

Radar data assimilation in Croatia.

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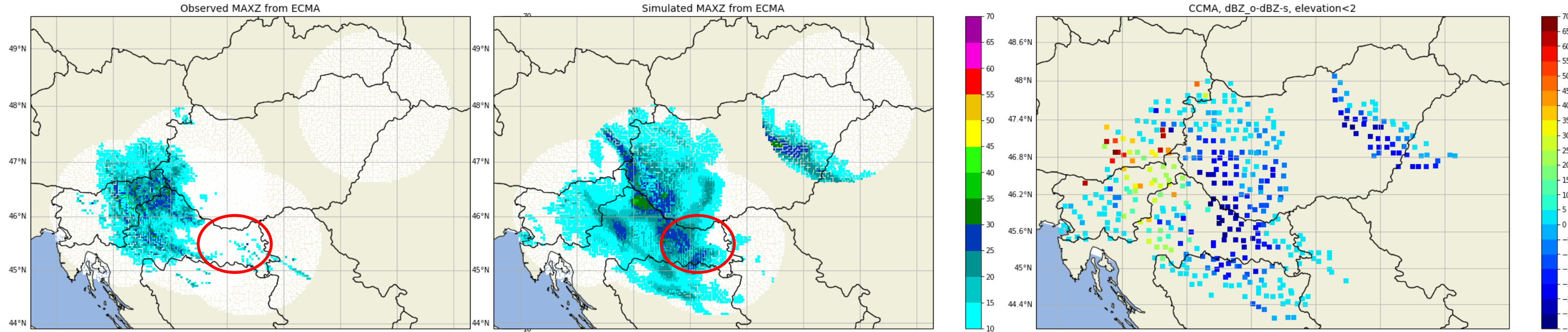
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Introduction.

Radar data assimilation method for reflectivity that was developed for AROME is tested with ALARO with horizontal resolution of 4 km. The results of the first test are shown. The effect of radar reflectivity assimilation on forecast was estimated by comparison of forecast with reference data assimilation to forecast with reference data assimilation plus radar data.

Assimilation at 6 UTC.

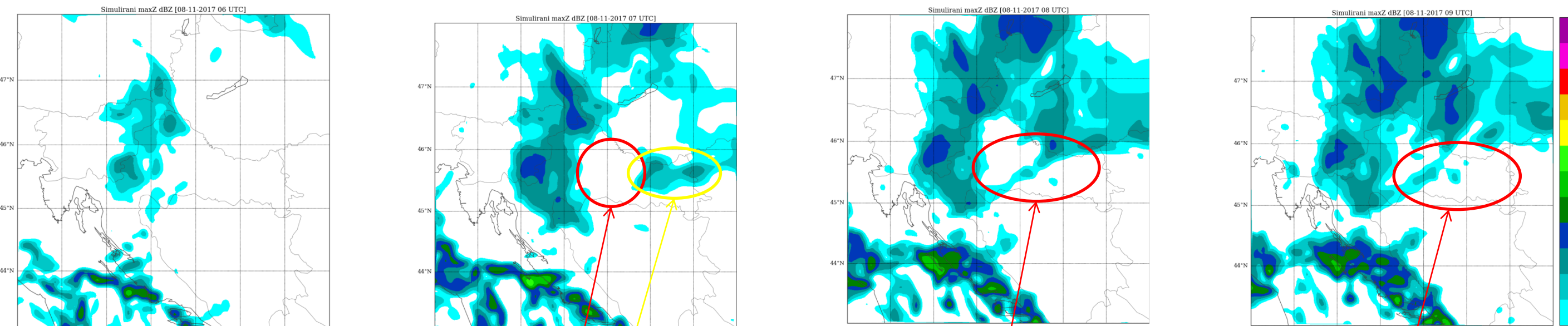
Observation - reflectivity Simulation - reflectivity First guess departure, o-f.



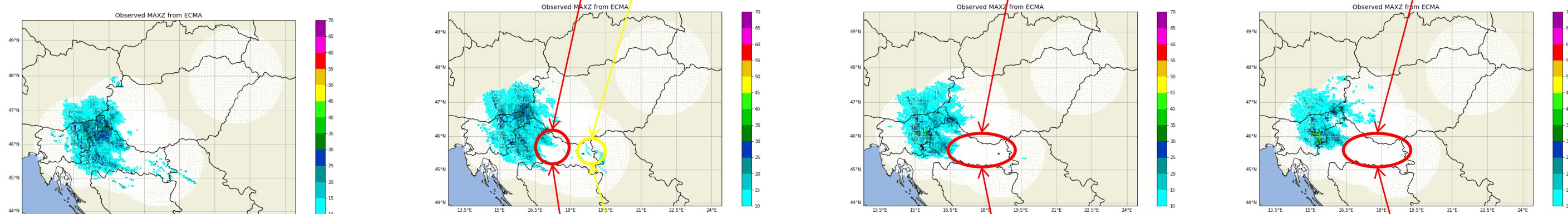
Forecast starting at 6 UTC.

