Servizio
IdroMeteoClima

CONSORTIUM FOR SMALL SCALE MODELING
COSMO

Testing a convection-permitting ensemble methodology for a Mediterranean domain

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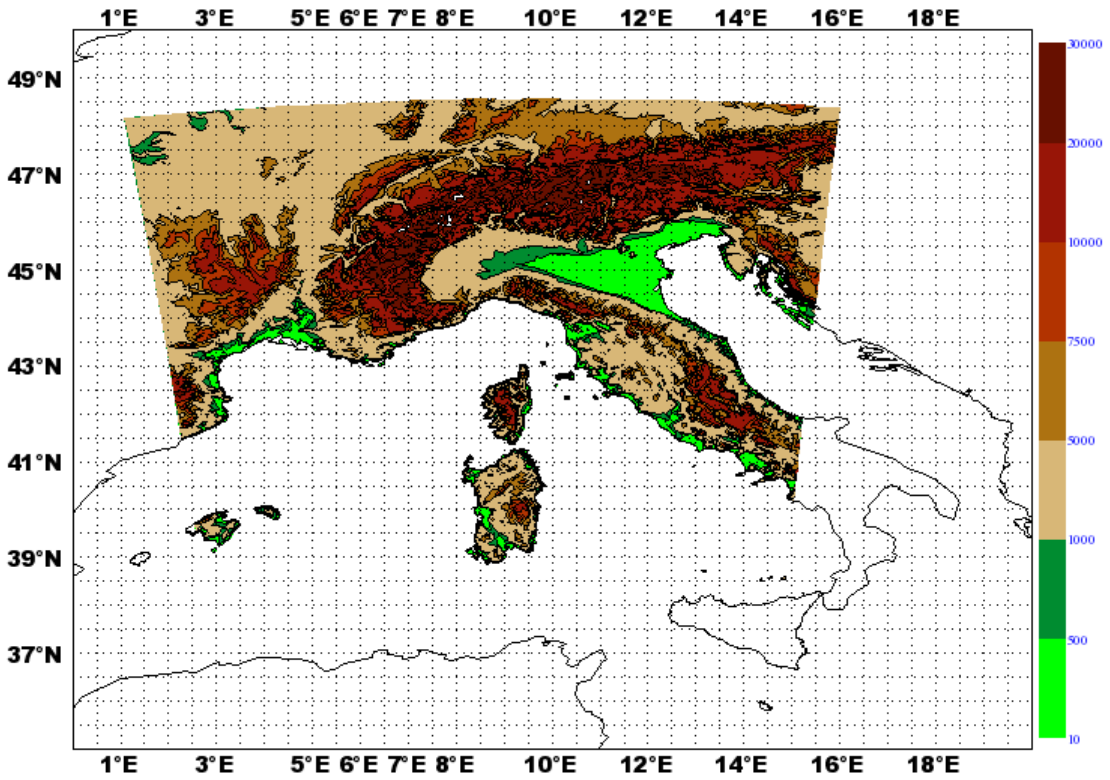
Outline

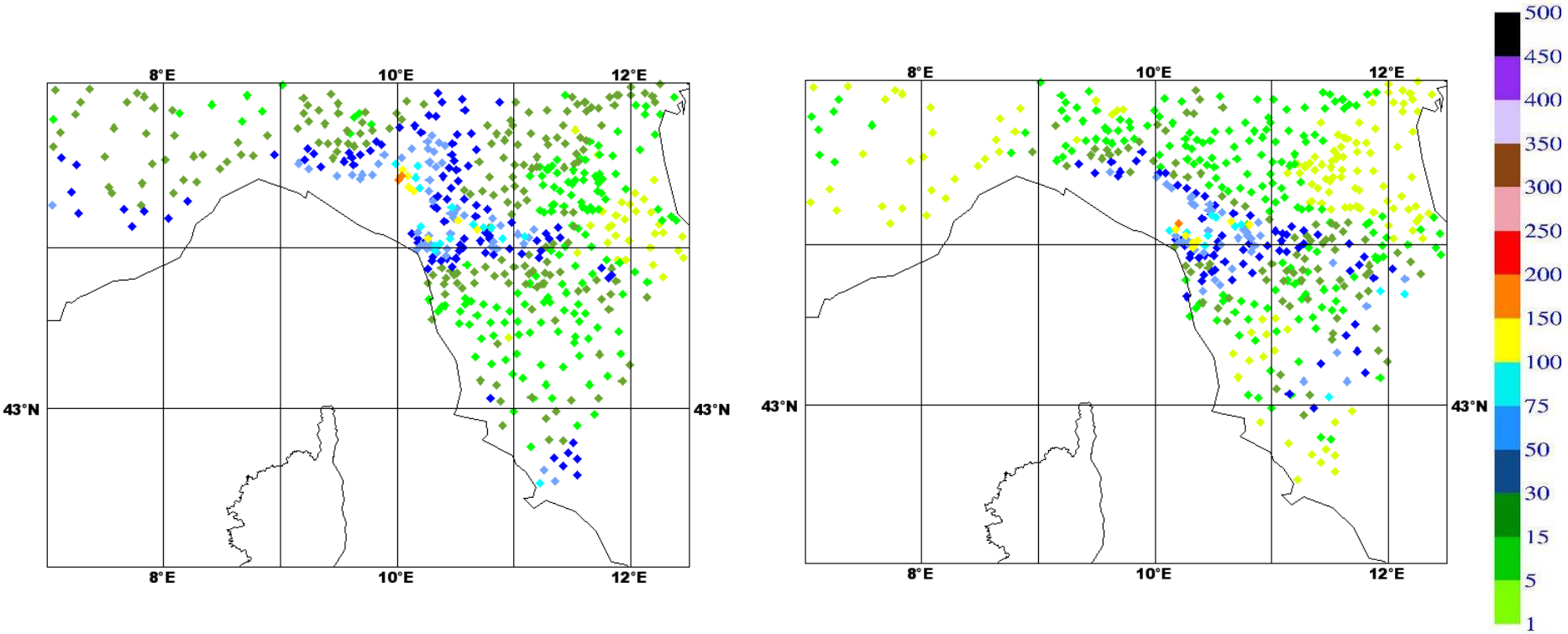
- The 2.8km ensemble for Hymex
- Case study: comparison with COSMO-LEPS
- LBC issue: COSMO-LEPS vs EPS
- Conclusions
- Future work

Ensemble implementation for Hymex

- Hymex SOP: 6th Sept – 5th Nov 2012
- COSMO-H2-EPS set-up:
  - IC and BC from COSMO-LEPS
  - parameter perturbations
  - 2.8 km, 50 levels
  - 10 members
  - run at 12 UTC
  - 36h forecast range



