

ICON-IL verification at IMS

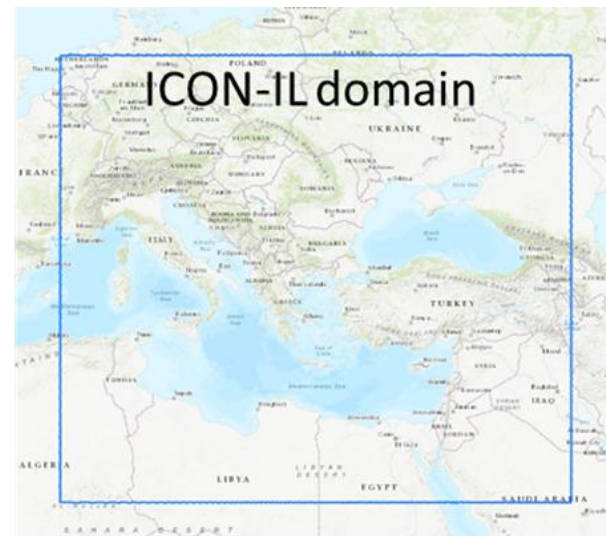
P. Khain, H. Muskatel, E. Vadislavsky, L. Uzan, A. Baharad, R. Drori and Y. Levi

WG5, January 2024



ICON-IL2.5

- **Platform:** Time Critical Suite on the ECMWF HPC
- **Model setup:** Domain: **4-45.5E/25.5-53N**
Resolution: **~2.5km** horizontal, 65 levels vertical
Range: **90h**, IC/BC: **det. IFS**
- **Oper. runs:** **2 runs/day** (00, 12 UTC)
- **Data assimilation:** **LHN (IMS radar + OPERA)**
- When CAMS model predicts heavy haze, ICON uses CAMS forecasted aerosols (temporary switched off)
- CAMS aerosol climatology
- During cyclones ICON uses forecasted SST from IFS
- Lakes temperature is corrected (important at cold starts)
- URBAN scheme is on, uses ESA land use mapped to GlobCover

