

ACCORD

A Consortium for COnvection-scale modelling
Research and Development

Posters Session, chaired by Javier Calvo

All Staff Workshop 2023

A-LAEF migration to Bologna and extreme weather forecasts

- **A-LAEF TC2 migration to Bologna**

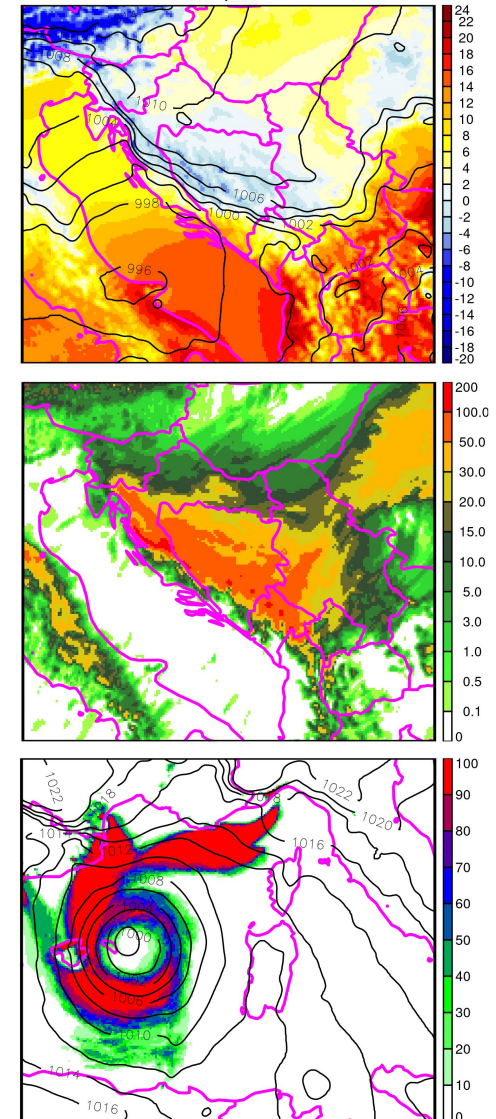
- technical upgrades, current configuration
- operational since 19 Oct 2022 (Atos)
- products available by 02:10/14:10 UTC

- **case studies**

- heavy snowfall in Dalmatia
- storm Juliette near Balearic Islands

- **convection-permitting EPS**

- new NEC HPC (240 nodes) at SHMU
- EPS (2.4 km/87 lev) coupled to A-LAEF

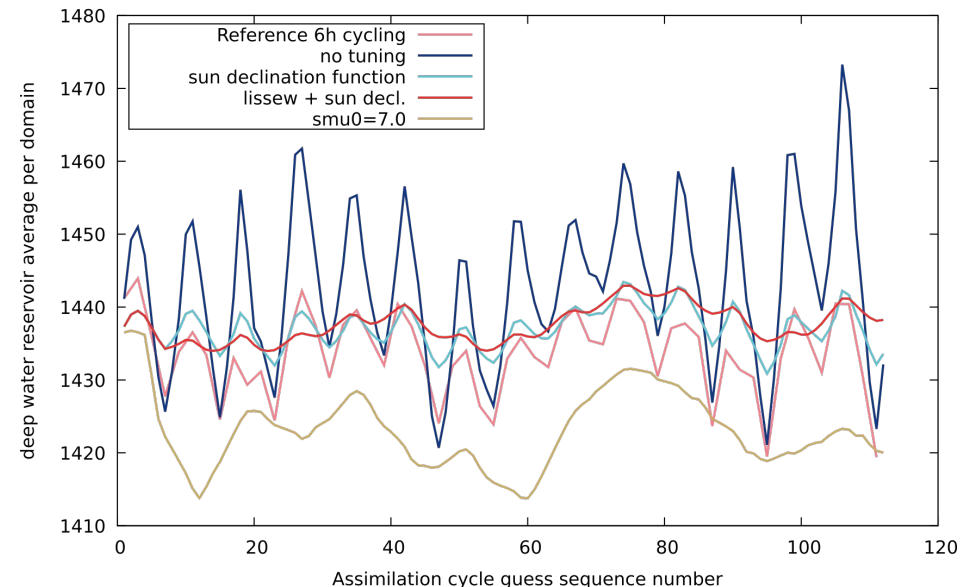


Numerical Weather Prediction activities at CHMI

- **Operational configuration**
 - ALARO-1vB
 - news: ALARO with prognostic graupel
 - e-suite of cycle 46t1mp
- **HPC systems**
- **Porting and validation of CY46T1**
 - Reported bugs (fullpos, canari, IO server)
 - Optimizations and vectorizations
 - Implementing remaining scientific development
- **Deep soil analysis oscillations**
 - “Jumpiness” of forecast in summer
 - Proposal of sun declination function to CANARI
 - LISSEW key in CANARI debugged



Average of PROFRESERV.EAU, 3h cycling, period 1-14.6.2022



Highlights AEMET activities

Status of operational suite: Now including SEVIRI data

- WV6.2 and WV7.3 (IR13.4 not)
- Slight positive impact

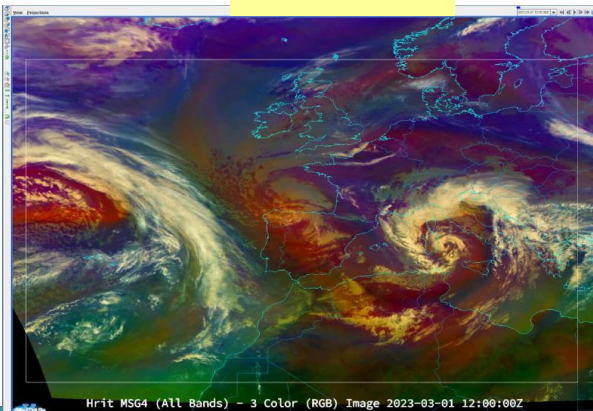
Nowcasting e-suite running in real time

- H+12 runs every hour with 23 min cutoff time
- Conventional obs, radar reflectivity and fast processing GNSS. On-going Mode-S

