ICON D2 Model Errors

National Domain Verification

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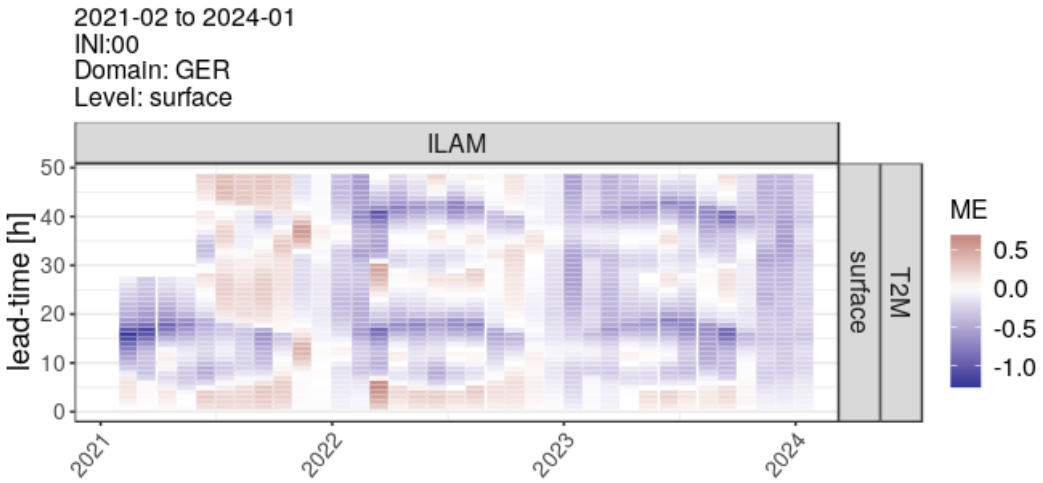
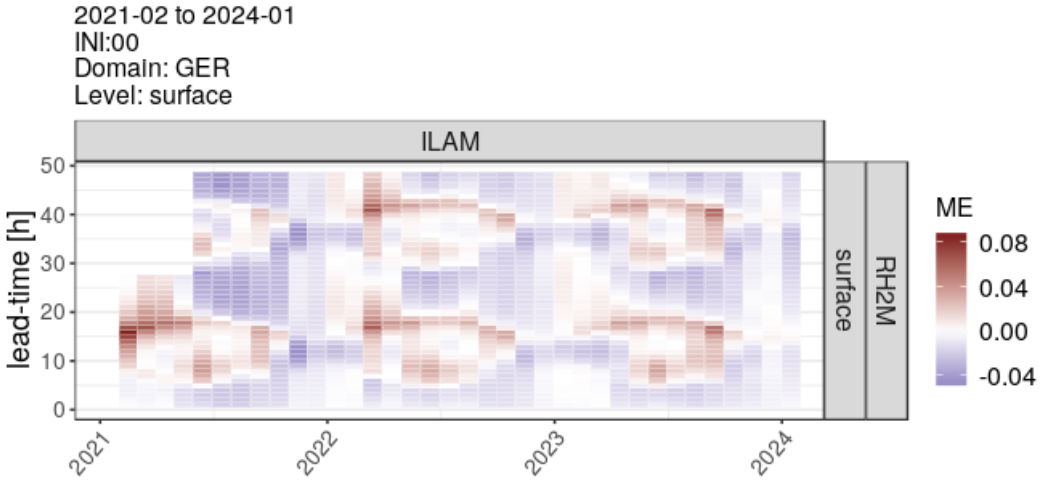
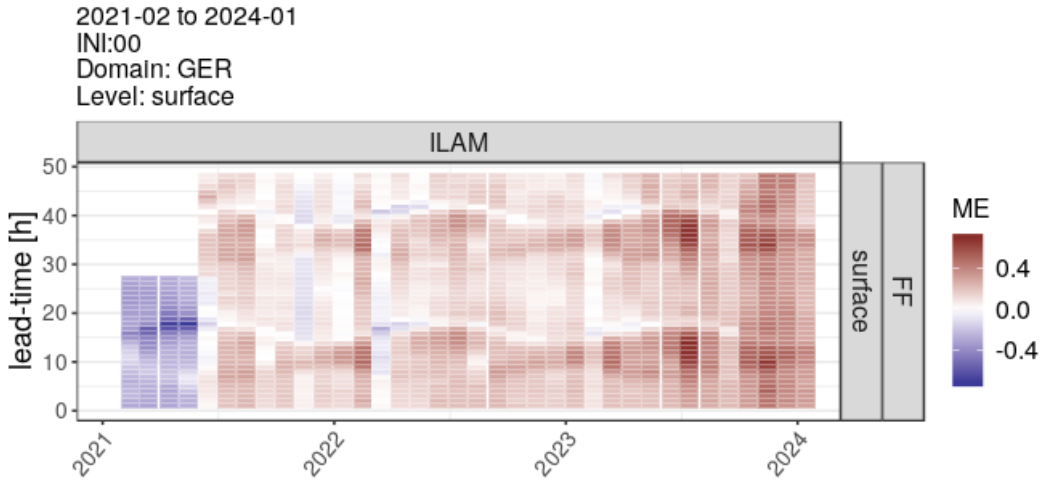
Bias Daily/Seasonal

