Studying KENDA derived initial condition for COSMO-IT-EPS

Chiara Marsigli

Andrea Montani

Tiziana Paccagnella

ARPA Emilia-Romagna, SIMC

Outline

- The COSMO-IT-EPS ensemble

- Implementation of KENDA at ECMWF

- First tests of ICs derived from KENDA

- Set-up of an OSSE

- Concluding remarks and future plans

COSMO-IT-EPS

- COSMO 2.8km ensemble over Italy
- in collaboration with CNMCA and ARPA Piemonte
- planned to go in pre-operational phase in 2015
  - 50 levels
  - 10 members
  - 36h forecast range
  - ICs from KENDA analyses
  - BCs from ECMWF-EPS
  - physics parameter perturbations (planned: SPPT or stochastic physics)
  - planned: soil state perturbations

COSMO-IT-EPS

- KENDA data assimilation cycle for these tests:
  - 3-hourly cycles, analyses taken after 36 hours
  - 20 members
  - BCs from ECMWF-EPS (also ICs for cold start)
  - no model perturbations
  - observations: TEMP SYNOP AIREP

KENDA suite at ECMWF
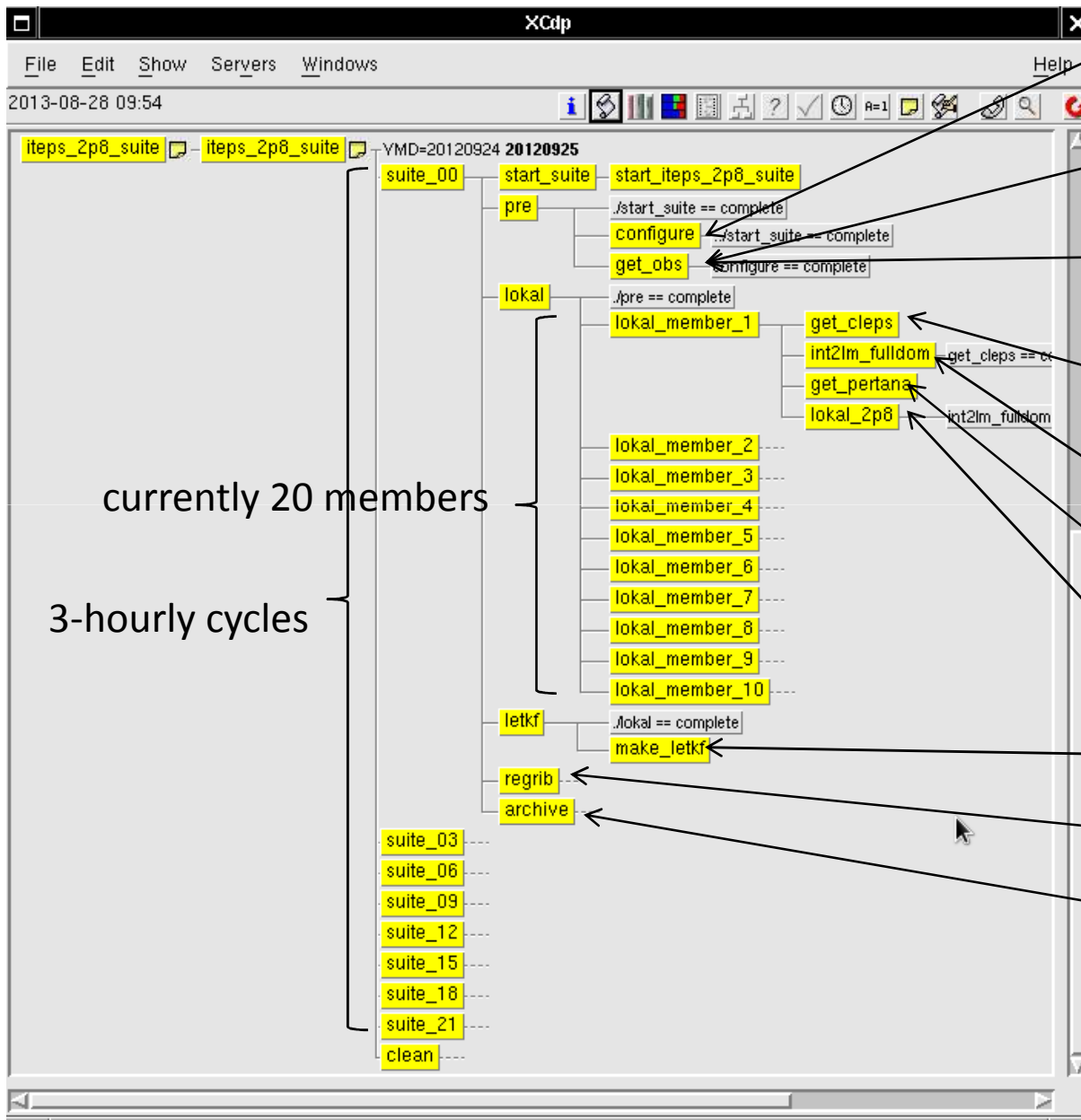
creation of the directories and set-up of the runs

MARS retrieval of conventional observation

(ARPA) bufr2netcdf

get Boundary Conditions from ECMWF ENS (and ICs for the cold start)

int2lm

get analysis from previous KENDA cycle

COSMO run

KENDA analysis step

processing of output

archiving of outputs

currently 20 members

3-hourly cycles

Spectra of the analysis perturbations
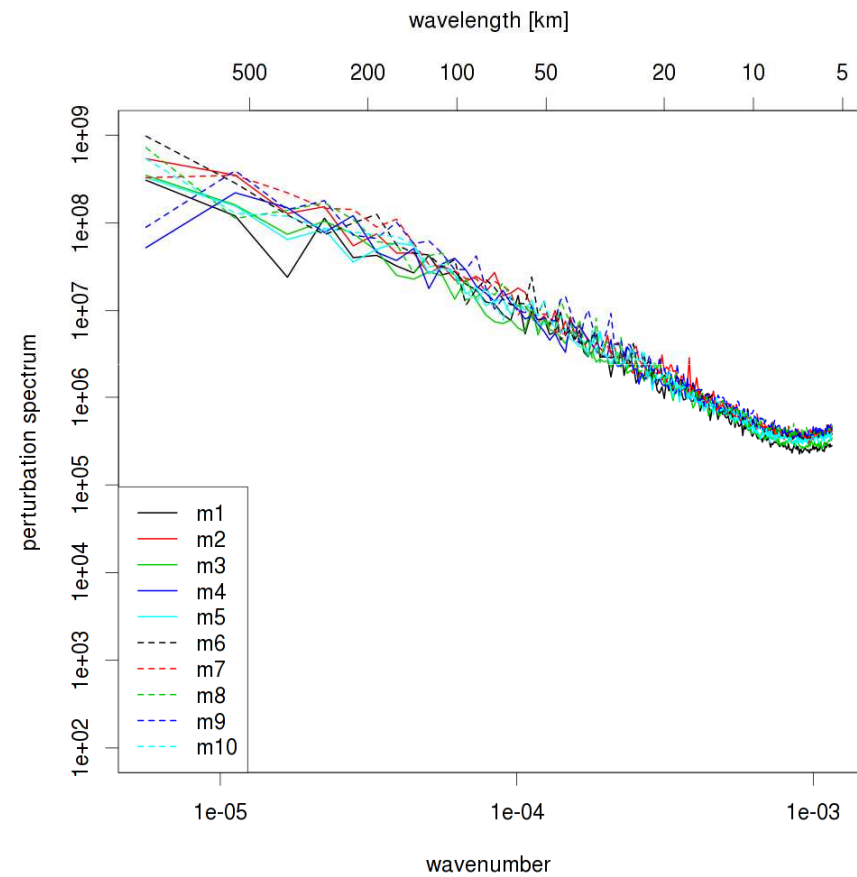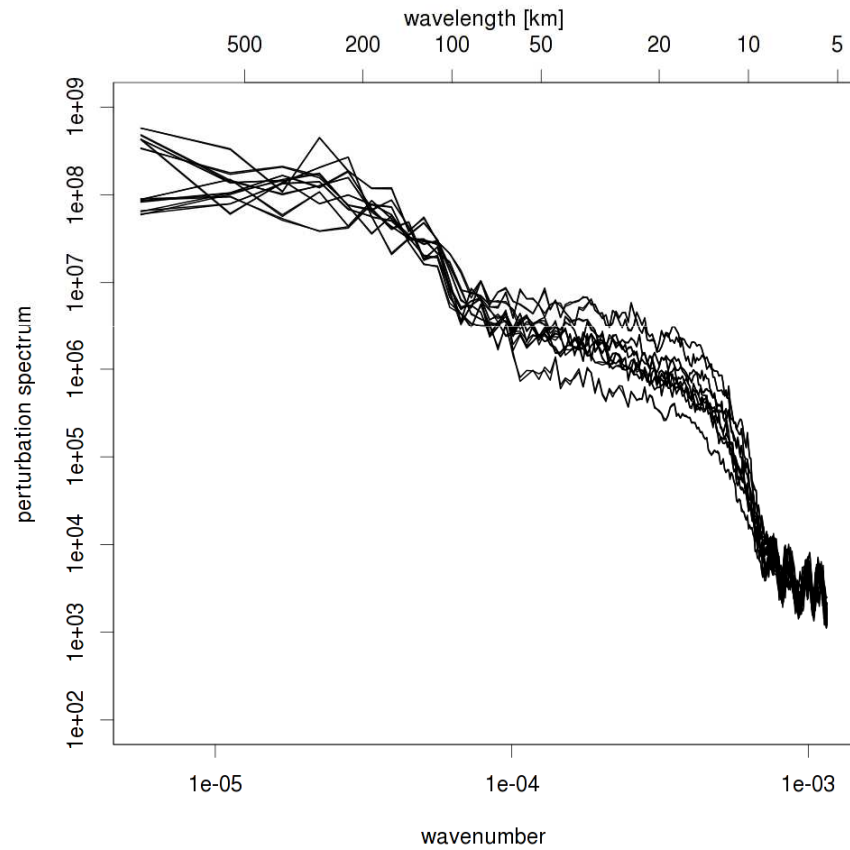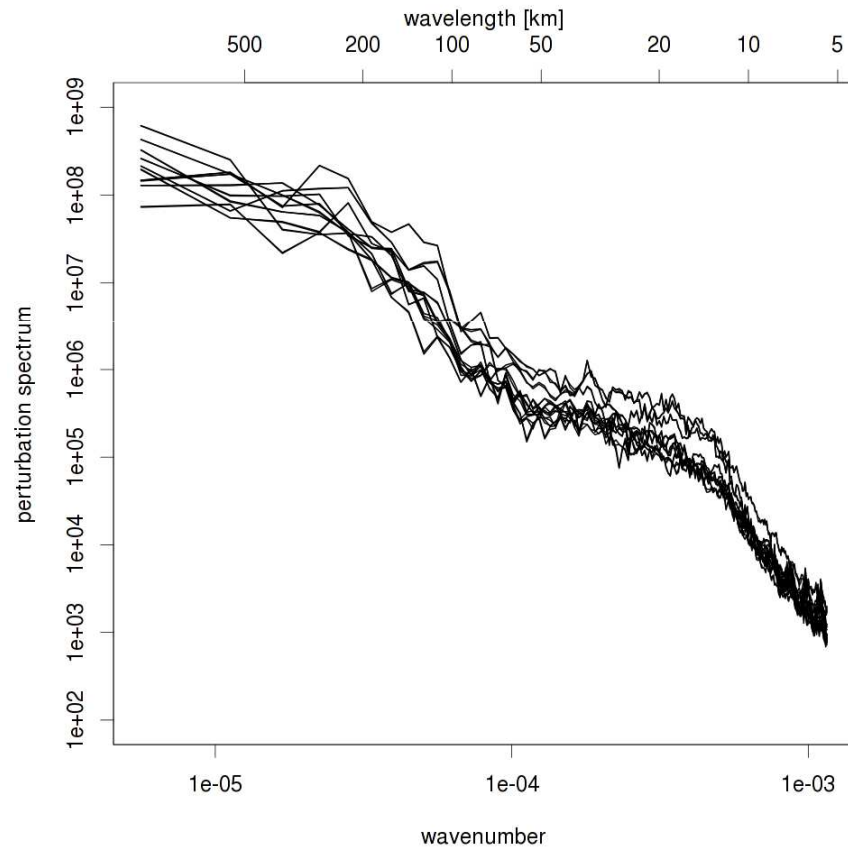## temperature level 50

