

Operational suite

• 4 configurations:

- **ALADIN-HR8:** 8km, 37 levels, ALARO phy.; CANARI+3D-Var with 6h cycle (no DFI); 72h fcs. (with DFI), ECMWF LBC (lagged mode), 4 runs per day (00, 06, 12, 18 UTC)
- **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, 24h fcs., ALADIN-HR8 LBC, 1 run per day (06 UTC)
- **ALADIN-HRDA:** 2km, dynamical adaptation (DA) of wind

ALADIN-HRDA new setup

- The new setup for ALADIN-HRDA was developed based on ALADIN-HR4 operational model (currently, ALADIN-HR8 model is used)
- Several DA configurations were created
 - HRDA - operational (coupled to ALADIN-HR8), 2km, 15 levels
 - HR42 - coupled to ALADIN-HR4, 2km, 15 levels
 - HRDI - coupled to ALADIN-HR4, 2km, 32 levels
 - HRDJ - coupled to ALADIN-HR4, 2km, 32 levels + new climate files
 - HRDK - as HRDJ, but on 1 km

Post-processing

• Analog-based method

- New algorithms are developed and tested to expand the number of locations and the forecast variables for analog-based post-processing method.
- The new setup includes 15-member wind speed, wind gusts and temperature ensemble predictions for approximately 50 stations, using the 2-year training dataset.
- Both ensemble and probabilistic output are produced for these variables in the test operational mode since beginning of Aug, 2019 (Fig. 2. and 3.)