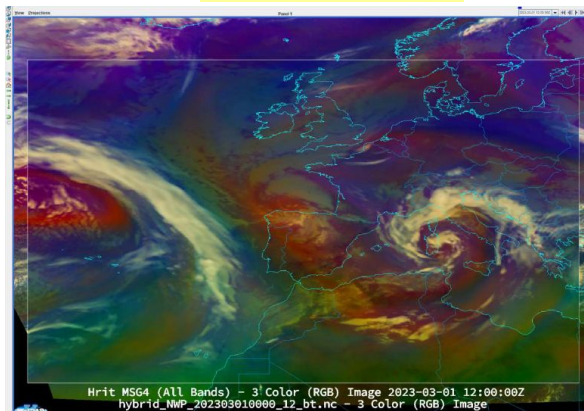
Simulated satellite images based on RTTOV 13.0

- Realistic synthetic images are produced in real time
- Powerful tool for model evaluation and monitoring

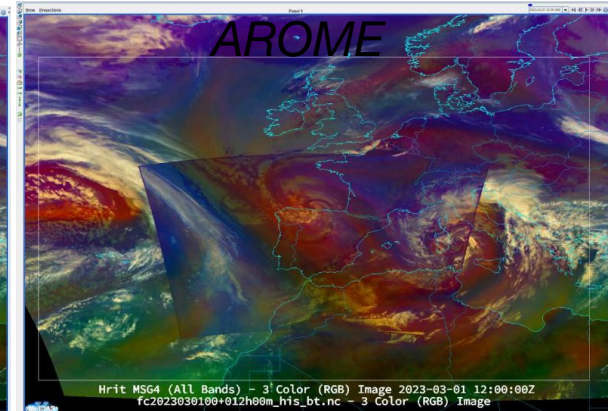
MSG-4



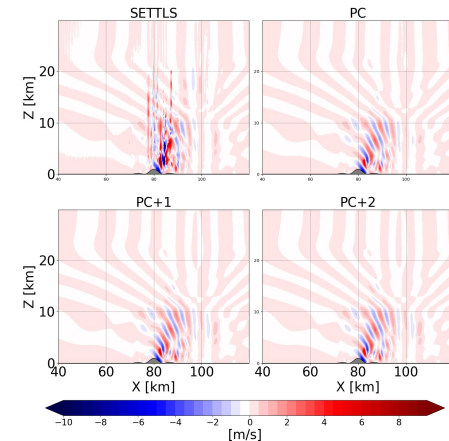
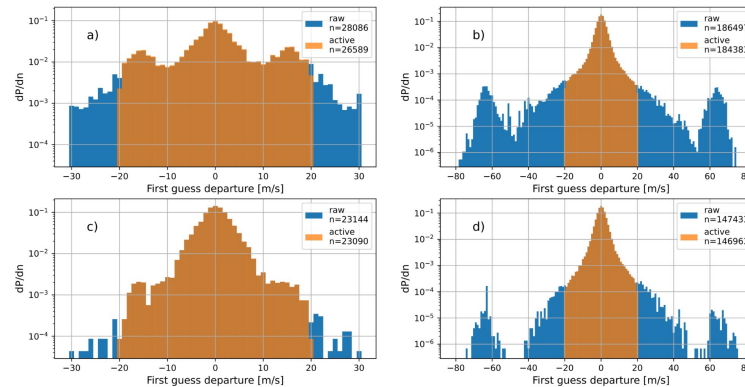
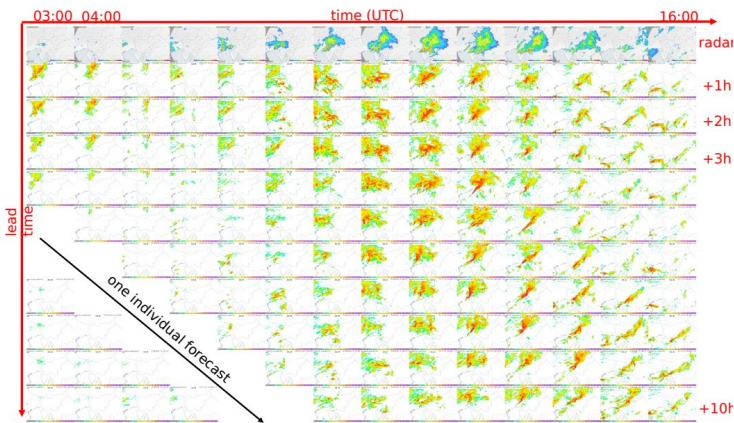
ECMWF



HARMONIE-
AROME



ACCORD activities in Slovenia 2023



- RUC (dx=1.3km) validation with respect to convection
 - investigate the ability to simulate convective activity in progress
 - examine intra-run model consistency

