# Operational use of Kenda@2.2 km at Comet: investigation of a case study

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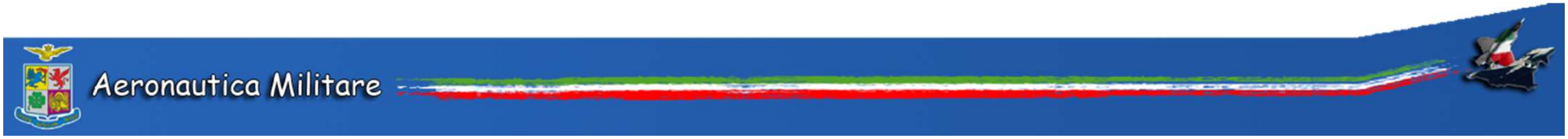
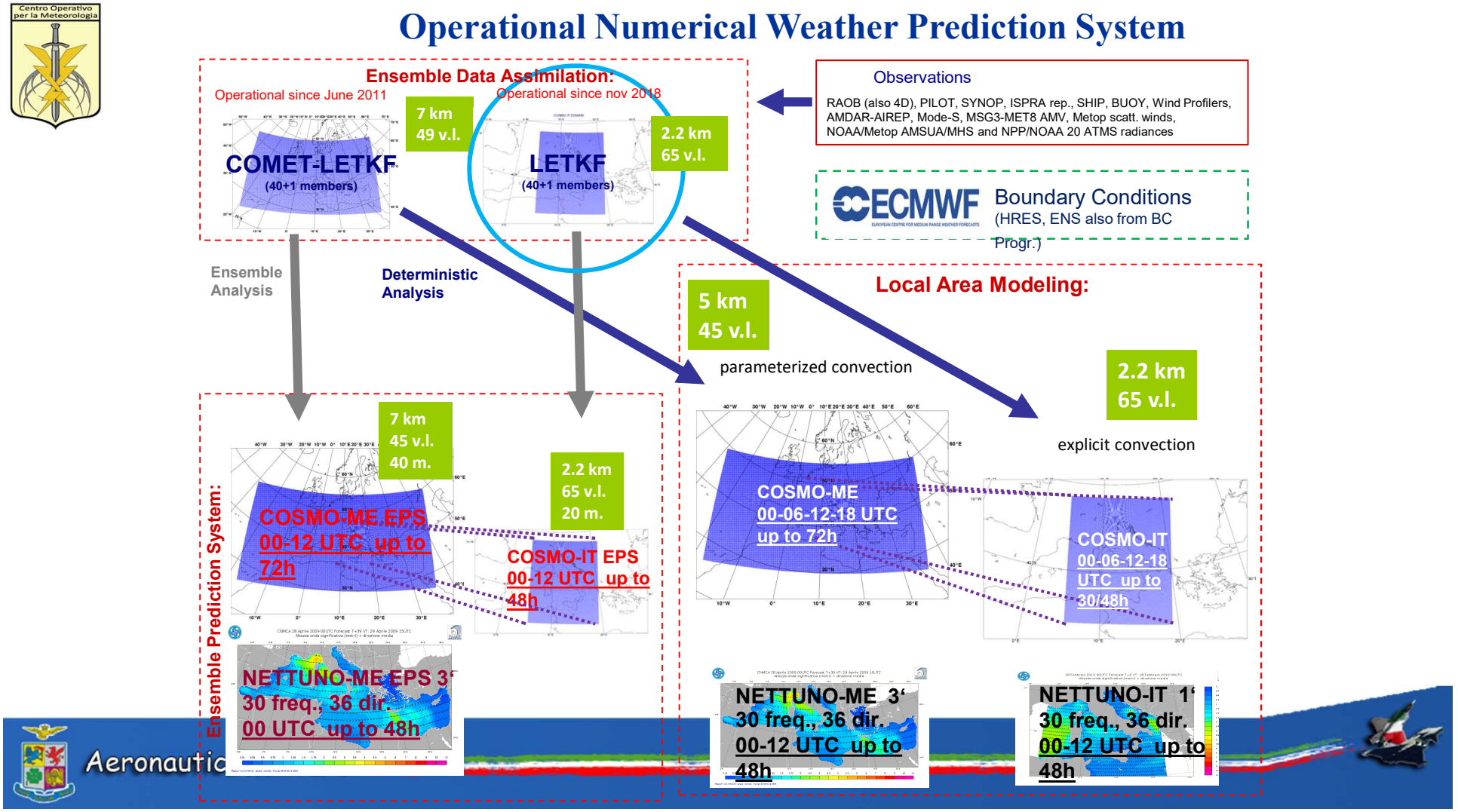