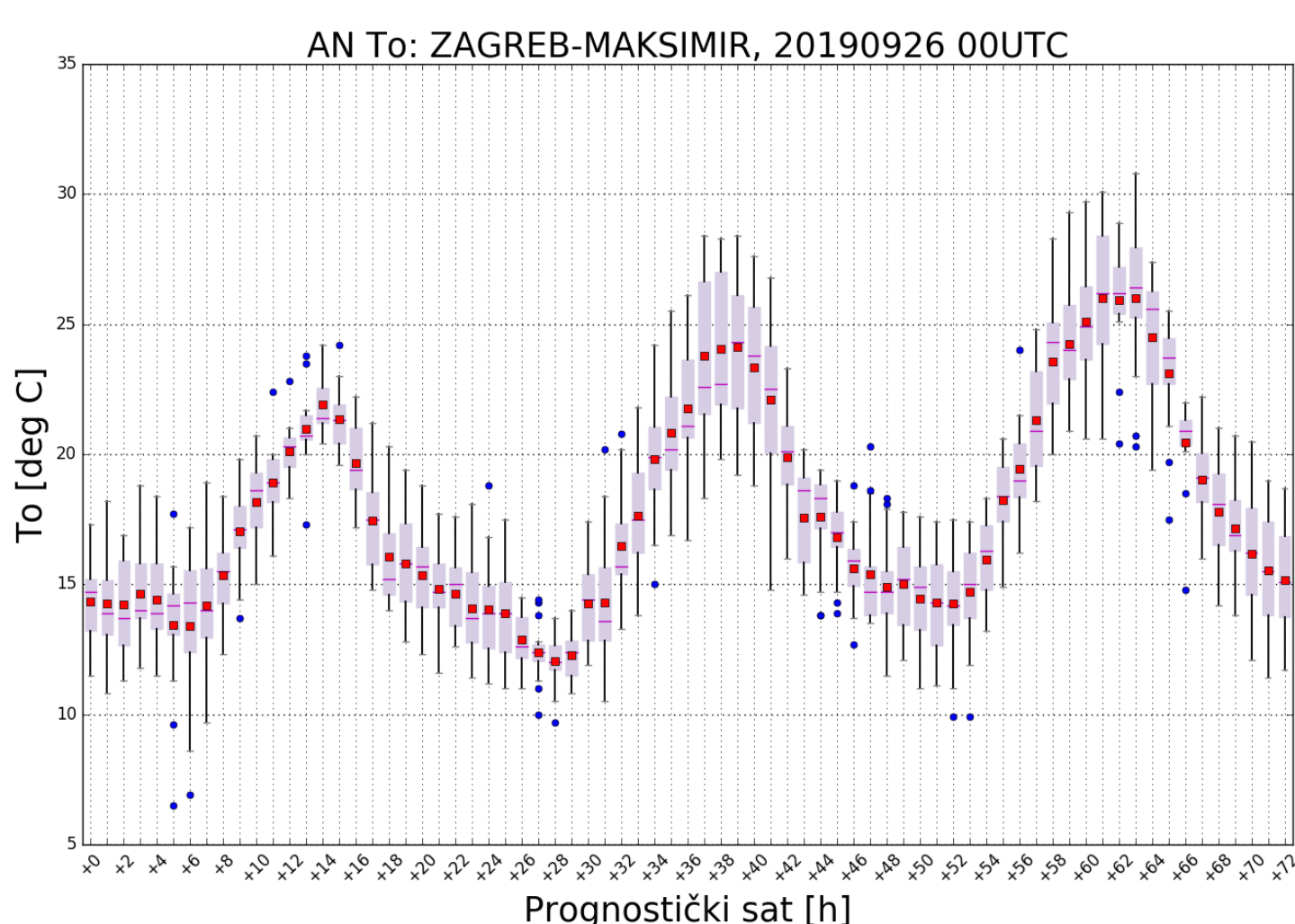


Fig. 2. The example of analog-based ensemble forecast output for temperature at Zagreb-Maksimir station.

