

*Regional Cooperation for
Limited Area Modeling in Central Europe*



RC LACE overview 2024

Martina Tudor on behalf of the MG and many researchers



ARSO METEO
Slovenia

NMSs of Austria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia

Common operational applications:

- OP-LACE is a common observation pre-processing system
- ensemble prediction A-LAEF

Common research activities

www.rclace.eu

Regular meetings LACE Steering Committee (LSC) Meeting 2x year, WVs and WGs mostly merged with ACCORD

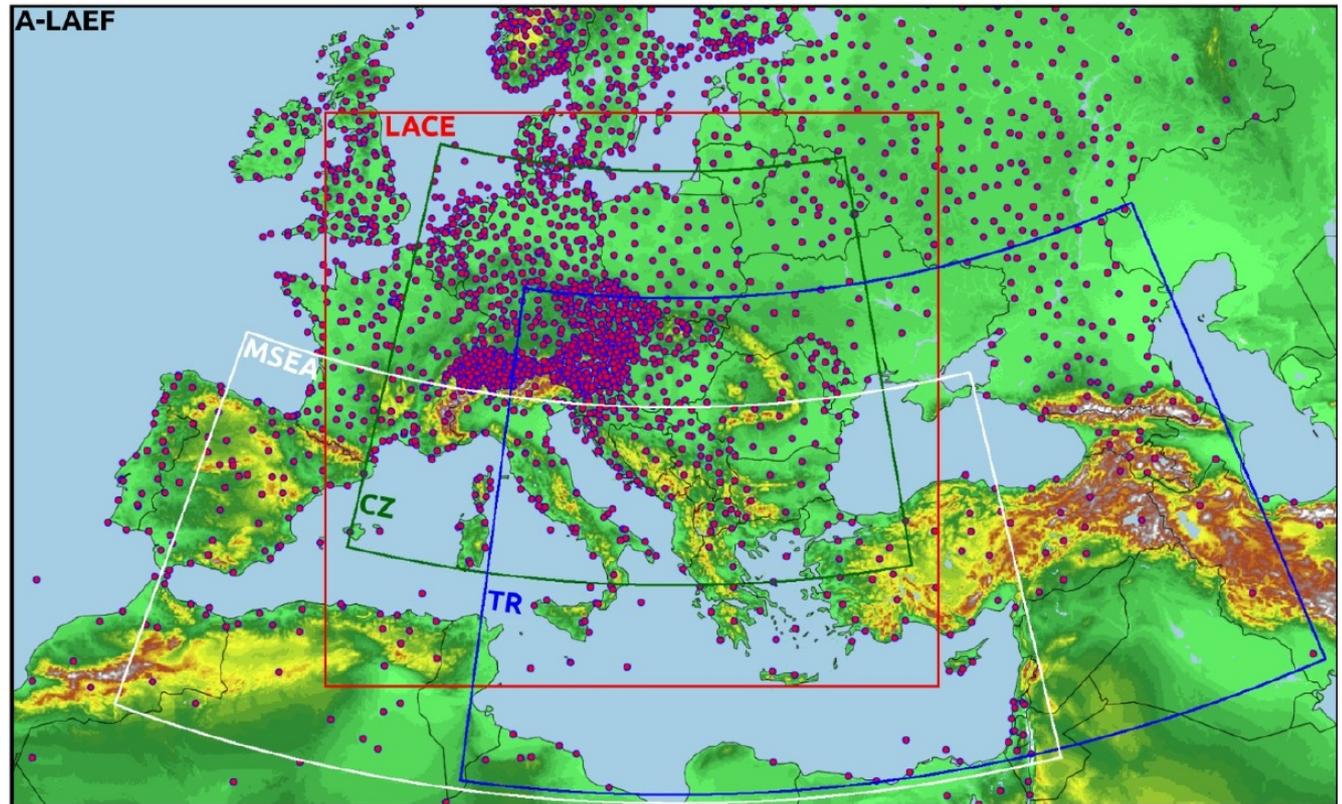
- ▶ Programme Manager: Martina Tudor
- ▶ Area Leaders
 - ▶ **Applications and Verification: Simona Tasku**
 - ▶ **Data Assimilation: Antonin Bučánek**
 - ▶ **Dynamics: Petra Smoliková**
 - ▶ **Physics: Mario Hrastinski**
 - ▶ **Predictability: Clemens Wastl**
 - ▶ **System and Code: Oldrich Španiel**
 - ▶ **Data Manager: Alena Trojaková**

