Alaro experiences in Croatia

Dunja Drvar and Martina Tudor

Short history

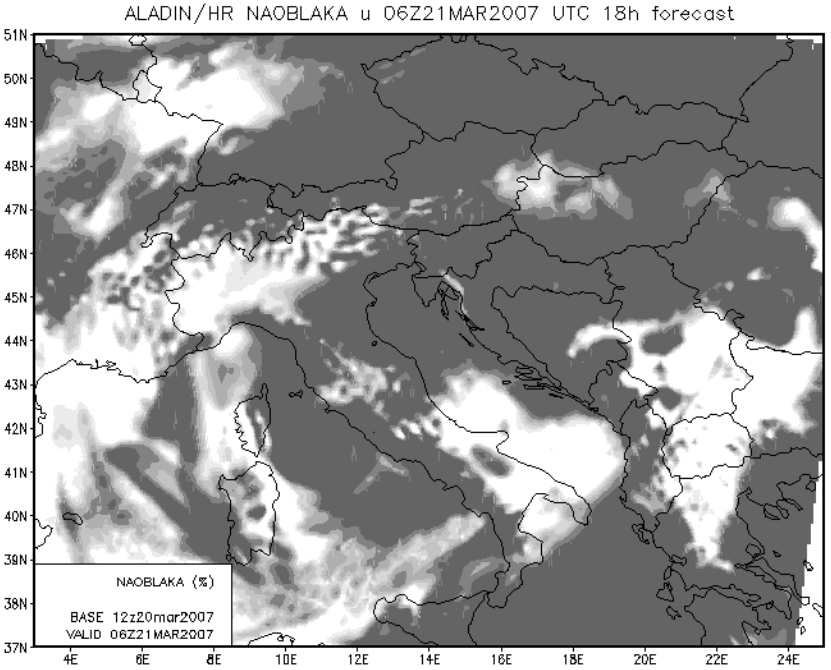
- 1st branch ported in September
- 2nd branch ported 2nd December
- Run twice a day, 00 and 12 UTC runs, 72 hour forecast, since 7th December 2006.
- “official” common version ported 2nd February 2007, used as an operational executable since 6th February

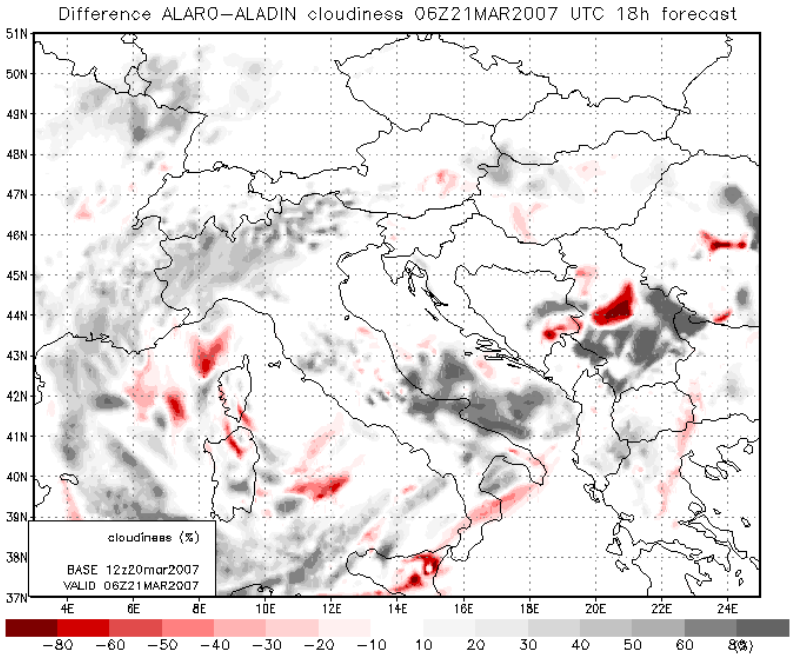
Operational Alaro outputs

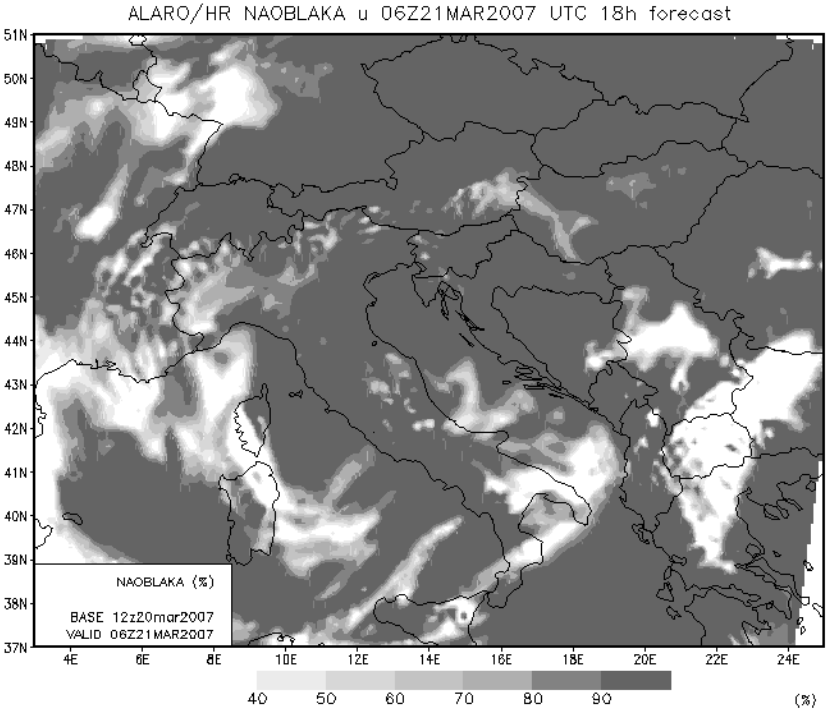
- The same output as from Aladin operational run, figures, tables and meteograms
- Differences between Alaro and Aladin forecasts are ploted for precipitation, cloudiness, 2m temperature and humidity, 10m wind, mean sea level pressure and other prognostic variables.

Cloudiness

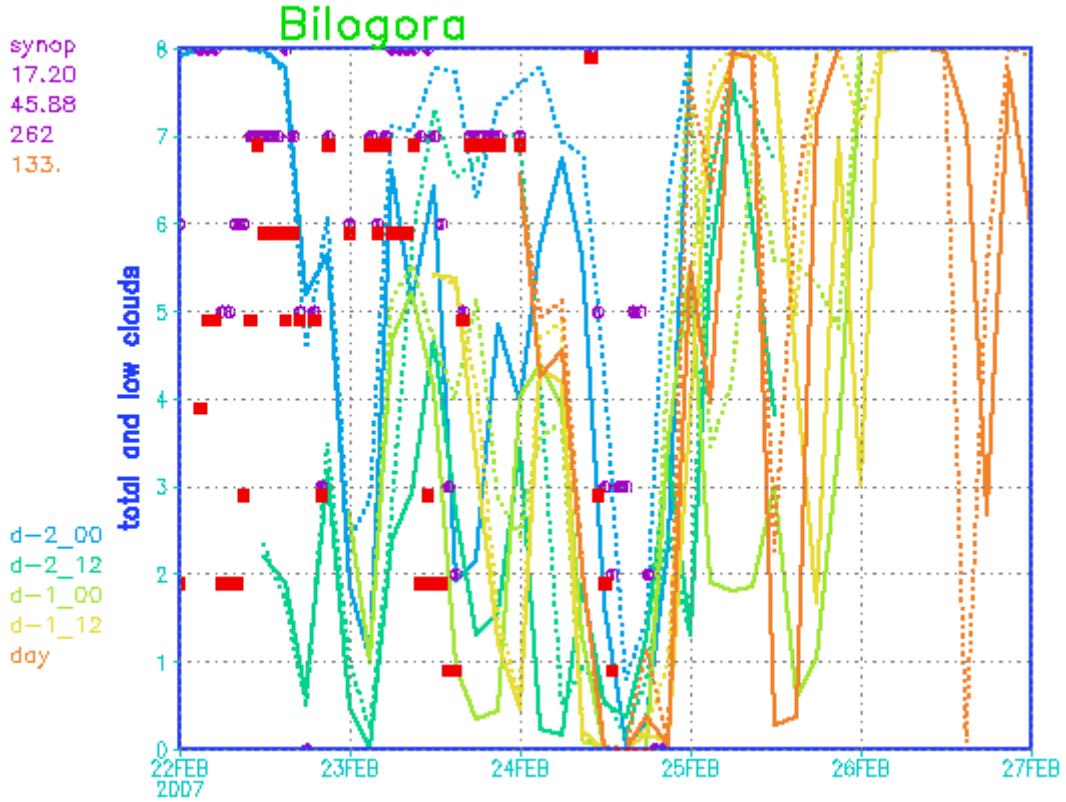
- Differences between Alaro and Aladin forecasts are ploted







Cloudiness



- Aladin (full lines) and Alaro (dashed) predicted cloudiness from several forecast runs and observed total (purple circles) and low (red squares) cloudiness.

Cloudiness

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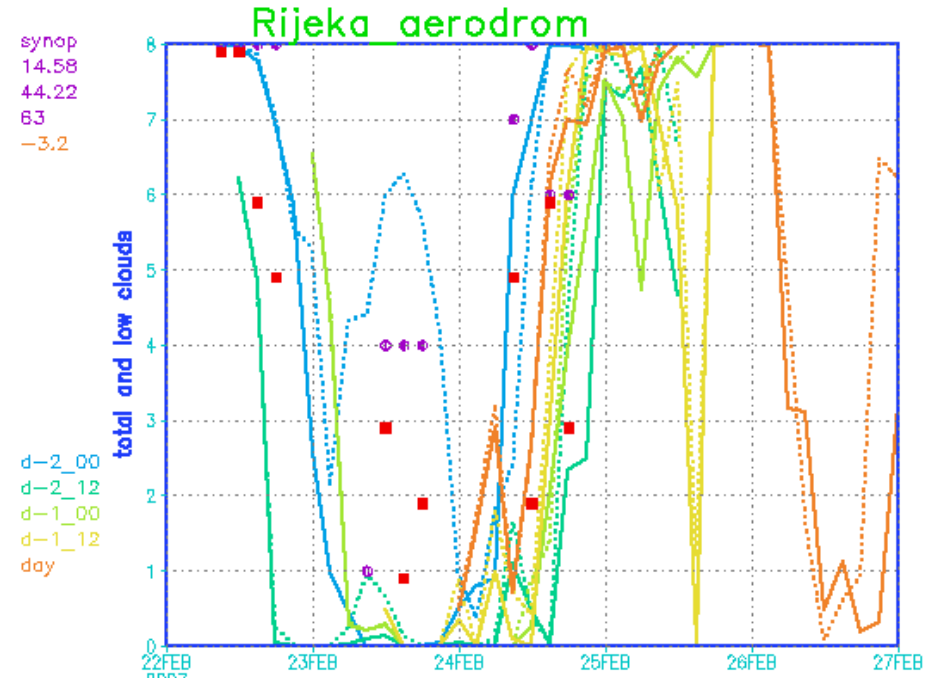
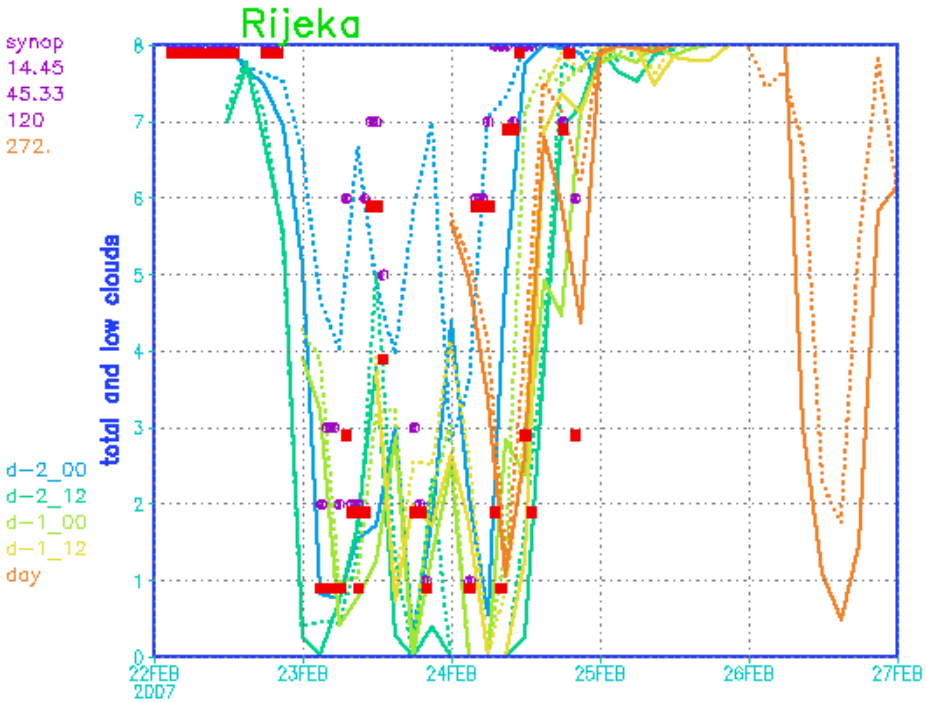
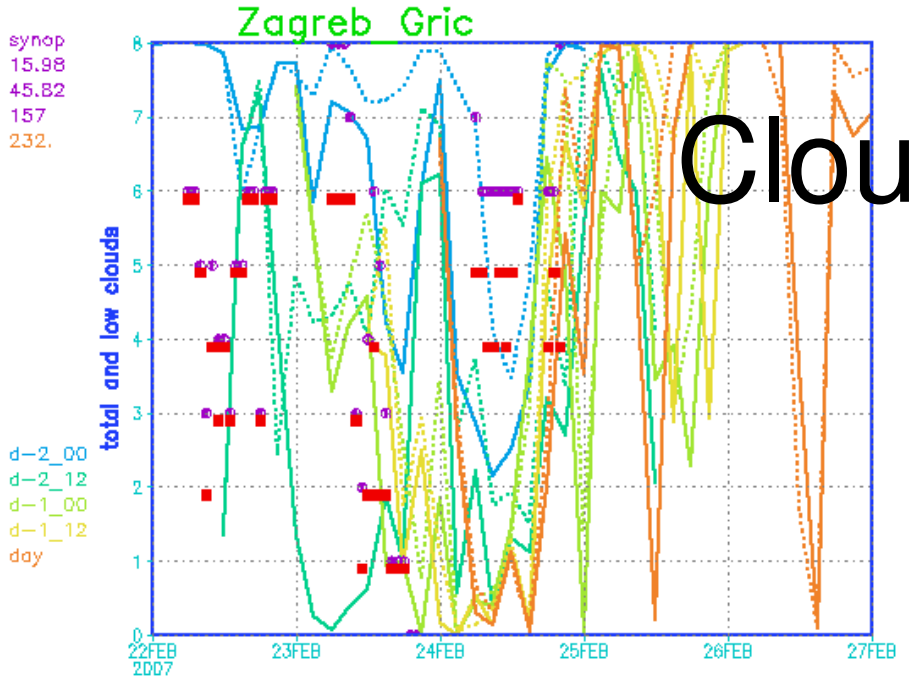
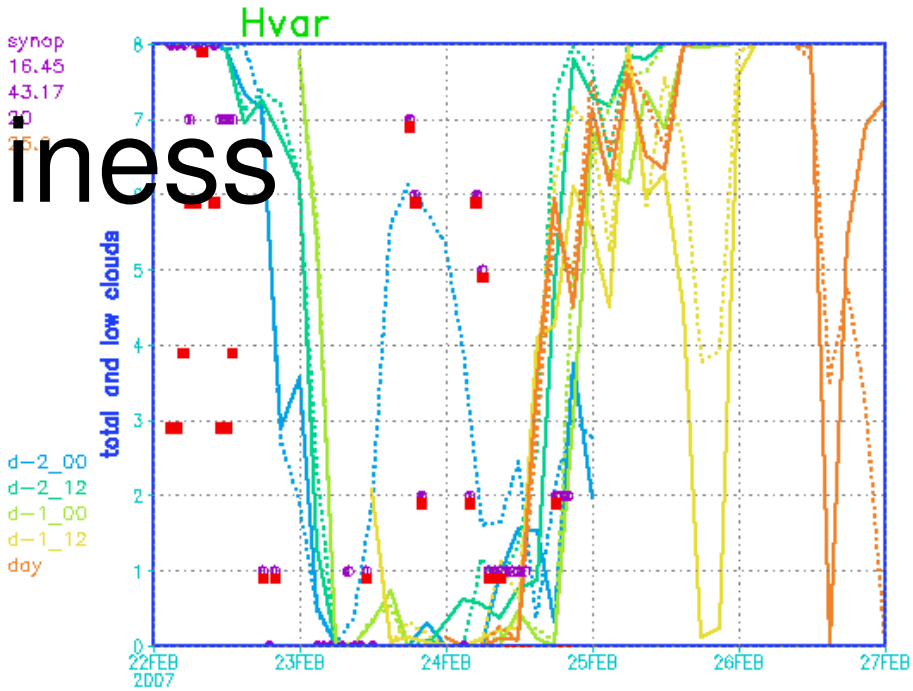
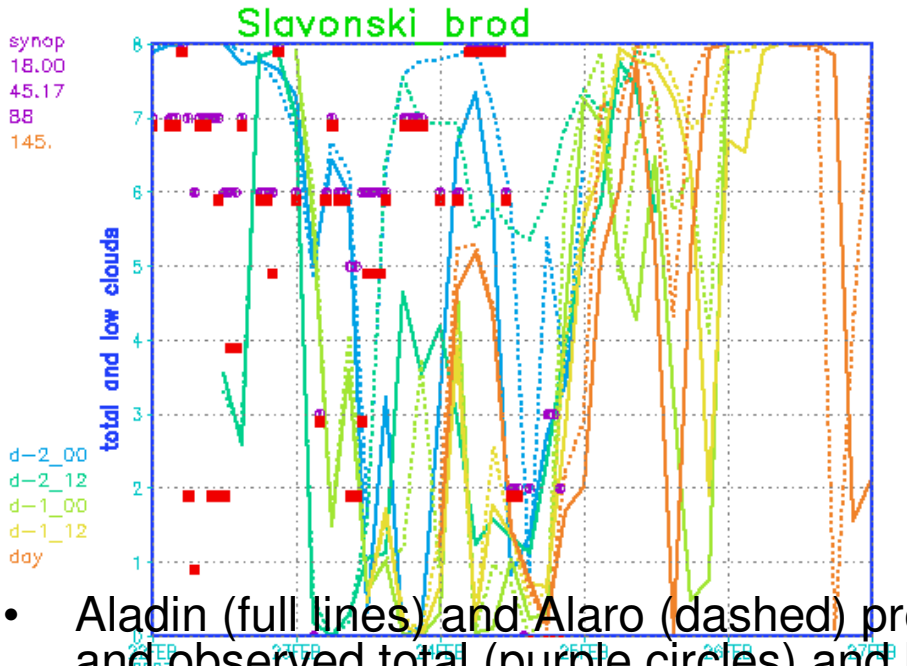


