

**Limited-area ensemble activities at the**  

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**Hydro-Meteorological service of Emilia-Romagna:**  
**the COSMO-LEPS system**

**Andrea Montani,**

**C. Marsigli and T. Paccagnella**

ARPA-SIMC

*HydroMeteoClimate Service of Emilia-Romagna, Bologna, Italy*

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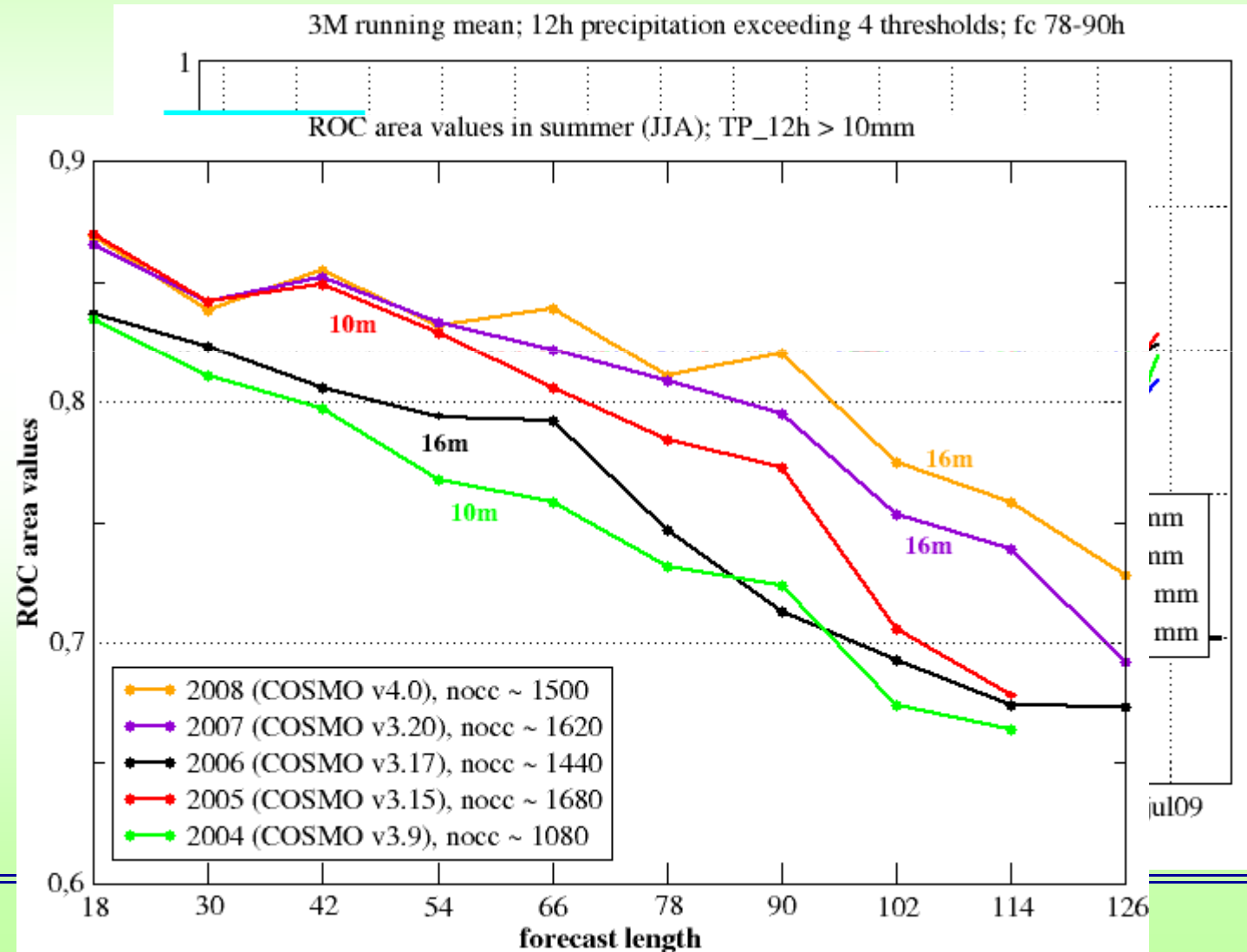


# ROC area: time series + seasonal scores

- Area under the curve in the HIT rate vs FAR diagram; the higher, the better ...
- Performance of the system also assessed for the **last 5 summers** (JJA), considering the "event" 10 mm/12h.

- Poor performance of the system in Spring and Summer 2006, despite upgrades.
- Good performance during DOP 2007 and some positive impact after 2007 system upgrades.
- Scores in 2009 similar to those of last year (worsening for the highest threshold).

- For seasonal scores, take into account the different statistics for each season (JJA 2004 less rainy than the others).
- Best performance for JJA 2008, more evident for longer ranges.