# Operational Numerical Weather Prediction System



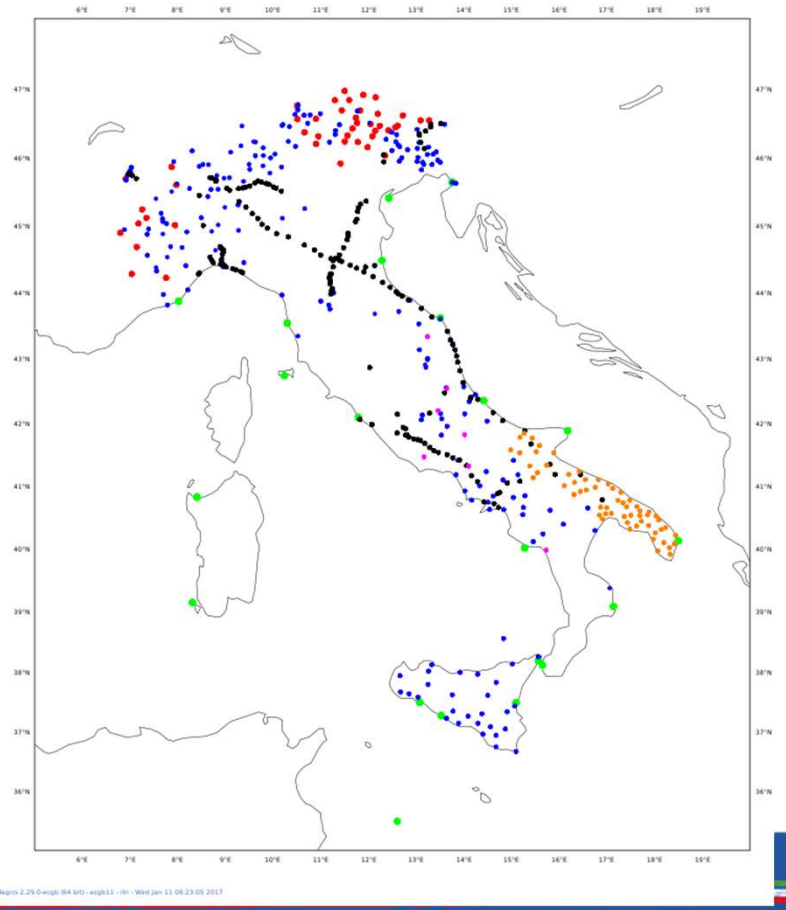
- COSMO-IT is operational with KENDA analysis (previously nudging) since oct 2018
- Namelist settings from DWD
- Ingested obs: RAOB (also 4D), PILOT, SYNOP, ISPRA rep., SHIP, BUOY, Wind Profilers, AMDAR-AIREP, Mode-S, MSG3-MET8 AMV, Metop scatt. winds, NOAA/Metop AMSUA/MHS and NPP/NOAA 20 ATMS radiances
- DA cycle : 3 hours

## Activities performed during last period:

- Introduction of new observations (ISPRA) (see next 2 slide)
- Daily investigation of performances of COSMO-IT (subjective verification from operational forecasters through comparison with COSMO-ME/ECMWF)
- In case of failure we try to evaluate if the «problem» is the analysis or the model
- In case of analysis problem we try to investigate

