# The Italian Air Force Met. Service Operational NWP system

## COMET - Italian Air Force Operational Center for Meteorology, Pratica di Mare, Rome - Italy

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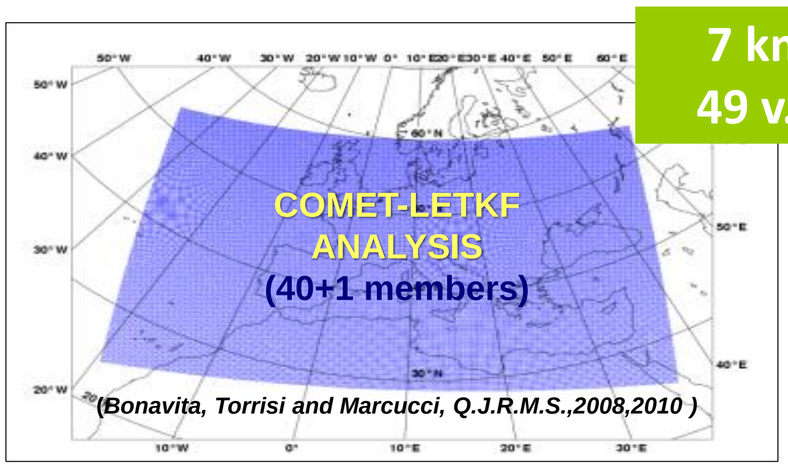
## Observations / BC

RAOB (also 4D), PILOT, SYNOP, ISPRA rep., SHIP, BUOY, Wind Profilers, AMDAR-AIREP, Mode-S, MSG AMV, Metop scatt. winds, NOAA/Metop AMSUA/MHS and NPP/NOAA ATMS radiances

ECMWF EUROPEAN CENTRE FOR MEDIUM RANGE WEATHER FORECASTS — Boundary Conditions (HRES, ENS)

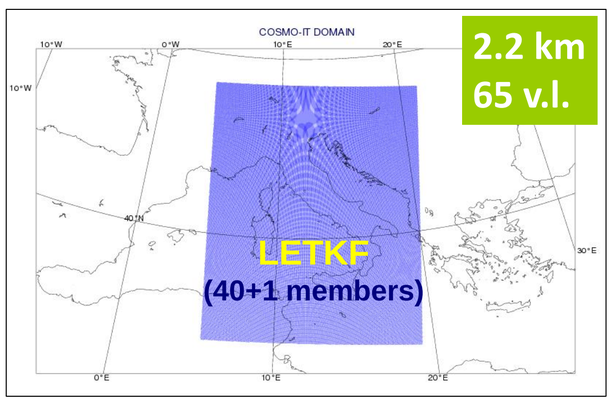
## Ensemble Data Assimilation




7 km
49 v.l.

COMET-LETKF Analysis Members

IC




2.2 km
65 v.l.

Deterministic Analysis

IC

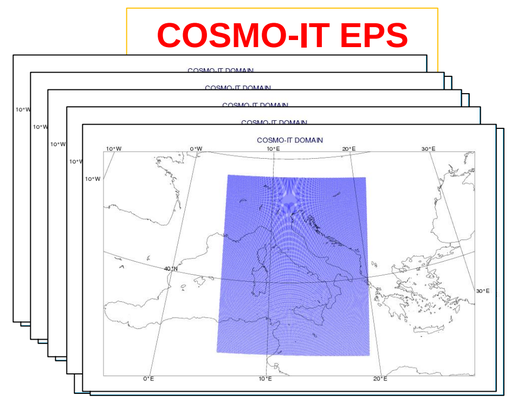
### Pre-operational convection permitting EPS (since nov 2018)

KENDA Analysis Members

IC

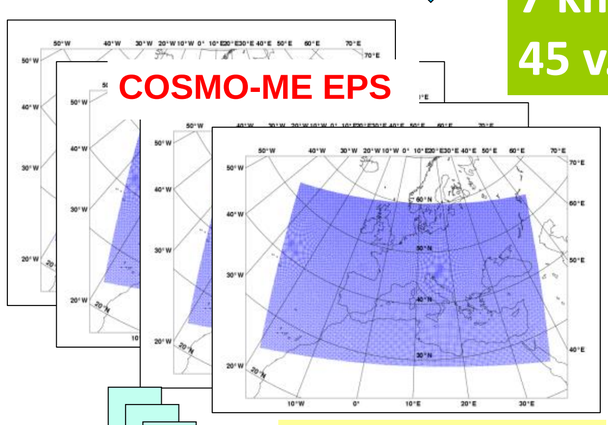
- BCs from COSMO-ME EPS members
- running on hybrid CPU/GPU hpc

COSMO-IT EPS



## Ensemble Prediction System

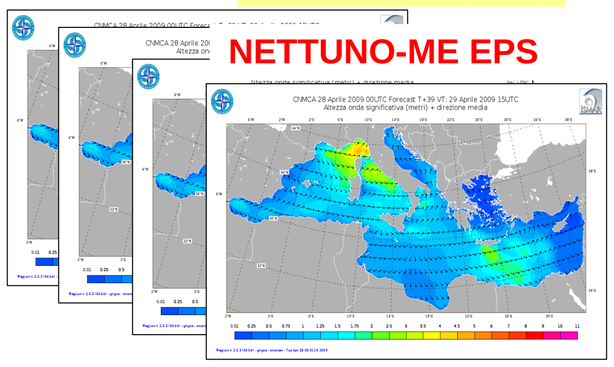
IC




7 km
45 v.l.

