

PP C2I...

Picking up the Pace

COSMO General Meeting
Rome, 2019

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and

the PP C2I team

12/09/2019, COSMO GM, Rome

Phase 1

- ICON Training 2018
- Installation
- Setup
- First experiments

Phase 2

- Daily forecasts
- Verification

Phase 3

- Daily forecasts
- Verification
- Data assimilation
- Forecasters' feedback



We are in the middle of phase 2, so there are some nice results to show today!

- ➔ A support framework has been established by DWD and NMA:
Mailing list: icon.support@dwd.de
FAQ: <https://code.mpimet.mpg.de/projects/iconpublic/boards>
- ➔ A 'How to Install ICON' additional course has been established by DWD and NMA during the Numerical Training Course event.
 - ➔ High interest, >30 registration for this additional course
 - ➔ Will be offered in 2020 again, hopefully with the new configure environment
- ➔ Spring ICON Developer Meeting 2020 will be integrated into ICCARUS
 - ➔ Communities can grow together, joint sessions, many advantages!
- ➔ COSMO and CLM are integrated into the future ICON workflow
- ➔ COSMO ICON-LAM Testsuite is prepared, soon to be started
- ➔ Verification guidelines are available on the PP C2I website:
 - ➔ <http://cosmo-model.org/content/tasks/priorityProjects/c2i/PP-C2I-verification.pdf>

Besides fixing technical issues that are left over, the plan for the remaining of the year is to

- ➔ Create a report on the outcome of the first experiments
- ➔ Update the ICON version to the Training Course 2019 Release
- ➔ Consolidate the namelist setup
 - ➔ The current ICON-D2 setup will be distributed
 - ➔ Every partner is asked to keep record of deviations from the ICON-D2 setup including a short reason for the deviation (e.g., better T2M scores)
- ➔ A survey to collect forecasters' feedback is currently being prepared by WG4

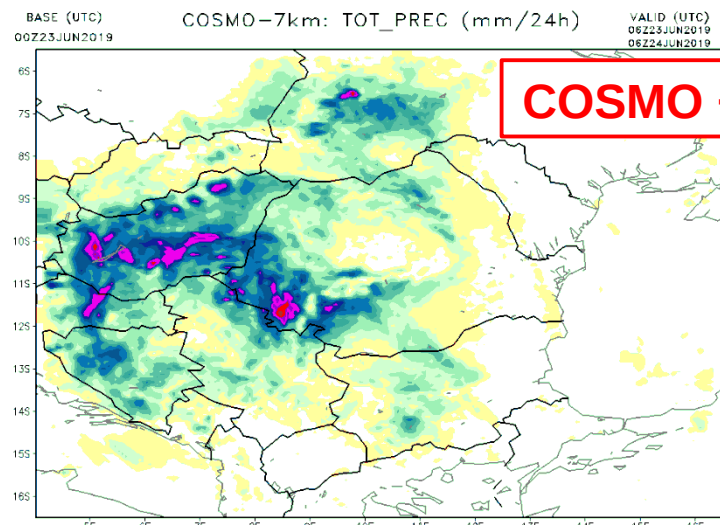
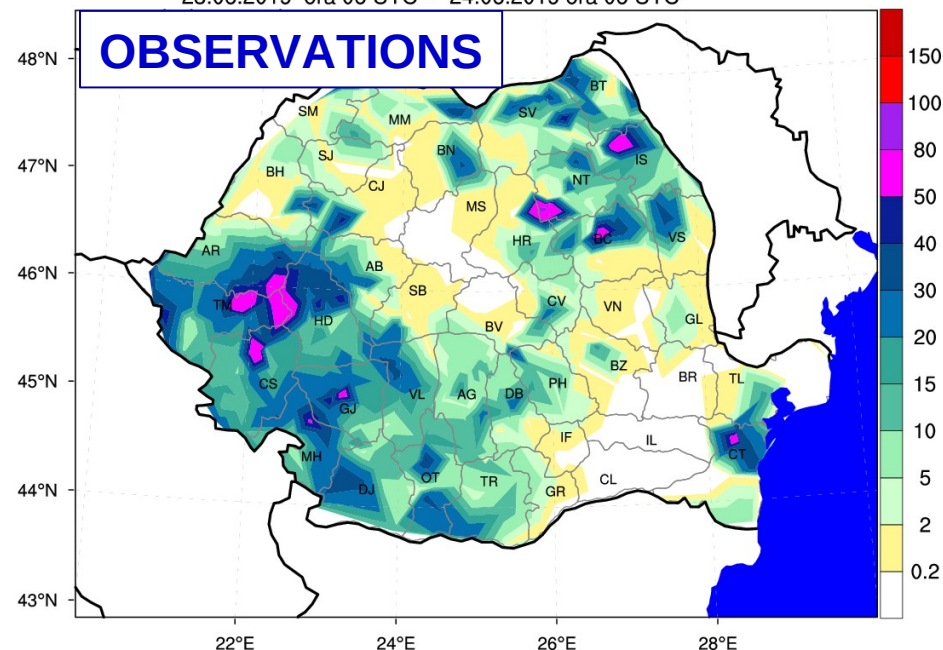
Status at NMA, Romania