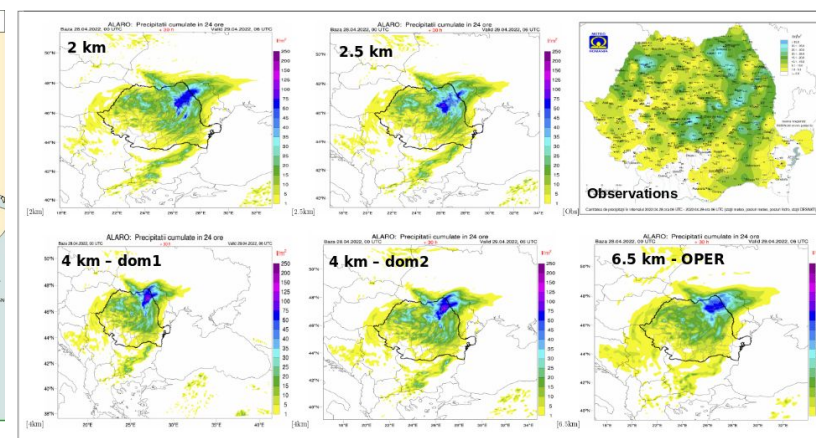
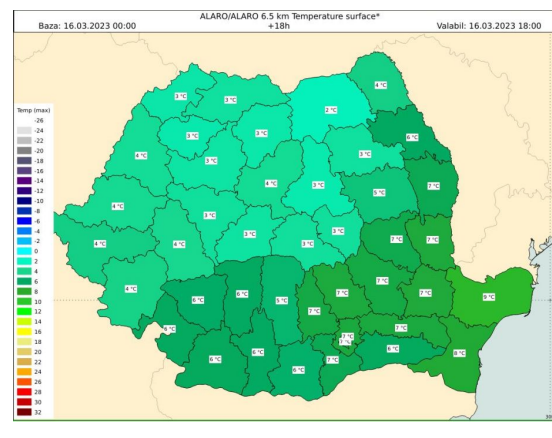
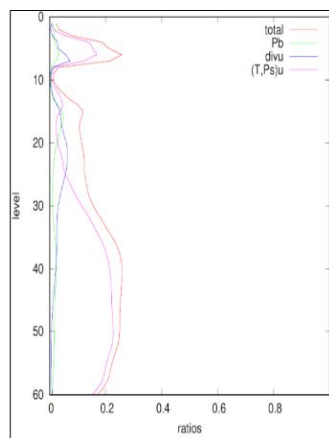
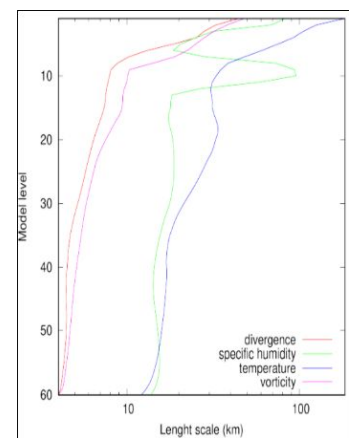
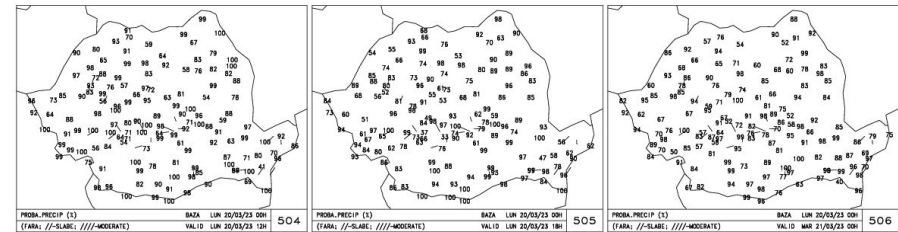
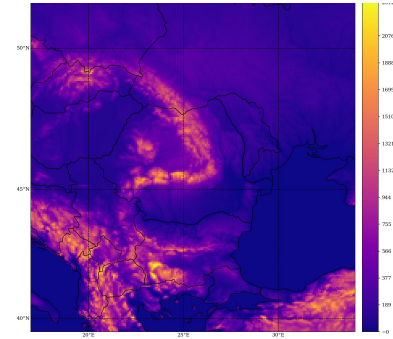
- Validation of wind dealiasing
 - significant improvement of radial wind measurements,
 - quality comparable to aircraft and radiosounding data,
 - included in HOOF.

See presentation on Wednesday.

- Stability analysis of NH model
 - SETTLS found to diverge compared to PC scheme (dx=dz=500m, dt=15s)

National Poster Romania

- Operational configurations overview
- Sensitivity tests for ALARO with different resolutions
- Feedback on ALARO performance
- B matrix computation for ALARO 4 km
- MOS for ALARO 4 km
- New visualisation system Visual Weather



ExtractGrib - A new tool to get the data you need from your HARMONIE-AROME forecast.

Everyone wants something different!

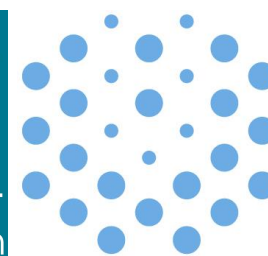
UWC West - a new multi-nation collaboration on a single NWP forecast system.

- Existing applications.
- What our forecasters know.

extractGrib allows

- Independent choice per institute
- Ease of configuration
- ecFlow integration
- Understands your HARMONIE-AROME config_exp.h
- 'STREAMS', sub-hourly

ESPRESSO		FRAPPE	
Affogato	\$ 5.00	Coffee Frappe	\$ 5.00
Cafe Latte	\$ 4.20	Vanilla Frappe	\$ 4.20
Cappucino	\$ 3.00	Matcha Frappe	\$ 3.00
Macchiato	\$ 4.50	Mocha Frappe	\$ 4.50
White Mocha	\$ 5.00	Milk Tea Frappe	\$ 5.00
TEA		SMOOTHIE	
Fruit Tea	\$ 3.75	Blueberry	\$ 5.00
Green Tea	\$ 4.50	Mango	\$ 4.20
HerbalTea	\$ 4.50	Lemon	\$ 3.00
Raspberry Tea	\$ 4.25	Cocolate	\$ 4.50



United
Weather
Centres

Operational NWP at Met Éireann

Overview of operational NWP suite

- Model configuration
- Ensemble details

Operational verification

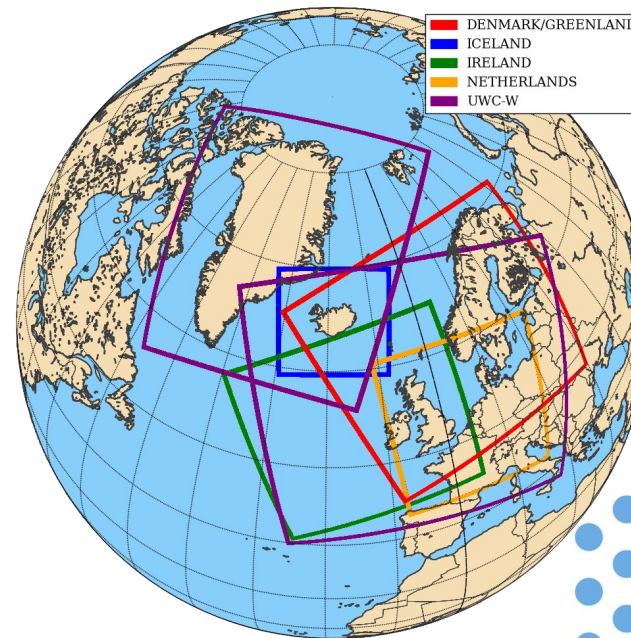
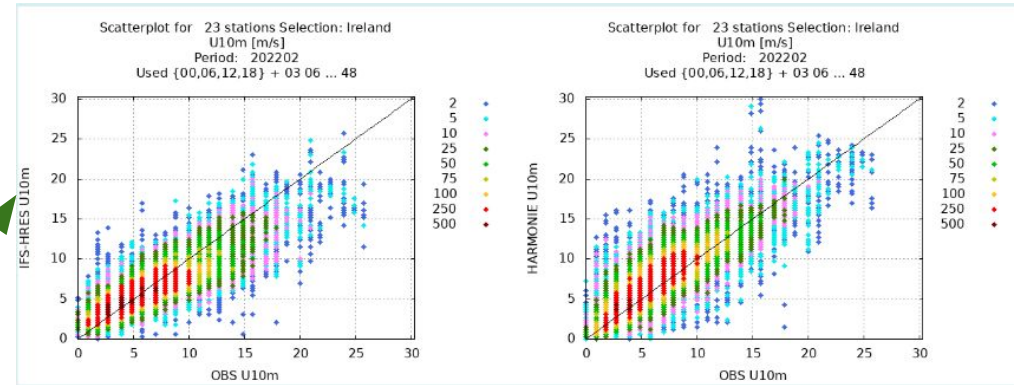
- Scorecard
- Stormy period (Spring 2022)

