

Simulation of MAP IOP2 with LM, impact of nudging

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4th General Meeting of the COSMO Consortium

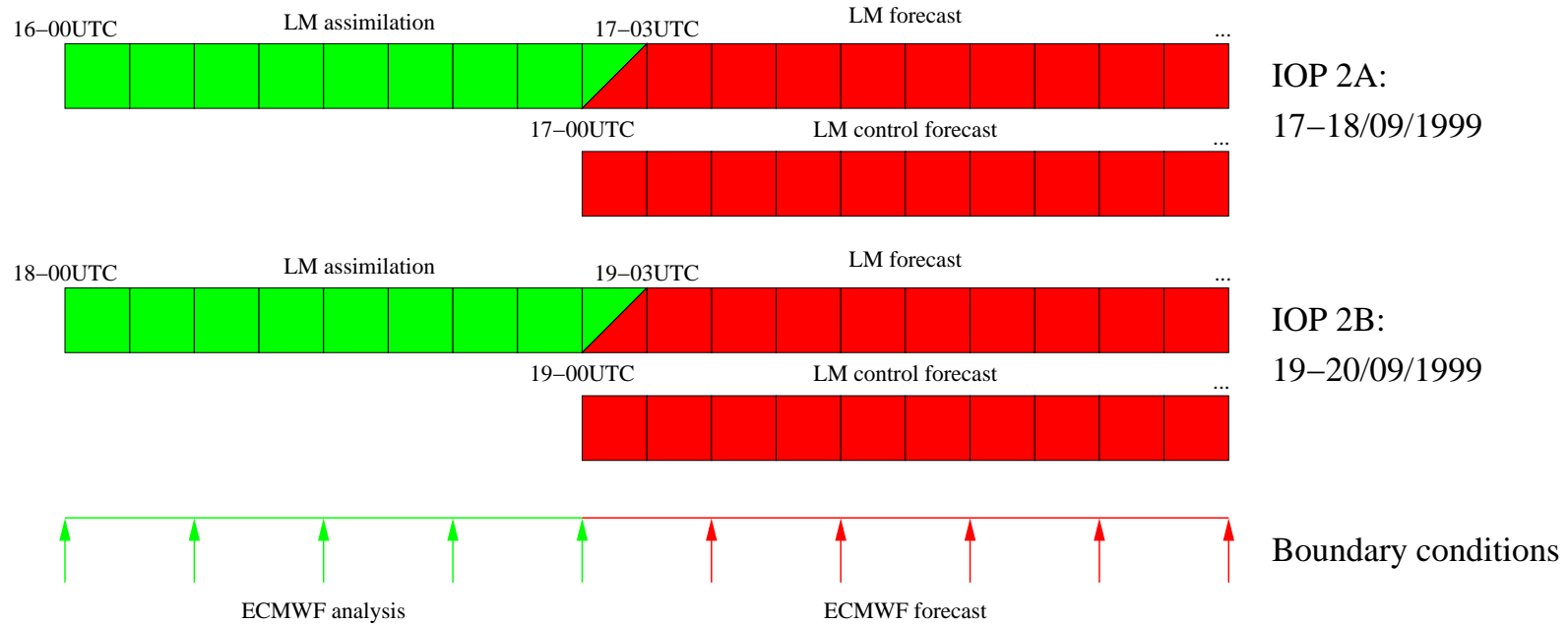
25-27 September 2002, IMGW, Warsaw, Poland

Purpose of the experiments

- Evaluate the nudging in view of an operational application
- Test the sensitivity of the nudging to tuning parameters
- Evaluate the impact of using profiles from surface observations

This is undergoing work, so a deeper verification of the results and the extension to other cases is expectable

Characteristics of the experiments

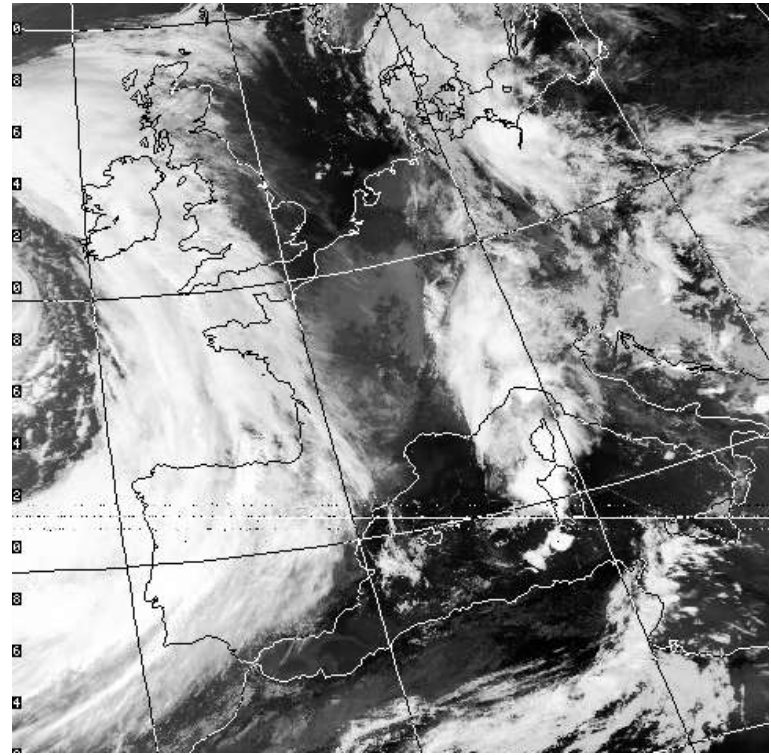
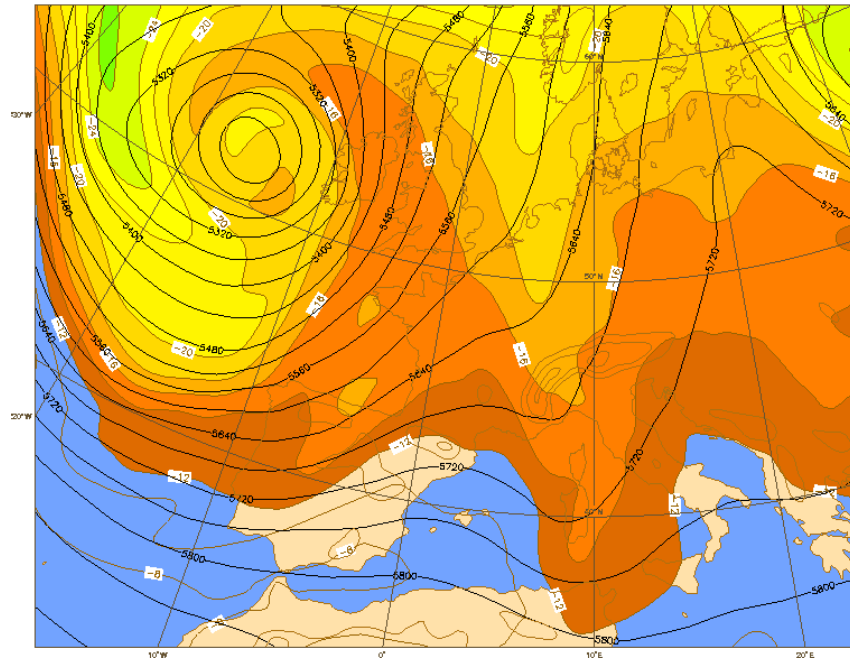