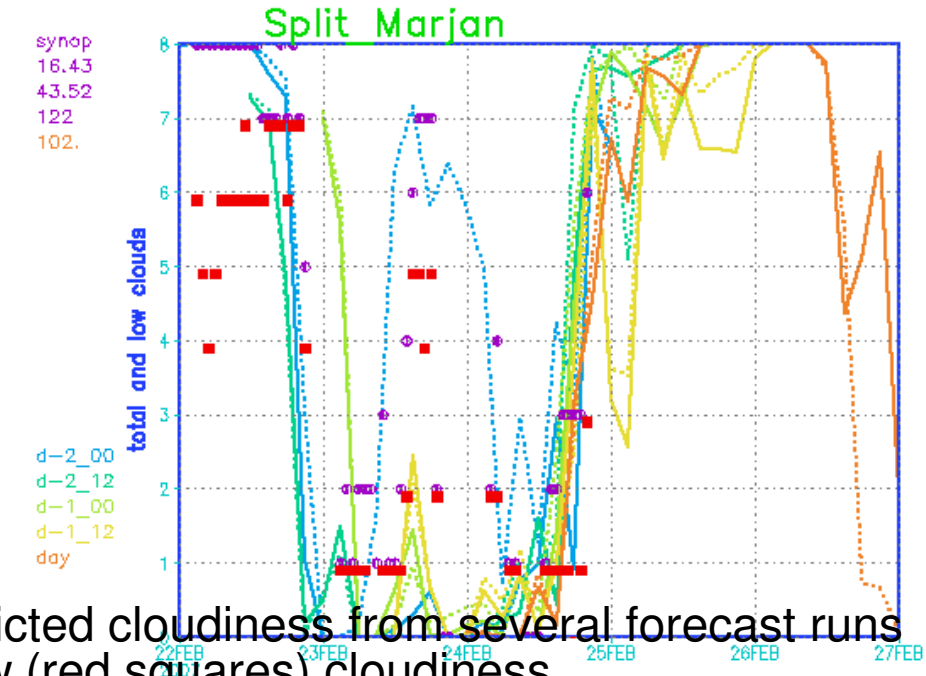


Cloudiness









- Aladin (full lines) and Alaro (dashed) predicted cloudiness from several forecast runs and observed total (purple circles) and low (red squares) cloudiness.

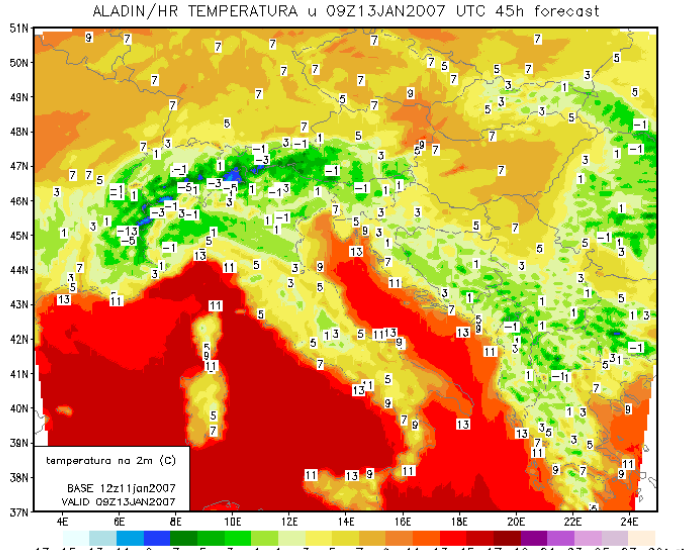
Cloudiness summary

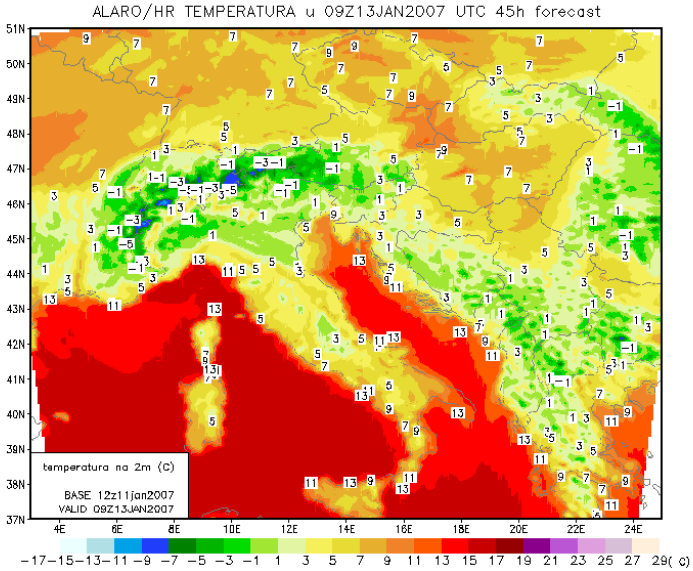
- Usually, Alaro gives more clouds than Aladin, especially later in the forecast run
- Aladin looses much moisture from the atmosphere that is kept in Alaro with moist prognostic variables

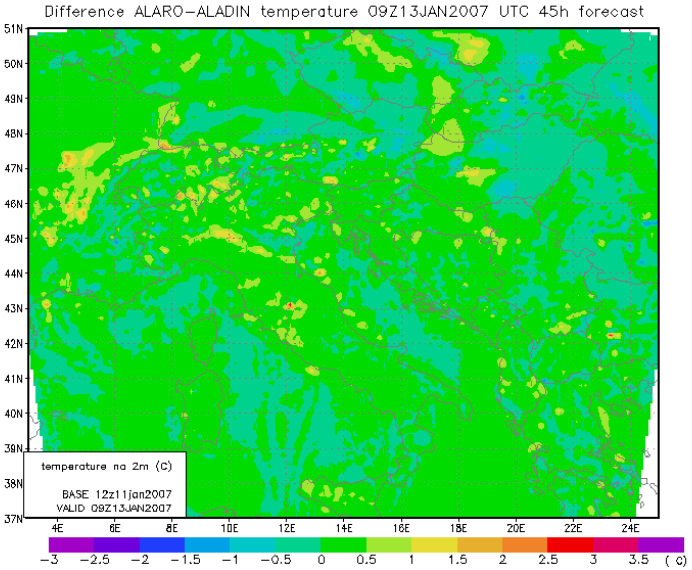
Temperature

- 2m temperature forecasts are ploted as well as their difference
- Both are also compared to measurements
- Examples of a cold front, precipitation and some other phenomena will be shown.