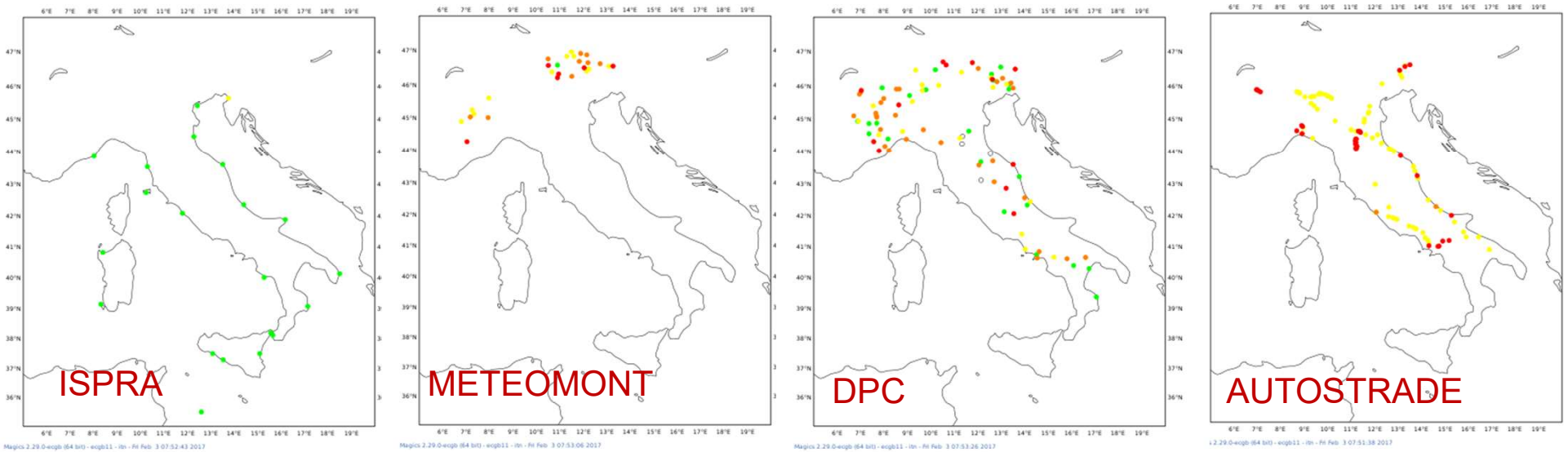
# Monitoring of new observations *IT national network*

**ISPRA**
**METEOMONT**
**DPC**
**AUTOSTRADE**
**ASSOCODIPUGLIA**
**CFS**



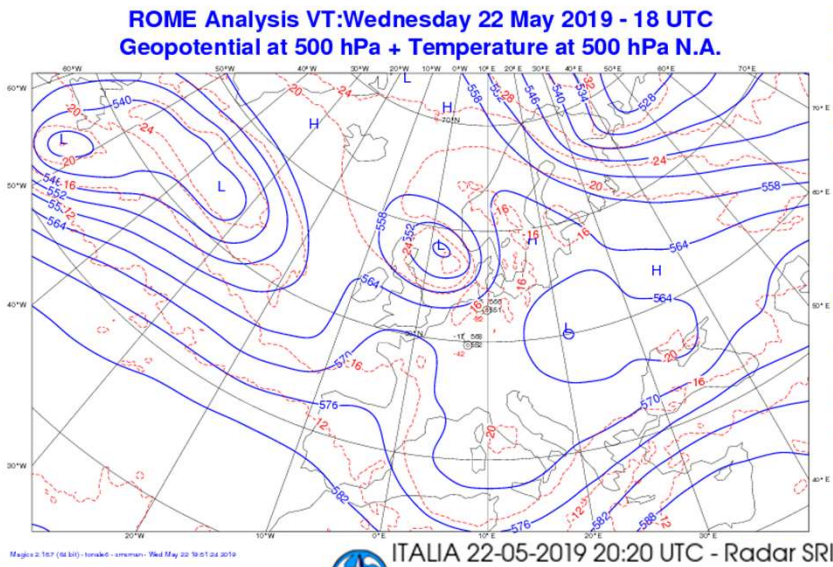
# Monitoring of new observations (obs incr stats)