Meteorological Situation, IOP2A, ECMWF model and NOAA-IR

500 hPa: Geopotential [gpm] + Temperature [degree C]

Sat 12

Based on: 1999 September 18 0 UTC +12 h



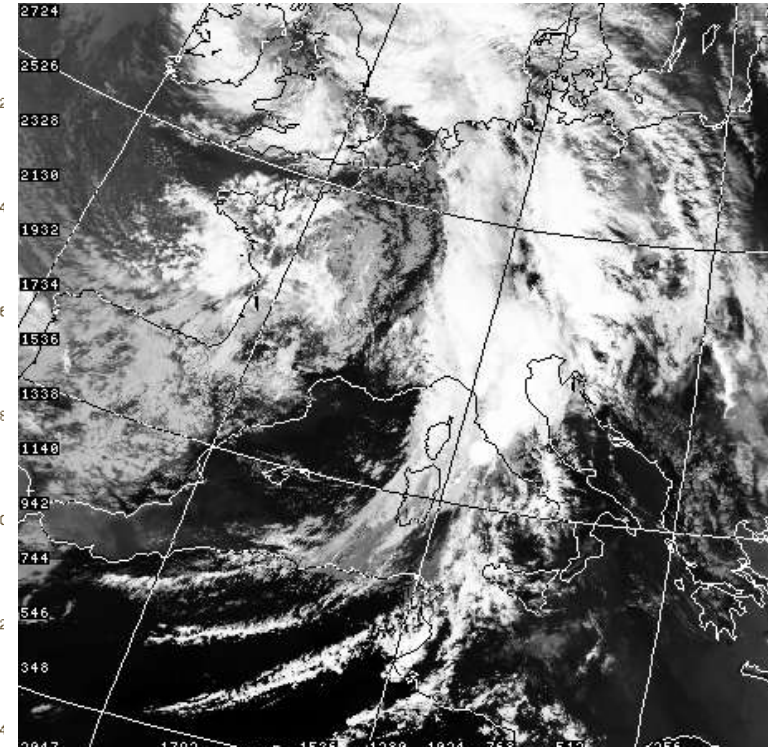
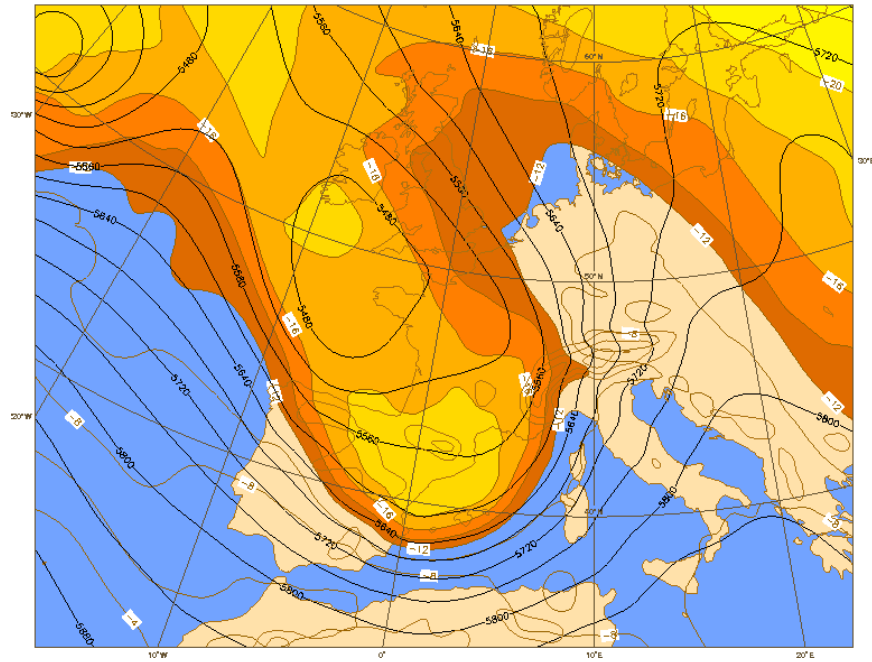
- MAP IOP2A -

Meteorological Situation, IOP2B, ECMWF model and NOAA-IR

500 hPa: Geopotential [gpm] + Temperature [degree C]

Mon 12

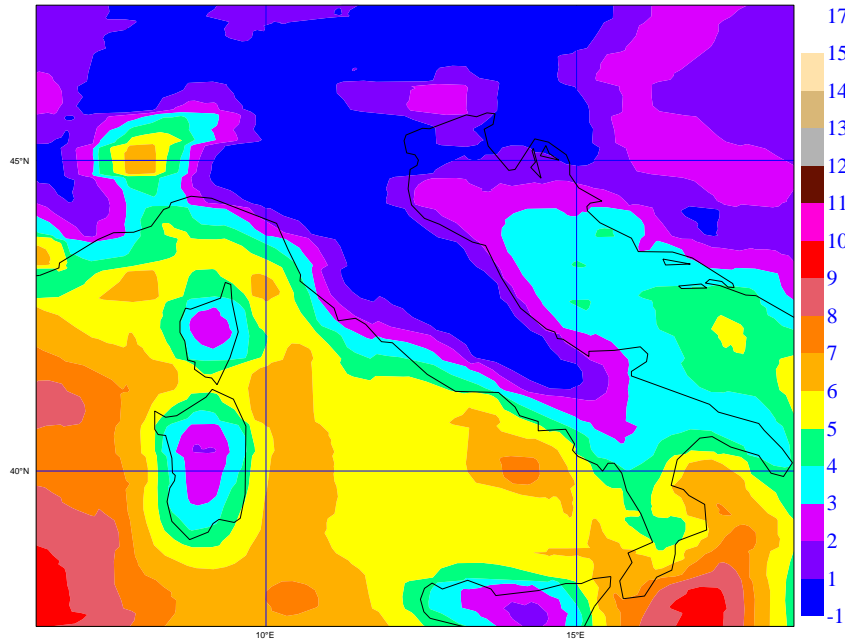
Based on: 1999 September 18 12 UTC +48 h