ENS analyses downscaling
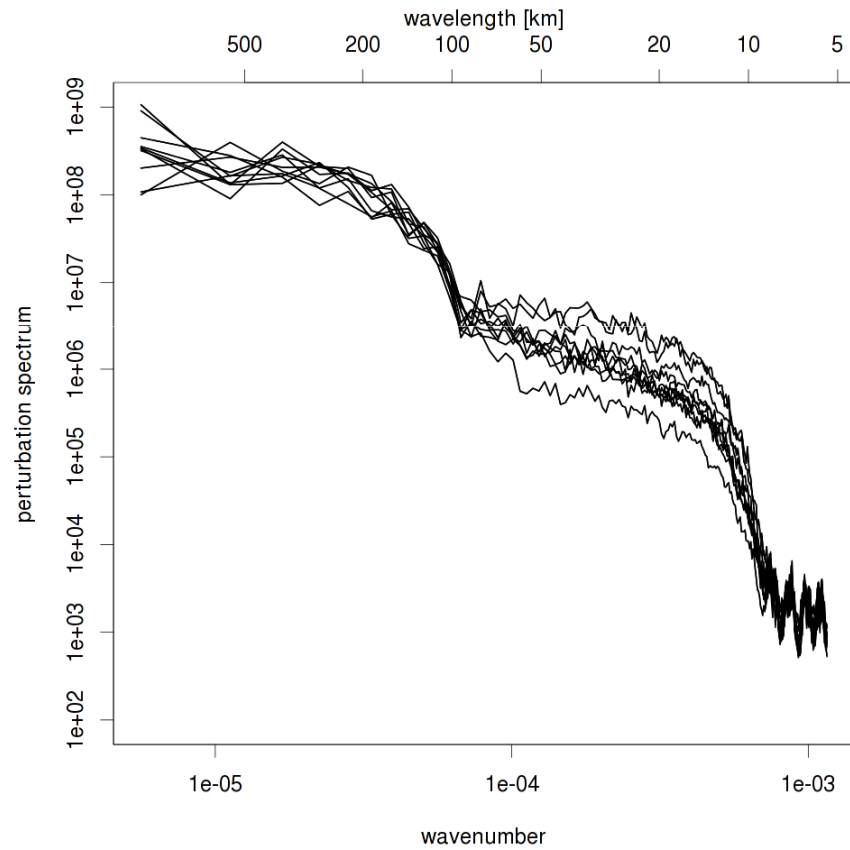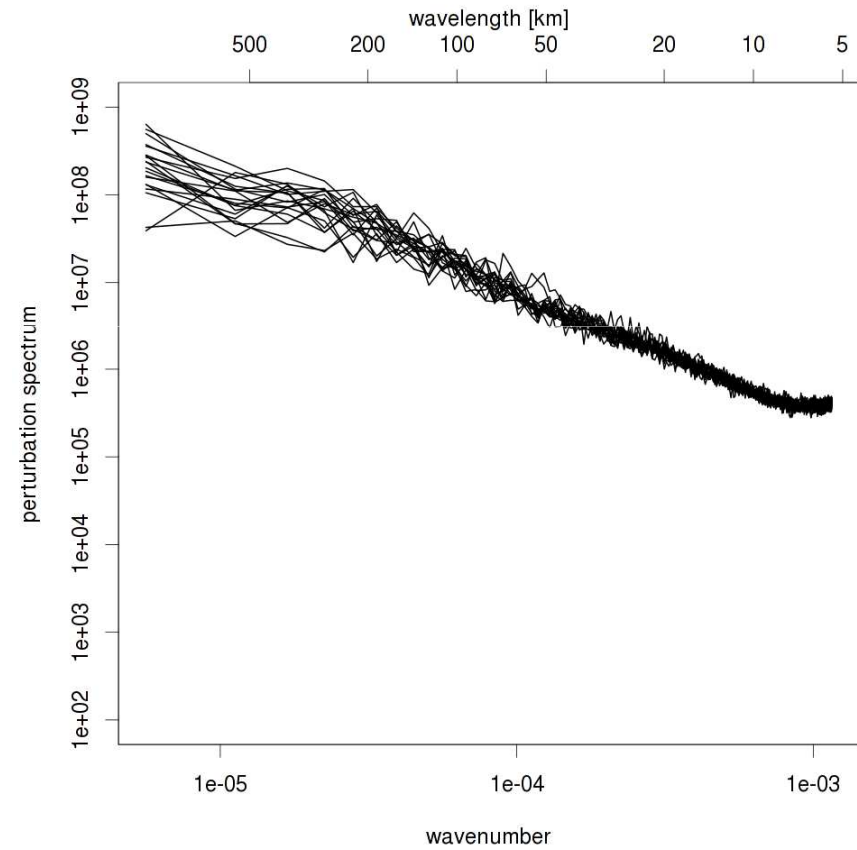
kenda