Temperature

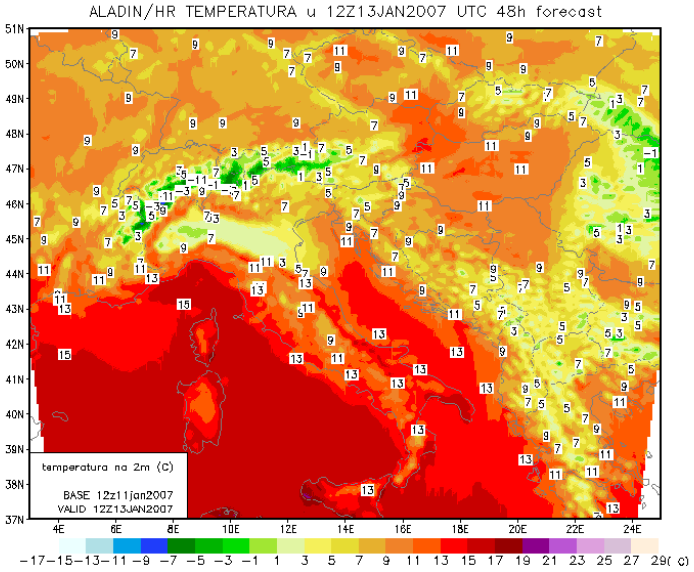


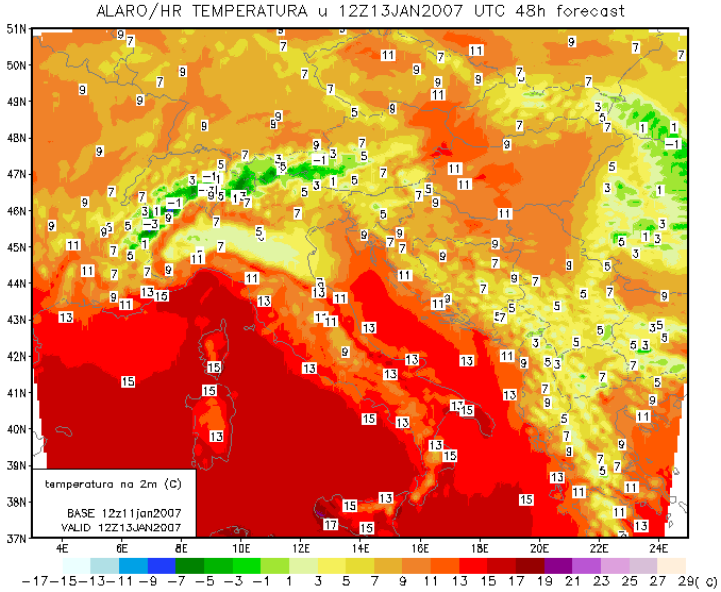


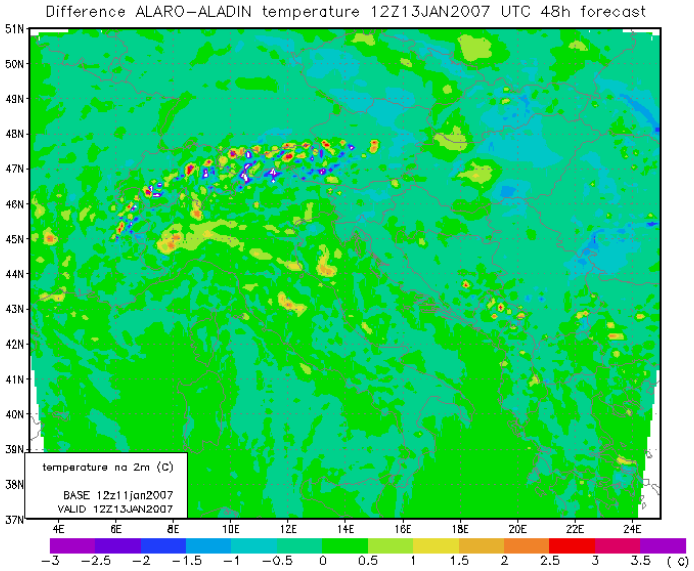


- 2m temperature forecasts from both models and their differences are ploted

Temperature

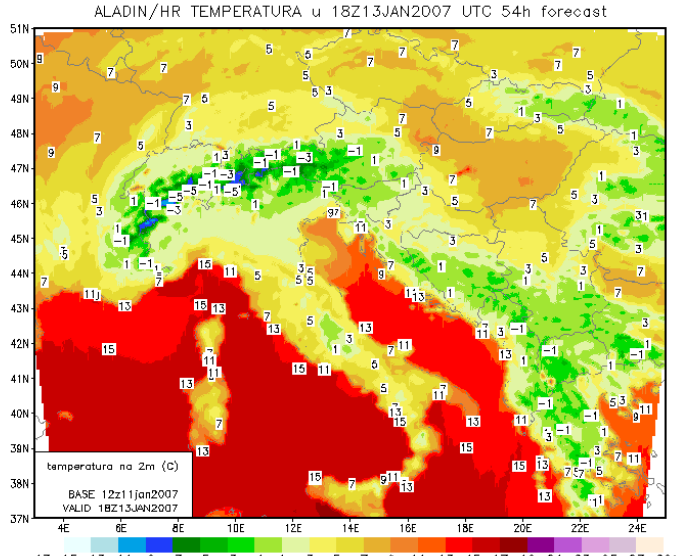


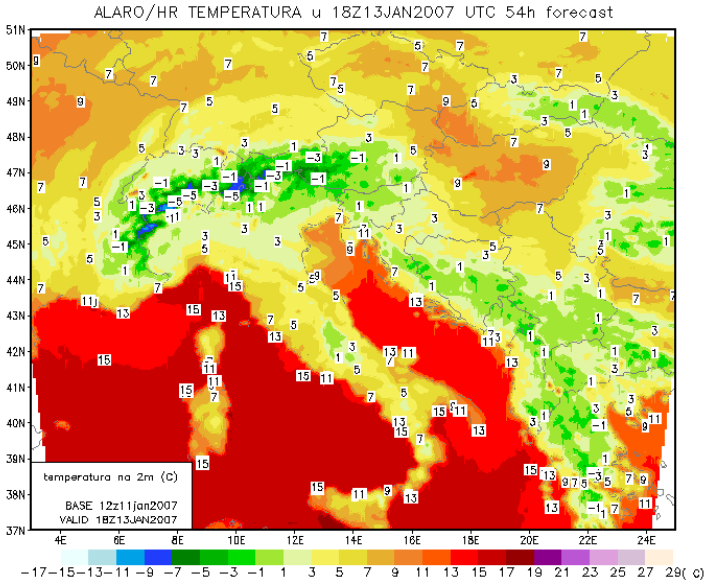


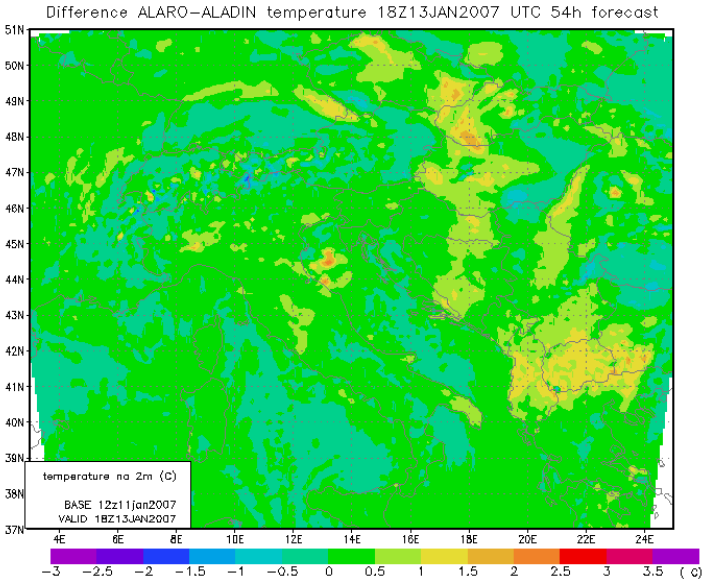


- Plotted difference in 2m temperatures shows some spotty behaviour over Alps

Temperature



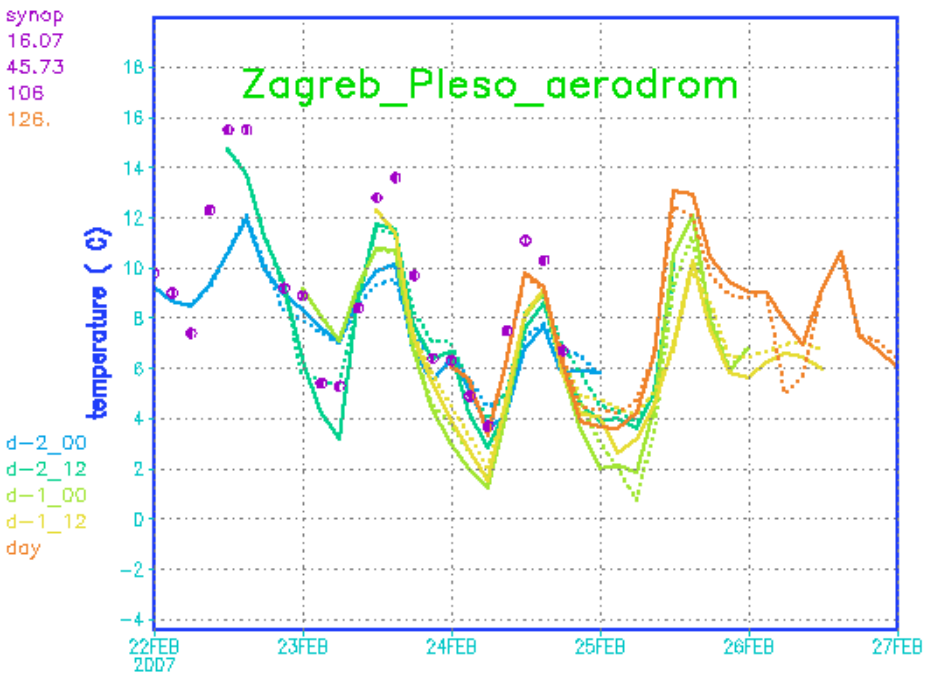


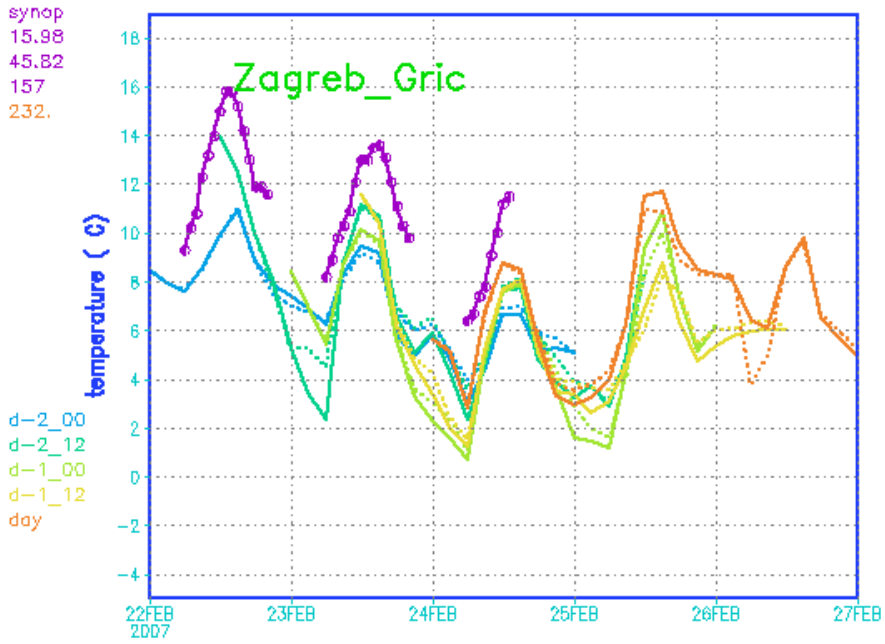


- That dissapears again after a few hours

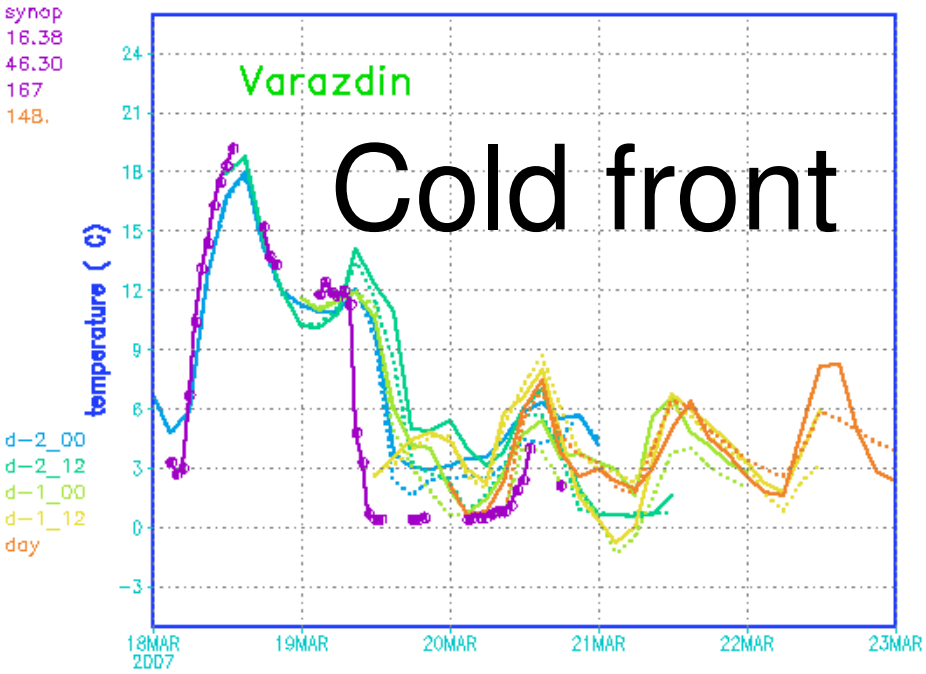
Temperature

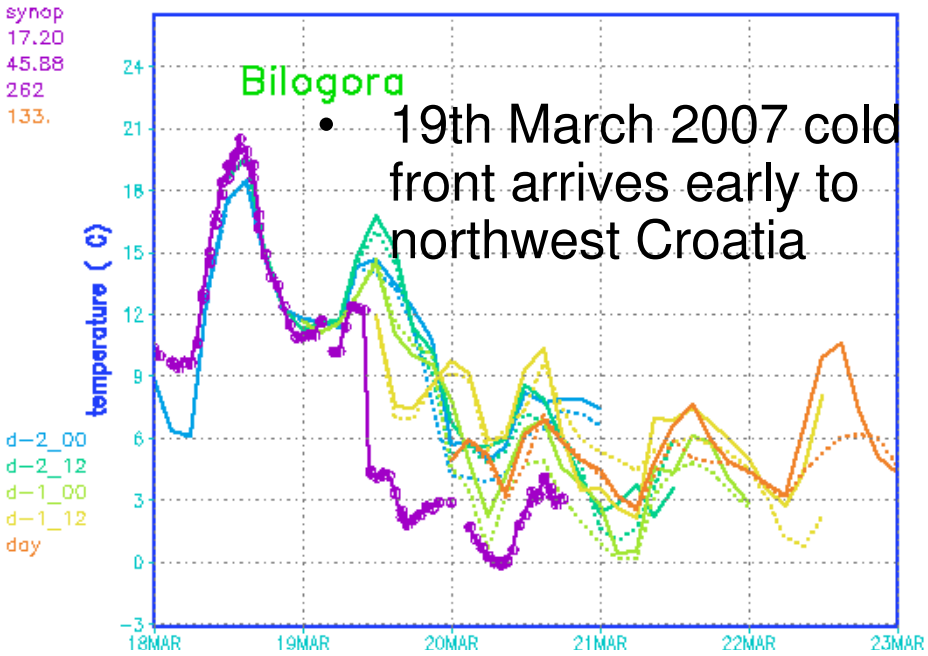
- Aladin (full lines) and Alaro (dashed) predicted 2m temperature from several forecast runs and measured 2m temperature (dark purple).



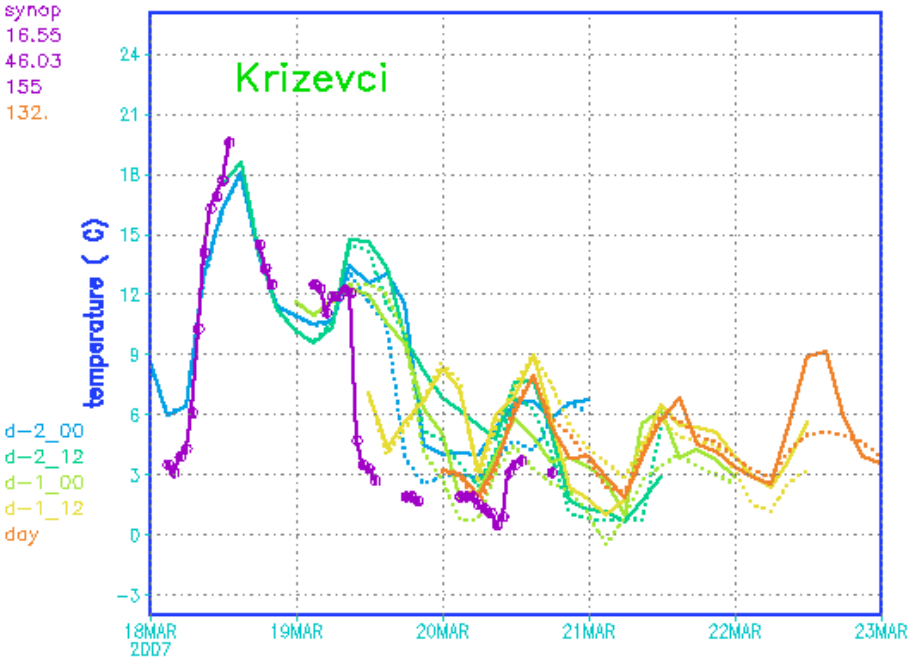


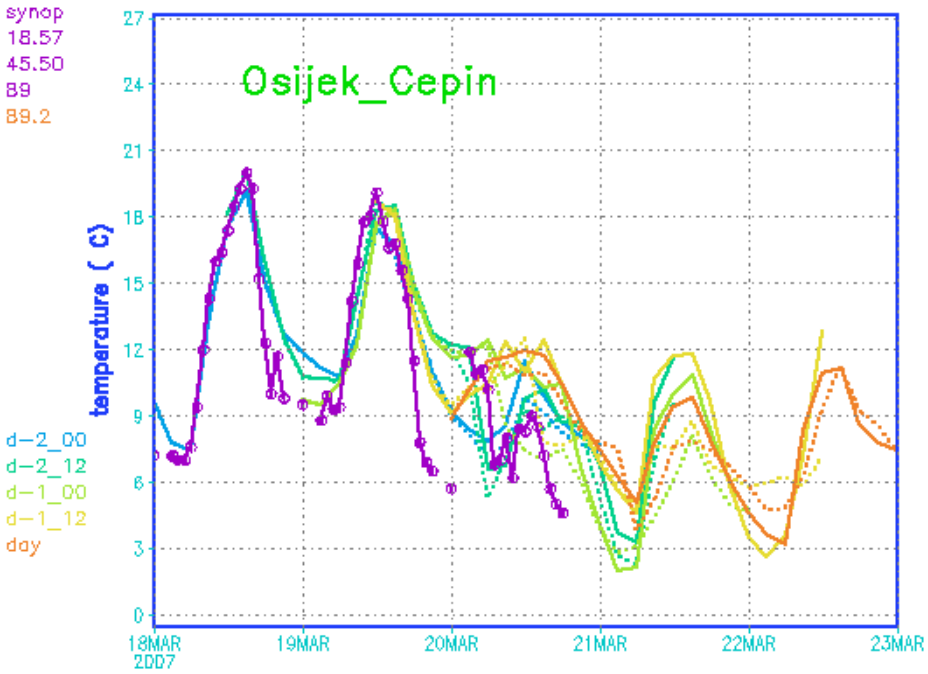
Cold front



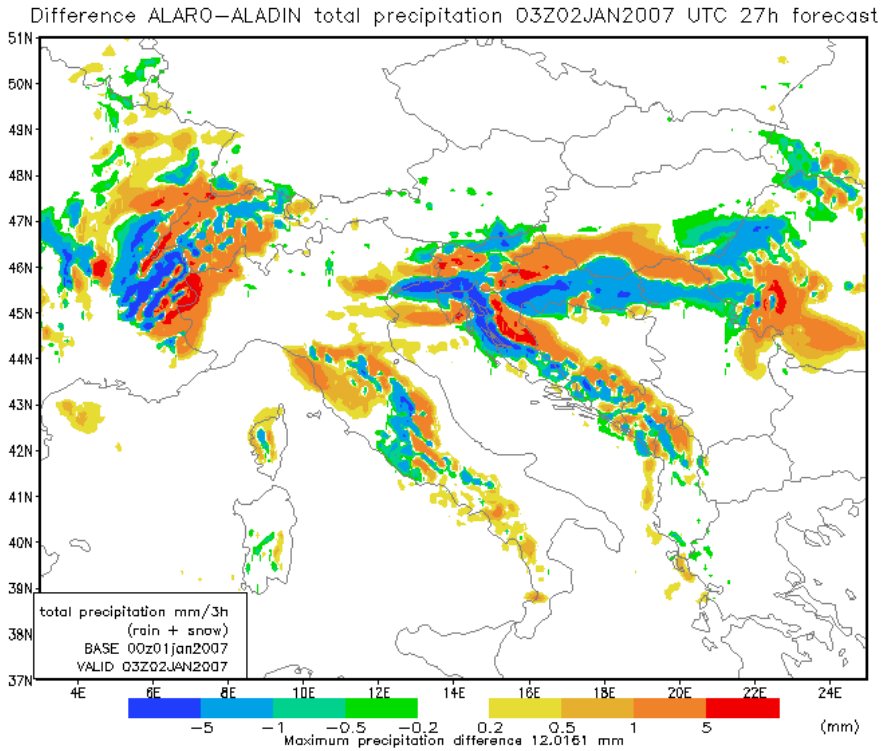


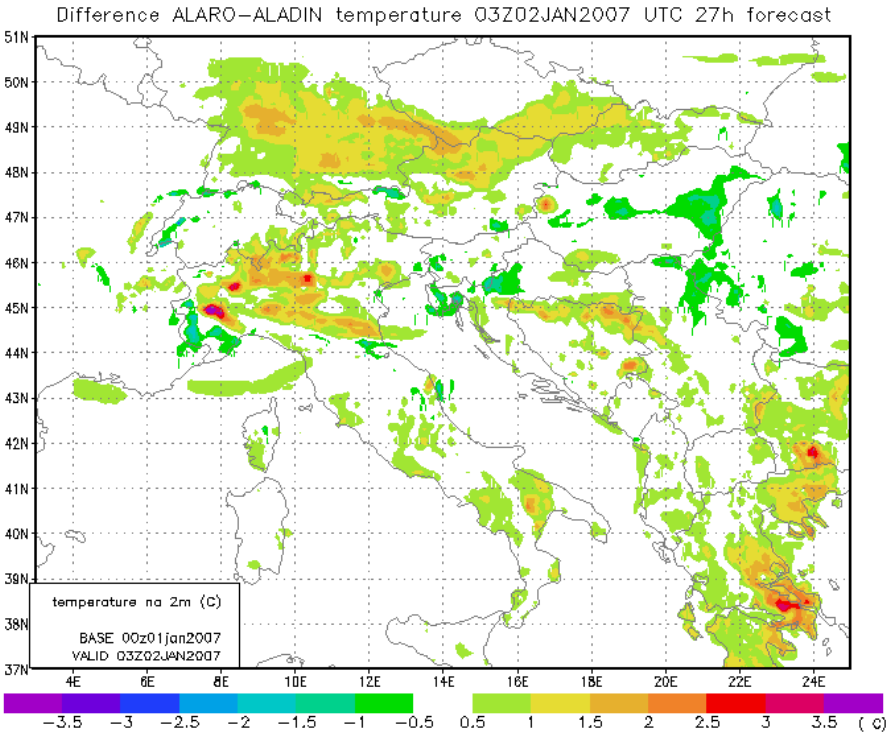
- 19th March 2007 cold front arrives early to northwest Croatia