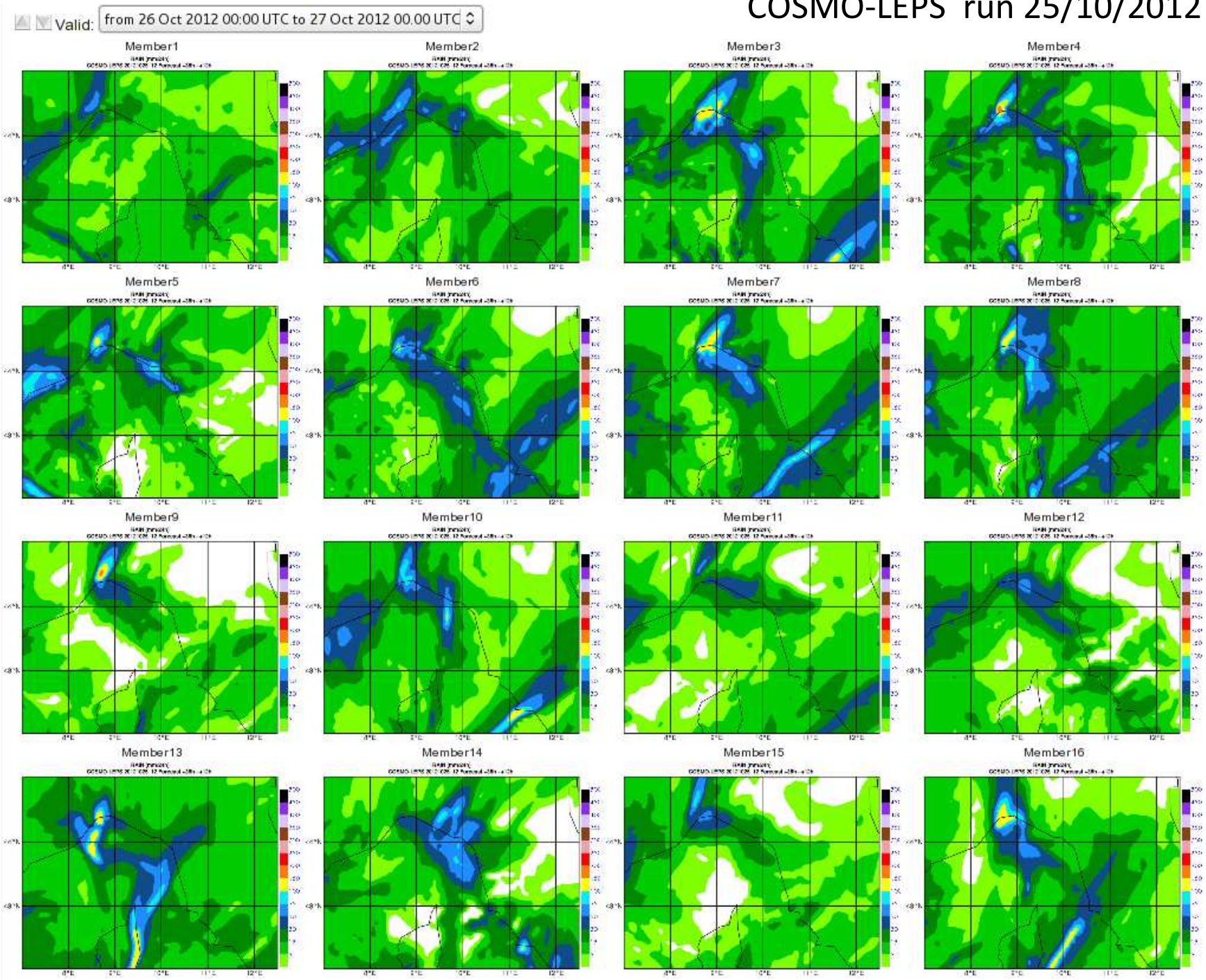
Case study



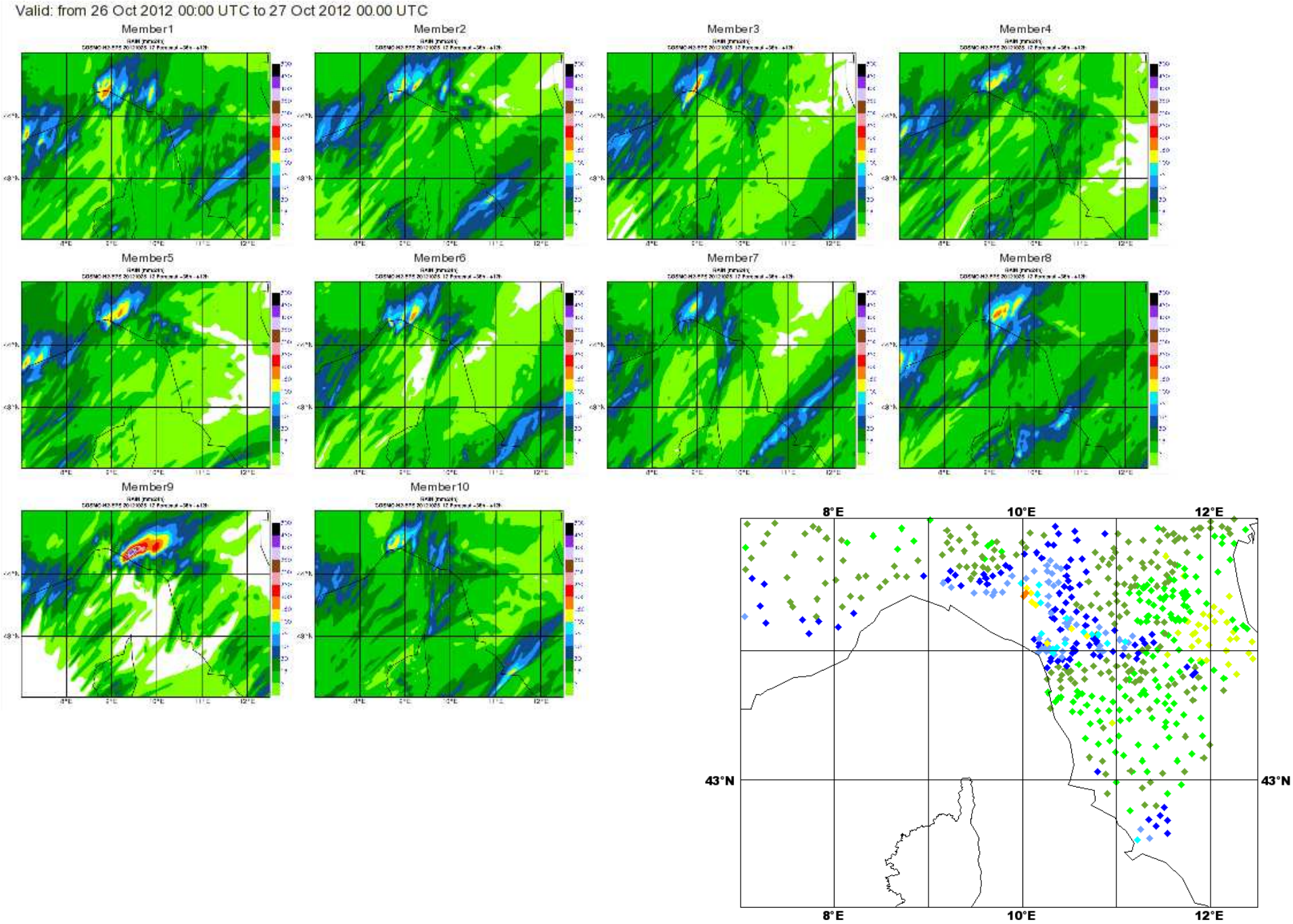
obs Fri 26/10/2012

obs Sat 27/10/2012

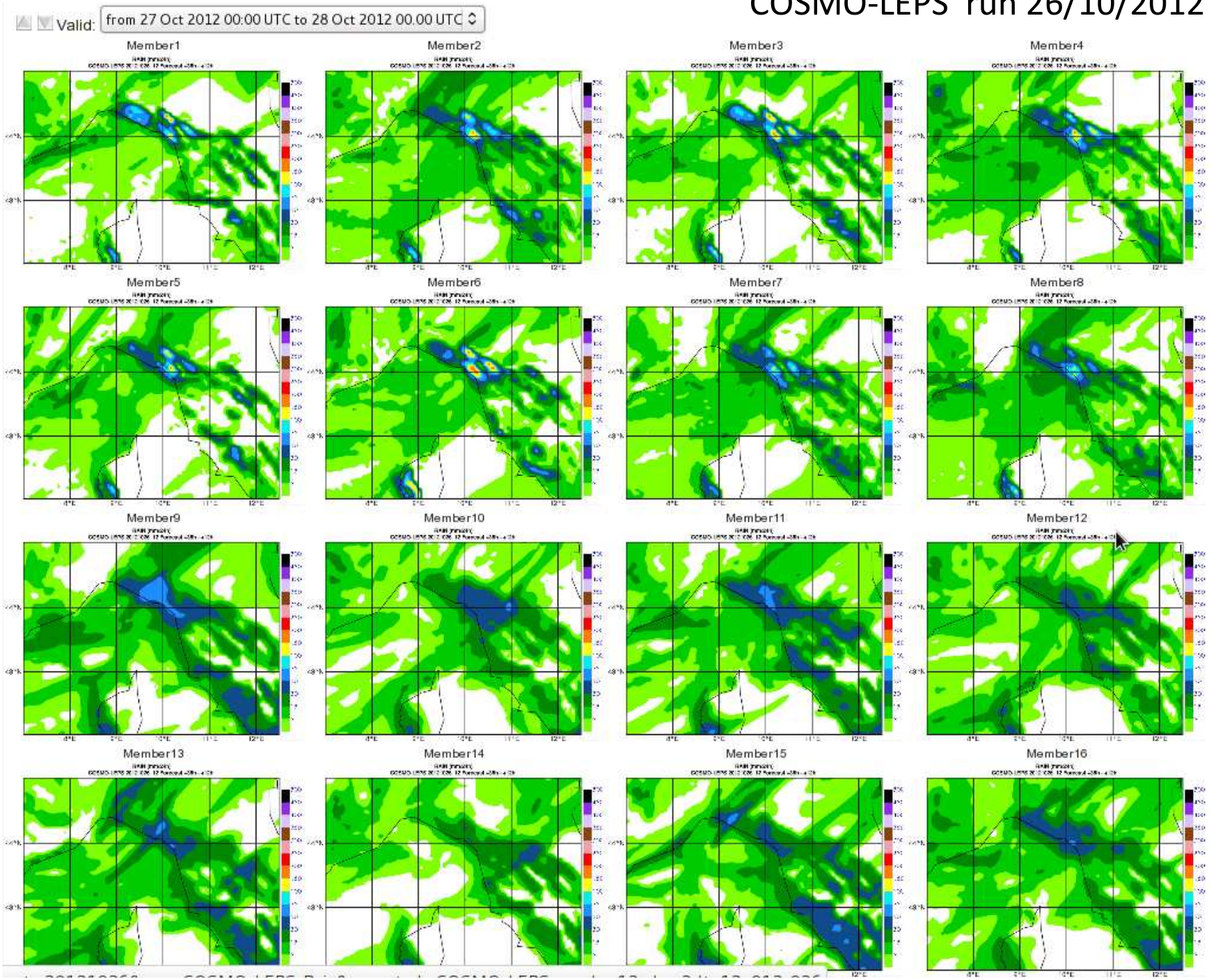
COSMO-LEPS run 25/10/2012 12UTC



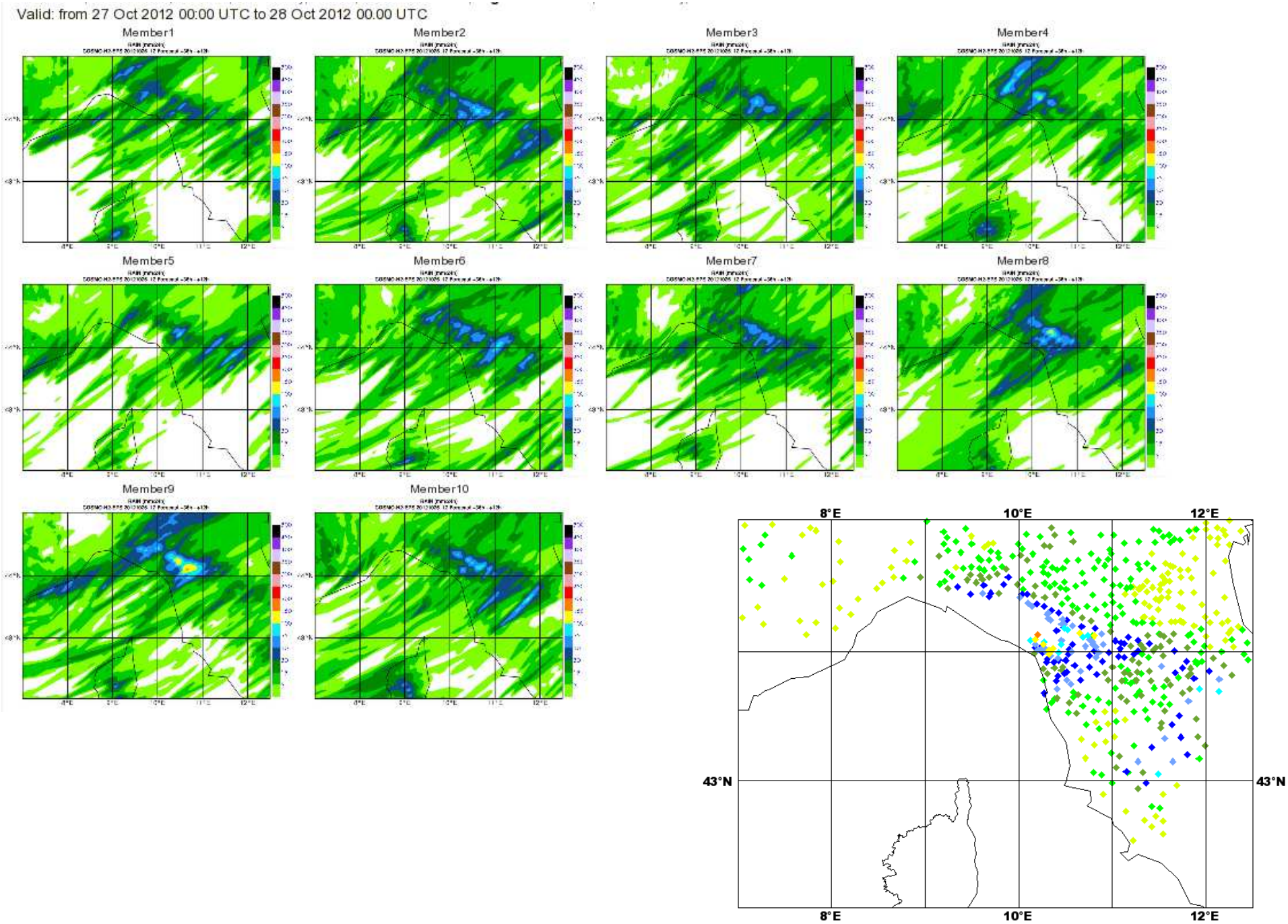
COSMO-H2-EPS run 25/10/2012 12UTC



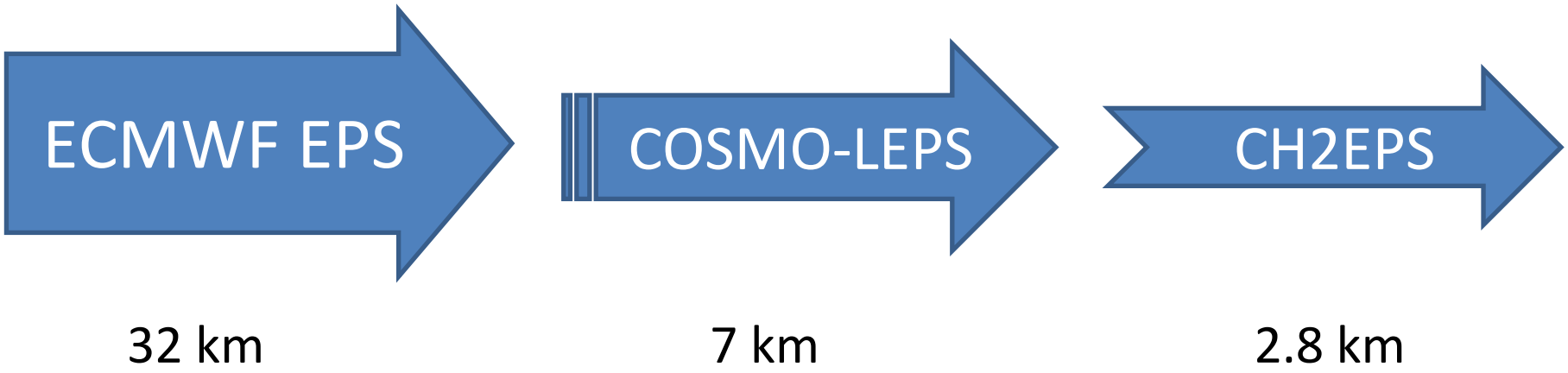