Spectra of the analysis perturbations
Temperature level 50
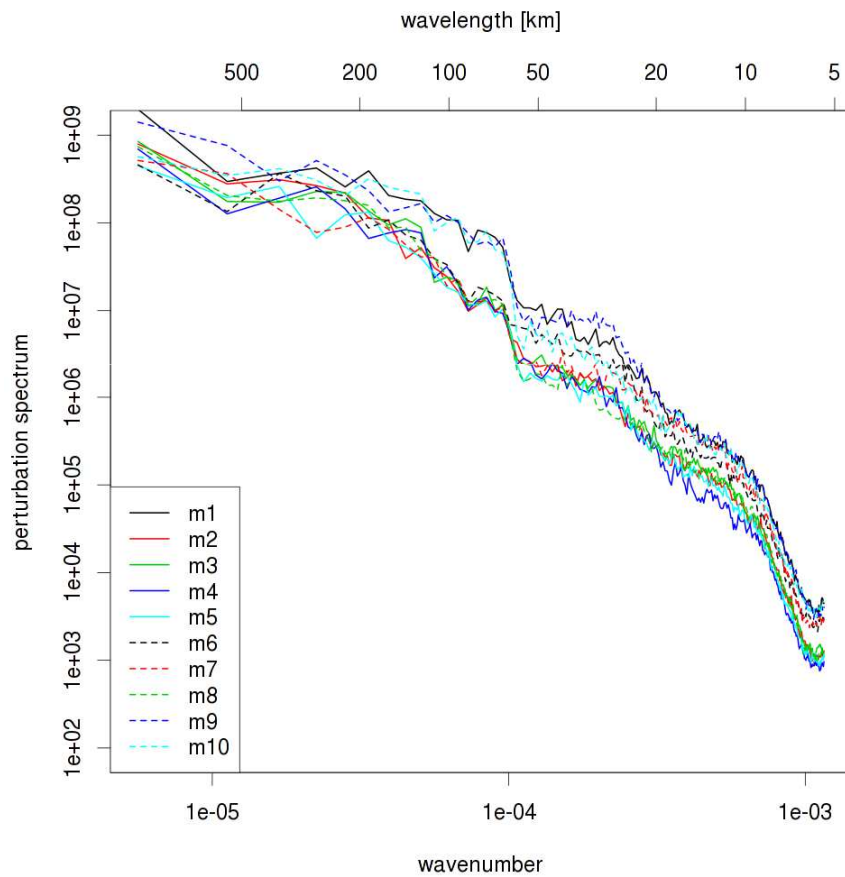
Spectra of the analysis perturbations
temperature level 40
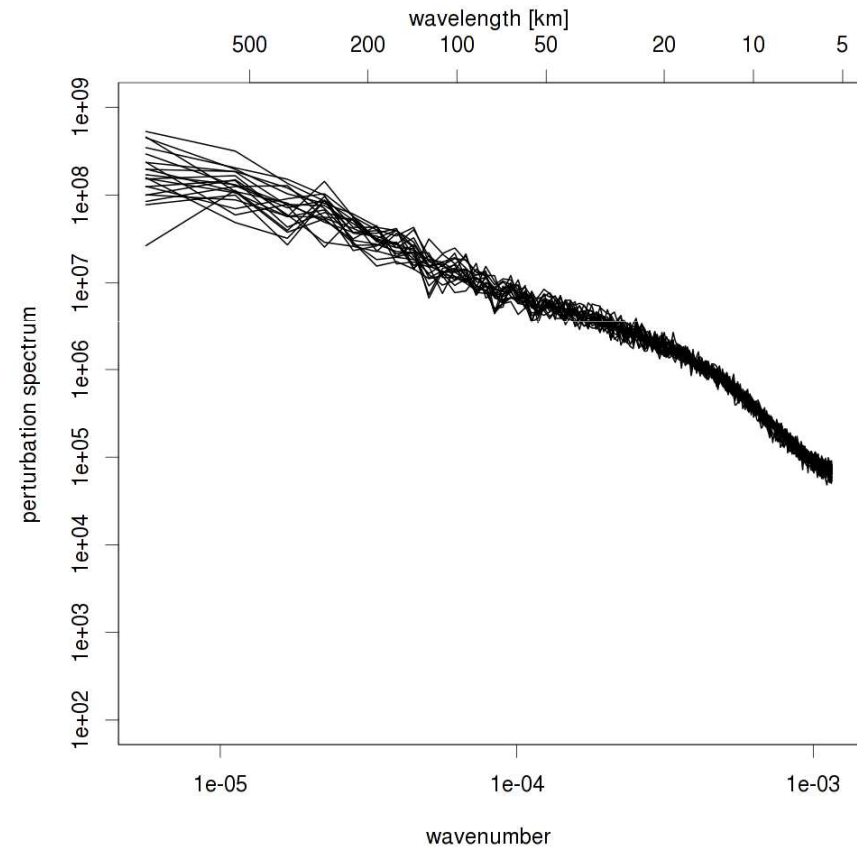
ENS analyses downscaling
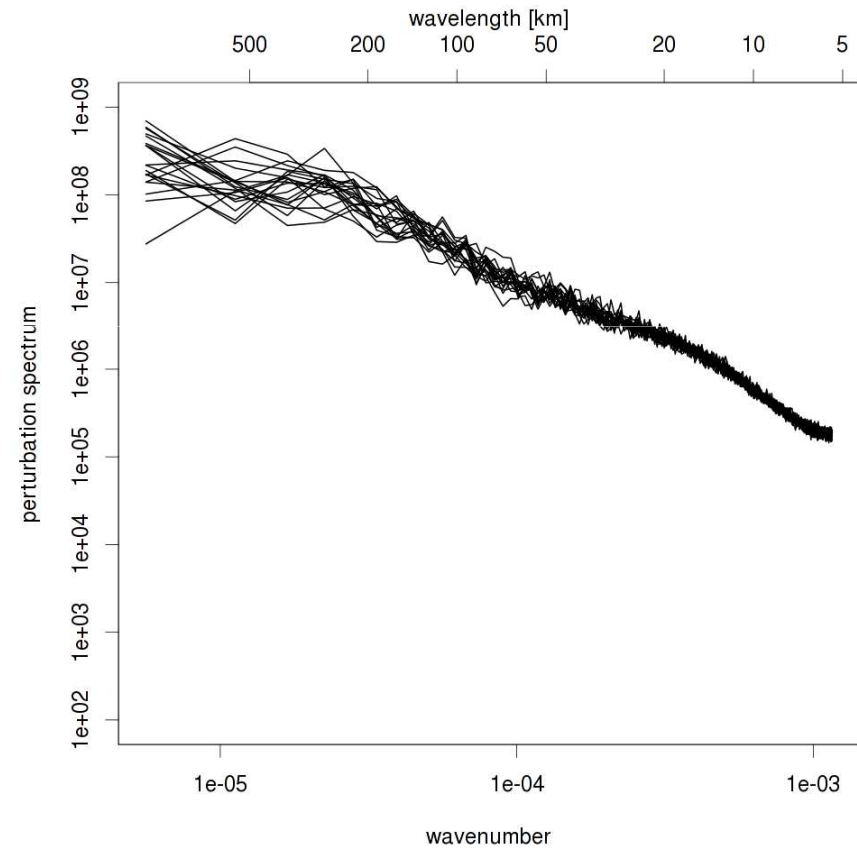
kenda

Spectra of the analysis perturnations
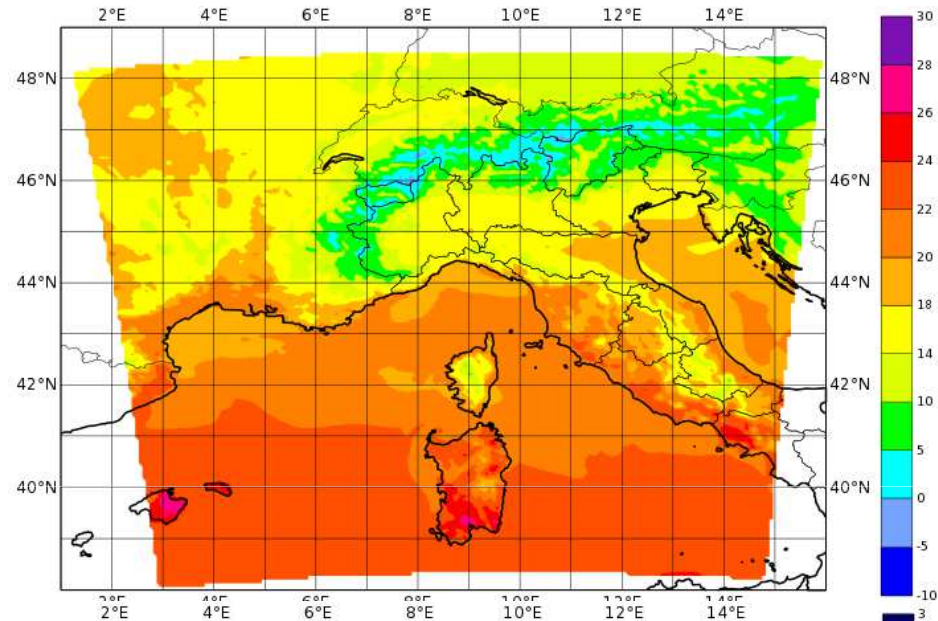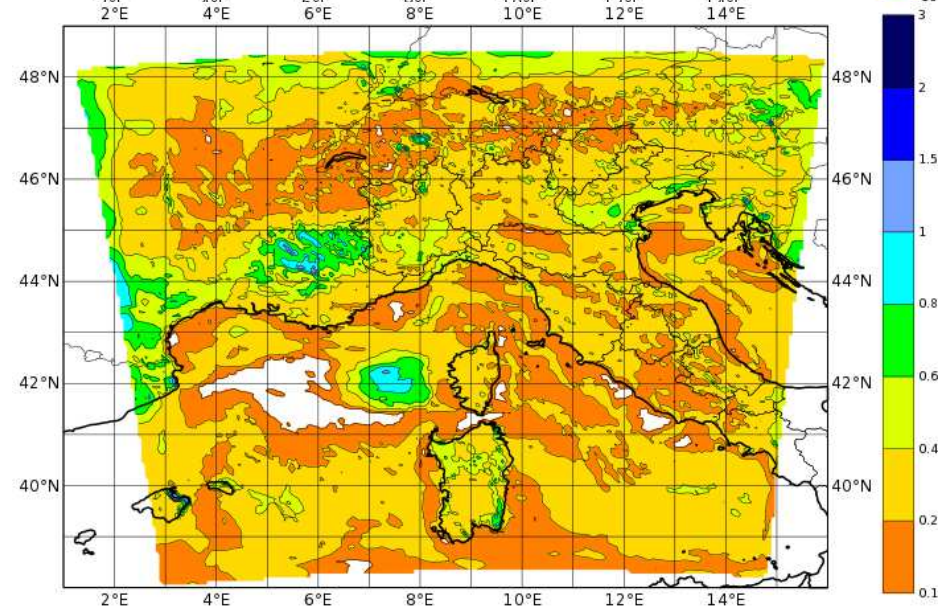## temperature level 30