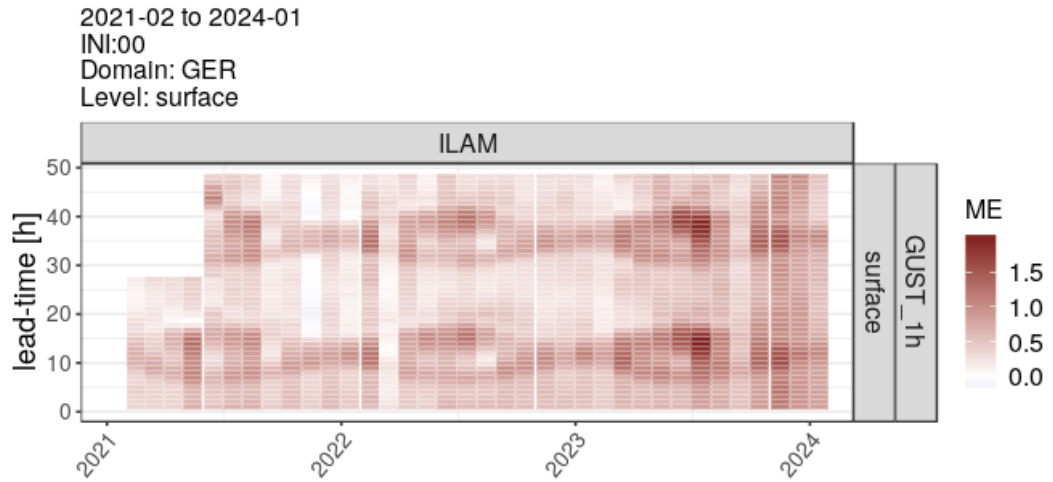




- Biases in diuranal cycle is less strong in cold months
- Starting too warm (summer)
- Daily warming period to narrow
- Too humid during day time
- Too dry during night