## Present activity

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1) Implementation of COSMO-LEPS at 7 km



2) COSMO-LEPS for TIGGE-LAM



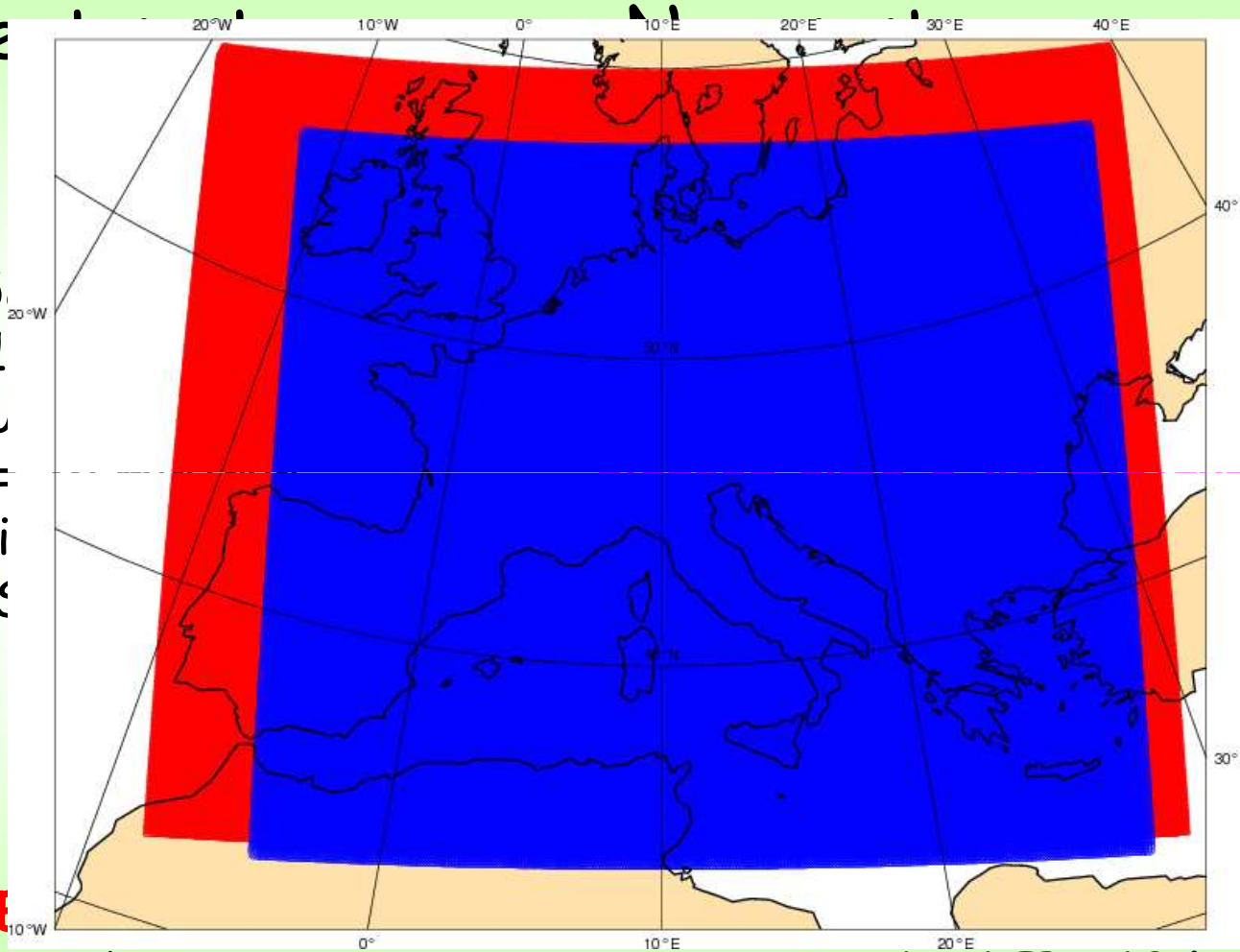
3) Multi-model clustering



# Implementation of COSMO-LEPS at 7 km

Present

$\Delta x = 10 \text{ km}$   
 $\Delta z = 40 \text{ ML}$   
 $\Delta t = 90 \text{ s}$   
 $\text{ngp} = 306 \times 25$   
 $\text{fcst range} = 1$   
 $\text{cost} = 570 \text{ BU}$   
 $\text{elapsed time} =$   
 $\text{initial condi}$   
 $\text{from EPS}$



