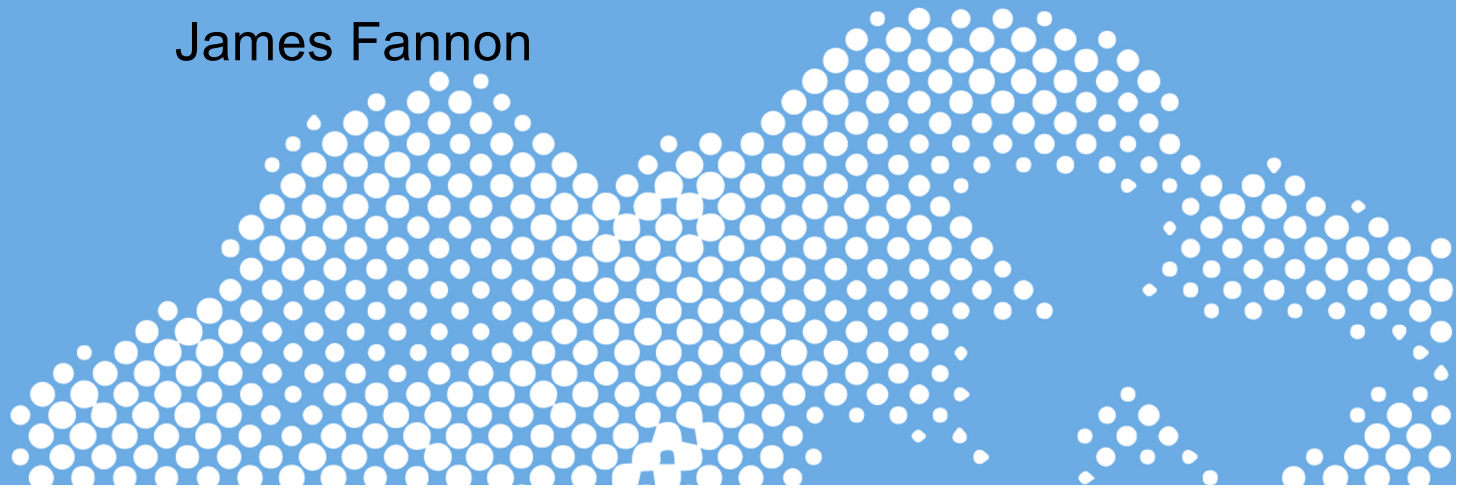
United Weather Centres

Verification UWC West lessons learned

Sander Tijm

James Fannon



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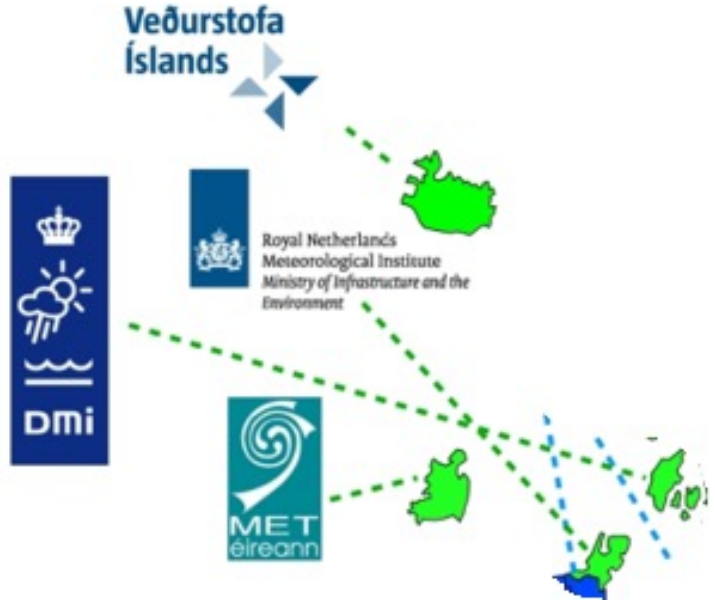
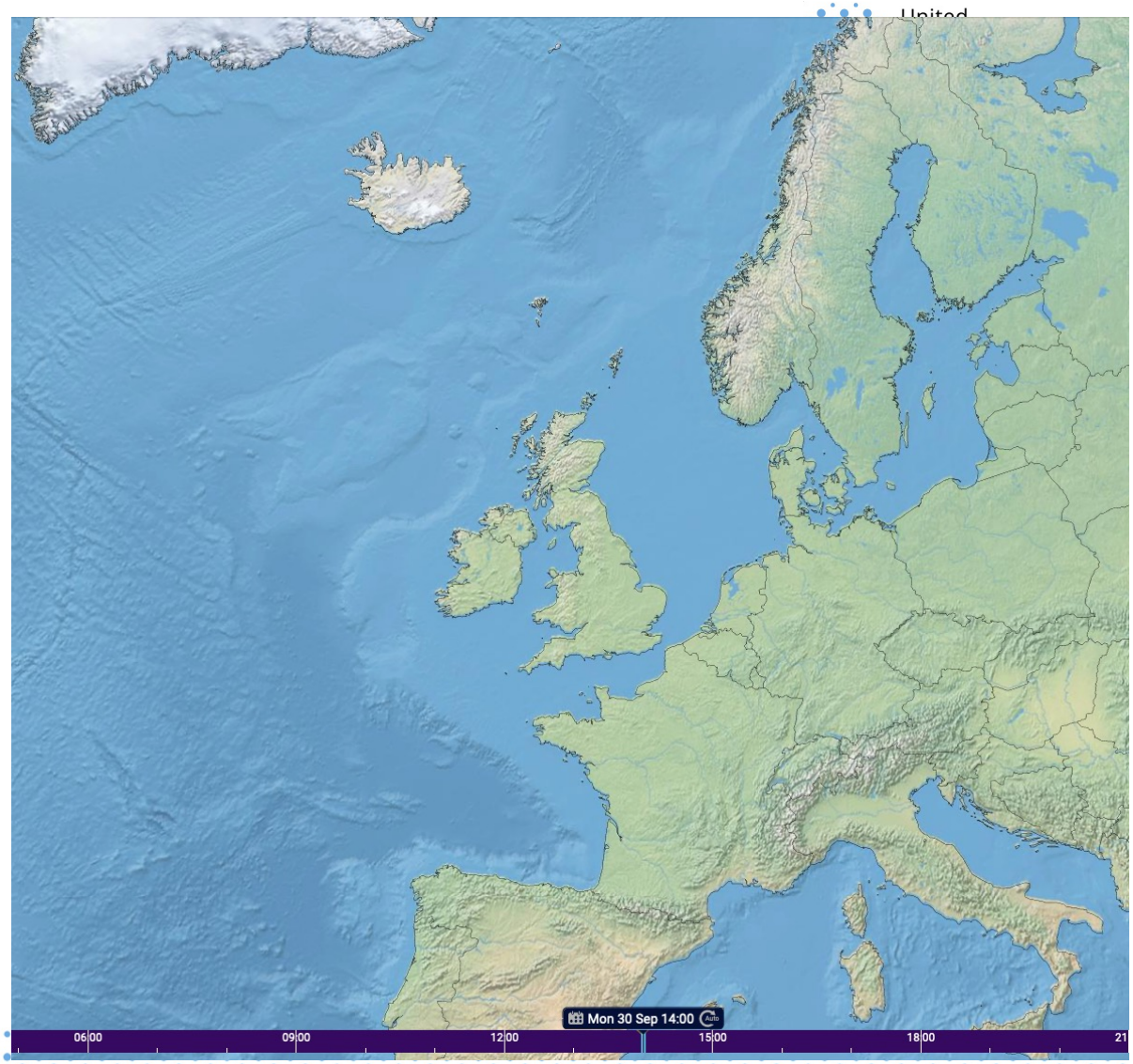
UWC West