Data Assimilation Operational Systems

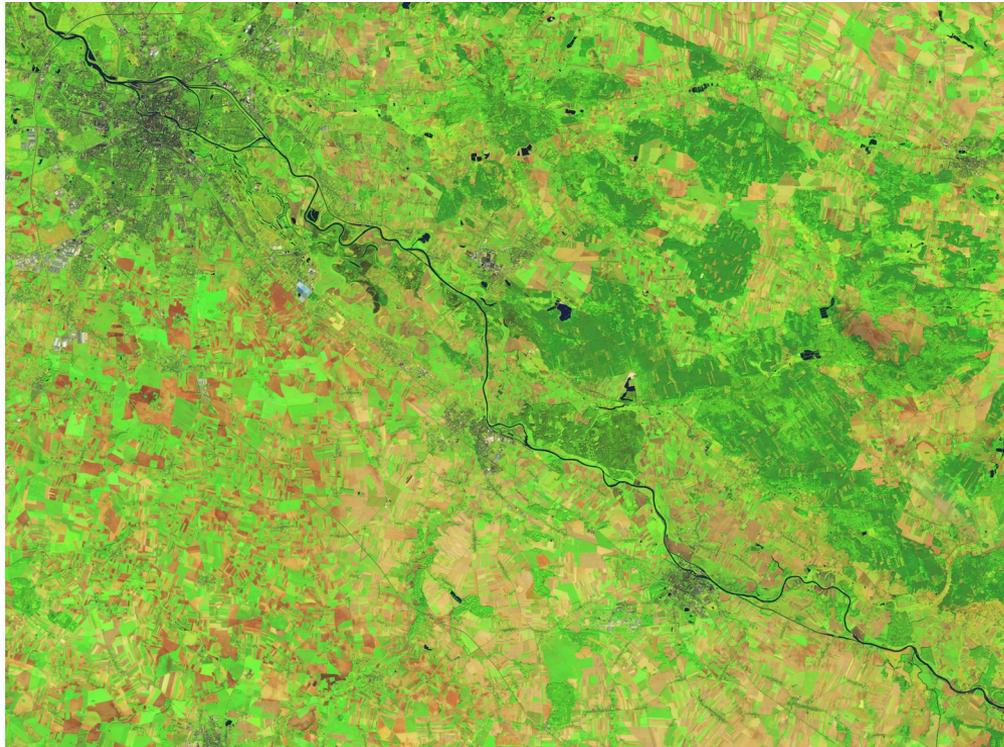
DA	AUSTRIA AROME	CROATIA ALARO	CZECH REP. ALARO	HUNGARY ALARO	HUNGARY AROME	SLOVAKIA ALARO	SLOVENIA ALARO
Resol	2.5L90, 600 x 432	4.0L73 480 x 432	2.3L87-NH 1069 x 853	8L49 349x309	2.5L60 490x310	4.5L63 625x576	4.4L87 432 x 432
Cycle	43t2bf11	43t2bf10	46mp_op3	cy40t1	Cy43t2bf11 Migration to cy46	cy46t1bf07	43t2_bf10
LBC	IFS 1h (lagged)	IFS 1h (lagged)	ARP 3h	IFS 3h (lagged)	IFS 1h (lagged)	ARP 3h	IFS 1h/3h (lagged)
Method	OImain MESCAN + 3d-Var	OI + 3D-Var + Jk	OI + BlendVar	OI + 3D-Var	SEKF + 3D-Var	OI + BlendVar	OI + 3D-Var
Cycling	3h	3h	3h	6h	3h	6h	3h
B matrix	EDA on C-LAEF	EDA	EDA	EDA	EDA	-	Downscaled ECMWF ENS
Initialization	No (SCC)	No (SCC)	IDFI in production, SCC	DFI	No	No	No (SCC)
Obs.	Synop + AS Amdar/ Mode-S EHS EU, AMV Temp, ASCAT, Snowgrid/MODIS snowmask, ceilometer	Synop Amdar/MRAR AMV Temp Seviri Radar RH (OPERA)	Synop + AS (soil) Amdar/MRAR/EH S-EU) HRW, Profiler, Temp, ASCAT, Seviri,	Synop + AS Amdar, AMV, Temp, Seviri AMSUA/MHS	Synop + AS GNSS ZTD Amdar/MRAR Temp AMV+HRW	Synop + AS, TEMP, HRW, AMDAR, MRAR	Synop + AS Amdar/MRAR/ EHS, AMV, Temp Seviri AMSUA/ MHS/ IASI, ASCAT/ OSCAT, E-GVAP ZTD (passive)