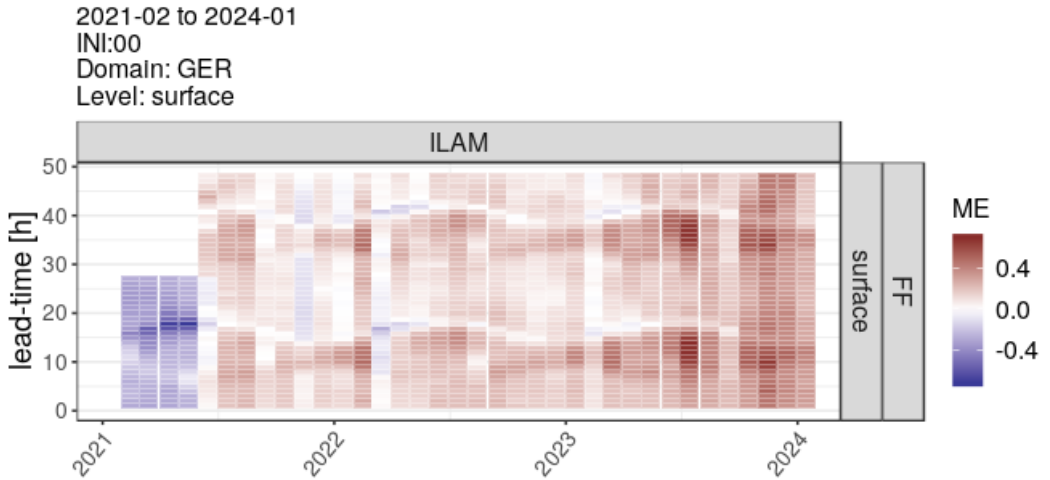
Bias Daily/Seasonal

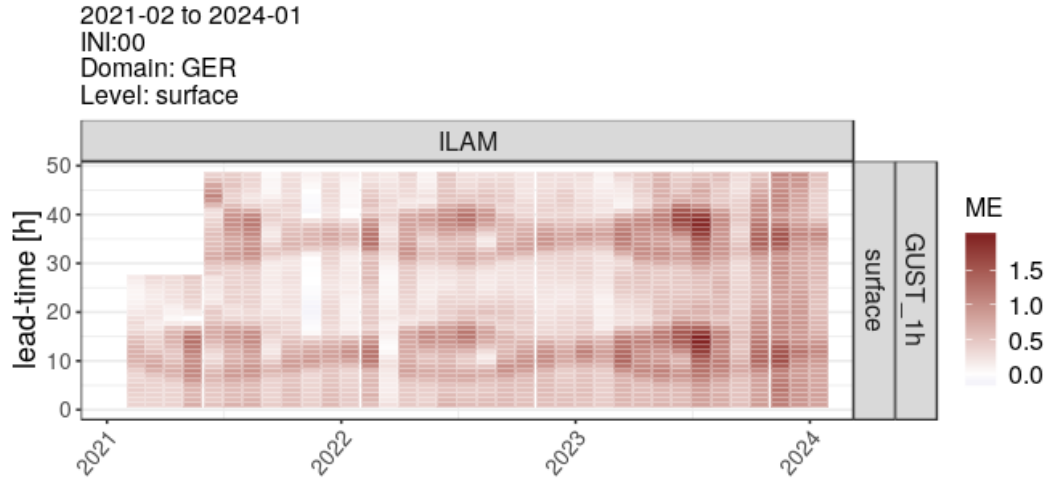




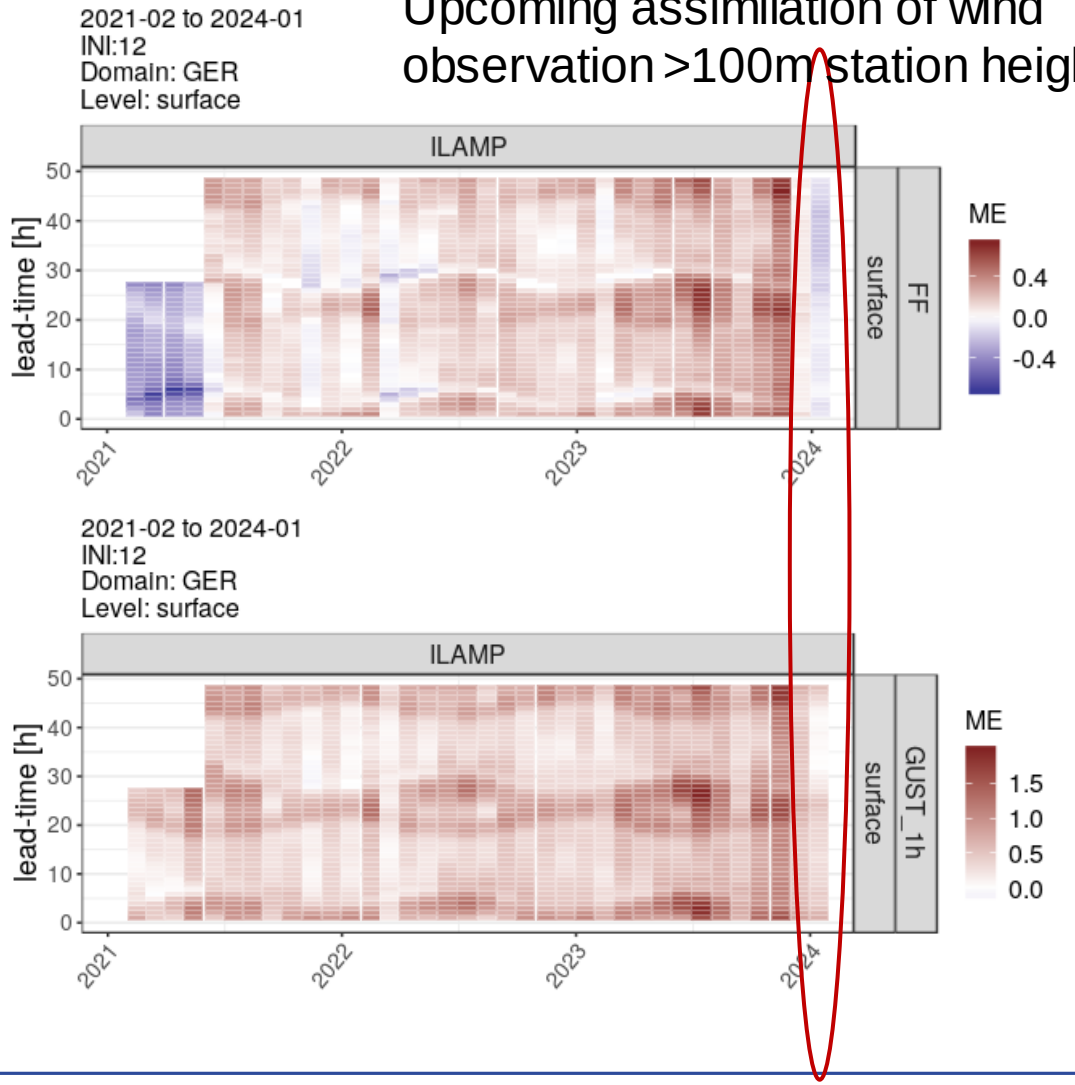
- Too high winds/gusts
- Even stronger bias around noon
- Improvement coming very soon…