- UWC West initiated in 2019. Common production on common computer
- July 2023: first model version agreed
- Sept 2023: e-suite runs started
- Oct 2023: reforecast started
- Nov 3rd 2023: computer accepted
- Mid Dec 2023: 3 year reforecast complete
- March 19 2024: declared operational
- Running smoothly, stability data transport biggest challenge



Past year:
work towards operations

- 1+5 ensemble hourly
- 60 hour forecasts
- 2km, 90 levels



Past year:
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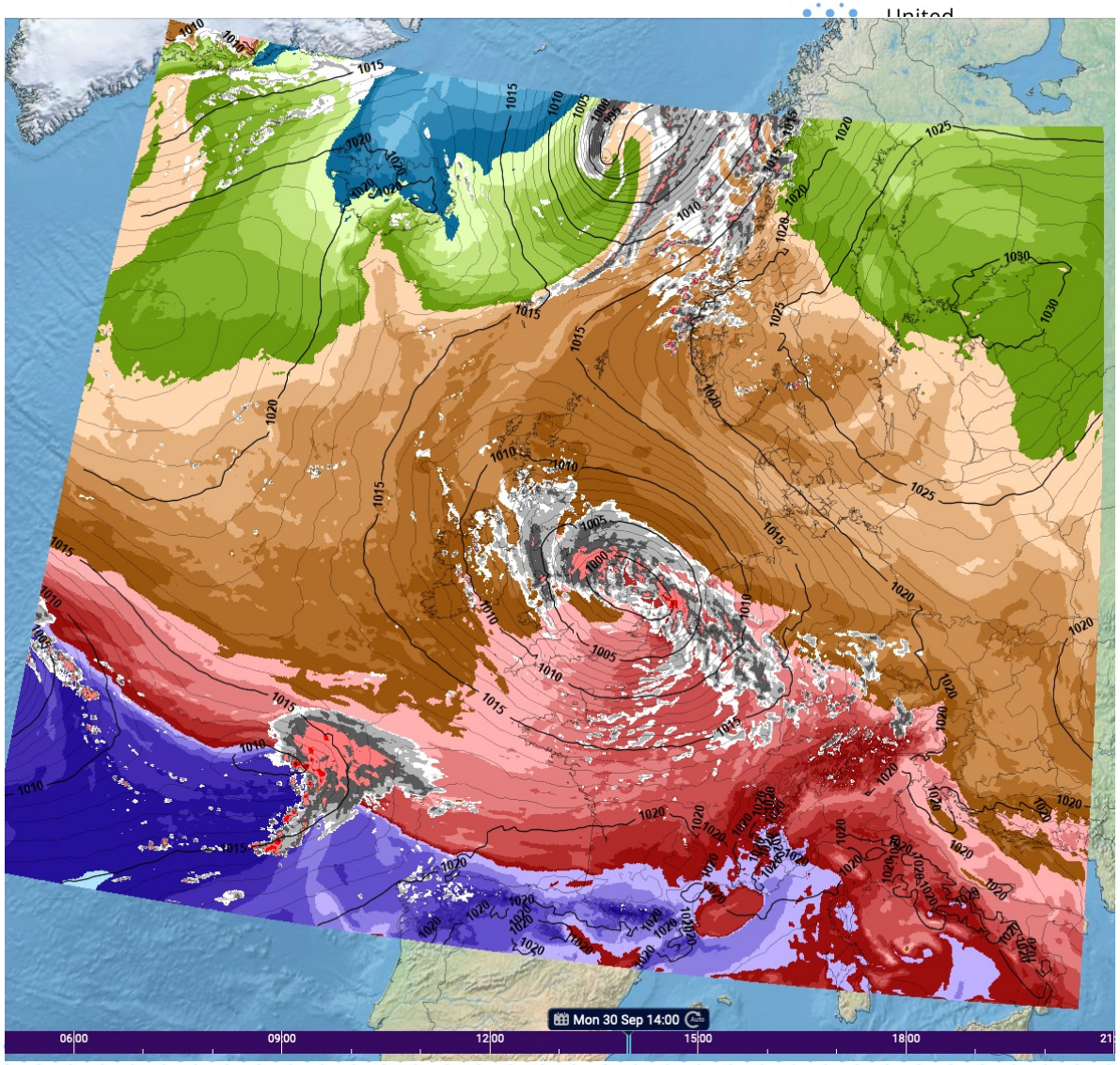
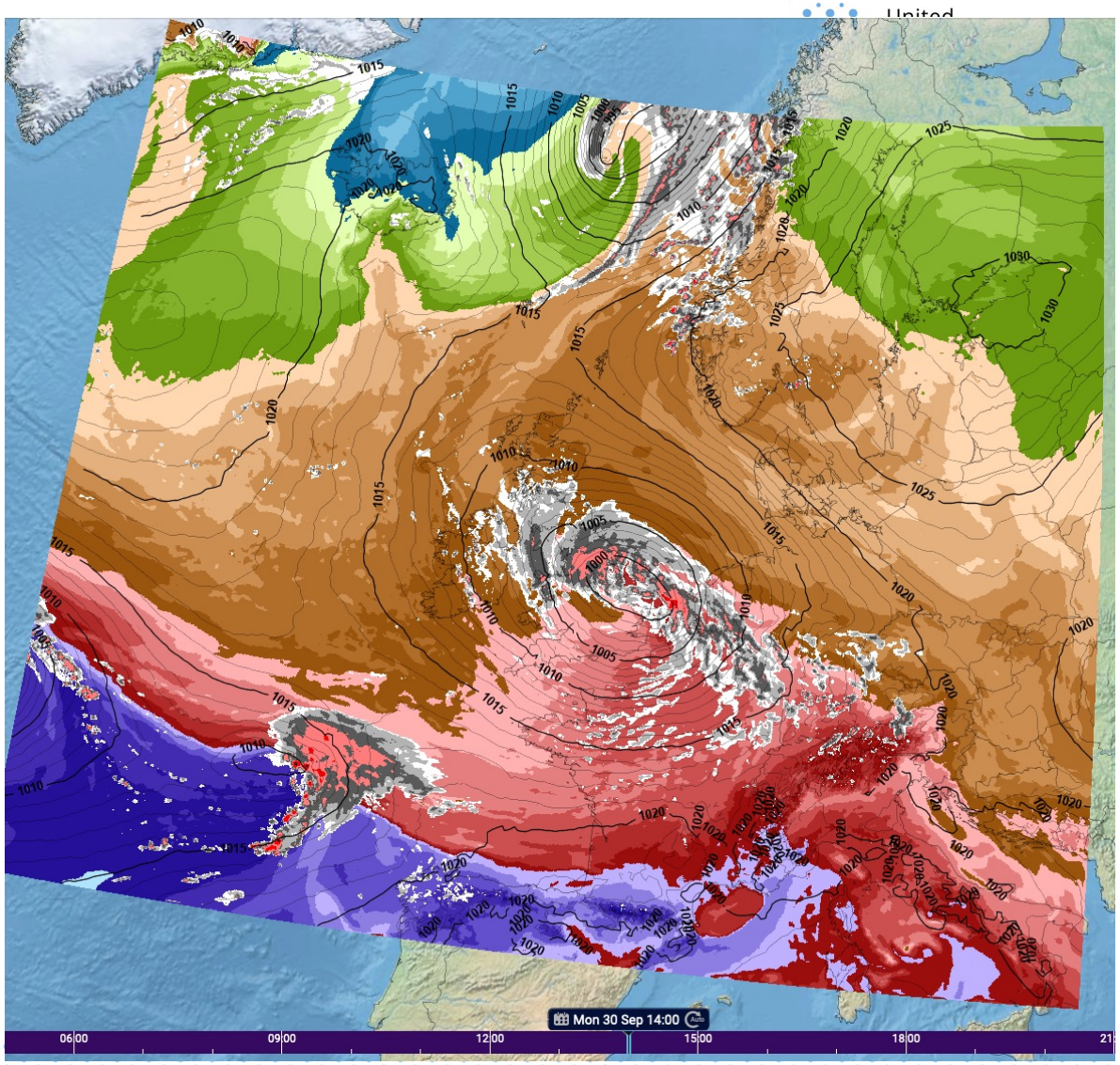