A-LAEF (Martin Belluš)

- ▶ operational domain
- ▶ frames are dissemination domains
- ▶ data points in ensemble surface data assimilation (ESDA)
- ▶ run in ECMWF as TC2 app
- ▶ using SBUs from Croatia, Slovenia and Turkey



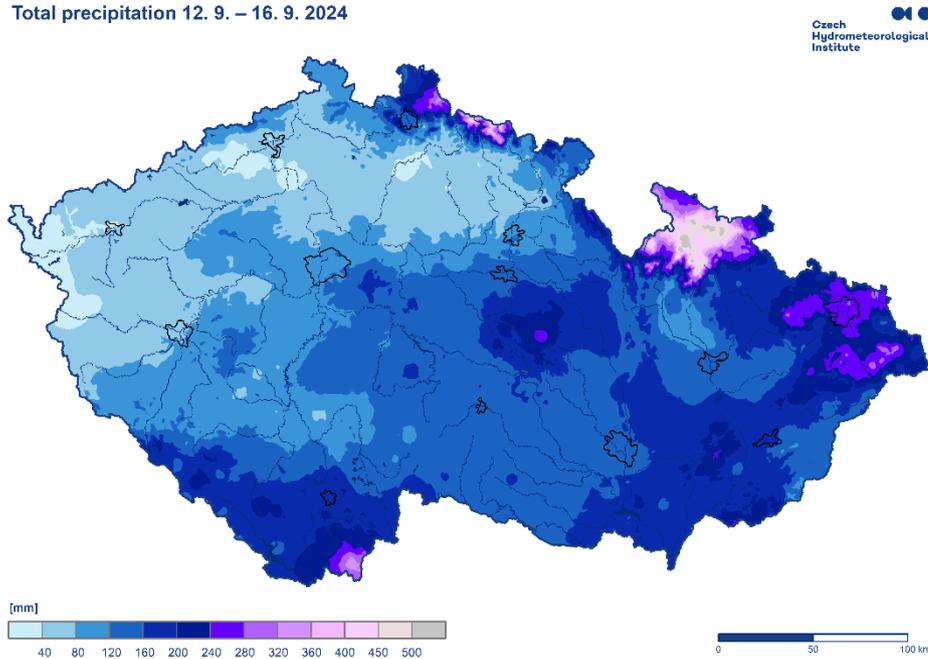
Storm Boris: Poland



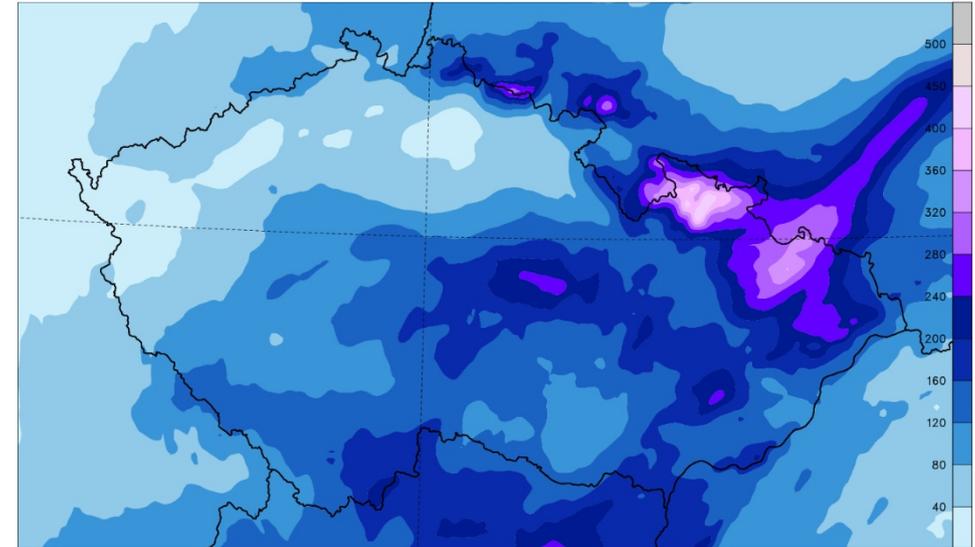