- ➔ Set-up of ICON-LAM for Romanian territory at 7 km resolution
- ➔ Initial and LBC data from ICON global (same as operational COSMO-7km)
- ➔ Daily forecasts at 00 UTC, for 78 forecast hours

23.06-24.06 06UTC

SYNOP+PLUVIO+HYDRO+DESWAT- precipitatii cumulate in intervalul
23.06.2019 ora 06 UTC - 24.06.2019 ora 06 UTC

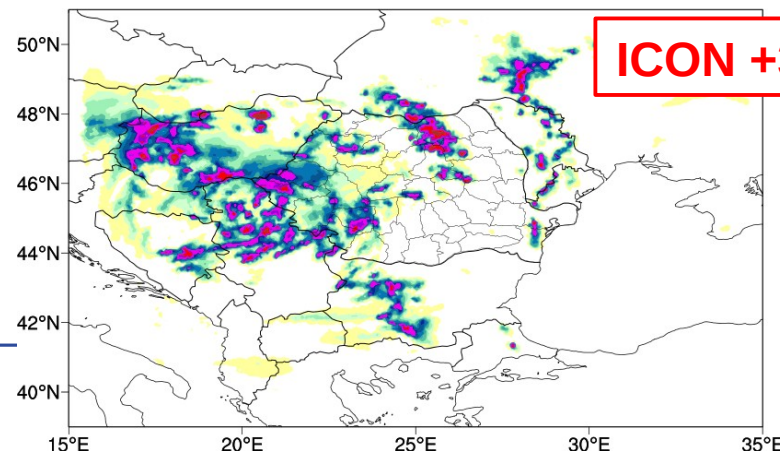
OBSERVATIONS



ICON-RO-7km: 24 hour cumulated precipitation

Base 23.06.2019, 00 UTC

Valid 23.06.2019, 06 UTC-24.06.2019, 06 UTC



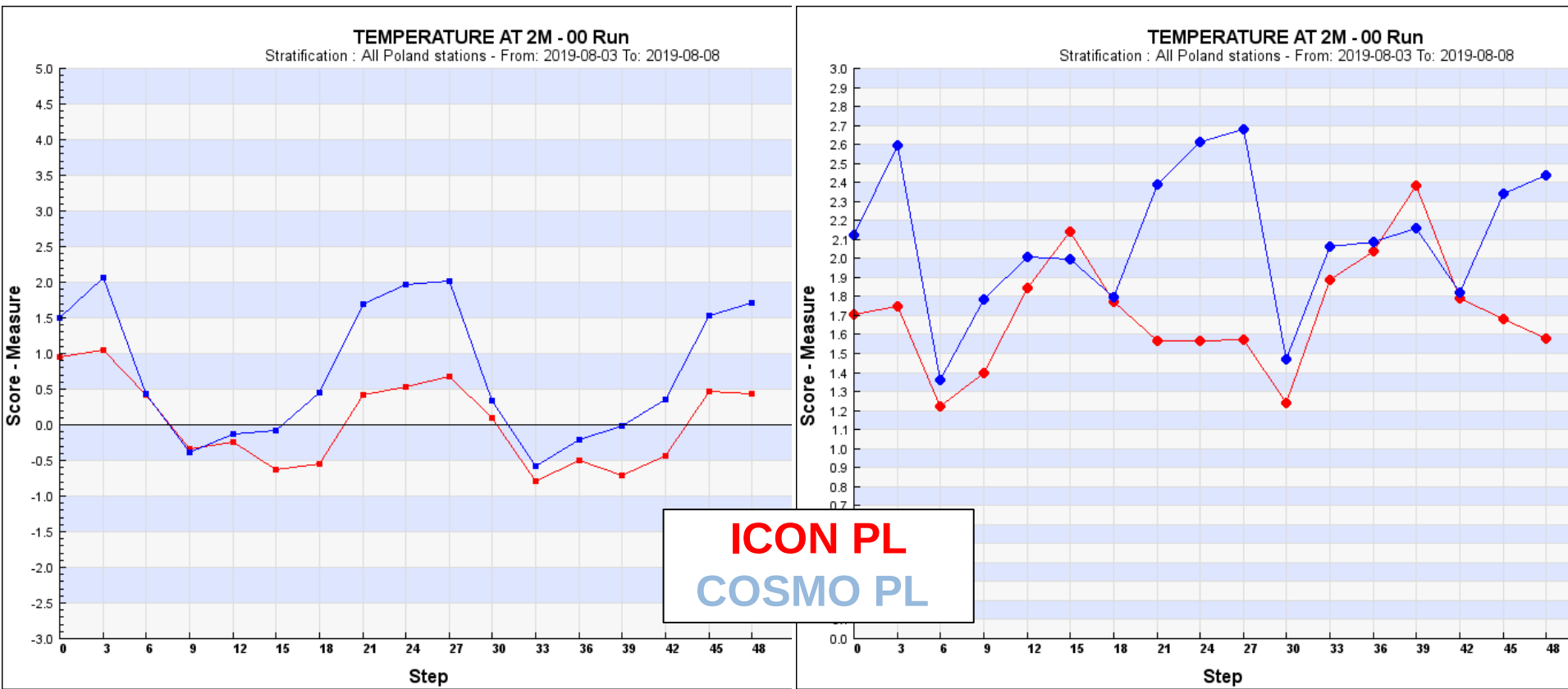
Status at IMWM-NRI, Poland

- ➔ R2B10, ~2.5km, corresponding to COSMO-PL (2.8km, rotated)
- ➔ Daily forecasts running, but some technical issues left

TEMPERATURE at 2 m, 03-08.08.2019

ME

RMSE



GOAL: to start some icon-test (same domain of COSMO-ME) with IFS boundary (rotated lat/lon) and interpolated COSMO-ME analysis.

Encountered several problems with rotated IFS data as LBC, e.g.:

- Bugfixes in iconremap and CDI were necessary