ENS analyses downscaling
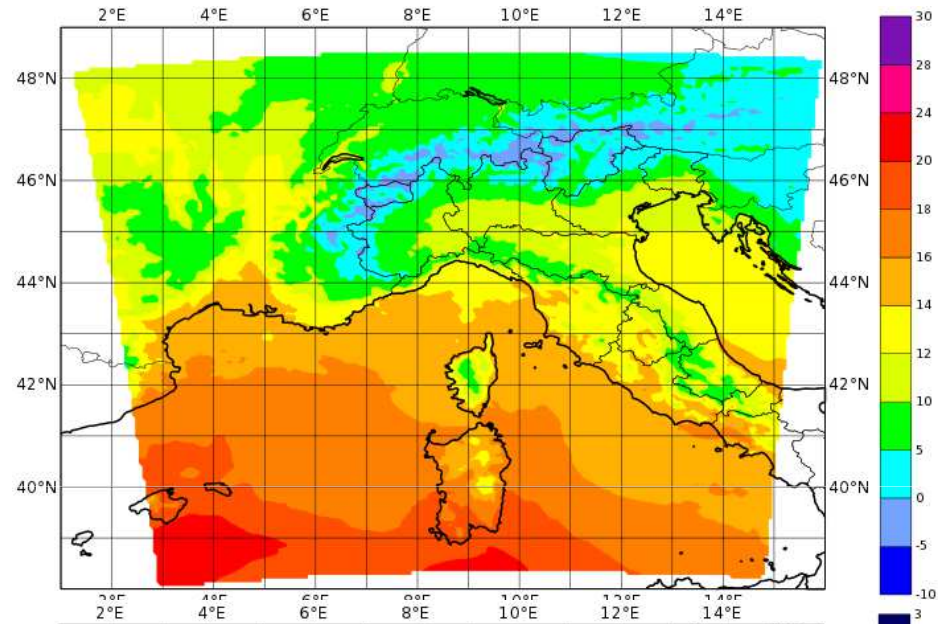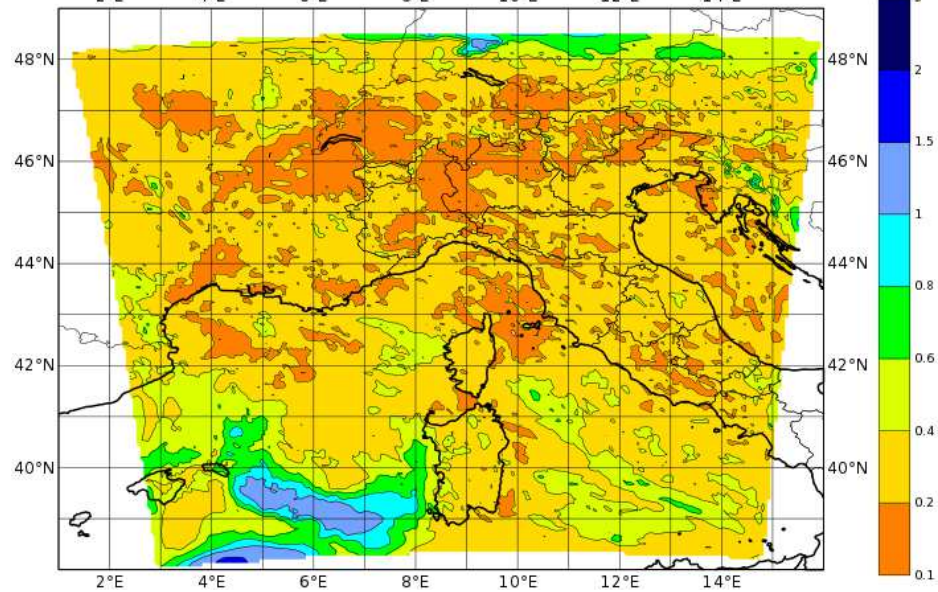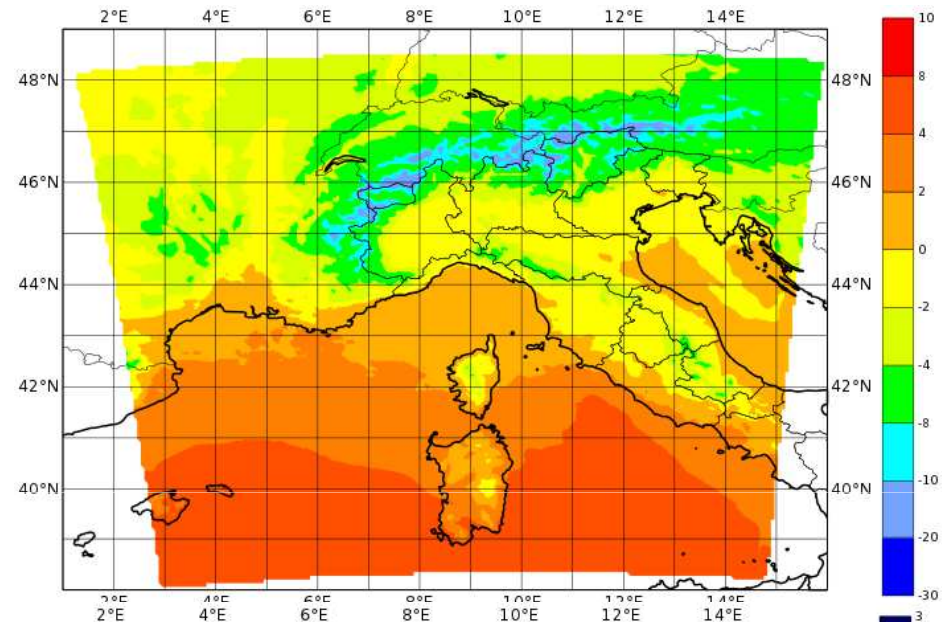
kenda