NASA Earth Observatory, southwest Poland, river Odra, 4th and 20th September 2024
<https://earthobservatory.nasa.gov/images/153358/rivers-in-europe-burst-their-banks>

Storm Boris: Czechia

Total precipitation 12. 9. – 16. 9. 2024



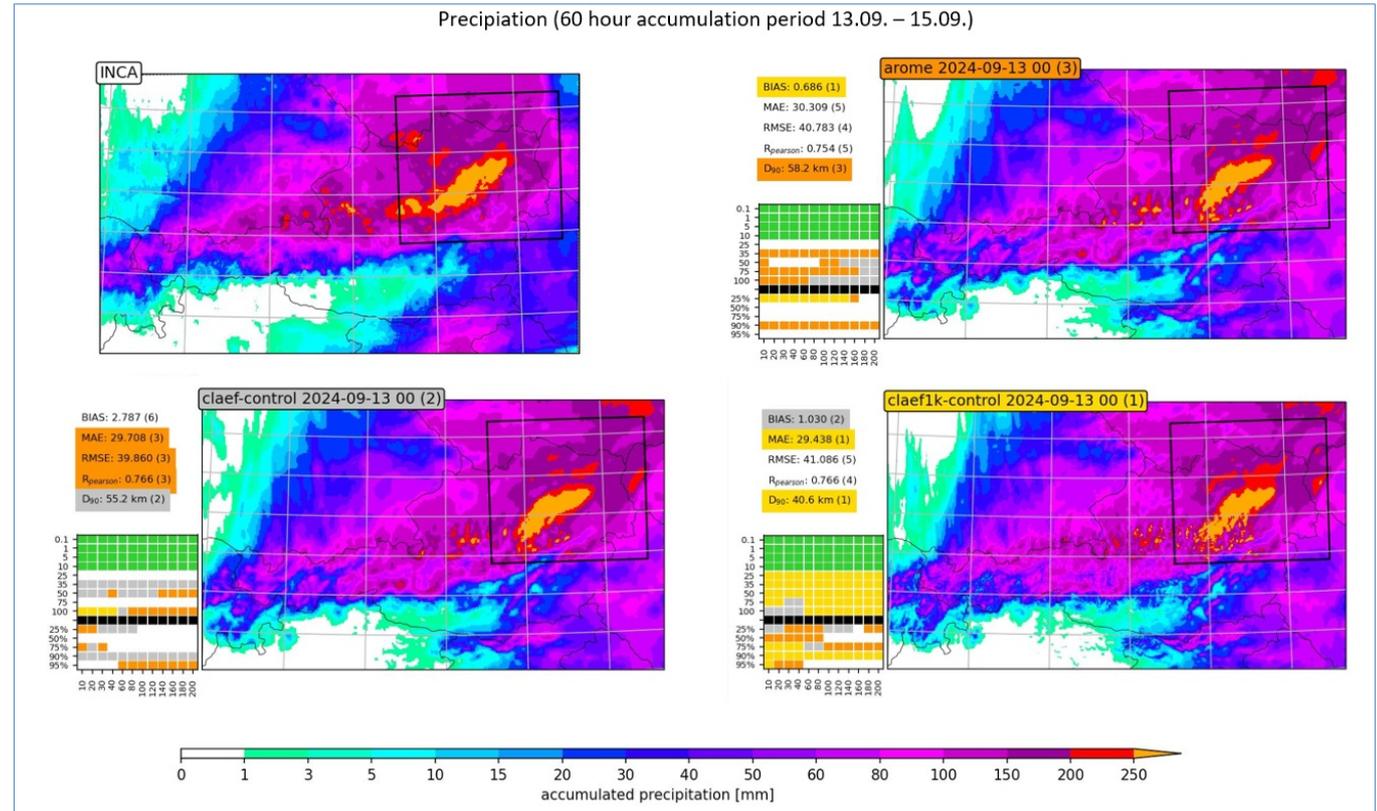
Interpolated rain gauges observations over period from 12/09 06 UTC to 16/09 06 UTC



