

Minutes of the COSMO WG7 (WG on Predictability and Ensemble Methods) meeting, Offenbach, 7th March 2012

Participants:

Marco Arpagaus (MeteoSwiss), Leonhard Gantner (IMK-KIT), Christoph Gebhardt (DWD), Vera Kluepfel (IMK-KIT), Chiara Marsigli (ARPA-SIMC, WG7 coordinator)

Minutes:

The aim of this meeting was mainly to review the plans about convection-permitting ensembles in the COSMO Countries and enhance coordination.

First, the current works and the future plans have been presented.

At MeteoSwiss, it is planned to have an ensemble system at the convection-permitting scale (around 3km) operational in 2015. The system will cover the current domain of COSMO-2, will be run two times per day with 5 days forecast range and around 20 members. Initial condition perturbations should be based on the KENDA system, boundary condition perturbations will be provided by ECMWF EPS (or by COSMO-LEPS/SREPS).

There is interest in the developments about “stochastic physics” perturbations in COSMO.

[It has been reminded that the issue of having also the EPS in the BC project of ECMWF is still pending. During the SRNWP meeting on LAM-EPS held Bologna in Feb 2011, it was asked to ECMWF (M. Leutbecher) to have a testing dataset of high-resolution EPS. Chiara will contact Martin to monitor the status of this task.]

At DWD, COSMO-DE-EPS will become operational in summer 2012, in the present configuration (20 members). Then, it is planned to increase the number of members up to 40, by getting extra boundary conditions from COSMO-LEPS. The use of boundaries from COSMO-LEPS is currently under testing, by getting 4 members of COSMO-LEPS on which to nest 20 COSMO-DE-EPS members, symmetrically to what is done with the 4 BC-EPS runs.

A general redesign of the 40 members set-up is possible, including more physics perturbations.

[Since the Kain-Fritsch convection scheme will be soon removed from the model, it will disappear also as a COSMO-LEPS perturbation. Hence, it is suggested to avoid to use KF members for testing.]

Other physics perturbations will be studied, to improve the spread in variables other than precipitation. Work is on-going about calibration of COSMO-DE-EPS forecasts.

At ARPA-SIMC, it has started a project to develop a convection-permitting ensemble over Italy, in cooperation with USAM. Currently, perturbations of the parameters are being tested at the 2.8 km resolution over Italy. There is interest in testing the “stochastic physics” as well.

L. Gantner and V. Kluepfel (IMK-KIT) have summarized their work on convection-permitting ensemble with the COSMO model over West Africa. The ensemble is based on a downscaling of the EPS, performed with the clustering technique implemented in COSMO-LEPS, which has been modified to consider the variables most relevant for forecasting precipitation over the region. Soil moisture perturbations are also applied, by using different sources:

- IFS soil
- use of IFS soil type distribution
- SM derived from satellite rescaled to the TERRA climatology (which has been computed over one year)

It is planned to test a breeding technique for soil moisture perturbations.

It has been highlighted that the contribution of the research institutions is vital for the ensemble field, since in the services there are often little resources, especially for basic research and predictability studies.

Discussion has highlighted the need for a greater coordination in COSMO about ensemble development, due to the lack of resources, at least in providing a clear common framework.

ECMWF EPS will run at about 20 km of horizontal resolution in 2015. What is the future of COSMO-LEPS? It is possible to think to increase its resolution? Or other options should be considered? E.g. increasing the number of members? It is recalled that the number of members will be increased as an outcome of the CONENS project, by adding multi-model driven members to have an hybrid system (put in testing in 2012). It is worth to add a data assimilation?

Development is dependent on computing resources available at ECMWF. How many computing resources at ECMWF are currently invested in COSMO-LEPS/SREPS? How these will change in the near future? An estimation will be provided by ARPA-SIMC.

A common planning for COSMO-LEPS is needed, considering also the possibility of using it for boundaries for further downscaling (convection-permitting systems).

It has been decided to prepare a document about the framework for ensemble forecasting development in COSMO in the next few years, helping coordination and investment of resources. A draft will be prepared and circulated.

As for the short-term developments, there is a general interest about the “stochastic physics”. Chiara will keep contact with Lucio Torrisi about the implementation in the COSMO model. When the code will be fully implemented, some testing will be carried on (possible cooperation between ARPA-SIMC and MeteoSwiss).

It has also been underlined that the developments which are on-going at DWD about the selection of COSMO-LEPS members on which to nest COSMO at 2.8 km are of interest also for the other countries, in view of the development of convection-permitting ensembles.