STATUS REPORT AUSTRIA

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, which are the domain size on one hand side and horizontal resolution on the other hand side. Further it could be mentioned that the change to one domain brought a simplification and reduction of the operational procedure, which has positiv effects on the availability of the customer-products. The specifications of the operational LAM system are:

- CY25T2, 289x259 gridpoints
- Timestep: 415s
- Horizontal resolution: 9.6km
- 45 vertical levels
- Coupling model: ARPEGE, coupling frequency: 3h

A newer model version (CY29T2) has been recently installed and is supposed to become operational in the beginning of 2006.

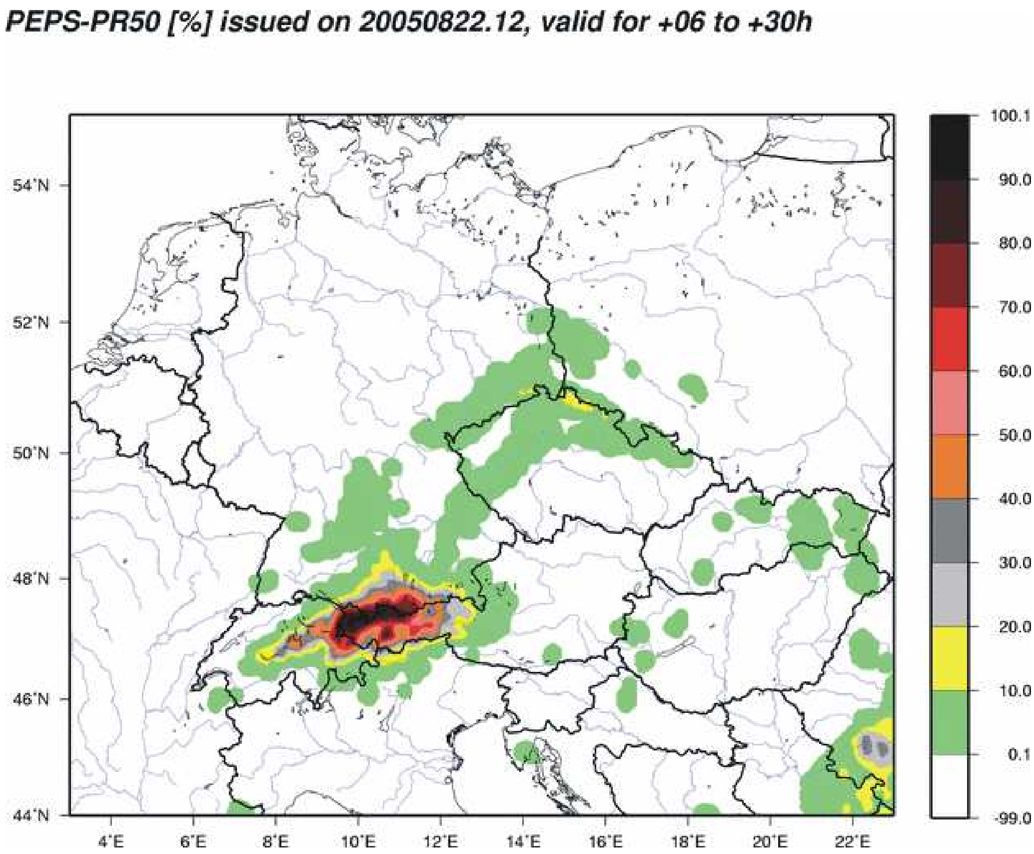

Figure 1.1.: Result of a PEPS precipitation forecast (probability of precipitation exceeding 50mm) for a period in August 2005, when several floodings caused a lot of damage in western Austria, parts of Switzerland and Bavaria.

ALADIN-AUSTRIA is also one member of PEPS (Poor Man Ensemble Prediction System) which tries to make predictability forecasts based on several different LAMs (see Figure 1.1.).

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 the results are made available via Intranet to help the forecasters in analysing forecast errors of previous days.