Precipitation and temperature

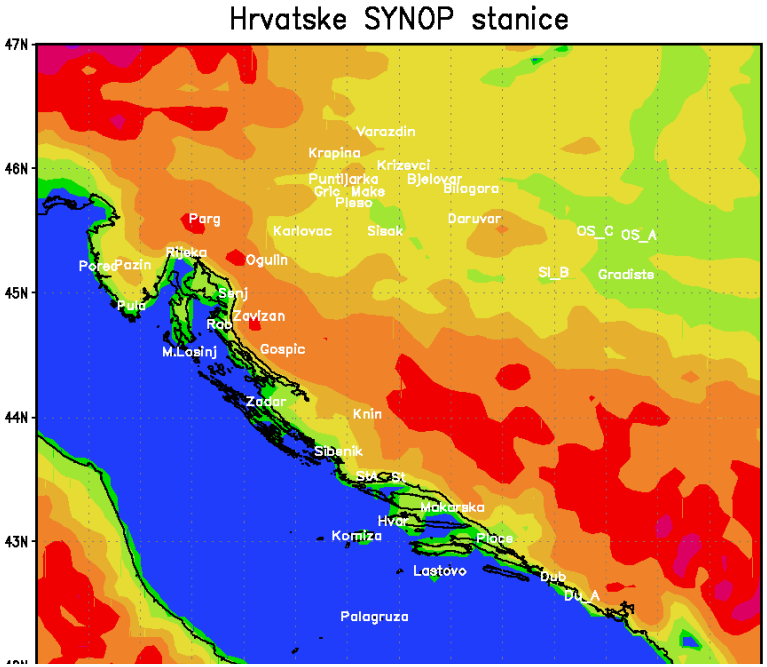


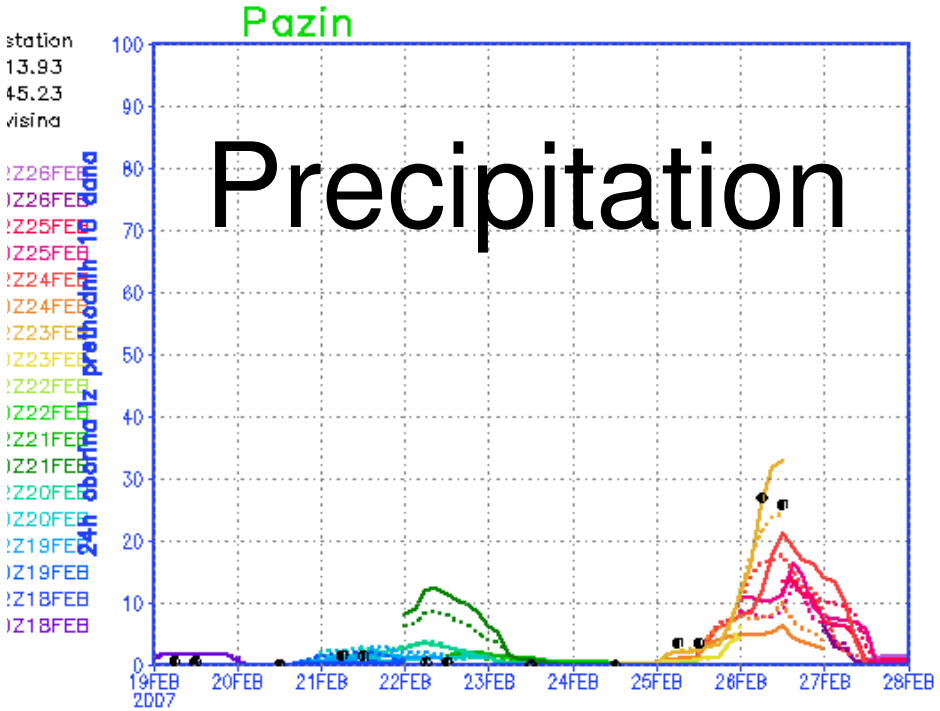


- Precipitation differences and temperature differences.

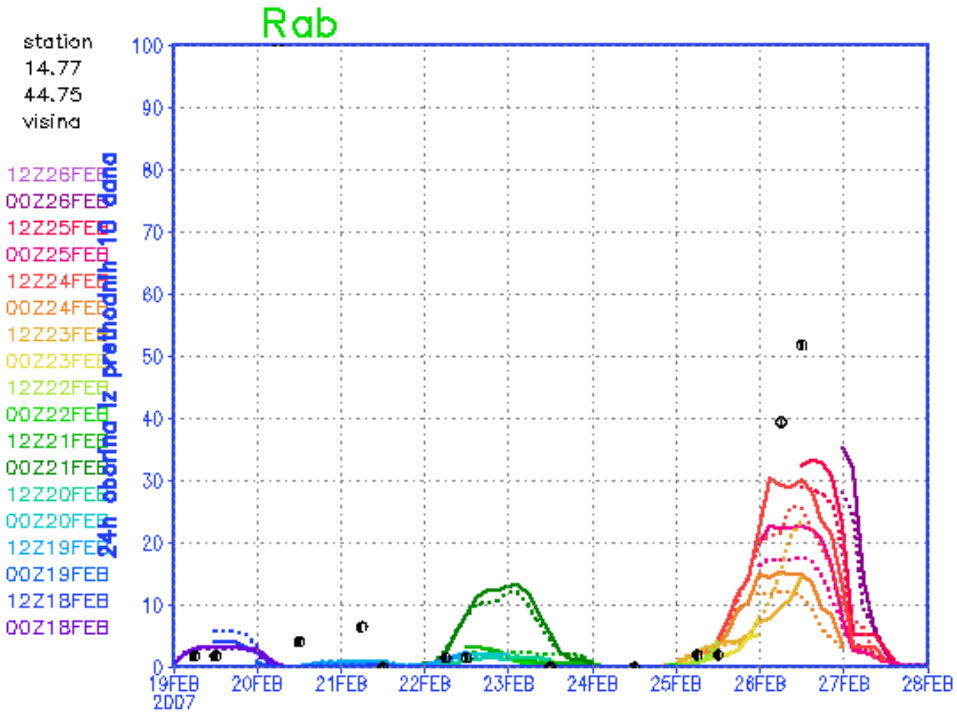
Temperature summary

- Cold fronts move faster in Alaro than in Aladin
- Temperature differences due to evaporation of precipitation
- Temperature differences due to cloudiness
- And some of the differences are not yet explained ☺



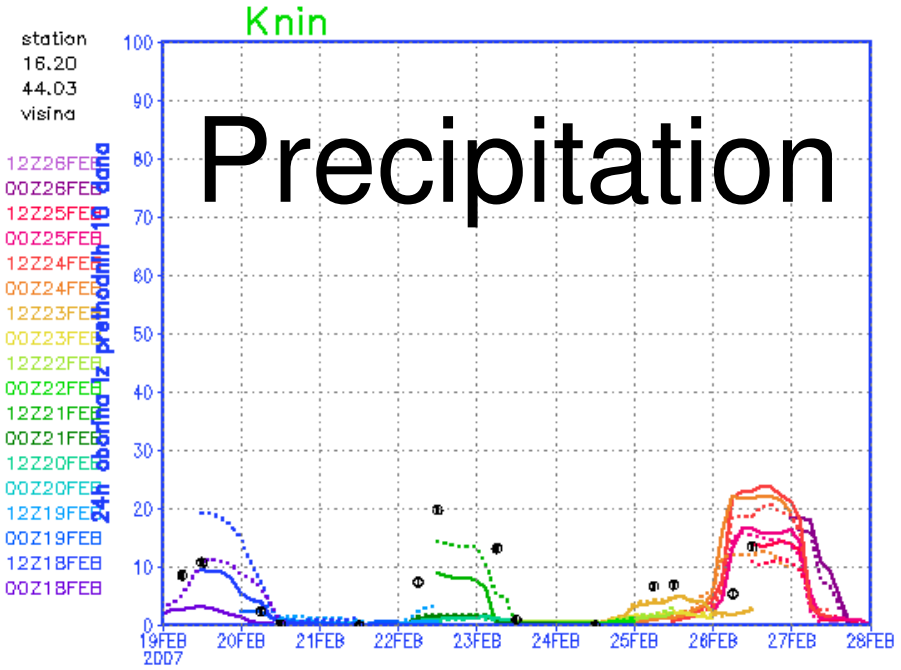


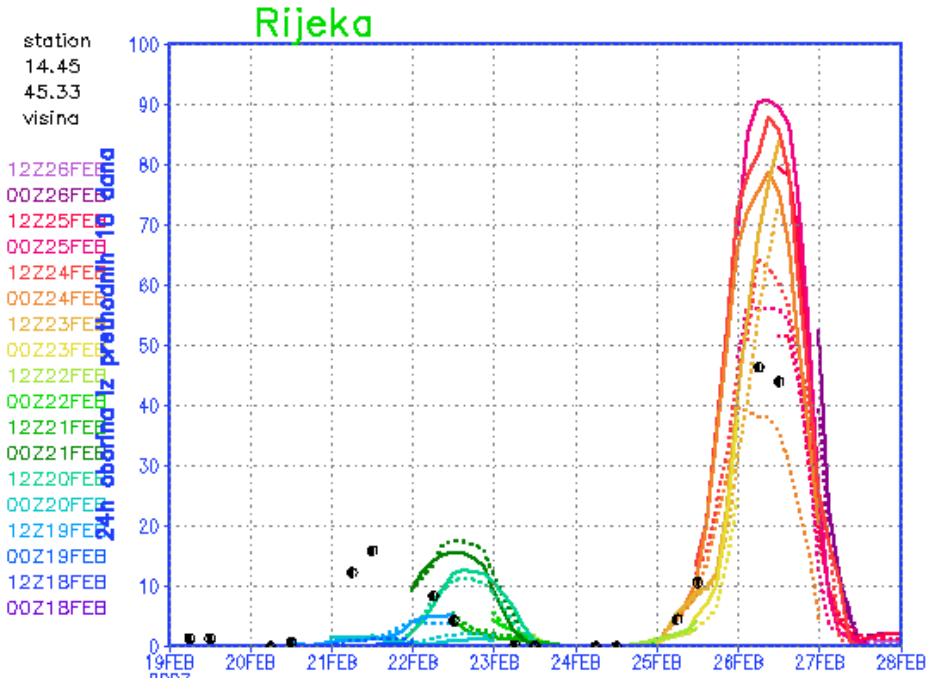
Precipitation

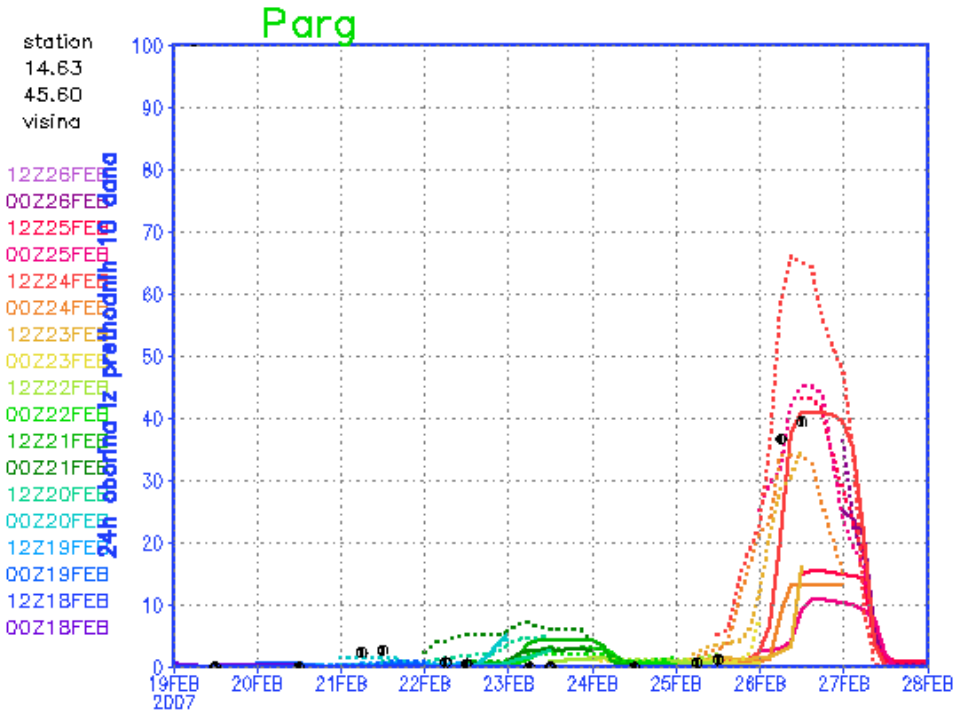


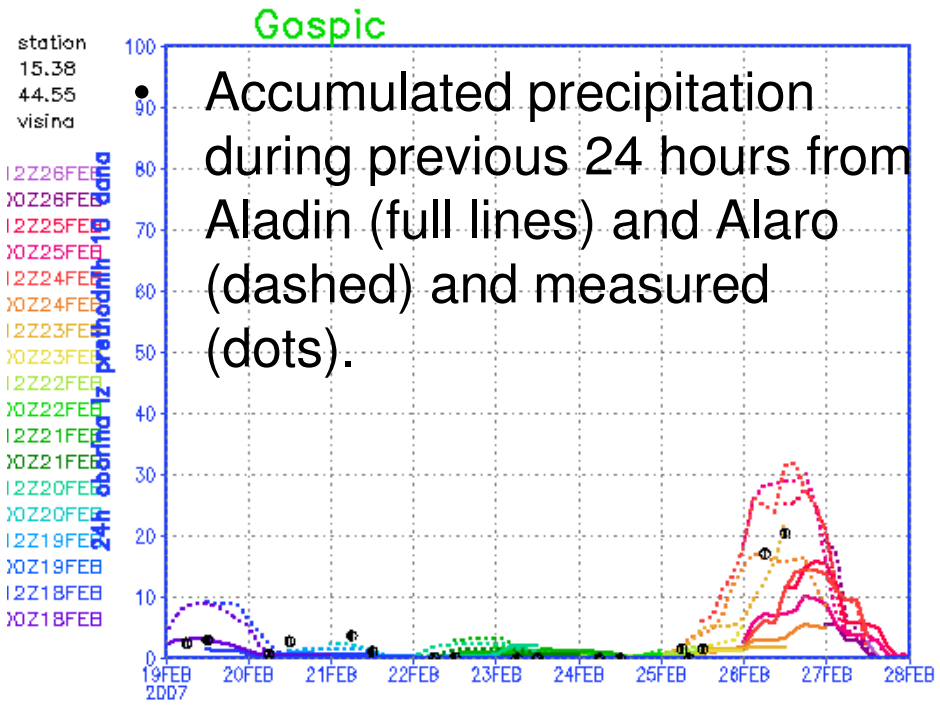
- Accumulated precipitation during previous 24 hours from Aladin (full lines) and Alaro (dashed) and measured (dots).