Past year:
work towards operations

- 1+5 ensemble hourly
- 60 hour forecasts
- 2km, 90 levels
- HARP verification operational
  - Weekly verification
  - Monthly verification
  - Reforecast verification
  - Verification older versions
  - Addition of CSI verification



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Point Verification

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Monthly | **Rolling** | **Seasonal**

Experiment

Knmi Oper

- Prd: DINIEPS
- Prd: DINImbr000 vs HRES
- Prd: IG vs HRES
- Prd: IG vs DINImbr000
- Prd: HECTOR vs DINImbr000
- Reforecast: DMI oper
- Reforecast: ECDS
- Reforecast: METIE oper

Summary | **Skill** | **Map**

Signif

Station selection

- All stations
- Netherlands Oper
- North Sea

Parameter: 10m Wind

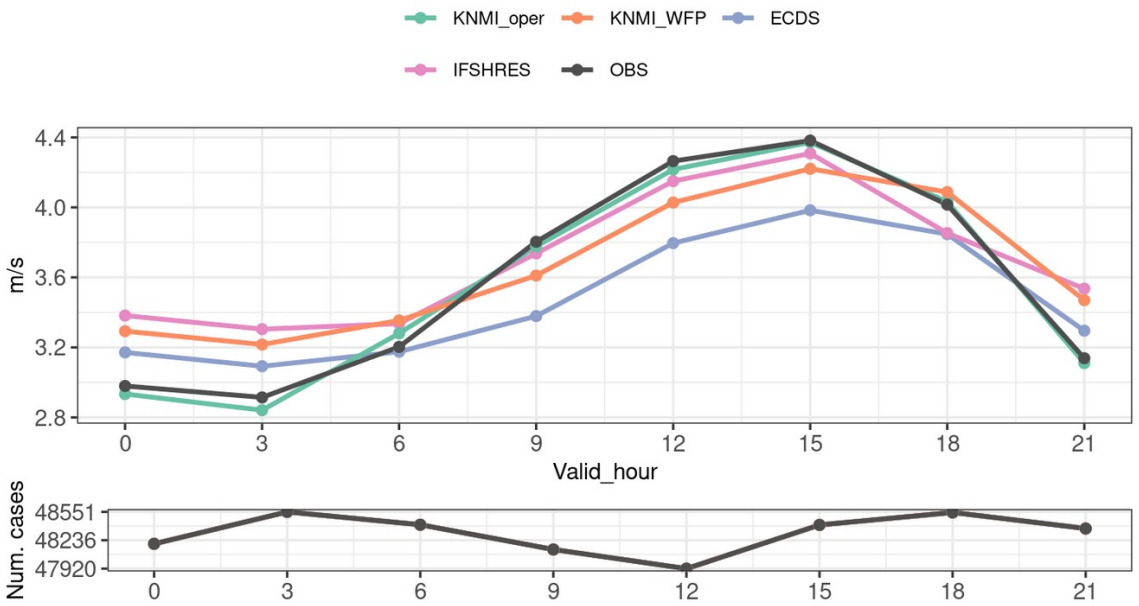
Score: DailyVar

Cycle: All

Valid time: NA

Dailyvar : S10m : 2023-06-01-00 - 2023-06-30-18

Used {00,06,12,18} +3, 6, ... , 48 : NL_OP stations



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Point Verification

United Weather Centres

Monthly | **Rolling** | **Seasonal**

Experiment

Knmi Oper

Year

2023

Date

2023/06/01 00Z - 2023/06/30 18Z

- 2023/09/01 00Z - 2023/09/30 18Z
- 2023/08/01 00Z - 2023/08/31 18Z
- 2023/07/01 00Z - 2023/07/31 18Z
- 2023/06/01 00Z - 2023/06/30 18Z
- 2023/05/01 00Z - 2023/05/31 18Z
- 2023/04/01 00Z - 2023/04/30 18Z
- 2023/03/01 00Z - 2023/03/31 18Z
- 2023/02/16 00Z - 2023/02/28 18Z

