PP C2I @ COSMO GM2019

Installation of ICON LAM at CIRA-CMCC and preliminary experiences

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Phase 1 - Preparation & Installation (10/18-12/18)

- Participation in C2I Workshop on Setup & Experiments 2018 (E. Bucchignani, P. Mercogliano),
- Definition of two test cases: Italy (about 7 km), Campania (about 1 km)
- The model has been installed at the CIRA supercomputer DELL “TURING”,

DELL - TURING:

- 40 dual socket Xeon E5-2697 v4 @ 2.30GHz computational nodes (1440 core in total)
- 2 Xeon Phi (TM) CPU 7210 @ 1.30GHz computational nodes (128 core in total)
- 2 GPU Nvidia Pascal Tesla P100 @ 1.33GHz (128 core in total)
- 256 GB RAM per node
- Operating System: RedHat Enterprise Linux 7.3
- Fortran compiler: Intel Fortran v18.0.2
- MPI: Intel MPI Library for Linux* OS, Version 2018 Update 2

ICON LAM Compilation and Installation

COMPILATION WITH **INTEL FORTRAN** v.18.02.199 AND **INTEL MPI**

- GRIB-API-1.22 (the same used in COSMO);
- netcdf-4.4.1.1, netcdf-fortran-4.4.4
- Further libraries required (and installed locally): XML2, HDF5, ZLIB, SZIP

Compilation was successful, but the model crashes in both the Italian cases considered and even in the idealized test case, with the following error message:

No splitting of processor grid

mpi_allreduce_

ICON LAM Compilation and Installation

COMPILATION WITH **GNU FORTRAN v.** 6.1.0 AND **OPEN MPI v.** 3.1.0

An older GRIB_DEFINITION_PATH (definitions.edzw-1.23.1) is required.

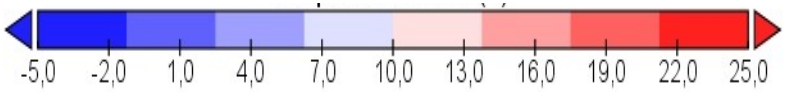
Compilation was successful!

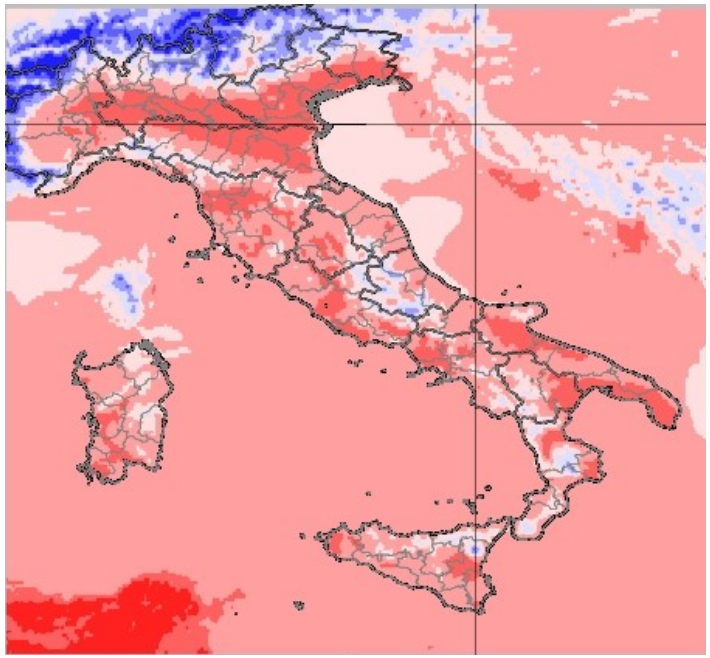
The model works properly with the idealized test case and with the Italian test case (forced by ICON global)!

Italian Domain (R3B8)

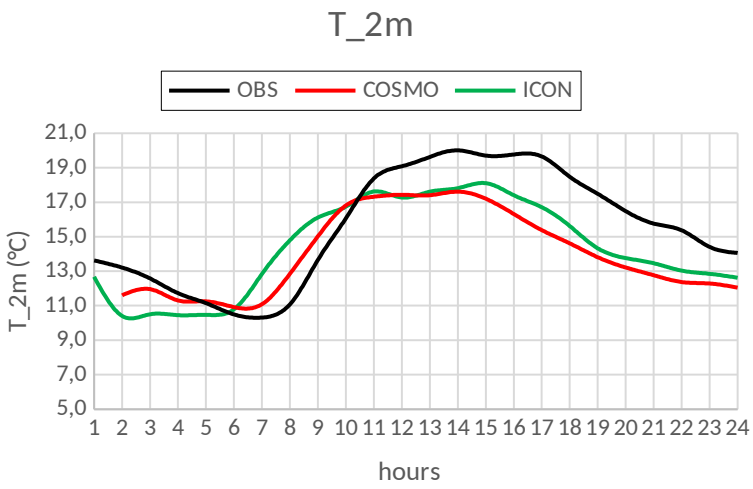
- The whole Italian area at 6.5km effective resolution (R3B8), forced by ICON global
- The simulation was performed for **April 16th 2019**.
- Evaluation is performed in terms of hourly values for several variables, at Napoli and CIRA sites.
- Observational data provided by Univ. Napoli and CIRA ground station.
- COSMO output for domain centered over Campania region at 1 km resolution are also reported