- U/V needs to be on the mass point

Encountered several problems driving ICON with COSMO analysis, e.g.:

- ICON accepts only 'generalVertical' vertical coordinate, grib_set...
- init_mode = 7 (vremap) is used
- iconremap has only seen ECMWF and DWD grib files. After setting up an environment where COMET local definitions are linked to DWD definitions:

Operational COSMO analysis data was finally read!!!!

Still problems in installation @CINECA, but successfully compiled @ECMWF

IFS IC and BCs have been obtained through the script **mars4icon.sh** provided by DWD with the option **-a**, in order to bound a domain, but there is still a bug

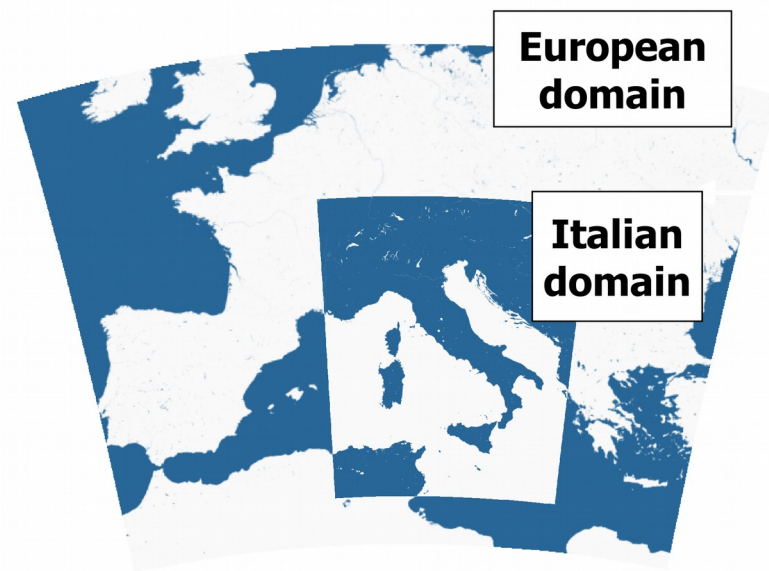


In the meantime runs with ICON ICs will be performed as soon as data are available from DWD



Test case: VAIA storm, October 2018

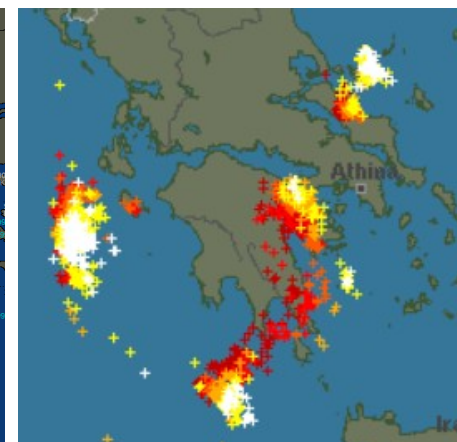
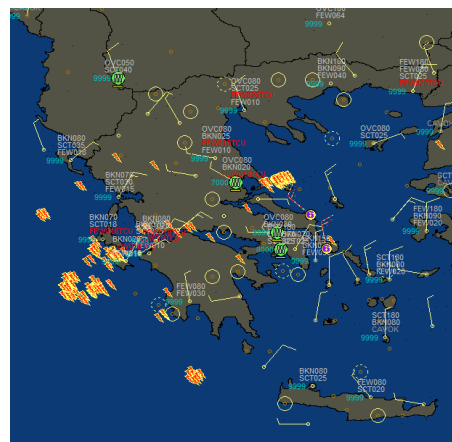
Runs @5km over Europe and @2km over Italy