COSMO-LEPS run 26/10/2012 12UTC

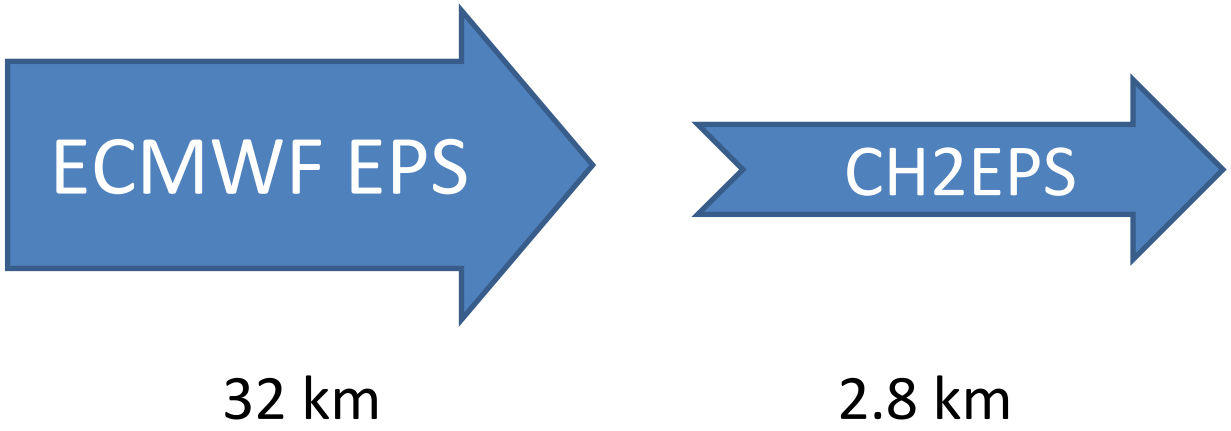


COSMO-H2-EPS run 26/10/2012 12UTC

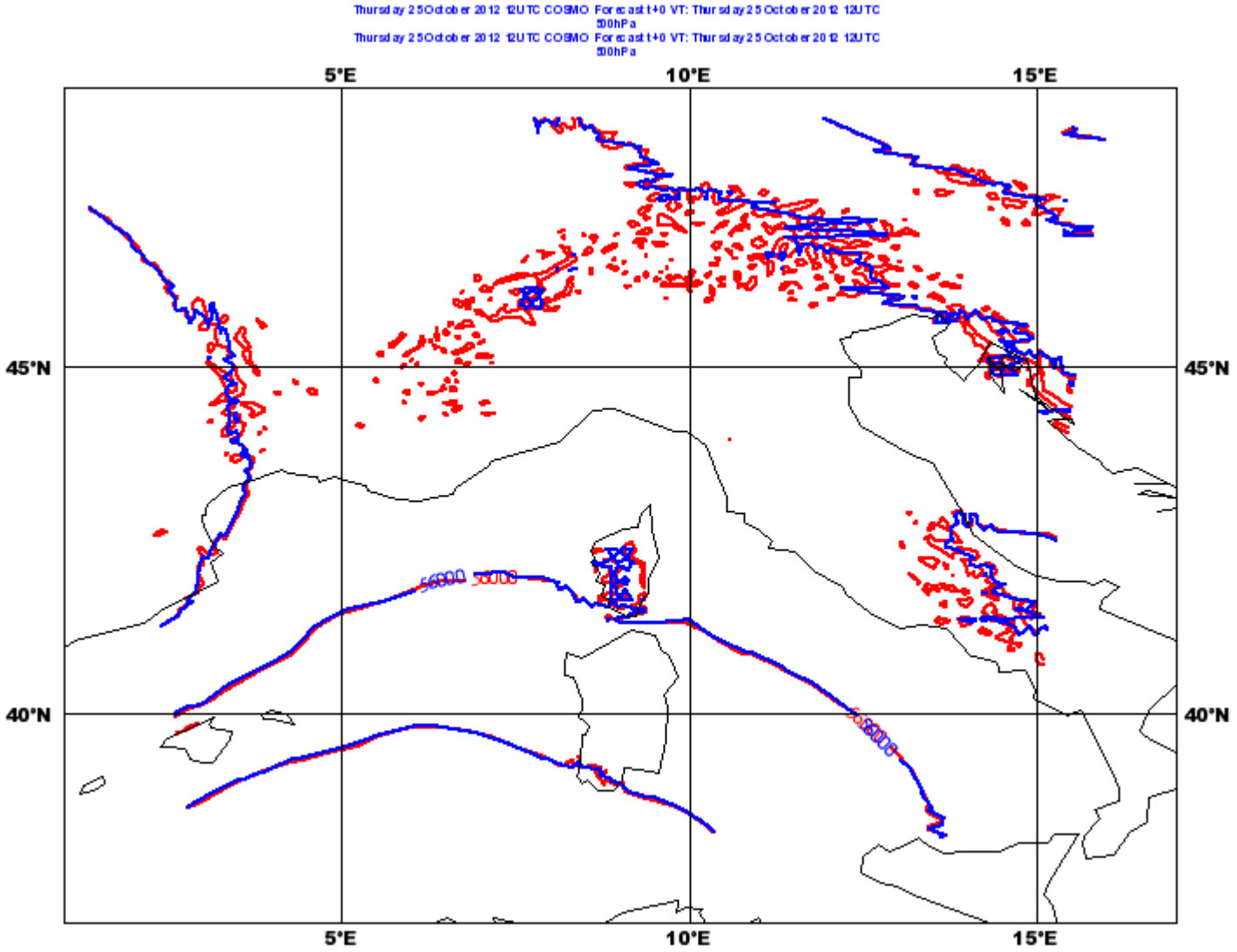


Test:
how to provide IC and BCs to the 2.8km ensemble





z500 – member 3



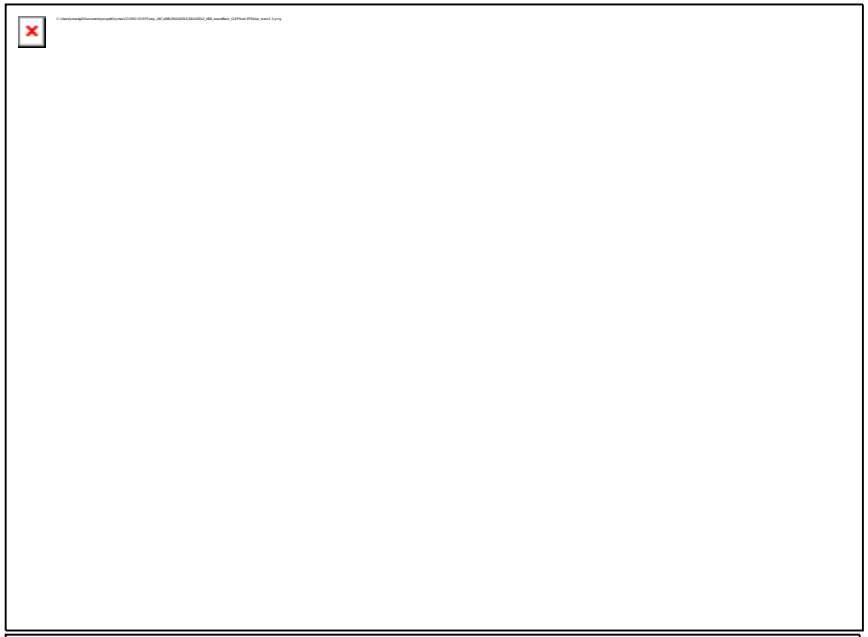
CLEPS

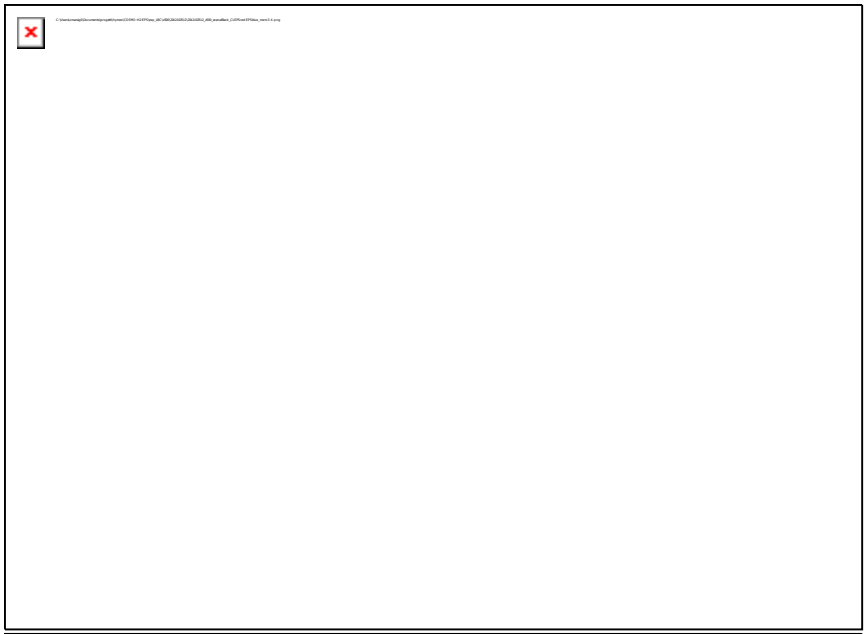
EPS