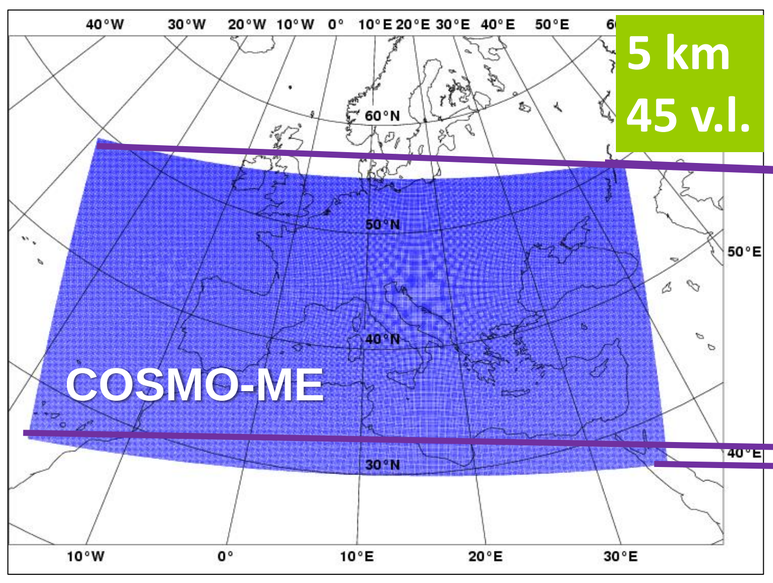
atm forcing

**COSMO-ME EPS**
- 20+1 members
- integrated up to 72h at 00UTC and 12 UTC
- Stochastic Perturbed Physics Tendency (SPPT)




**NETTUNO-EPS** Sea state probabilistic fc system
- 3' res., 30 freq., 36 dir.
-20+1 members, that are integrated at 00 UTC up to 48 hour forecast over the Mediterranean basin
- wind forcing from COSMO-ME EPS members

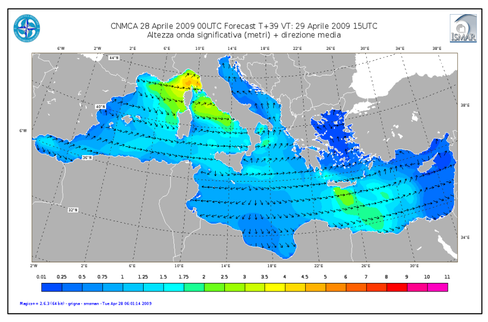
## Local Area Modeling




5 km
45 v.l.

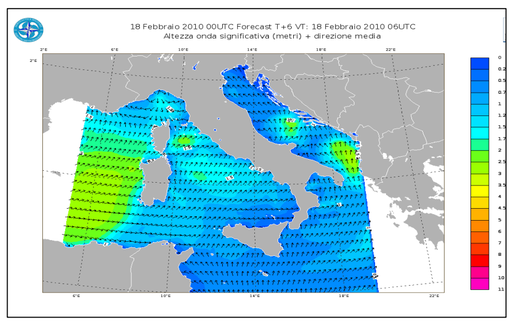
atm forcing

**COSMO-ME**
- IC from COMET-LETKF
- parameterized convection
- integrated up to 72 h at 00/06/12/18 UTC



**NETTUNO-ME** (3' res., 30 freq., 36 dir.)

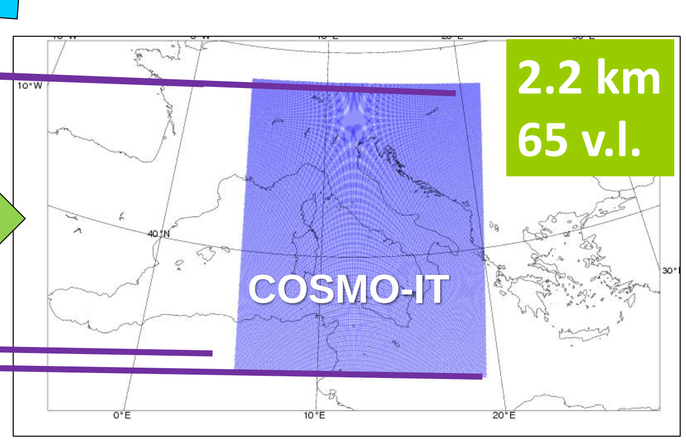
BC



**NETTUNO-IT** (1' res., 30 freq., 36 dir.)

IC

### Deterministic Analysis




2.2 km
65 v.l.

