ALADIN in Poland

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OPERATIONAL ACTIVITIES

OPERATIONAL SUITE

Domains:

POLb domain: 13.5km horizontal resolution, 169x169 grid points, 31 vertical model levels on a Lambert projection with 3h coupling frequency and 3h output.

POLo domain: 7.7km horizontal resolution, 133x133 grid points, 31 vertical model levels on a Lambert projection with 3h coupling frequency and 1 hour output

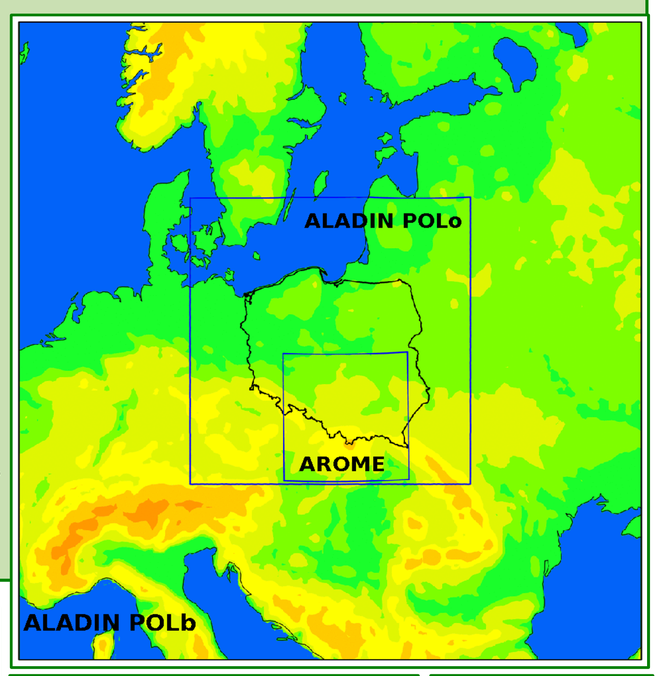
Configurations:

POLb domain: 2 runs per day (00 and 12UTC)
with 54 hours forecast range; LBC from ARPEGE;
on-line Fpos on model grid, every 3h – for operational database;
off-line Fpos on geographical regular grid, GRIB format, every 3h – for LEADS system;

POLo domain: 2 runs per day (00 and 12UTC)
with 36 hours forecast range; LBC from ARPEGE;
on-line Fpos on model grid, every 1h;
off-line Fpos on geographical regular grid, GRIB format, every 1h – for INCA model;

Computer characteristics

SGI Altix 4700, OS SUSE Linux Enterprise Server 10,
32 processors Intel Itanium 2, clock 1.66 GHz,
RAM 64 GB, disk space – 1.8TB,

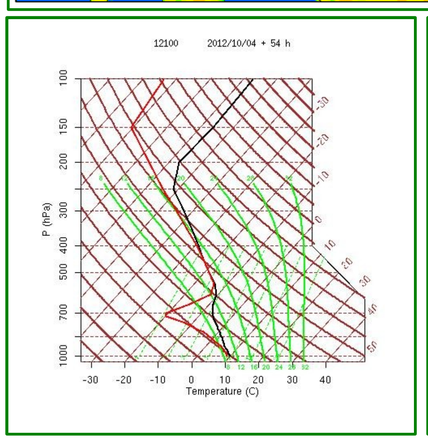


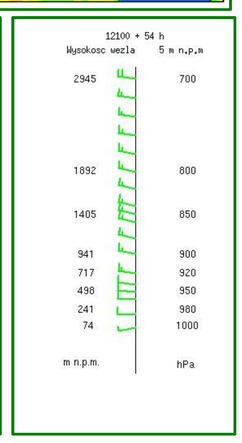
Products

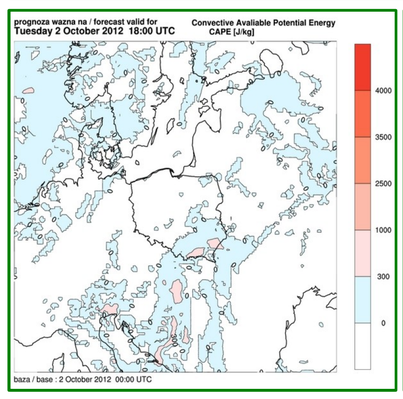
Graphical prediction products for standard levels (maps), for surface (maps, meteograms, tables) are presented at the Aladin intranet web site.

