27th EWGLAM & 12th SRNWP Meeting, 3. - 5.Oct. 2005, Ljubljana, Slovenia

LAM activities in Austria in 2004/2005

1. The operational LAM system: ALADIN-AUSTRIA

In May 2004, the spectral limited area model ALADIN has changed from two Central European domains (**LACE** & **VIENNA**) to one domain (**ALADIN-AUSTRIA**). The system merges the benefits of its operational predecessors (domain size and resolution). Model specifications of ALADIN-AUSTRIA: Cycle 25T2, horizontal resolution: 9.6km, number of gridpoints: 289x259, 45 vertical levels, coupling model: Arpege, coupling frequency: 3 hours, timestep: 415s. (Cycle 29T2 recently installed)

Main benefits of ALADIN-AUSTRIA

Customer-products are available earlier

Simplification of operational procedure

Horizontal resolution + domain size
+ additional vertical levels (45 levels)

SGI origin 3400

Other operational activities in 2004/2005

Installation of model version Al29t2.

Operational daily verification of upper air field forecasts

Operational weekly verification of point forecasts of T2min and T2max

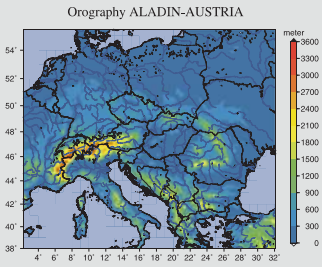


Fig 1.1: ALADIN-AUSTRIA domain and topography

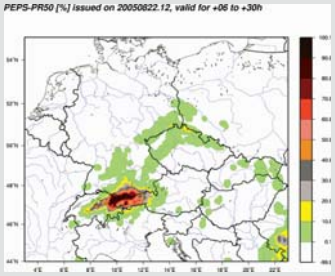


Fig 1.2: PEPS forecast (median) of 24 hour precipitation amount (+6 to +30 hours) from 22.8.2005 12 UTC

ALADIN-Austria is also one member of the PEPS-project which tries to make predictability forecasts based on many different LAM's.

In Fig 1.2 a result of a PEPS- precipitation forecast is shown for a period, when several floodings caused a lot of damge in western Austria.

2. Verification

ALADIN forecasts are verified against ALADIN analysis and against point observations at several locations in Austria.

Parts of the verification are run operationally and results are made available on the Intranet to help forecasters in analysing forecast errors of previous days.

Additionally an internal verification report is issued by ZAMG every two years including long term verifcations as well as verification of special events like flooding or strong wind periods.

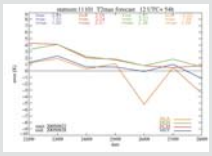


Fig 2.1: T2max for day+1

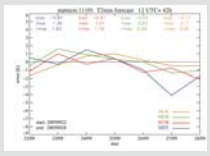
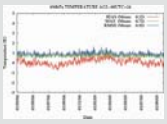


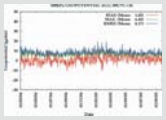
Fig 2.2: T2min for day+1

Comparison of point forecasts for station Bregenz (22.9.05-28.9.05) orange: ALADIN red: ECMWF green: MOS blue: forecaster

Fig.2.3 and 2.4 show results of 850hPa Temperature (upper) and 500 hPa Geopotent.(lower) verification.

Such verifications are carried out on a daily basis at ZAMG.





3. INCA Integrated Nowcasting through Comprehensive Analysis

A high-resolution analysis and nowcasting system INCA is being developed at the Austrian national weather service. It provides three-dimensional fields of temperature, humidity, and wind on an hourly basis, and two-dimensional fields of precipitation rate and cloud cover. The system operates on a horizontal resolution of 1 km and a vertical resolution of 100 m. It combines station data, remote sensing data (radar, satellite), forecast fields of a numerical weather prediction (NWP) model, and high-resolution topographic data, in order to generate analysis fields.

The NWP model output is used as a first guess on which corrections derived from observations are superimposed. In the case of temperature and humidity, the spatial interpolation of the corrections is three-dimensional, because the station network covers most (from 150 to 3400 m) of the elevation range in the Austrian alps.
A mass-consistent high-resolution wind-field is obtained from NWP model output by using a sequential relaxation procedure, with the wind vectors at observation points held fixed.

An important application of INCA fields is nowcasting of convective cell initiation and development. This requires detailed analyses of the state of the mountain convective boundary layer (CBL). Derived from INCA analyses, a number of fields pertinent to deep convection initiation are routinely generated and their predictive potential evaluated. These fields include flow convergence and specific humidity within the CBL, LCL, CAPE, CIN, several stability indices and the difference between temperature and trigger-temperature.

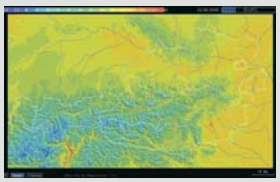


Fig 3.1:High-resolution INCA analysis of temperature (22 Aug 2005, 10 UTC)

Fig 3.2: Zoom of Fig 3.1 in the region Innsbruck/Inn-valley

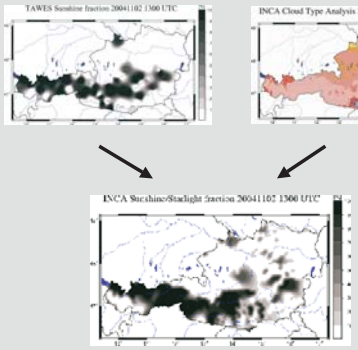


Fig 3.2 Combination of sunshine duration measurments at station locations (upper left picture) and cloud type analysis (upper right picture) derived from satellite measurements for INCA cloud cover analysis (lower picture).

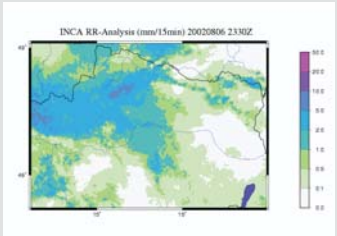


Fig 3.3 Example of a 15min INCA precipitation analysis including rain gauge and radar data 6 Aug 2002

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