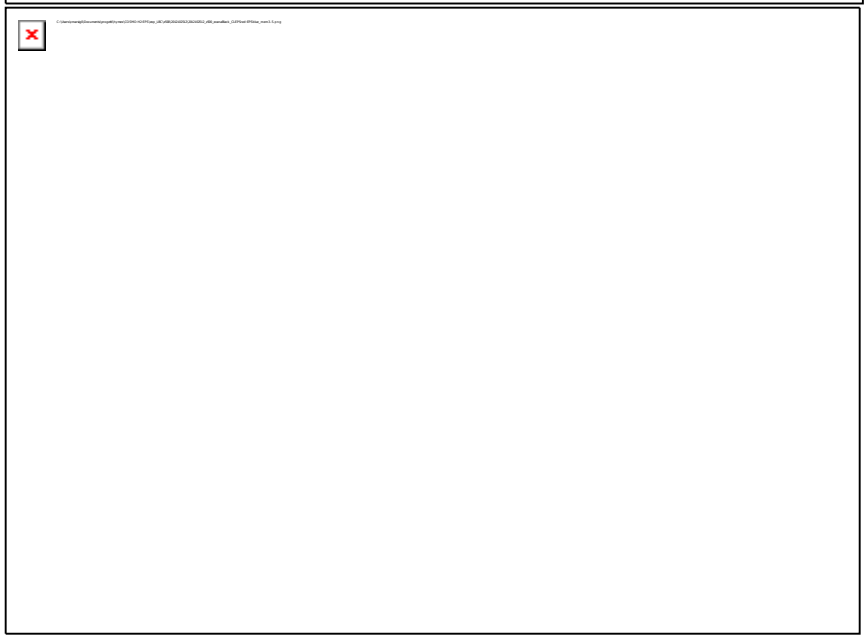
z500 – member 3

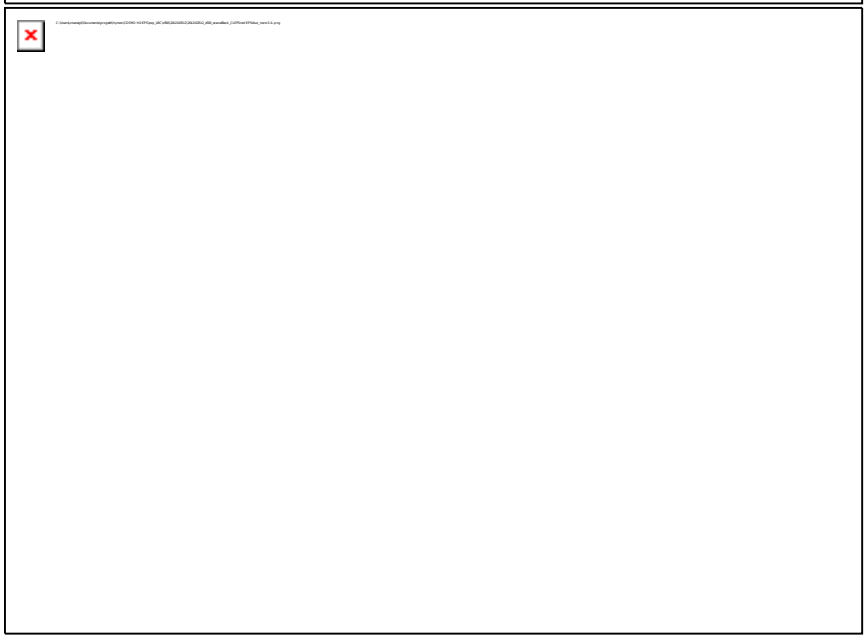
CLEPS EPS

ECANA

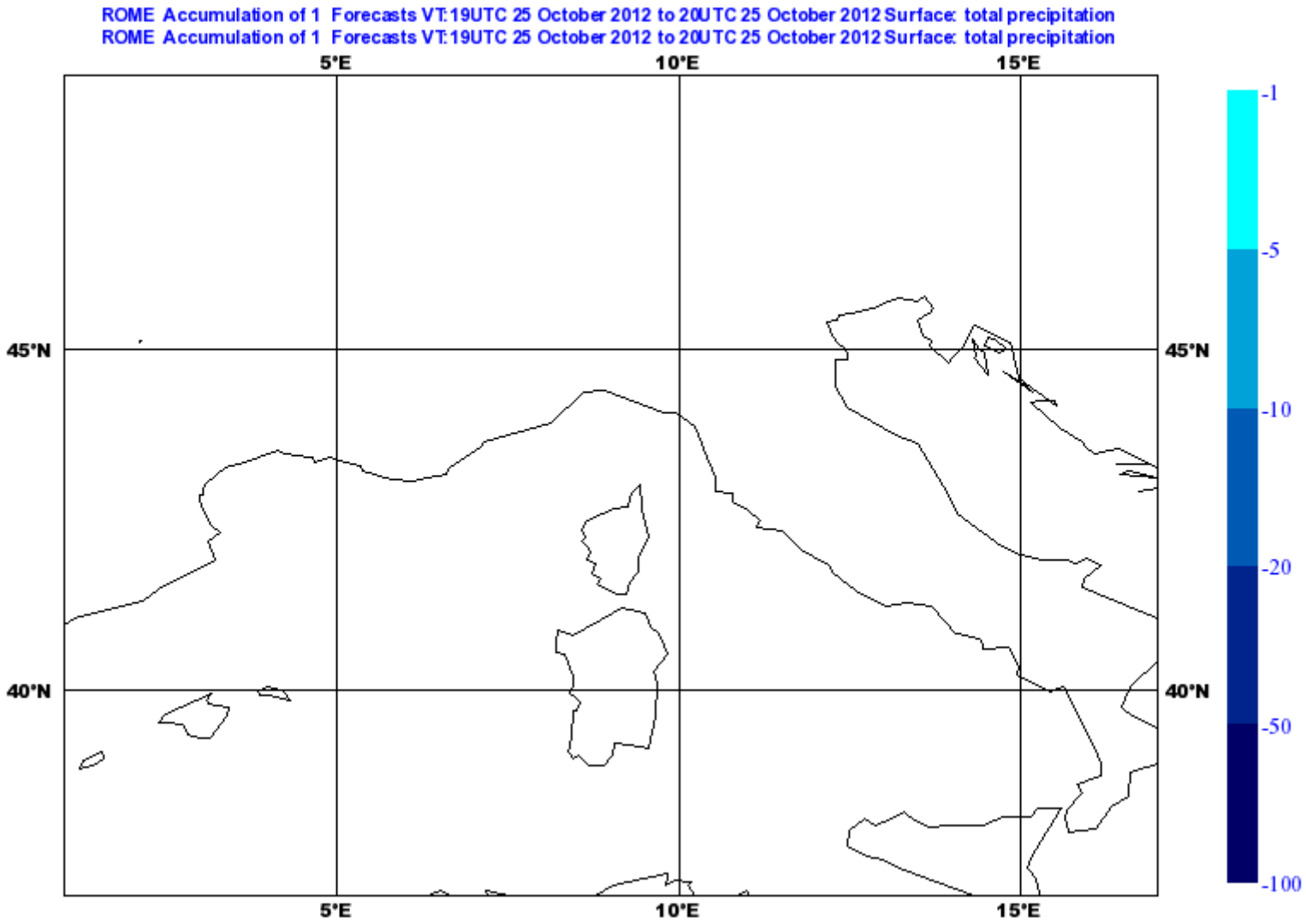








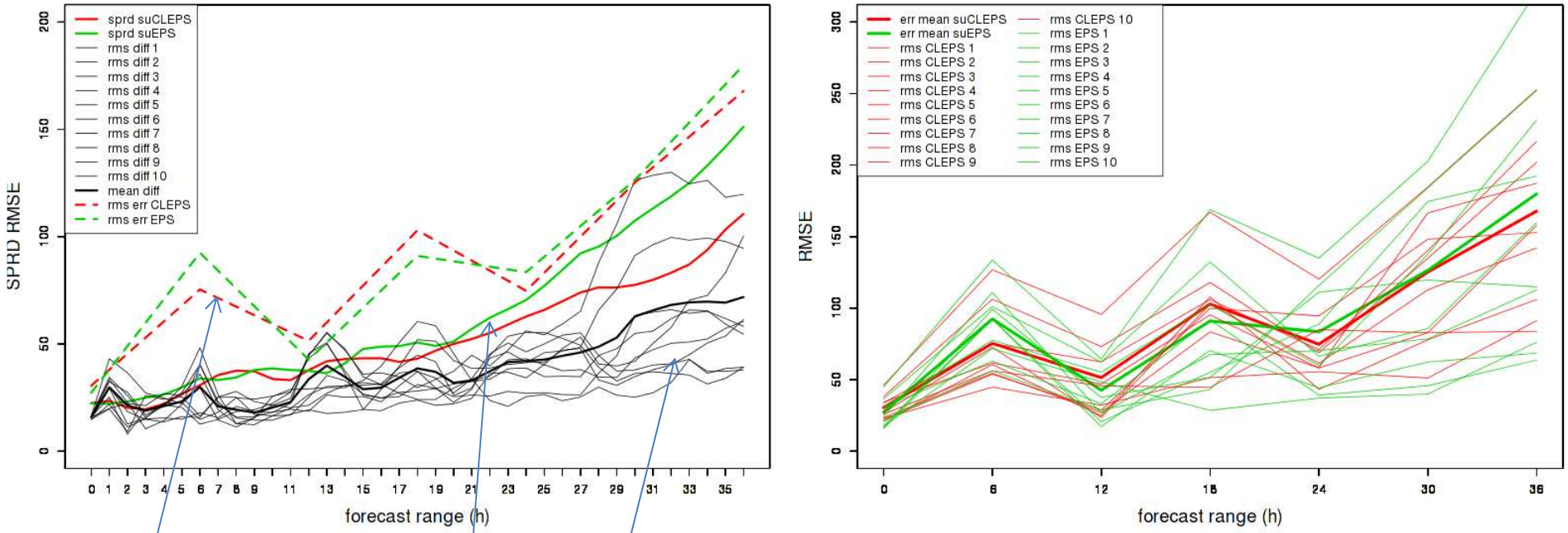
total precipitation 1h – member 3



black contouring: CLEPS precipitation
shadowing: difference between EPS and CLEPS precipitation