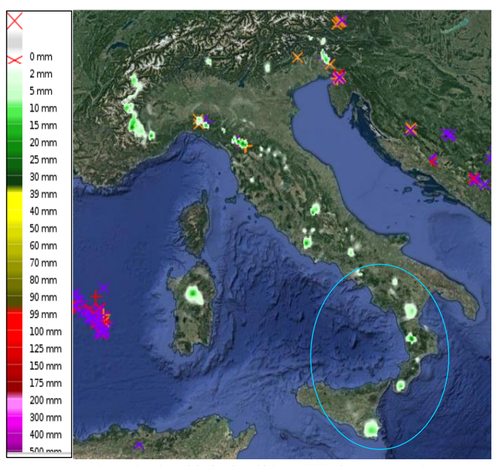
atm forcing

**COSMO-IT**
- IC from KENDA Deterministic Analysis **(operational since oct 2018)**
- only shallow convection parametrization
- integrated up to 30/48 h at 00/06/12/18 UTC

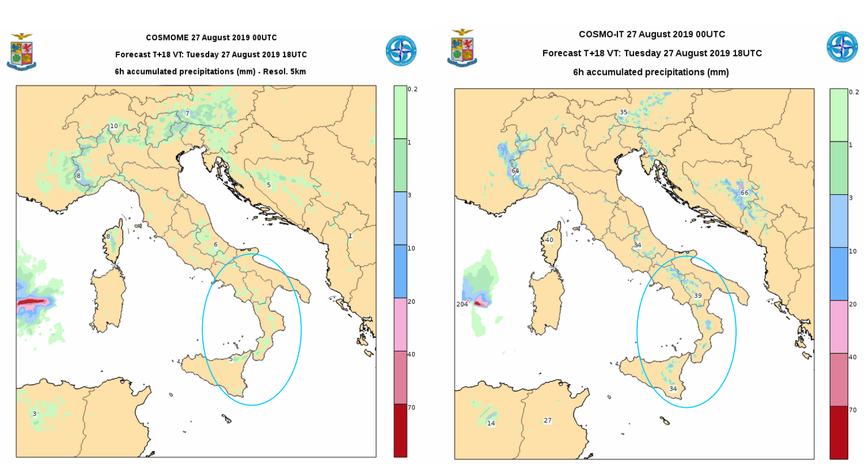
**NETTUNO**
Sea state forecast system based on the COSMO model forcing and the WAM model
*(In cooperation with ISMAR-CNR of Venice)*

## A case study: convective precipitation over southern Italy (27 August 2019, 12-18UTC)

***deterministic forecasts : COSMO-ME vs COSMO-IT***

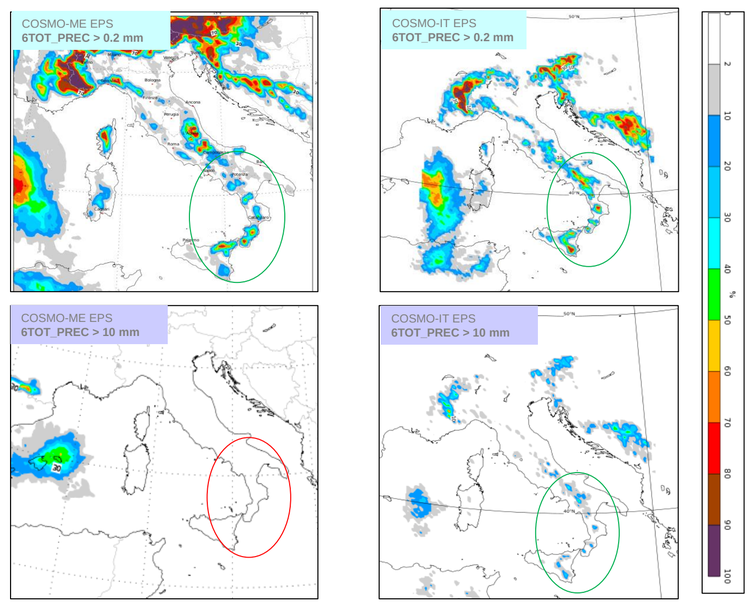



6h cumulated precipitation from high-res DPC rain gauge network




*As expected the COSMO-IT model well represents the precipitation pattern as regards the intensity and spatial/temporal localization especially over southern Italy*

***probabilistic forecasts : COSMO-ME EPS vs COSMO-IT EPS***




*COSMO-IT EPS gives a better indication of probability of 6h cumulated precipitation >10 mm*