

WG4 Data Assimilation and NWP

Summary of Working Group Discussion

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Scientific Questions

1. What will be the relative improvement in forecasts resulting from better large-scale observations (e.g. targeted observations, as is being investigated in the THORPEX program) vs. better local observations (e.g. lidar wind and water vapour, evaporation and soil moisture, high-resolution satellite products)? The answer is likely to depend strongly on the meteorological situation, and the nature of the additional data.
2. How should high-resolution data assimilation be done? Both the observing systems and underlying dynamics differ significantly from those found in medium-range weather prediction. Current research within the SPP includes 3 and 4D Variational methods, nudging, and ensemble-based methods. It will be important to involve a variety of models and assimilation schemes in the experiment.
3. How should limited computing power be allocated between resolution, complex parameterisations, data assimilation, ensemble size? All of these are likely to produce improved forecasts, at least in some circumstances, but all compete for the same resources.
4. What improvements can be transferred to operational practice? Some observing systems or modelling techniques will be easier and more economical to deploy. There should be some evaluation at the end of the project of how the results can have a positive impact on operational forecasting, but this should not restrict the ideas that are involved in the project.

Additional Actions

1. Agree on common cases for pre-experiment testing. (*Note: since the meeting, DWD has produced a list of events which could serve as a basis for testing.*)
2. Trial simulations should be attempted a year before campaign. This should be carried out in cooperation with the instrument groups as it may provide valuable guidance for the measurement strategy.
3. Ensure that experiment produces a good validation data set, as well as initial condition data.
4. Start work early on data exchange issues (e.g. radar data with France).

Additional Discussion Topics

(issues that were discussed but without an agreed conclusion)

The influence of high-resolution orography on mesoscale models is not well-understood. Therefore careful experiments using different horizontal resolutions were considered necessary.

There is a need for new measures of skill appropriate for QPF, but it is unclear what these should be. The scale-dependent measures being investigated by Heini Wernli in the SPP were cited as an example. Probabilistic measures will probably be required. The question arised whether a special measure of the impact of different data assimilation method exists and can be applied.

There were some questions regarding the availability of data, particularly from neighbouring countries, and how and to what extent model data should be made available. BUFR was not necessarily regarded as the most appropriate format for observational data such as radar.

There was discussion about whether modelling and data assimilation should be done in real-time during the field experiment with some groups seeing this as a worthwhile goal where possible, and others seeing it as a distraction.

Finally, the question was discussed how important a high-resolution initial state is or whether it is sufficient to let the model generate small-scale features though not all these processes can be produced by models.