Experiments

- Single precision
- Vertical resolution

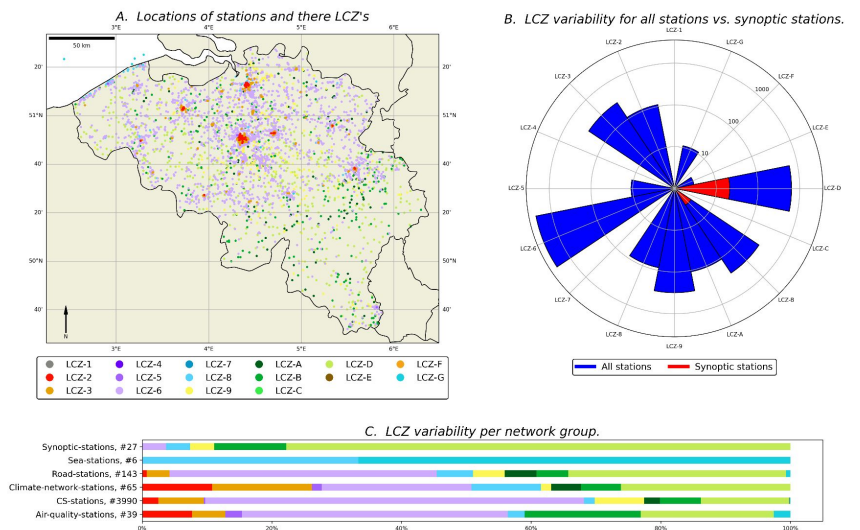
Future plans

- High resolution nowcasting
- UWC-West Joint operations



Belgium national poster

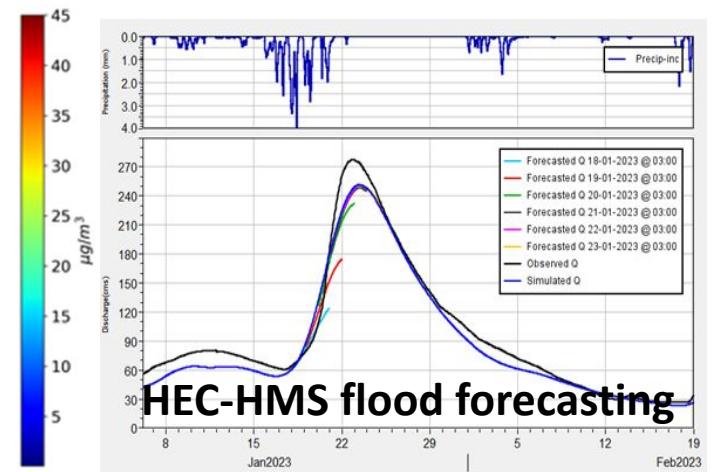
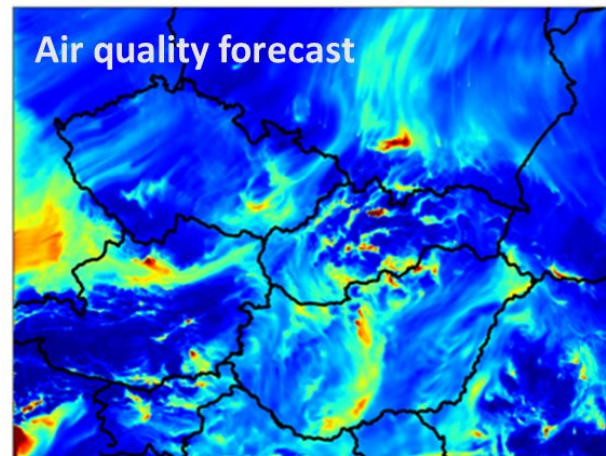
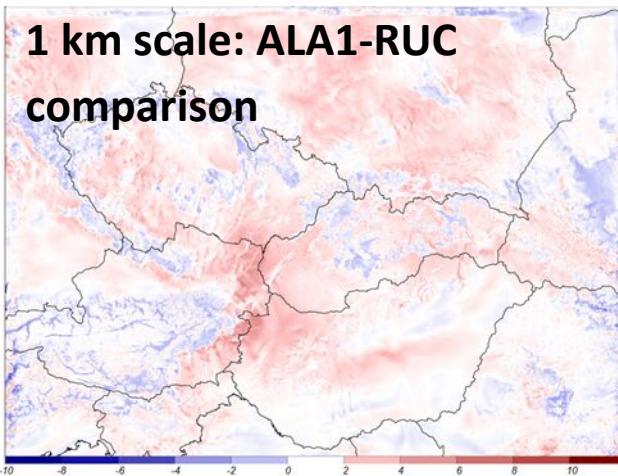
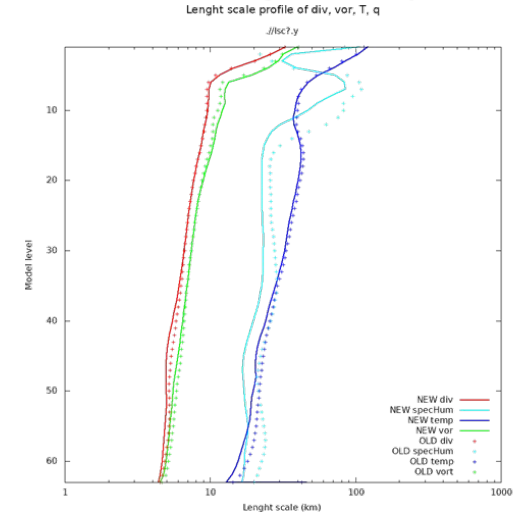
- **Operational forecasts:**
 - HPC becoming too old and unreliable
 - porting to ATOS (Bologna)
- **Adoption of ACCORD codes to GPU's**
- **CS-MASK (Crowd Sourced data for Modelling at Sub-Kilometer scale)**