KENDA analyses
temperature level 50
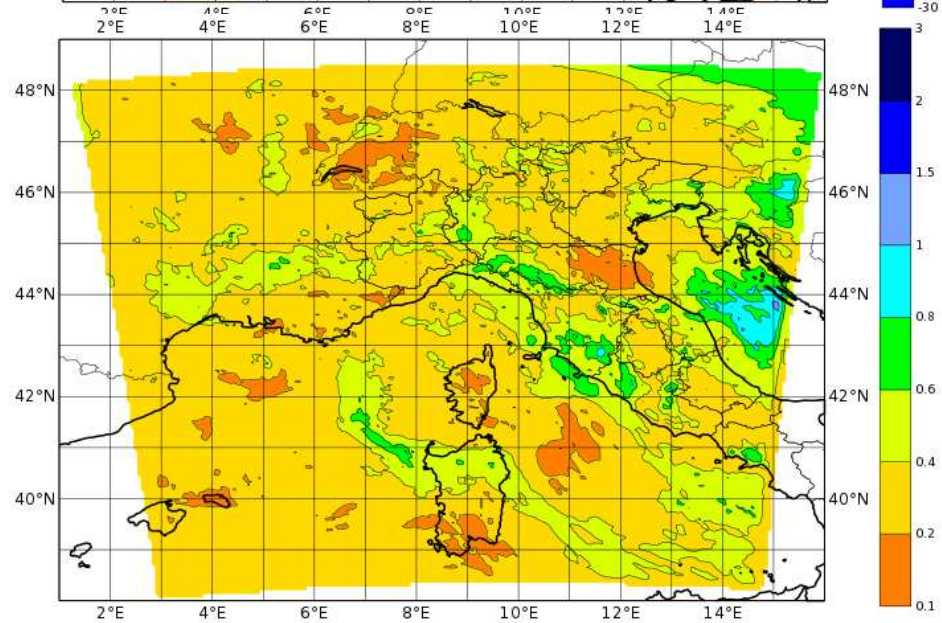

mean

spread

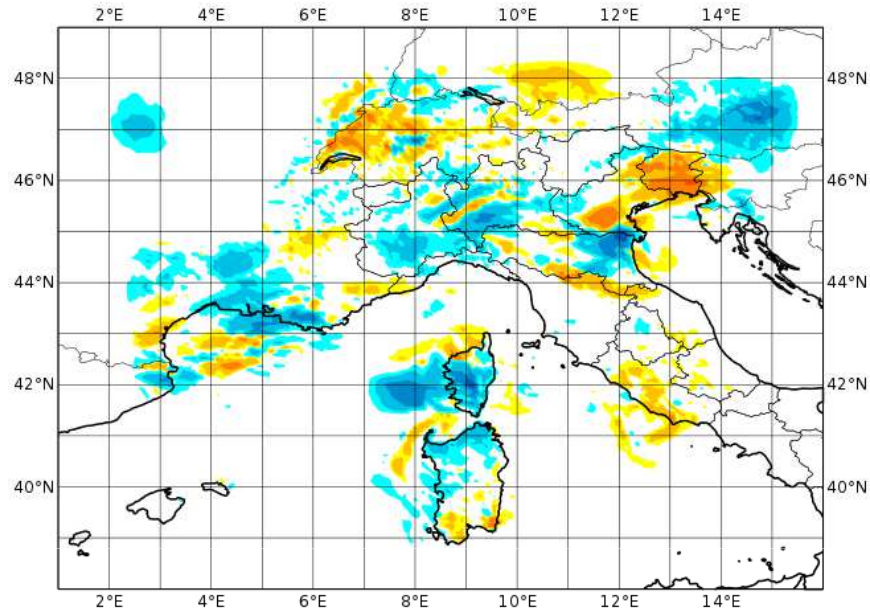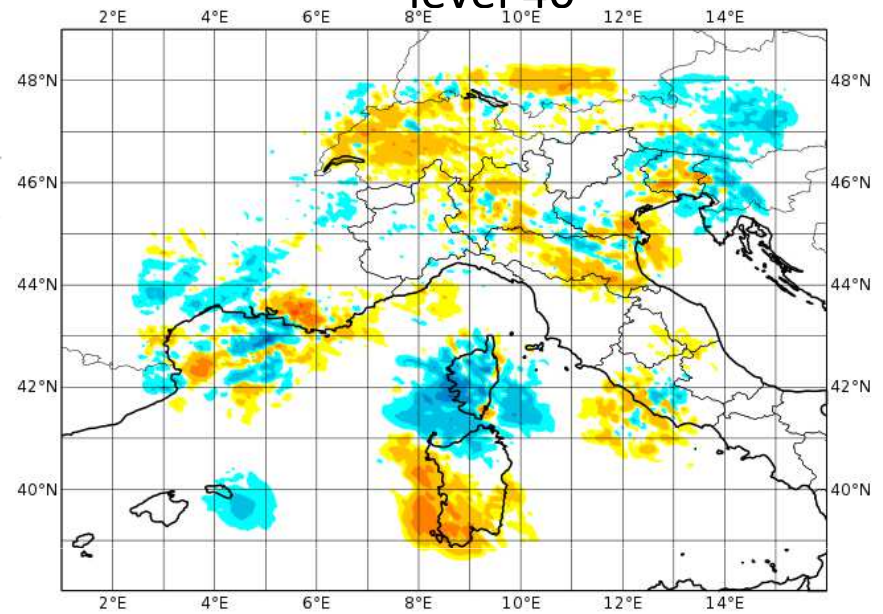# KENDA analyses
temperature level 40

KENDA analyses
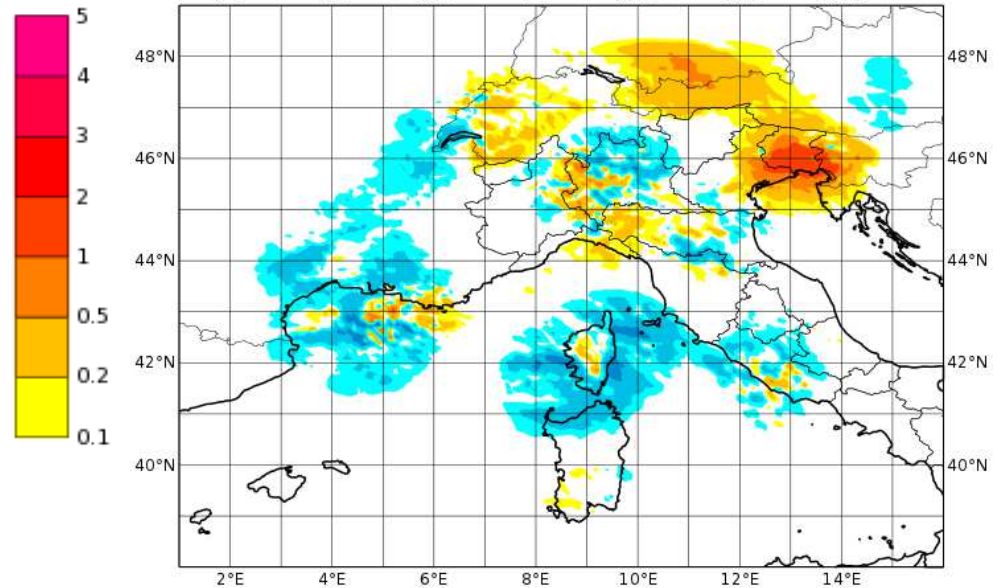temperature level 30

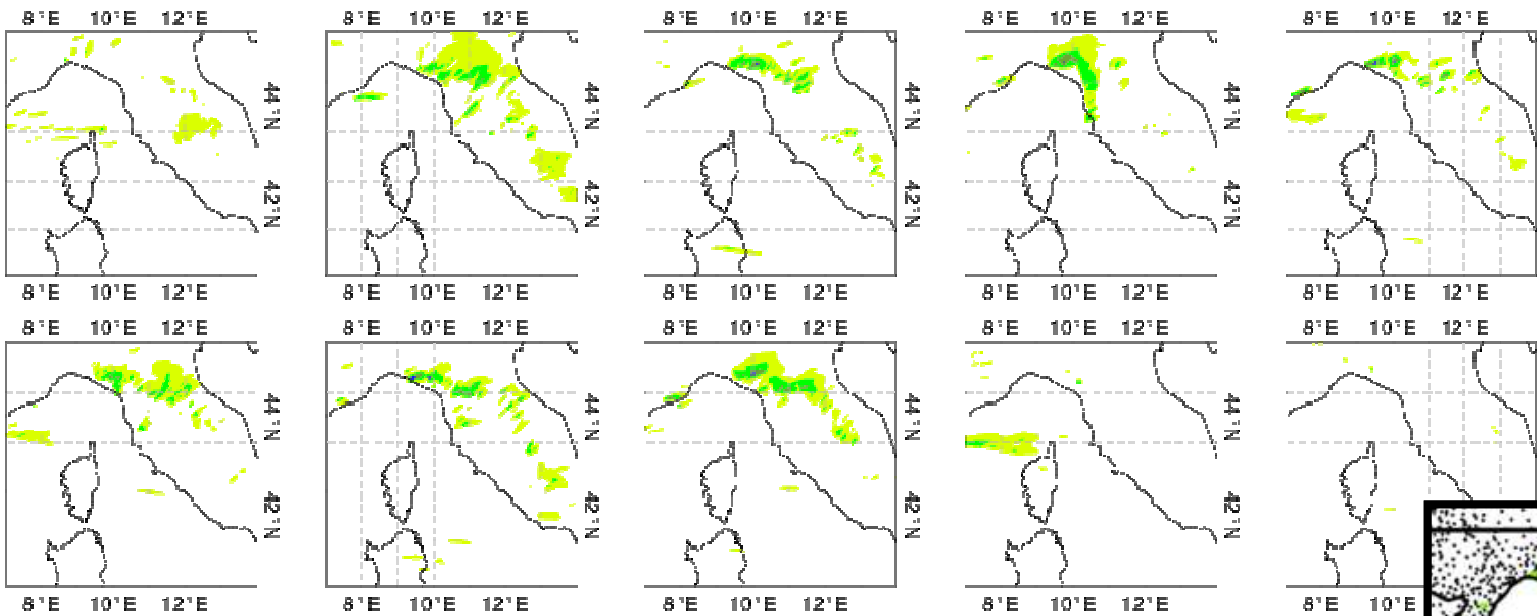# analysis – background (ens mean)