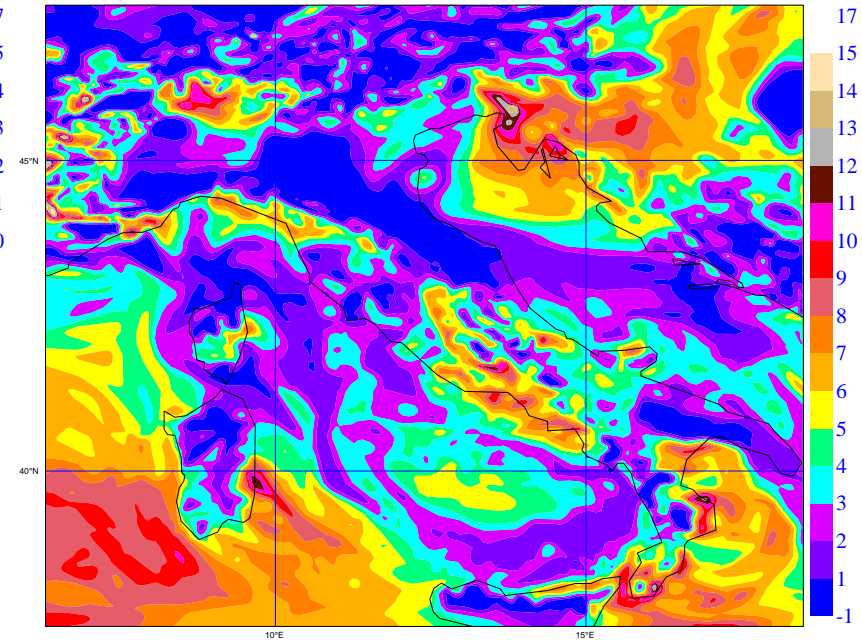
- MAP IOP 2B -

Comparison between analyses: 2m humidity

differenza t - td 2m 17/09/99 00 CNTL

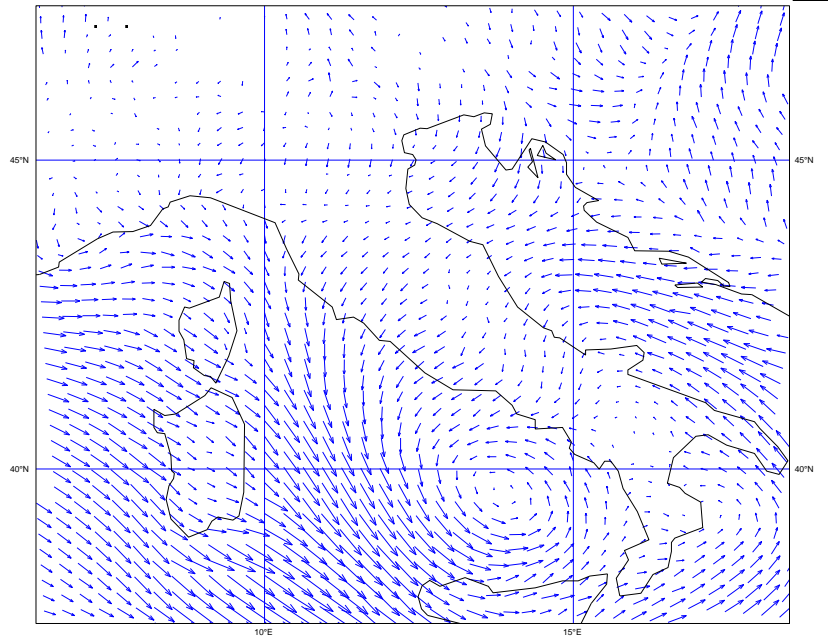


differenza t - td 2m 17/09/99 00 ASS2

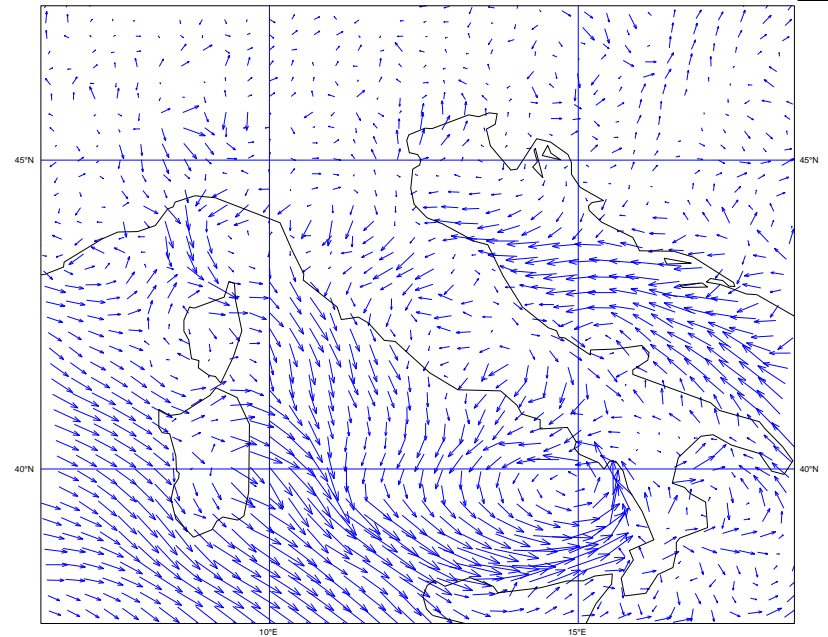


Comparison between analyses: lowest level wind

vento livello 1 CNTL 17/09/99 00



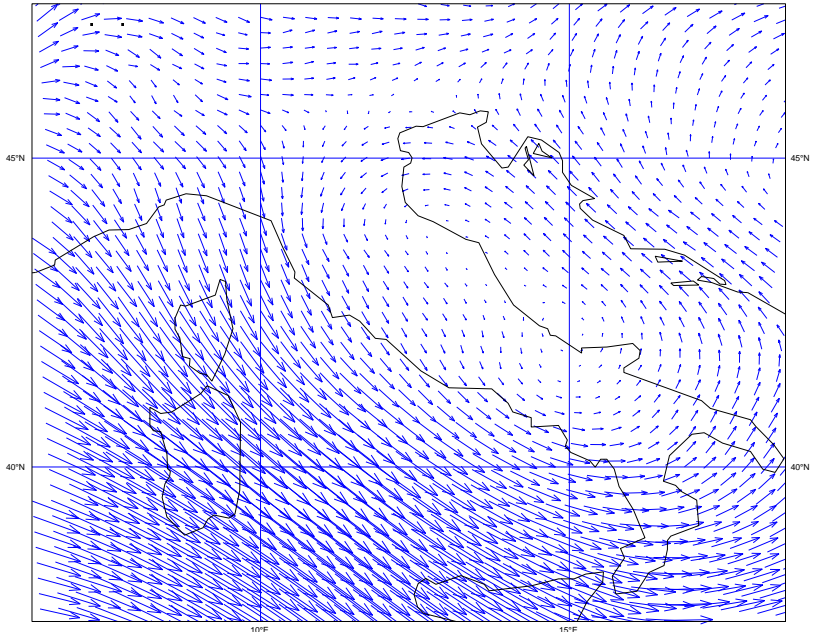
vento livello 1 ASS2 17/09/99 00



