way.
3) Calibration for 2m T will be developed based on linear regression but stratifying on the basis of the ICs/BCs
4) It is planned to apply logistic regression to calibration of precipitation

After lunch WG7 joins WG5 for the presentation of the new DWD verification SW by Felix Fundel.

Finally, the discussion takes place.

Michael Tsyrulnikov informs that the pattern generator developed by RHM will be made compliant with the COSMO code standards.

Interesting results at DWD include:
1) The problem over the sea due to the joined perturbation of rlam_heat and rat_sea
2) The problem of c_diff perturbation (too high value)
3) tur_len is a parameter with the largest effect on precipitation

It is mentioned the work of Pirkka Ollinaho (ECMWF) on the introduction of parameter perturbations in their ensemble.

It is mentioned the work of Dey at al on FSS decomposition, for spatial verification.

How to assess the spread in the structure of the meteorological fields? Does SAL permit to assess such component of the spread? Is day-to-day variability of the spread similar to the one of the error?

CG suggests to compute also the spread/skill relation with respect to analysis, not only of observations, to exclude model error.

It is suggested to compute also the spread/skill relation on vertical profiles, to assess the vertical structure of the error and its representation in terms of spread.

Dulcis in fundo, next year we will ask for a larger meeting room for WG7!