

Working Group 1: use and interpretation of medium and extended range forecast guidance

The role of observations

Topics to discuss

➤ **Statistical adaptation**

- **Where is it needed, given the model's increasing resolution?**
- **Which methods are most relevant for deterministic and ensemble forecasts?**
- **What is the need for observations?**

➤ **Verification of weather parameters**

- **Need for high-resolution observational data**

➤ **Monitoring of observations**

- **Establishing a common set of statistics**
- **Exchange of results and alerts**

Statistical adaptation

- **Statistical adaptation is commonly used to post-process medium-range model output, especially the deterministic forecast**
- **Methods are generally based on MOS, Kalman filter, or both, and use station observations (WMO, additional local stations)**
- **Given the increasing resolution of the medium-range models, is this post-processing still useful?**
 - **For general public forecasting, high-resolution models may now be good enough to use direct model output for surface temperature and winds in areas of low/smooth orography**
 - **However, for more complex terrain, for other parameters, and for specific users there is still a clear benefit from statistical adaptation (vital for wind energy users even in flat areas)**

Statistical adaptation

- **Methods are so far generally linear; there is some work beginning on non-linear or regime-dependent adaptation; it is too early to assess the added benefit of these approaches**
- **Some users have begun to calibrate EPS model output using re-forecasts. Initial results are encouraging and show improved performance**
- **Observations are important (this is what the end users are used to and have as reference)**
- **Observation requirements for adaptation are similar to those for verification of model performance**

Verification of weather parameters

- **Increasing resolution and improvements to model physics have resulted in significant increases in performance for medium-range forecast of surface weather parameters**
- **Users are requesting additional products (fog, visibility, cloud base, hail/thunderstorm risk) from medium-range forecasts**
- **The growing interest in a large range of weather parameters, and the increasing resolution of models place great demand on observations for effective verification/validation/calibration**
- **There is a need for high-resolution observational data**

Requirements for observations

- **There is a strong need for high-resolution observational data for both validation/verification of models and for use in statistical adaptation of forecast output for end users**
- **Freely available (WMO) station data is limited and not at sufficient spatial resolution for all requirements**
- **Most countries have additional local observational data that is not widely disseminated**
- **It would be beneficial to all if this data could be more widely exchanged, especially to allow verification of model quality (even if slightly delayed from real time)**
- **Any initiatives to enable this are strongly encouraged**

Requirements for observations

- **All observations need careful quality control**
- **It is important to understand the different aspects of observation uncertainty (obs error, interpolation, representativeness) when using this data for verification**
 - **Different observation sets can even give contradictory impressions of model skill**
- **There is a trend of decreasing manual observations and replacement by automatic equipment. This gives some significant inconsistencies over time**
- **There is large potential to use satellite and radar data to give high resolution (space/time) observational information for verification. More work is needed to fully exploit this data**
 - **GPSRO data may be particularly useful because it is bias-free**

Requirements for observations

➤ **Synop observations**

- **Snow:** reporting of zero snow amounts is important both for verification and for initialisation of the model. Many stations do not report this, but leave as missing
 - **Wind gusts:** there are differences in reporting practice between countries that makes it difficult to verify model gusts consistently
- **Harmonisation of reporting practice will be valuable**
- **Lightning reports are in principle available globally and can be useful in verification of thunderstorm activity**

Monitoring of observations

- **There are WMO guidelines for exchange of monitoring information for conventional data (monthly reports)**
- **It would be valuable to establish a basic set of monitoring statistics for satellite data and to make this available for comparison between centres in (near) real time**
- **Routine exchange of alerts from monitoring at different centres could improve the identification of observation problems**
- **It was noted that the CGMS Inter-comparison of Atmospheric Motion Vectors and EUMETSAT NWP SAF monitoring may provide some relevant information**
- **To follow up after the workshop**