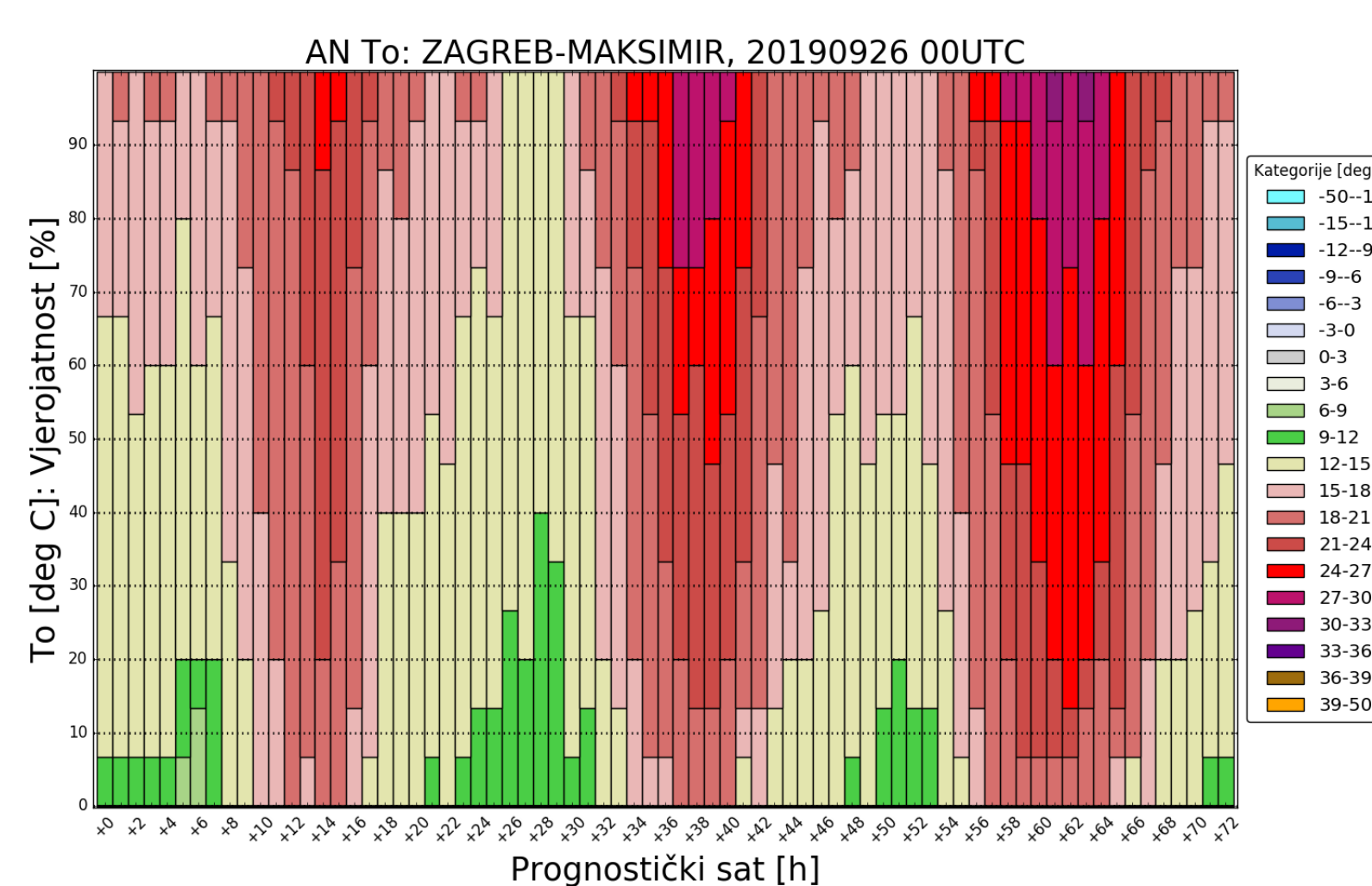


Fig. 3. The example of analog-based probabilistic forecast output for temperature at Zagreb-Maksimir station.

