ICON-LAM at IMS

IMS COSMO team

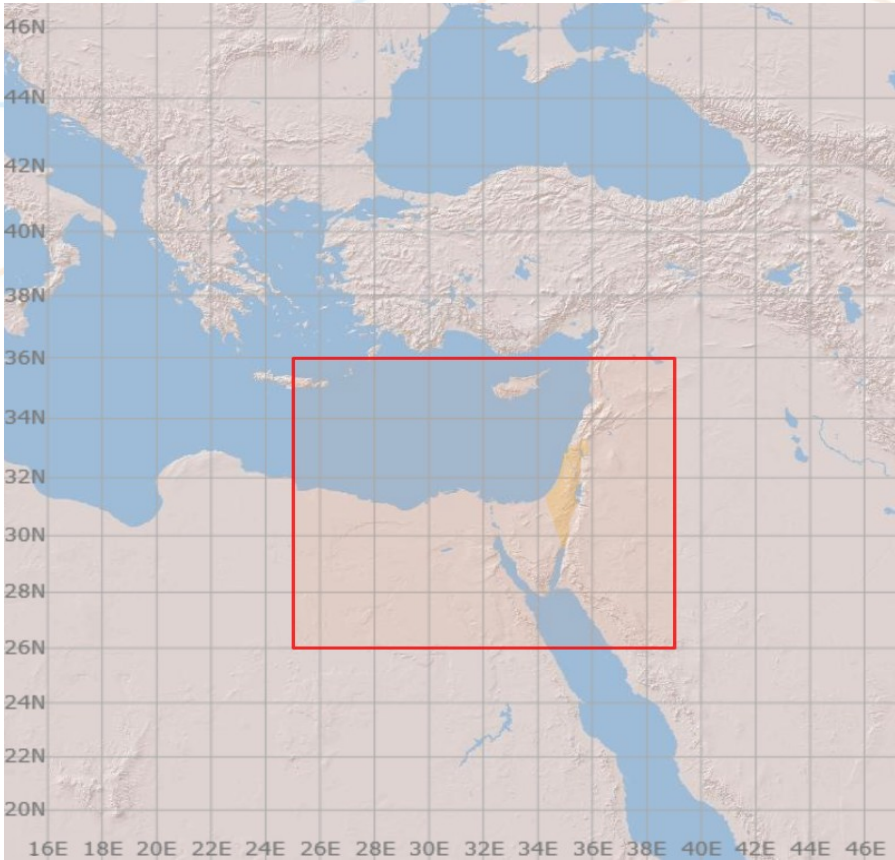
COSMO GM September 2019
Rome

ICON-LAN setup

- Goal - create the same setup as the operational COSMO:
  - cold starts
  - Atmosphere BC from IFS
  - Land fields from ICON
  - Without DA

ICON-LAM:

2.8 km resolution
560x400 grid points (~1500x1100 km)
δt 24 sec
65 levels
78 hours forecast