Netherlands Oper

North Sea

Parameter: 10m Wind

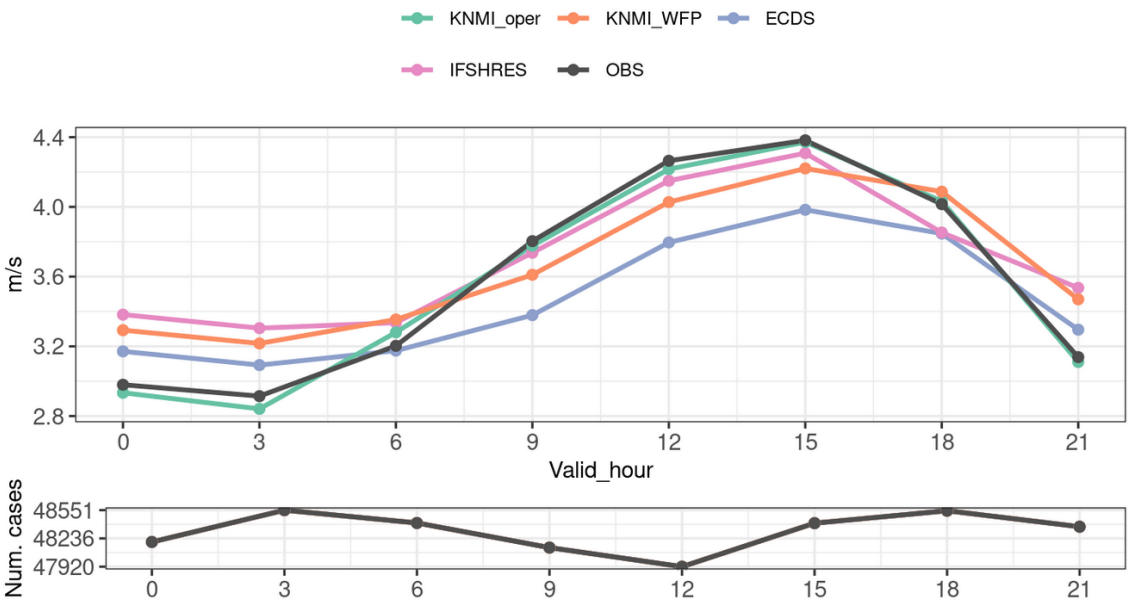
Score: DailyVar

Cycle: All

Valid time: NA

Dailyvar : S10m : 2023-06-01-00 - 2023-06-30-18

Used {00,06,12,18} +3, 6, ... , 48 : NL_OP stations



Experiment

Prd: DINImbr000 vs HRES

Year

2024

Date

2024/08/01 00Z - 2024/08/31 18Z

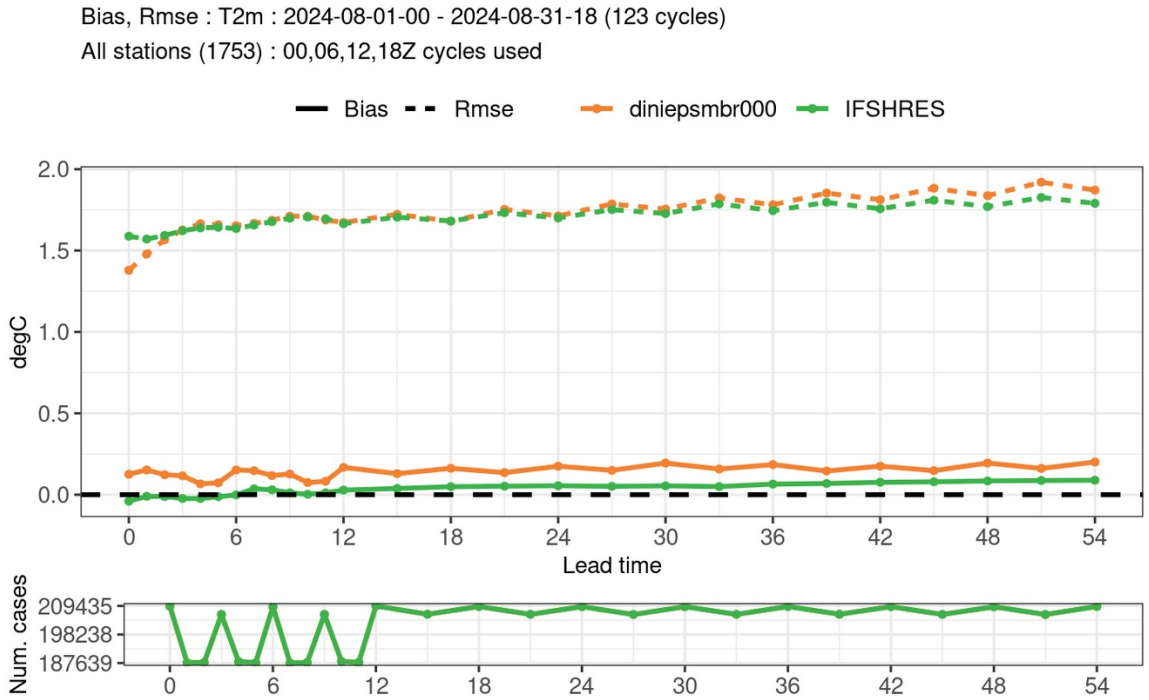
Surface | **Temp** | **Scorecards**

Summary | **Skill** | **Map**

Signif

Station selection

- (•) All stations
- ( ) Denmark
- ( ) Netherlands
- ( ) Netherlands Oper
- ( ) Iceland
- ( ) Ireland
- ( ) Ireland+UK
- ( ) Scandinavia
- ( ) France Synop
- ( ) North Sea
- ( ) Germany Synop
- ( ) Alps



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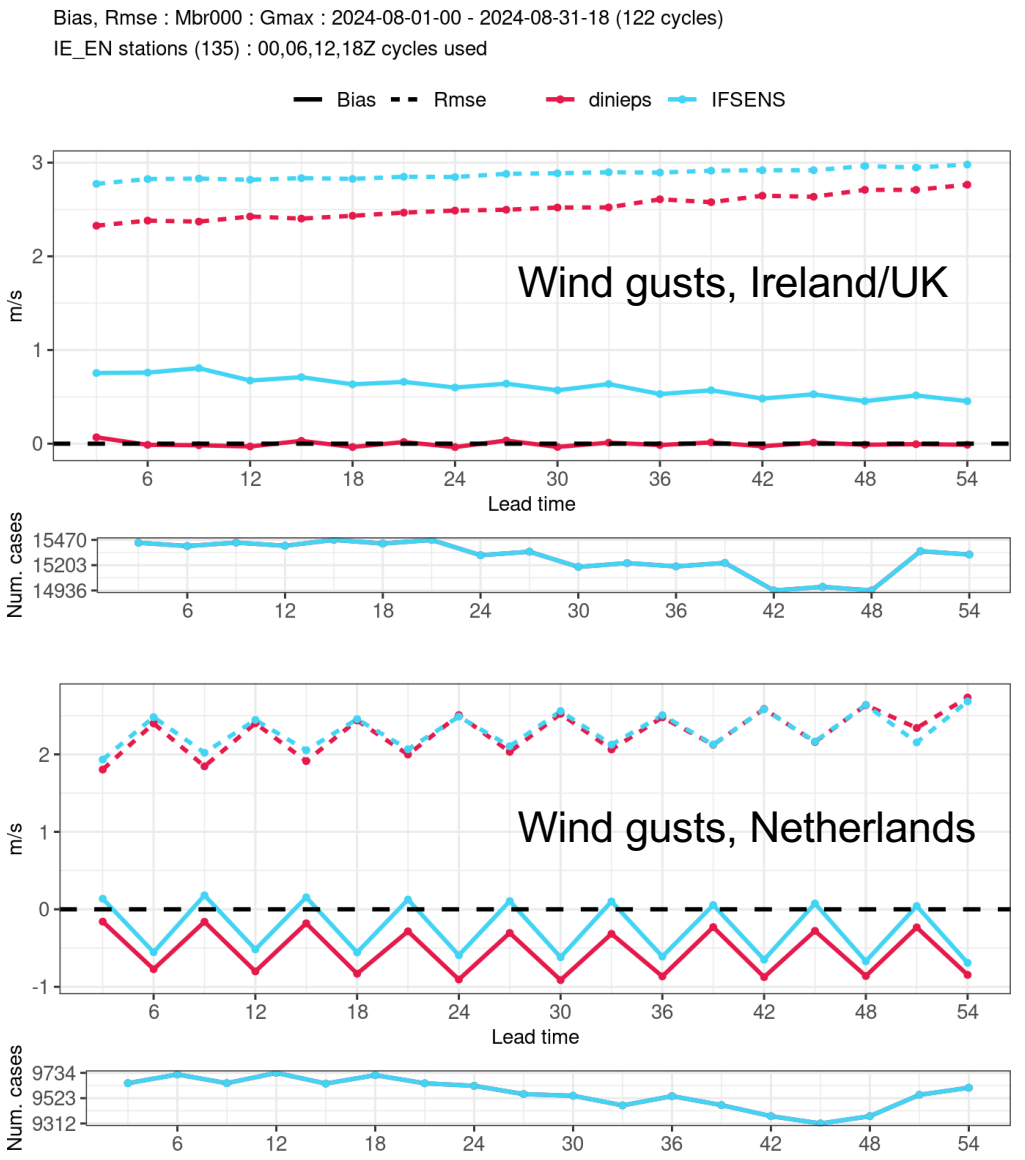
Weekly verification

- Weekly Forecasters Feedback (O2R)
- 10-20 persons attending
- Alternated between partner institutes
- 5th week R2O
- Recent events can be verified objectively quickly with weekly verification

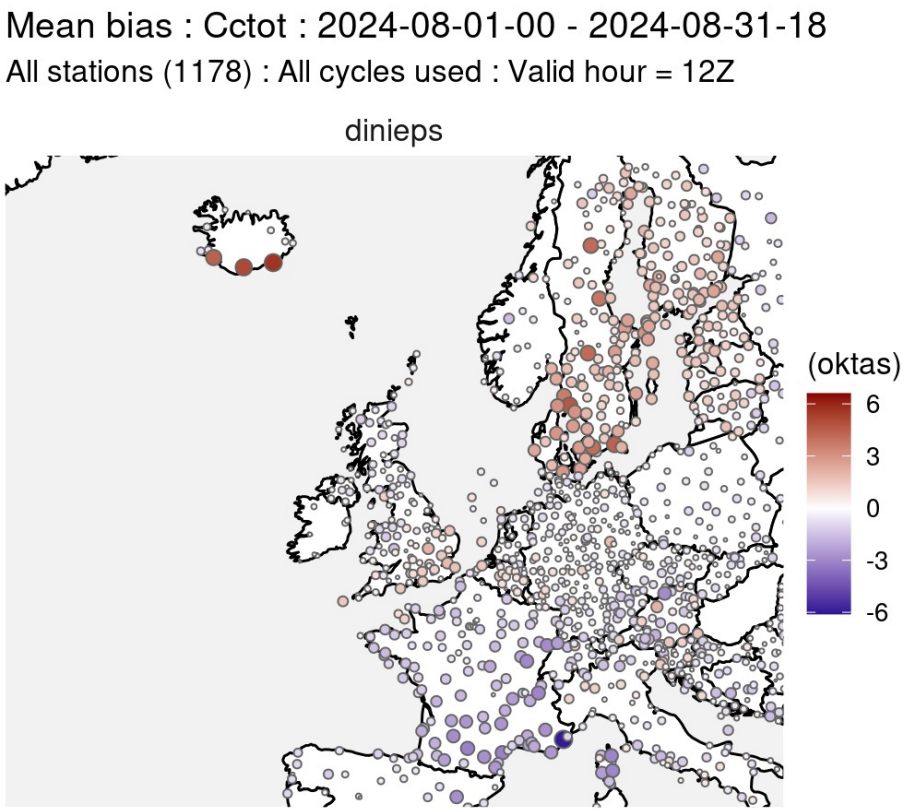
Challenge with obs.

