Plans for GLAMEPS, HarmonEPS and FROST-14

Inger-Lise Frogner,
HIRLAM-B Project Leader for Probabilistic Forecasting

On behalf of the GLAMEPS/HarmonEPS team

GLAMEPS – plans for a version 2

GLAMEPS – possible updates in version 2

Based on two experiment periods in 2010/2011 the following experiments are underway with the full GLAMEPSv1 set up:

Ongoing:
- EXP_2.0: Control hindcast experiment for GLAMEPS_v1, *Reference experiment*
- EXP_2.1: Perturbations based on Hirlam CAPE SVs blended with ECEPS
- EXP_2.2: Perturbations based on Hirlam ETKF blended with ECEPS
- EXP_2.3: Perturbations based on Hirlam EDA blended with ECEPS

Considered:
- EXP_2.4: Increase number of Aladin members at the expence of the EC EPS members
- EXP_2.5: combining with LAEF?
- EXP_2.6: 4 runs a day with half ensemble size, lagging
- EXP_2.7: Increase resolution as ECMWF has a new computer

CAPE SVs

Variance in 3h accumulated rainfall (domain averaged)
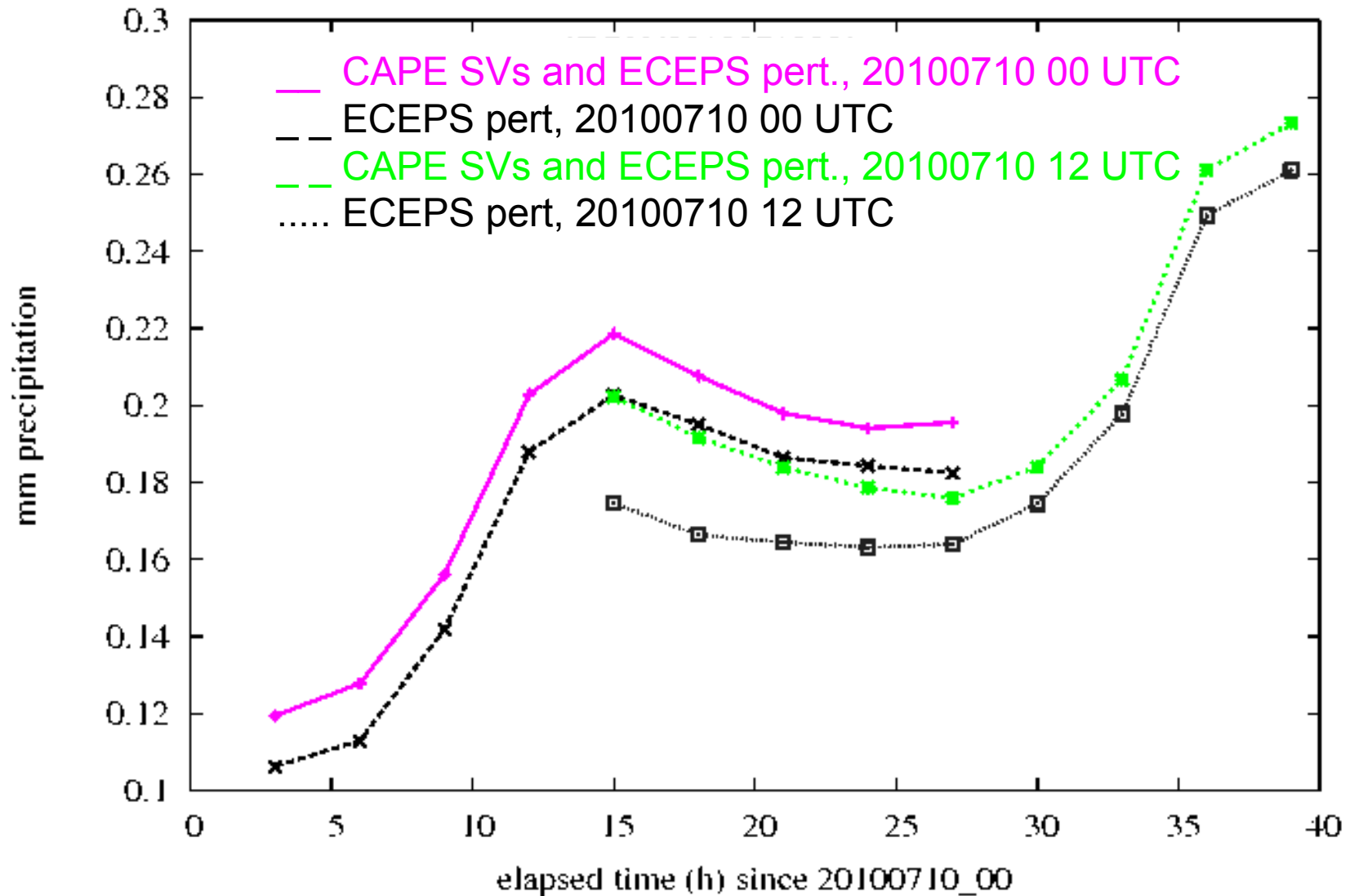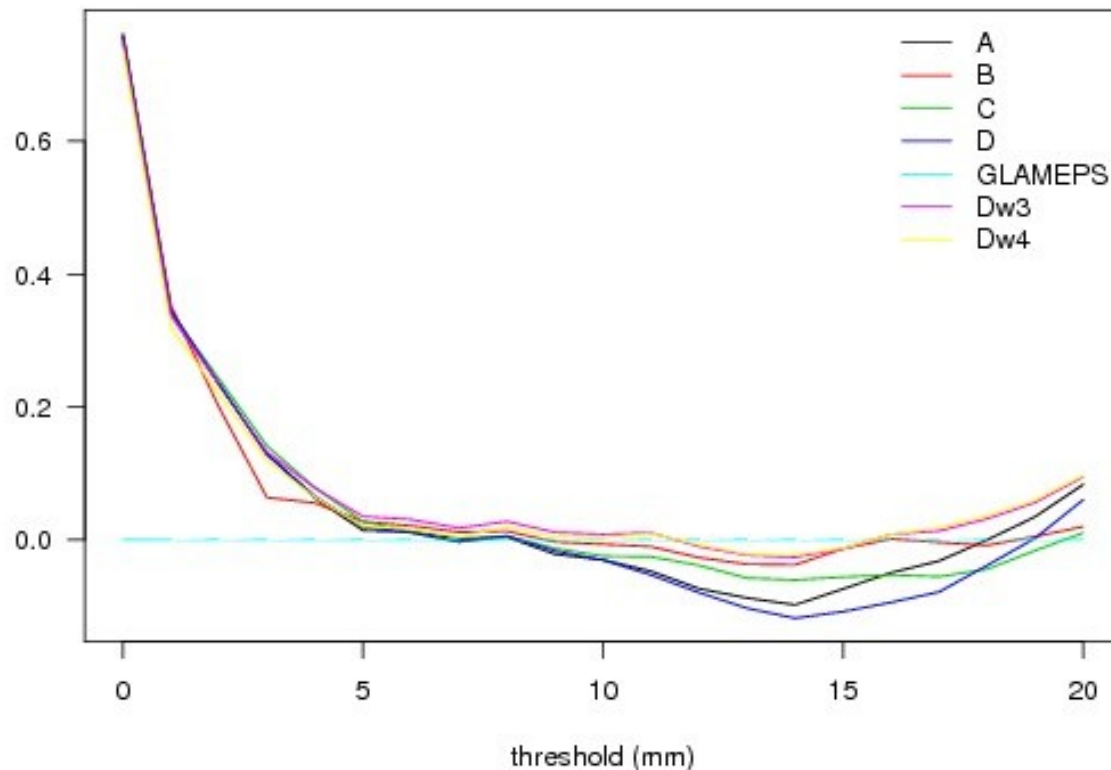
R&D for further improvements include:

A new R-based verification system is being developed

Post-processing and calibration work has started

Statistical post-processing for bias- and variance-corrections and multi-model combination (ELR)

Example from February 2012, 06 UTC + 30h.
For different ways of calculating ELR

Brier skill score

Planning HarmonEPS

Intention is to provide to the member weather services a prototype probabilistic forecast system on non-hydrostatic, convection-permitting scales
- Not pan-European

To enable reliable predictions of probabilities for high-impact weather events which are confined in space and time by:
- Meso-scale dynamical structures
- Orographic and other fine-scaled surface forcing

Planning "HarmonEPS" experiments - 1

General aspects:

- Convection-permitting Harmonie
- Sub-European test-areas and Sochi-area
- 2.5 km resolution
- + 36 h lead time (or less).
- 20 +2 members, 10 members with AROME and 10 with ALARO -> continue the multi-model approach
- Output to be produced every hour
- Full DA and 6 h cycling for the control