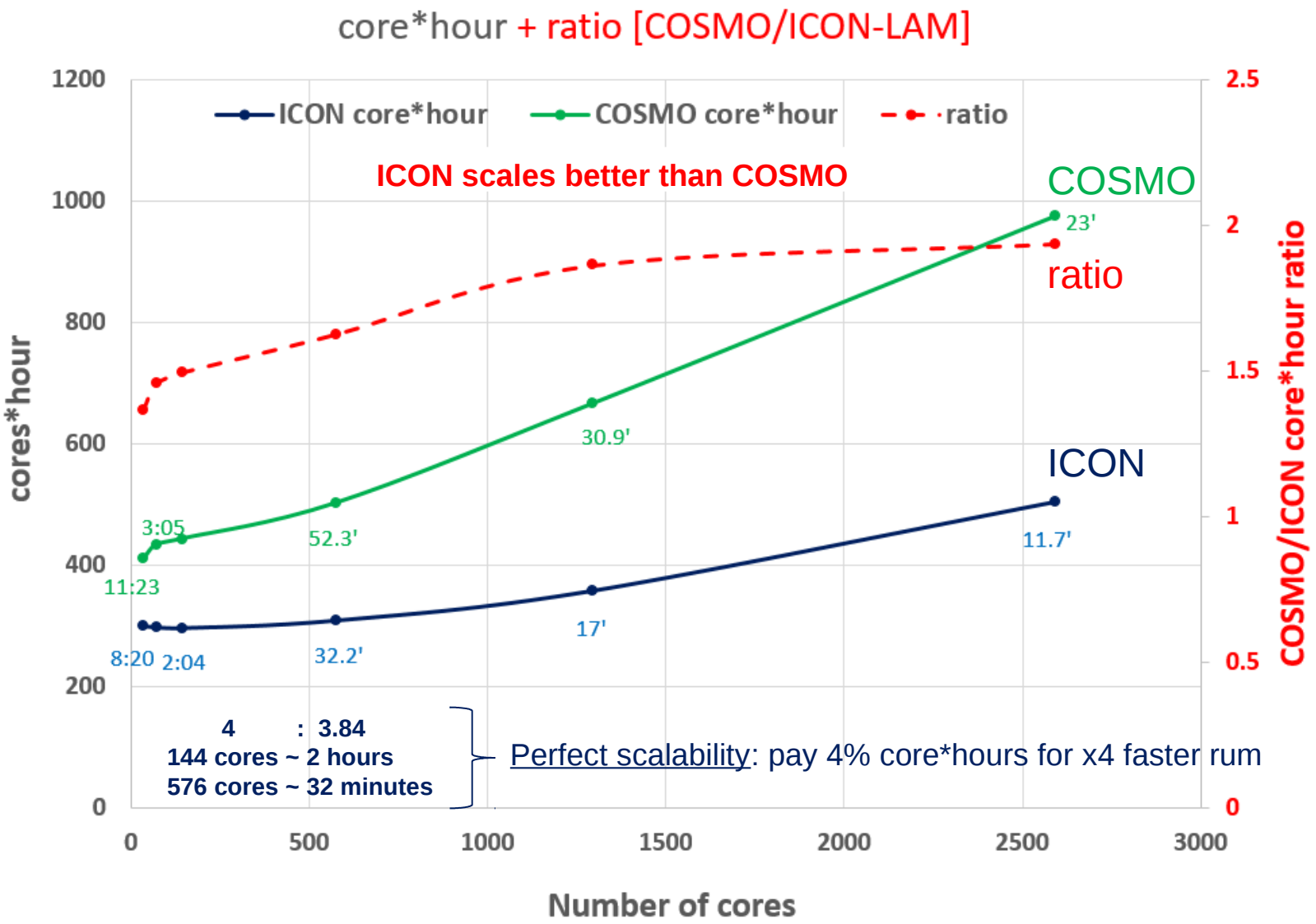


ICON on various computer planforms

Our success in:	IMS HPC	ECMWF	Azure	Amazon
Compiling libs and model	✓	✓*	✓	✓
Running ICON global test case	✓	✗	✓	✓
Scaling benchmarking	✓	✓	✓	✗
Running LAM driven by IFS	✓	✓	✓	✗
Running LAM driven by ICON	✓	✓	✗	✗
Semi-operational ICON-LAM driven by ICON	✓	✗	✗	✗
Semi-operational ICON-LAM driven by IFS	✗	✗	✗	✗