Analysis. +01 h +02 h +03 h

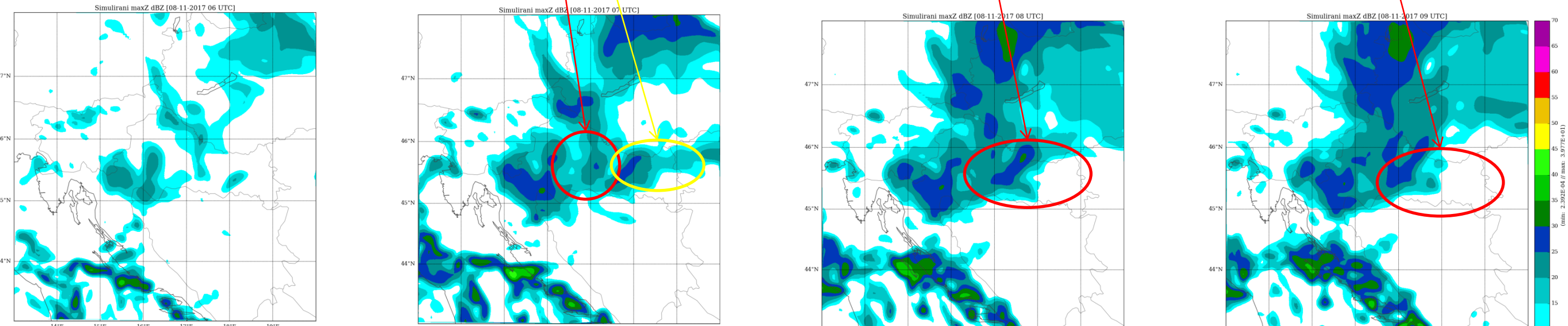
Ref. + radar.



Observations.

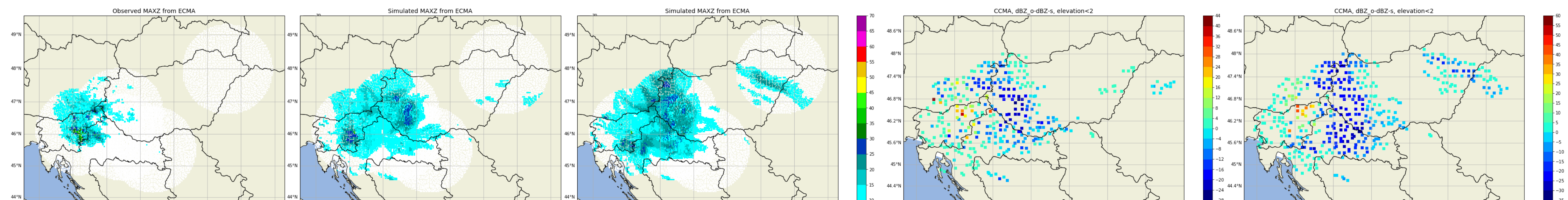


Fer.



Assimilation at 9 UTC.

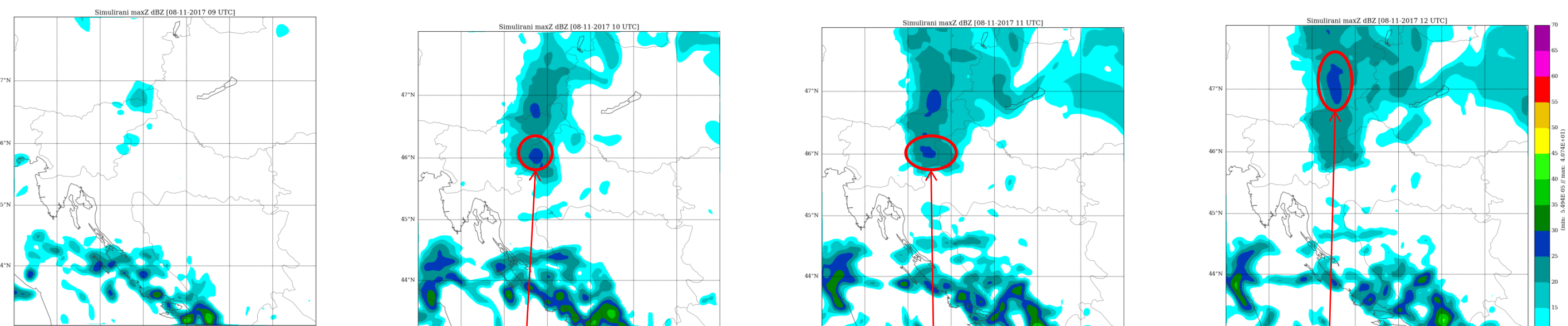
Observation - reflectivity First guess (ref.+radar) First guess (ref.) o-f, (ref.+radar). o-f, (ref.)