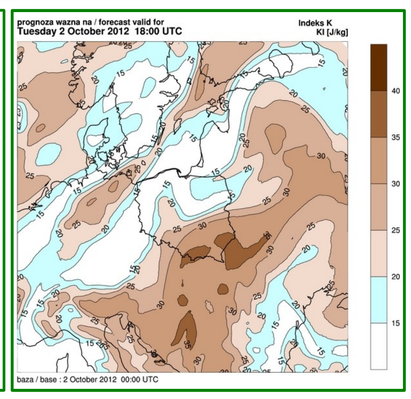
Data for feeding nowcasting system INCA and data sets for Areology Department, Satellite Department and others.

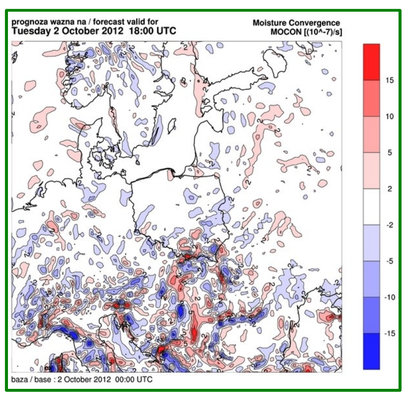
New visualization products are added, among them stability indexes, tropopause and jet-stream maps based on NCARG/NCL also vertical profiles for synoptic stations based on R-package.











Verification

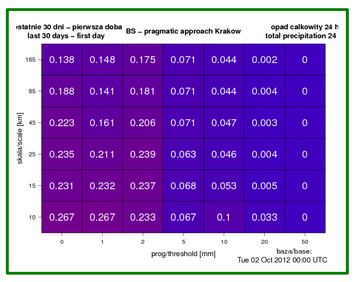
Classical

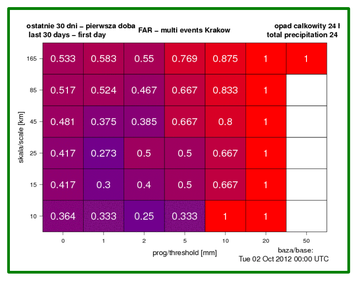
Operationally, four times per day we run verification of ALADIN model numerical weather forecast: BIAS and RMSE and MEDIAN and MAD. Outputs of model are verified on basis of observational data (SYNOP reports) from Polish synoptic stations. Results are presented for last avaliable model run and for last 30 days, both for whole domain and for specific stations.Quality of forecasts of total cloud cover and accumulated precipitation is evaluated using contingency tables, and for others elements the differences between model and observed values are counted.

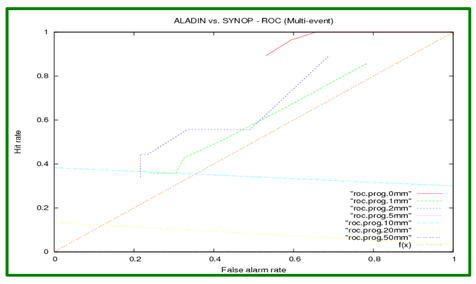
Fuzzy

Fuzzy methods for verification are in operational use, to compare high resolution forecasts of ALADIN vs. SYNOP and ATS (automatic) observations of precipitation. Currently five methods are in use: Upscaling, Minimum coverage, Fuzzy logic, Multi events and Pragmatic approach. According to the recommendation of WMO verification is performed on 24h accumulation of precipitation, with intensity thresholds 0, 1, 2, 5, 10, 20 mm/24h and spatial resolutions 1, 5, 10, 15, 25, 45, 85, 165 km. Verification window is a square of side equal to 2x spatial resolution.

Additionally is performed 30days verification of precipitation for each SYNOP station. There are calculated several indicators e.g.: Brier Score (BS) for Pragmatic Approach method or False Alarm Rate (FAR) in Multi-events method.







RESEARCH ACTIVITIES

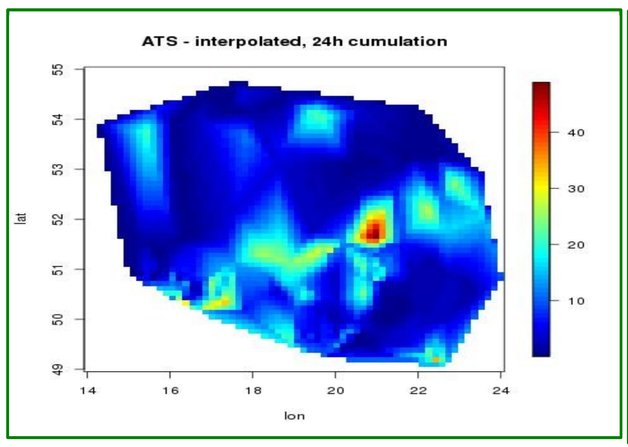
Multi-scale methods can increase scope, precision and reliability of forecast verification and model intercomparison. They features should be especially estimated if they are applied to non-smooth fields showing complex patterns, such as precipitation. Multi-scale attitude to verification tasks is widely developed and applied at IMGW. One example of such work is presented below.

