

Operational suite

3 operational configurations:

- **ALADIN-HR4:** 4km, 73 levels, ALARO phy.; CANARI+3D-Var with 3h cycle (no DFI); 72h fcs. (with DFI), ECMWF LBC (lagged mode), 4 runs per day (00, 06, 12, 18 UTC)
- **ALADIN-HR2:** 2 km, 37 levels, SSDFI, 48h fcs., ALADIN-HR4 LBC, 1 run per day (06 UTC)
- **ALADIN-HRDA:** 2 km, dynamical adaptation (DA) of wind starting from ALADIN-HR4

Backup of DHMZ operations on ECMWF&EWC

Backup NWP operations:

- An earthquake hit Zagreb on 22 Mar 2020 during COVID-19
- DHMZ's headquarters (where HPC and other servers are located) was severely damaged

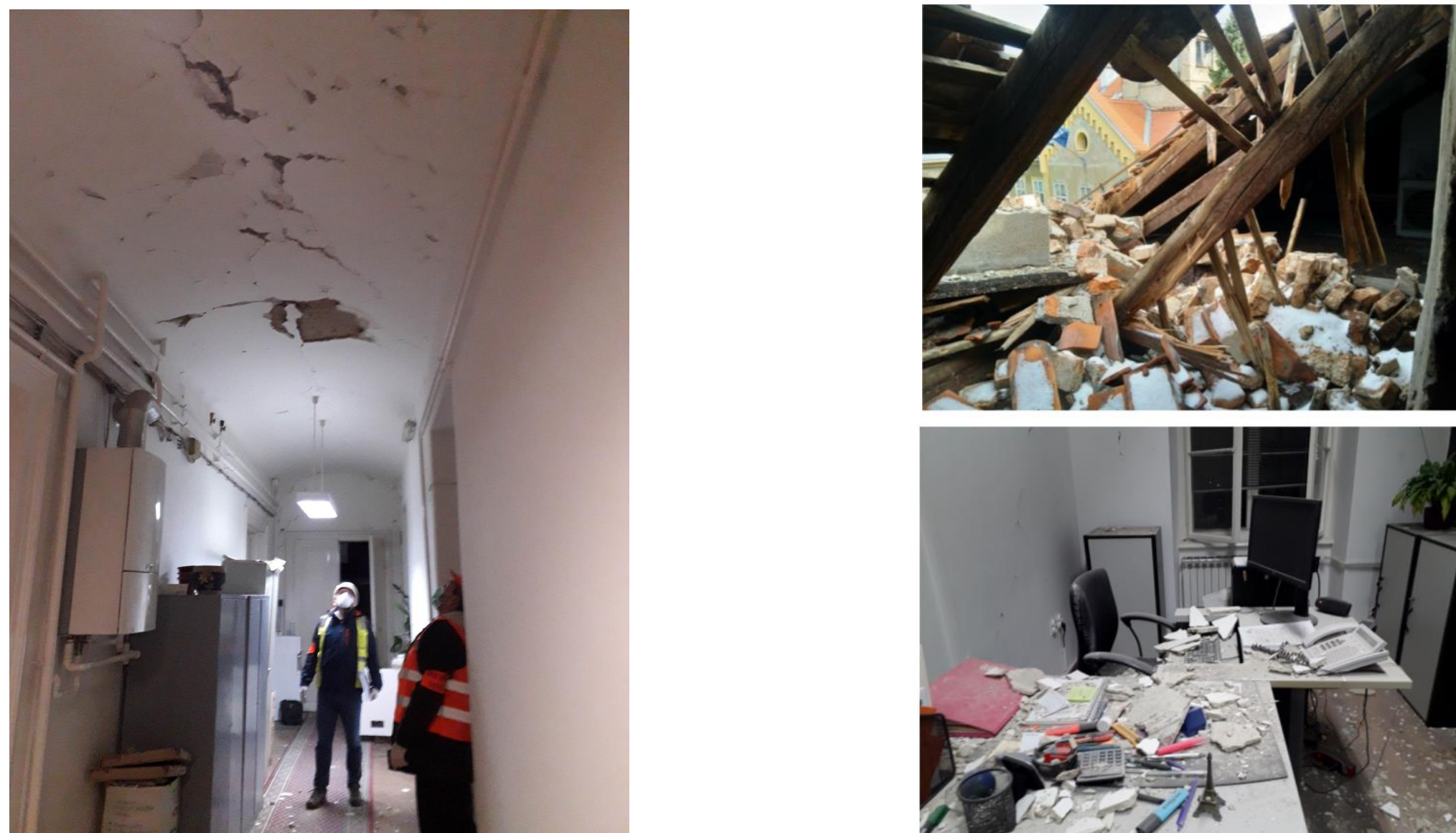


Fig. 1. DHMZ headquarters: consequences of the earthquake in Zagreb on 22 Mar 2020

- Quick decision was made to make a backup of DHMZ's NWP operations using off-site resources
- ECMWF's High-Performance Computing Facility (HPCF) seemed as an obvious choice for NWP & postprocessing
- For some production lines e.g. for exposition of products to forecasters, European Weather Cloud (distributed Cloud Computing infrastructure) was used
- Future plans: continue backup operations until new HPC is fully operational
- More details can be found in ECMWF newsletter Number 164 - Summer 2020: <https://www.ecmwf.int/en/newsletter/164/news/croatian-met-service-backs-its-production-ecmwf-after-earthquake>



Postprocessing & Plotting

New postprocessing & plotting:

- Developing of the new postprocessing & plotting system using python/EPyGrAM/shell environment to boost flexibility (e.g. adding new user with specific needs), which includes:
 - Visualisation (maps, cross-sections, meteograms,...)
 - Derived ascii products (json, txt, xml, csv,...)
 - On-line verification (using SYNOP and AWS)
 - Analog-based statistical postprocessing
 - Model and OBS database and web app for users

