Minutes of the meeting of COSMO WG7 (WG on Predictability and Ensemble Methods) and PROPHECY PP, Web-conference, 11th March 2022.

Participants:

Maike Ahlgrimm (DWD), Marco Arpagaus (MCH), Evripidis Augoustoglou (HNMS), Sascha Bellaire (MCH), Grzegorz Duniec (IMGW), Christoph Gebhardt (DWD), Pavel Khain (IMS), Yoav Levi (IMS), Chiara Marsigli (DWD, WG7 coordinator), Andrzej Mazur (IMGW), Christoph Schraff (DWD), Andre´ Walser (MCH).

Agenda:

13:00 – 13:20 Andrzej Mazur: “PROPHECY activities at IMGW”

13:30 – 13:50 Pavel Khain, Alon Shtivelman and Yoav Levi: "Comparison of ICON-EPS and COSMO-EPS over the Eastern Mediterranean"

14:00 – 14:20 Andre´ Walser, Sascha Bellaire: “Implementation of SPPT in ICON”

14:30 – 14:45 break

14:45 – 15:00 Chiara Marsigli and Christoph Gebhardt: “Test of PSP2 in ICON-D2-EPS”

15:10 – 15:30 Maike Ahlgrimm: “Impact of stochastic shallow convection scheme on ensemble forecast spread”

15:40 – 16:00 Evripidis Augoustoglou: “Progress on the Seasonal Dependence of the Sensitivity of ICON model parameters over the Central Mediterranean Region“

16:10 – 16:20 Chiara Marsigli: “New products for COSMO-2I-EPS”

16:30 – 17:00 Discussion. Nest steps of PROPHECY, open issues

Minutes:

The meeting alternates presentations and discussion.
The presentations can be found at:
http://www.cosmo-model.org/view/repository/wg7/2022/ICCARUS

- Andrzej Mazur: “PROPHECY activities at IMGW”
Several parameters have been tested as perturbations in the TLE-MVE ensemble, but no decision to include them in the operational suite has been made yet. As for the perturbation of the initial soil temperature field, it has been found beneficial to apply the perturbation down to 2.5 m. Maps of probability of impact have been shown for a case of volcanic eruption, based on ensemble forecast trajectories.

- Pavel Khain: " Comparison of ICON-EPS and COSMO-EPS over the Eastern Mediterranean"
ICON-EPS has parameter perturbation (PP), while COSMO-EPS has SPPT. The former has lower RMSE but also lower spread, in particular for wind. Spread-error relation is computed by considering also an Observation Representativity Error (ORE) based on the INCA analysis. Precipitation scores are comparable, with ICON-EPS slightly worse.

- S. Bellaire: “Implementation of SPPT in ICON”
A first basic SPPT implementation has been made in ICON. The Random Number Generator has to be implemented (possibly agreement with the work by M. Ahlgrimm), and it has to be selected a method to implement spatially correlated random numbers (PSP2 scheme can be used as a reference?). First test performed on CPU.

- C. Gebhardt: “Test of PSP2 in ICON-D2-EPS”
PSP2 scheme developed at LMU has been tested in ICON-D2-EPS. There is an improvement in the onset of the convection (earlier) but there is also a faster decrease. Open issue: the gusts diagnostics needs to be re-tuned, there is a problem of double counting. More experiments are ongoing at LMU in order to reduce the vertical extension of the perturbation according to the BPL height.

- M. Ahlgrimm: “Impact of stochastic shallow convection (SSC) scheme on ensemble forecast spread”
The spread generated by the SSC has been compared with the one generated by the perturbation of 4 convection parameters. SSC does not change the domain average T and qv tendencies, but it changes their distribution: longer tails and narrower peaks. It seems that SSC introduces an offset in the precipitation, earlier onset in some members. When applied to the global ensemble, the impact of SSC is larger (combination with parametrised deep convection).

- E. Augoustoglou: “Progress on the Seasonal Dependence of the Sensitivity of ICON model parameters over the Central Mediterranean Region“
The sensitivity analysis has been extended to the entire year, particularly covering the different seasons. In summary, high sensitivity has been found for these parameters: c_soil, rlam_heat, thkmin-thmmin, box_liq, tur_len, alpha1; gkwake for the gusts.

- C. Marsigli: “New products for COSMO-2I-EPS”
The new products for warnings of precipitation and gusts have been presented: beside mean, maximum and percentiles, summary tables (“chessboard”) have been developed, in order to condense the information from the probability maps and give a signal to the forecasters.

Discussion:
- the PSP2 scheme has been run with the shallow convection on. At MCH the 1km COSMO run has the shallow convection off, not clear what to do with ICON.
- The SMME work at DWD has now stopped and there are no plans for the moment.
- In general, the different perturbation schemes may be complementary and not mutually exclusive.
- at IMS ICON has implemented without grayzone tuning, because it generates too smooth rain, similarly to the deep convection scheme.
- a problem with the stationary cyclones over the Mediterranean has been observed at IMS, which gets too strong due to stationary SST, in contrast to ECMWF forecast.