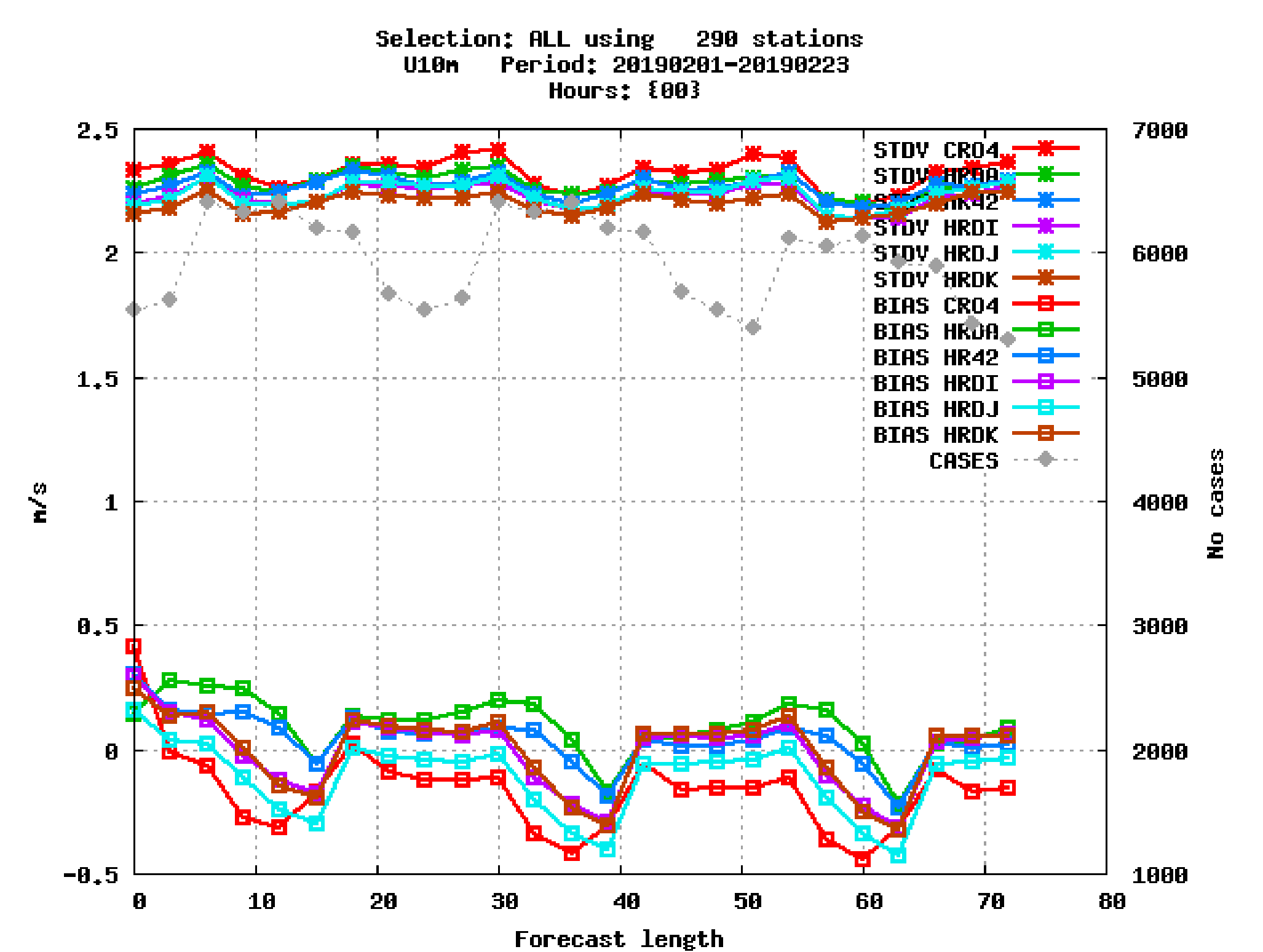


Fig. 1. 10 m wind speed BIAS and STDEV for different experiments. CRO4 is ALADIN-HR4.