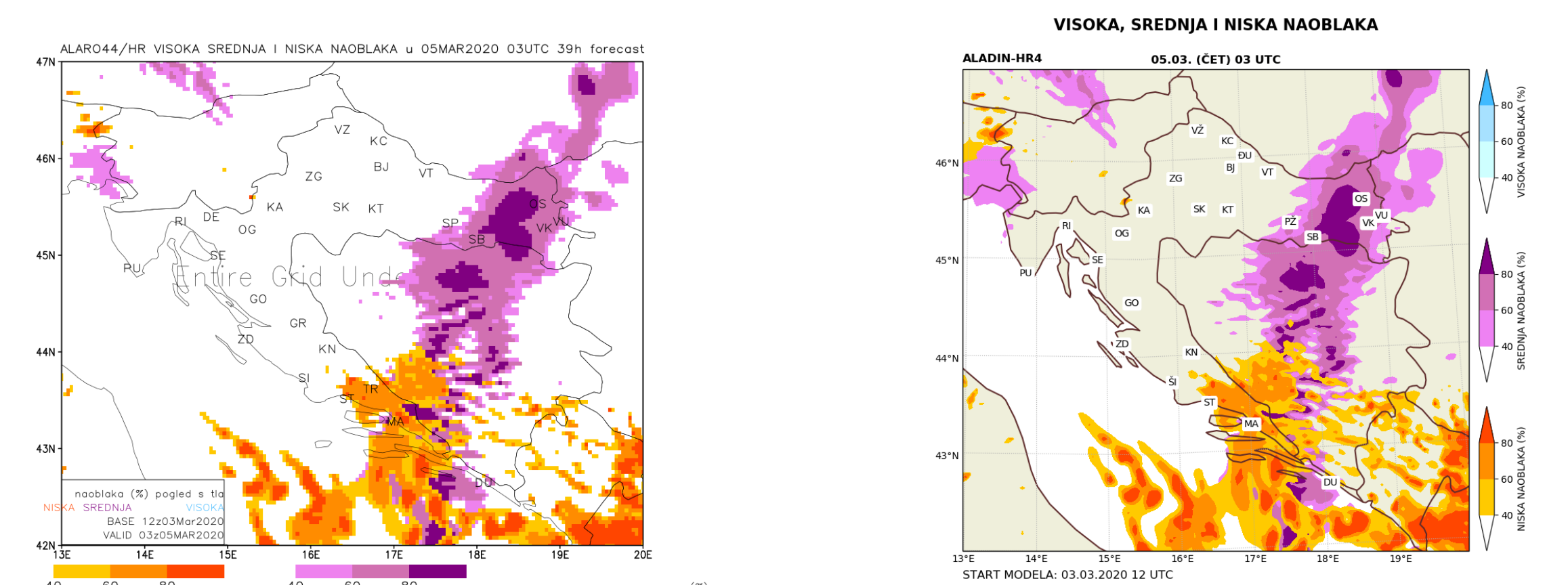


Fig. 2. An example of old (left) and new (right) spatial plot of high, middle and low cloudiness.