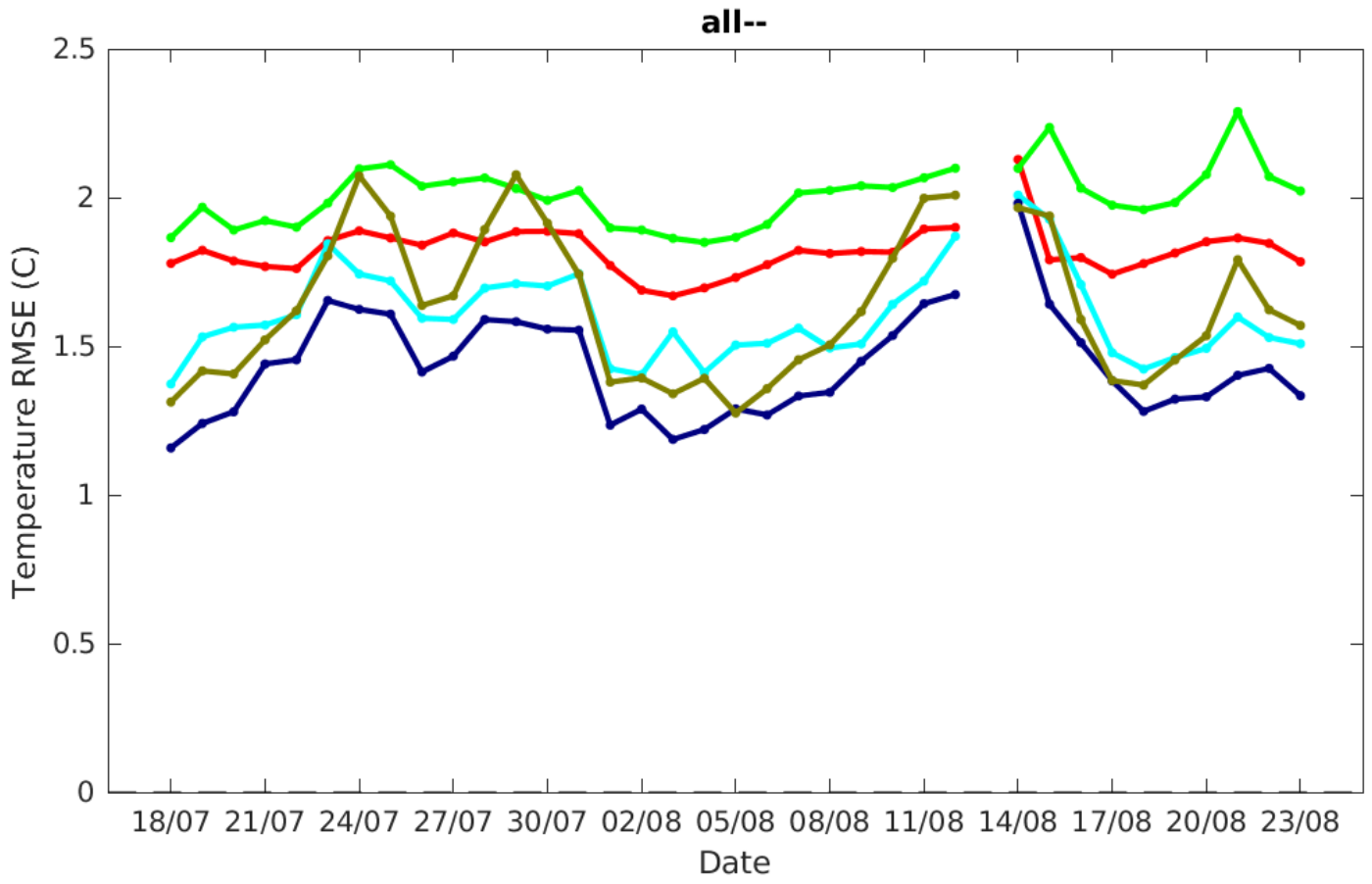
cook book (including ART) for compiling ingredients at ECMWF is available*