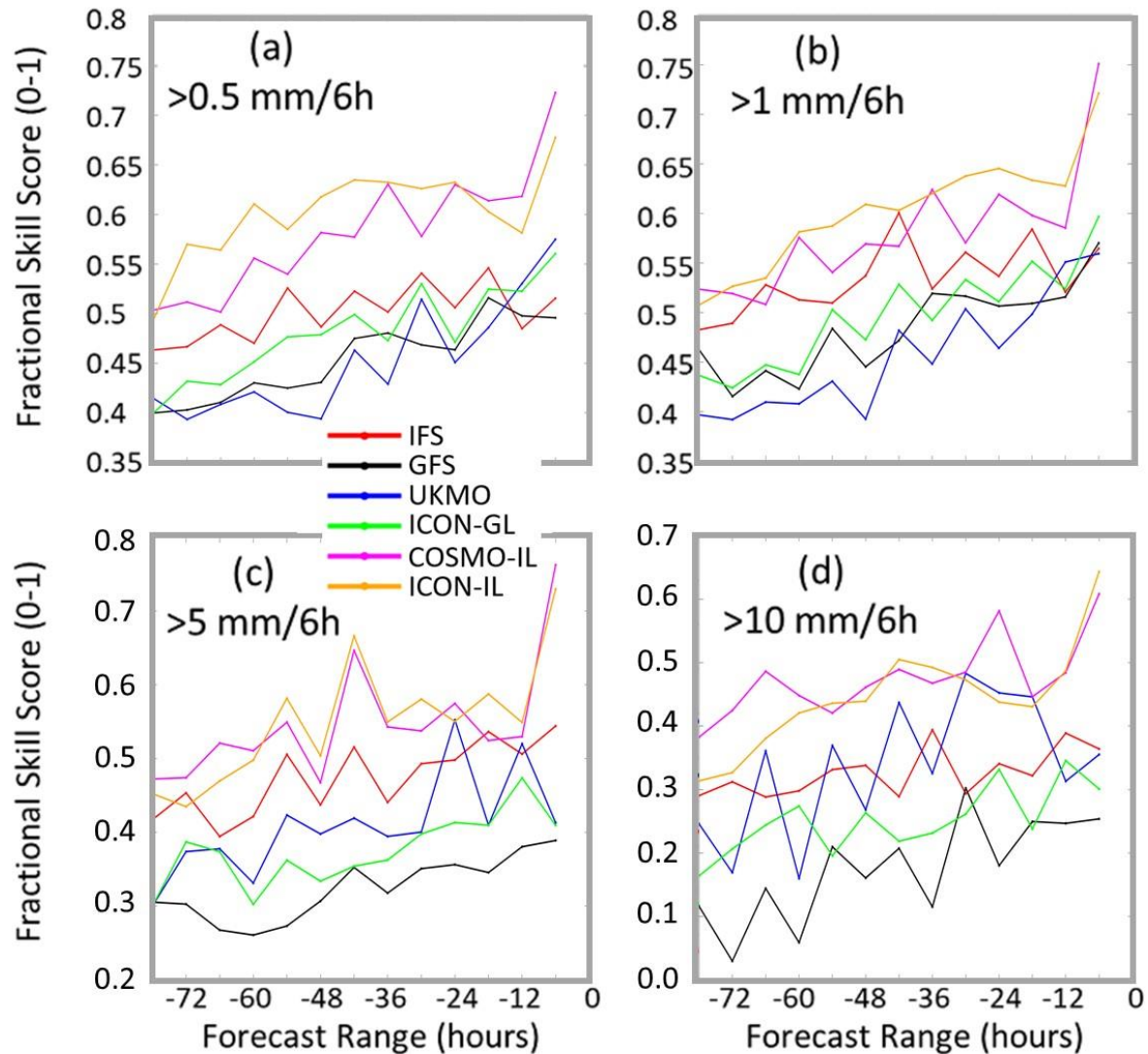


Configuration of ICON-IL2.5

from October to April (Tuned winter) and from May to September (Tuned summer)

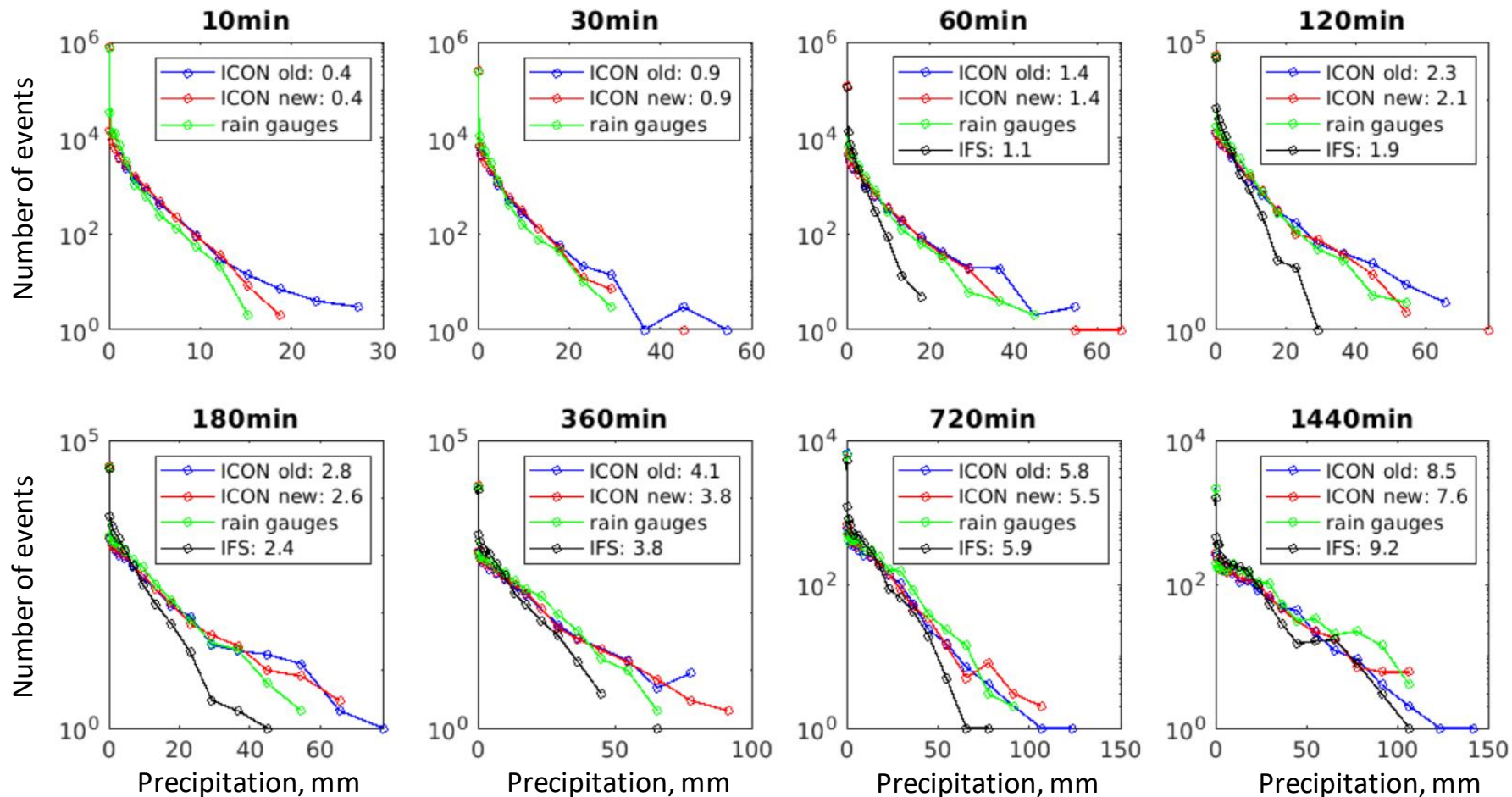
Forecasted field	Parameter	Reference Configuration (ICON-D2)	Tuned winter	Tuned summer
Precipitation	lshallowconv_only / lgrayzone_deepconv	F/T	T/F	T/F
	tune_rdepths	20000	10000	20000
2m temperature	rlam_heat	10	10	10
	tkhmin/tkmmin	0.5/0.75	0.3/0.3	0.5/0.5
2m relative humidity	c_soil	1.25	2.0	0.8
10 wind speed	tune_gkwake	0.25	0.1	0.5
Low cloud cover	tune_box_liq_asy/ allow_overcast	4/1	4/1	1.7/0.63
Precipitation	rain_n0_factor	0.1	0.1 or 64 Depending on instability	