rms difference between members

Case: 2012102512 - Z500

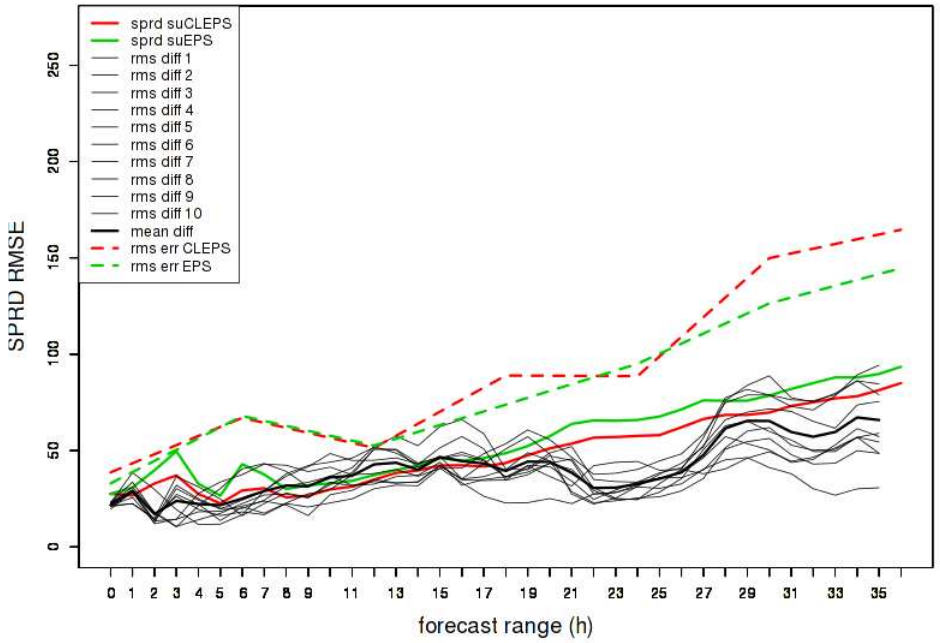


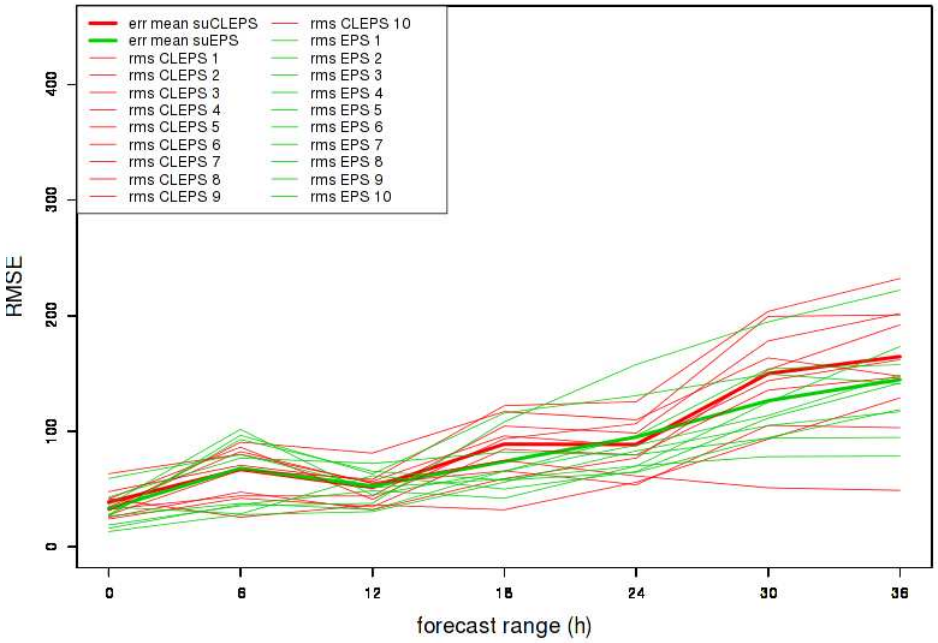
black lines: rms difference EPS-CLEPS (for each member)

solid coloured lines: ensemble spread (CLEPS and EPS)

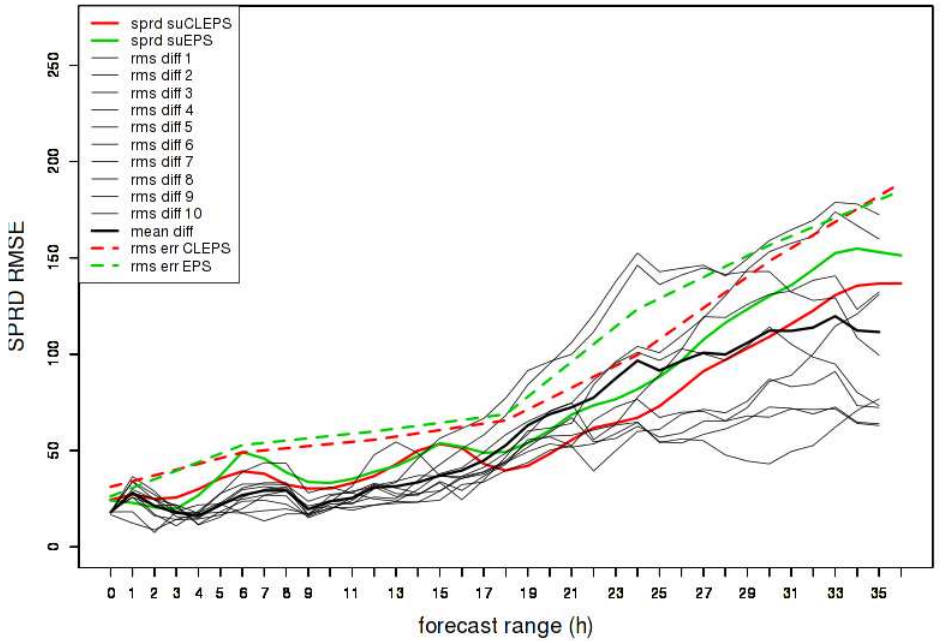
dashed coloured lines: ensemble error w.r.t ECMWF analysis (CLEPS and EPS)