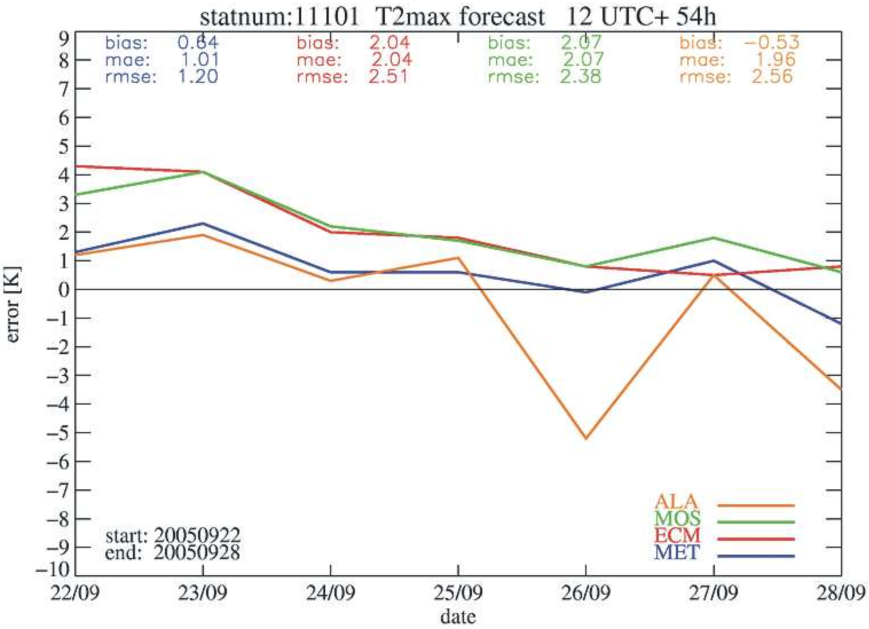

Figure 2.1.: Comparison of point forecasts (T2max) for station Bregenz (22.9.05-28.9.05). Orange: ALADIN, red: ECMWF, green: MOS, blue: Forecaster.

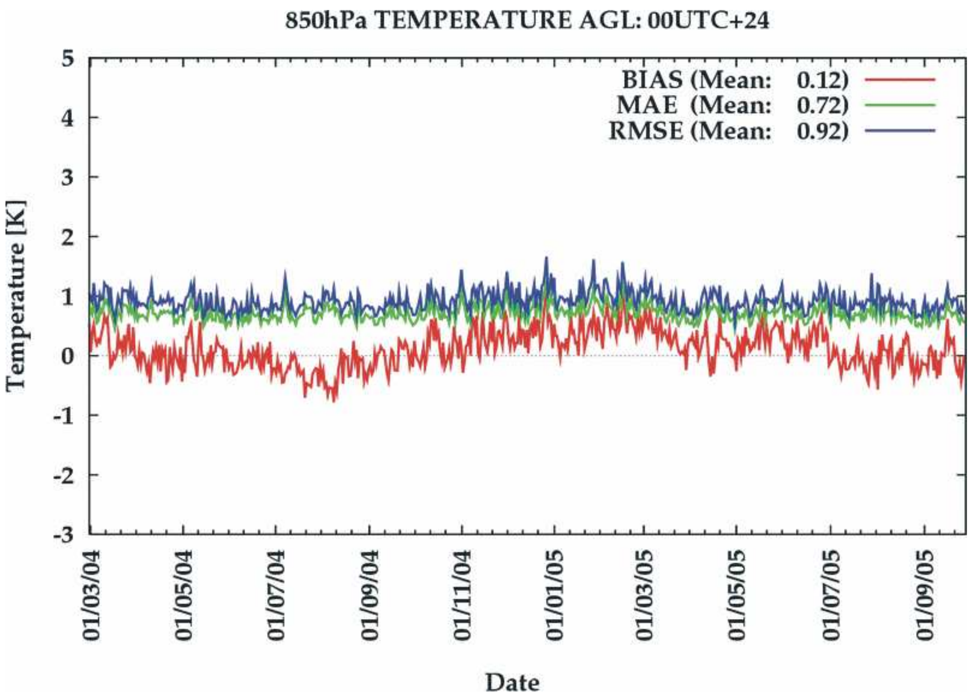

Figure 2.2.: Result of 850hPa temperature verification.