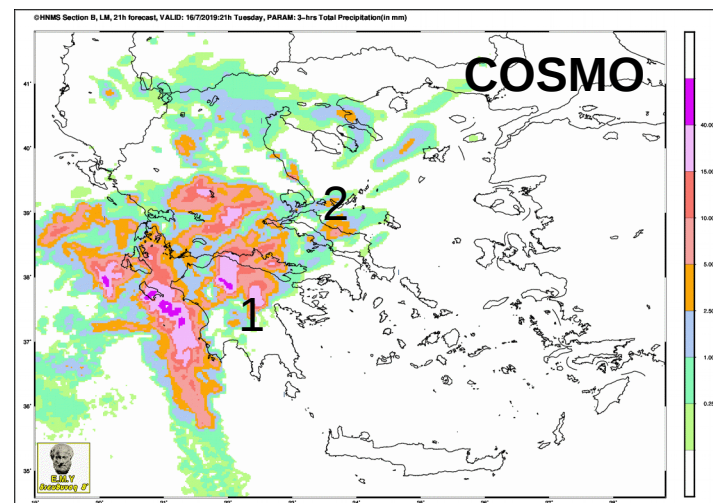
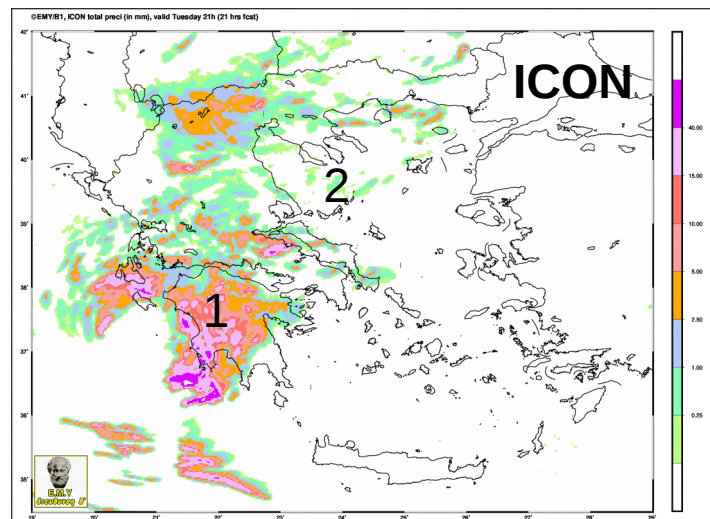
Status at HNMS, Greece



- ➔ R2B10, ~2.5 km grid
- ➔ IFS forecast is used for BC
- ➔ Regular forecasts since spring 2019



3h Precipitation 16/7 21 UTC



You can find information on the Greek ICON setting in

<http://www.cosmo-model.org/content/tasks/operational/hnms/icon/default.htm>



Status at RHM, Russia

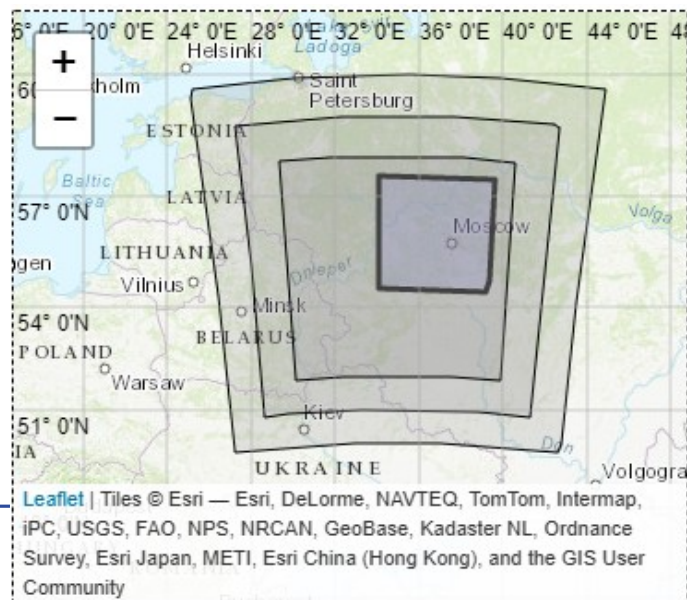
- Installation – **done**
- Forecast setup – **done**
- Adaptation for postprocessing and users – **in progress**
- Case study – **in progress**
- Verification – **in progress**

