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ALADIN in Poland

- operational and R&D activities

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Current status of the operational suite

Computer characteristics

Operational: SGI Altix 4700, system SUSE Linux Enterprise Server 10, configuration: 32 processors Intel Itanium 2, clock 1.66 GHz, RAM 64 GB, disk space – 1.8TB, peak performance - 212 Gflops

Pre-operational: HP Cluster Platform 3000 BL 2x220, system Scientific Linux, Intel Xeon processors, RAM 20TB, disk space – 1,8 PB, peak performance -105 Tflops

Operational status

Operational model geometry:

13.5km horizontal resolution

169x169 grid points

31 vertical model levels

Lambert projection

Model geometry in pre-operational mode:

7 .4 horizontal resolution

320x320 grid points

60 vertical model levels

Lambert projection

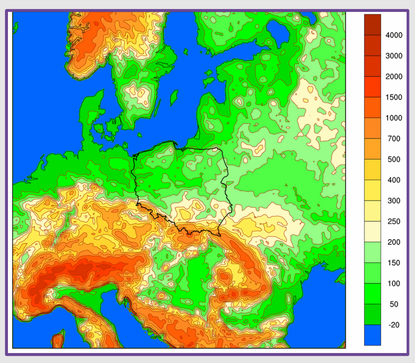
Forecast settings:

2 runs per day (00 and 12UTC) with 54 hours forecast range

LBC from ARPEGE (3h coupling frequency)

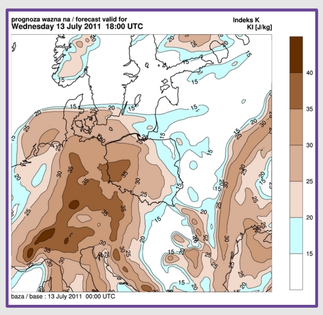
on-line Fpos on model grid, every 3h – for operational database

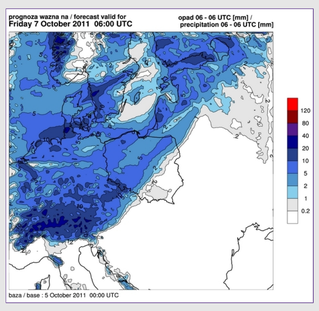
off-line Fpos on geographical regular grid, every 3h – for LEADS system

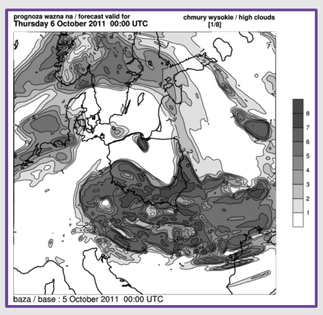


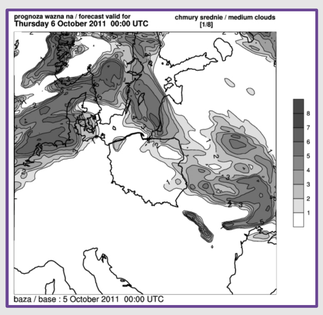
Products

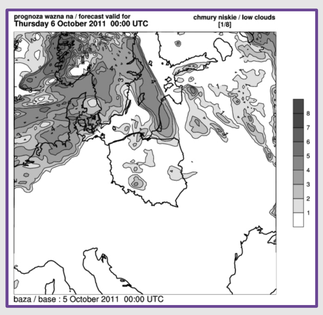
Graphical products of forecast for standard levels (maps), for surface (maps, locations, meteograms, tables) are presented on the Aladin intranet web site. Additionally we prepare sets of model forecast data for nowcasting system INCA, avalanche model CROCUS (test mode), Aerology Department, Satellite Department and others. Lately we ran in test mode new system for graphical presentation of results based on NCAR Graphics/NCL tools. Examples of them you can see below.











Fuzzy Methods in Operational Verification

There were performed first quasi-operational test of fuzzy verification system applied to high resolution forecasts of AROME and ALADIN vs. surface observations. The tests were used for the forecast of precipitation.

Fuzzy methods rely on the comparison of one single forecast (or one domain of forecast) with the set of observations.