NWP Activities at SHMÚ

- Operational developments (BlendVar, B-matrix)
- 1 km resolution (RUC) and hectometric scale models
- Applications in Hydrology and Air quality modeling
- Offline Surfex validation
- EPS (see the A-LAEF poster - Martin Belluš)

BlendVar: Length scale profiles



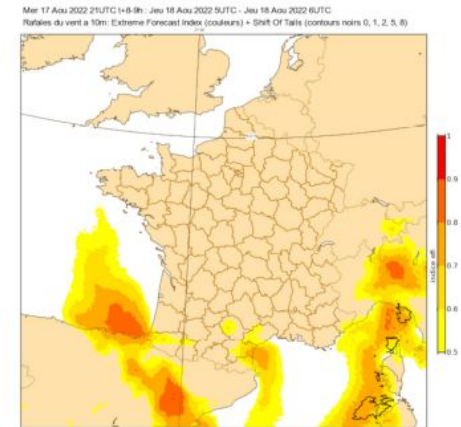
Meteo-France NWP systems

Operationnal suite : CY46T1_op1 (June 2022)

- Arpege EPS and Arome EPS have the same resolution than their deterministic counterpart :
Tl1798 c2.2 L105 and 1.3 km L90
- New Arpege physics : Tiedtke deep convection scheme, 1D sea-ice scheme, etc.
- And much more: assimilation of MW rainy cloudy observations, linear interpolators for hydrometeors and no diffusion, new version of the Ecume oceanic surface fluxes scheme, etc.

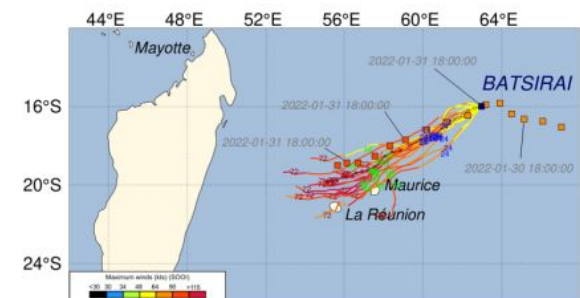
Next e-suite: CY48T1_op1, to start by 2023 Q1

- OOPS in 3DVar and 4DVar analyses
- Assimilation : 3DENVAR Arome, hybrid B matrix in Arpege 4Dvar
- Arome EDA : 50 members (instead of 25 currently)
- Physics : EcRad (Arome), use of SST from Mercator-Océan global model and enhancement of Tiedtke deep convection scheme (both for Arpege), change of aerosol and ozone climatologies (from CAMS, Arome)

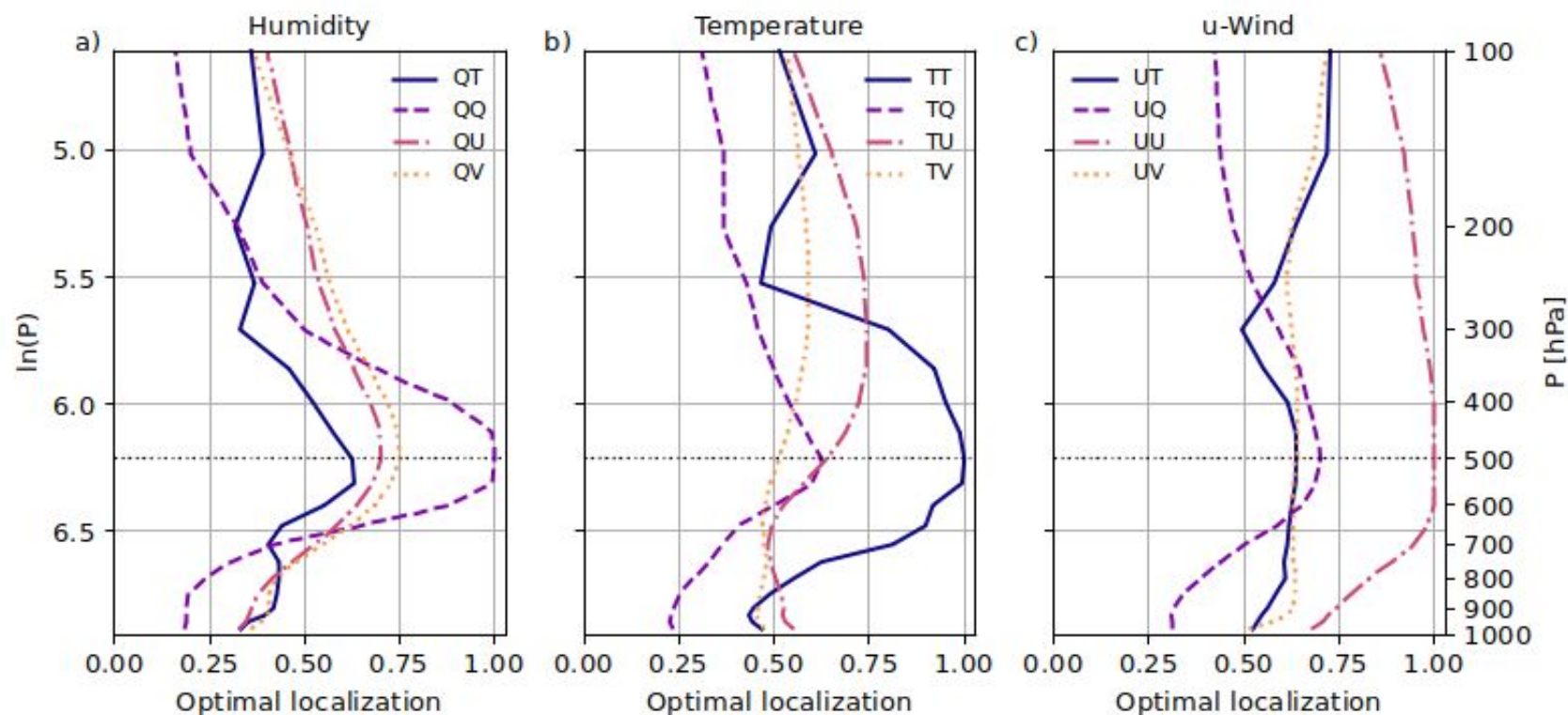


In between :

- Transfer to operations of EFI and SOT diagnostics on Arpege EPS and Arome EPS
- **Arome overseas EPS in operations since February 2023 !**



Guidance on how to improve vertical covariance localization based on a 1000-member ensemble



We find that the optimal localization is highly variable dependent, and quantify how beneficial various localization approaches are.