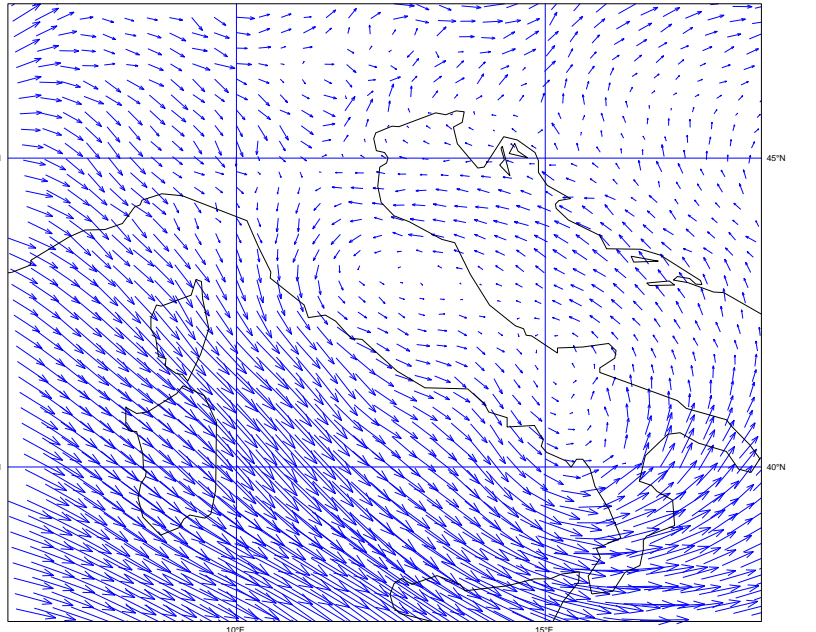
- MAP IOP2A -

Comparison between analyses: upper air wind

vento 500 hPa CNTL 17/09/99 00

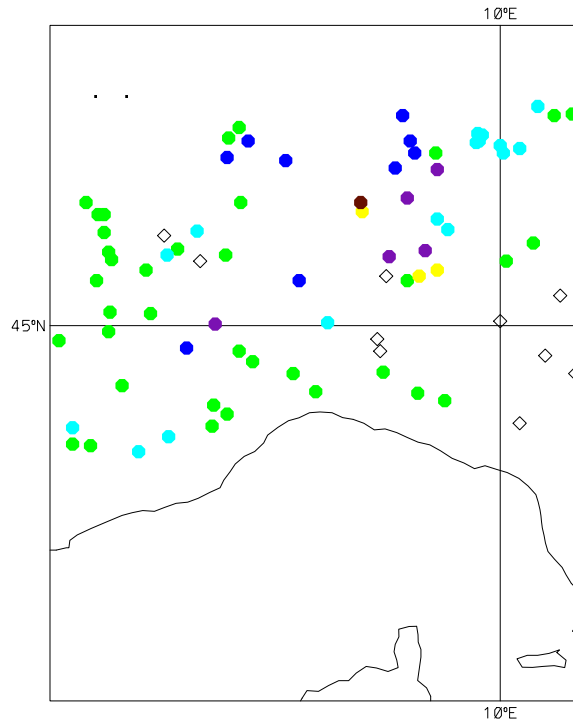


vento 500 hPa ASS2 17/09/99 00

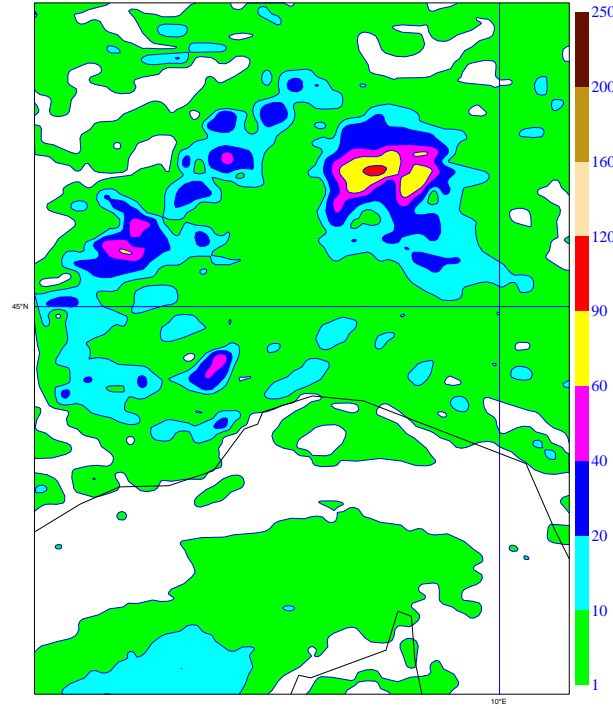


Comparison between precipitation fields on 24h

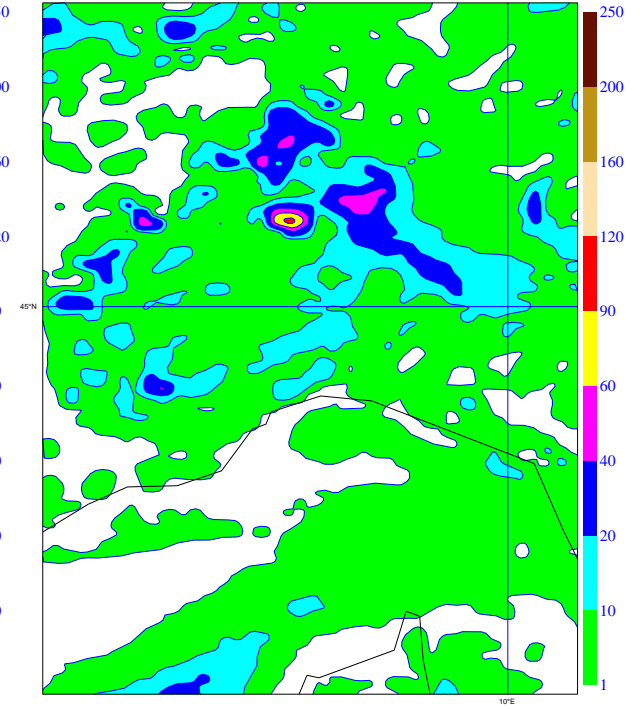
pioggia cumulata (mm) 24 ore



pioggia cumulata (mm) 24 ore ASS2

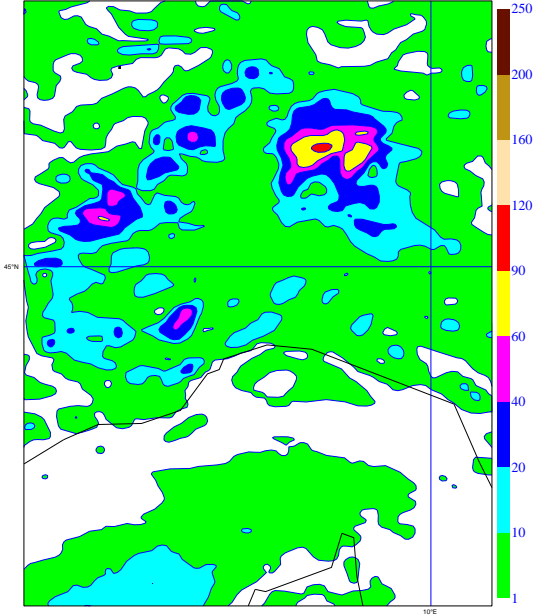