For example, we take into account the upscaling, minimum coverage, fuzzy logic and multi-event contingency table:

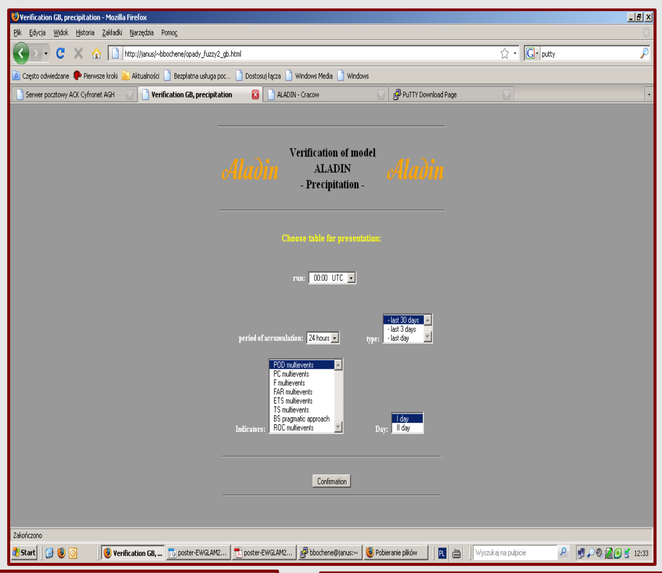
Upscaling matches neighbourhood of observations and the neighbourhood of forecast. Useful forecast in this case resembles the observations when averaged to coarser scales.

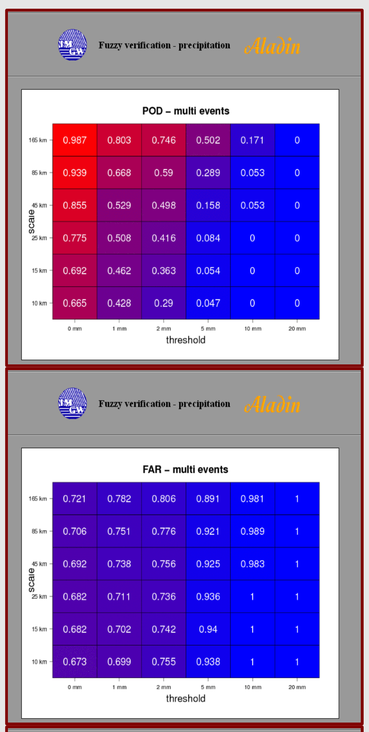
Minimum coverage method matches also both neighbourhoods (of observation and of forecast) and the forecast is useful when predicts the event over a minimum fraction of the region of interest.

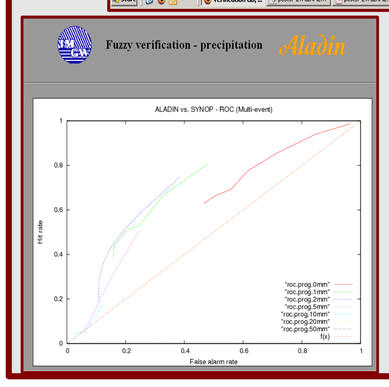
Multi-event contingency table compares single observation with the neighbourhood of forecast. Useful forecast predicts at least one event close to an observed event.

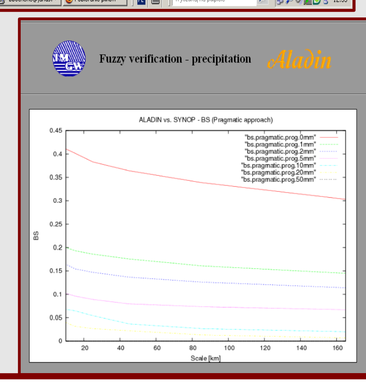
Fuzzy logic method matches also both neighbourhoods (of observation and of forecast) and the forecast is useful when is more correct than incorrect over the region of interest.

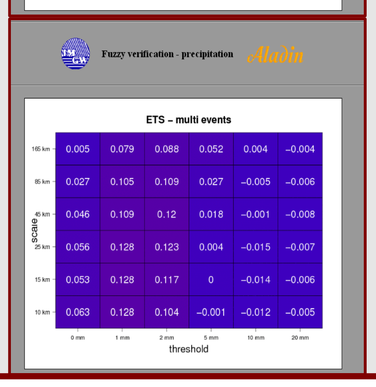
Results of fuzzy verification system are shown on web pages. It presents results of verification ALADIN model against data from synoptic stations. Two SO-NF methods are used, multi events and pragmatic approach. Indicators POD, PC, F, FAR, ETS, TS, BS and ROC curve can be seen for every station or all stations together, for last 30, 3 or 1 day and for first or second 24 hours of forecast.











Research activities

Steps toward new verification

To take full advantage of available observing networks and numerical models in analysis, prediction and verification tasks one should work with adequate and comparable scales. Hence there is great need to properly separate scales of interest in data obtained from different meteorological systems because only then appropriate comparison and merging data of various origin will be possible. There are many separation methods applied in meteorology but still some of important fields (e.g. precipitation) and domains of meteorological applications require more accurate attitude. To reach the goal weighted median filters were chosen. Another problem is analysis of differences between of images on corresponding scales.