Testing the AROME Hybrid 3DEnVar for convective-scale NWP over Austria

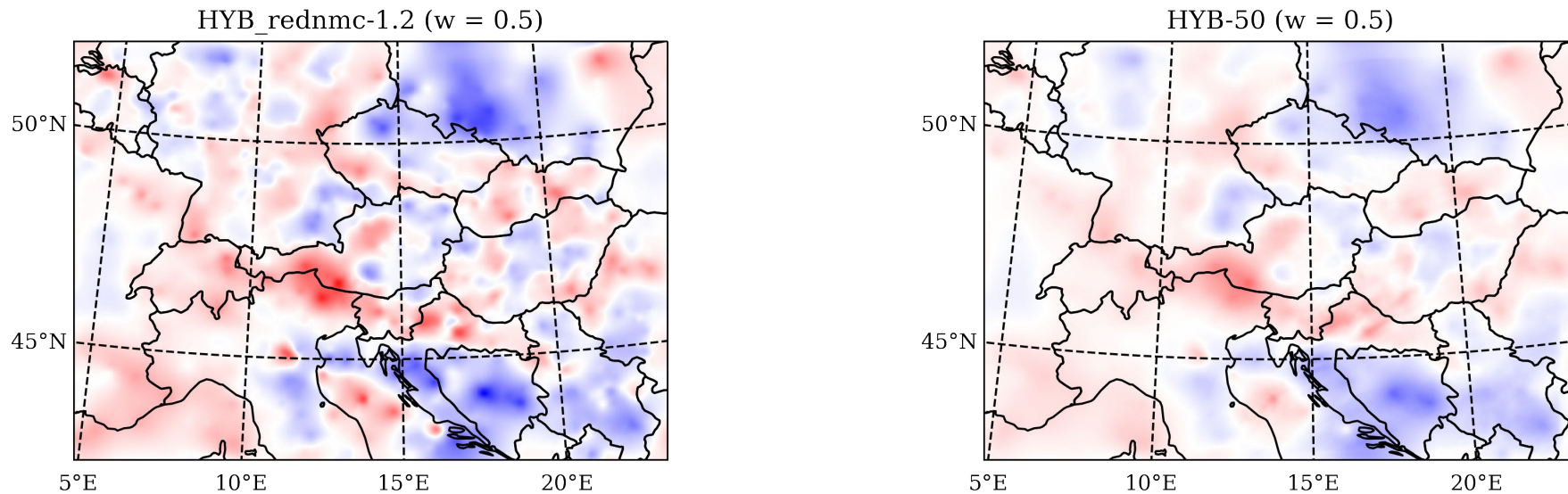


Figure caption: Analysis increments at 250 hPa from assimilation of aircraft temperature

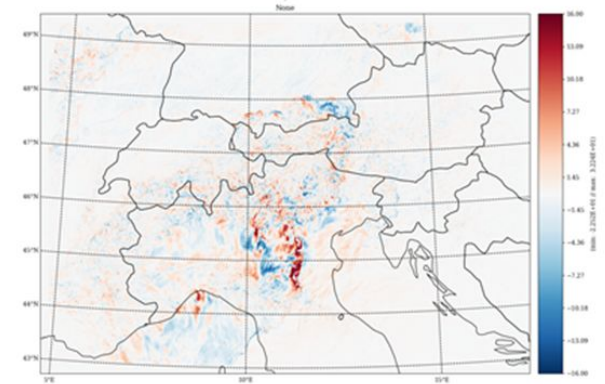
We investigate the approach to determining the balanced weighting of static and ensemble components of background covariances in Hybrid-3DEnVar.

National Poster Austria

Operational settings and changes/plans



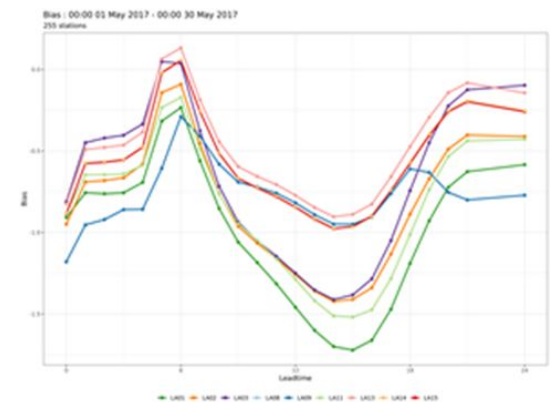
Tests with windfarm parametrization AROME1.2/0.5km



mobile phone microwave link assimilation (Lopez scheme)

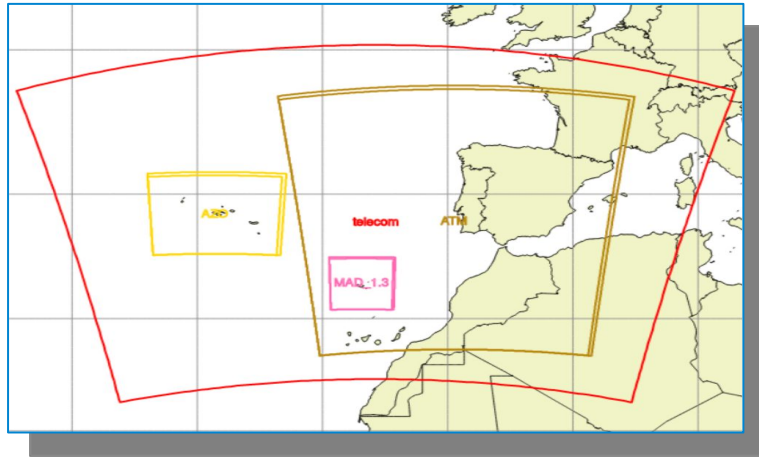


Leaf area index assimilation in Surfex offline



Portuguese Status on SRNWP

Re-design of the Portuguese (SR)NWP system



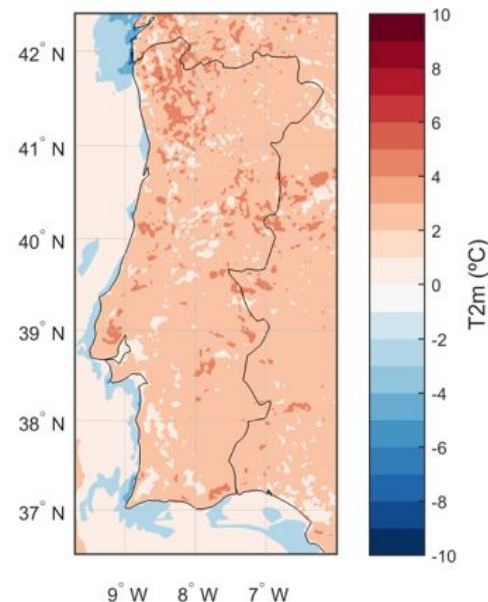
T2m AROME Cy43t2
Diff Canopy - Geleyn
13/07/2022 Step 06