Preliminary results: **Spring daytime T_{2M} better for ICON!**



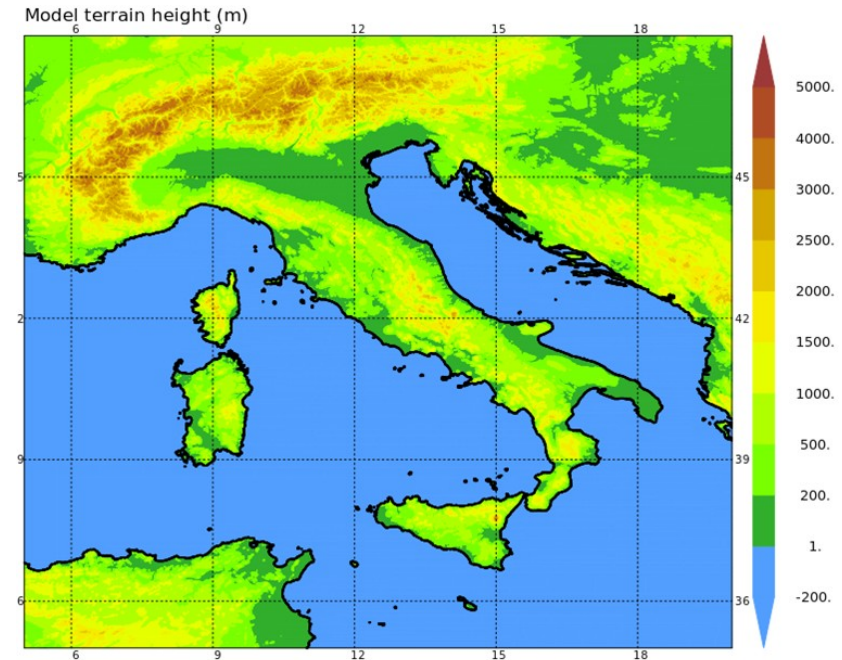
Outlook for ICON-LAM

- ICON-LAM with nested domains for grid 2, 1, 0.5 km
- Operative routine ICON-LAM6.5 after neutral or positive results of verification



Status at ARPAE, Italy

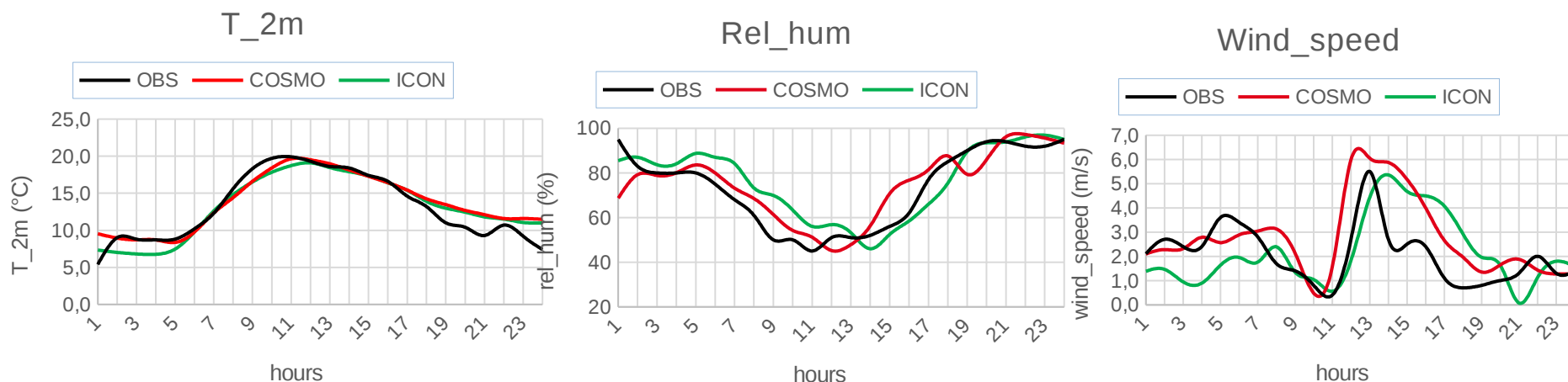
- ➔ Plans are to focus initially on the higher resolution (~2 – 2.5 km)
- ➔ The integration domain will be equivalent to the present Cosmo-2I domain
- ➔ A comparison with the actual Cosmo-2I under similar conditions (e.g. BC from COSMO-5M if feasible) is foreseen
- ➔ Boundary conditions should be operationally provided by IFS
- ➔ A multigrid configuration, including a lower resolution grid on a larger domain, will be successively tested
- ➔ ICON has been installed but no experiments have been performed up to now
- ➔ The plan is to start the experiments in October 2019



Status at CIRA-CMCC, Italy



- The whole Italian area at 6.5km (R3B8) forced by ICON global
- COSMO output for domain centered over Campania region



Hourly values for COSMO and ICON against CIRA ground station data. April 16th 2019