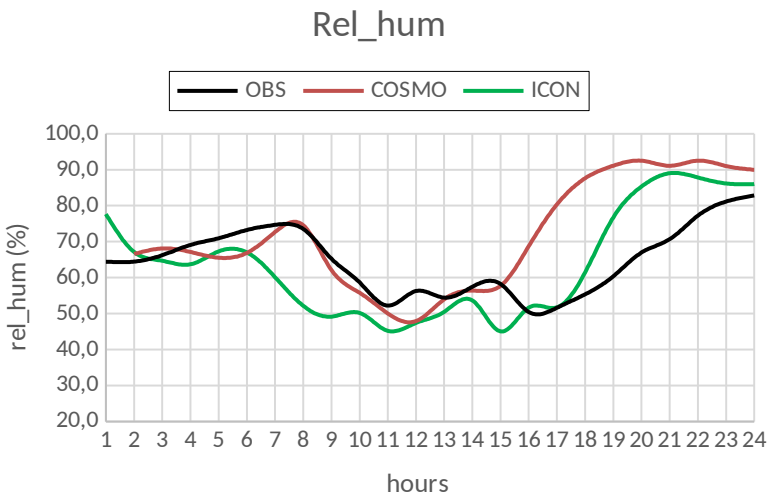
T_2m at April 16th 2019,
h 12.00 as simulated by ICON





ICON evaluation and comparison with COSMO





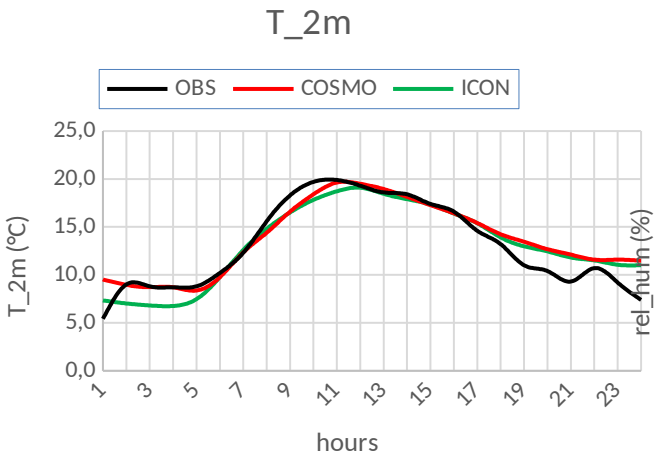
Hourly values for COSMO and ICON against Napoli ground station data. April 16th 2019

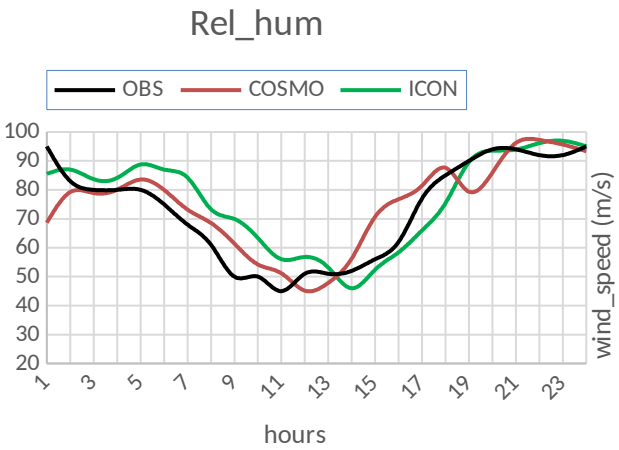
	OBS	COSMO	ICON
T_2m (°C)	15.5	14.0	14.4
Rel_hum (%)	64.8	71.7	64.0

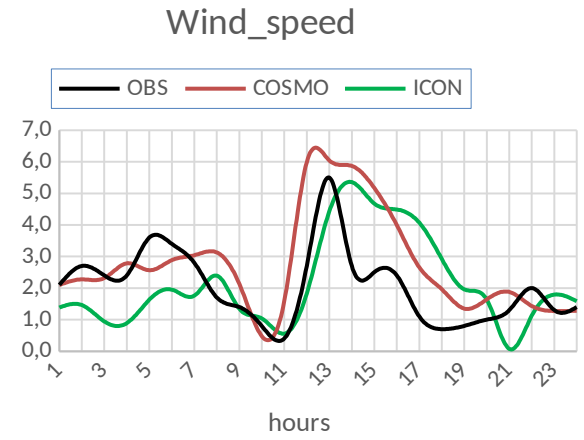
Mean daily values for COSMO and ICON against Napoli ground station data

Null precipitation value well reproduced by both models

ICON evaluation and comparison with COSMO







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

Null precipitation value well reproduced by both models