Highlights and challenges - Looking back and forward

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Highlights of the past year (a personal view)

- ✓ **Data assimilation and use of observations:**
  access to, and studies how to optimize use of, high-resolution observations
  developments in flow-dependent assimilation (towards 4DEnVar)
  preparations for OOPS/COPE

- ✓ **Forecast model:**
  Dynamics staffing highs and lows
  Cloud and convection working group: solutions coming in, under testing
  High-resolution experimentation: geospatial data, dynamics, …

- ✓ **GLAMEPS/HarmonEPS:**
  Preparations for GLAMEPSv2, Sochi

- ✓ **Validation/verification/system:**
  First Harmonie RCR: Cy38 at DMI and MetCoop
  HARP: towards a first full release
  Discussions on common (tools for) DA, validation of cycles: Turkey experiment

- ✓ **Training: C++/OOPS, offline Surfex, …**

From use to optimal use of observations

Radar assimilation:

- extending to non-national radars
- SMHI setup to test radar exchange feasibility

Impact/sensitivity studies triggered a lot of (much needed) discussion:

- What is best DA cycling frequency?
- What level of thinning is needed? When are we assimilating noise?
- Blending with large scales from the global model: are we doing this in a sensible way?
- How damaging is model bias?
- What are the limitations of an assimilation method which isn't flow-dependent?
- … and many more…

=> Introducing greater flow-dependency matter of highest priority

Building the future DA algorithmic framework…

Long-term view:

- 4DEnsVar
- Build within OOPS framework (Cy41R1 code = starting point)

Building blocks:

- 4D-Var: now working together with Arome/Surfex
- 3D-Var/FGAT
- Hybrid ensemble 3D-Var/ ETKF

Physics and dynamics

- NH VFE: trying to achieve a full VFE scheme while remaining stable
- Another go at transparent LBC (weak formulation)?
- Testing ideas for getting rid of some low cloud/fog problems
- Work on getting the interaction between radiation, clouds, microphysics and aerosols right
- The new physics-dynamics interface
- Towards sub-km scales: some hurdles to cross

Probabilistic forecasting: pushing the limits

…GLAMEPS-v2: steps to enhance operational functionality

…HarmonEPS: introducing physics perturbations, making system environment more robust

…Calibration with ELR

…SRNWP: EPS workshop June; Experiments with LBC from IFS EPS.

…Frost-14 experiences

… and communication with users, of course…

Validation and verification

First experiences with Harmonie RCR (Cy38h1 released in February) and “scorecard”

“Turkish exercise”: implementation/ validation of Cy38 with Harmonie tools

HARP evolution:
first basic setup =>
=> extend to more users/developers =>
=> assess/extend desired functionality and robustness =>
=> design, define and create first official release =>
=> maintain and extend

Transparency, performance and efficiency

- Transparency, scalability of IFS/AAAH code = increasingly urgent problems
- OOPS/COPE should solve some of these issues for the DA part
- Surface assimilation: SODA aimed at making surface DA more advanced and flexible (discussion this meeting)
- Surface model: how to guarantee (future) performance for operational NWP?
- New phys-dyn interface: use as opportunity to clean up at least the main steering routines
- Scalability workshop, April: consider ways forward for the IFS/AAAH community. Hor2020 proposal for external funding?

So, for all of us…

Plenty of things still to do and to look forward to!

Have a productive and fun meeting!