Research and developments in Slovenia
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EARS

1. Verification project

The web interface for visualization of data, calculation and visualization of verification scores, etc. is now accessible through internet. Authentification is not ready yet but anyone interested can ask for the address.

The verification system is still in testing mode (limited number of models, low performance) so currently we are receiving model data from 7 countries (Austria, Croatia, Hungary, Slovakia, Slovenia, Romania, Tunisia).

To solve the performance problems we tested various indexes on tables in *PostgreSQL* database and their combination, but without significant success. We are getting much more promising performances with computing differences for each model point and time slot against the observation and storing them into new separate tables and using them for computations of all verification scores.

2. Testing of Latent Heat Nudging in ALADIN Model.

Latent heat nudging (LHN) has been implemented in ALADIN model (cycle 25T1). With this method the model is forced with measured precipitation rate. Measurement data are interpolated to model grid and combined with model precipitation values. Latent heat release part of temperature tendency profile in the model is then rescaled with the ratio of observed and analysed precipitation.

LHN runs were performed for the entire year 2002. Measured precipitation data were used from the 3 closest radars. Nudging was performed for the first twelve hours of the run and after that the model was left on its own. Generally there was only marginal positive effect for LHN runs. In some cases a better spatial pattern of precipitation occurred. On the other hand there were some unrealistic cases of outbreaks of convection after the end of nudging period.

3. Probability forecast of temperature with quantile regression method

A probability forecasting can also be done with a statistical model and not only with the ensembles. An advanced regression method, called quantile regression can be used as such statistical model. This method takes into account the true distribution of residuals, and combines probabilistic forecast and statistical adaptation of NWP direct model output variables to the local conditions. The result is not only the forecasted value but we also get the accuracy estimation of this forecast. This method allows us to produce probabilistic forecast not only for discrete but also for continuous variables. For development of such statistical model the learning data set is needed, big enough to train the model.

The quantile regression method was tested on maximum and minimum daily temperature forecasts and 2 m temperature forecasts for different time ranges and for different locations in Slovenia. As predictors the observations and direct model output parameters from operational ALADIN model were used. With comparison of verification scores for quantile regression and some other regression methods it was shown that the weighted local linear principle is the most privileged method among those tested.

4. High-resolution wind climatology

Using an advanced numerical model is the best way for producing a physically consistent spatially complete climatological field of surface wind. We produced datasets using several different configurations of ALADIN (single vs. double nesting, continuous in time vs. dynamic adaptation), all initialised and driven by ECMWF ERA-40 at the lateral boundaries. The horizontal resolution we are aiming at is 2.5 km using the ALADIN model and further down to 1 km using a kinematic approach (mass-consistent model) or another dynamic model. In the next newsletter we are going to report on the results, i.e. which configuration appears to be the best for this purpose, and also present an objective verification of the obtained wind climatology.

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