Precipitation



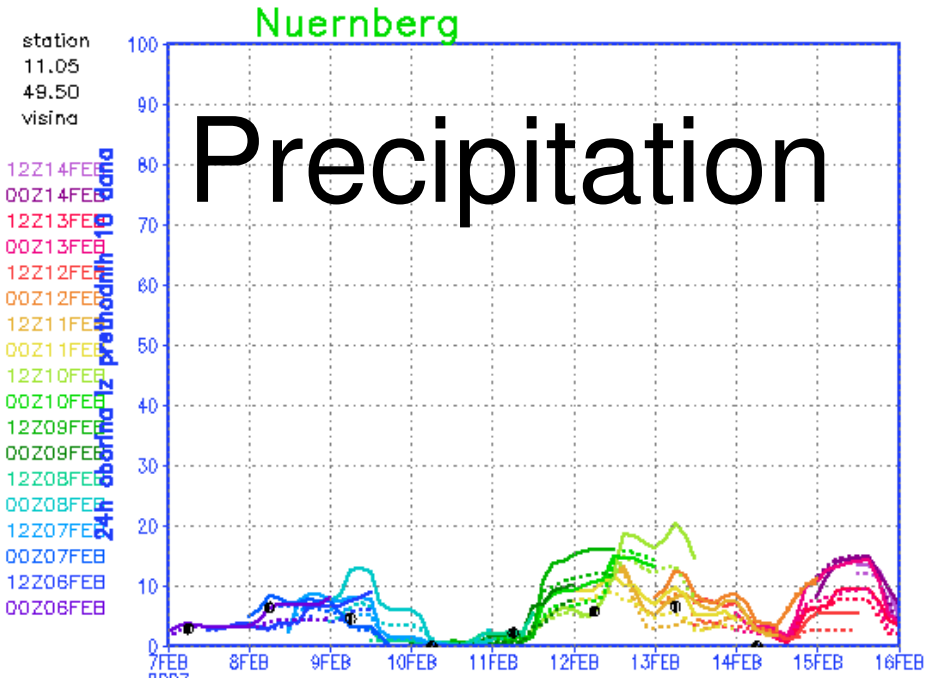


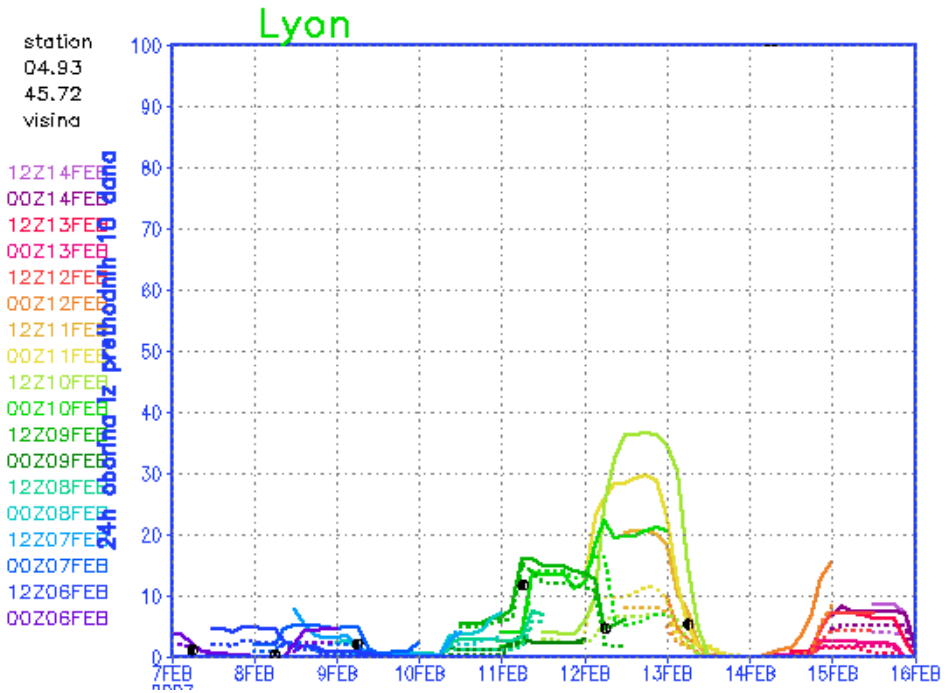


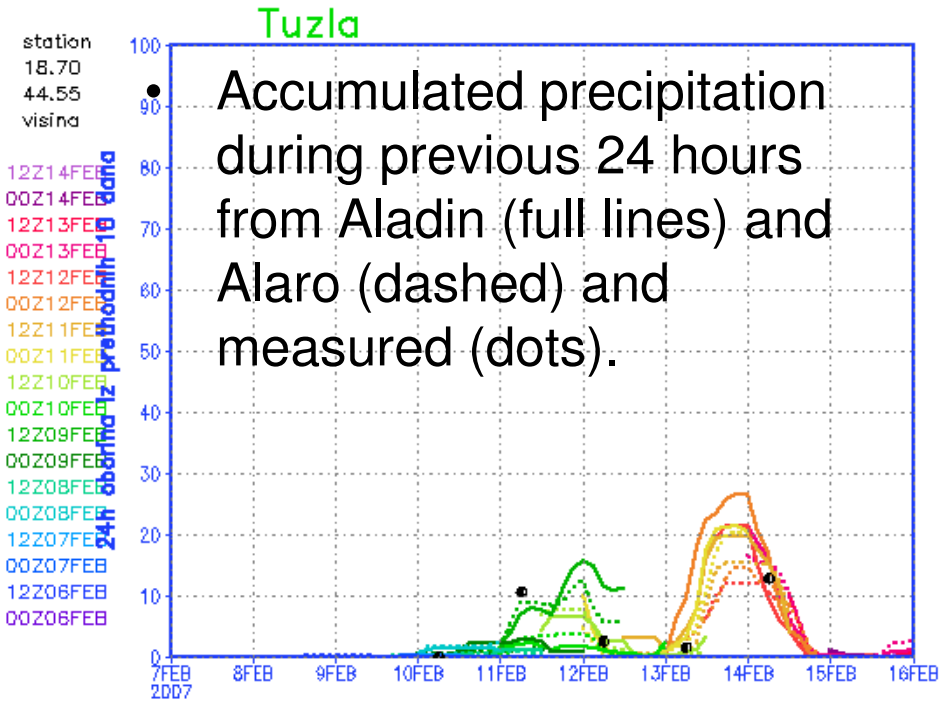


Accumulated precipitation during previous 24 hours from Aladin (full lines) and Alaro (dashed) and measured (dots).

Precipitation







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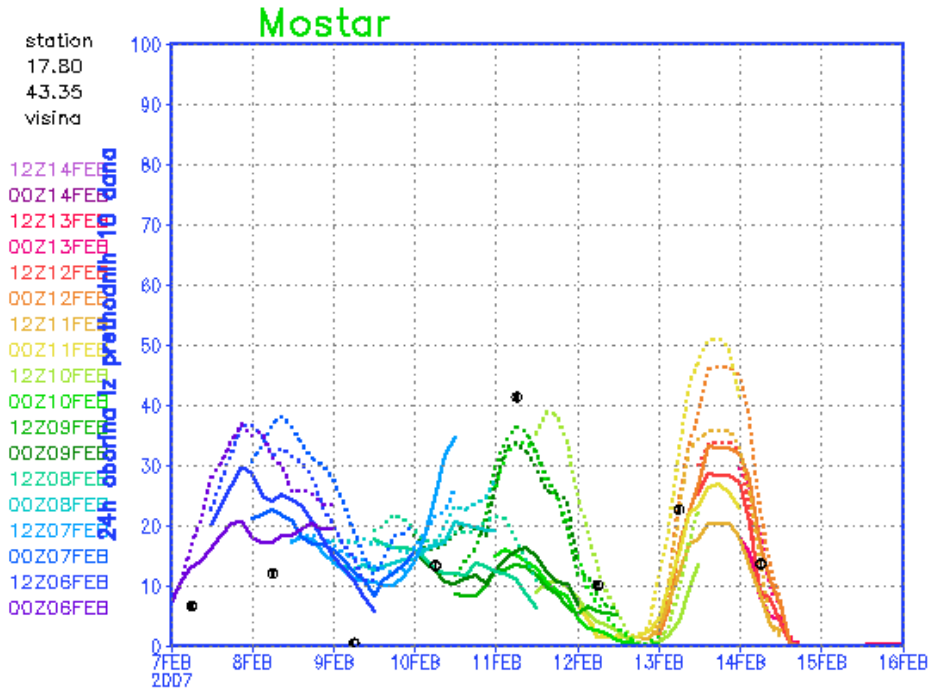

Precipitation

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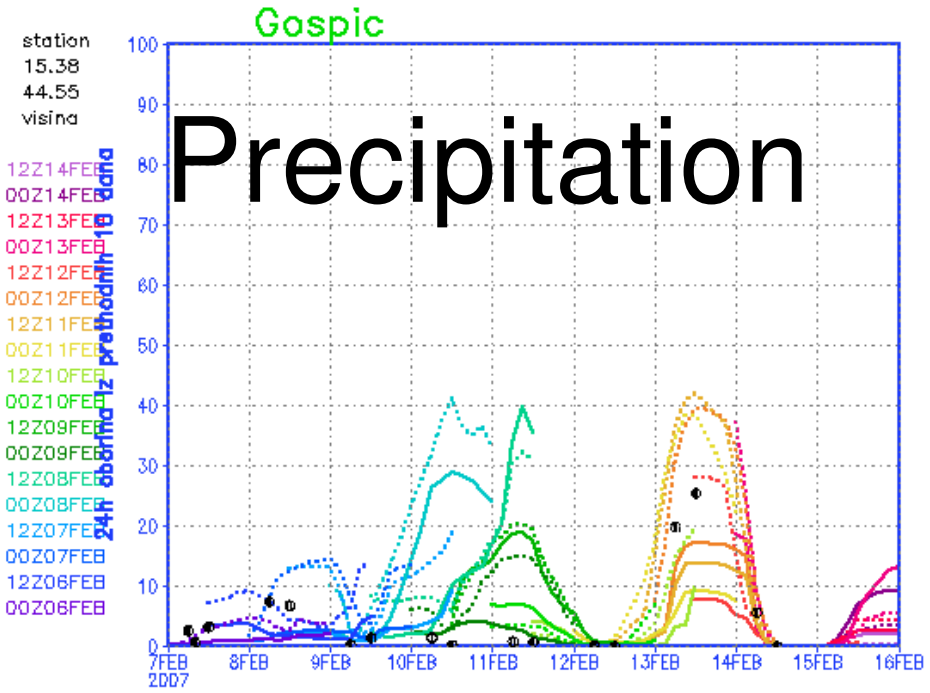
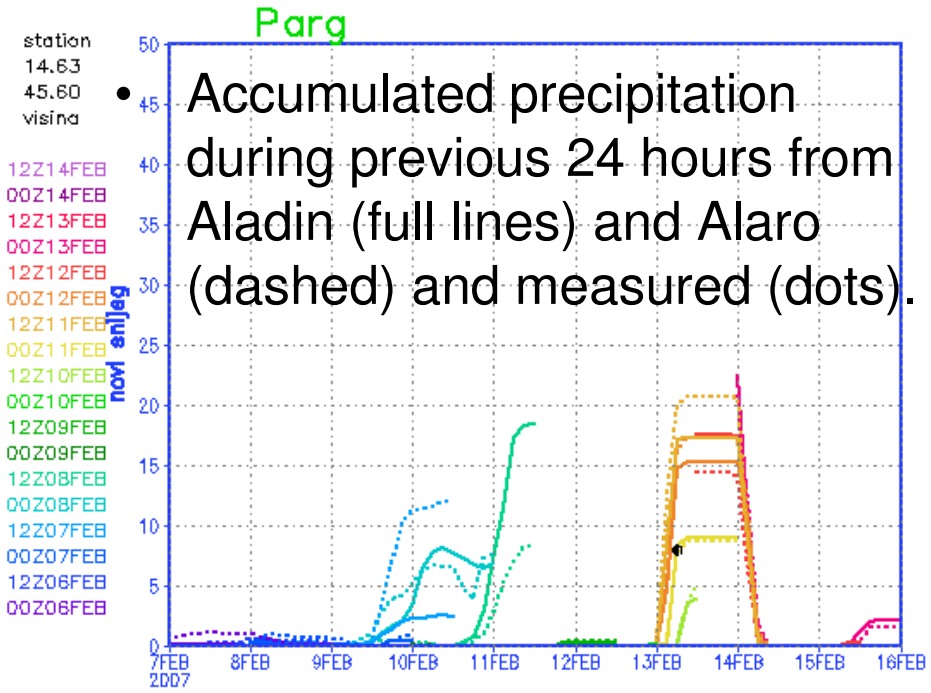
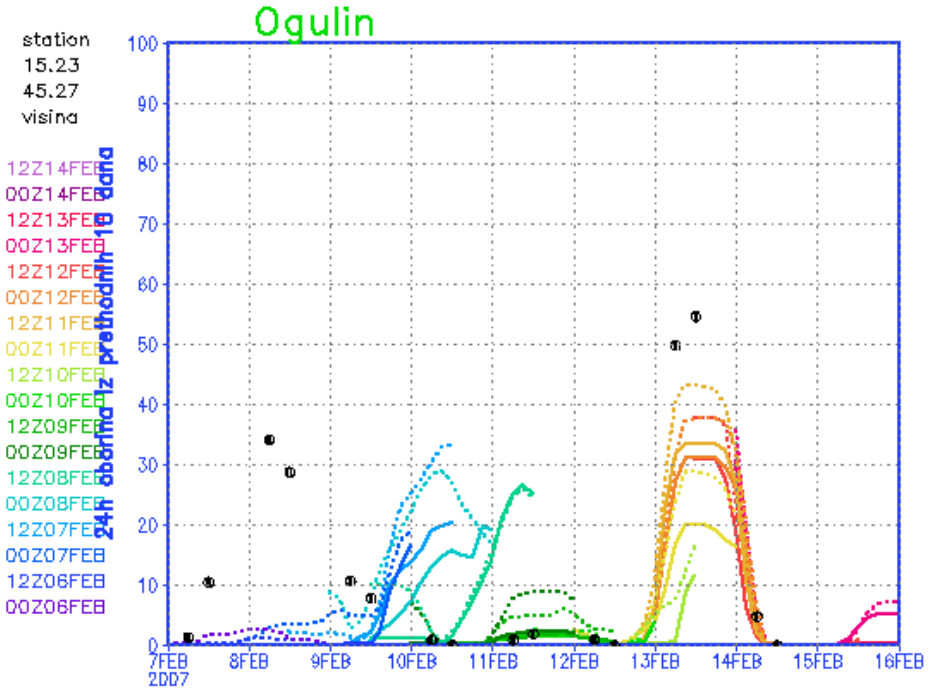
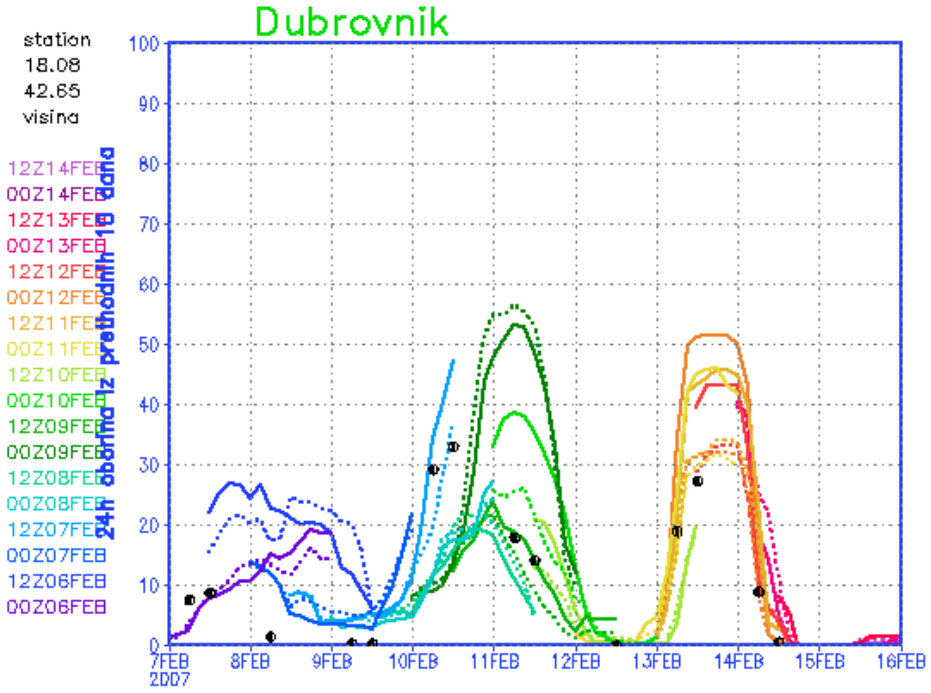
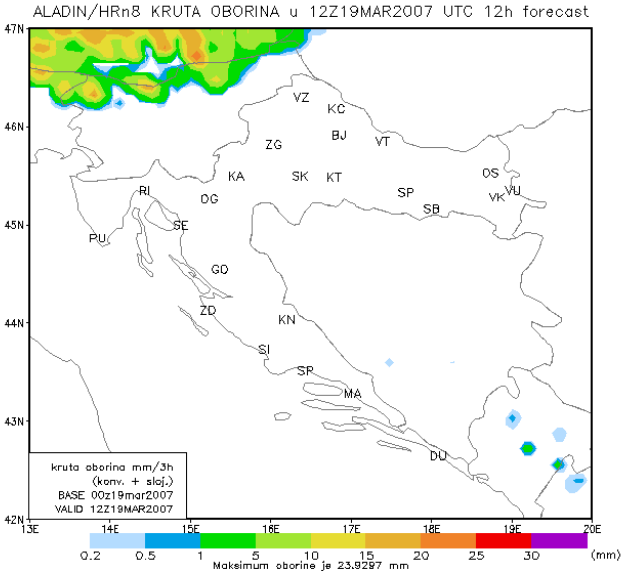