	OBS	COSMO	ICON
T_2m (°C)	13	13.7	13.1
Rel_hum (%)	73	75	77
Wind_10m (m/s)	2	2.7	2.1

Mean daily values for COSMO and ICON against CIRA ground station data



Status at IMS, Israel

→ Create the same setup as the operational COSMO:

→ Cold starts, without DA

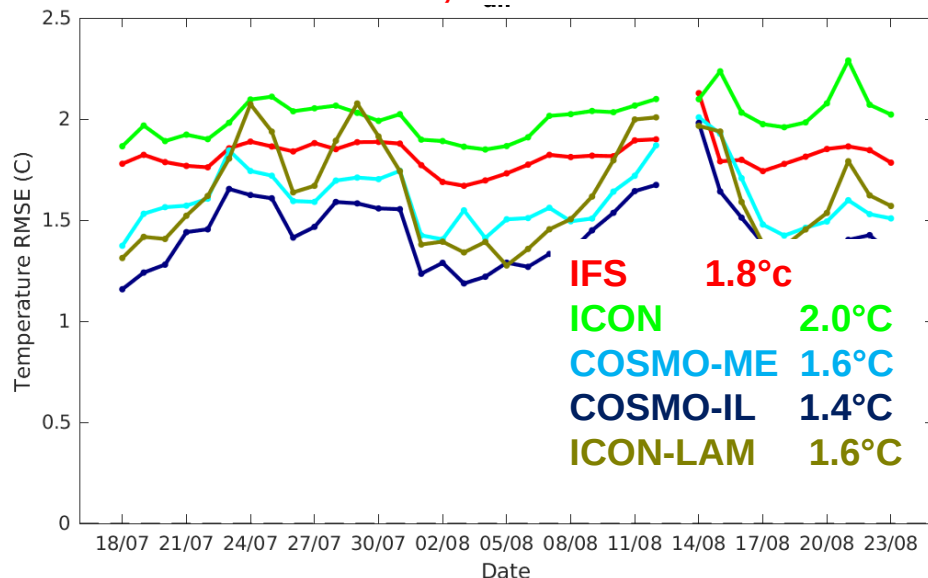
→ Atmosphere BC from IFS

→ Land fields from ICON

→ ICON can run on several HPC

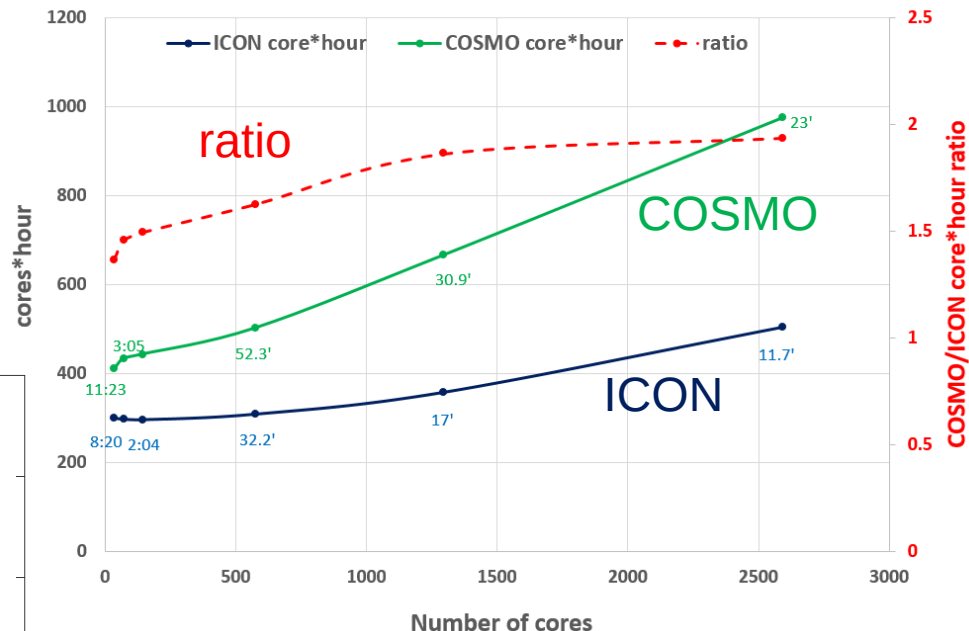
→ (IMS, ECMWF, Azure, AWS)

T 2m verification, 80 IMS stations 78 hours



ICON scales better than COSMO

core*hour + ratio [COSMO/ICON-LAM]