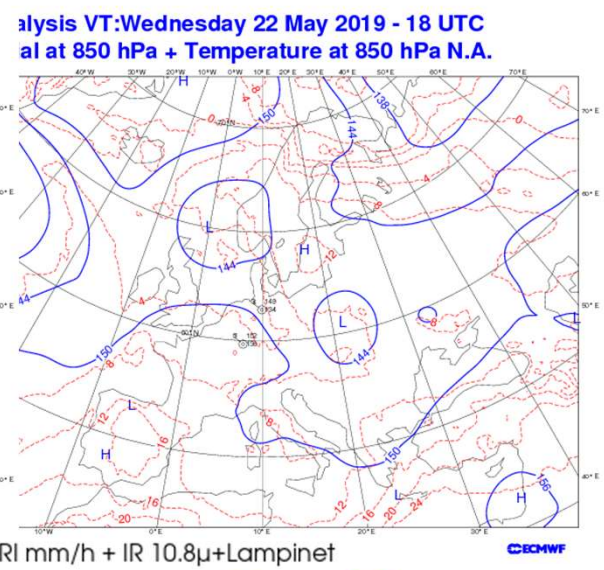
## Surface pressure results (similar values for sfc wind)

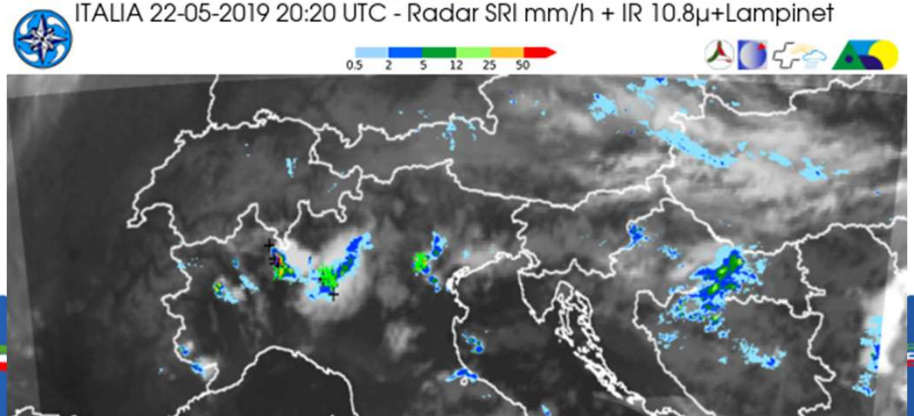



abs(bias) <= 1.5 && stdv <=1
(abs(bias) <= 2.5 && abs(bias) >1.5 && stdv <= 2) || ( stdv <= 2 && stdv > 1 && abs(bias) <= 2.5 )
(abs(bias) <= 1.5 && stdv > 2) || (stdv <= 1 && abs(bias) > 2.5)
abs(bias) > 2.5 && stdv > 2