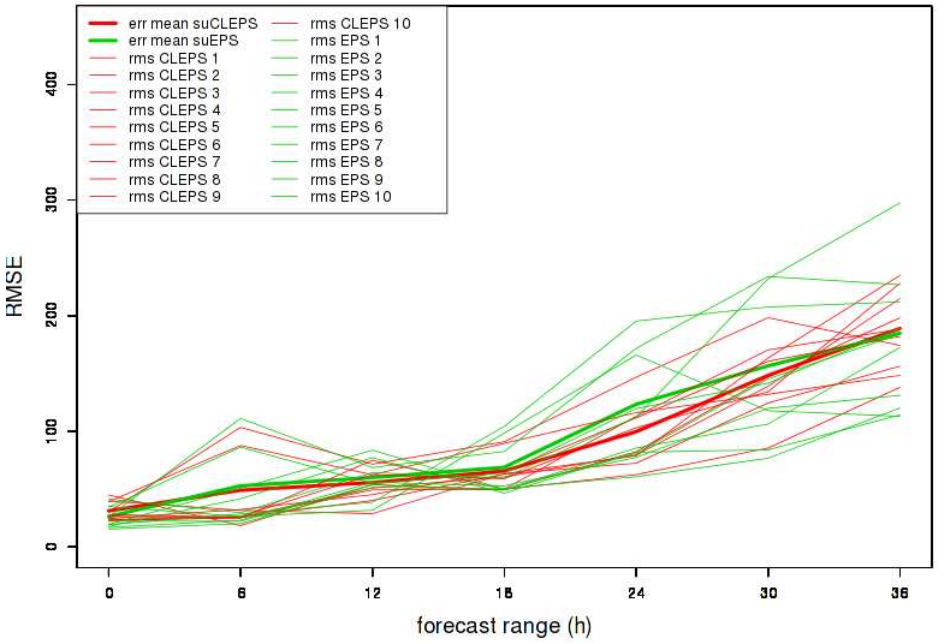
Case: 2012102012 - Z500





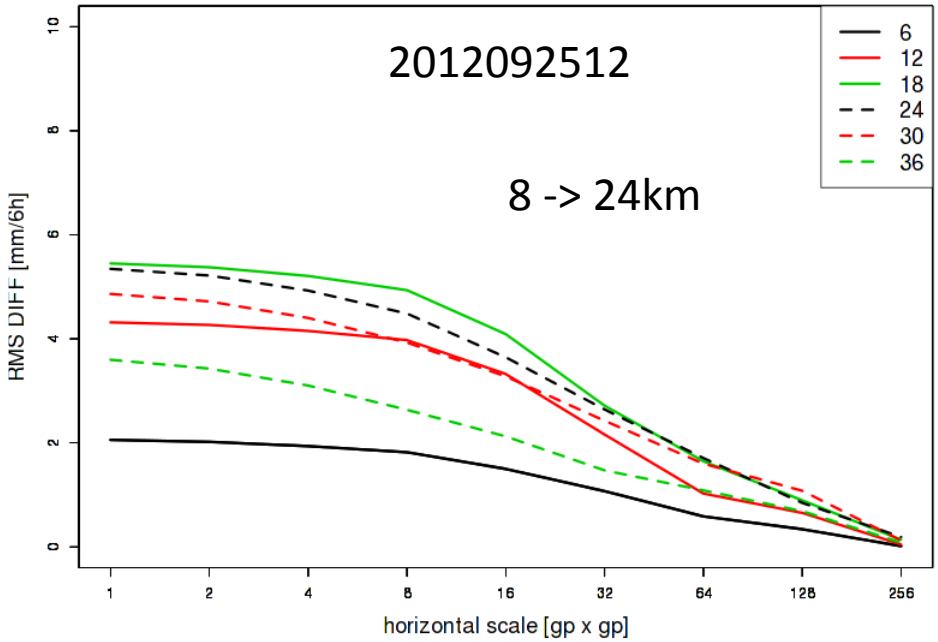
Case: 2012103012 - z500

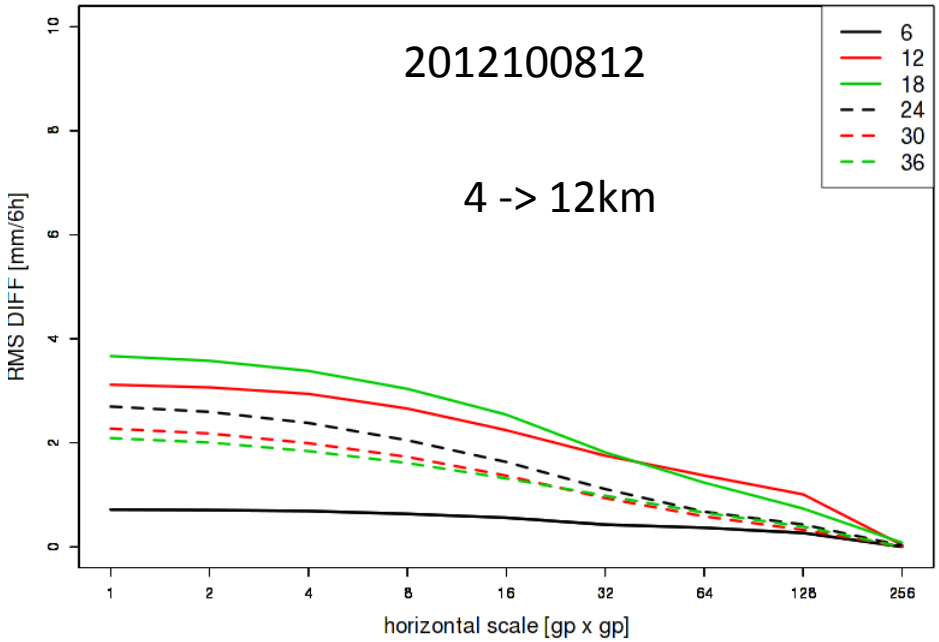


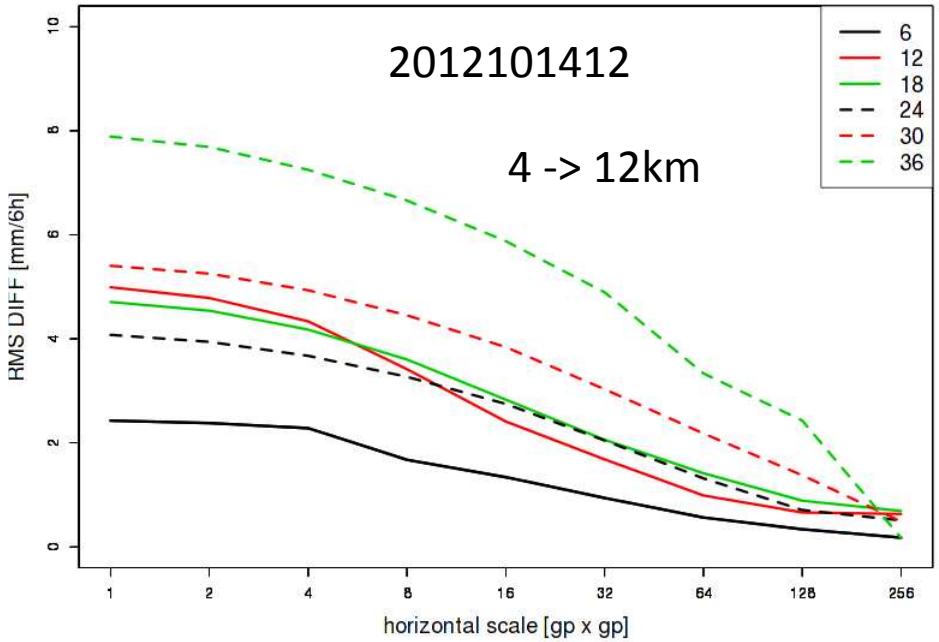


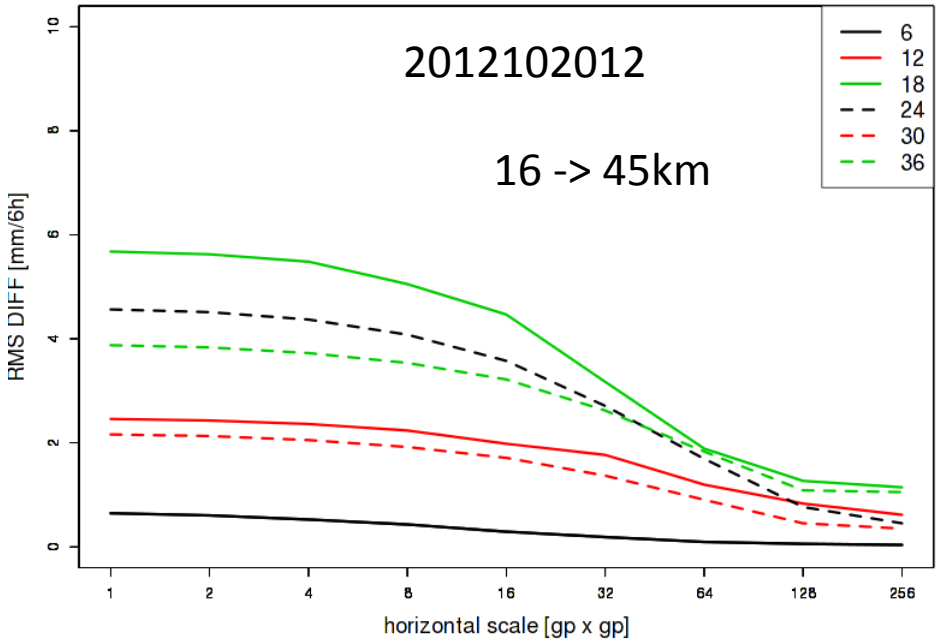
Spatial scale of precipitation differences

tp6h



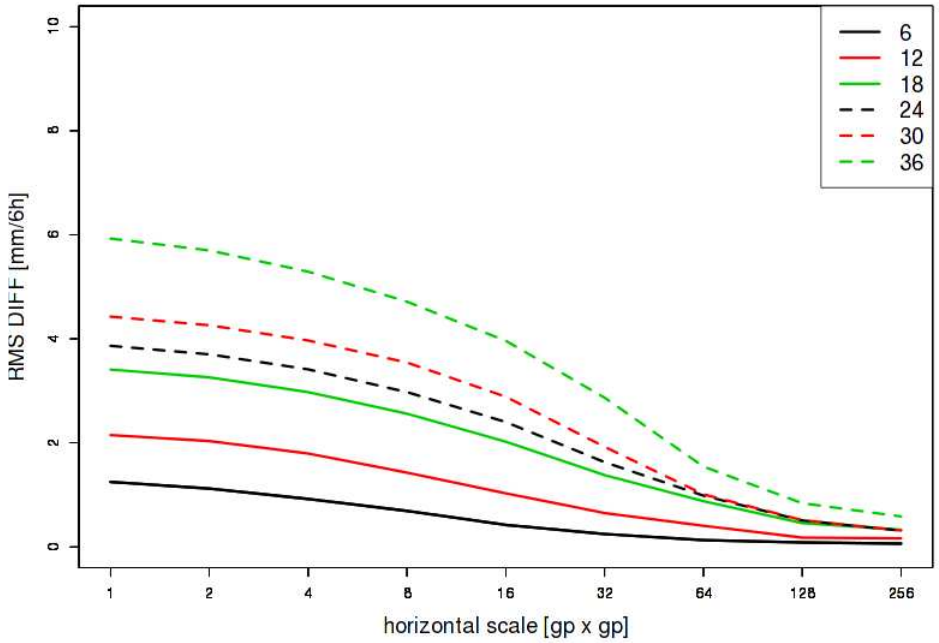


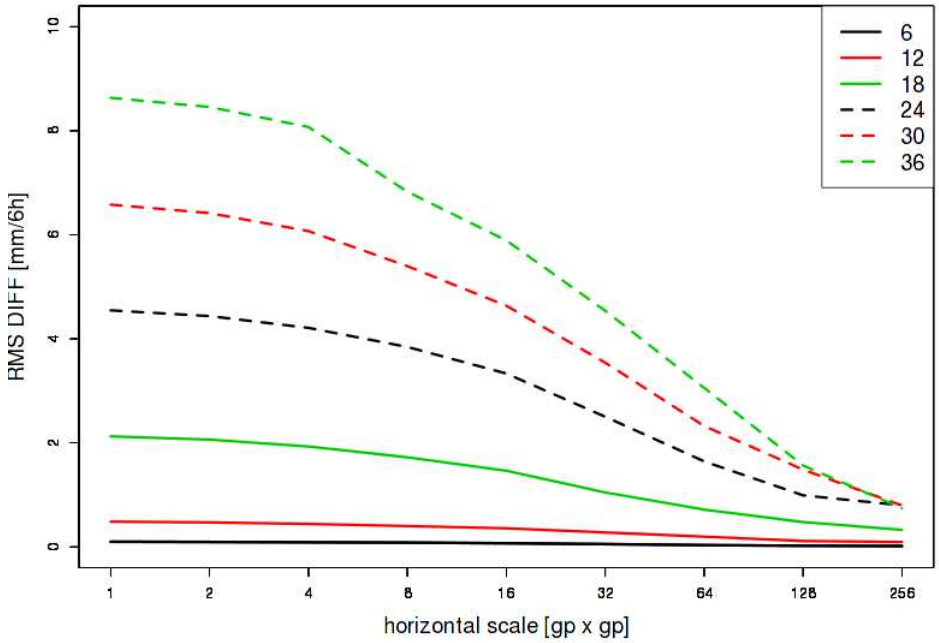


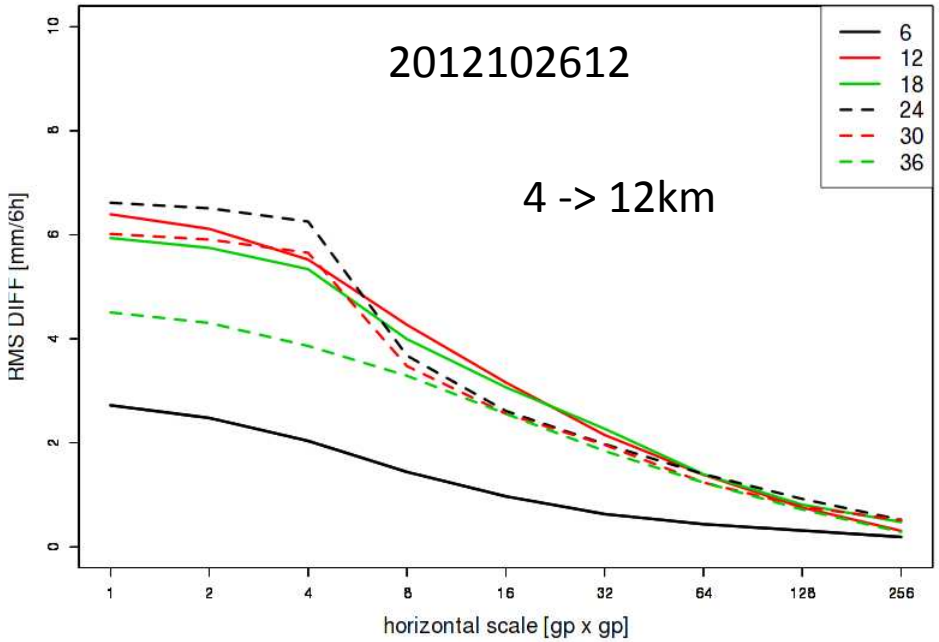


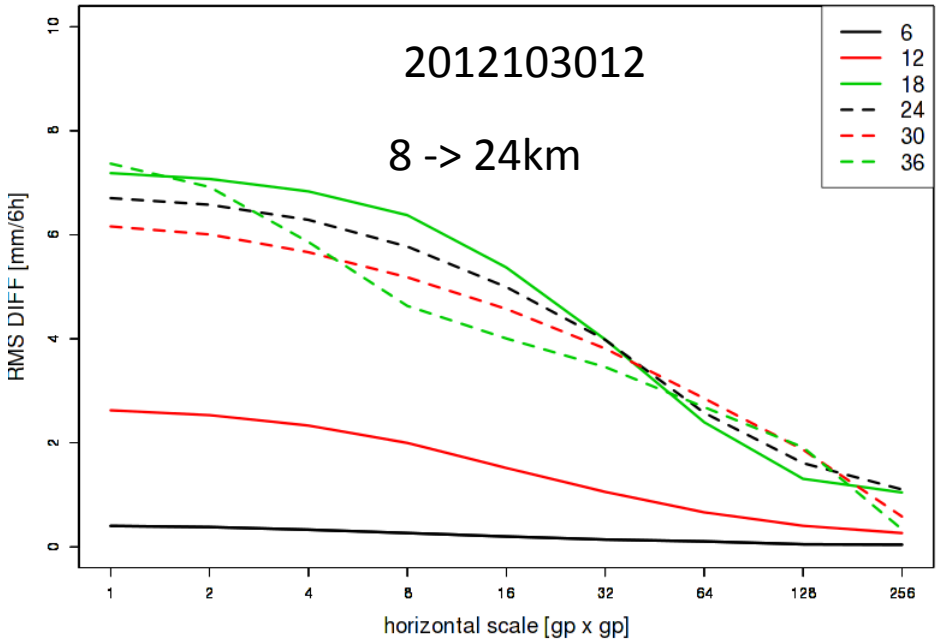
Spatial scale of precipitation differences