level 50

level 40

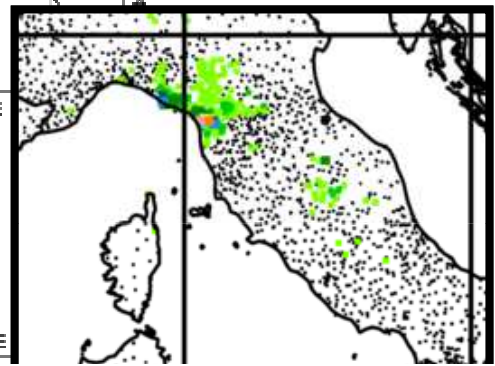## level 30
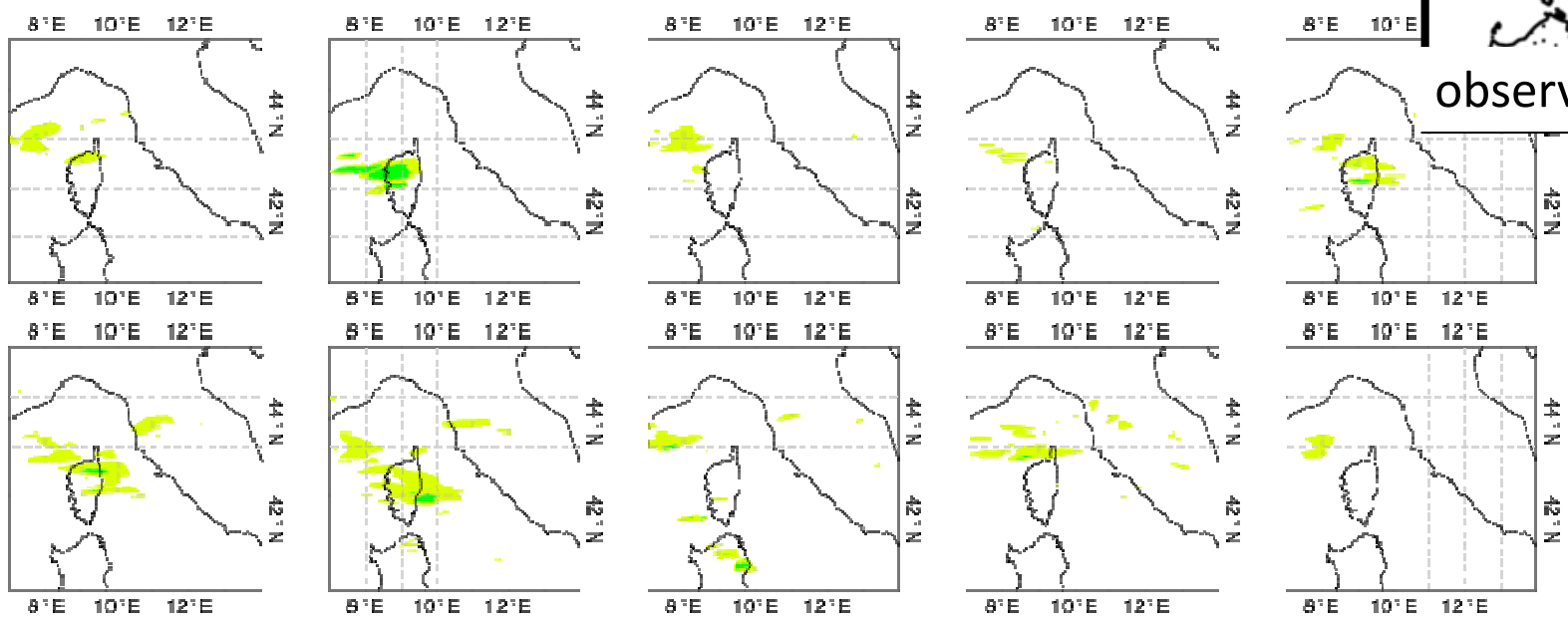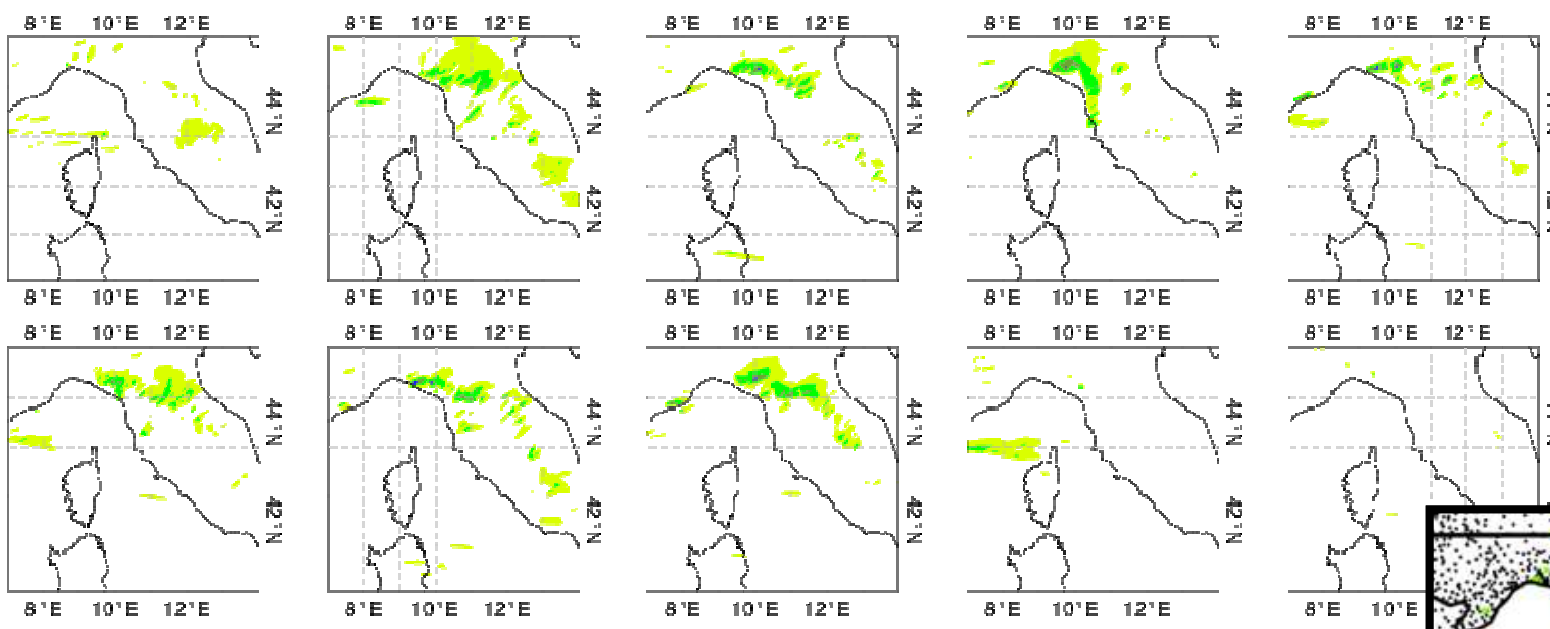
20121011
16-17 UTC
(+4-5 h fc range)