Scalability test on ECMWF



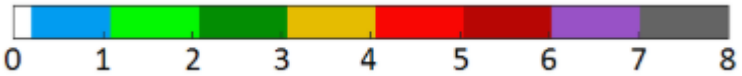
T 2m verification

80 IMS stations 78 hours



IFS 1.8°c
ICON 2.0°C
COSMO-ME 1.6°C
COSMO-IL 1.4°C
ICON-LAM 1.6°C

Cloud cover
ICON over-estimation



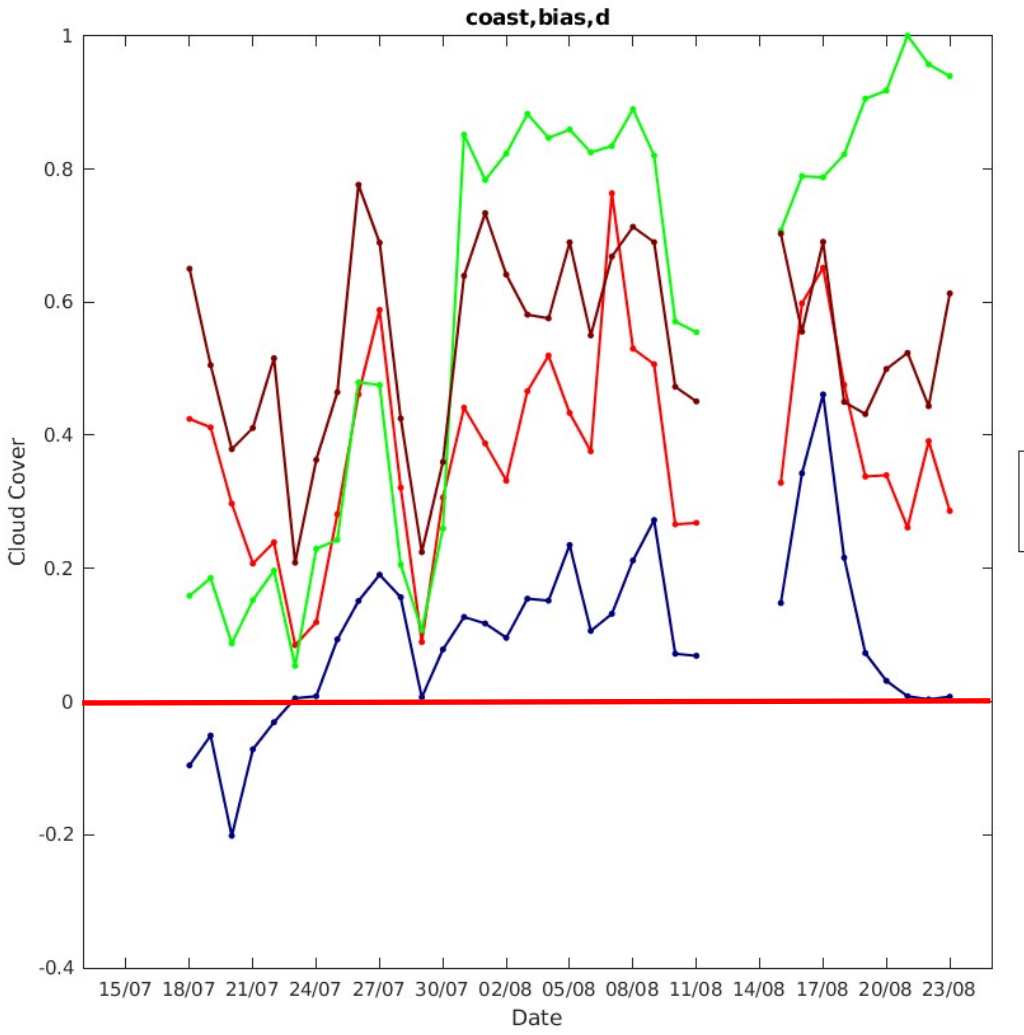
OBS. IFS COSMO C-CAMS ICON-LAM UKMO GFS ICON

06Z

12Z

18Z

Cloud cover fraction bias coastal area at 12:00 UTC



Cloud cover:
0 = no cloud
1 = above 1/8

IFS 37.6%
ICON 59.4%
COSMO-IL 9.6%
ICON-LAM 53.8%

COSMO and ICON use the same method for cloud cover by critical relative humidity.

Conclusions

- ICON scales much better than COSMO.
- Summer Semi-operational runs of ICON-LAM with DWD namelist improved global ICON temperature forecast.
- We need to implement ICON tools to support IFS HRES, ICBS.
- ICON cloud fraction should be improved. An example for:

  ICON ⟺ ICON-LAM interaction