Bias Daily/Seasonal

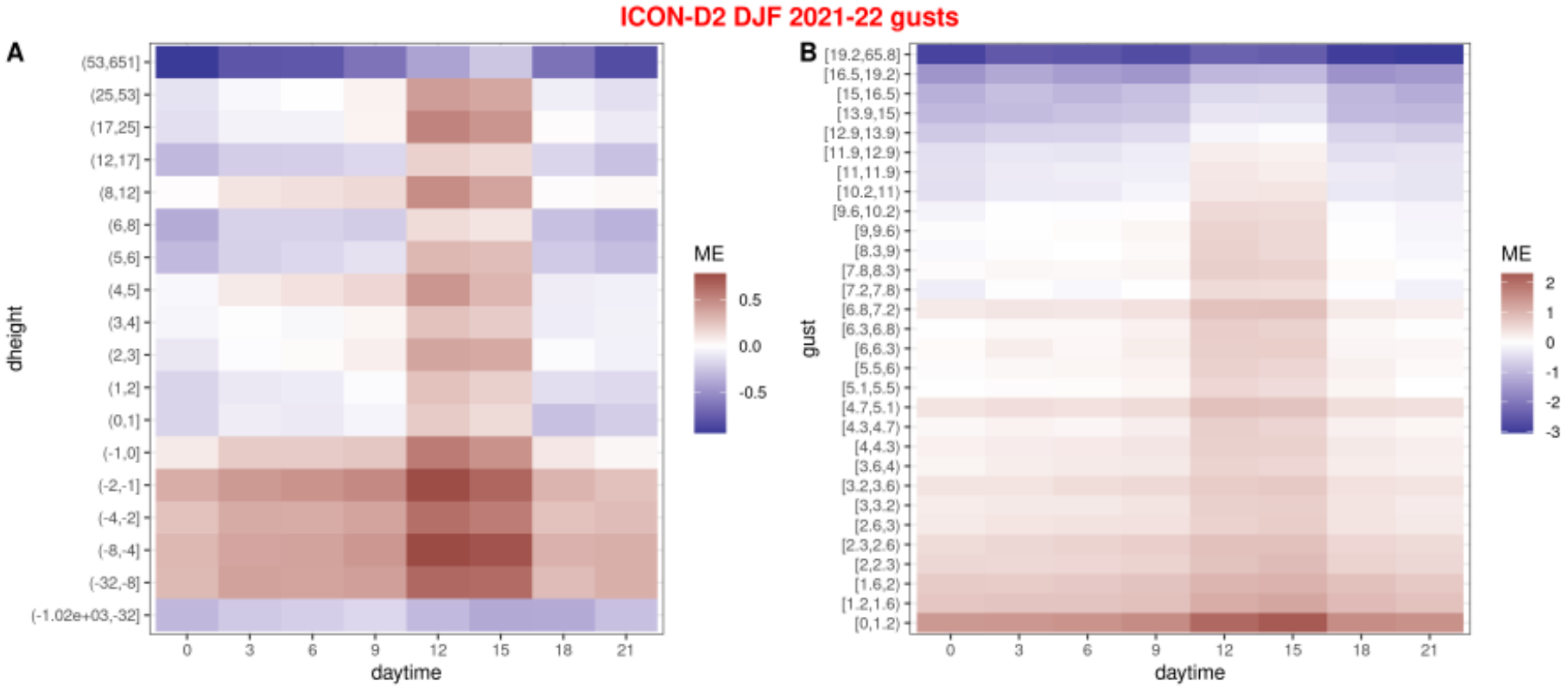




Upcoming assimilation of wind observation >100m station height

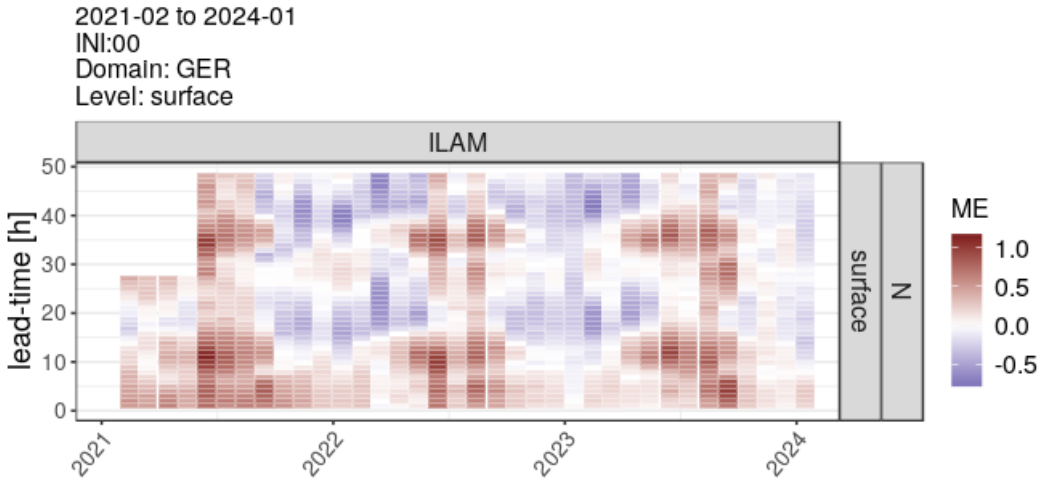


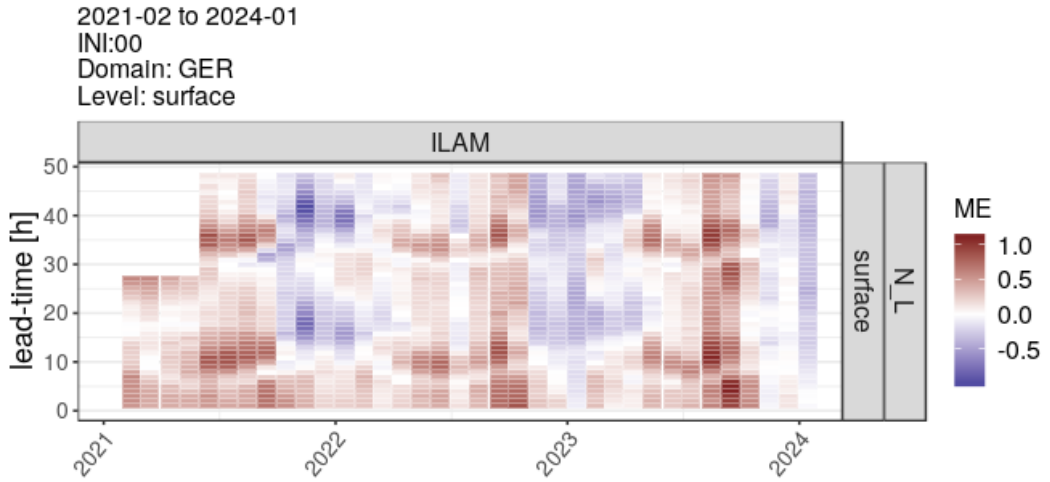
Bias Daily/Seasonal



- Consistent gust over-estimation of gusts at noon
- Consistent gust under-estimation if station is far above model surface