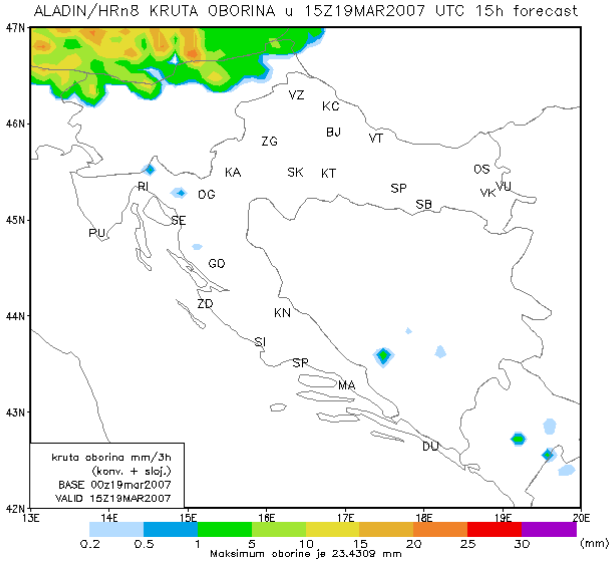


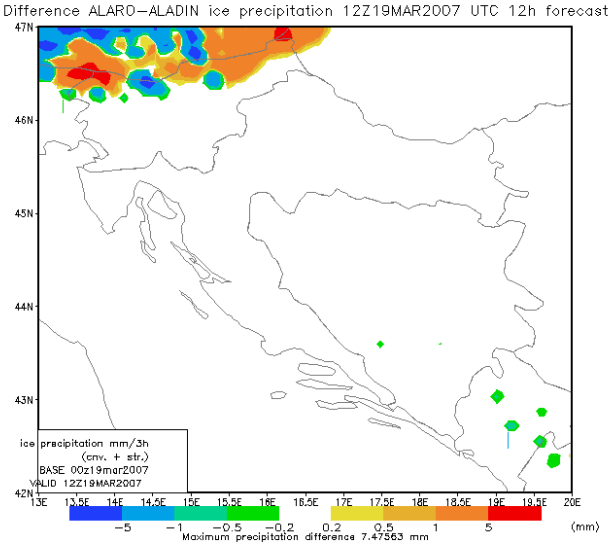




Snow



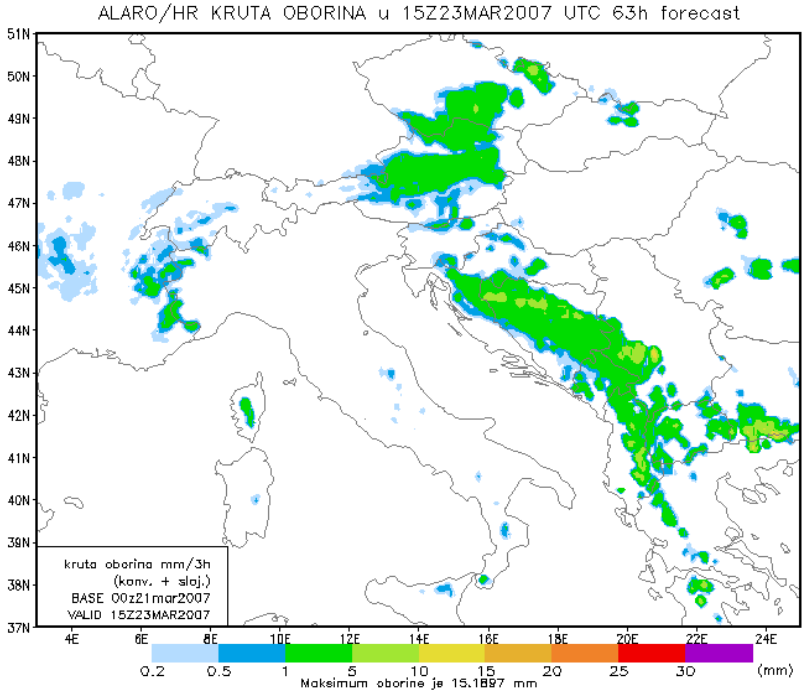


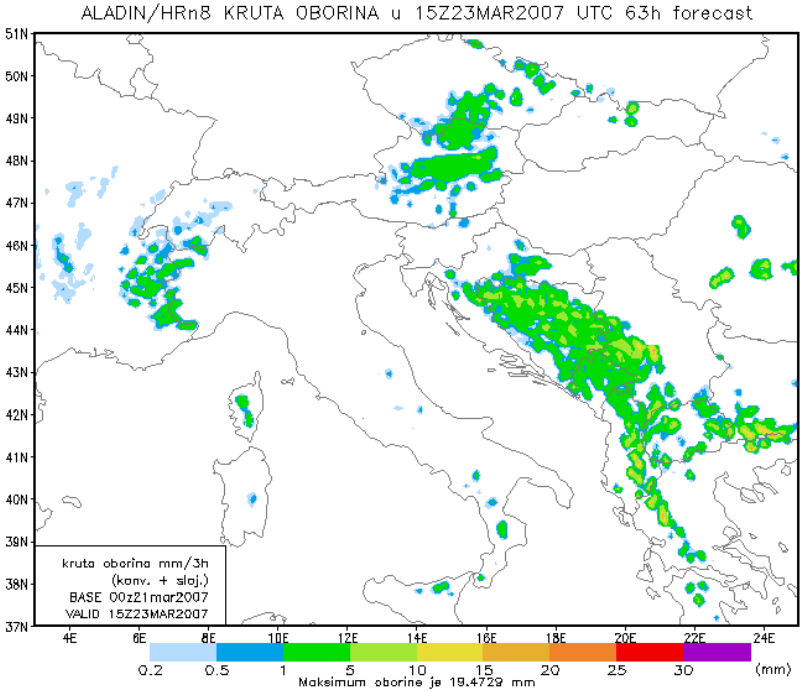


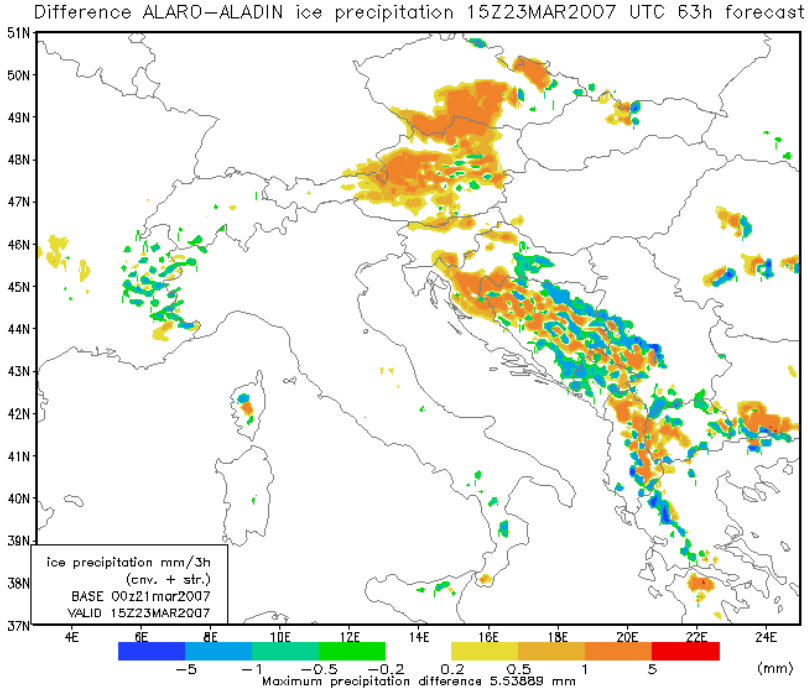
- Precipitation forecasts from Aladin and Alaro are ploted as well as their difference

Snow

- Predicted snow from Aladin and Alaro and the difference is plotted







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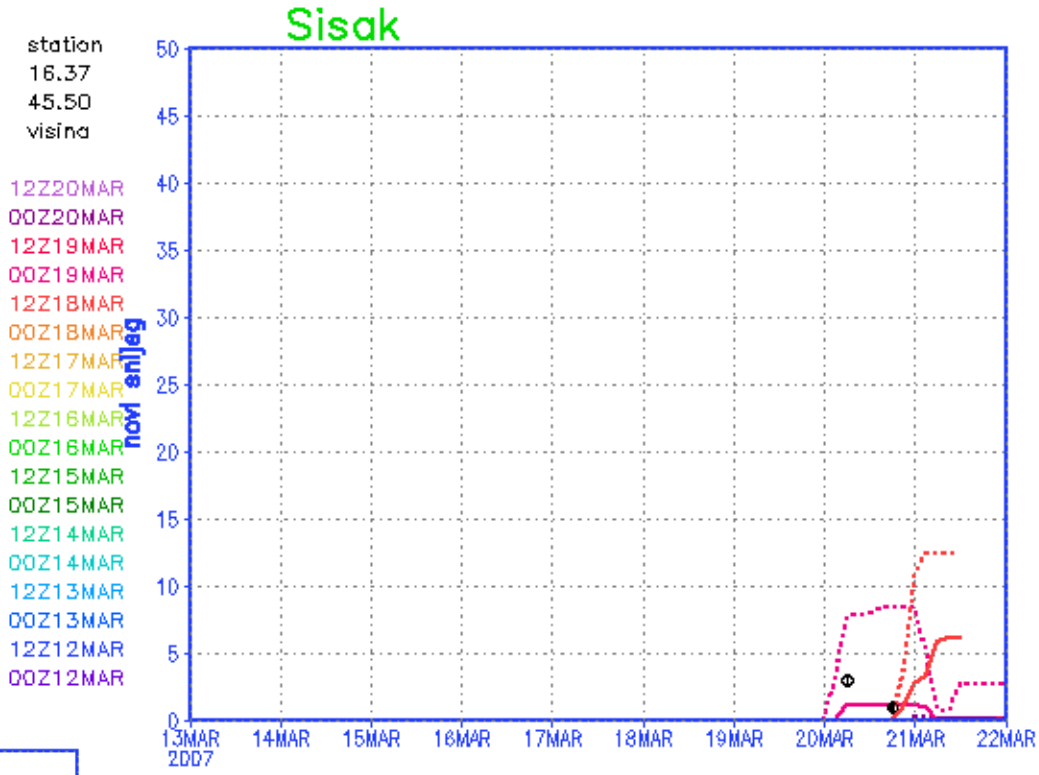
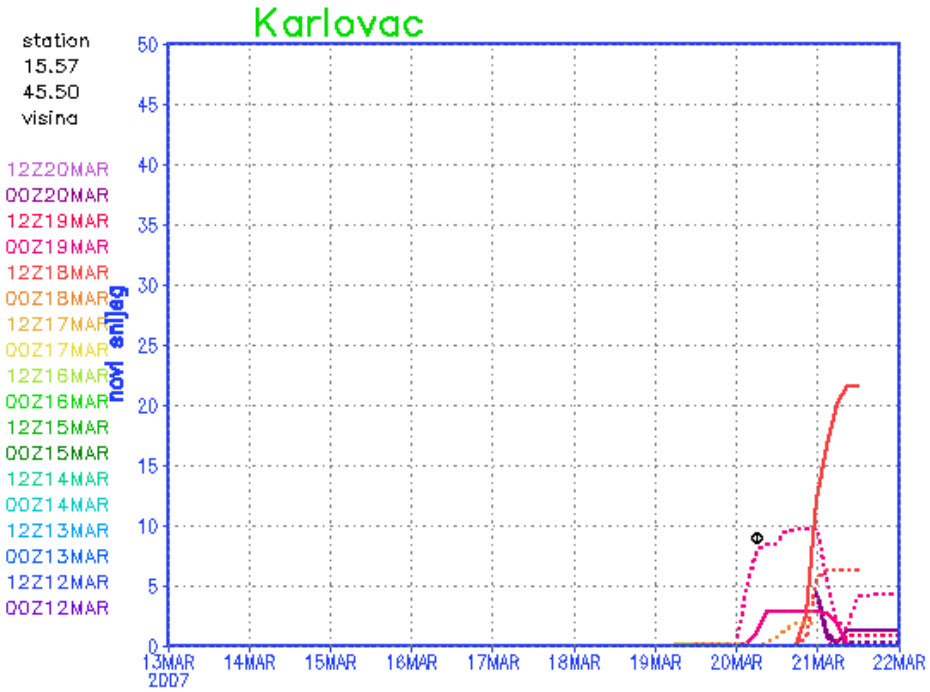
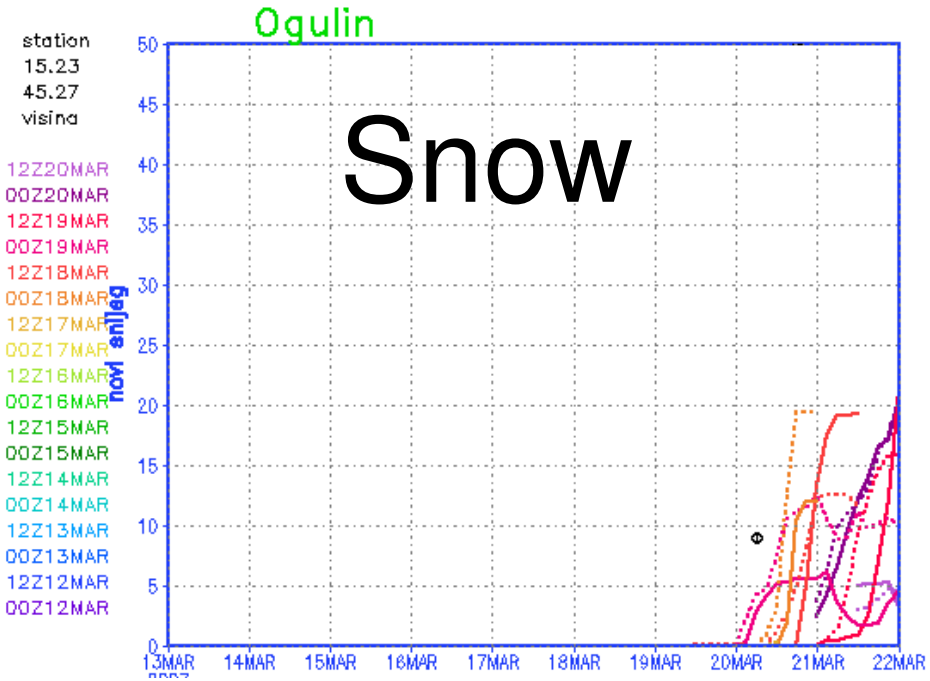
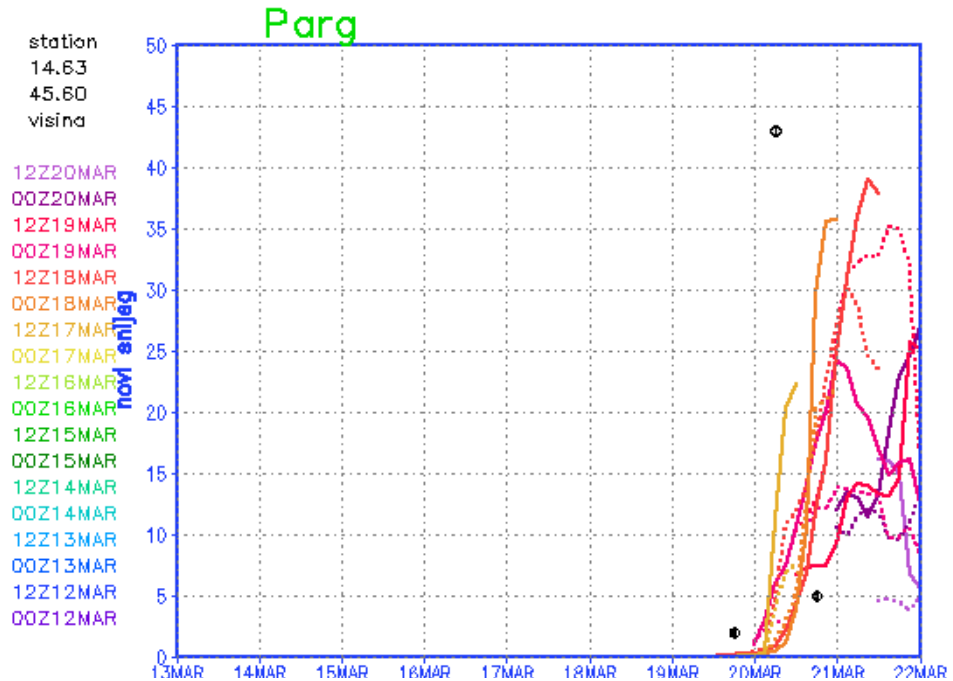