pioggia cumulata (mm) 24 ore CNTL

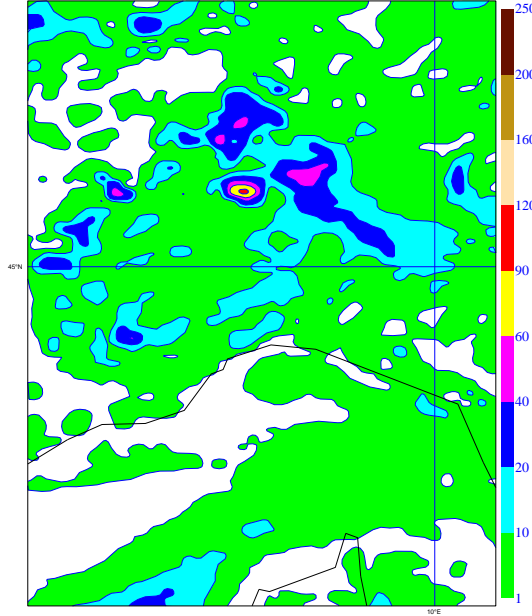


Explanation for the precipitation differences

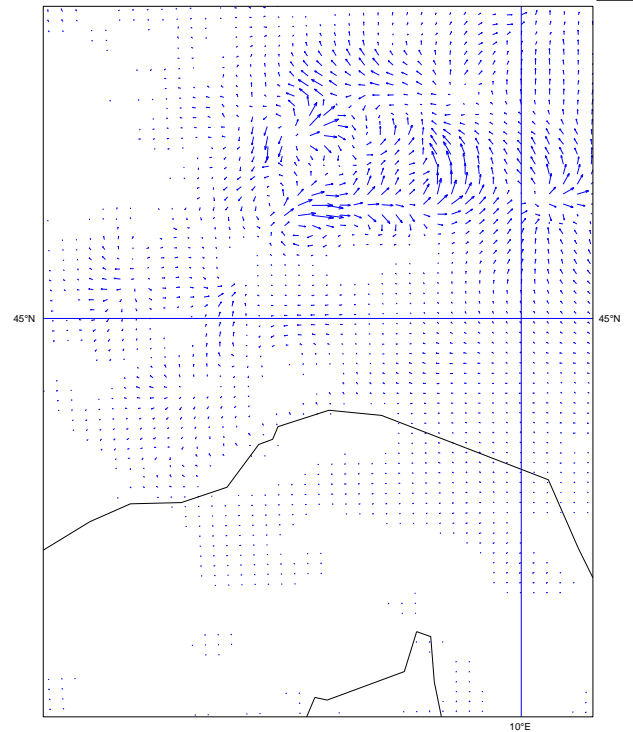
pioggia cumulata (mm) 24 ore ASS2



pioggia cumulata (mm) 24 ore CNTL



differenza vento 700 hPa ASS2-CNTL 18/09/99 09 UTC

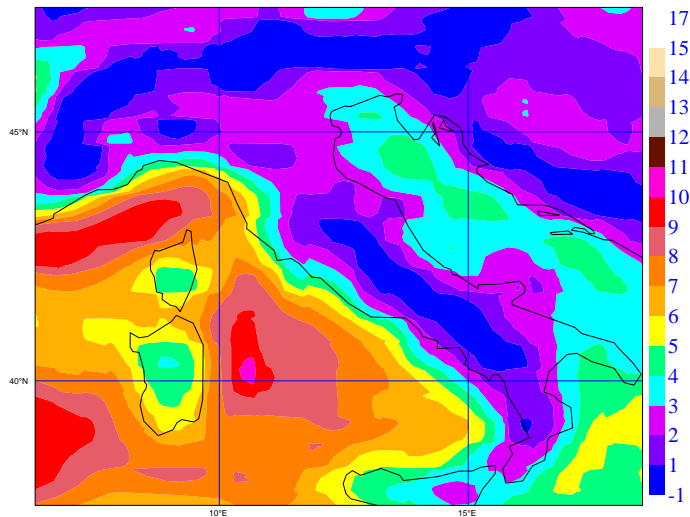


Comparison between analyses: 2m humidity

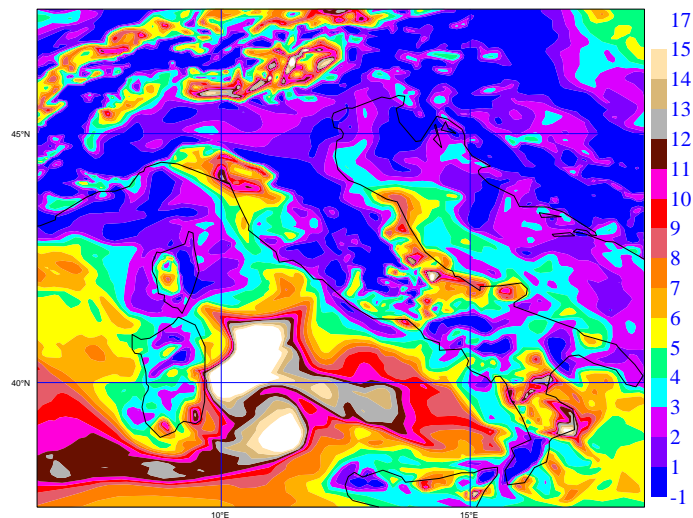
...