Precipitation verification vs radar

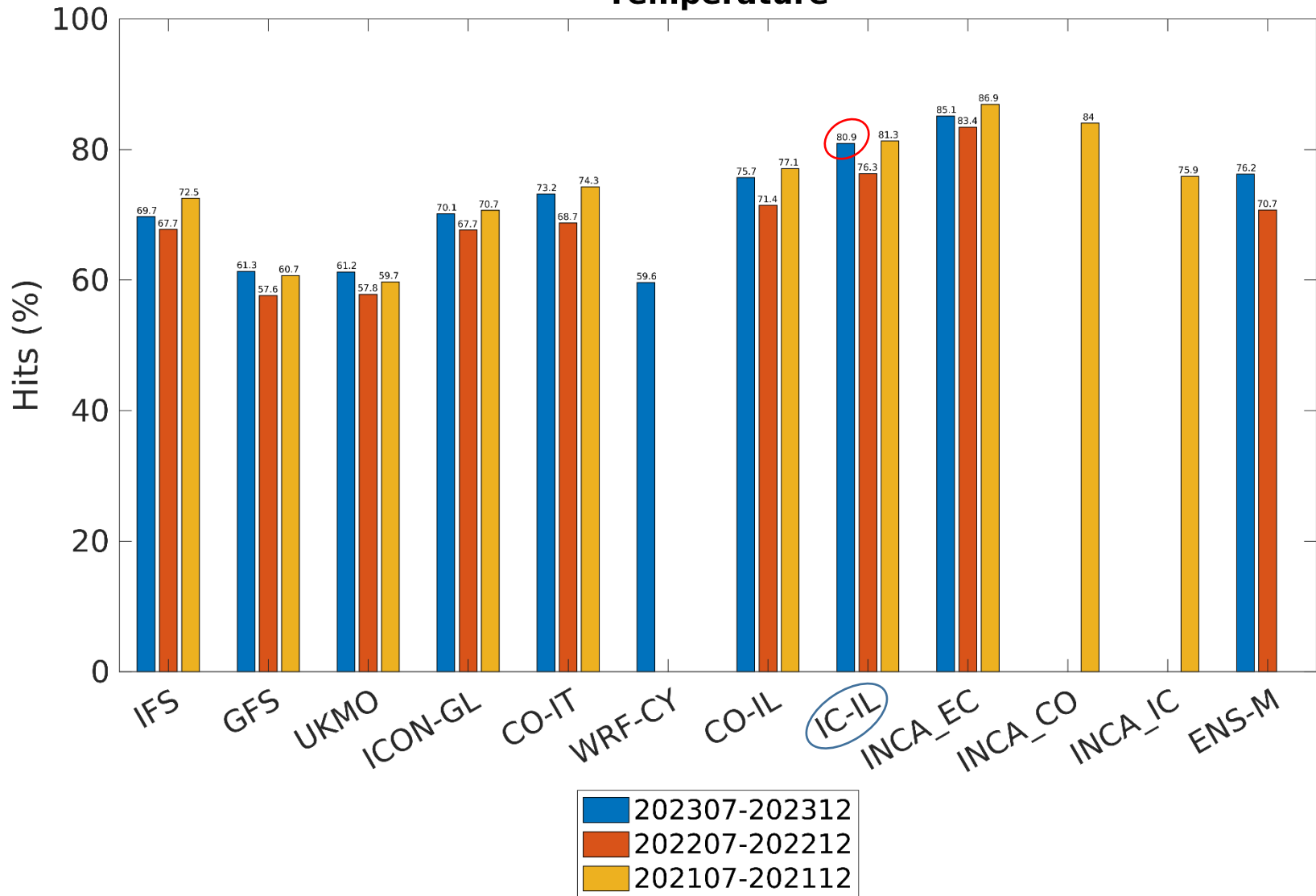


Distributions at rain gauges locations

Based on 30 events



