

OPERATIONAL ALADIN in SLOVENIA - 2008

The computer system SGI Altix ICE 8200:

Technical characteristics:

- 35 compute nodes are installed in a single rack,
- every compute node has a 8 GB of memory and 2 Quad core Intel Xeon 5355 processors,
- 300 cores are currently installed,
- two Infiniband DDR networks, one for IO and the other for MPI communication,
- additional 7 service nodes are used for login, management, control and IO operations,
- a dedicated NAS IO node is installed with 15 TB FC disk array.

System software:

- SGI ProPack on top of SLES 10,
- Scali MPI Connect is used for MPI,
- Altair PBSPro queuing system,
- Intel 10.1.Fortran compiler.

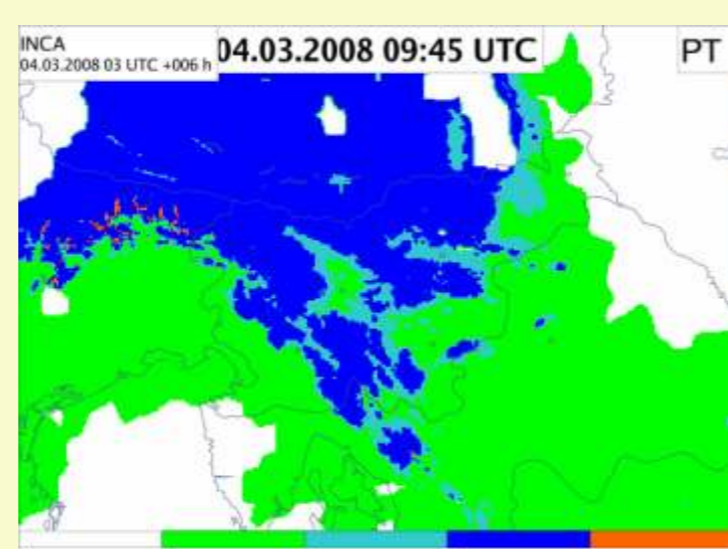
The milestones:

- ITT for a new computer system: May 2007
- delivery and installation: November 2007
- in pre-operational phase: February 2008



INCA analysis and nowcasting system:

- running in pre-operational mode on the new cluster,
- resolution 1x1km, 401x301 points,
- NWP input: ALADIN fields,
- observations: temperature, humidity, wind and precipitation from AMSs, SYNOPs and radar measurements,
- nowcasting initiated from the analysis and converging to NWP model after 12 hours,
- temperature, humidity, wind and several convective indices are updated hourly,
- precipitation type, rain and snow rate products are updated every half an hour.



.INCA precipitation type forecast valid at 4.3.2008 09:45 UTC. Forecast indicates areas with snow (blue), rain/snow mixture (light blue), rain (green) and freezing rain (red).

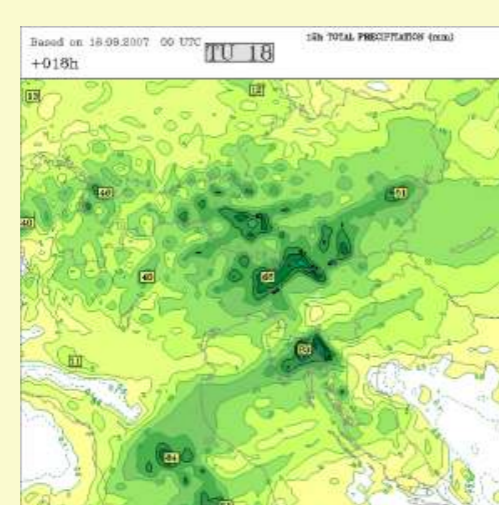
Flashfloods - 18 September 2007:

Weather situation:

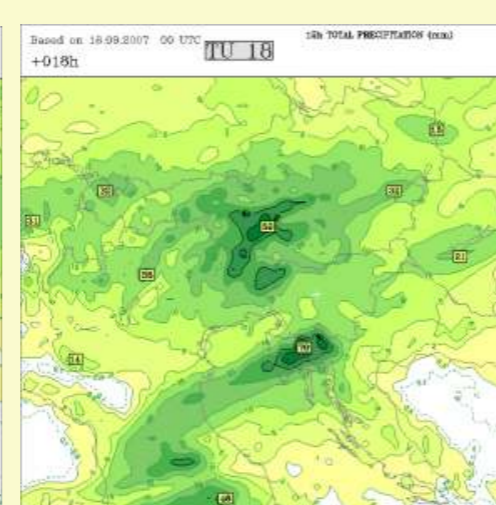
- moderate pre-frontal south-westerly flow of warm and humid air forced to lift due to orography thus triggering release of convective instability,
- severe quasi-stationary convection cells with local maxima exceeding 450 mm in 12 hours.

Simulations results:

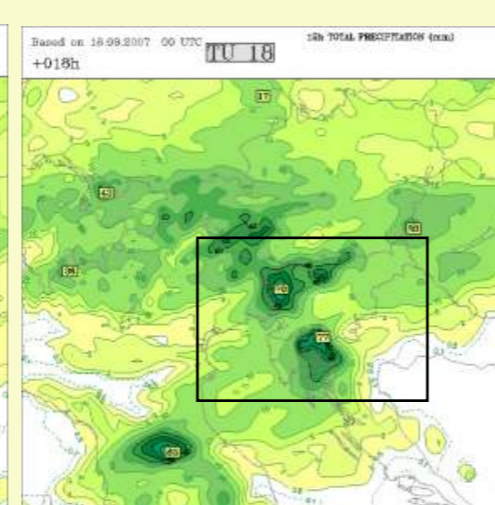
- amount of precipitation severely underestimated,
- distribution of rainfall in 3MT case much closer to observations, though still much too low,
- rain intensity strongly affected by resolution - the prevailing factor for location and intensities in such situations is topographically conditioned low-level convergence.



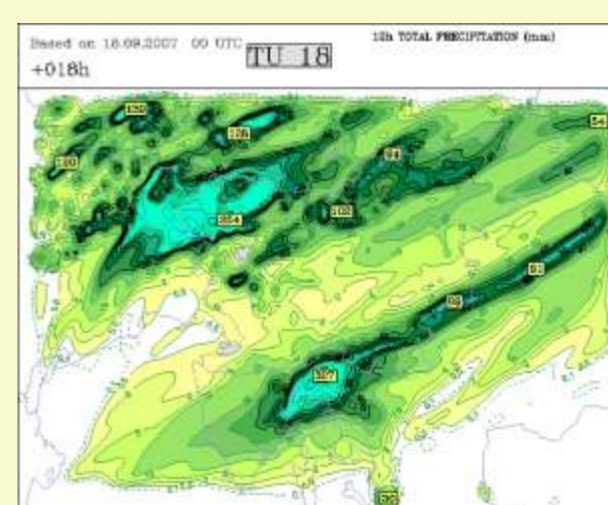
12 hour rain accumulation - operational ALADIN



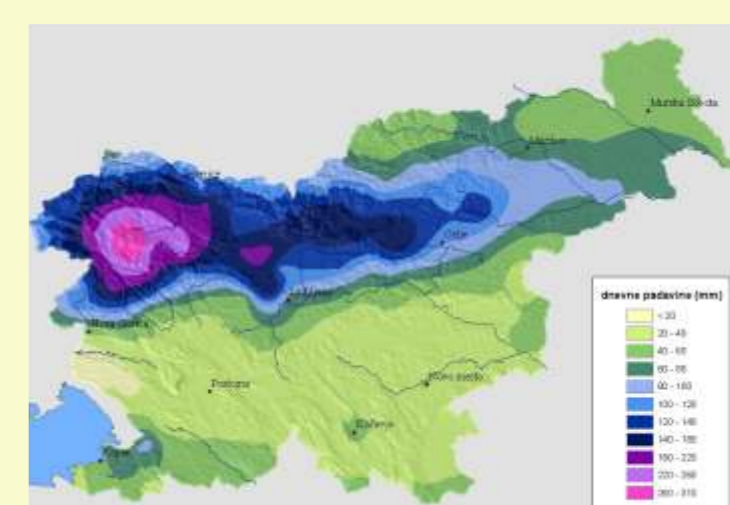
12 hour rain accumulation - ALARO-0 without 3MT



12 hour rain accumulation - ALARO-0 with 3MT



12 hour rain accumulation - AROME (smaller domain, 148*108 points)



24 hour rain accumulation analysis based on measurements.