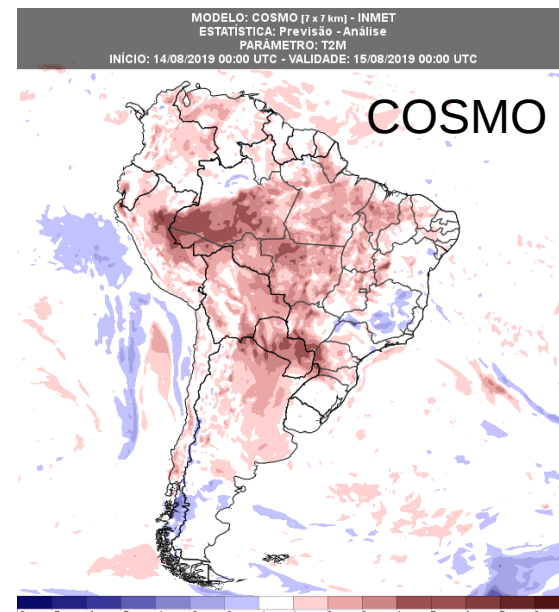
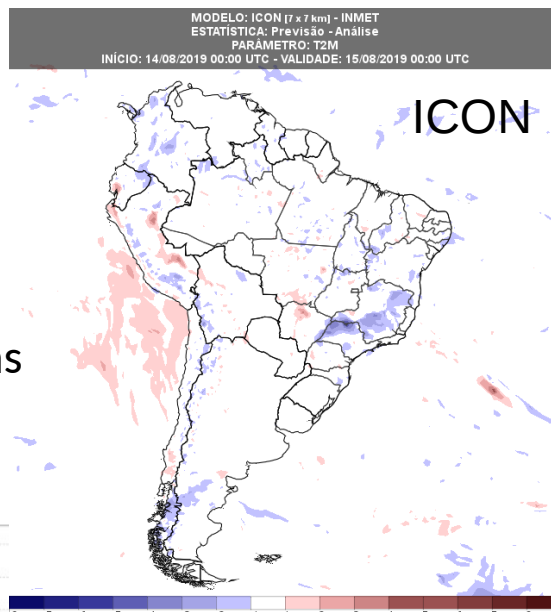


→ ICON overestimates cloud cover for Israel (not shown)

Status at INMET & SIMEPAR, Brazil

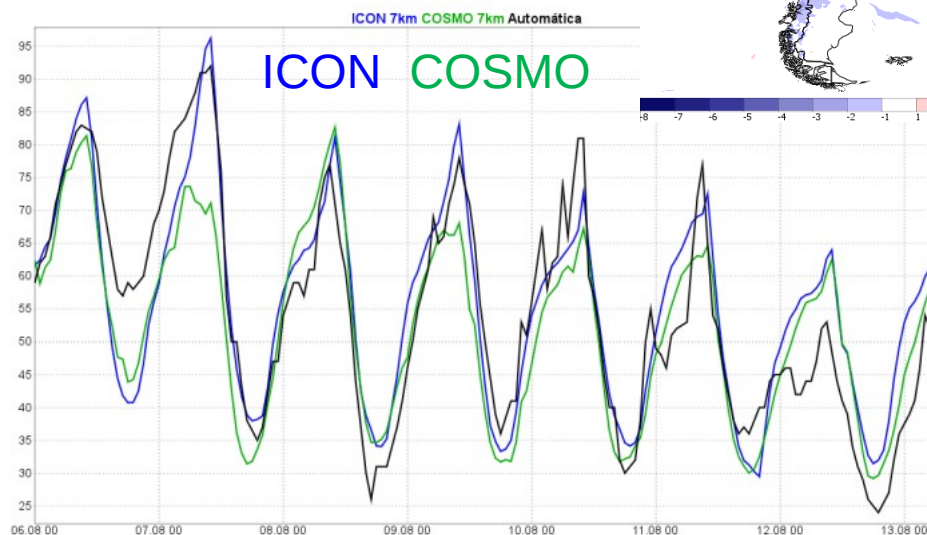
- ➔ Daily forecasts for South America (7km)
- ➔ Running every day at 00 and 12 UTC for 174 hours

2m T 24h forecast-analysis

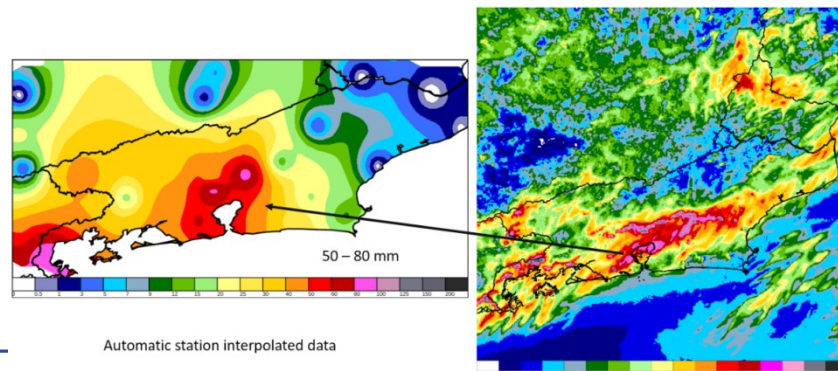


2M RH compared to >500 stations

Umidade Relativa em 2m (%)
Local: Brasília
Validade: 06.08.2019 00:00 - 13.08.2019 06:00