- Consistent under-estimation of higher gusts

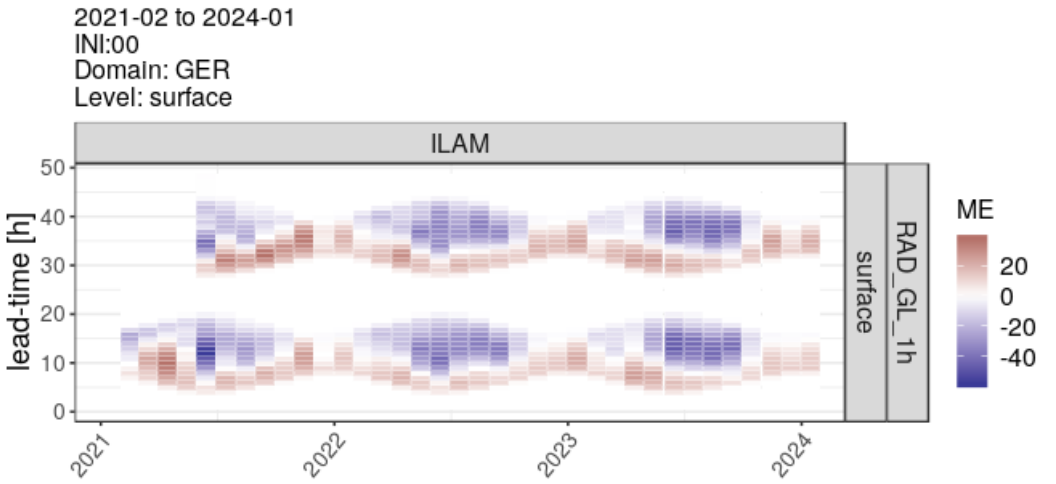
Bias Daily/Seasonal

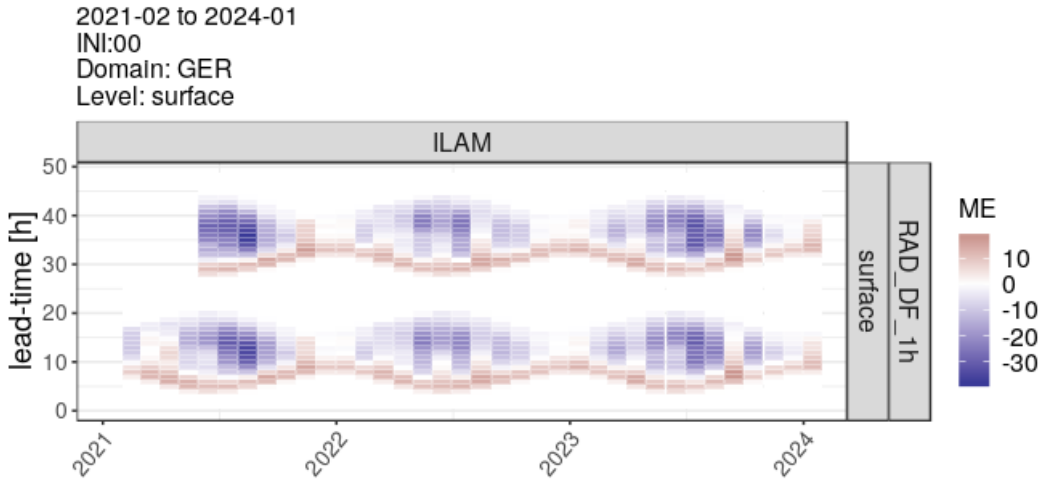




- Too many clouds in summer
- Too few clouds in winter at day time
- Alwas starting with to many clouds
- (problems with cloud cover reporting, e.g. from France)