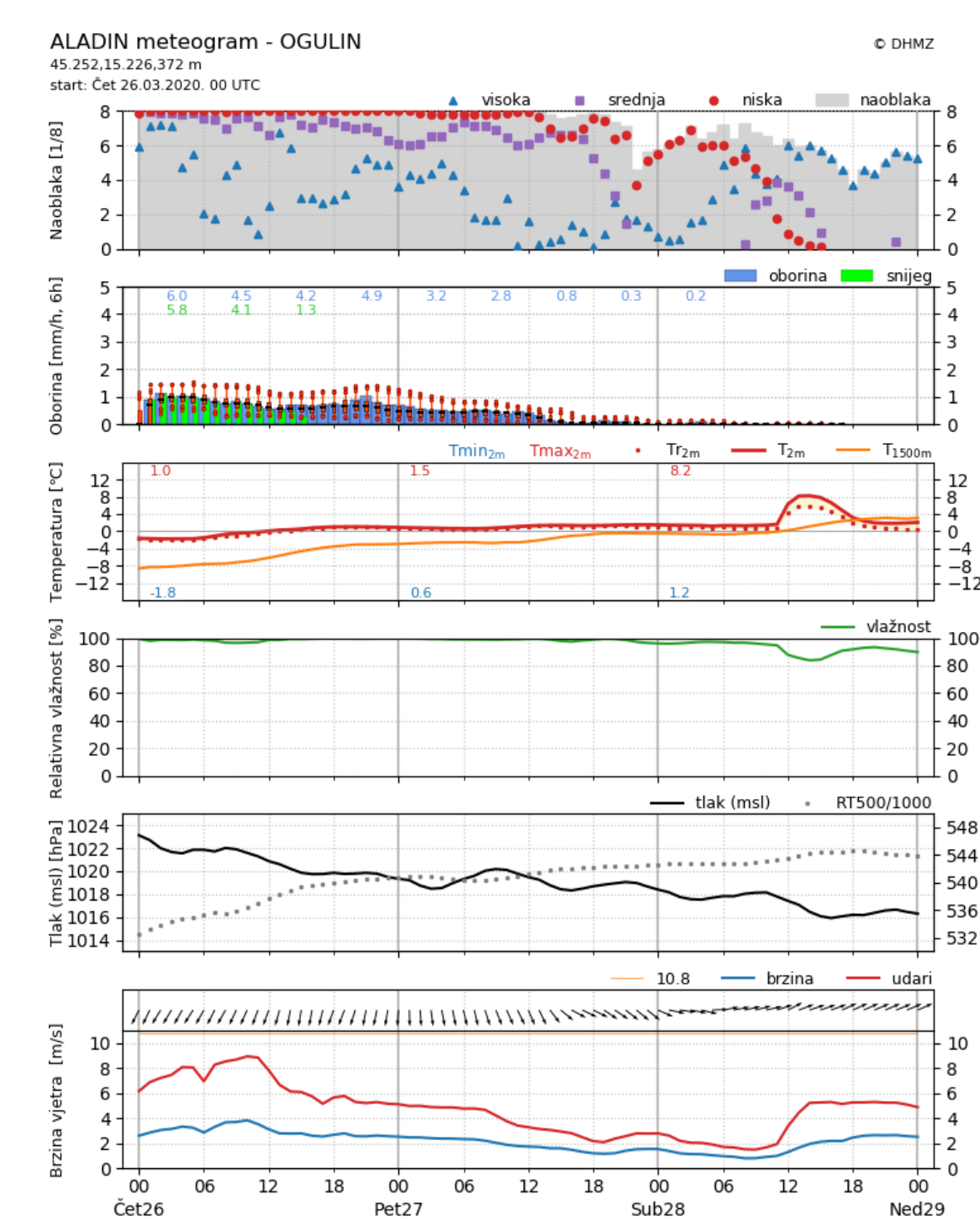


Fig. 3. An example a new meteogram with probabilistic precipitation

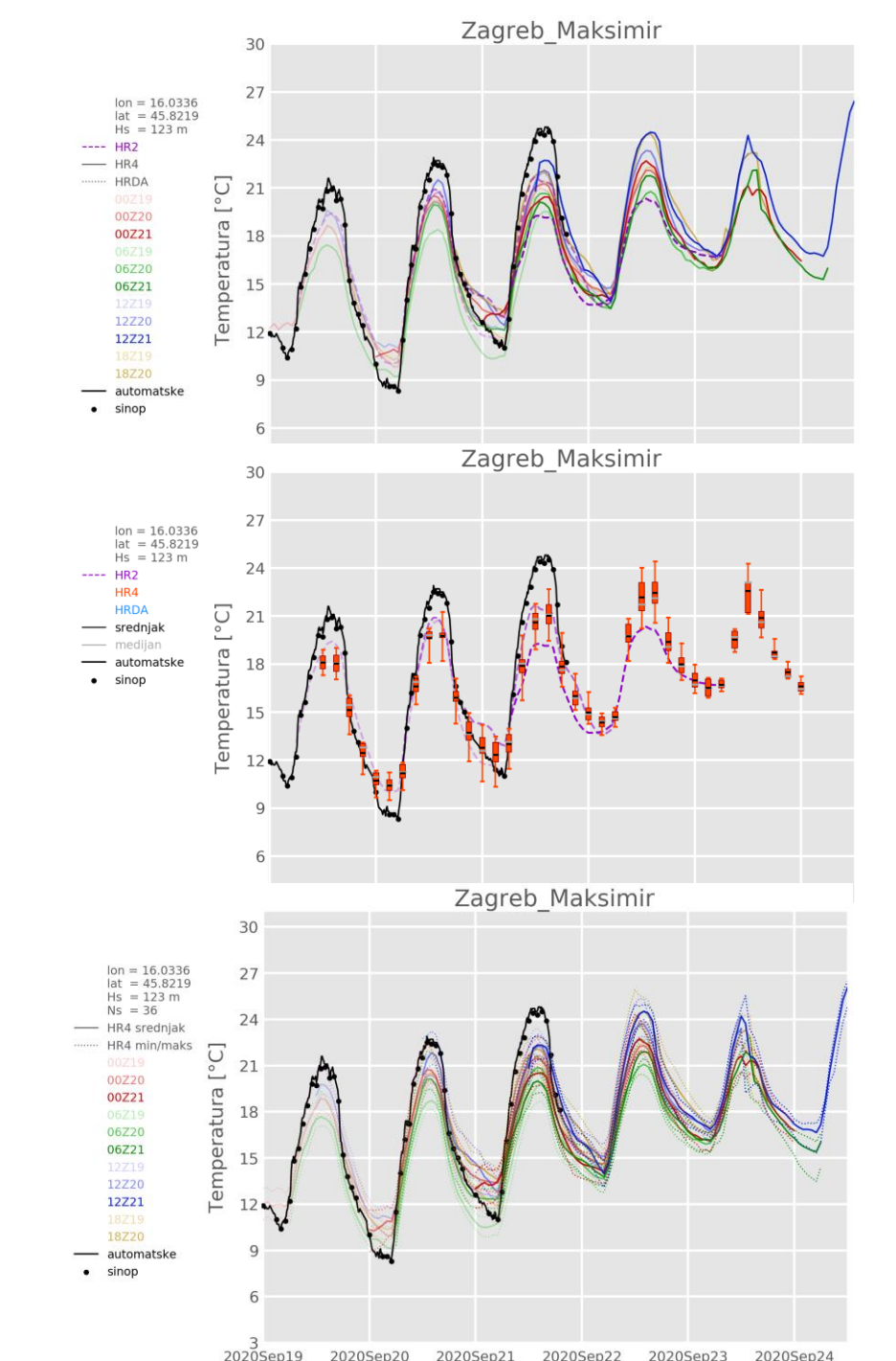


