

Forecast Products Users' Meeting: 9-11 June 2010 Summary

Recent operational changes 2009-2010

➤ 8 September 2009 (cycle 35r3) includes

- Non-orographic gravity wave scheme, improved quality control of conventional observations, revised humidity analysis, assimilation of cloud-affected radiances for infra-red instruments, weak constraint 4D-Var in stratosphere, revised snow scheme
- Revised stochastic physics for EPS

➤ 26 January 2010 (cycle 36r1)

- Increased horizontal resolution for assimilation and medium-range forecast systems. Deterministic model: 25 km grid to 16 km; EPS: 50/80 km to 32/65; wave model : 0.36° to 0.25° (deterministic) and 1.0° to 0.5° (EPS)

Future model developments

- **Cycle 36r2 (22 June)**
 - **Ensemble data assimilation – EPS initial perturbations**
- **Cycle 36r4 (autumn 2010) including:**
 - **Prognostic rain and snow with more comprehensive cloud microphysics**
 - **EKF for soil moisture analysis**
 - **New snow analysis (O-I)**
- **Vertical resolution increase (2011)**
- **Wave model: surface currents, couple to ocean**
- **Seasonal forecast system 4**

ECMWF performance

- **Exceptional scores last winter (ACC>60% at day 10)**
 - **strong persistent anomalies; ERA scores also very high**
- **Increased horizontal resolution: significant improvement for large-scale flow in NH, improved frequency for high precipitation amounts, better analysis and forecasts for tropical cyclones**
- **EPS performance also consistently good (including monthly)**
- **Lead over other centres: deterministic, EPS, waves**
- **Precipitation forecasts still improving**
- **Snow issues during winter fixed**
- **Seasonal: good forecast through current ENSO and for TCs in 2009; but poor performance for large and persistent anomalies associated with the Negative NAO pattern DJF 2009-10**

Product Development

- **New products:**
 - **100m winds, Stokes drift**
 - **clickable EFI, wave swell/wind-sea**
- **Available for user testing (experimental) nwmstest.ecmwf.int**
 - **New EPS clusters**
 - **Tracking of tropical cyclones developing during forecast (medium-range and monthly products)**
 - **Extra-tropical cyclone products**
- **In preparation**
 - **Height of lowest cloud base**
 - **Height of 0°C level**
- **WREP soon to be in alpha testing with Member State users**
- **Monthly forecast twice a week**

User feedback: performance

- Overall, users reported good performance of ECMWF forecasts
- Post-processing (MOS, etc) improves in many cases but difficult to improve on DMO for waves (N com), temp (Fin)
- Best TC tracks, even beats official forecast after T+36 (F)
 - Impact of resolution change?
- TC genesis products reliable enough to use in operations (F)
- 100m wind verification including probability confirms good skill (bias in latest cycle?)
- EPS lower errors than deterministic beyond days 3-4 (Hun)
- Snow better (F), but ... not perfect (Cro)
- Severe summer convective event not well forecast (Rom)
- Occasional jumpiness in EPS probabilities difficult to handle (UK com); also occur in monthly forecasts (UK com, Cro, F). EPS better than deterministic (D)
- Monthly forecast good to week 3 (Cro); caution for small (sub-country) areas (D, Cro)

User feedback: use and application of products

- **ECMWF products widely used via ECMWF website, users' internal web, workstation display systems**
- **Significant commercial use and application for wide range of ECMWF products**
 - **Energy trading: using weather forecasts including ensembles (medium-range, monthly, seasonal) now standard**
 - **substantial post-processing efforts**
 - **use in application models: forecasts for wind energy, movement of oil platforms, dispersion of oil slicks**
 - **Sophisticated users (2D wave spectra, MJO phase space)**
 - **Boundary conditions for LAM and local waves**
 - **ERA for climatological data: wind farm sites, vulnerability to oil slick**
- **Volcanic ash: new EPS products; EPS to drive dispersion model (UK) [EPS model level data temporarily extended to D10 to support this]**
- **Products for disaster relief (e.g. Haiti), include EPS, monthly (F,D)**
- **EPS important for warnings (Fin, UK, F, D)**

User feedback: use and application of products

- **Use of EPS continuing to grow among forecasters and for customers (F, Hun, Cro, B)**
- **EPS used to put flow-dependent uncertainty on TC tracks (F)**
- **100m winds appreciated (F)**
- **Clickable EFI being used routinely (D)**
- **New clusters useful, suggestion to improve presentation (D)**
- **BC: Aladin for Austria (A), tropical regions (F); wave models (N com)**
- **Increasing resolution gives more detail, but must not expect perfect accuracy in time/location: probabilities important (Fin)**
- **Growing demand for monthly; public outlook (week 2) (CH)**
- **Seasonal forecast experience (hindcasts, EUROSIP) valuable for climate change work (use of ENSEMBLES) (CH)**

Users' requests

- **Stokes drift in catalogue (N com)**
- **More frequent output (hourly, 3-hourly)**
- **TC genesis tracks for operations and verification; operational tracks beyond day 5 (F) (CXML?)**
- **EFI for beyond day 5 (F)**
- **Low/medium/high cloud from EPS (Hun)**
- **precipitation-type (freezing rain, snow/rain diagnostic) (UK, Hun)**
- **Model simulated radar reflectivity, or at least hourly precip (F)**
- **Vertical profiles (F, Hun)**
- **WREP (UK, D)**
 - **geographical attributes, combined probabilities**
- **EPS plumes (Dk, B)**
- **Prediction of sea-ice coverage (Dk)**
- **Information about soil-type over geographical areas (Cro)**
- **Monthly forecast to run twice a week (F, UK, A); 2nd run to be Monday 00**
- **Individual members from the EuroSIP runs (UK com)**

Topics for next meeting

- **The next Forecast Products Users' Meeting will be held at ECMWF in June 2011**
- **Suggestions for special topics:**
 - **Case studies, with focus on physical processes (Ire)**
 - **Calibration and combination of deterministic and EPS forecasts (UK)**