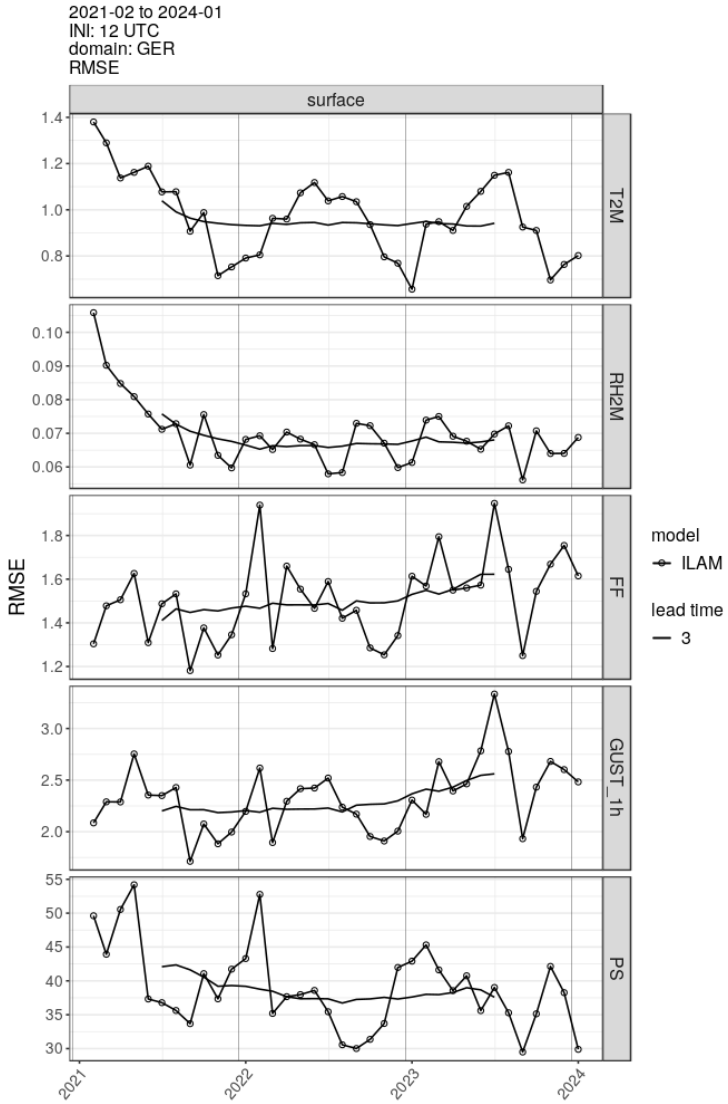
Bias Daily/Seasonal



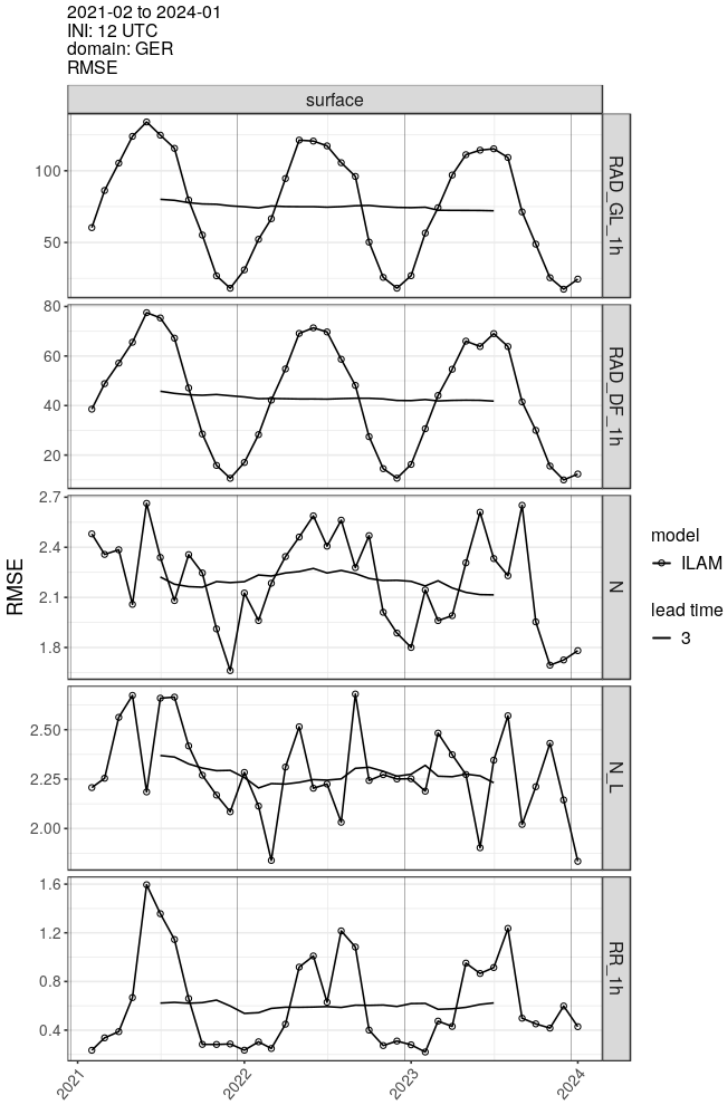


- Onset of radiation is too strong
- Radiation Maxima not reached
- Naturally strong seasonal dependency