- Inconsistencies in observations
  - wind gust period
  - wind speed
  - precipitation period
  - cloud cover?



Monthly verification

- Discussed in development team meetings
- Verification of ensemble, against IFS
- Large area, large differences in verification statistics in different areas



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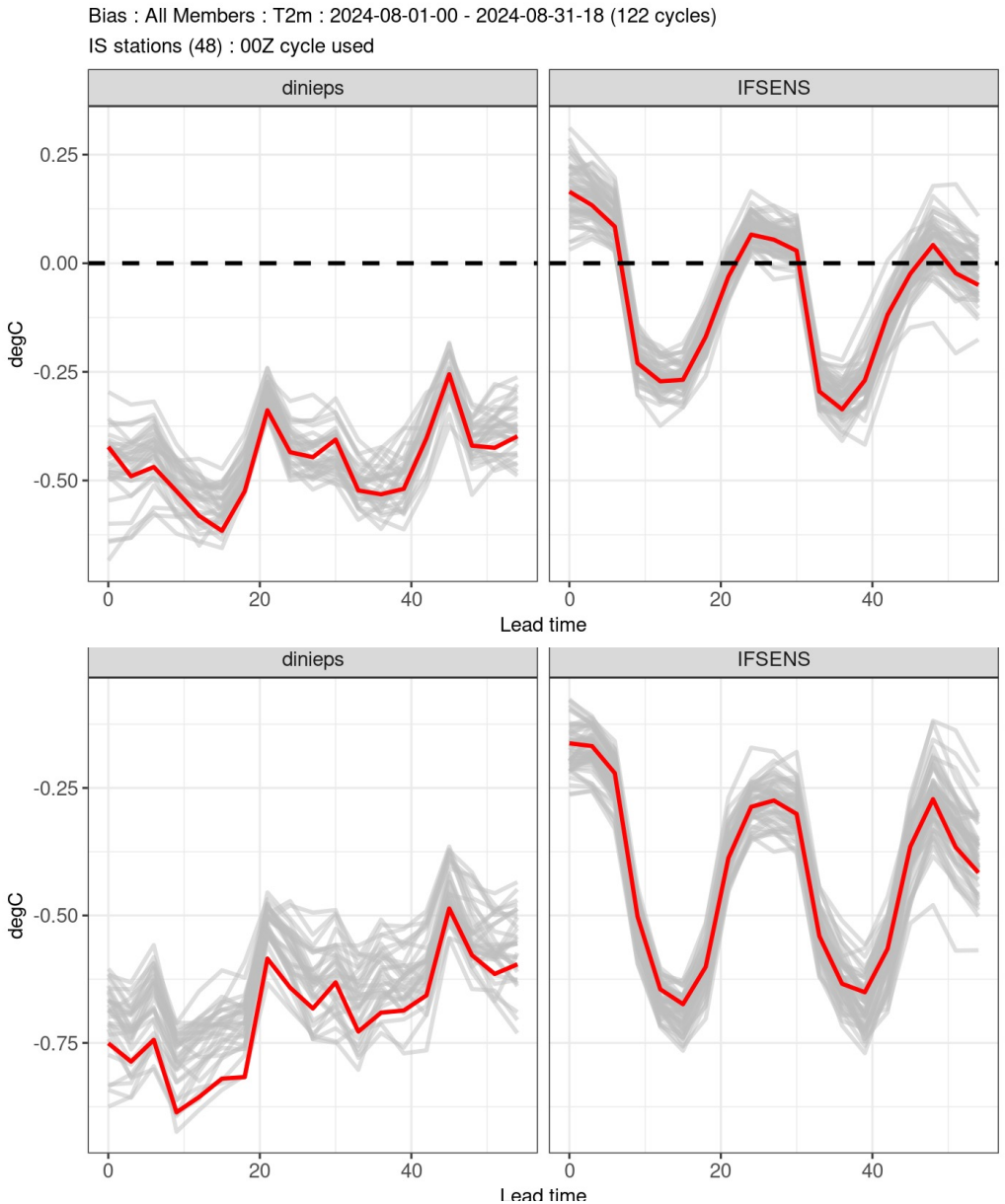
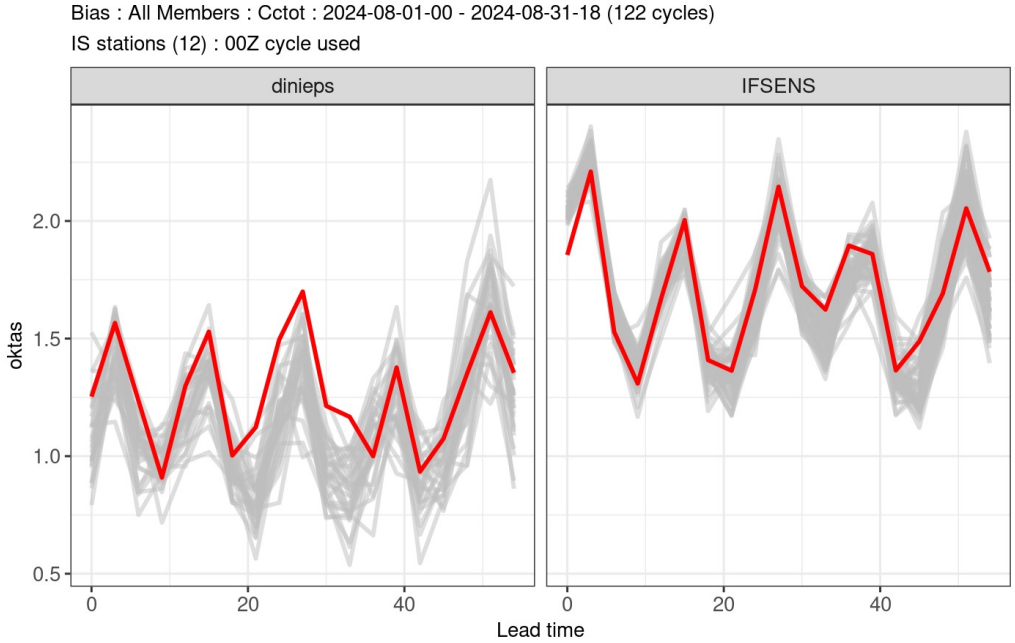
Iceland