Improved initial condition perturbations

- A new method to combine large-scale initial perturbations from a global ensemble prediction system (EPS) with small-scale initial perturbations from a limited area EPS
 - Perturbations are combined within limited area ensemble data assimilation system.
 - New large-scale perturbations results in a more skillful and reliable EPS with a positive impact on precipitation forecasts.
 - Initial condition and lateral boundary perturbations are more consistent.

ALADIN and ECMWF joint 7-day forecast

• Goal:

- Verify ALADIN and ECMWF temperature forecast and assess potential issues when joining models' forecast into a 7-day point forecasts

• Conclusions:

- Analysis suggests that for point forecasts, joining ALADIN and ECMWF forecasts may be justified
- Discontinuity at the model discontinuity forecast range (75 h) is not seen in T2m, but is found to some extent for Tt2m
- ALADIN has lower T2m and Tt2m BIAS (Fig. 5. and 6.) than ECMWF, and comparable RMSE (not shown)

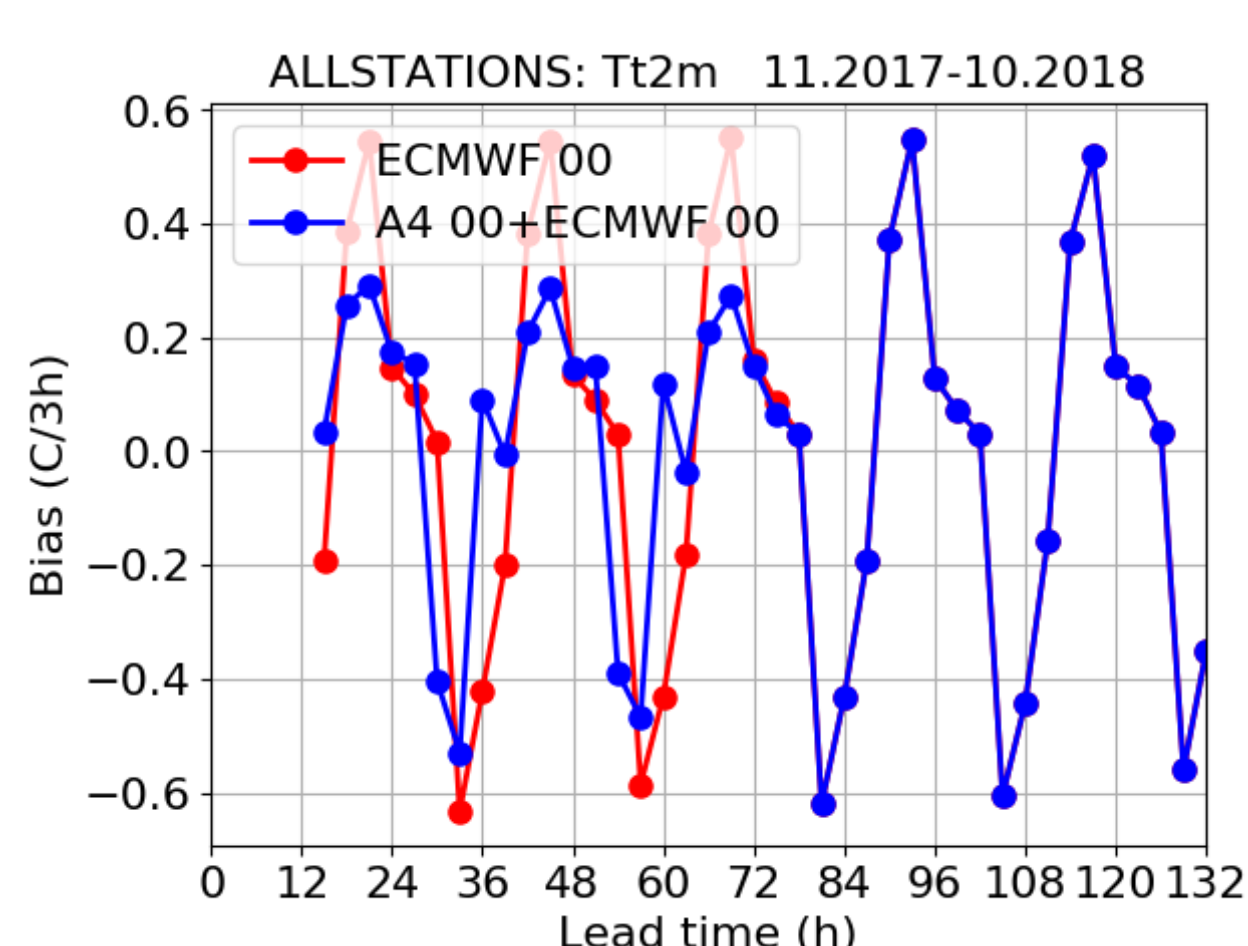


Fig. 5. 2 m temperature tendency BIAS.