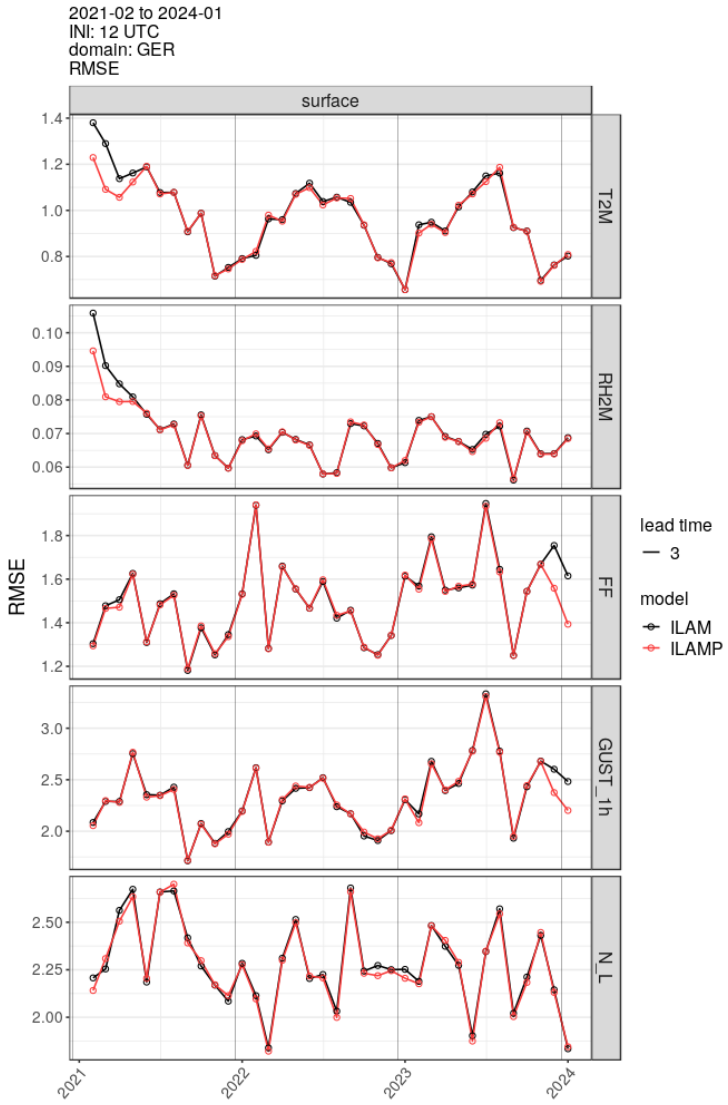
RMSE Trends



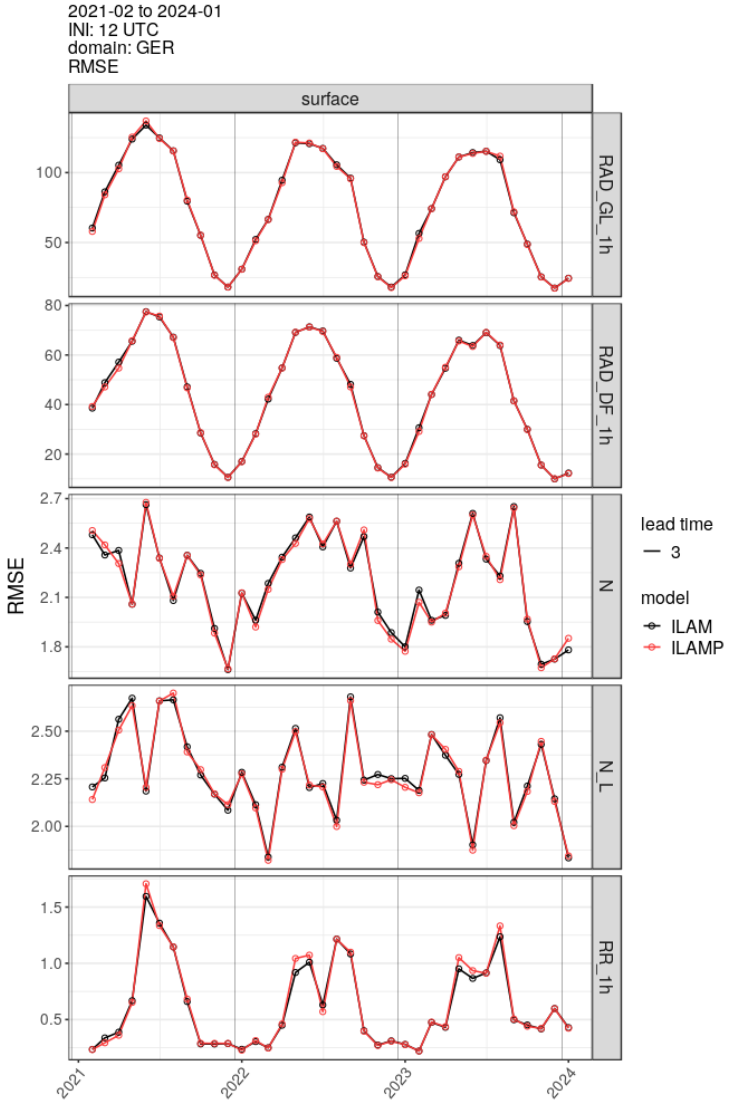
- As seasons vary, forecast quality also varies with season
- Weather variability exceeds any model development signals
- Observation basis varies, further compiciating interpretation