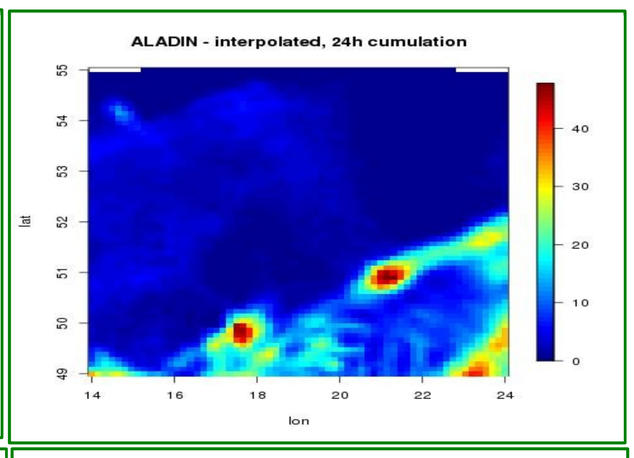
In the eight pictures below, the results of spatial verification (performed with the aid of 'Spatial Vx' package in the R environment) are visualized. The choice of the indicator (IS) was due to its wide reference in the publications of this topic, whereas the days (12/06/2012 and 07/05/2012) were selected by the (obvious) criterion of high daily precipitation.

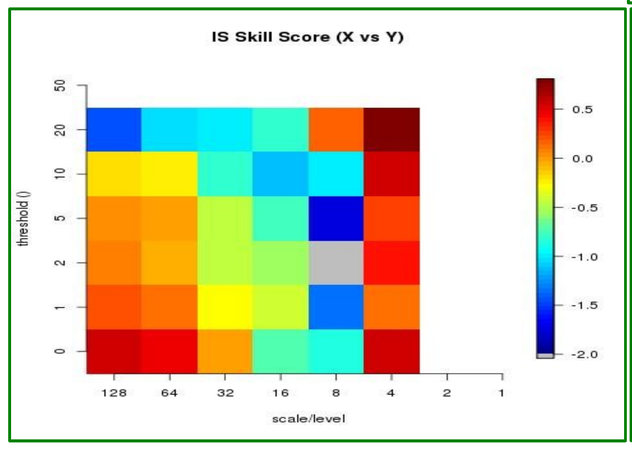
The first and third rows of diagrams are the result of interpolation (package 'akima') of observational (automatic telemetric stations) and forecast (ALADIN 13.5 km) grids. The mesh size (64x64 pixels) was chosen so as to make the pixel size (around 10 km each side) as close as possible to the ALADIN grid dimension. The irregular observational grid data deserved interpolation.

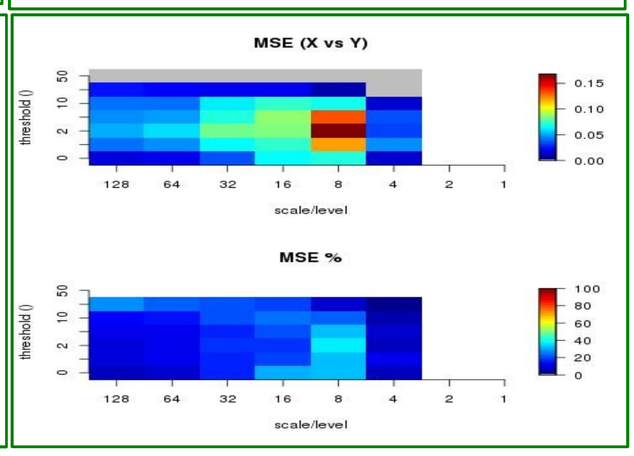
The second and fourth rows of pictures are both connected to the obtaining of IS diagrams. The abscissa and ordinate are spatial scale (4 to 128 km) and threshold (ranging from 0 to 50 mm/day), respectively. On the right hand side we see a component for the IS diagram – Mean Square Error of the forecast. If MSE is high, the IS indicator is low (cf. 2-5 mm thresholds for the 8 km scale on the bottom diagrams). Contrarily, IS is high (close to 1) when MSE is close to 0 (perfect forecast – here, 4 km scale).

12/06/2012









07/05/2012