tp6h



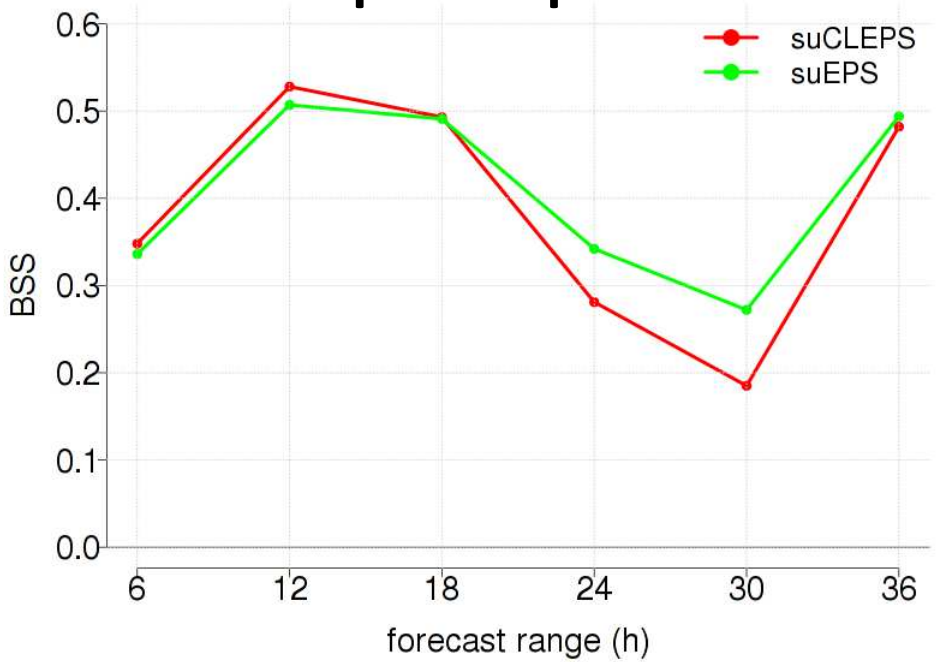


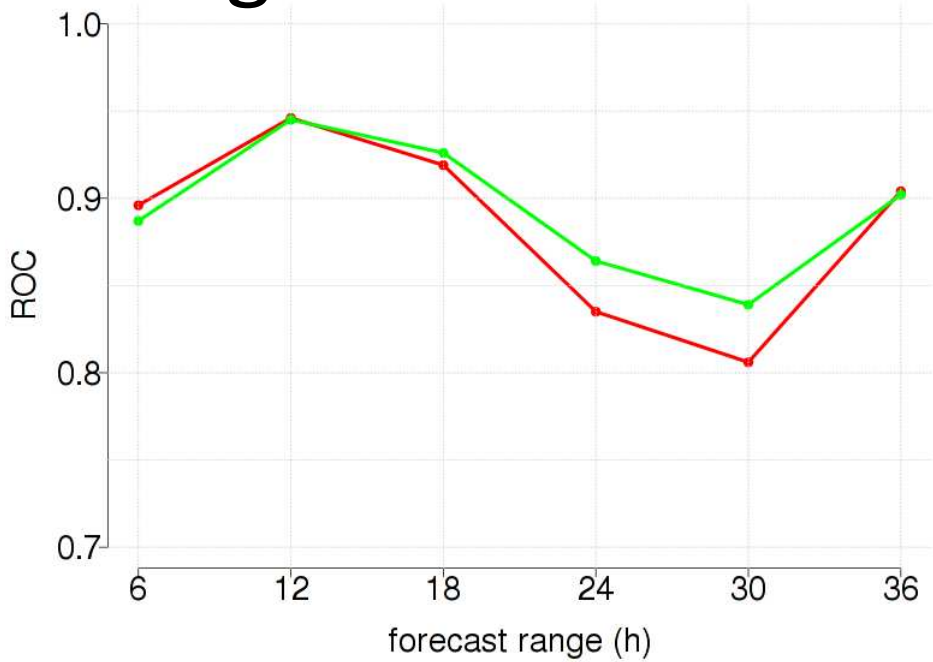


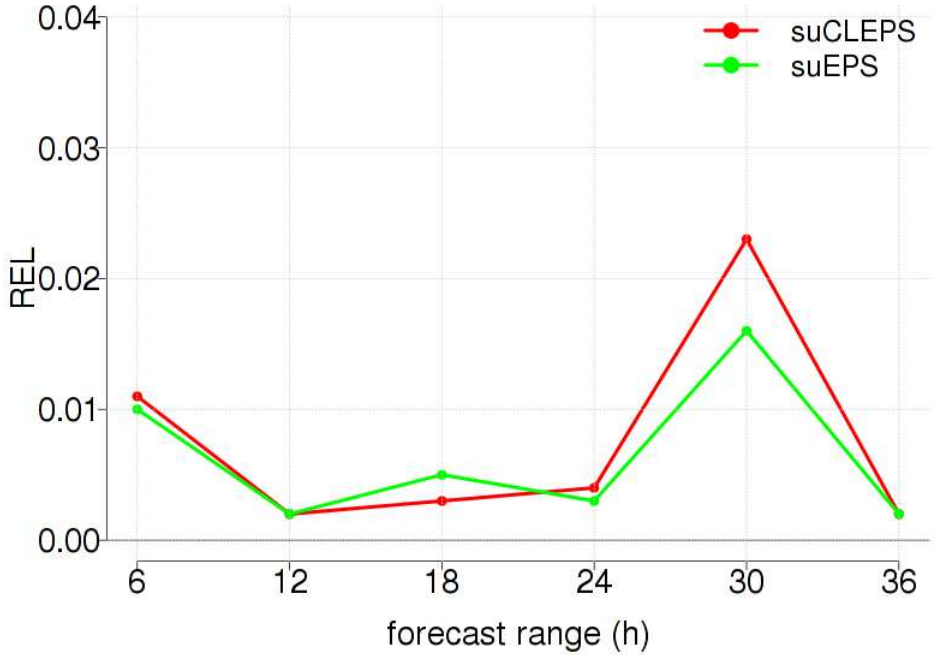


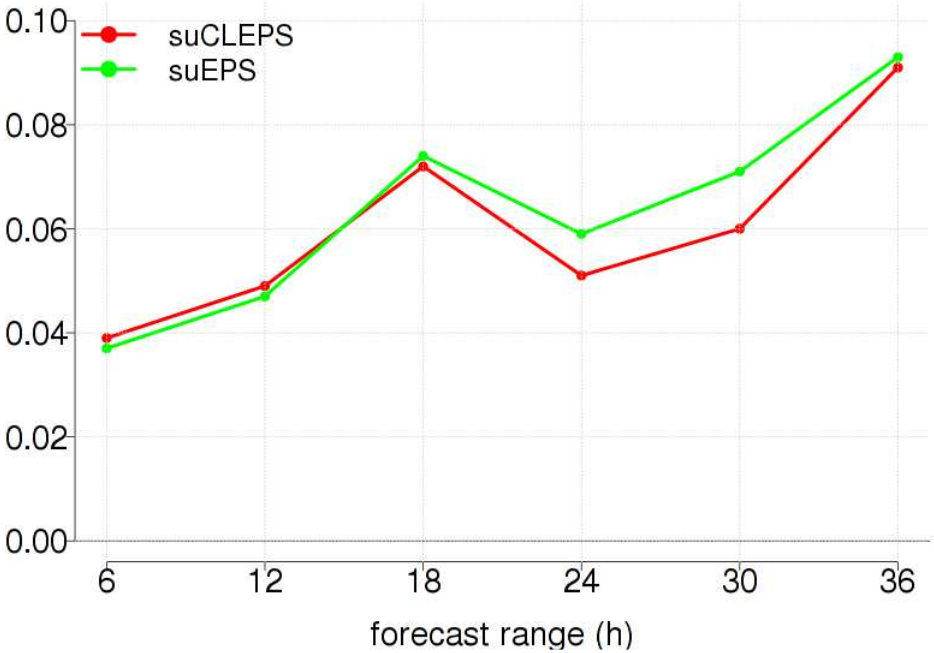
precipitation scores against obs

NI









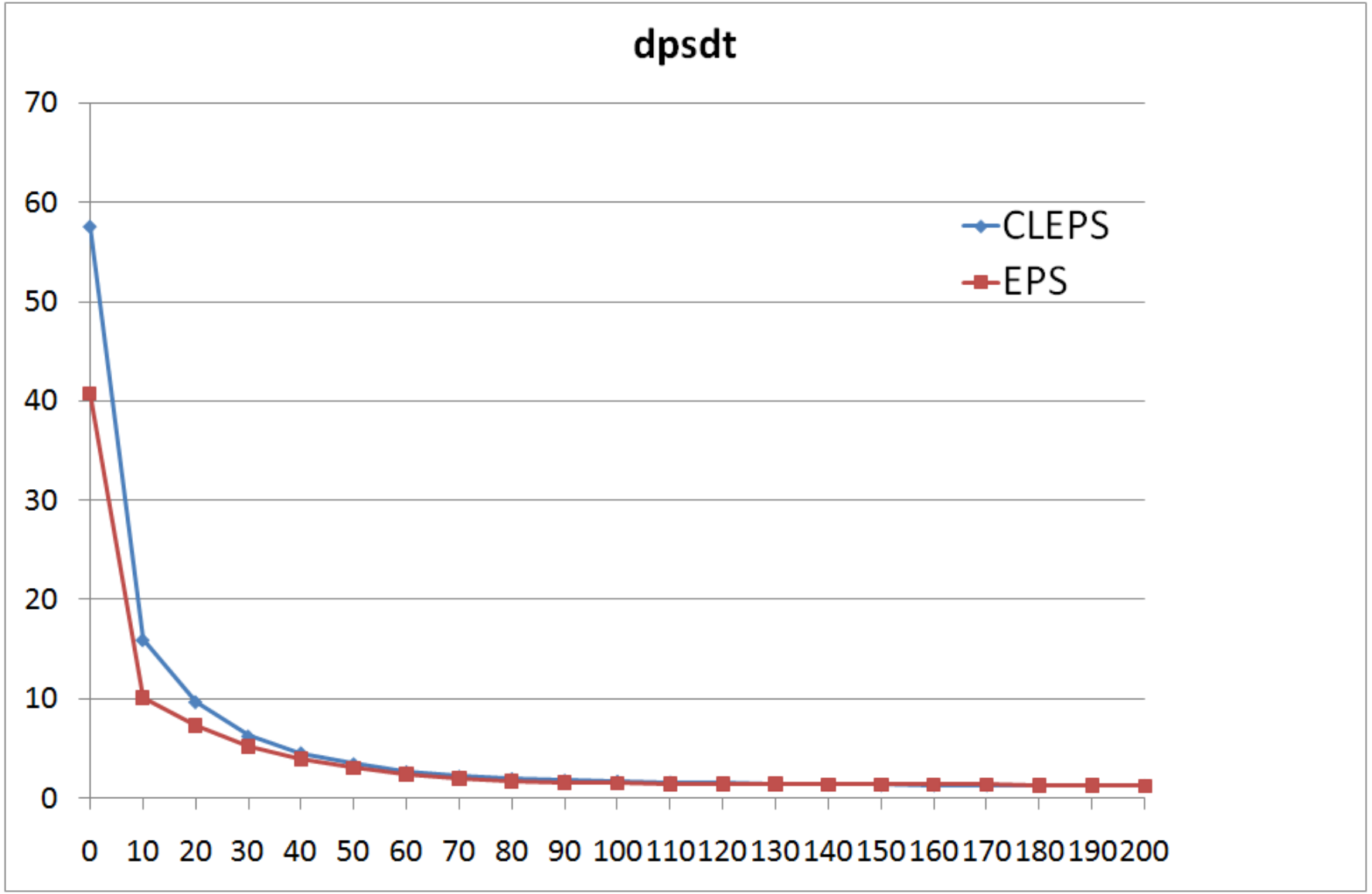
Conclusion

- 2.8km ensemble set-up over a Mediterranean domain for testing
- Added value w.r.t. the 7km ensemble to be assessed
- LBC test: rms difference between CLEPS driven and EPS driven runs is generally smaller that the rms error of the ensemble members (z500 and mslp)
- differences in precipitation due to spatial shift is generally in the order of (at least) 25km
