



Status of the work on KENDA at Arpae SIMC

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Arpae SIMC

KENDA operational @ Arpae SIMC (CINECA)

- implemented on a Linux cluster at CINECA (516 nodes)
- 3 hourly cycles (soon going to 1-hourly cycles)
- COSMO run at 2.2 km, 65 levels, version 5.04d
- 20 members (soon going to 40)
- BCs from LETKF ensemble of COMET (3/6 or 6/9 h older)
- deterministic member: BCs from COSMO-5M (3-12h older)
- LHN on rain rate on Italian radar network
- SM and SST perturbation
- adap_loc (n=100)
- adap_rho=F adap_R=T; + RTPP
- ICs to COSMO-2I RUC run +18 h (8 runs per day)
- ICs to COSMO-2I long (+48h) (00 and 12 UTC)
- ICs to COSMO-IT-EPS (+48h) (00 UTC) (pre-ope)





KENDA (Kilometer-scale ENsemble Data Assimilation)



KENDA experimental (CINECA)

- 1-hourly cycles
- COSMO run at 2.2 km, 65 levels, version 5.04e
- 20 members
- BCs from LETKF ensemble of COMET
- deterministic member: BCs from COSMO-5M
- LHN on rain rate rom Italian radar network
- SM and SST perturbation
- Ih=80 lv_surf=0.075 lv_top=0.5 (adap_loc=F)
- radar: h_loc=16 v_loc=0.3
- adap_rho=T + RTPS





KENDA (Kilometer-scale ENsemble Data Assimilation)



Experiments: set-up of the hourly cycle

- climatological B-matrix
- assimilation of all observations (conv + radar) only in the 15 minutes closest to the analysis time
- hloc vloc for radar





CASE STUDY

03/02/2017 06 UTC -07/02/2017 00 UTC





Some statistical outcomes



Assimilated observations ~3 10⁶ Rejected observations ~0.0006%





Verification of forecasted rainfall fields during the assimilation cycle













3-hourly accumulated precipitation – 03/02/2017 21 UTC





3-hourly accumulated precipitation – 05/02/2017 12 UTC



Boxplots of 3-hourly accumulated precipitation over the event







Evaluation of the precipitations with SAL



Experiments: shorter assimilation cycles

• 60 min - 30 min - 15 min







Experiments: shorter assimilation cycles







Experiments: shorter assimilation cycles







KENDA ICs for COSMO-IT-EPS ensemble

- The analyses obtained with KENDA are used as Initial Conditions for the COSMO-IT-EPS ensemble (2.2 km over Italy)
- Experiments have been performed at ECMWF





Hourly precipitation, area average (land only)

CTRL

CTRL + IC from LETKF





10 October 2015



Spectra of the perturbations (T)

CTRL

CTRL + IC from LETKF





28 October 2015





Spectra of the perturbations (T)

Concluding remarks

- If the radar reflectivity underestimates the rain, this has an effect on the assimilation
- Difficult to select the setup on the basis of few experiments (inflation, localisation, ...)
- Suggestion of a good impact of considering only the observations of the last 15 min
- COSMO software?