- RUC-experiments

Planning "HarmonEPS" : Proposed uncertainty strategies

Initial conditions perturbations:
- Perturbations from EC EPS
- (Later ETKF/LETKF/EDA)
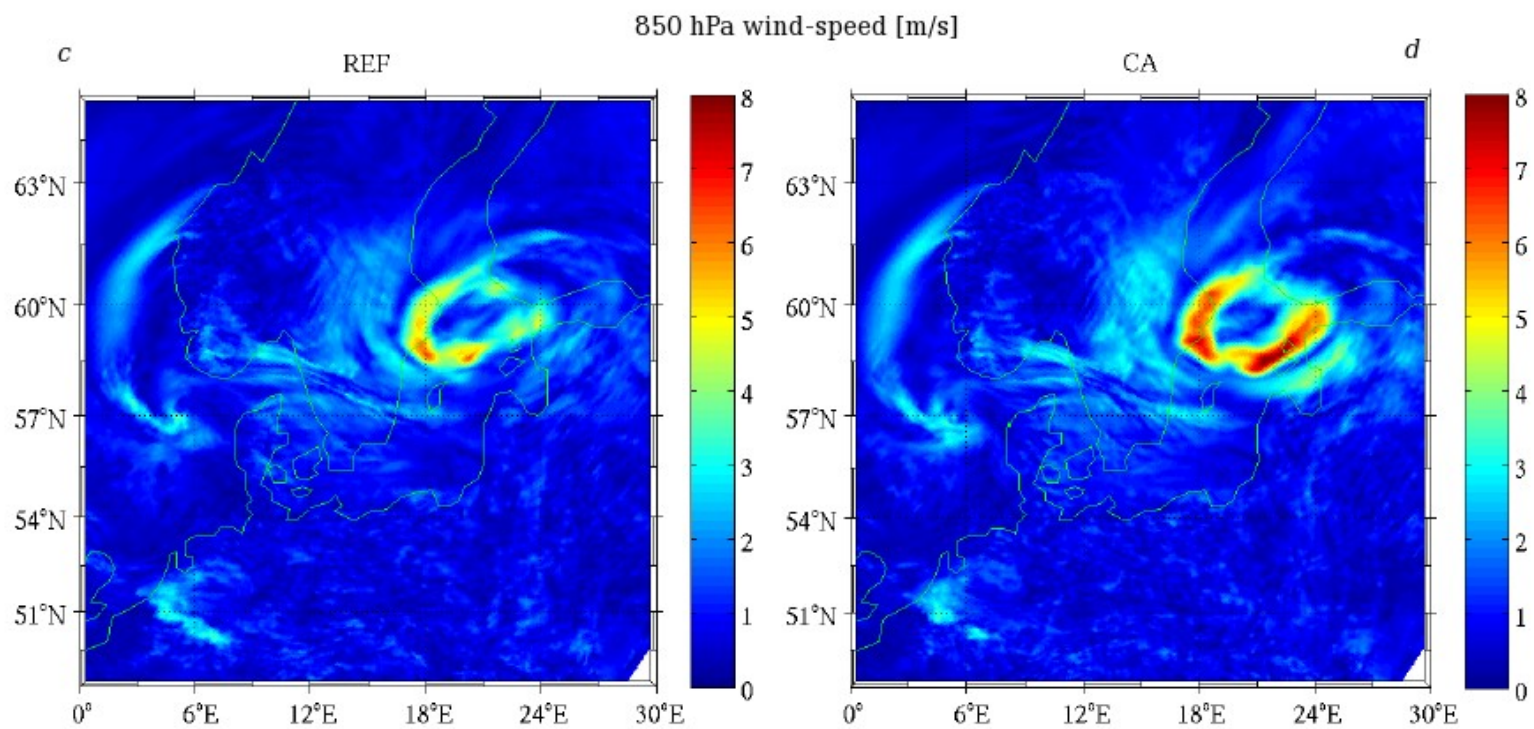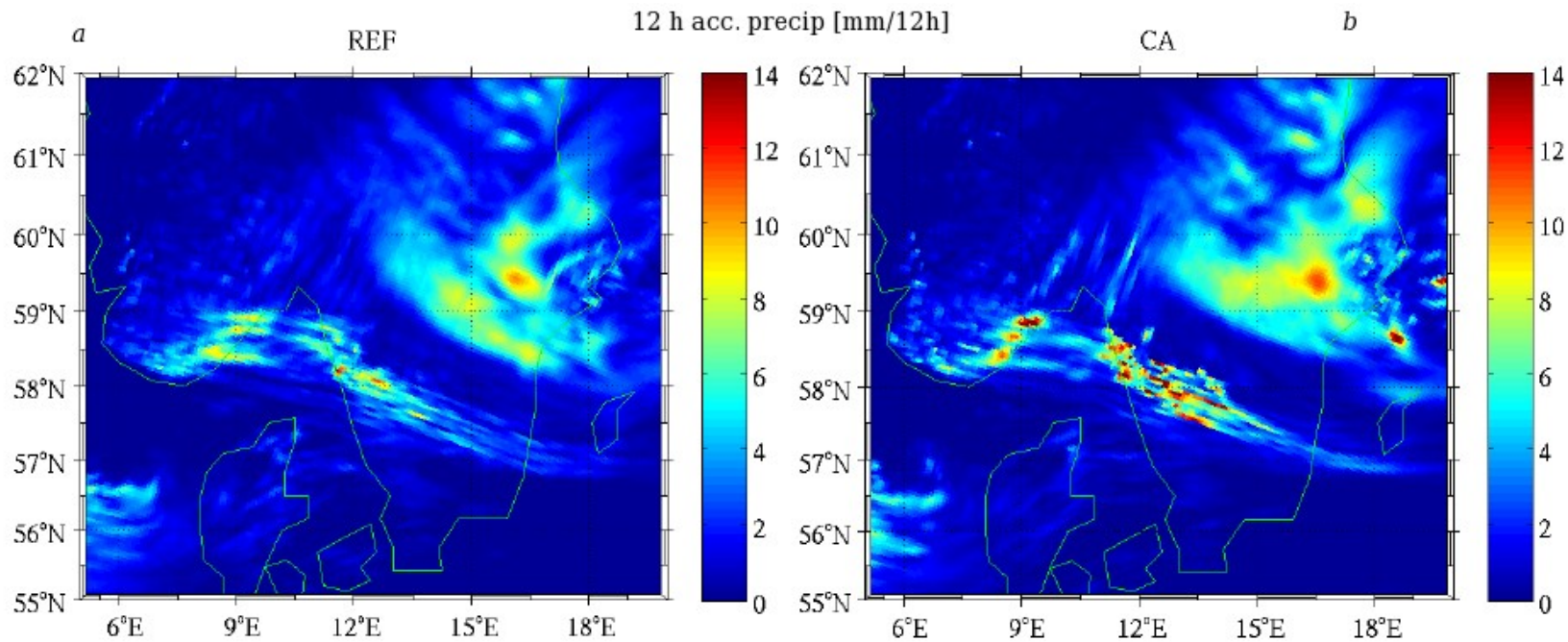
Lateral boundary perturbations:
- Test EPS (T639) vs EPS (T1279)
- (Double nesting EPS → GLAMEPS → HarmonEPS)