# Investigation of a case study : 22th may 2019



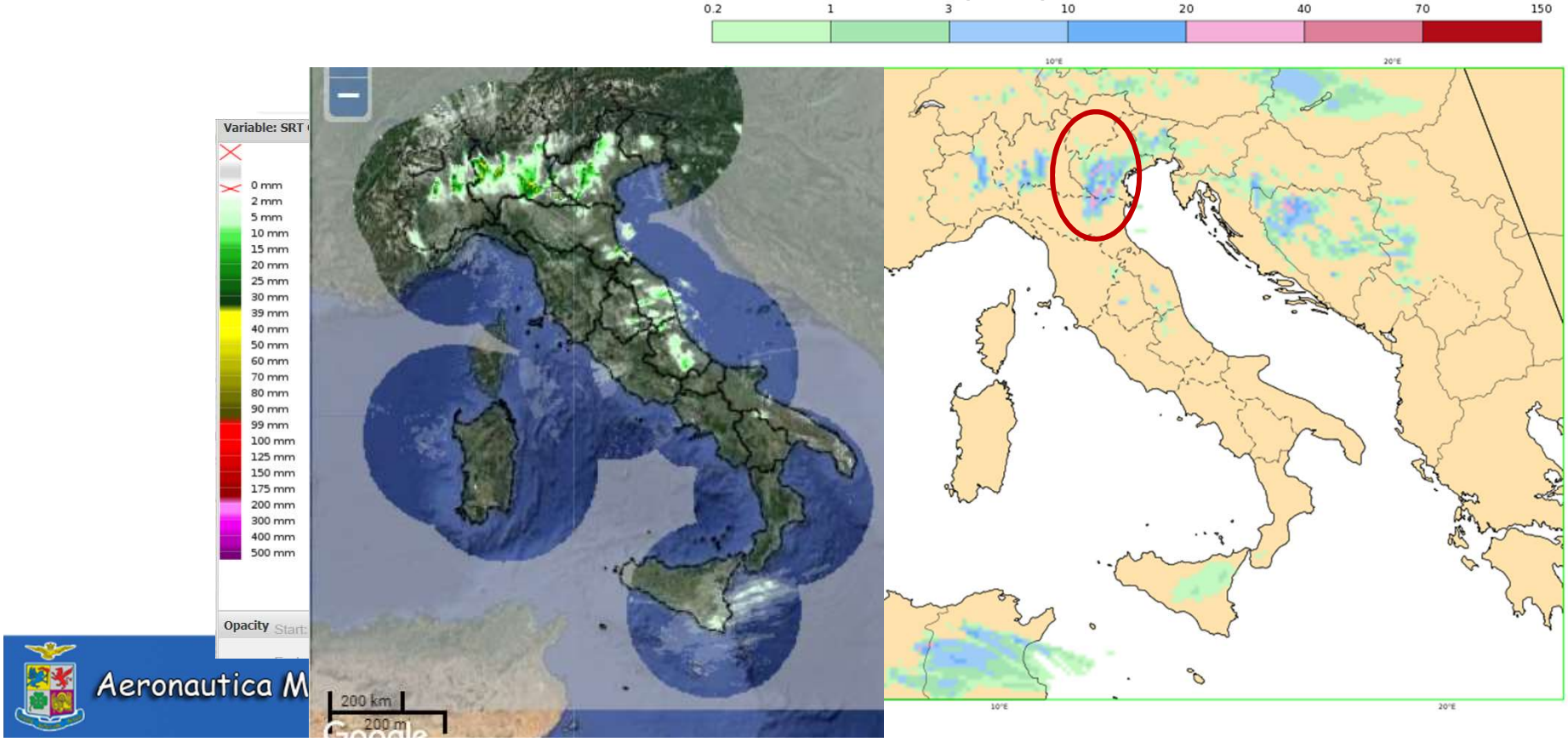



# Importance of Data Assimilation: 00 UTC run

Radar National Mosaic SRT
6h cum.: 20190523 00 UTC

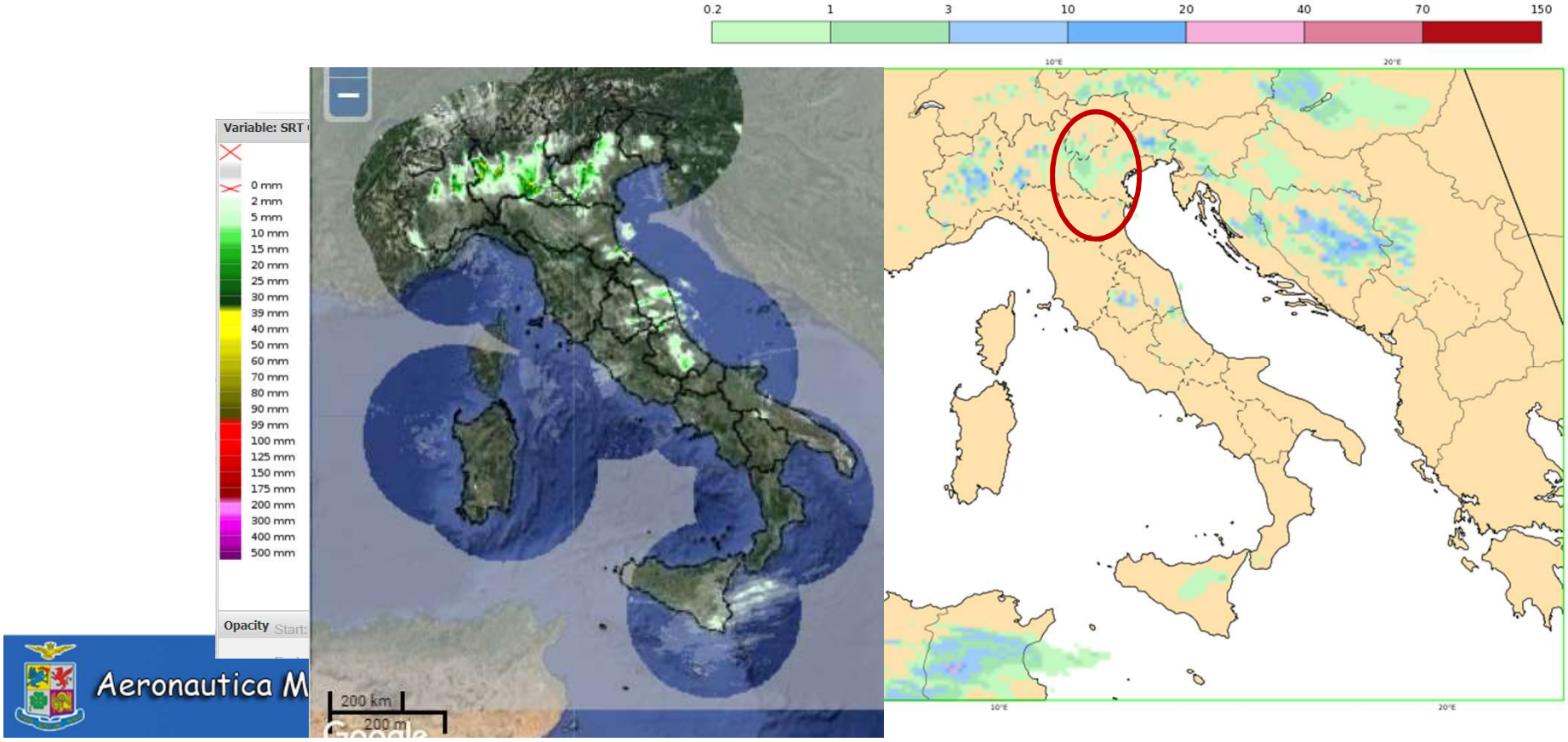
COSMO-IT 20190522 00 UTC – T+24h
6h cumulated precipitation



# Importance of Data Assimilation: 06 UTC run

Radar National Mosaic SRT
6h cum.: 20190523 00 UTC

COSMO-IT 20190522 06 UTC – T+18h
6h cumulated precipitation



# Wind profilers

Some of them with a very high observation frequency (10-15 min)!

Since KENDA is typically used with a 1-hourly DA cycle, temporal thinning has not been an issue

Probable overfitting in the 3h time window.

| Station name | WMO code | lat | lon | time freq. |
|---|---|---|---|---|
| WEISSFLUHGIPFEL (CH) | 06776 | 46.84 | 9.79 | **15** |
| SCHAFFHAUSEN (CH) | 06620 | 47.69 | 8.62 | **30** |
| ALBIS (CH) | 06661 | 47.29 | 8.51 | **15** |
| PATSCHERKOFEL (A) | 11126 | 47.21 | 11.46 | **10** |
| GRENCHEN (CH) | 06632 | 47.18 | 7.42 | **30** |
| ZIRBITZKOGEL (A) | 11164 | 47.07 | 14.56 | **10** |
| PLAINE MORTE (CH) | 06726 | 46.37 | 7.49 | **15** |
| TORINO | 16300 | 45.40 | 7.40 | **30** |

## «First aid» approach:

Thinning (maintaining one profiler)
(safe solution: we apply it also to synop, usually 1 hour temporal resolution)