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2009

**COSMO-LEPS**  
(no merging yet)

**COSMO-LEPS 10 km**  
**COSMO-LEPS 7 km**

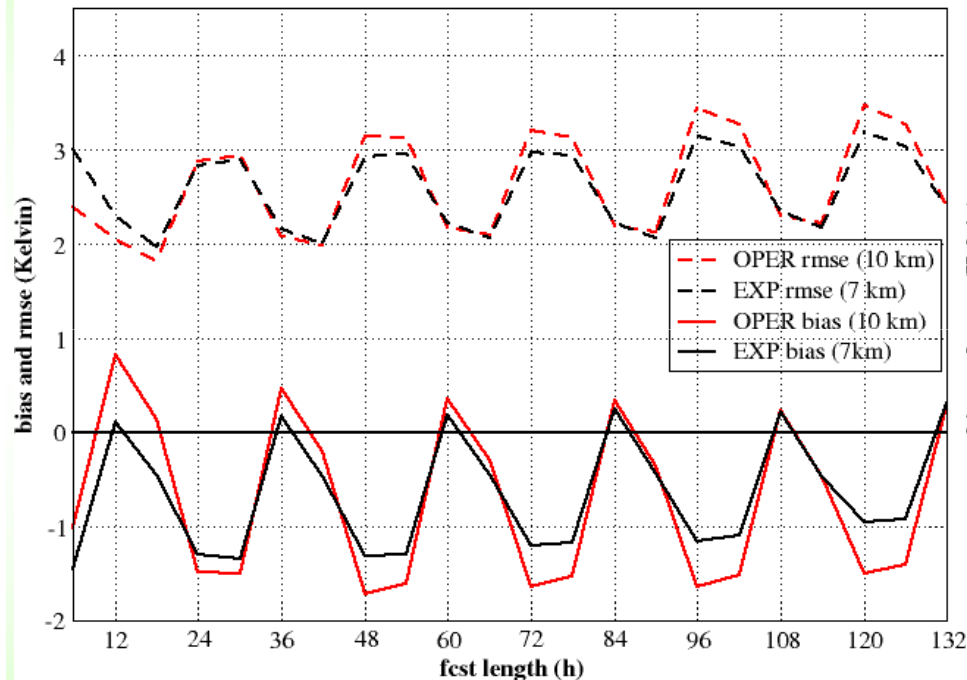


# Bias and rmse of T2M Ensemble Mean

- Consider bias (the closer to zero, the better) and rmse (the lower the better) **for June 2009**.
- T2m forecasts are corrected with height.

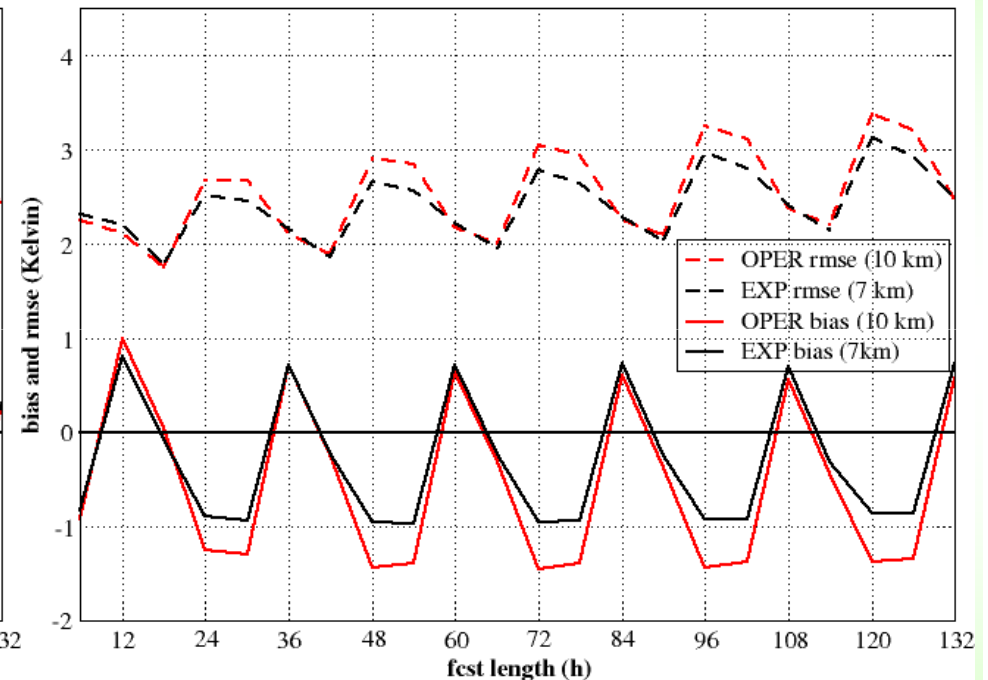
## MAPDOM

period: June 2009; ~ 450 synop; red: OPER (10 km), black: EXP (7km); corrq=TRUE



## FULLDOM

period: June 2009; ~ 1400 synop; red: OPER (10 km), black: EXP (7km); corrq=TRUE



- **Bias closer to zero and lower rmse for the 7-km suite.**
- **Improvement** is not "massive", but **detectable** for all forecast ranges, especially for **day-time** verification.
- For both models, lower rmse over the FULL domain in comparison with the MAP D-PHASE domain.
- The signal is stable (similar scores for 1-month or 3-month verification).

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**Thank you !**