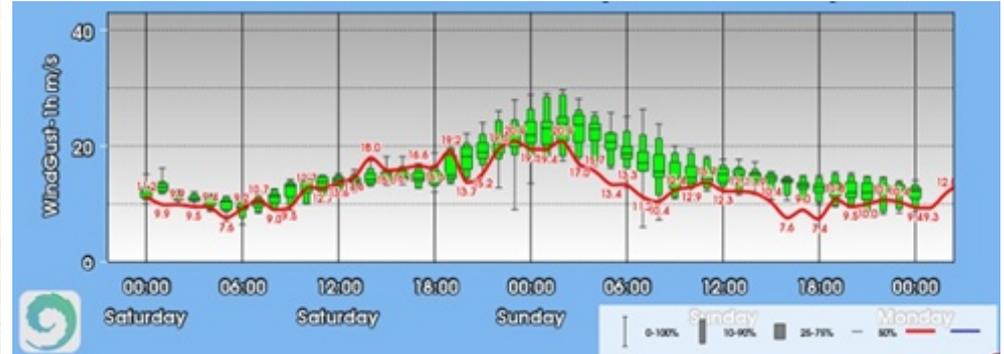
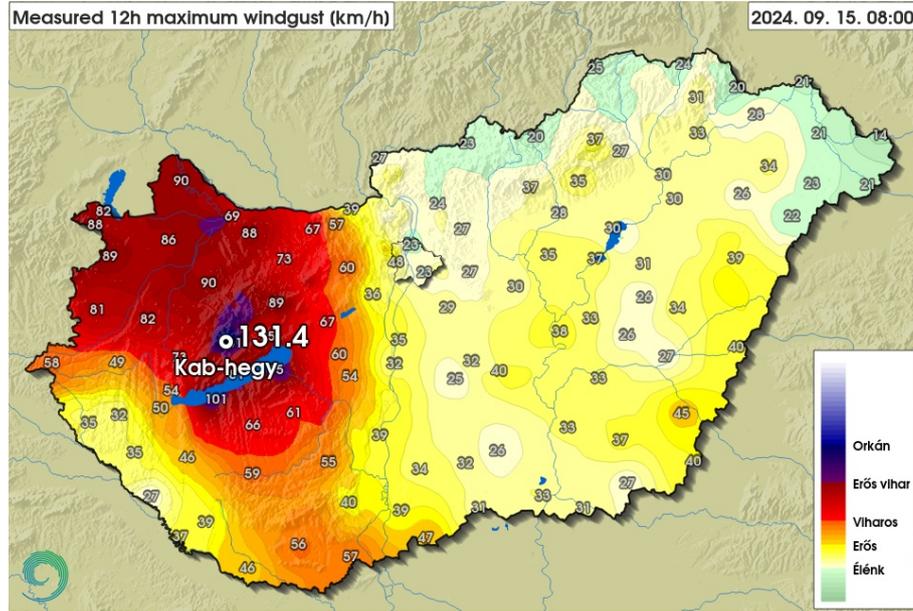
Total precipitation forecast by Alaro/CE 2.3 km: Consecutive sums of 24 h accumulations each day from 00 UTC, ranges +6 h to +30 h.