Zoom on Rio de Janeiro state ICON 1km



Automatic station interpolated data

ICON 1km - Inic. 13/02 - 00UTC

Status at the CLM Community



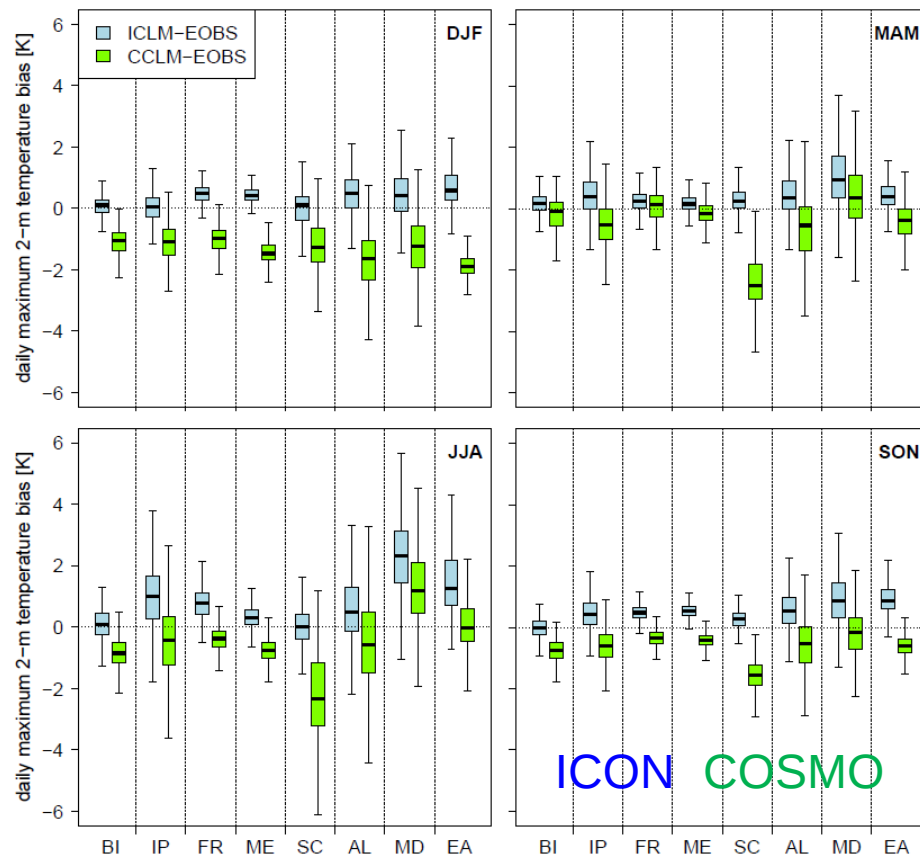
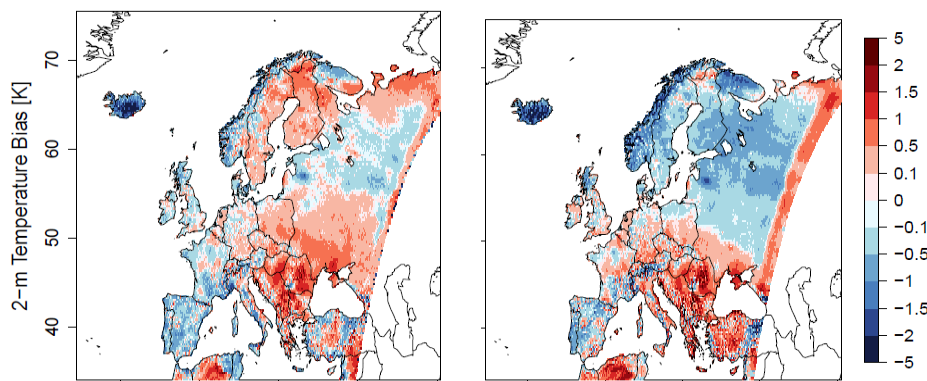
- ➔ Domain: EU-CORDEX, R2B8 (~10km)
- ➔ Initial data: Atmospheric fields from ERA-Interim; surface fields from an ICON-CLM long run
- ➔ Lateral, lower, upper boundary data: ERA-Interim
- ➔ Period: 1979-2000 (20 years)

Max 2m T

2m T bias

ICON

COSMO



- Most of the partners are running ICON daily or at least for test cases
- In few cases still some technical problem exists, but they are almost solved
- The verification is at the beginning, sometimes not objective but on visual basis
- The results show that the road is correct although there are grey areas
- It is not possible to draw definitive conclusions since a larger statistics is needed