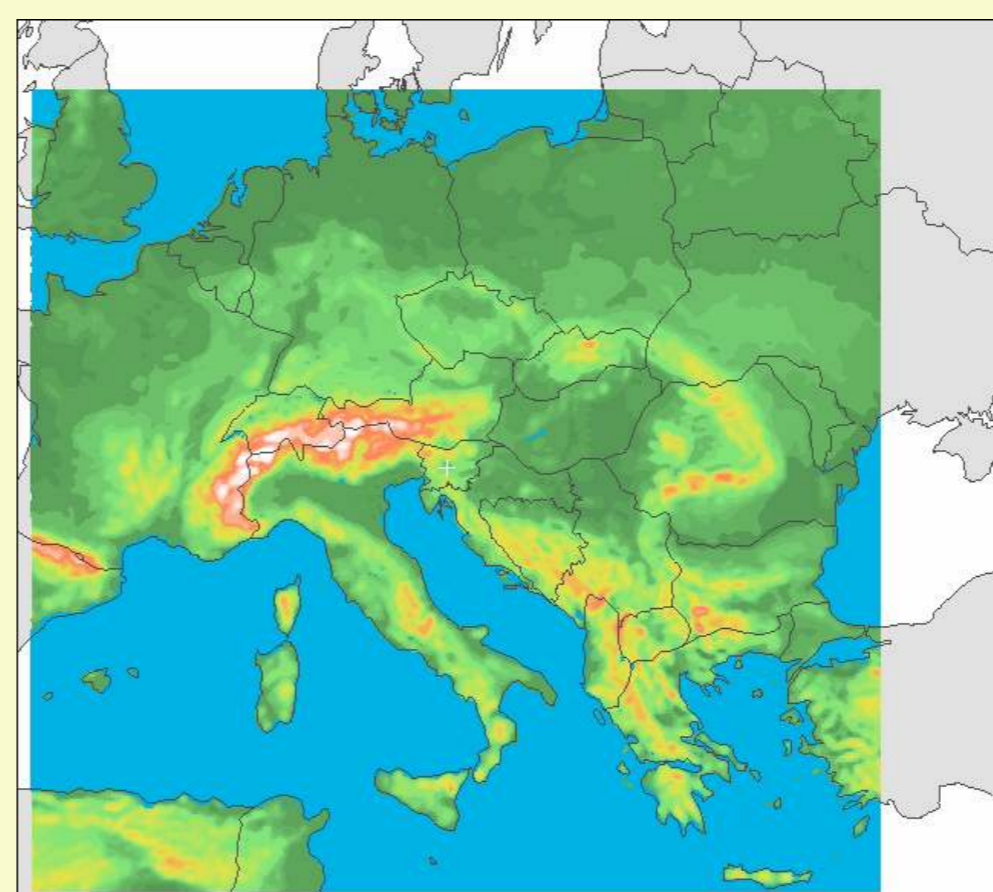
Operational suite at the new computer system:

Step 1 Migration - minor modifications

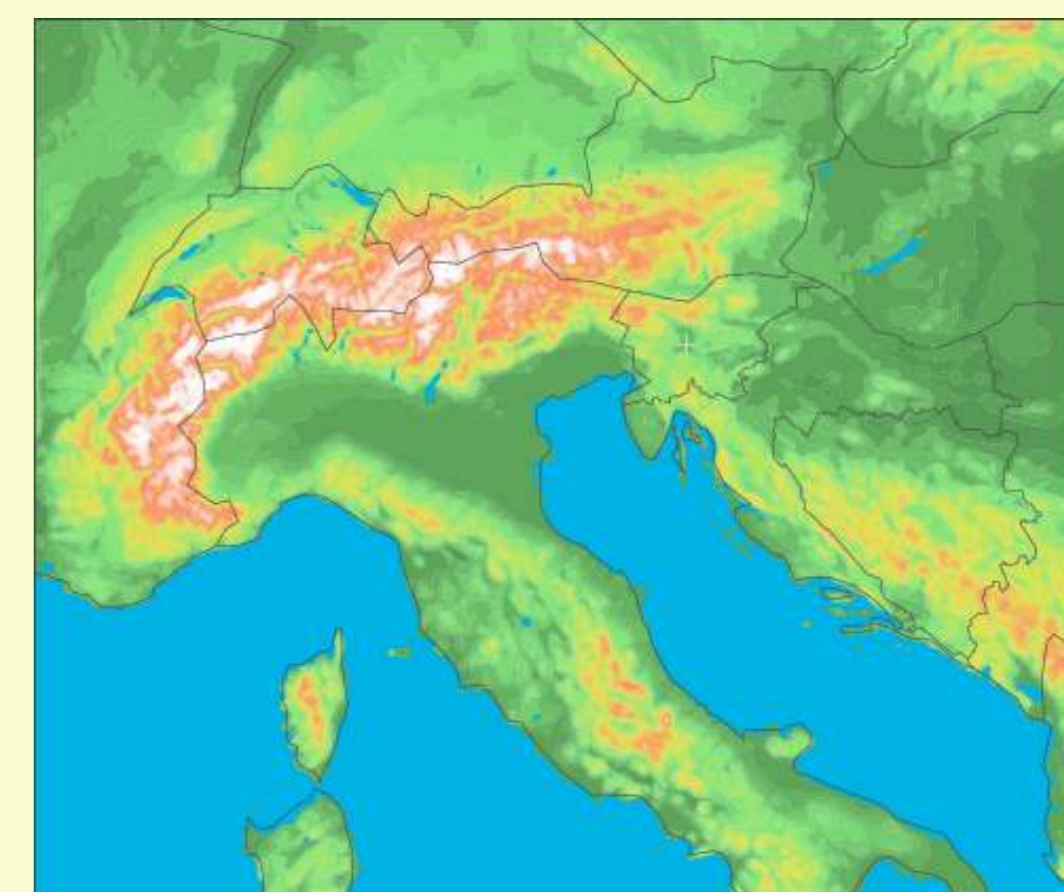
- aladin code cy32t3,
- ALARO-0 without/with 3MT
- increased number of vertical levels,
- linear grid instead of quadratic one,
- domain unchanged (9.5 km, 258*244 points),
- 4 runs per day - additional run at 06,
- 400 s time-step, range of forecast 72 hour,
- initial and lateral boundary conditions from ARPEGE,
- coupling at every 3 hours,
- digital filter initialization,
- installation of all needed programs.

Step 2 Extension - aim for higher resolution and cycling

- digital filter spectral blending (6h cycle),
- CANARI surface analysis (ODB installed),
- ALARO 3MT configuration with resolution around 5km,
- AROME on 2.5km resolution for runs on request (to become operational if proven feasible).



Operational ALADIN/SI domain



Likely AROME domain

Operational suite consists of:

- transfer of ARPEGE LBC files from Météo-France, Toulouse via Internet, backup from ECMWF via Internet,
- preparation of files with initial and lateral boundary conditions,
- the model integration (32 cores, 30 minutes),
- post-processing:
 - visualization of meteorological fields,
 - the selected fields are written in GRIB format on latitude/longitude regular grid and Lamber projection,
 - dynamical adaptation of surface wind and precipitation,
 - meteograms with correction of 2m temperature using Kalman filter for selected points,
 - time cross-sections (HRID based on pseudotemps) for selected points,
 - simulation of satellite images (pseudo-satellite movie),
 - precipitation amounts needed for hydrological models,
 - space vertical cross-sections for predefined directions,
 - products for internal end users (hydrology, Internet) and external users (energy companies),
 - input files (GRIB format on latitude/longitude regular grid) for nowcasting system INCA,
 - products for peps, eurorisk, rodos, www.rclace.eu,
 - archiving of the selected model output for verification.

Operational suite is running in Supervisor Monitor Scheduler, ECMWF product.

The computer system and operational suite is controlled by NAGIOS supervision system.