T2m 00 UTC runs





CC

Td2m

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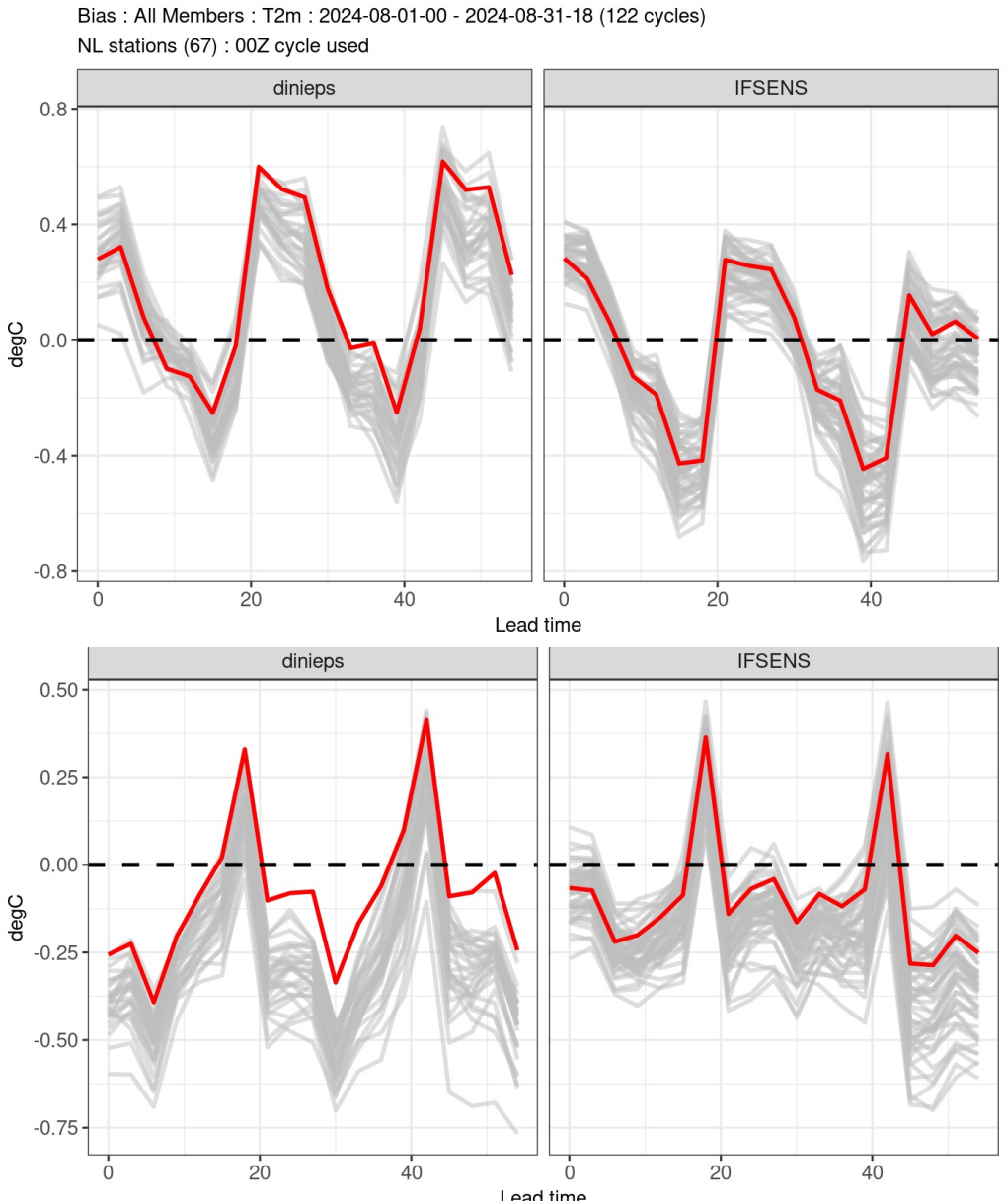
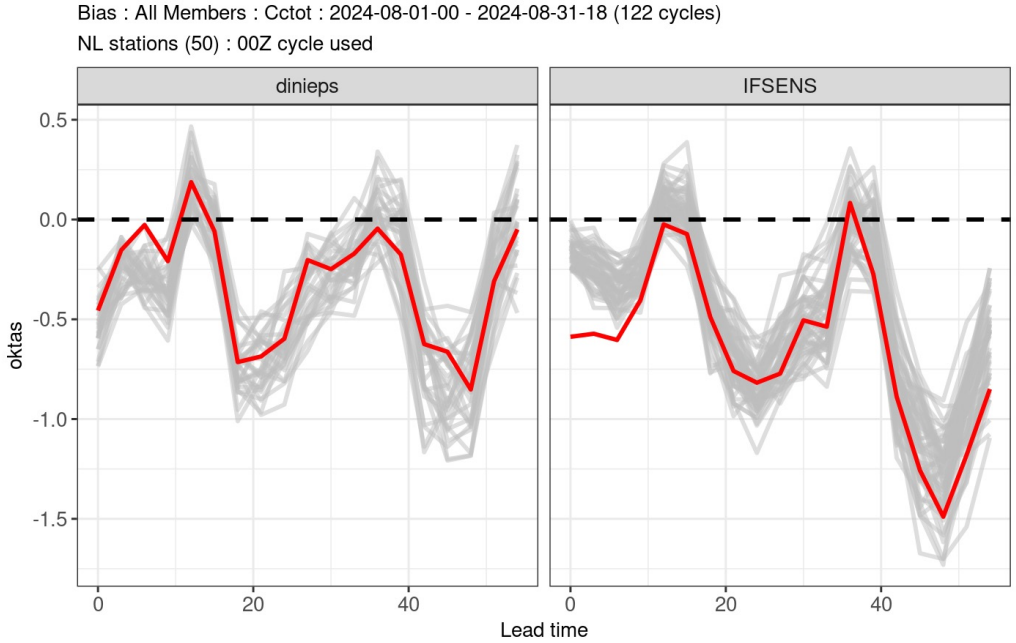
Netherlands