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

3. INCA (Integrated Nowcasting through Comprehensive Analysis)

A high-resolution analysis and nowcasting system 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 1km and a vertical resolution of 200m. 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.

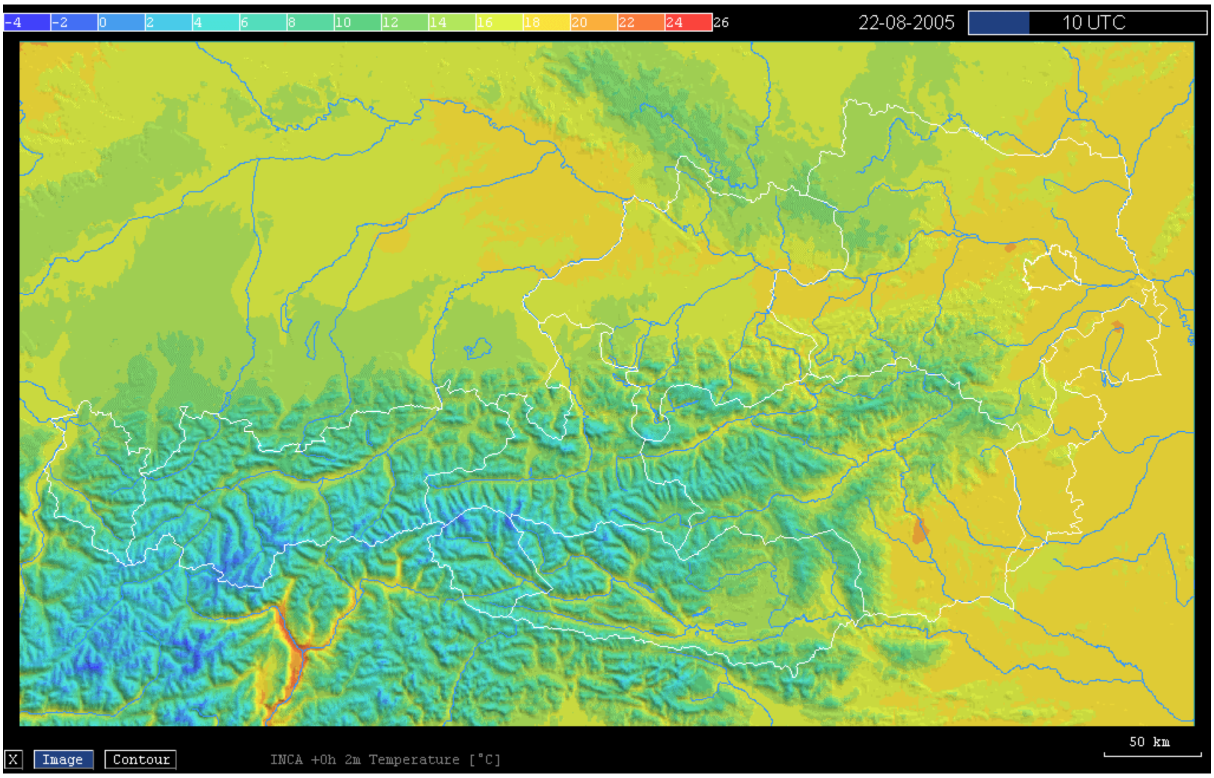

Fig 3.1.: INCA T2M Analysis, 22.08.2005 10 UTC.