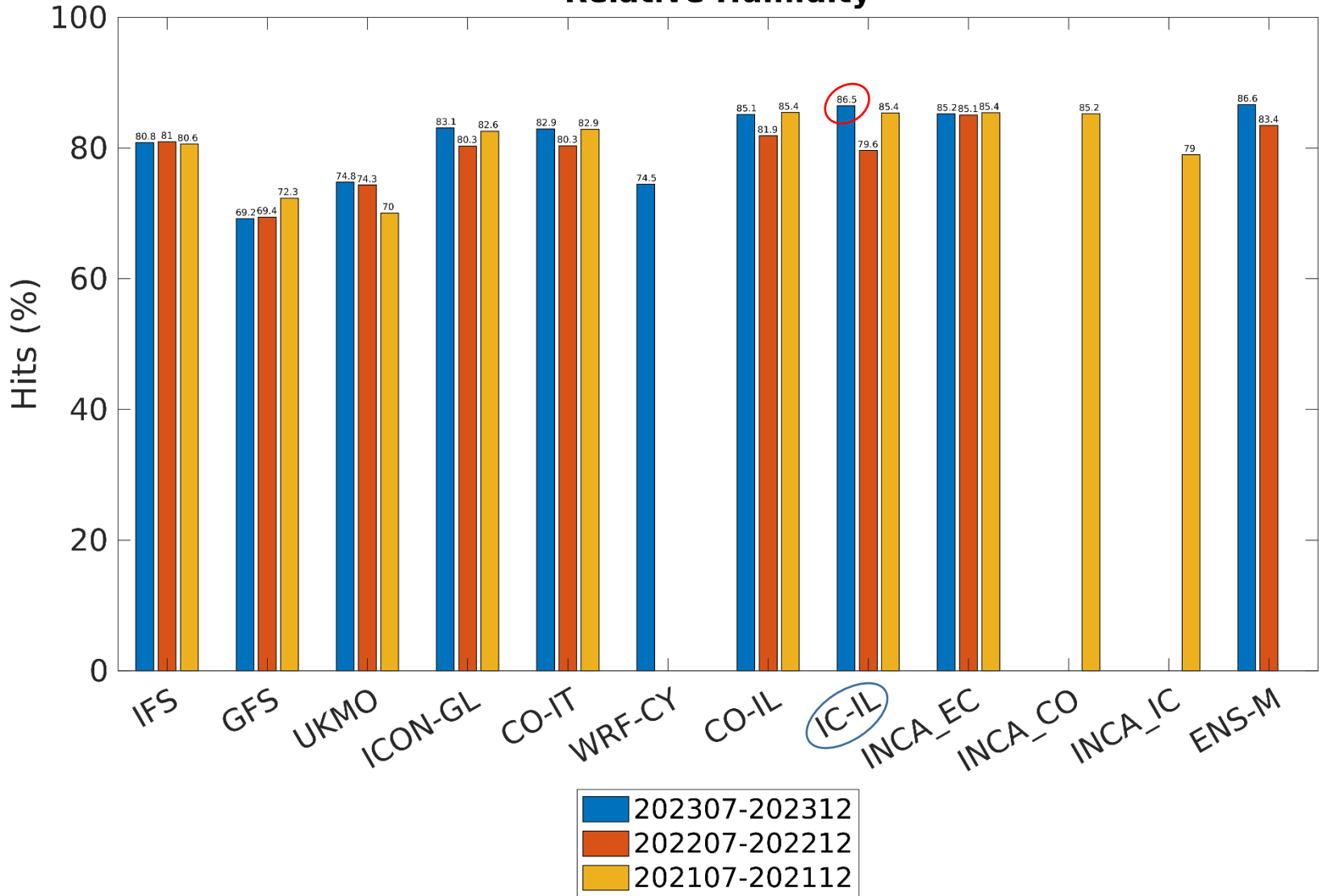
Temperature



Hit is when T error is $<2^{\circ}\text{C}$

Verification since last upgrade on July 2023

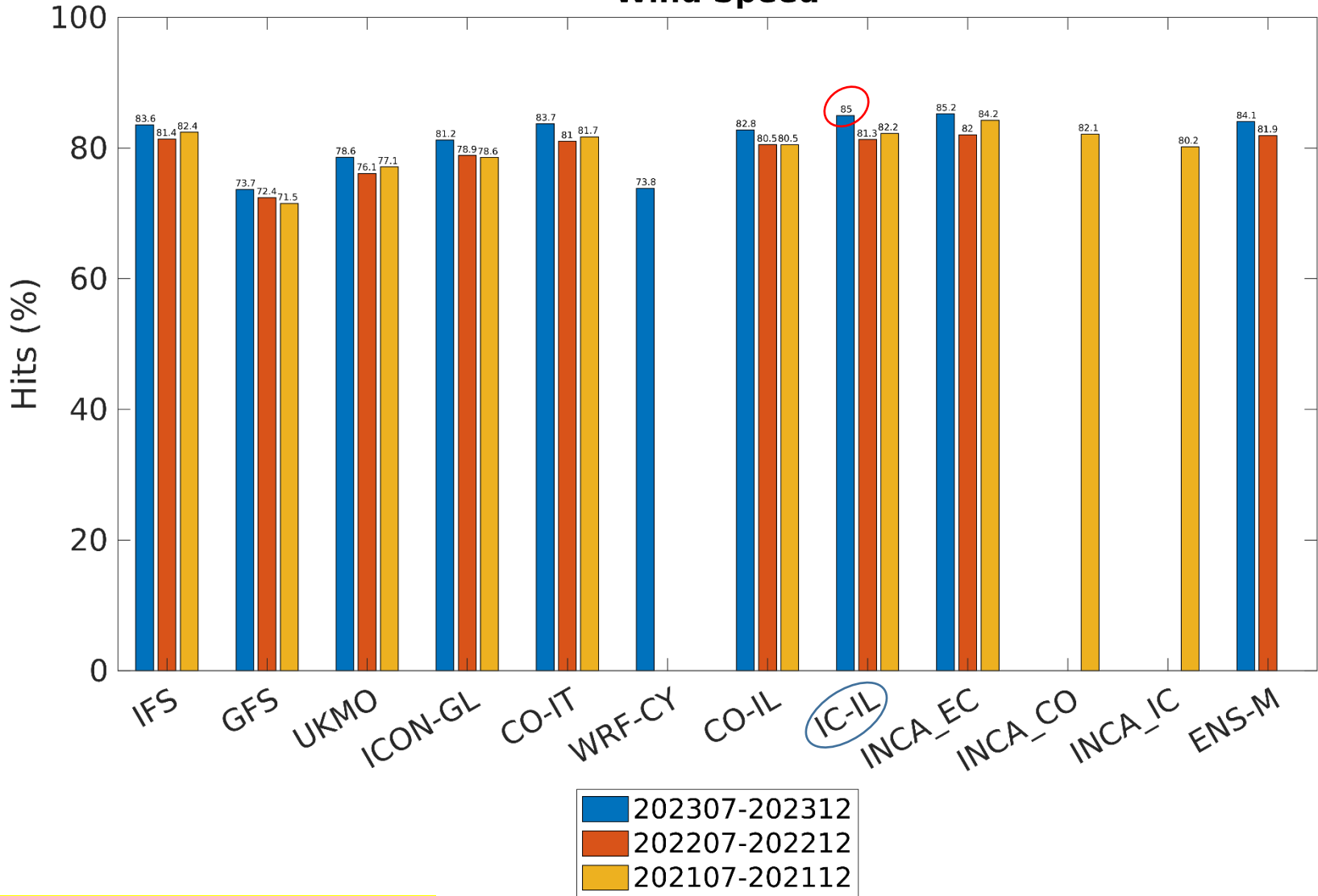