- MAP IOP 2B -

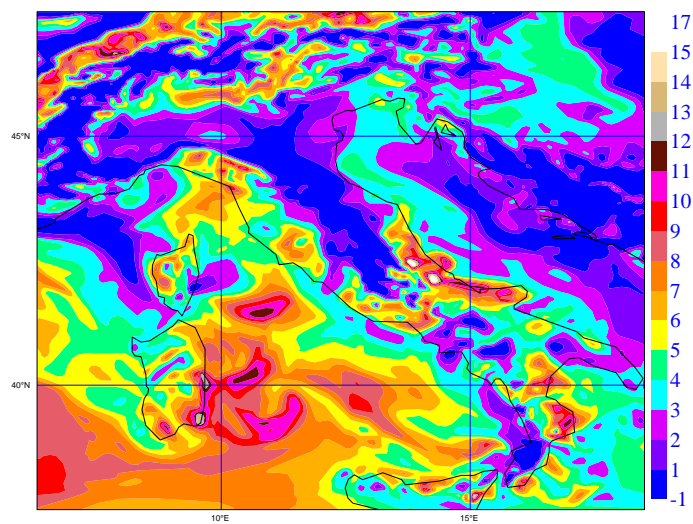
differenza t-td 2m 19/09/99 00 CNTL



differenza t-td 2m 19/09/99 00 NUD1



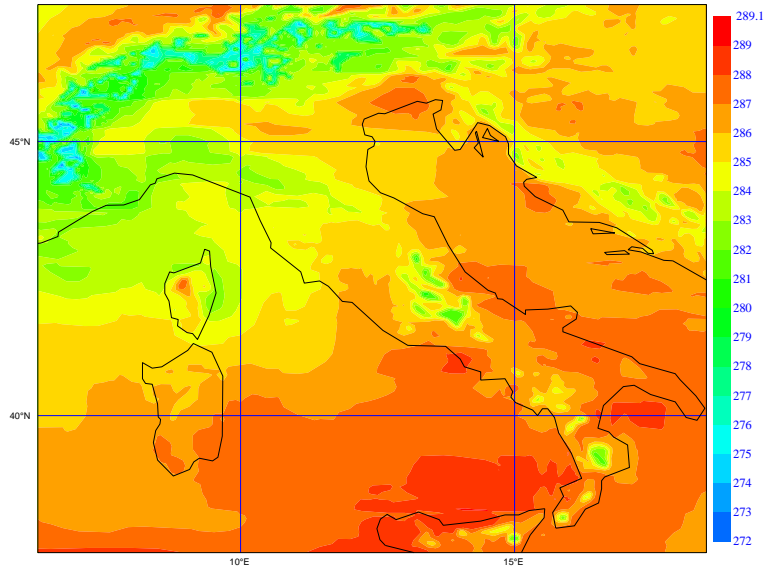
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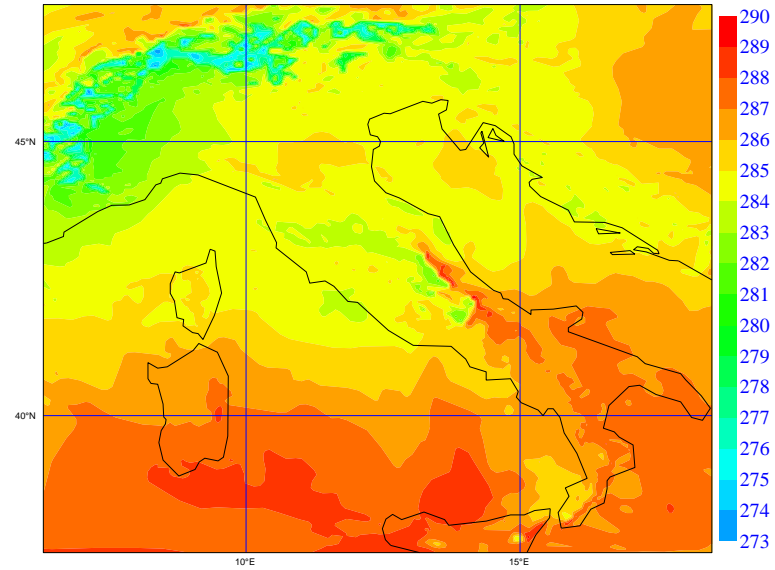
- MAP IOP 2B -