Fig. 4. An example of on-line verification: multirun (top), lagged eps (middle), neighborhood eps (bottom)

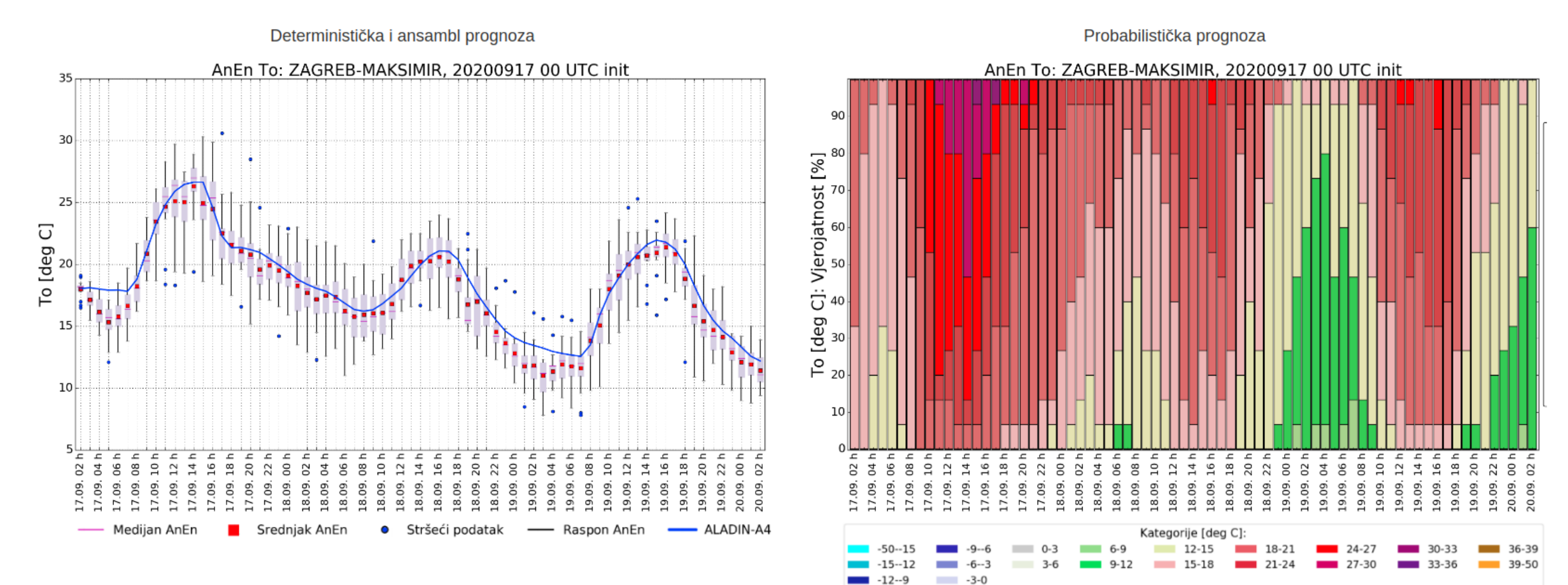


Fig. 5. An example of operational analog-based ensemble forecast output for 2mT at Zagreb-Maksimir