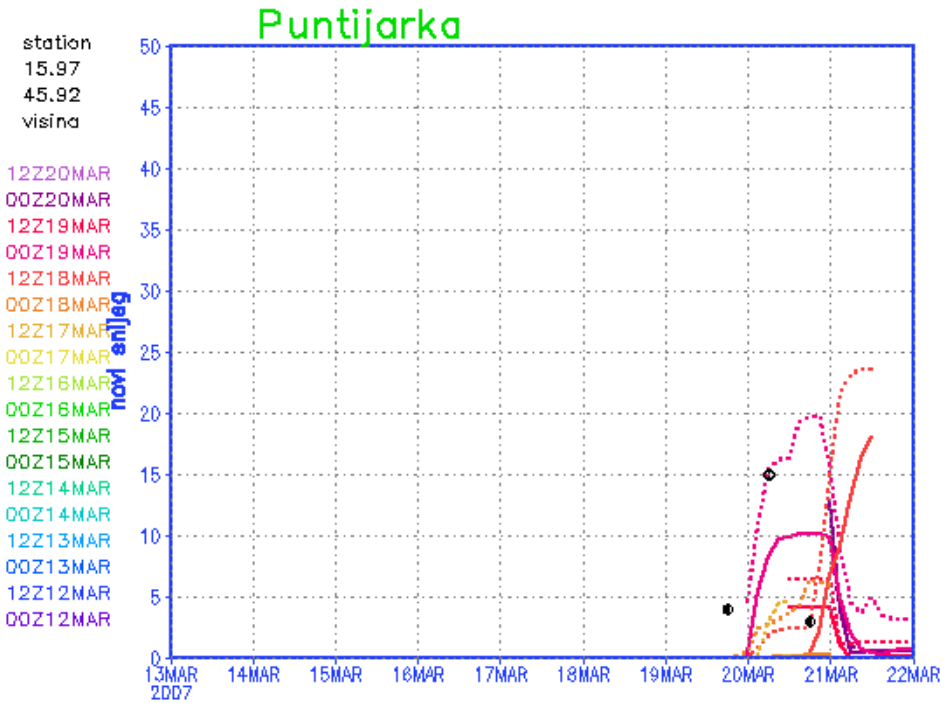


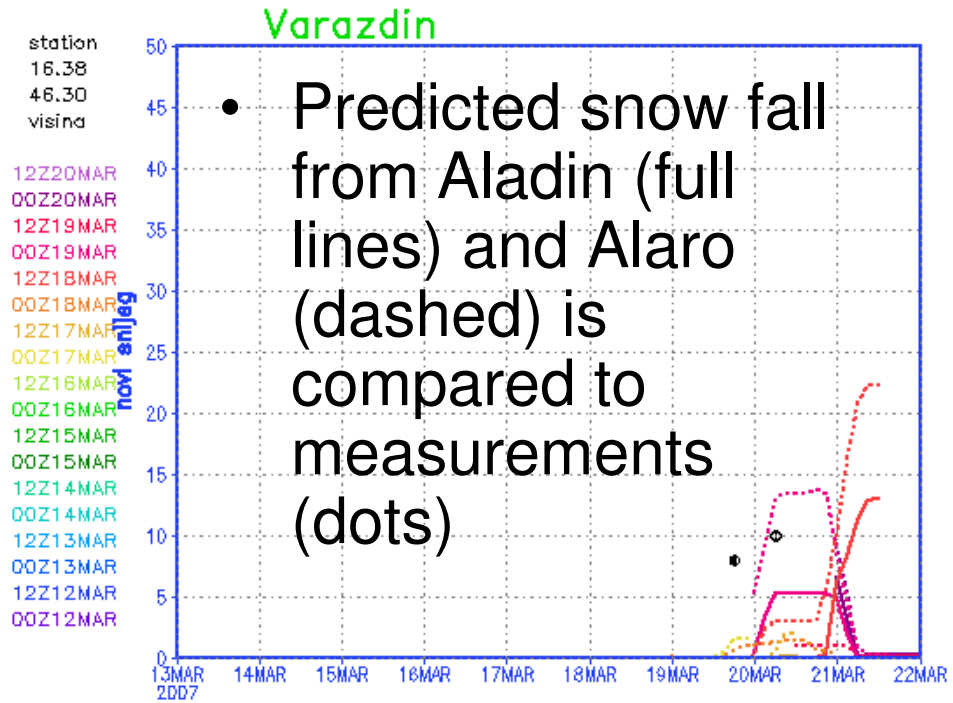
- Predicted snow fall from Aladin (full lines) and Alaro (dashed) is compared to measurements (dots)



Snow







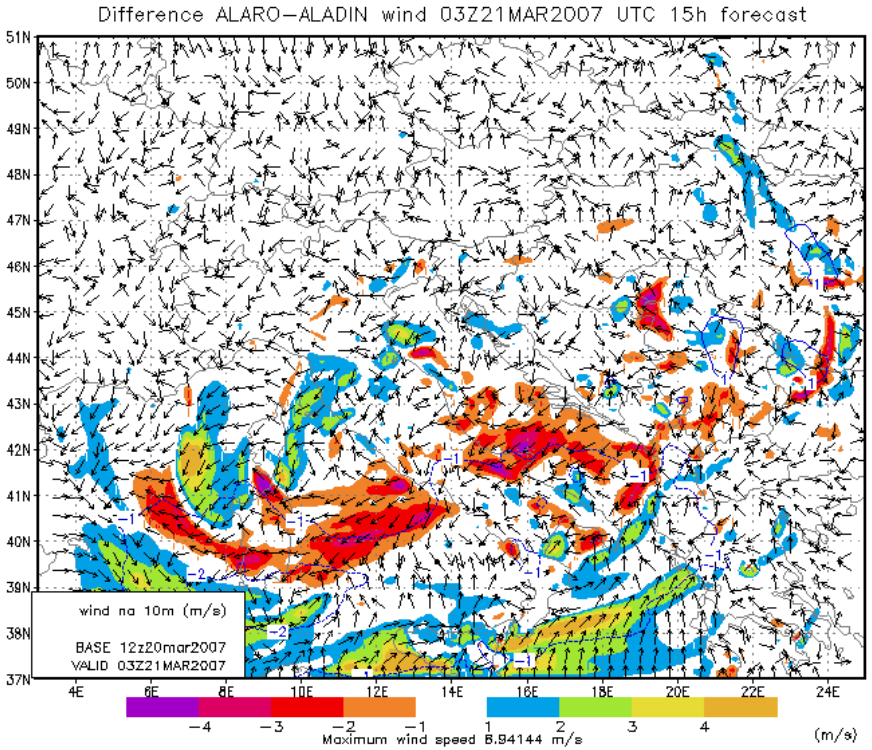
- Predicted snow fall from Aladin (full lines) and Alaro (dashed) is compared to measurements (dots)

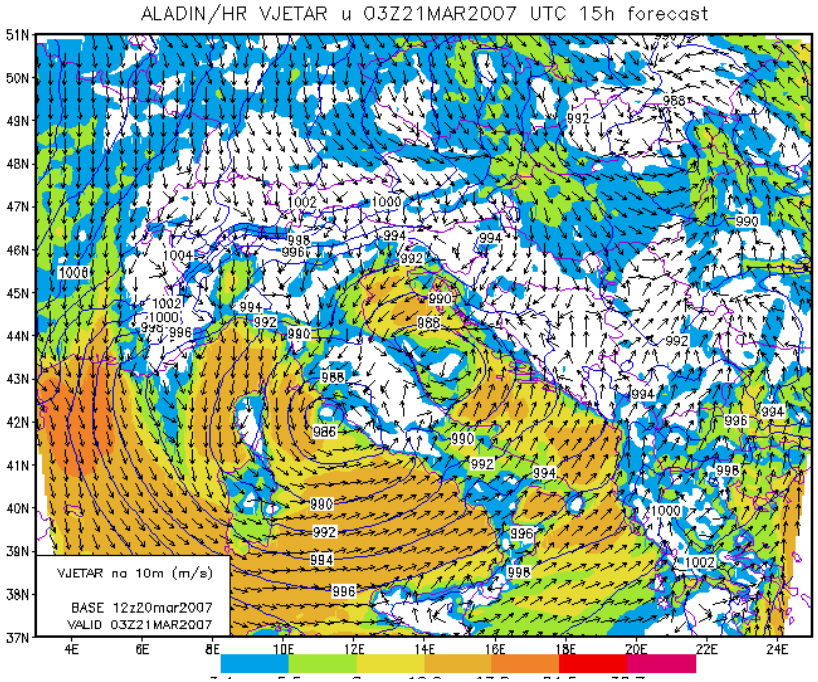
Precipitation summary

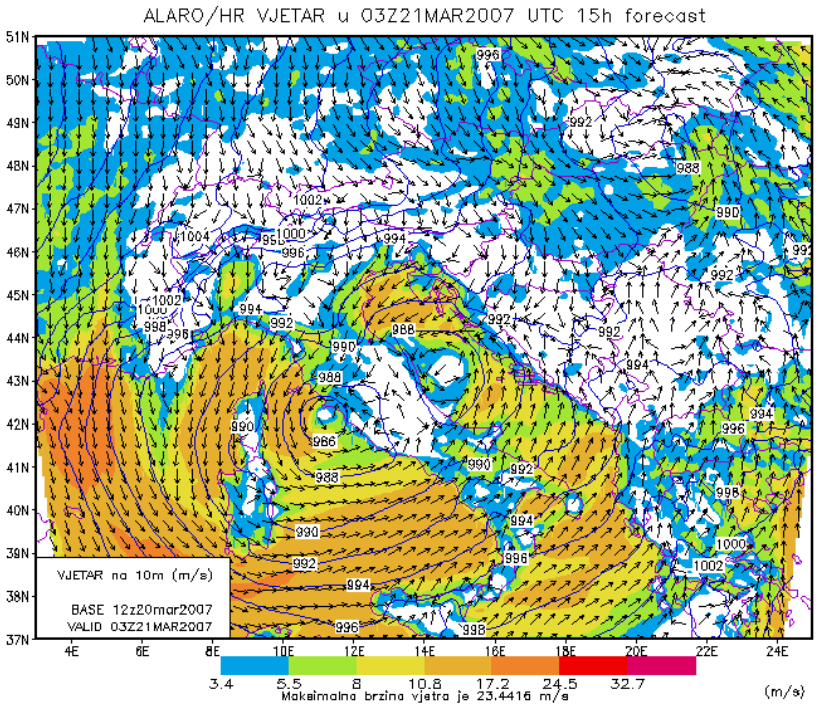
- Generally, less precipitation in Alaro
- Alaro gives more precipitation on the lee side
- Alaro produces more snow

Wind

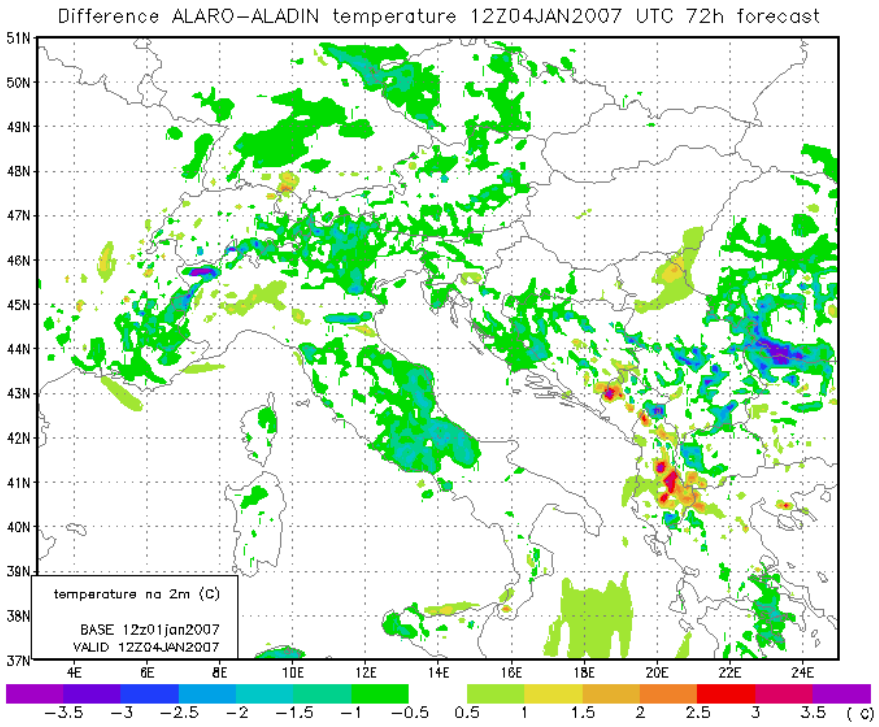
- Differences between Alaro and Aladin forecasts