Storm Boris: Austria

- Flood event fortunately „high predictability“ event
- Good indication by global models days in advance (-> „red warning“)
- LAMs finally helped to identify extreme peaks (finally > 400mm/5d)
- Pre-oper C-LAEF 1k with best scores for AT



Storm Boris: Hungary



Wind gust forecast of **AROME-EPS** initialized at 0 UTC on 14 September and corresponding **observations** for Veszprém (located in the vicinity of Kab).

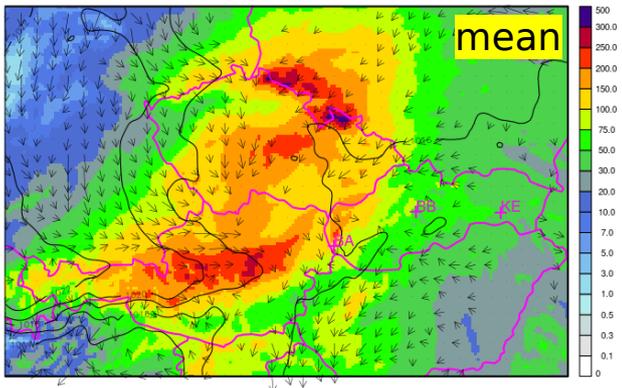
Maximum of the wind gust measured in the preceding 12 hours at 8 UTC on 15 September

In addition to precipitation, high wind conditions

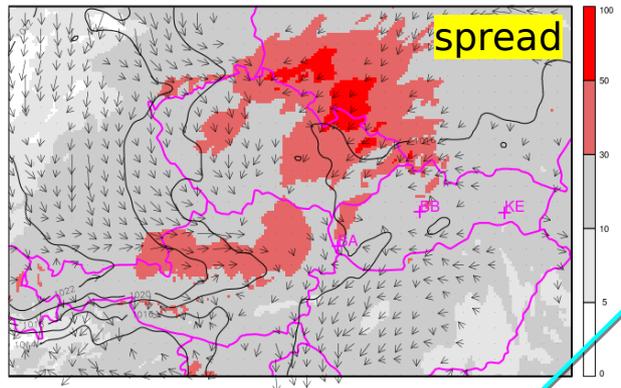
A-LAEF (CY46T1) e-suite +108 h

(Storm Boris: precipitation totals Sep. 12-16, 2024)