RMSE Trends



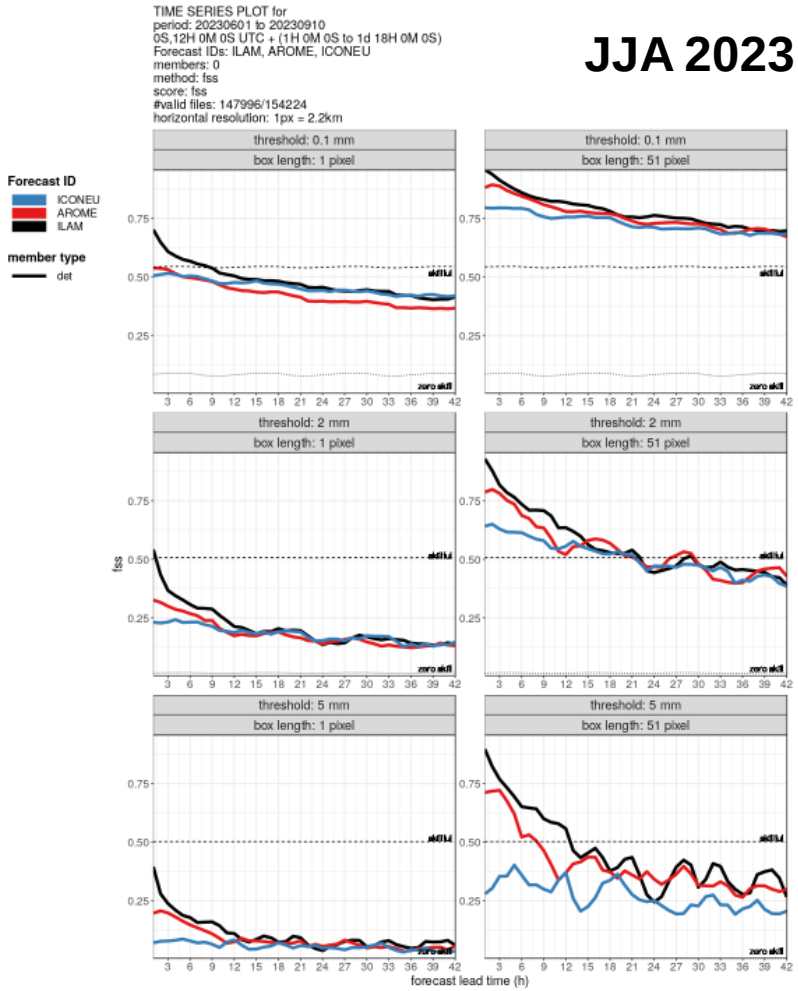
- Comparison to paralel routine shows model development improvements more fair
- Here only a slice (12UTC run, 3h forecast) is shown



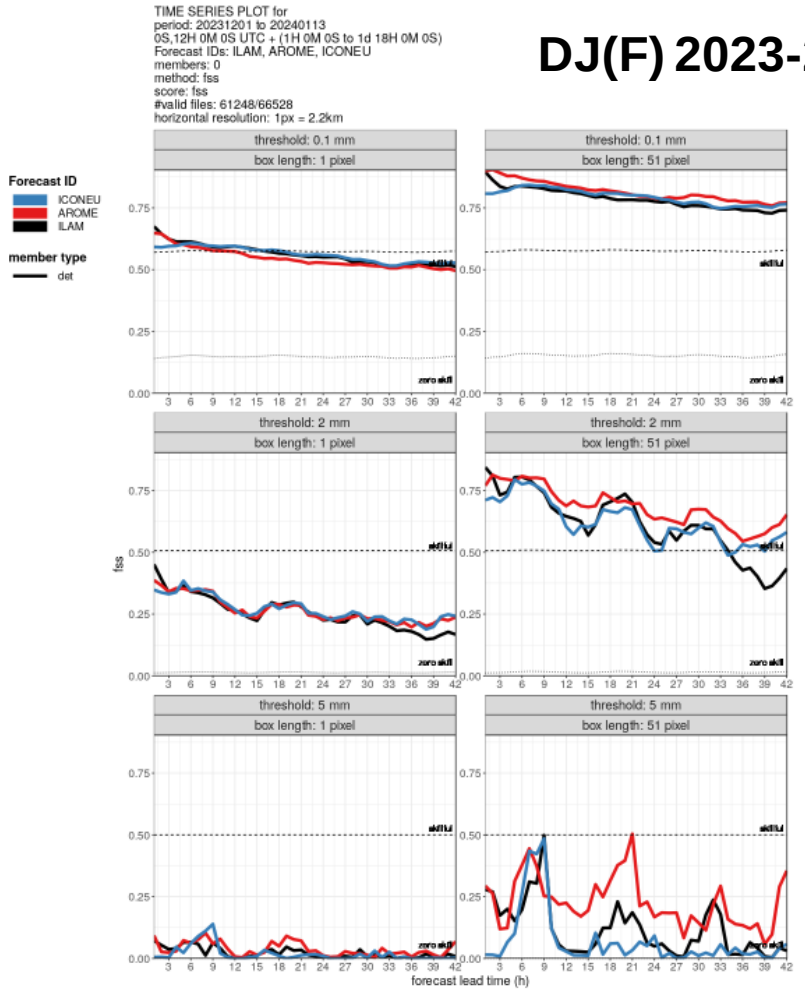
Bias Daily/Seasonal

FSS against calibrated german radar composite

JJA 2023



DJ(F) 2023-24



FSS against Radar