Looking for synergies

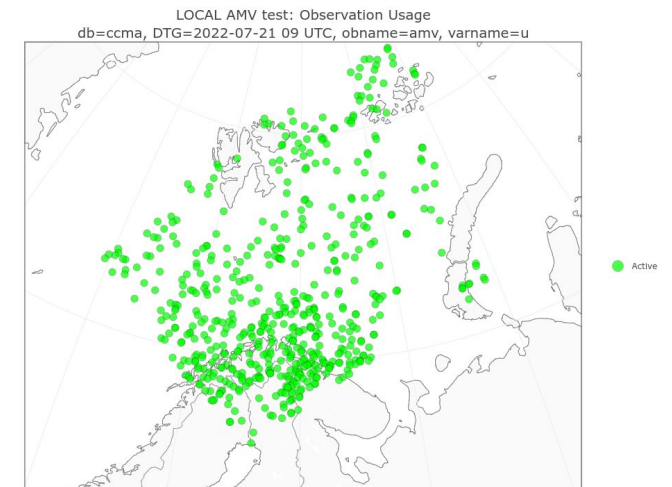
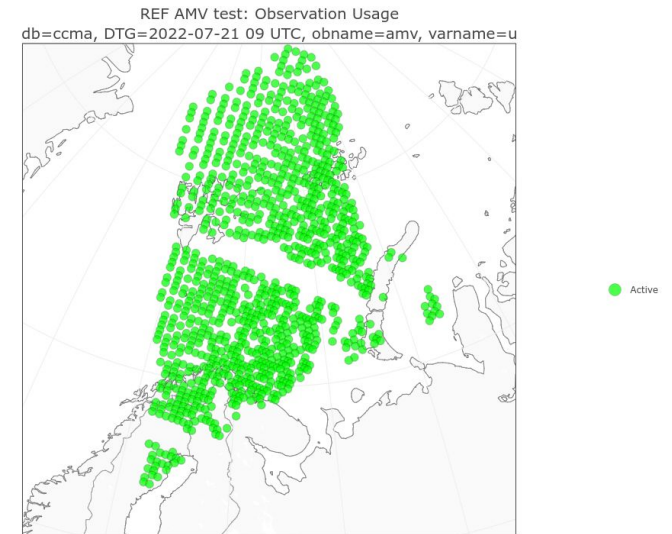


Validation of the AROME operational configuration
over mainland Portugal considering the fuel state



Use of locally processed polar winds in Arome-Arctic

- A solution for processing of the US satellite base polar wind was found using NWC/PPS-HRW v7.P processing package since April 2022.
- The resolution of the locally processed wind data is lower than that of the dual winds provided by EUMETSAT.
- Impact study was conducted for both winter and summer periods.
- Blacklisting was needed to efficiently assimilate the new observations.
- Despite the resolution difference, the locally processed winds provides comparable relative impact to that already used in operational.
- There is a room for improvement of the resolution of new observations
- A strategy for operational implementation can be worked out.



ACCORD in Poland

Operational setup:

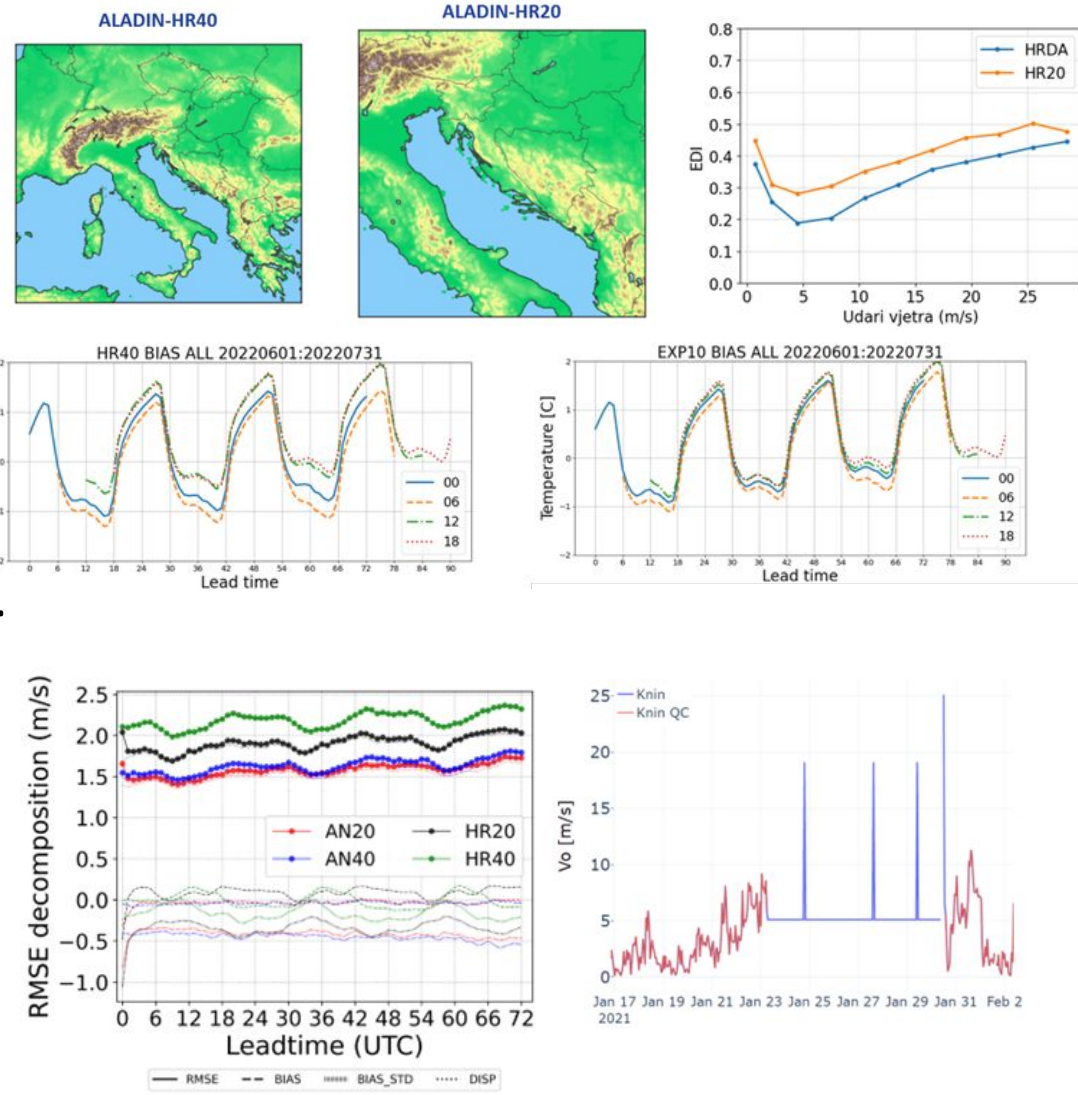
- No changes

Main activities and results:

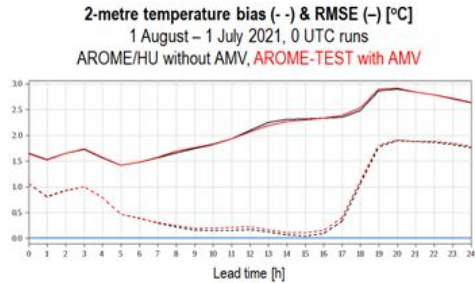
- **Studies of Urban Boundary Layer** dynamics with use AROME cy43 (res. 1 x 1 km) and vertical profiling up to 300 m a.g.l.
- Analysis of **derecho case** from 11 Aug 2017 - model AROME cy43
- Analysis of the **air temperature** forecast error in NWP models depending on the type of atmospheric circulation

NWP activities at Croatian Meteorological and Hydrological Service

- The new operational model configurations (from 06.02.2023.)
 - ALADIN-HR40; ALADIN-HR20; verification
- Problem with jumpiness of T2m forecast
 - Tuning of surface assimilation
- Post processing
 - comparison of analog wind speed gusts forecasts generated by HR20 vs. HR40 configuration
- Temporal and spatial QC
 - a quality assurance method - a user-friendly tool developed to automatically flag suspicious data (t, ws, mslp, rh)



NWP activities at the Hungarian Met Service



Extra GEOWIND & HRWIND data from 800–350 hPa:

- Mostly neutral impact
- Significant (but < 0.02 °C) bias difference for 2m temperature & dewpoint

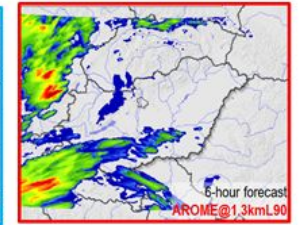
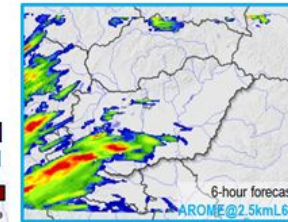
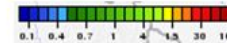
Operational assimilation of AMV in AROME/HU

Forecast experiments for 8–21 July 2021:

- Improved precipitation overestimation in the first forecast hours
- Degradation in wind gust forecasts



3-hour precipitation [mm]
6 UTC, 18 July 2021



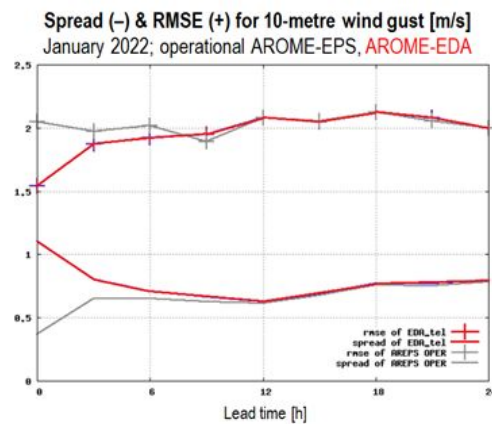
Impact of new EDA B-matrix and 1.3kmL90 resolution in AROME

Operational implementation of EDA in AROME-EPS

Post-processing of AROME-EPS radiation forecasts

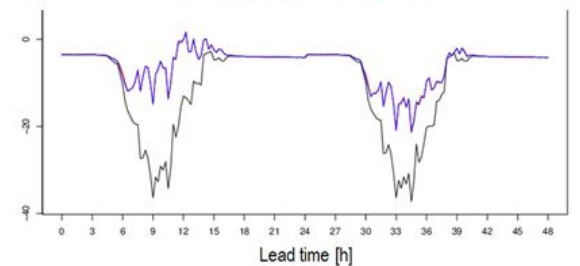
Experiment & e-suite for winter:

- Less improvement wrt. summer run
- Positive impact for 10m wind & gust
- Lower 2m dewpoint & temperature



- Ensemble model output statistics
- Verification from October 2022 to February 2023
- Improved CRPS for the first/second forecast day by 11/7%

Radiation bias [W/m²]; location: Debrecen
Raw AROME-EPS, censored logistic, censored normal



NWP Activities at TSMS

- **Operational Configurations & Parallel Suite**
 - ALARO-TR (Operational, no change)
 - AROME-TR (Operational, LBC from ALARO-TR)
 - AROME-RUC (Parallel Suite, no change)
- **HPC Systems at TSMS** (No change)
- **Calibration Tests of Multi-Model 2-M Temp Forecast Ensembles**
 - 8 model members from 4 models used to create EPS
 - BMA datasets: training and testing
 - Pairs of obs and model data are used
 - Forecast time up to 48 hours
 - BMA vs. Kalman Filter
- **Interactive Web Page for A-LAEF Outputs**
 - Ensemble mean for surface variables
 - Spaghetti plots for upper air variables
- **Future Plans**
 - Addition of new observation types into DA System
 - Adaptation of operational HARP System
 - Adaptation of C-LAEF for Turkish domain