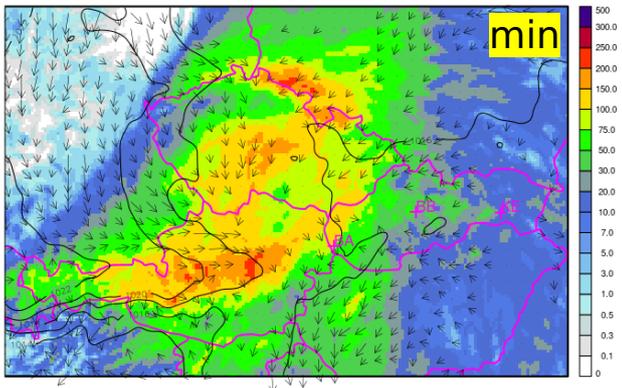
[A-LAEF CY46T1] PRECIP [mm] (MEAN) + WIND and MSLP (CTRL run)
run: 12/09/2024 00 UTC | val: 12/09/2024 00 UTC + 108 h | MAX= 322.08



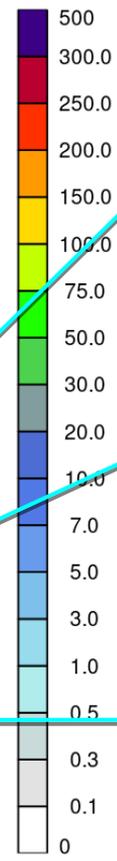
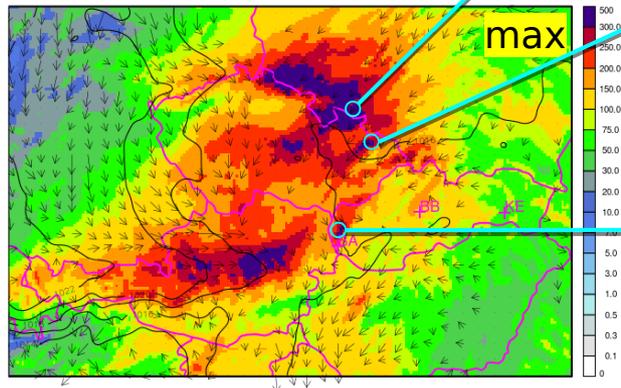
[A-LAEF CY46T1] PRECIP [mm] (SPREAD) + WIND and MSLP (CTRL run)
run: 12/09/2024 00 UTC | val: 12/09/2024 00 UTC + 108 h | MAX= 87.67



[A-LAEF CY46T1] PRECIP [mm] (MIN) + WIND and MSLP (CTRL run)
run: 12/09/2024 00 UTC | val: 12/09/2024 00 UTC + 108 h | MAX= 245.76



[A-LAEF CY46T1] PRECIP [mm] (MAX) + WIND and MSLP (CTRL run)
run: 12/09/2024 00 UTC | val: 12/09/2024 00 UTC + 108 h | MAX= 498.43



Głucholązy (PL)



Opava (CZ)



Stupava (SK)

- ▶ OPLACE Maintenance and Development
 - ▶ Extension with more snow data (HU, CH)
 - ▶ BUFR, NOAA-21, upgrades ...
- ▶ OPLACE Data Exchange
 - ▶ non GTS stations
 - ▶ MODE-S data exchange
 - ▶ EMADDC upgrades
- ▶ ODB support
 - ▶ implementation of surface DA
 - ▶ HARP IO

	Number of national stations	Update WRT 2023
Austria	203	-0/+1
Croatia	24	-0/+6
Czech Republic	89	-0/+0
Hungary	107	-4/+2
Romania	134	-0/+0
Slovakia*	98	-0/+2
Slovenia	12	-0/+0
Poland	172	-2/+1
Total:	839	-6/+12



More presentations on RC LACE work

- ▶ POSTERS!
- ▶ in Verification: Natalia Szopa Mon 14:45
- ▶ In physics David Nemeč Tue 12:00
- ▶ Data Assimilation: Antonin Bučanek Tue 13:40
- ▶ Dynamics: Petra Smolikova Wed 11:45
- ▶ Predictability: Clemens Wastl Thu 8:30
- ▶ Applications: Jan Mašek Thu 11:30
- ▶ Parallel sessions
 - ▶ **Surface: Martina Tudor**
 - ▶ **Physics: Mario Hrastinski**

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Thank you for your attention.

