

NWP TS UPDATES

Contributors:

- *Run the test suite for S24icon202410 and S24icon202504 (E. Minguzzi)*
 - *Perform model evaluation with MEC/FFV2 for S24icon202410 and S24icon202504 (A. Iriza-Burcă, S. Gabrian, M. Bogdan)*
 - *MEC and Rfdbk support and debugging (F. Fundel)*
 - *Evaluation report for the SMC (E. Minguzzi, U. Schattler, C. Gebhardt, D. Rieger, A. Iriza-Burcă)*
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NWP Test Suite - previous project

ECMWF Special Project Finalized

"ICON Numerical Weather Prediction Test Suite" (2024 – 2026)

B.Us on ATOS: Allocated (yearly): 7 500 000.00

- ECMWF Yearly Report was submitted in June (*thanks @Enrico*)
- The current project stops at the end of 2026, so a **new request** was advanced to ECMWF
- *By the end of June 2027: Final report with results for the entire project (2024-2026) to be submitted*

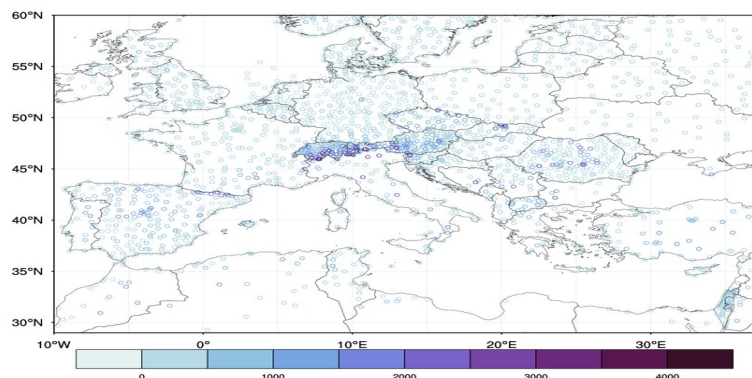
NWP Test Suite – new/ current project

ECMWF Special Project / European Meteorological Infrastructure
Research and Development Projects (EMI R&D Projects) / EMI R&D

"TESTBED FOR THE EVALUATION OF ICON MODEL VERSIONS"
(2027 – 2029)

It has the following resources:

- **B.Us on ATOS (yearly): 5 000 000.00**
- **Accumulated data storage GB (total archive volume): 30 000**



Overview of meteorological observations used for the verification.

➤ **ICON v2024.10 vs. ICON v2025.04** verification module:

- ➔ NWP Test Suite Report **completed**
- ➔ Will be uploaded on the COSMO web page

The statistical scores do not show overall significant differences in favour of one model. Based on the mixed results obtained from the evaluation of **ICON version 2025.04 (new)** against **version 2024.10 (operational)**, it is recommended to **keep the current operational version (v2024.10) as a reference** for the evaluation of the next model version (**v2026.04**) and investigate this further on.

➤ New format for the NWP TS Report

➔ In previous discussions, it was decided to follow the format of the Technical Reports



Consortium

for

Small-Scale Modelling

Technical Report No. xx

Numerical Weather Prediction

Meteorological Test Suite:

S24icon202504 vs S24icon202410

Deutscher Wetterdienst
MeteoSwiss
Ufficio Generale Spazio Aereo e Meteorologia
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Experiment ID	Completed by	Icon version	Simulation periods	Simulation Namelist	Soil IC + domain	Top bound. nudging	BC frequency
S23icon2023	11/05/2023 17/05/2023	2.6.5.1	Jul 2021 Dec 2021	200-2023	ICON-EU	No	3 hours
S23icon202410	22/12/2024 10/12/2024	2024.10	Jul 2021 Dec 2021	2024	ICON-EU	No	3 hours
S24icon202410	31/01/2025 04/02/2025	2024.10	Jul 2021 Dec 2021	2024	ICON-EU	Yes	1 hour
S24icon202504	20/07/2025 13/07/2025	2025.04-1	Jul 2021 Dec 2021	2025	ICON-EU	Yes	1 hour

Table 2: Summary for the main features of the most recent ICON-LAM experiments.

Namelist	Key	Version 2025.04	Version 2024.10
New microphysics setup			
NWP_TUNING_NML	TUNE_SUPSAT_LIMFAC	2	N/A
NWP_PHY_NML	IVARIABLE_RAIN_N0	T	N/A
NWP_TUNING_NML	TUNE_ZOSC	0.25	0
NWP_TUNING_NML	TUNE_VOSNOW	20	-1
Activation of urban module			
LND_NML	UTERRA_URB	T	F
Other modifications			
NWP_PHY_NML	ITYPE_SATPRES_COEFFS	2	N/A
NWP_PHY_NML	ITHERMO_WATER	1	0
NWP_PHY_NML	ITYPE DISSIP HEAT	1	N/A
NWP_TUNING_NML	TUNE_SCSCHFAC	0.5	N/A
NWP_TUNING_NML	TUNE_GRZDC_OFFSET	0.1	N/A
NWP_TUNING_NML	ITUNE_VIS_DIAG	2	N/A
NWP_TUNING_NML	TUNE_BOX_ICE	5.E-2	N/A
TURBDIFF_NML	IMODE_SNOWSMOT	2	1
TURBDIFF_NML	IMODE_TKEMINI	1	N/A
LND_NML	ITYPE_OSKIN_WARM	0	N/A

Table 3: List of the most important namelist changes between ICON versions 202410 and 202504.

2 MODEL OUTPUT VERIFICATION

The Model Equivalent Calculator (MEC) software for the production of Feedback Files and verification scripts based on the R package FFV2 implemented on the ATOS system were employed for Model output Verification, as follows:

- production of feedback-files using MEC (performed on the **Atos HPC machine**; employs part of the available billing units);
- production of model output verification based on feedback-files using the FFV2 (performed on the ECS interface);
- additionally, conversion of observations from bufr to netcdf format (using bufr2netcdf) can also be performed on the ECS interface, using the **bufr2netcdf** utility.

Do we keep it in the Technical Report format?

- **ICON v2024.10 vs. ICON v2026.04** verification module:
 - ➔ Processing of ICON model output will begin as soon as possible.

Thank you!