ensemble forecast with downscaled ENS analyses as ICs

ensemble forecast with kenda analyses (**10 members**) as ICs
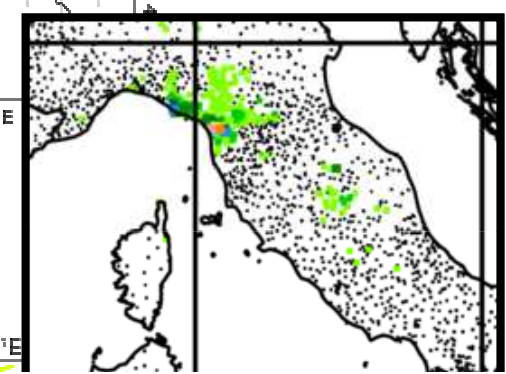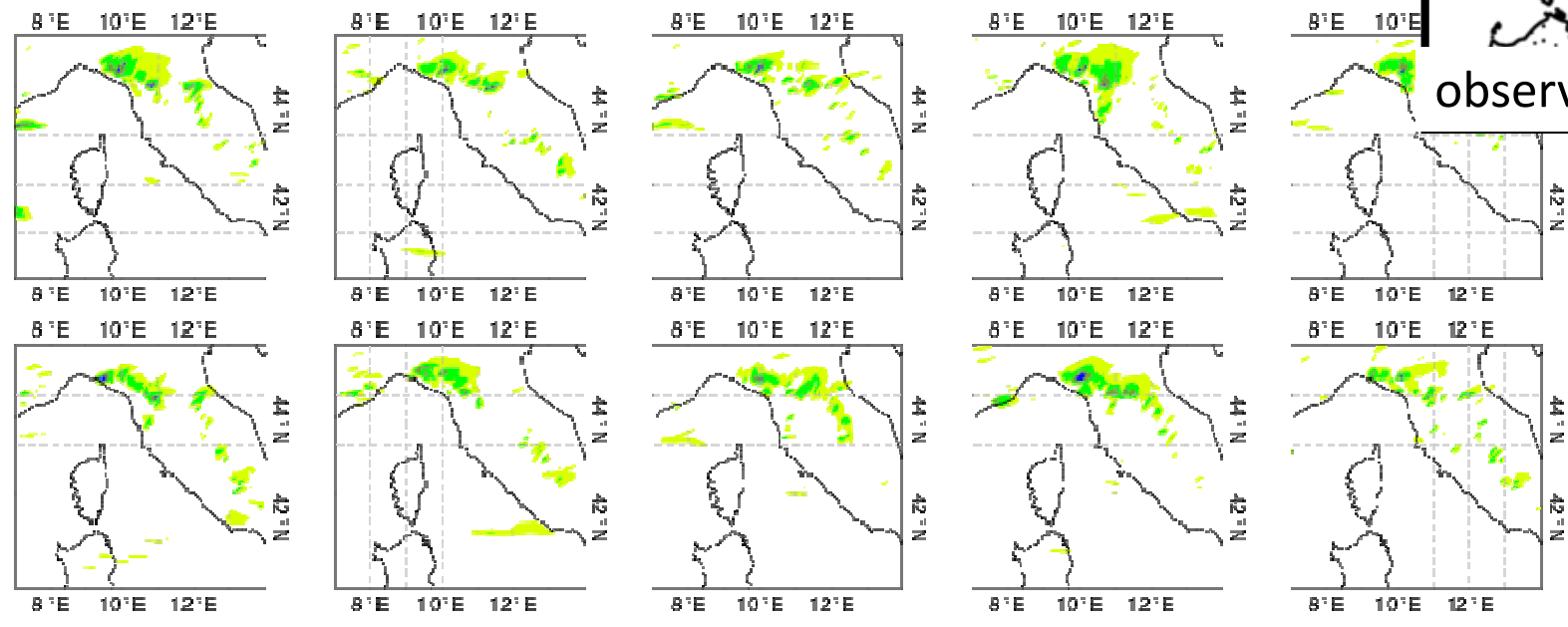
observed precip. (1h)
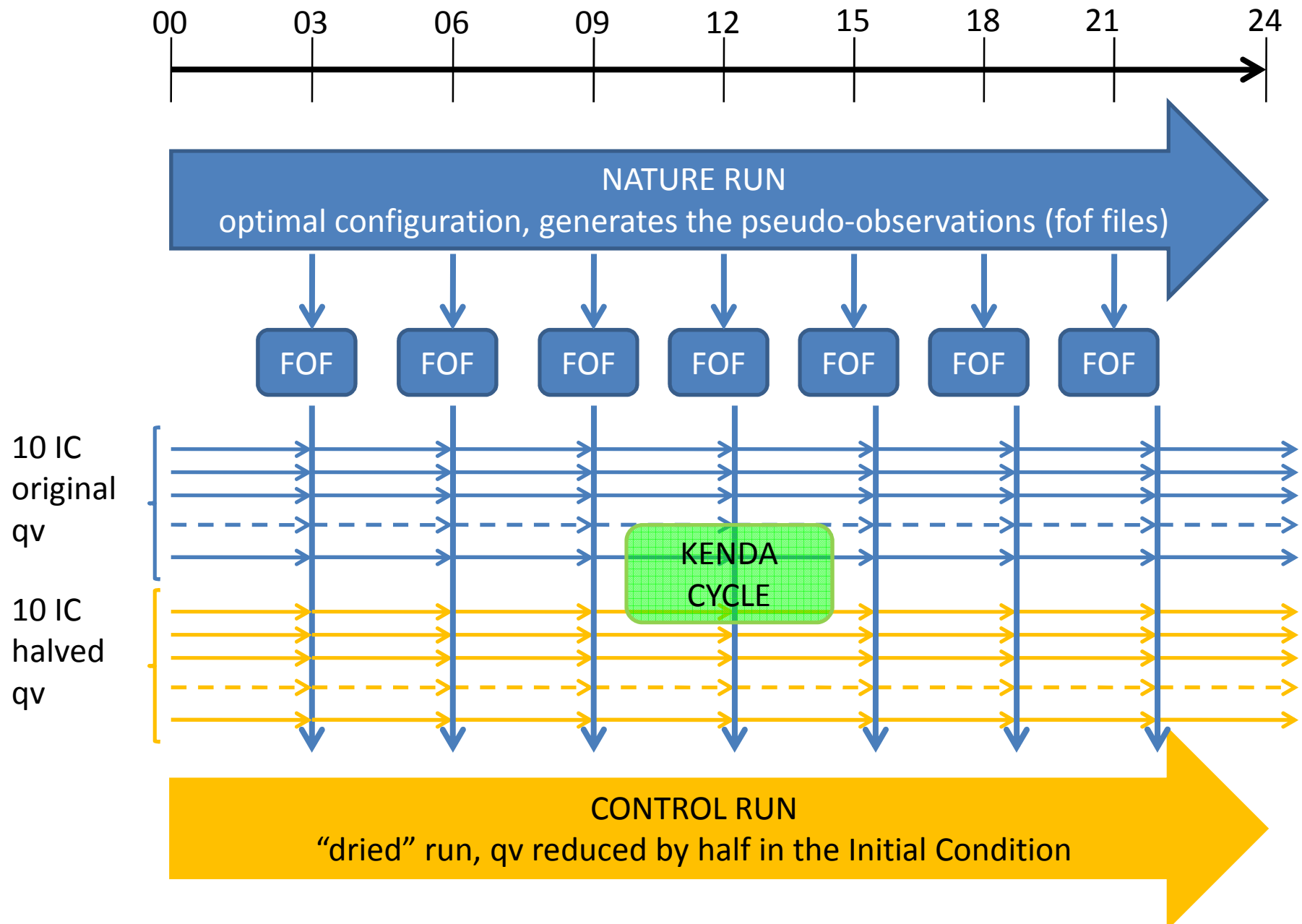
20121011
16-17 UTC
(+4-5 h fc range)

ensemble forecast with downscaled ENS analyses as ICs

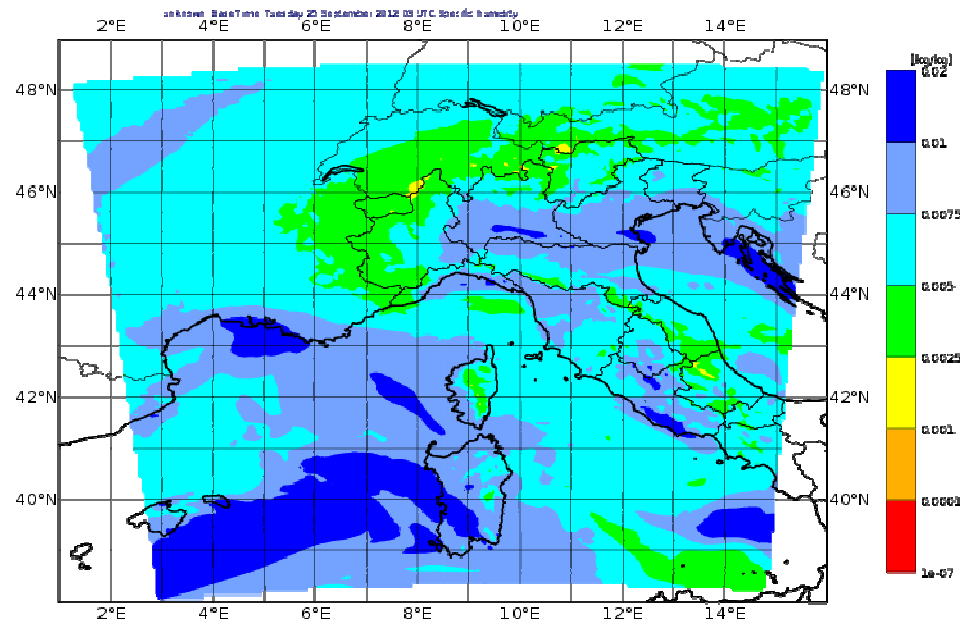ensemble forecast with kenda analyses (**20 members**) as ICs
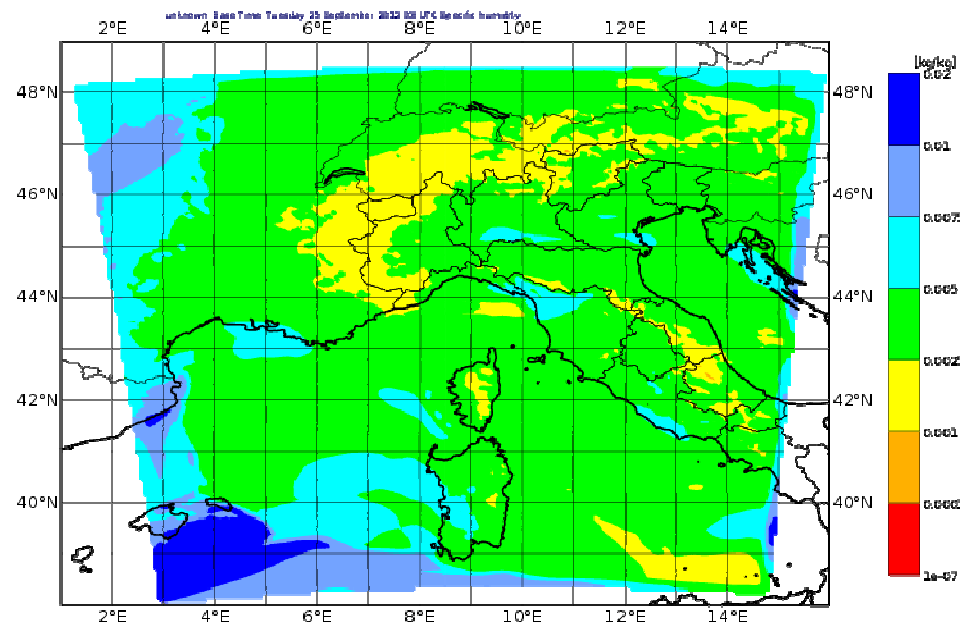
observed precip. (1h)