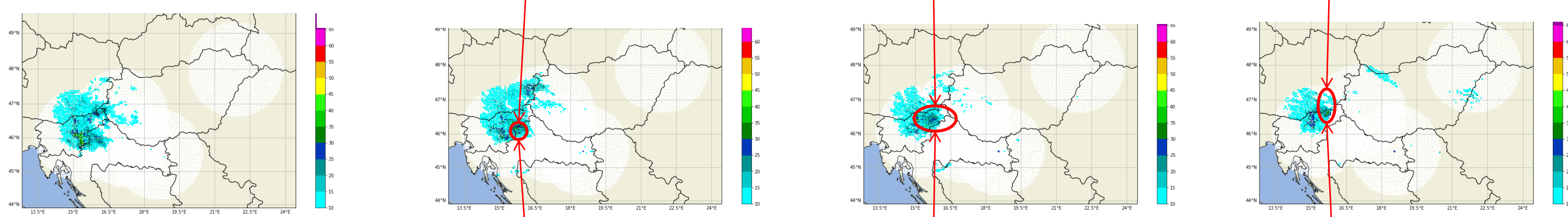
Forecast starting at 9 UTC.

Analysis. +01 h +02 h +03 h

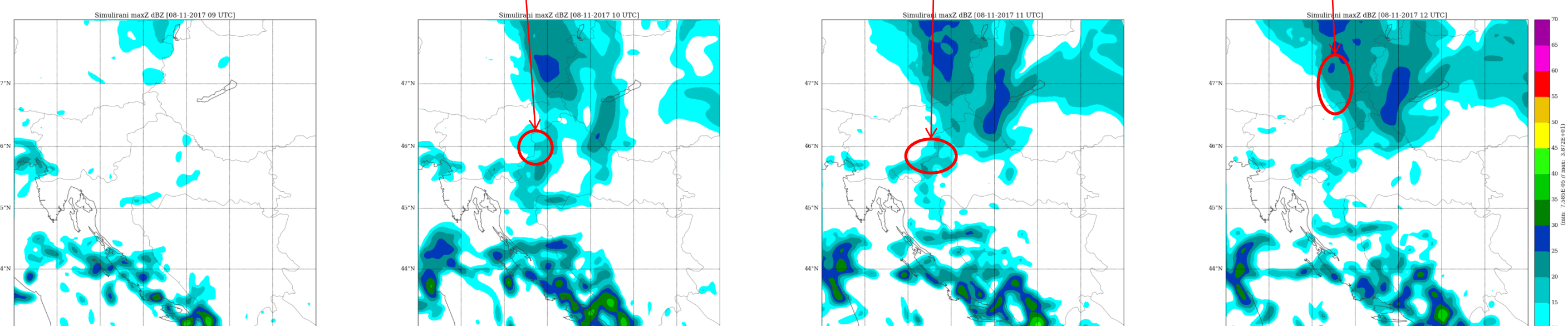
Ref. + radar.



Observations.



Ref.



Reference data assimilation.

- Every three hours.
- Data: conventional, SEVIRI, geowind.
- 3DVAR only

Radar data.

45 radars from ten European countries enter our domain.

Data are available from OPERA.

The data format is ODIM HDF5 for volume scans.

The case.

- The date: 8th November 2017.
- At 6 UTC, over eastern part of continental Croatia rain was forecasted (see simulated reflectivity at 6 UTC) while on the radar images there was no rain (see Observation – reflectivity)
- Only upper air 3DVAR was done (no Canari).
- Only forecasts from assimilation cycle were used.
- Only data from Croatian, Slovenian and Hungarian radars were used.

Results.

- Two assimilation cycles are shown, from 6 UTC and 9 UTC.
- At 6 UTC both assimilations, reference and reference with radars started with the same first guess. Assimilation of radar reflectivities has removed wrongly forecasted rain in eastern Croatia. This removal is visible in forecast up to 3 hours. Corresponding areas are marked on images.
- At 9 UTC each assimilation started with first guess from it's cycle. There is too much simulated radar echoes in reference run that can be seen from o-f differences, too. Forecasts from radar data assimilation experiment give somewhat better results for rain in Slovenia and Austria.
- According to this one example assimilation of radar reflectivities for ALARO gives promising results.