- impact on precipitation scores is good

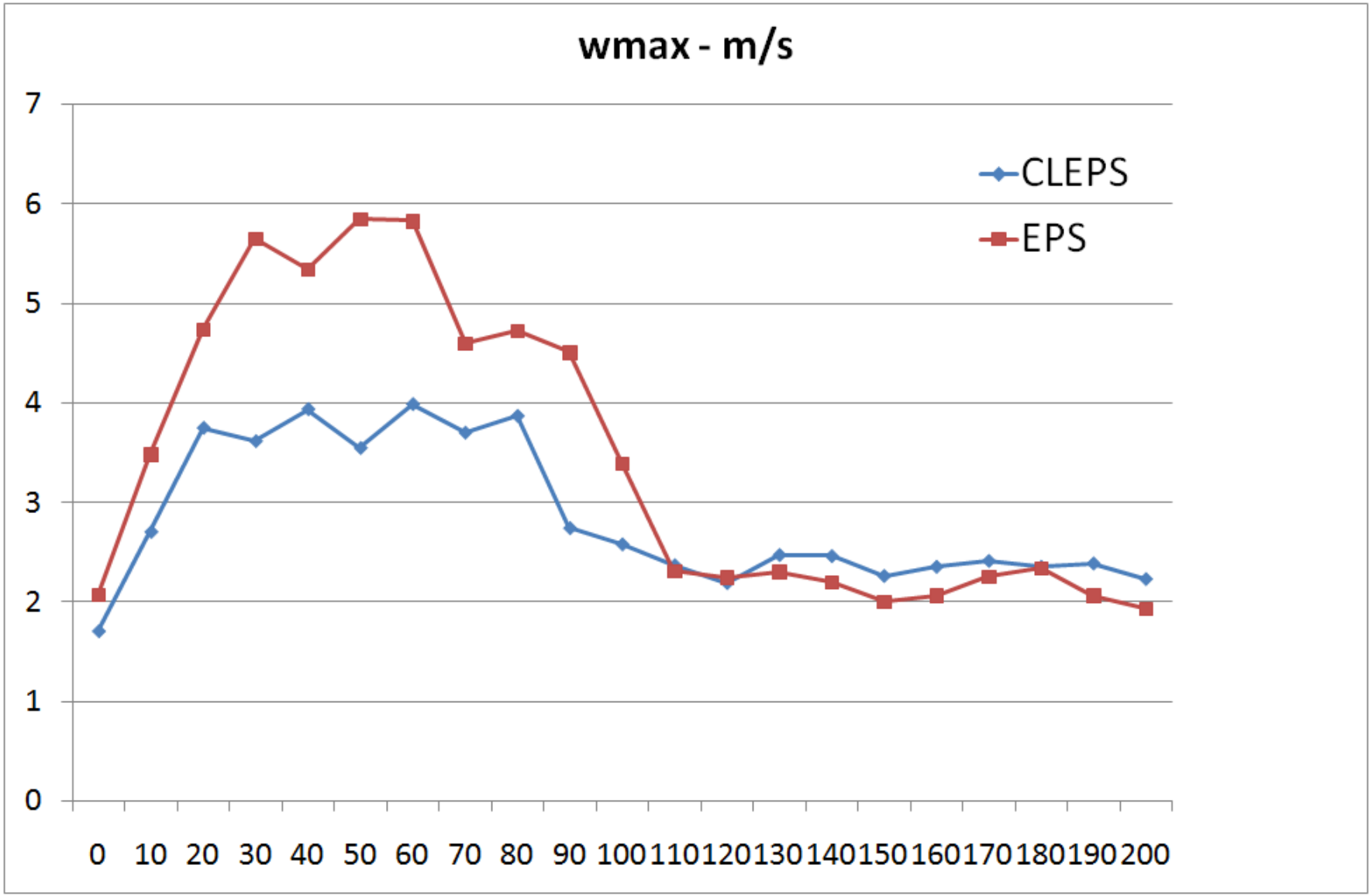
Future work

- ICs from KENDA
- Test SPPT in the 2.8km ensemble
- assess the impact of LBC resolution without the intermediate step with COSMO -> LAM-EPS BC experiments with high resolution EPS (0.125°)

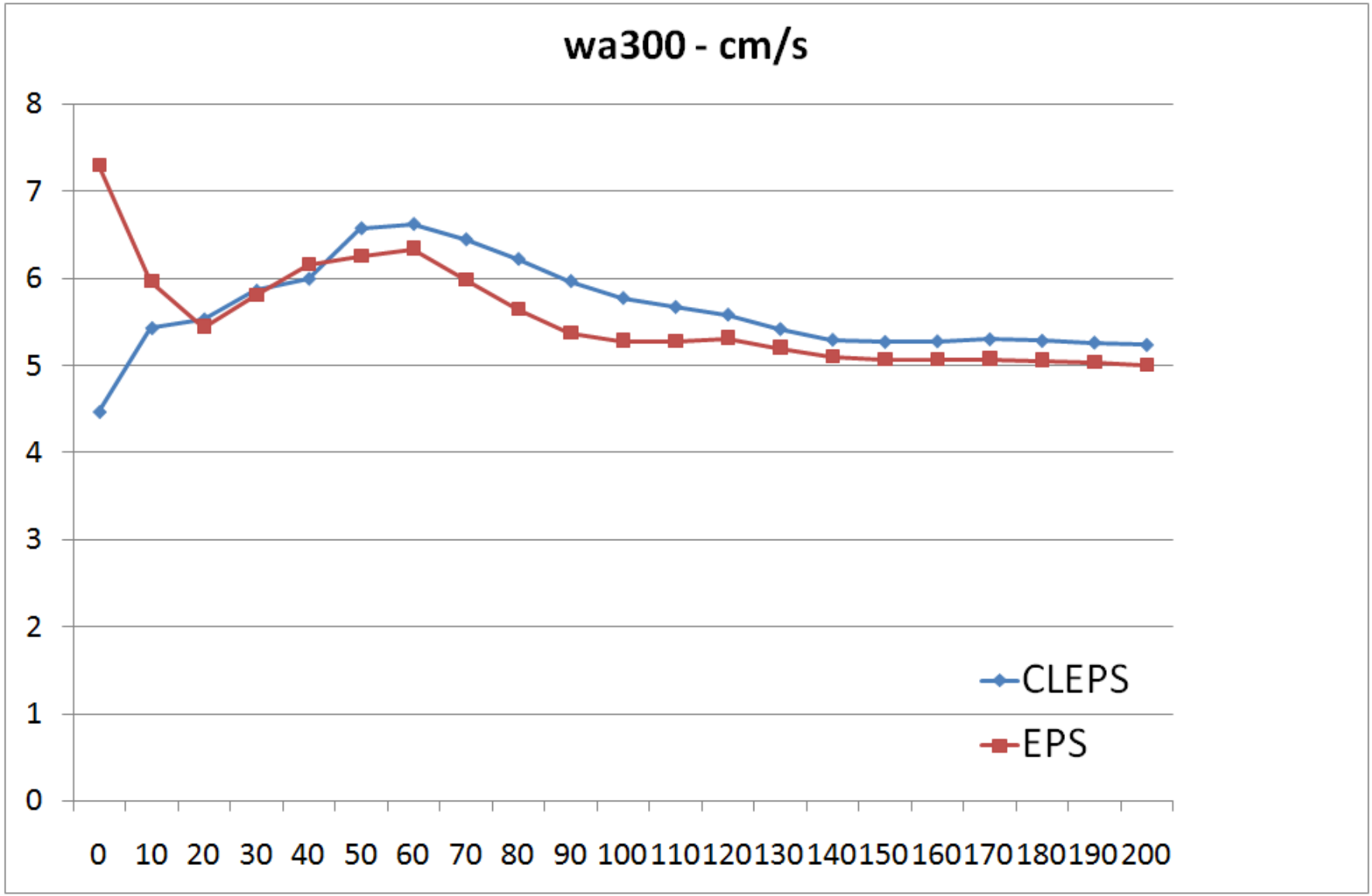
mem3 - dpsdt


dpsdt
70
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
CLEPS
EPS

mem3 - wmax


wmax - m/s
CLEPS
EPS
0
1
2
3
4
5
6
7
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

mem3 – wa300


wa300 - cm/s
8
7
6
5
4
3
2
1
0
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
CLEPS
EPS