For temperature, humidity and wind, 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 correction is three-dimensional, because the station network covers most (from 150m to 3400m) 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. During the relaxation algorithm, the wind at the station locations is kept at its observed value.
The current method of predicting temperature in the nowcasting range makes use of the fact that much of the temperature error in the NWP forecast is due to errors in the cloudiness forecast. Starting from analysis, nowcasting is done by reducing or increasing the temperature amplitude of the model by a factor depending on the cloud fraction error.
The INCA precipitation forecast consists of two components, which are observation-based extrapolation, and NWP model forecasts. The extrapolation method is based on motion vectors determined from previous analyses. The model forecasts are output fields of the limited area model ALADIN and the global ECMWF model.
An important application of INCA fields is nowcasting of convective cell initiation and development. This requires detailed analysis of the state of the mountain convective boundary layer (CBL). Derived from INCA analyses, a number of fields pertinent to deep convection

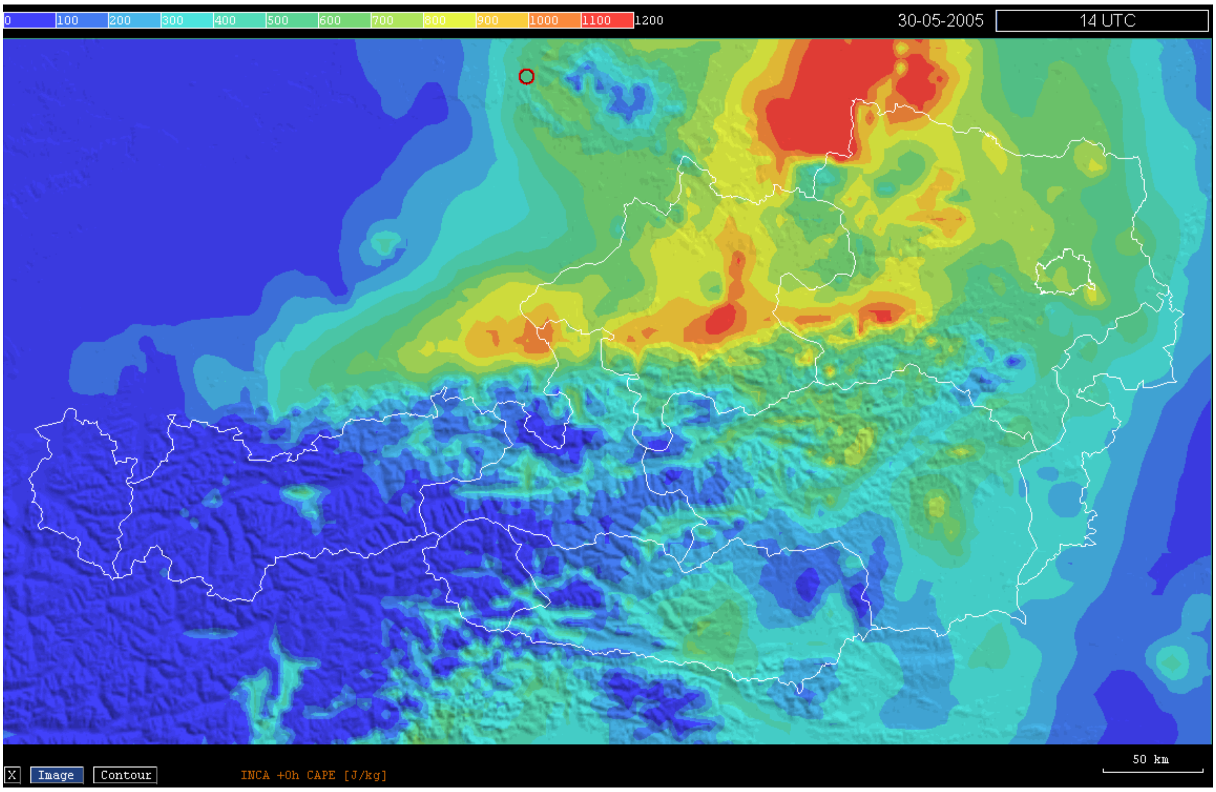

Fig 3.2.: INCA CAPE analysis, 30.05.2005 14 UTC

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.