Relative Humidity



Hit is when RH error is <13%

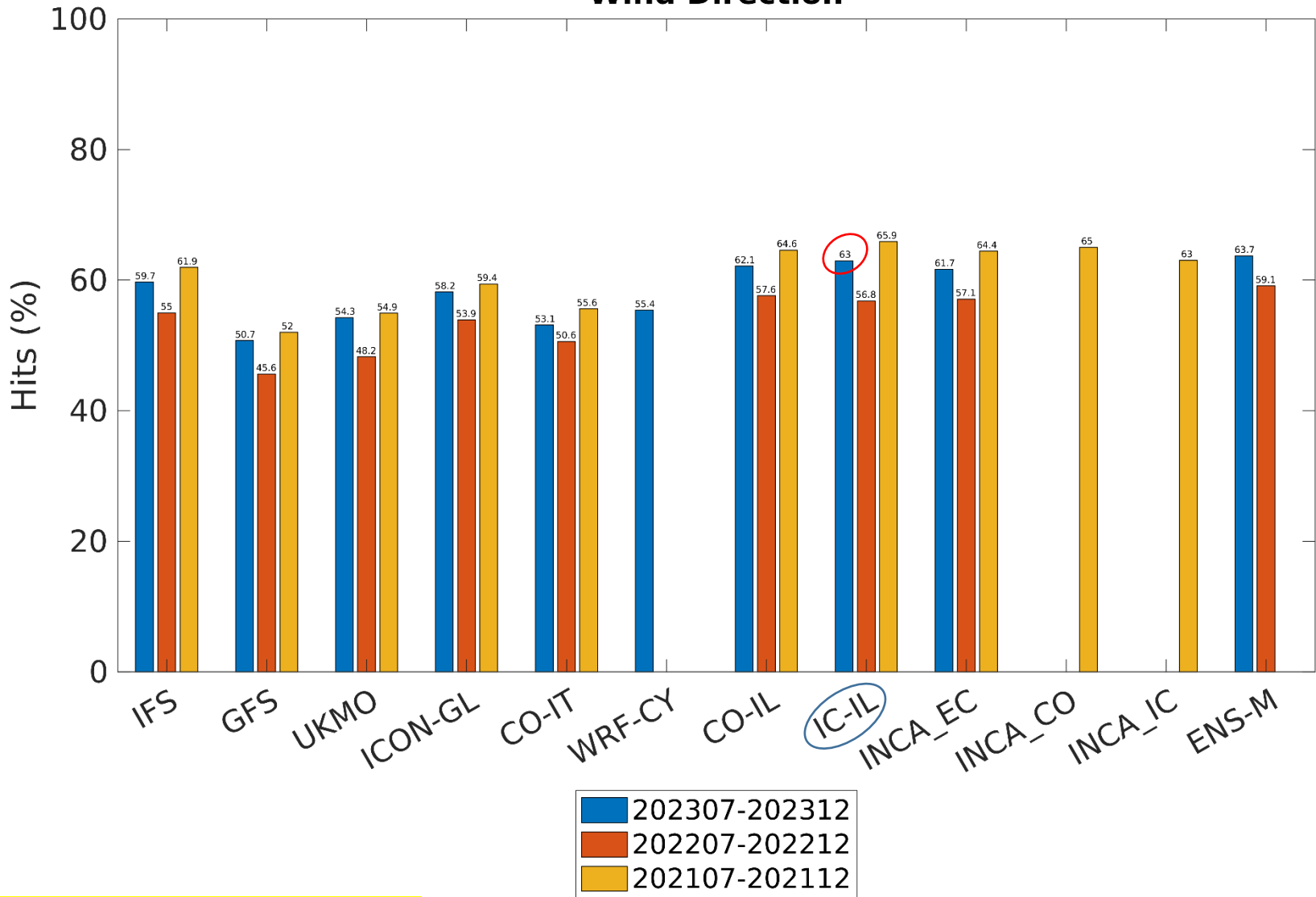
Verification since last upgrade on July 2023