2-D ICWM filters

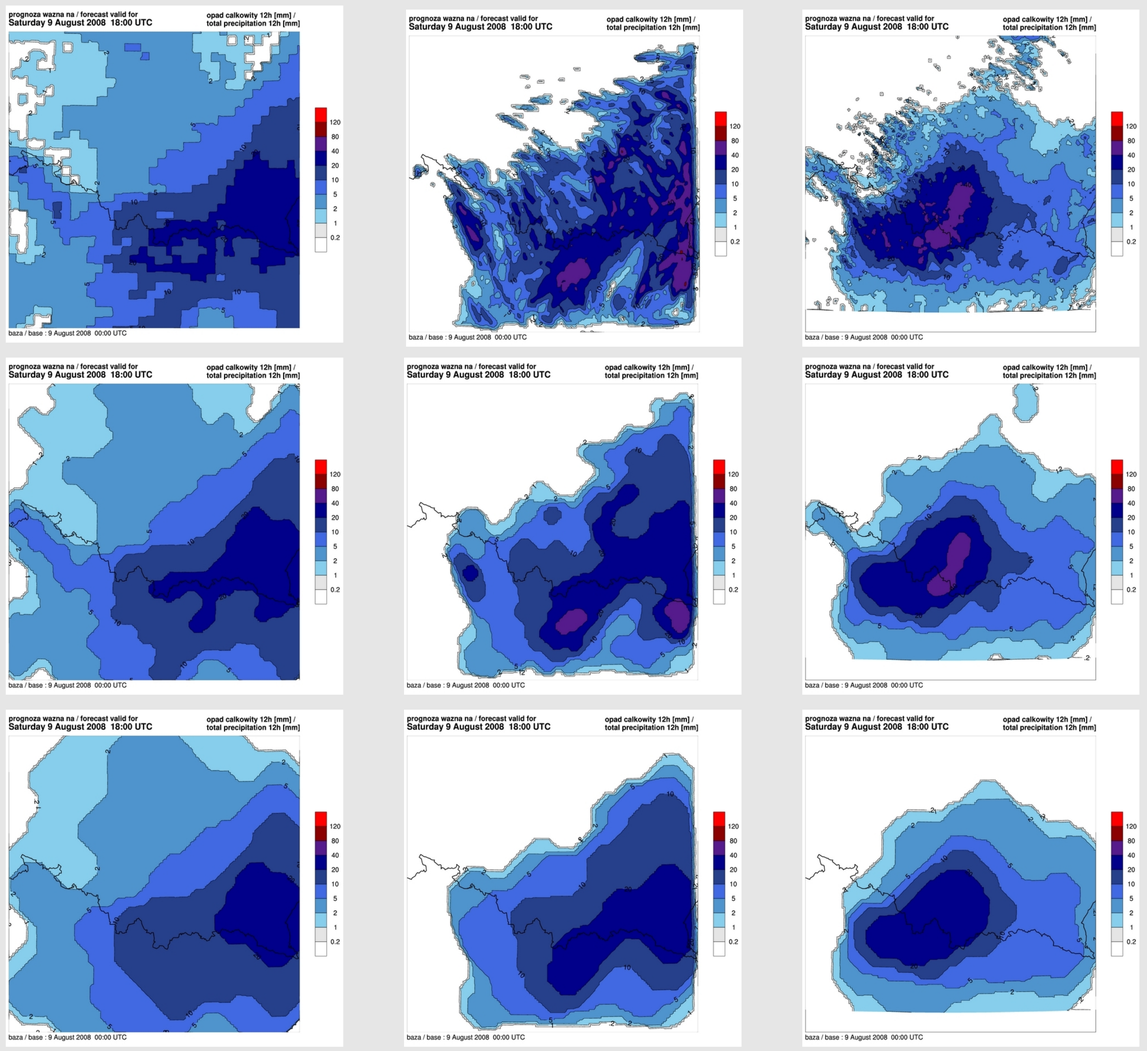
Weighted median filters have appeared good basis for development of a new scale-separation tool applicable to non - smooth meteorological fields given at regular grids due ti their simplicity, robustness and idempotence.

The proposed tool is a set of **Iterative Four - Directional Composite Weighted Median Filters.**

2-D ICWM filters are superpositions of 1-D weighted median filters with different sizes and weights applied for iterative smoothing performed in four directions. At right some examples of precipitation field filtration with 2 - D ICWM filter are shown (two-parameter field quantization is applied). Three sequences correspond to data from ALADIN, AROME and POLRAD radar network. It can be noticed that filtration preserves its boundaries of precipitation area really well.

Patterns comparison

Having scales separated any multi-scale comparison method - from simple global statistics to pattern recognition ones – can be used. It was decided to develop relatively simple tool based on pattern matching. One of comparing images is transformed to get best matching and norm of the transformation is one of measure of similarity. The second measure of similarity is obtained with chosen global statistics applied to data after matching images. New method of matching was proposed - optimisation minimizes set of quantiles and some additional parameters. Images are comparing scale by scale giving detailed insight into differences. Currently used transformation comprises image shift only. The method is under tests and tuning.



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