OSSE set-up
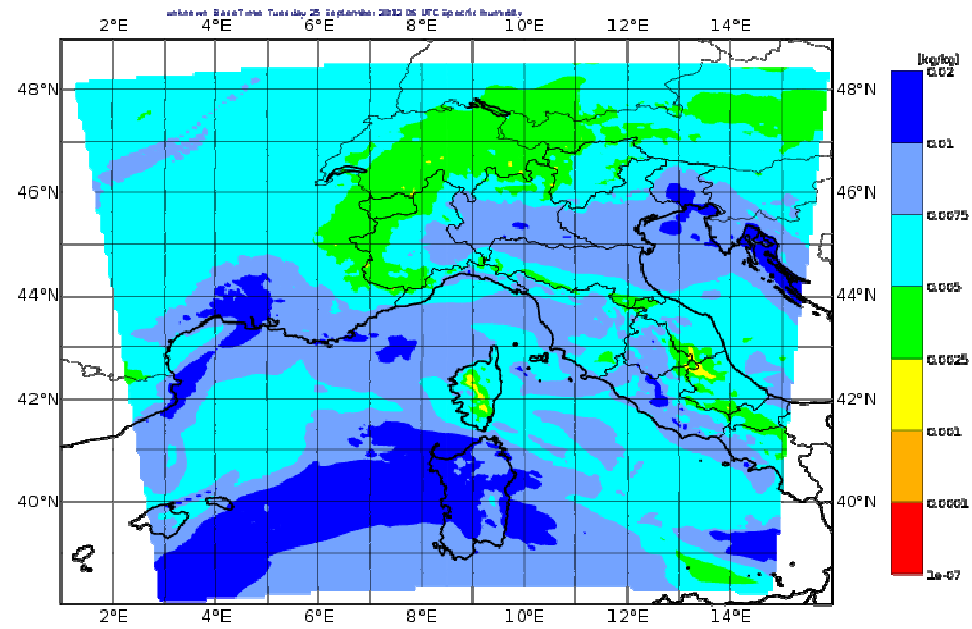
qv lev 40-41 +3h
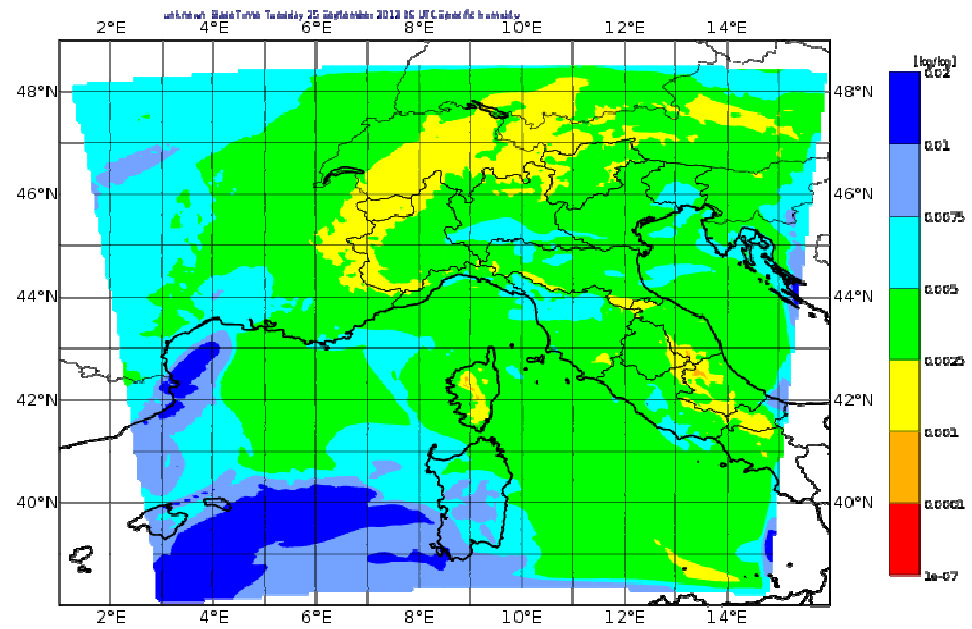
NATURE RUN

CONTROL RUN
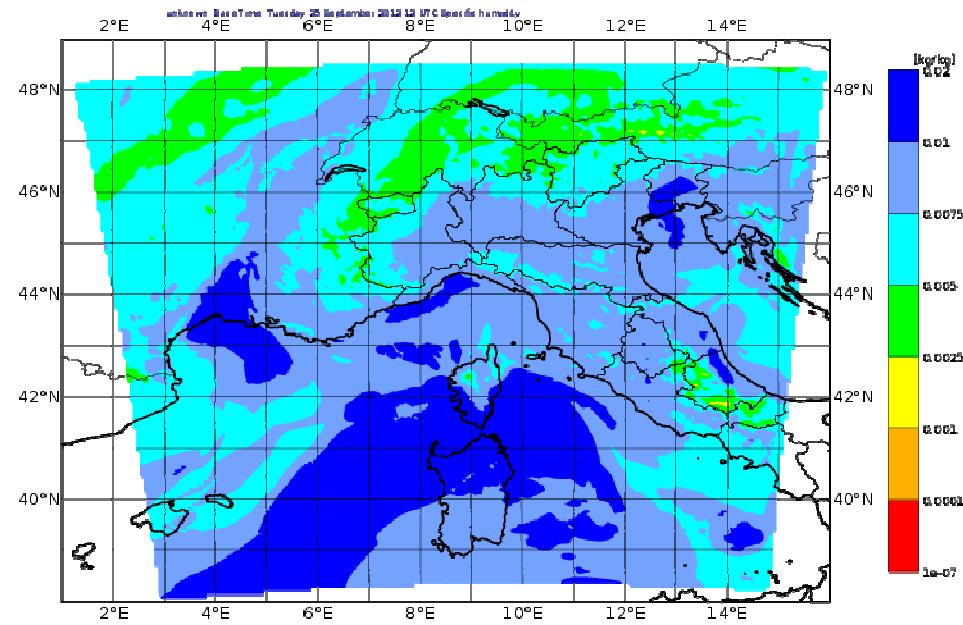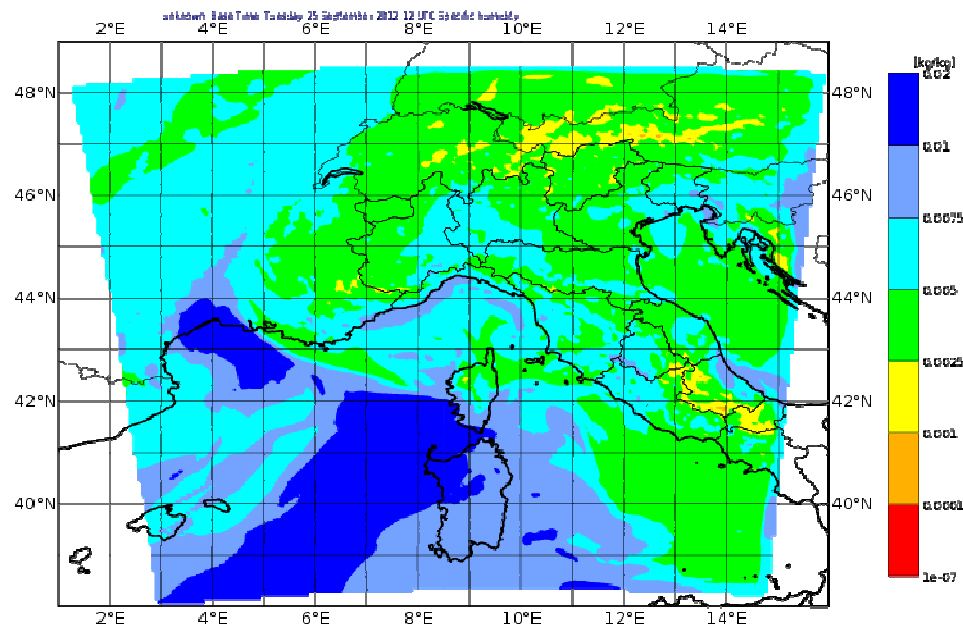
qv lev 40-41 +6h

NATURE RUN

CONTROL RUN

qv lev 40-41 +12h

NATURE RUN

CONTROL RUN

Concluding remarks and future plans

- ICs derived from KENDA are tested for COSMO-IT-EPS
- Analysis perturbations have small scale structure
- The spread at the surface is too low (soil state perturbation needed)
- To be studied with the OSSE:
  - Impact of the observations
  - Localisation
  - Ensemble spread (inflation)
  - Number of members