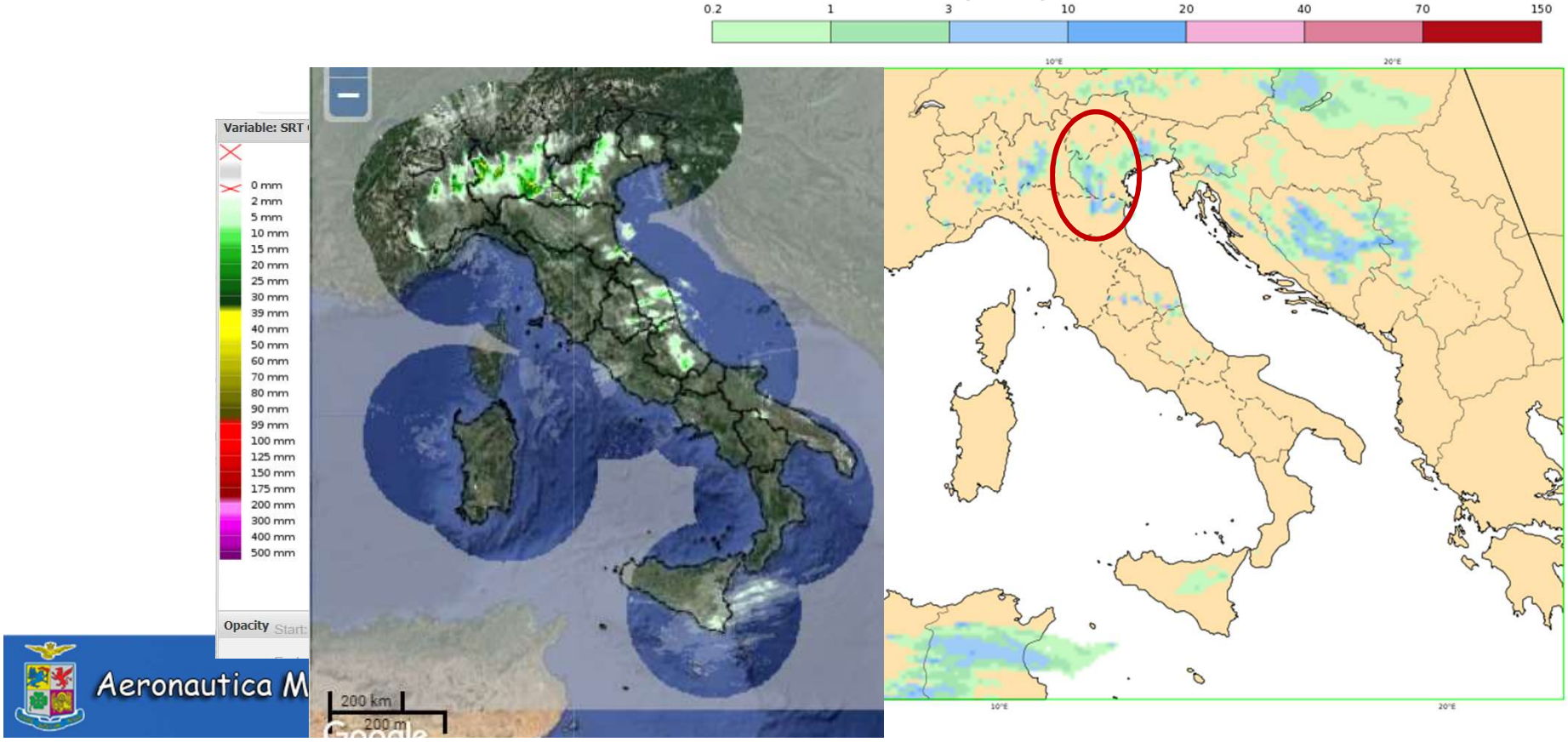
## Best solution:

Temporal localization (as the spatial one) : increasing the obs error of the more distant (in time) wind profiler reports and only give full weight to the closest report to the analysis time

# Importance of Data Assimilation: fixed 06 UTC run

Radar National Mosaic SRT
6h cum.: 20190523 00 UTC

COSMO-IT 20190522 06 UTC – T+18h
6h cumulated precipitation



# Operational use of Kenda at Comet: future plans

- Merge of wso assimilation into last version of kenda

  (Valerio should be re-introduced in the group)

- Merge of wso obs treatment in last version of MEC

  CDF method (model dependent,coefficients estimated with cosmo-me) and normalization method (more general) and both implemented in a local repository of MEC

- Assimilation of local observation (from IT national network, synop-like treatment)
- LHN (need some «pre-processing» of italian national mosaic radar data)
- 1 hour assimilation windows