Model error:
- Multi-model (Arome and Alaro, later maybe also UM)
- SPPT
- physics parameter perturbations

Planning "HarmonEPS" : Uncertainty strategies

•Introduce "stochastic physics" on process level, rather than multiplying the total physical tendencies.

•Use Cellular Automata (CA) to introduce stochastisity, horizontal communication and convective memory to the parameterization.

•Plans for future: look at other processes besides deep convection, try to estimate "how stochastic should each physical process be?"

12 h acc. precip [mm/12h]

850 hPa wind-speed [m/s]

Surface uncertainties:

- Surface assimilation for every member
- Perturbations of physiographic fields – soil moisture, roughness, albedo and also sea-ice coverage, snow cover....

- -> Study what others have done

Planning "HarmonEPS": Post-processing and verification

Post-processing:

• Work on ELR in GLAMEPS will probably benefit HarmonEPS

Verification:

• Development of R-package started for GLAMEPS, should also be possible to use for HarmonEPS
• Acknowledge the need for upscaling techniques (eg SAL) or neighboring techniques (eg SWS) or …
• Verification of combined events necessary

HIRLAM contribution to FROST

2011:

•GLAMEPS semi operational (FDP). Technical work in setting up Harmonie to run in ensemble mode finished. First test with HarmonEPS for the area of Sochi run successfully (RDP)

2012:

•Providing GLAMEPS results routinely (FDP) – Delivery of GLAMEPS to FROST from October 2012.

•Run HarmonEPS experiments for the area of Sochi.

•Calibration of EPS forecasts (RDP).

2013:

•Run HarmonEPS for the area of Sochi and provide output

FMI – road management

Thank you