Wind Speed



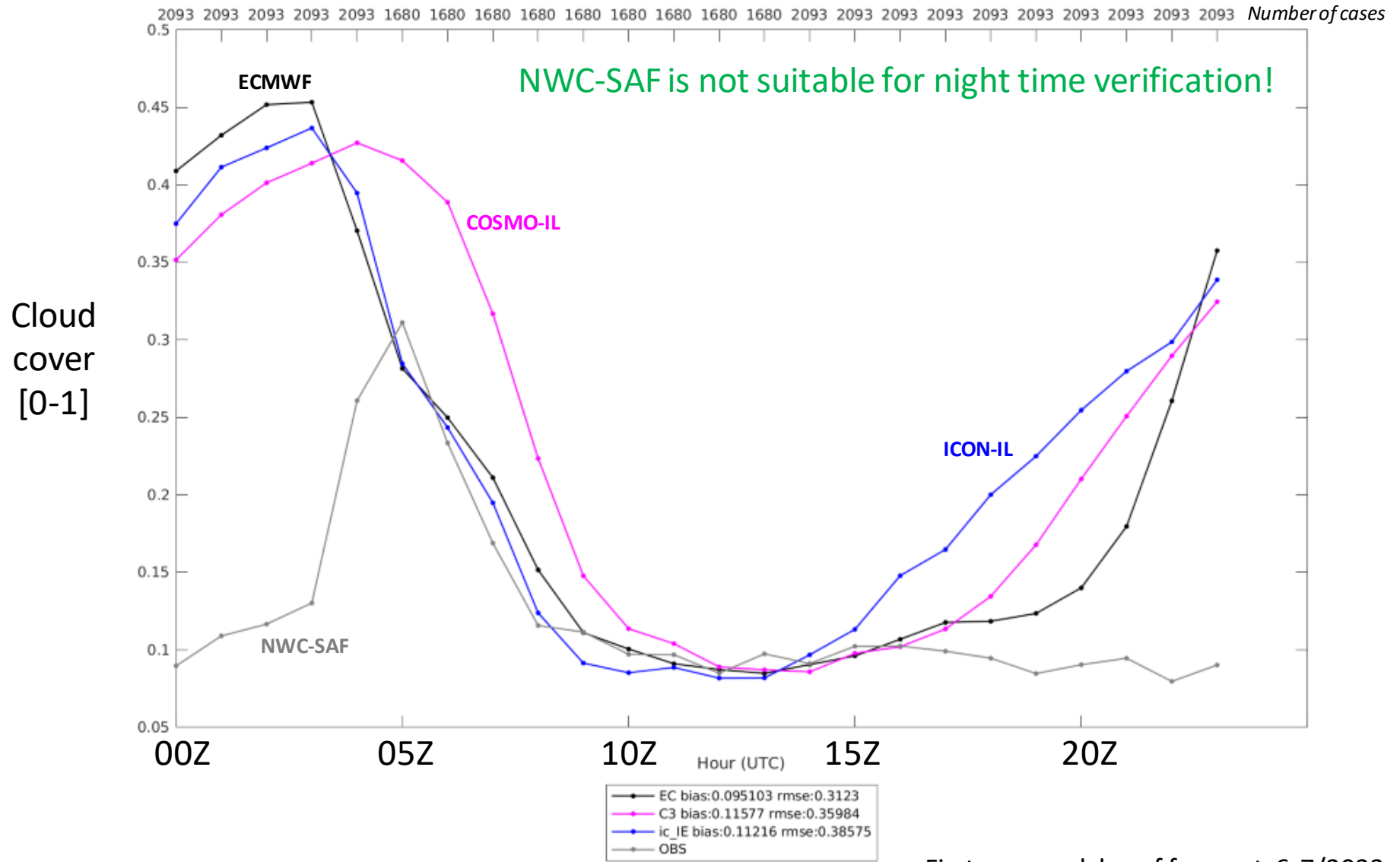
Verification since last upgrade on July 2023

Wind Direction



Hit is when WD error is < 30°

Cloudiness verification



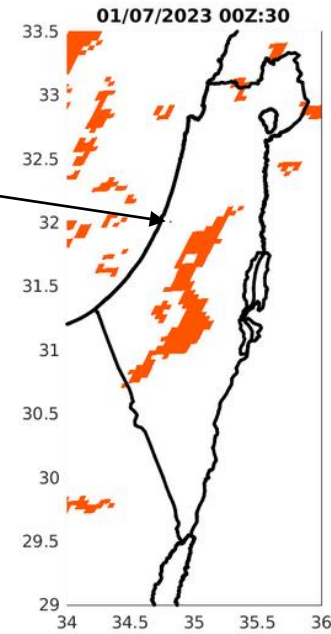
First + second day of forecast, 6-7/2023