South-East European Multi-Hazard Early Warning Advisory Warning System

WMO project SEE-MHEWS-A

- DHMZ's main role is verification of precipitation forecasts for 18 southeastern European countries
- Goal is to deliver country-specific verification reports
- NWP models involved:
 - ECMWF
 - ALADIN
 - COSMO
 - ICON
 - WRF-NMMB



Fig. 6. SEE-MHEWS-A target countries

- Using and enhancing open-source VERIF python package
- Continuous, categorical, neighborhood approaches
- ECMWF and ICON are available up to date

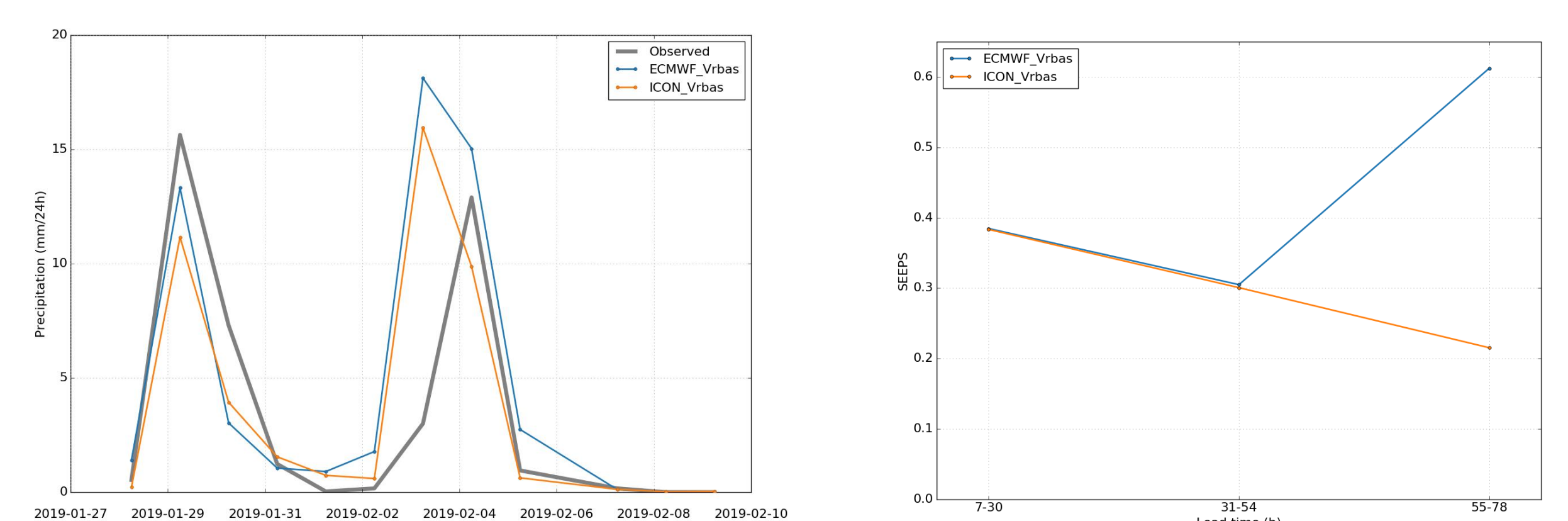


Fig. 7. Comparison of 24-h precipitation time-series (left) and SEEPS score (right) for of ECMWF&ICON