Comparison between analyses: upper air temperature

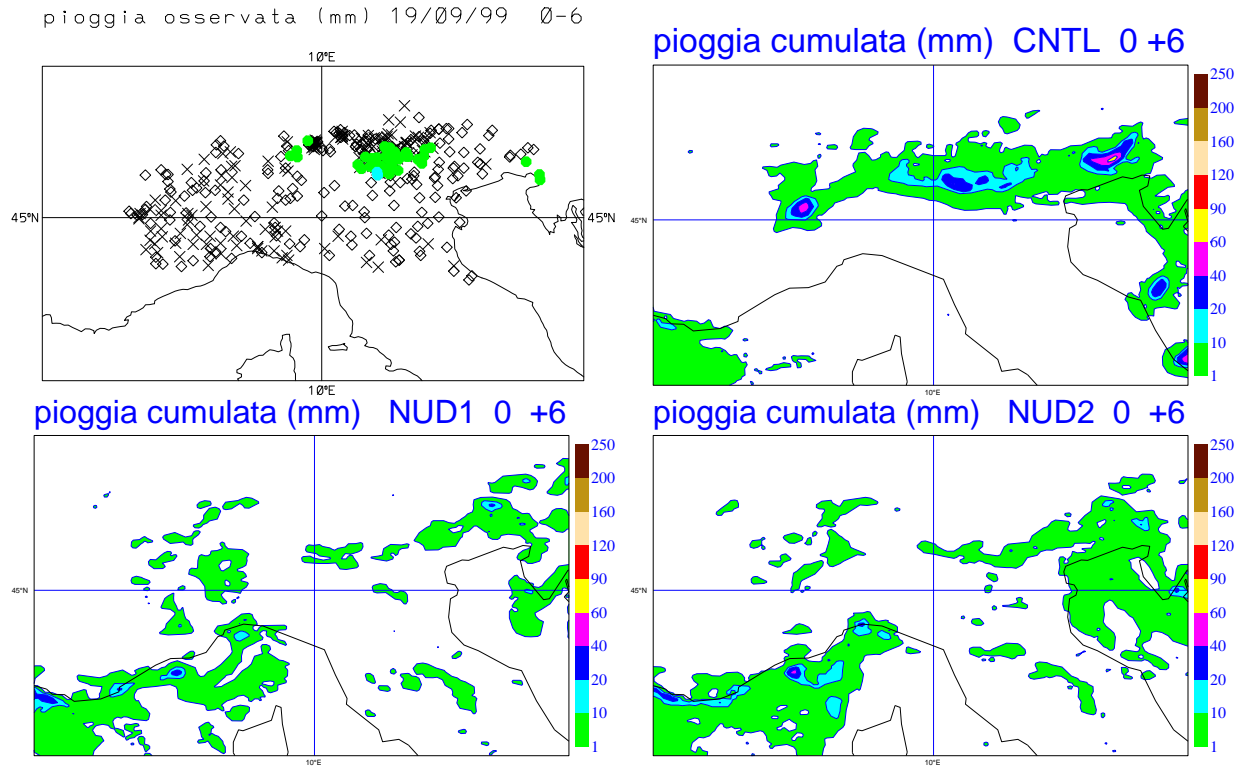
temperatura 850 hPa 19/09/99 00 CNTL



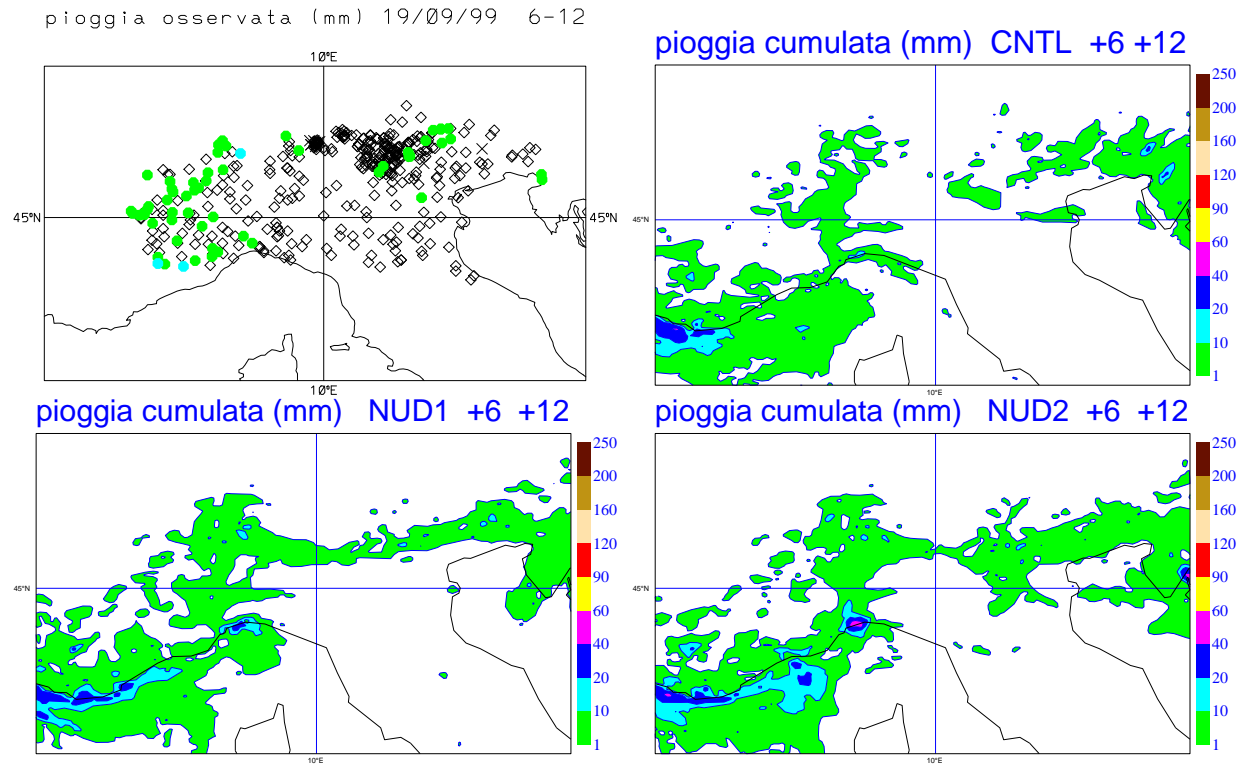
temperatura 850 hPa 19/09/99 00 NUD1



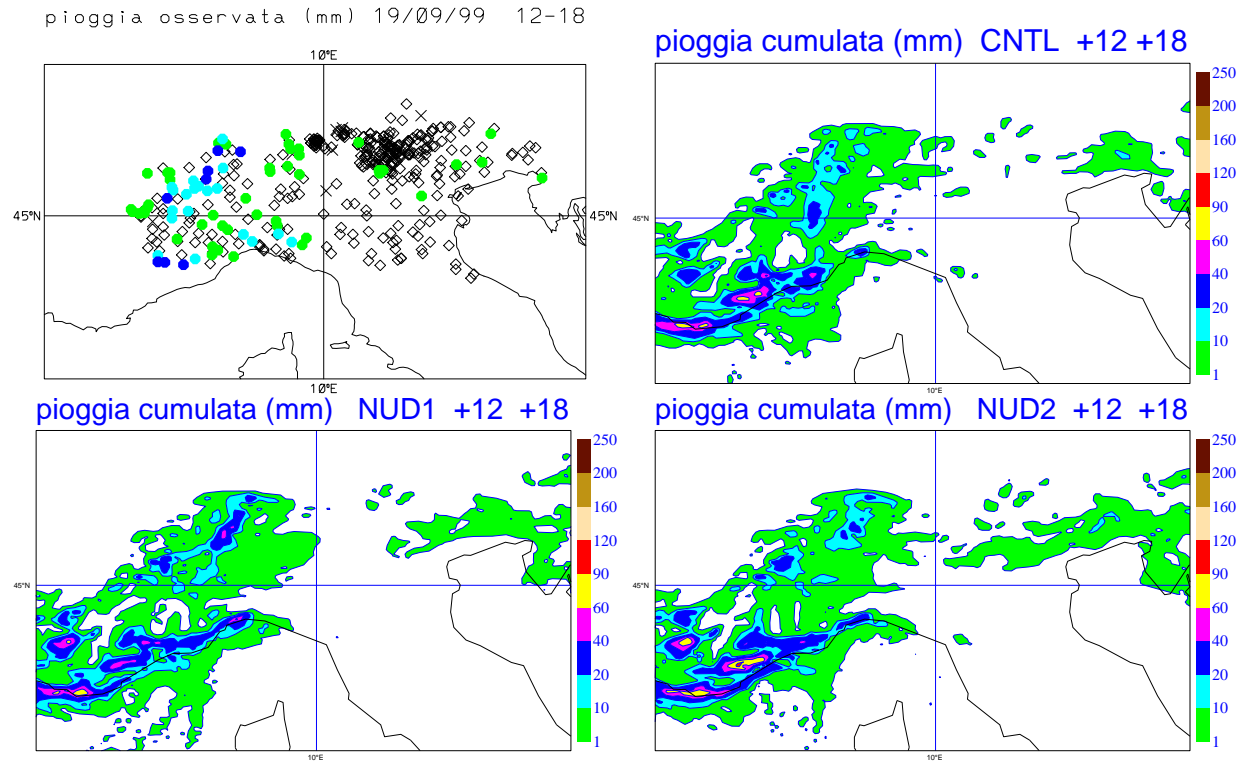
Comparison between precipitation for IOP2B on 6h