Coastal locations: ENKARMEL, HADERAPORT, HAKFARHAYAROKIEC, ENHAHORESH, TELAVIVCOAST, BETDAGAN, QEVUZATYAVNE

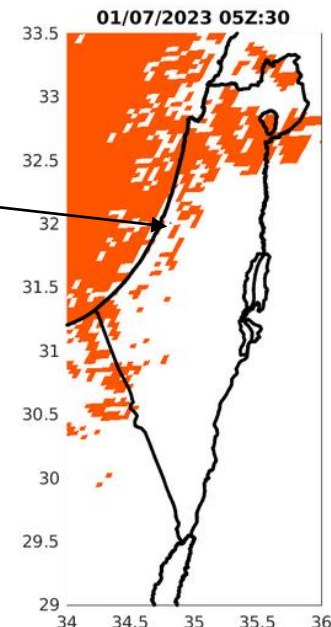
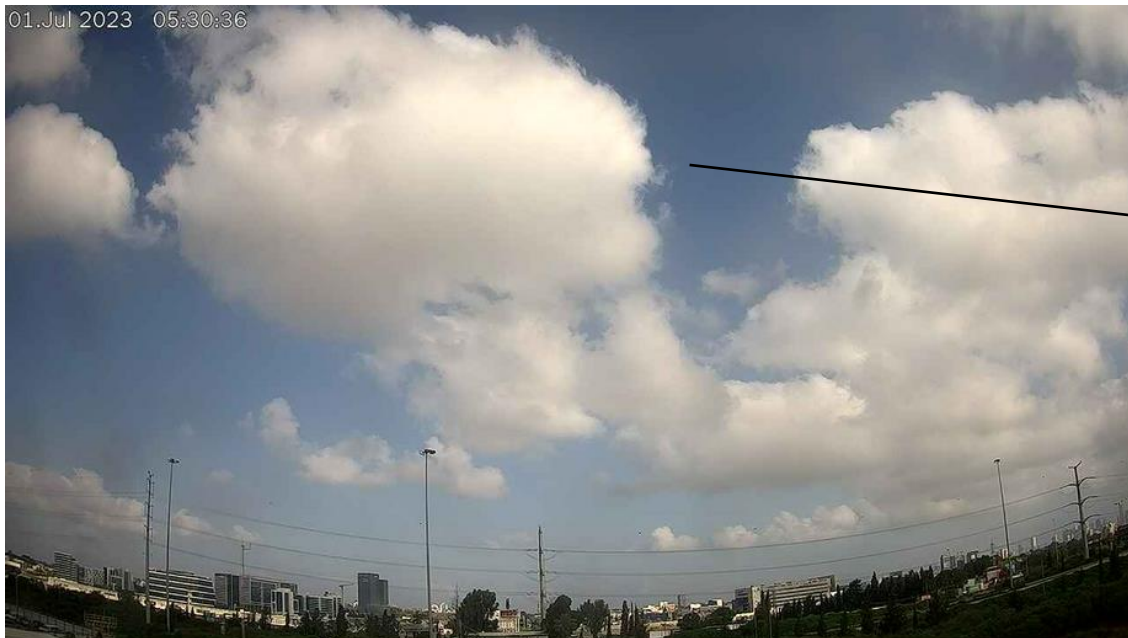
Example:

Sky camera

NWC-SAF Cloud mask



Night
(good)



Morning
(good)

Conclusions

- ICON-IL is better than any other model at IMS
- Rain tuning was necessary to get proper rain-rate distributions
- NWC-SAF is not suitable for cloudiness verification at night

Many new insights from collaboration with **WG EVAL** (CLM)

- Tegen climatology is outdated, Kinne/CAMS climatologies are needed. Switch to Kinne increases **global radiation**
- New ground water scheme by Linda Schlemmer (DWD) will be soon merged to master. Switch to her scheme increases **soil moisture** in Central Europe
- → ICON needs retuning which should be done together with NWP people. Open questions:
 - Cloud cover tuning versus latitude and season? AI?
 - Albedo tuning versus soil type and soil moisture?
 - Soil moisture infiltration tuning?

Thank you!