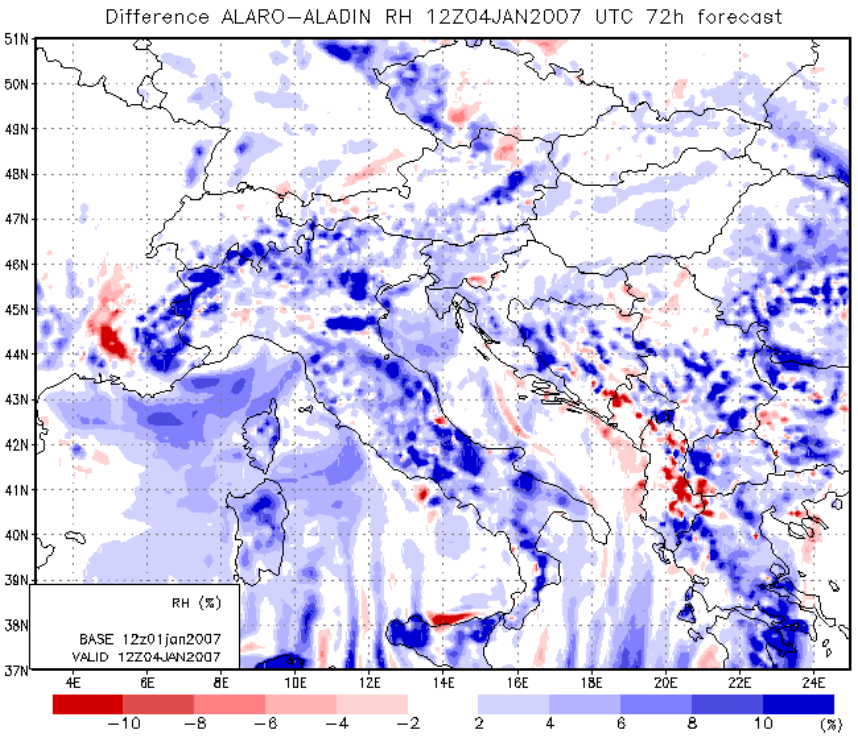






Relative humidity

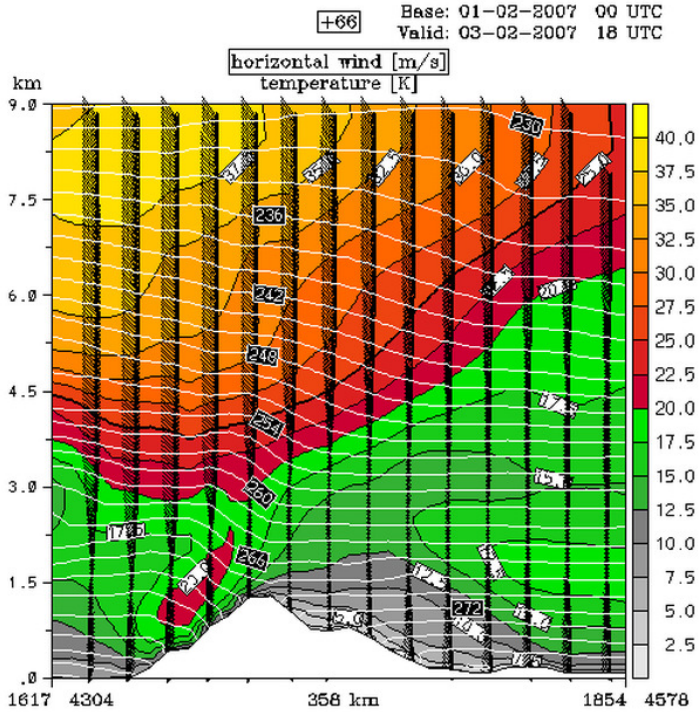


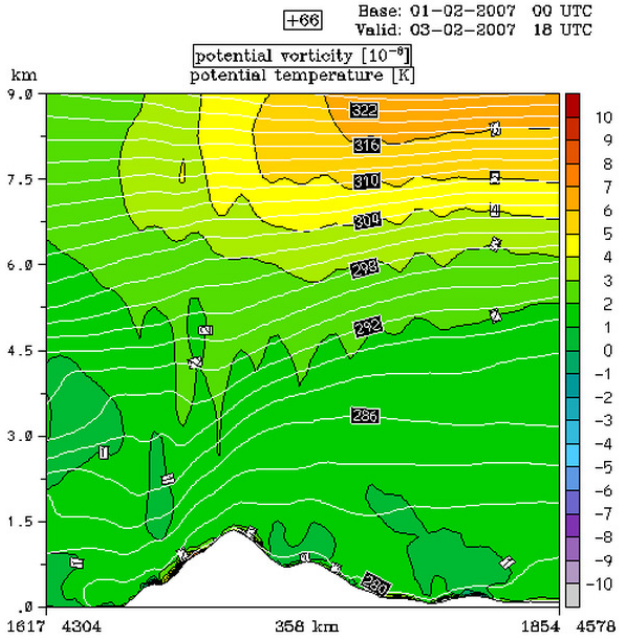


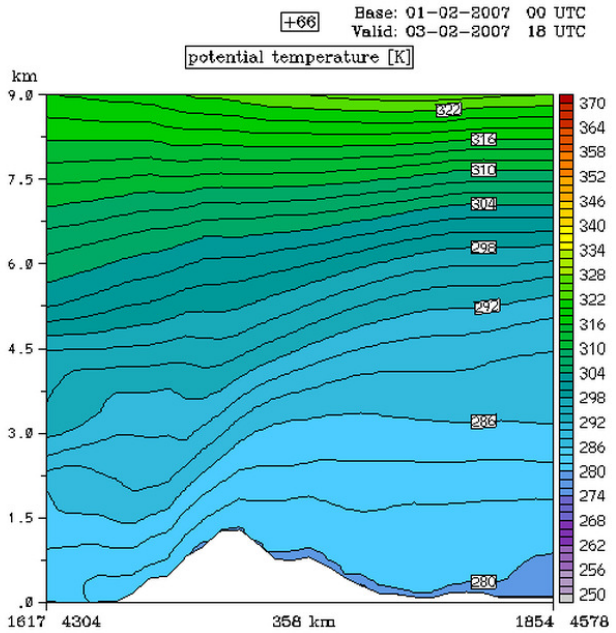
- Usually different due to differences in the temperature field

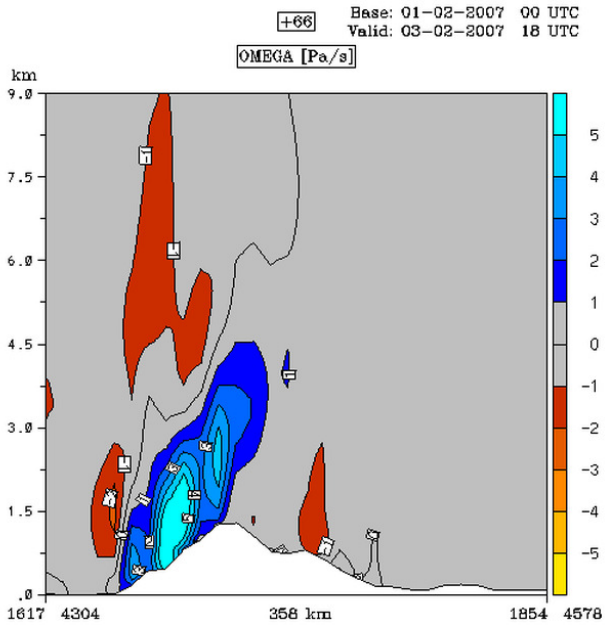
Vertical cross-sections

- Split-Osijek for wind (right), PV (low left), potential temperature (below center) and vertical velocity (below right).



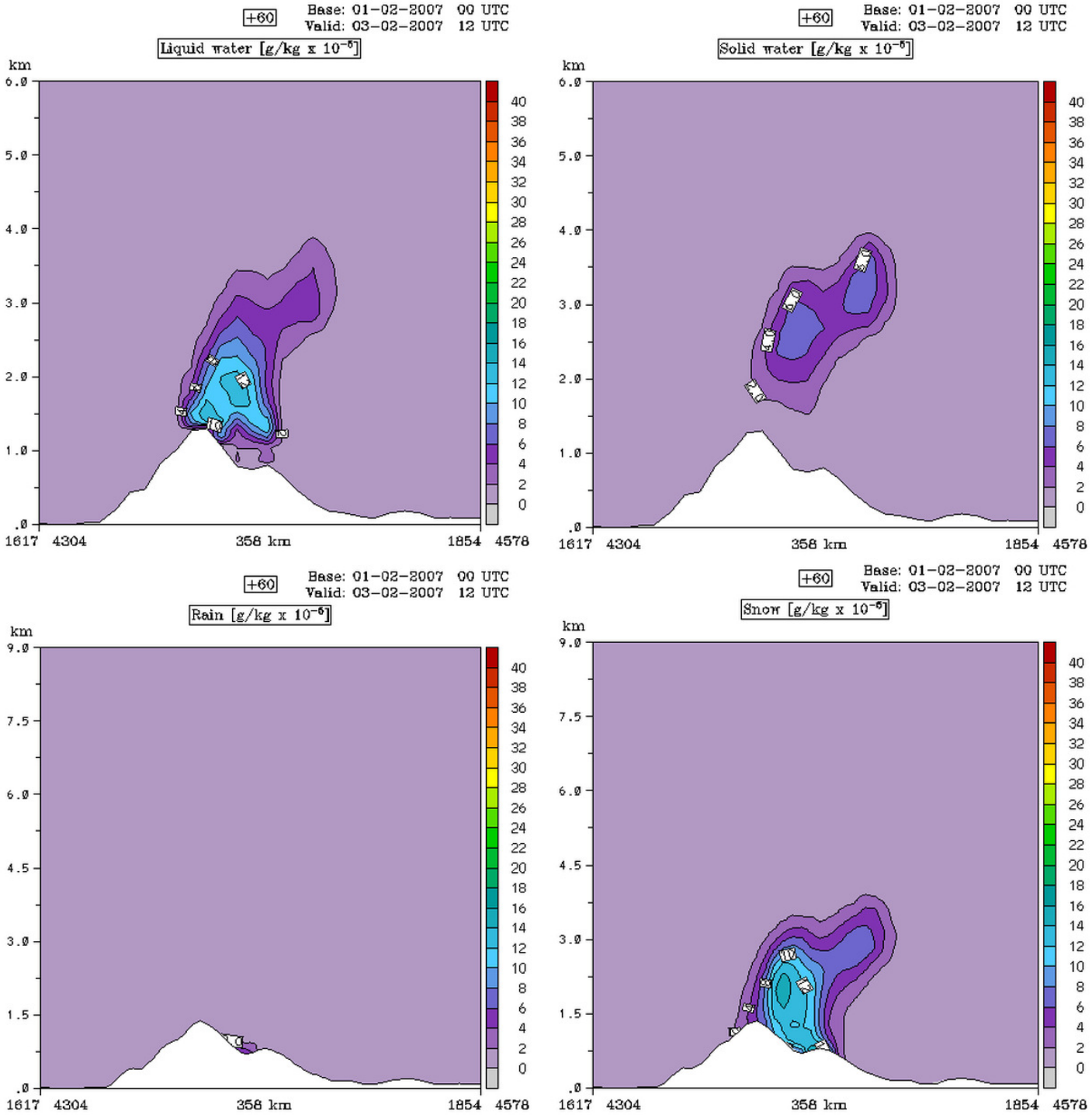






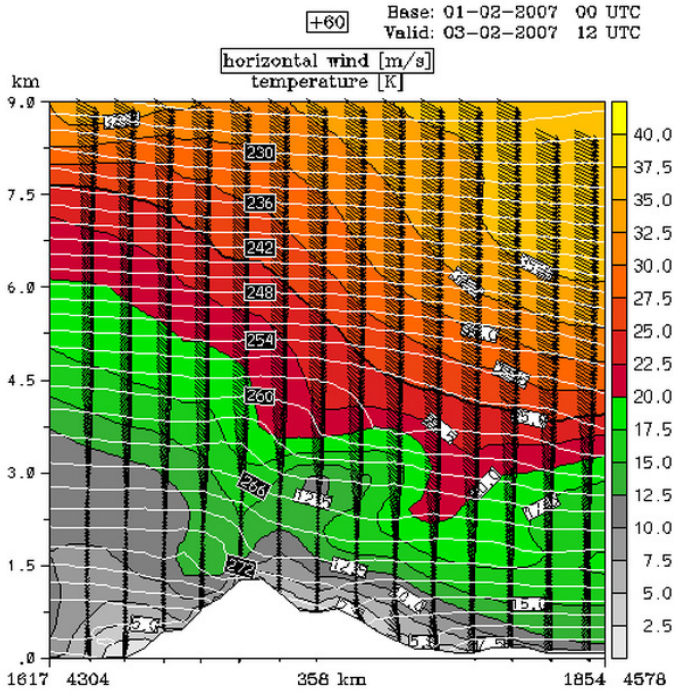
Vertical cross sections

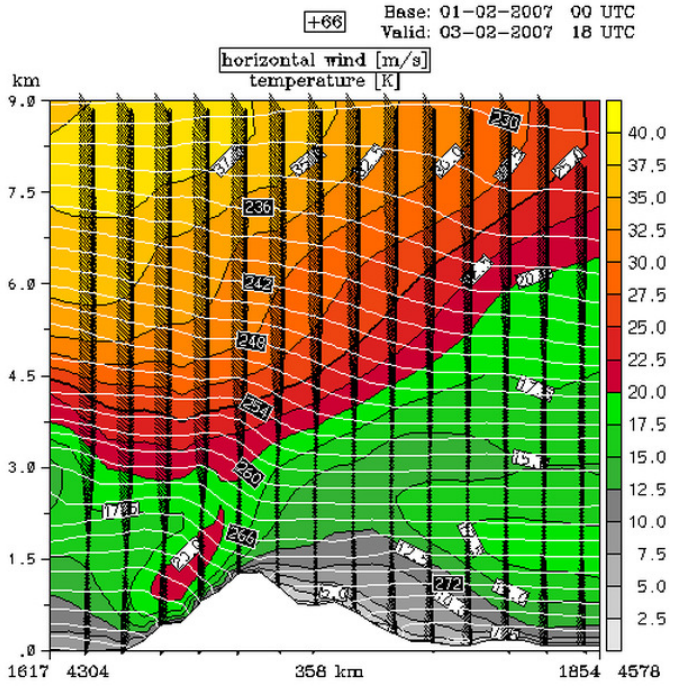
- Moist variables: cloud water (top left) cloud ice (top right) rain (bottom left) and snow (bottom right)

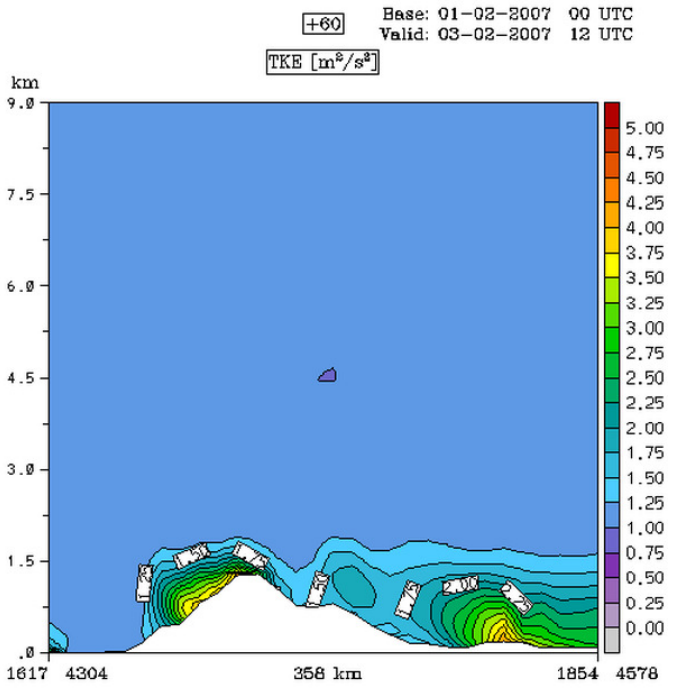


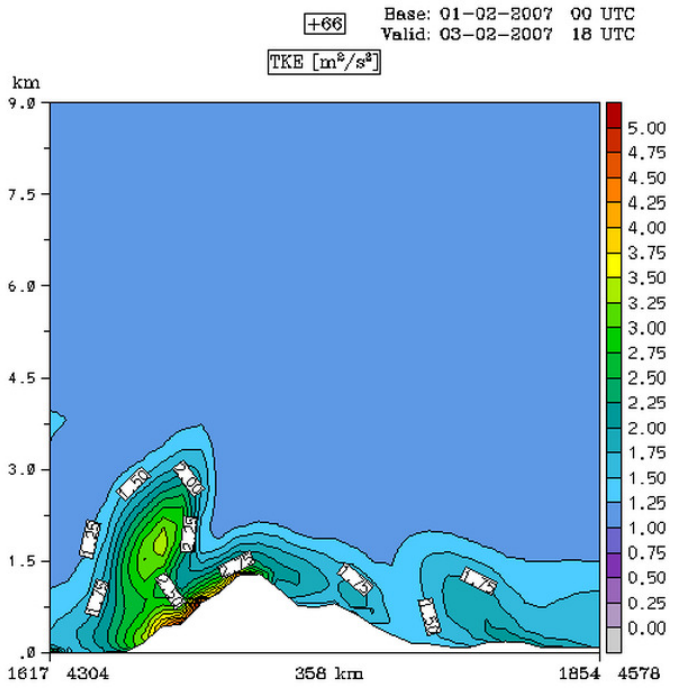
Vertical cross sections

Wind (top row) and TKE (bottom row) for a case of severe bura









Final remarks

- Not enough time/bench experience for a meaningful validation
- Model insight necessary (to try) to understand the behaviour of Alaro
- Surely valuable (at least) as a new ensemble member