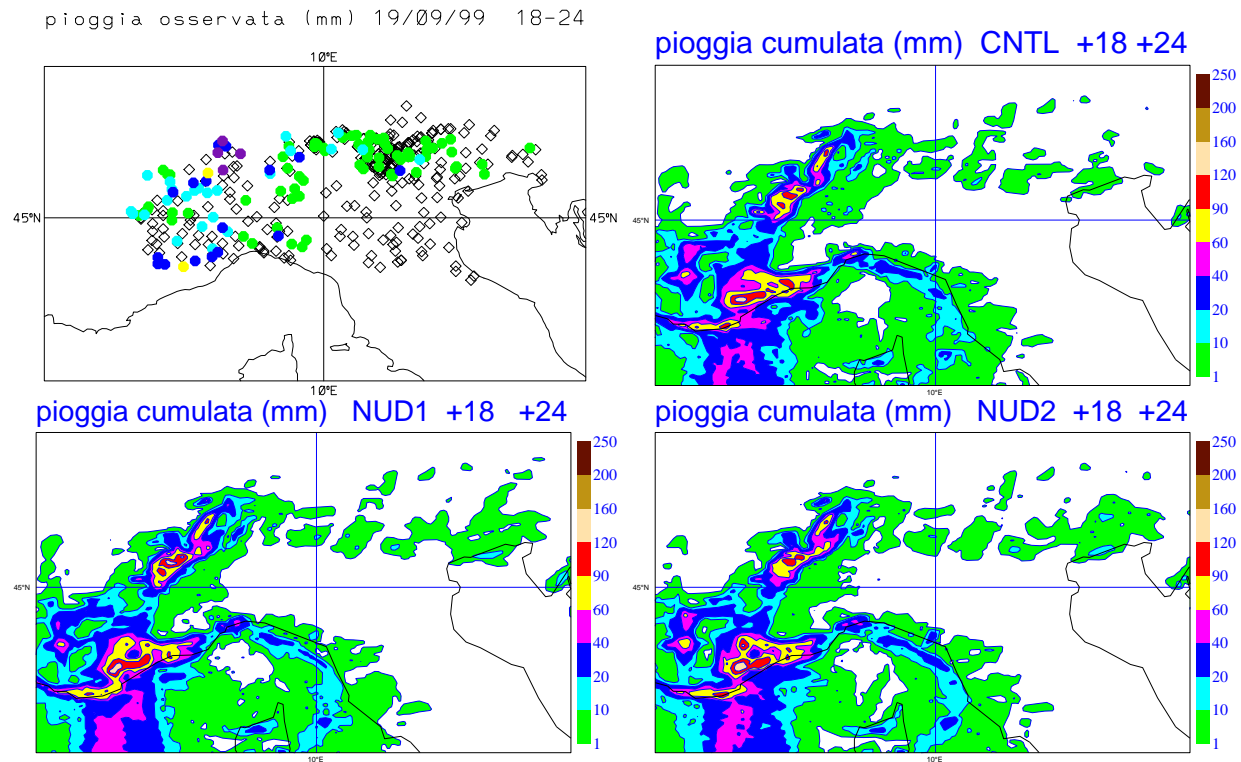
Comparison between precipitation for IOP2B on 6h



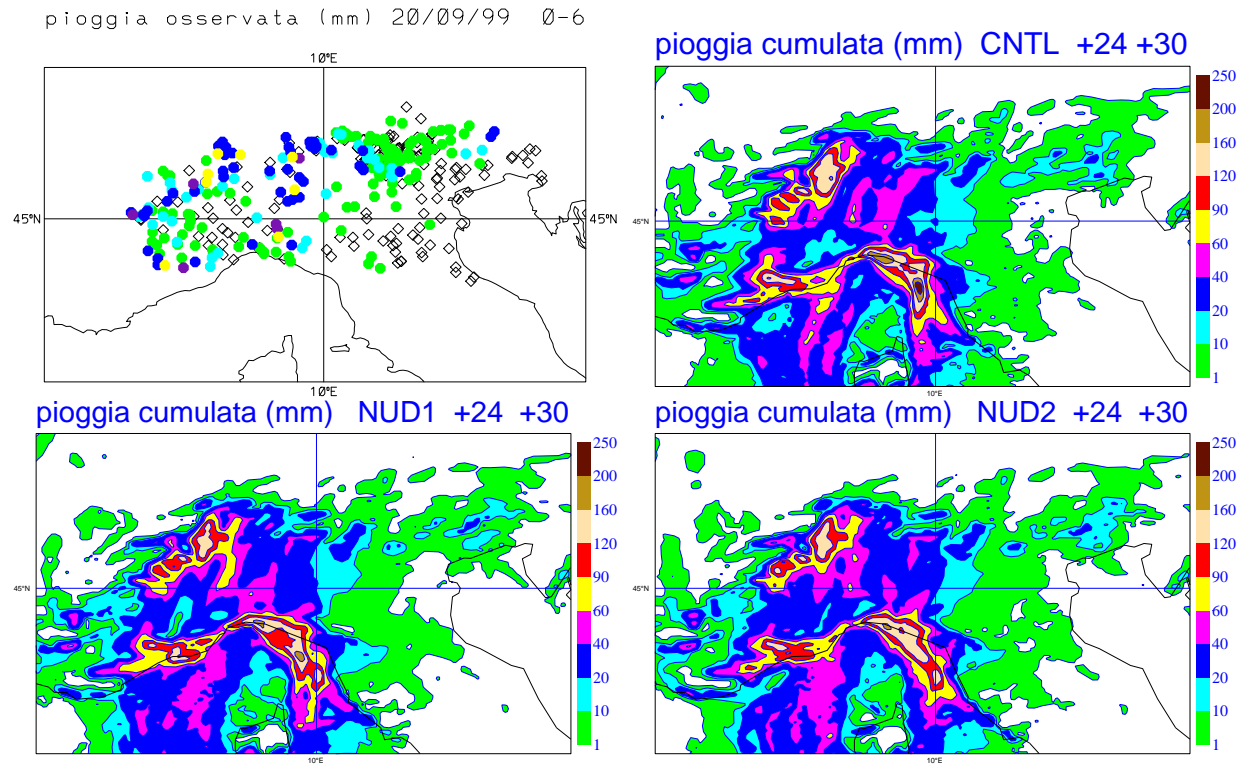
Comparison between precipitation for IOP2B on 6h



Comparison between precipitation for IOP2B on 6h



Comparison between precipitation for IOP2B on 6h



Conclusions

- The assimilation drastically reduces the spin-up problem so that also the first 12 hours of forecast are reliable
- At least 24 hours of assimilation are necessary \Rightarrow continuous assimilation cycle appears to be the best option
- After about 36 hours of forecast (on the considered integration area $\sim 1500 \times 1500 \text{Km}^2$) the influence of assimilation ceases
- Comparison with ECMWF analysis (4dvar, although larger scale) is challenging
- Objective scores are needed
- “Harder” test-cases should be chosen