T2m 00 UTC runs





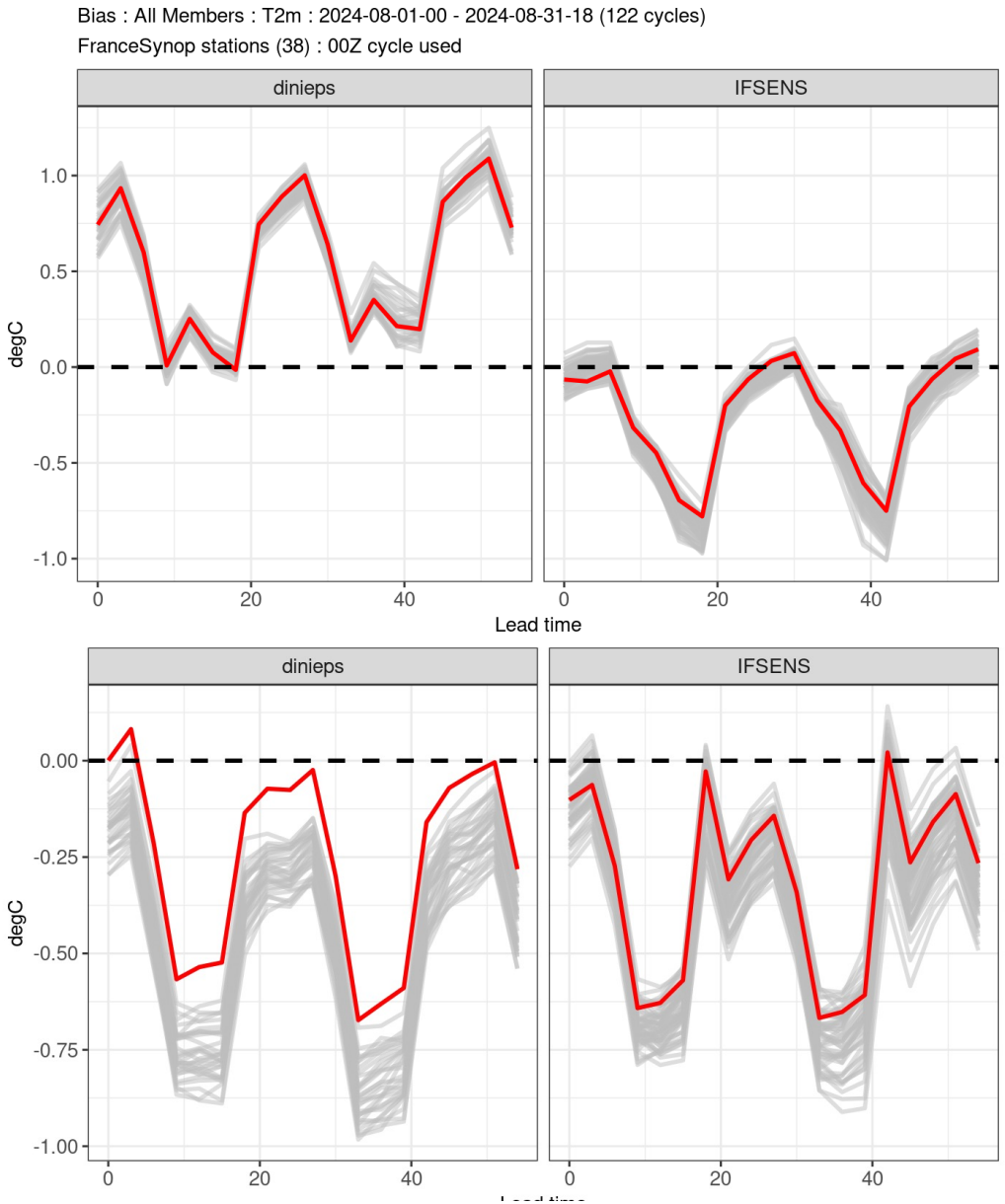
CC

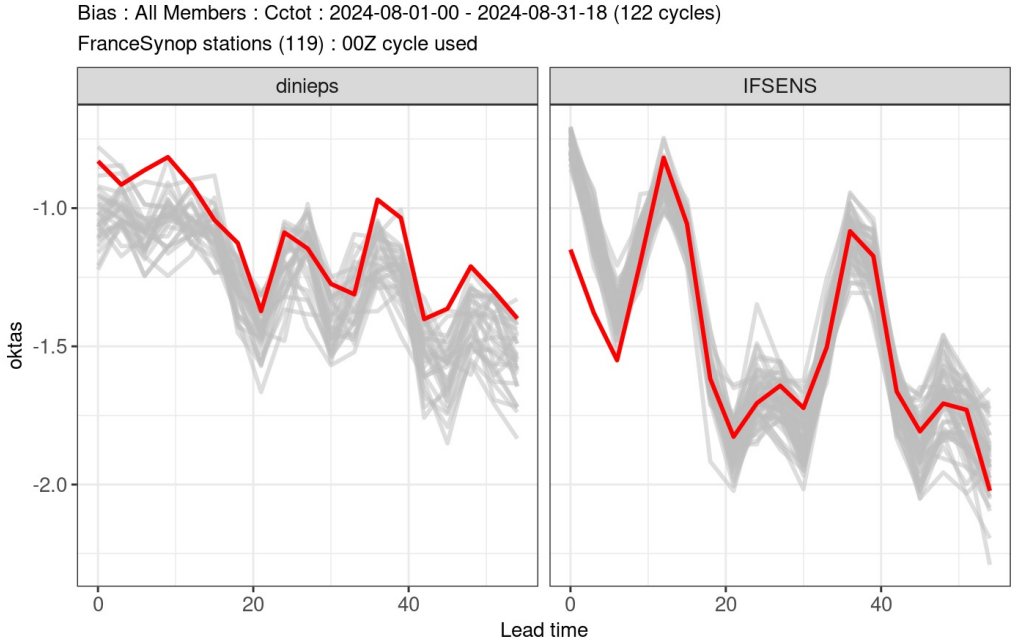
Td2m

United Weather Centres

T2m 00 UTC runs

France





CC

Td2m

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Most important features

- T2m too low in Iceland, Ireland
- Iceland, Denmark, Scandinavia overestimation of cloud cover, link to too low day time temperatures, too high night time temperatures?
- Opposite daily cycle in T2m and Td2m in Denmark and Netherlands. Too much evaporation, too little heating.

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Reforecast verification

- 3 year reforecast with operational setup to enable users to tune their applications to new model
- 3 years in parallel run in 2.5 months time, part of work load during acceptance testing
- Verification can show seasonal variation of model bias, a quick way of learning this compared to operational running
- Long time series can show characteristics you often do not find in shorter periods (weeks/months)
- Bias of wind speed different in all UWC west countries

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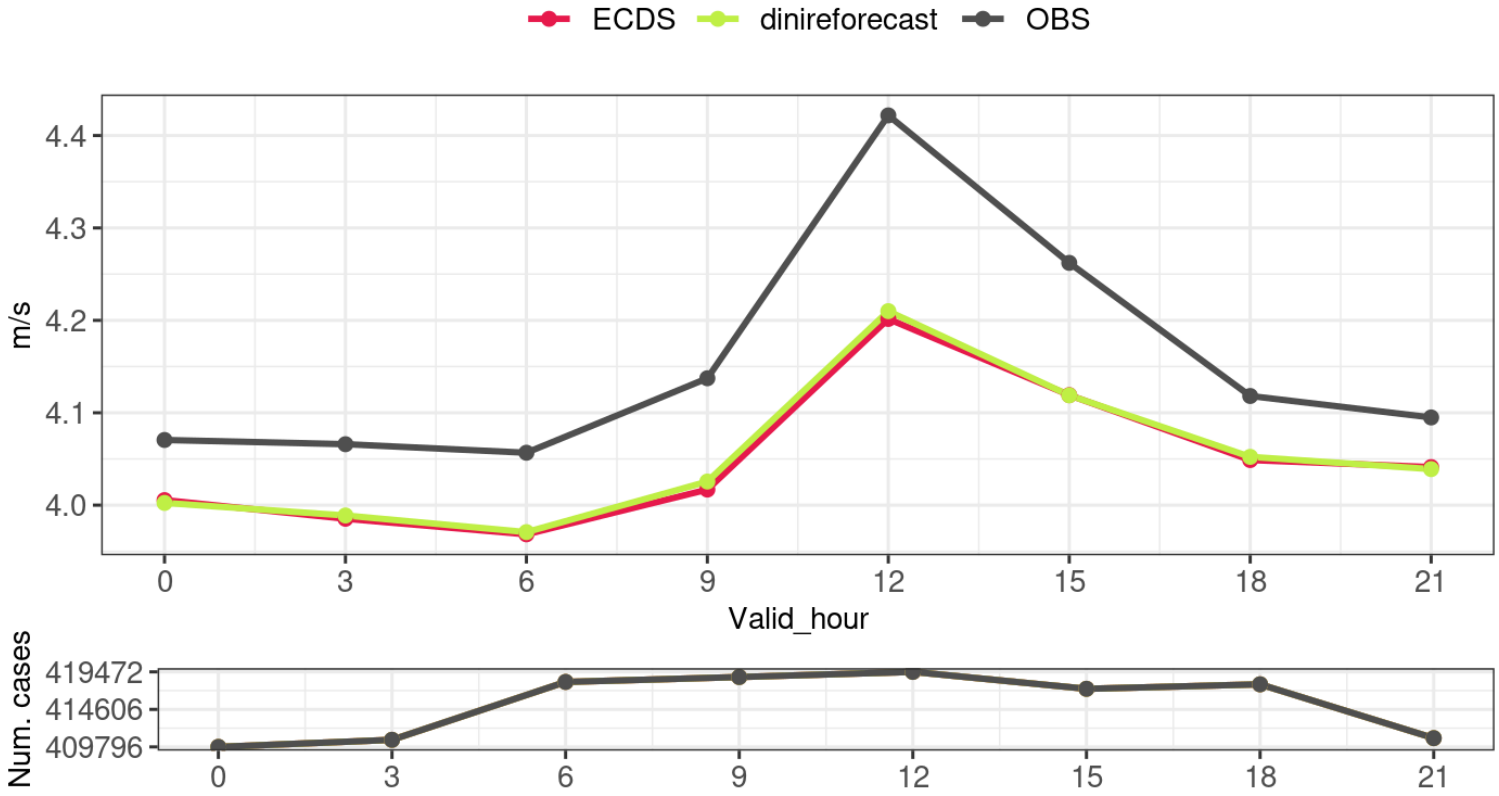
Dailyvar : S10m : 2023-01-01-00 - 2023-01-31-18
Used {00,06,12,18} +3, 6, ... , 48 : All stations