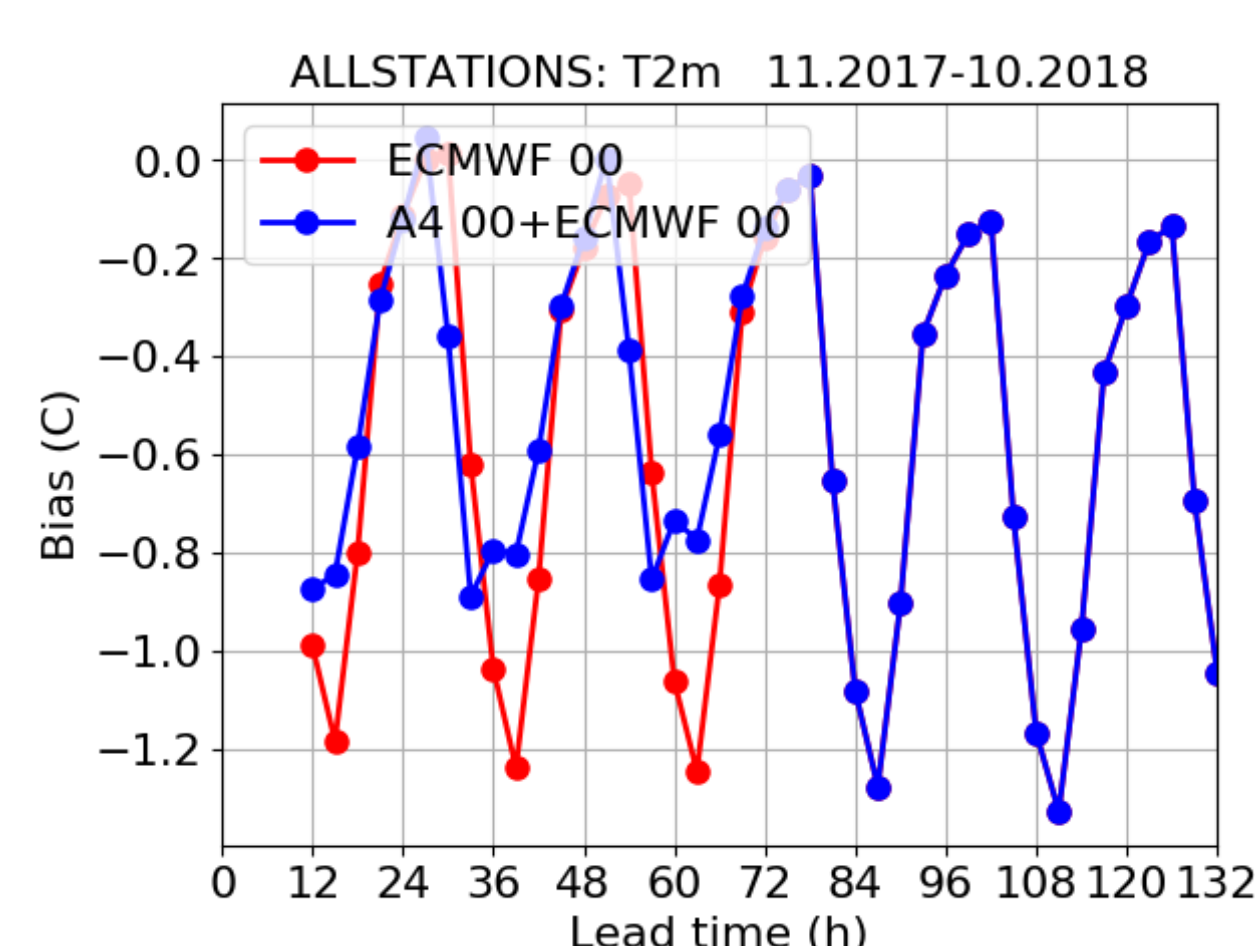


Fig. 6. 2 m temperature BIAS.

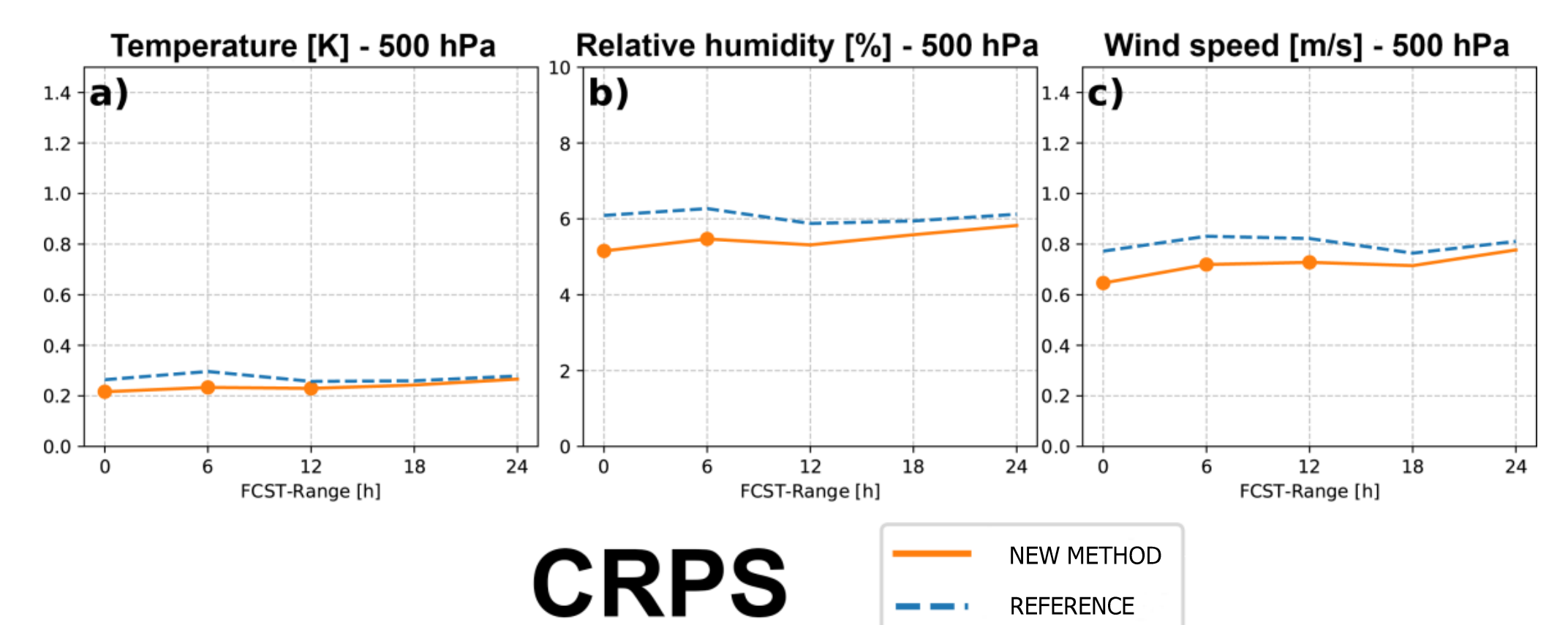


Fig. 4. CRPS of REFERENCE (dashed blue) and the NEW METHOD (solid orange) for 62 days in summer 2016. Variables and pressure levels are written above each plot. Forecast ranges with statistically significant differences are marked with bullet.

* This work was done while the author was on a research stay at ZAMG under supervision of dr. Yong Wang