January



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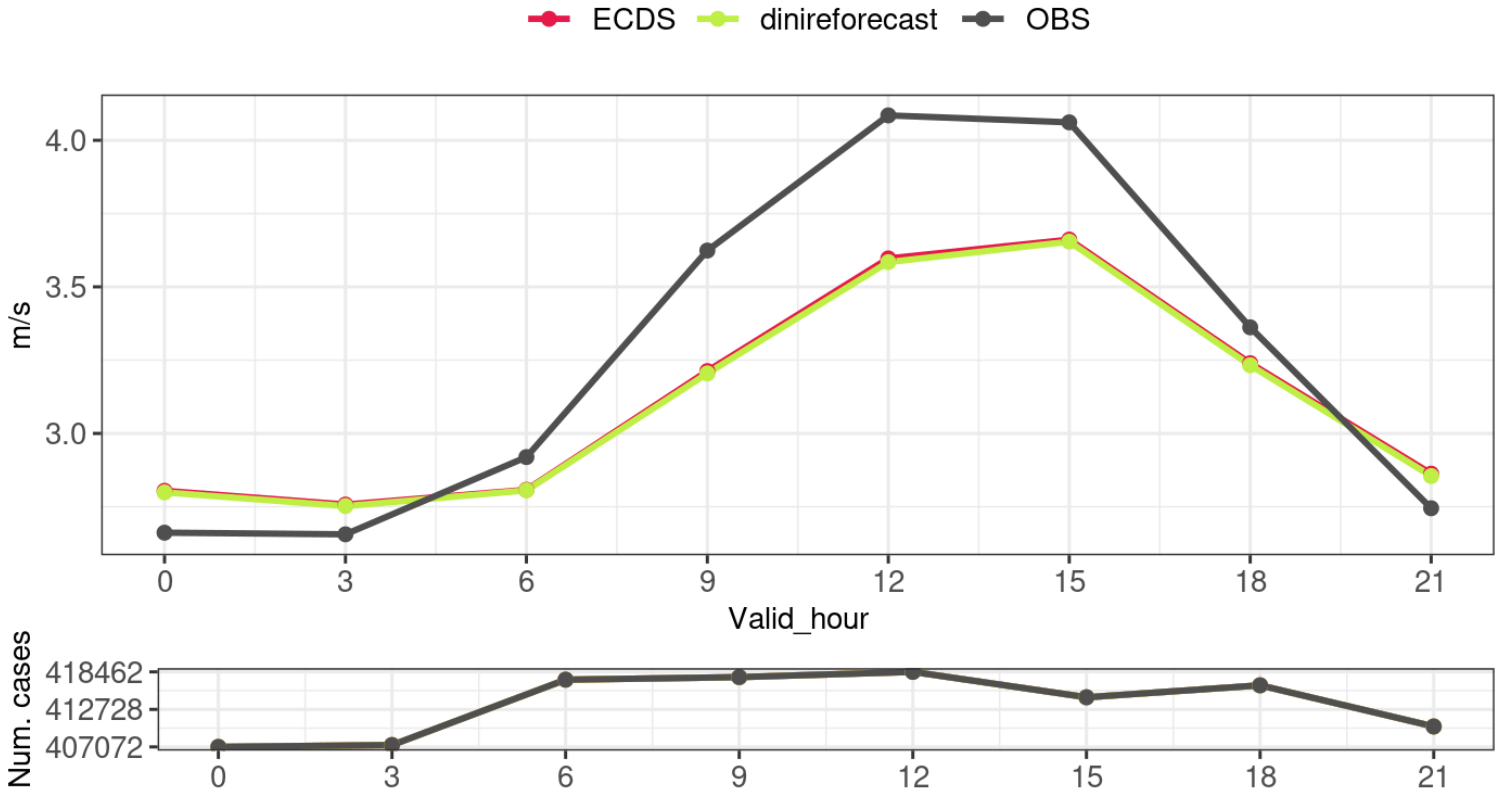
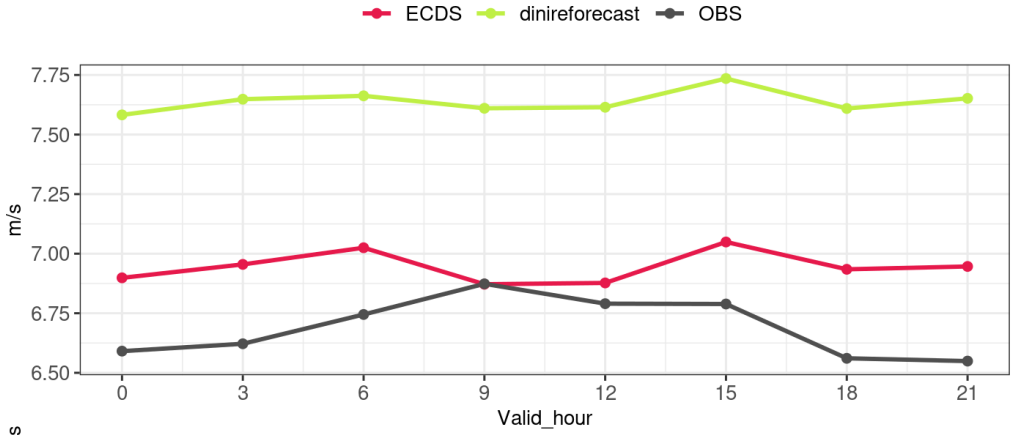
Dailyvar : S10m : 2023-07-01-00 - 2023-07-31-18
Used {00,06,12,18} +3, 6, ... , 48 : All stations

July



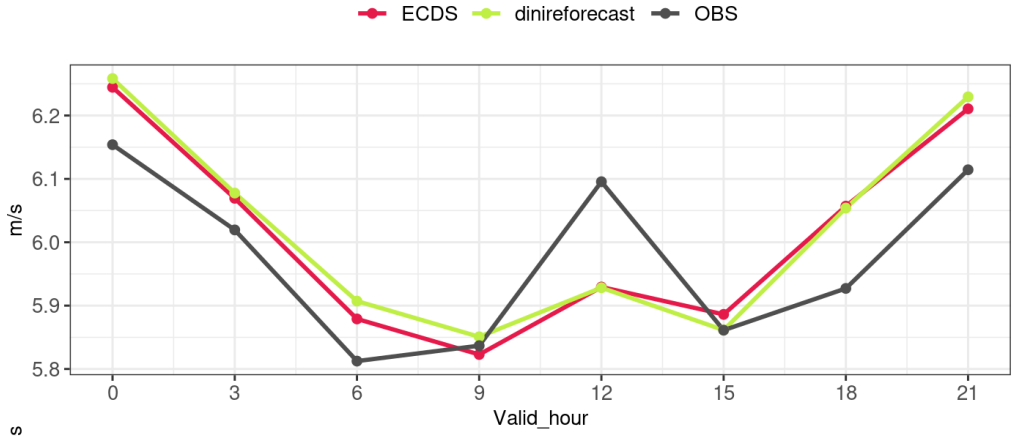
Dailyvar : S10m : 2023-01-01-00 - 2023-01-31-18
Used {00,06,12,18} +3, 6, ... , 48 : IS stations

Iceland



Dailyvar : S10m : 2023-01-01-00 - 2023-01-31-18
Used {00,06,12,18} +3, 6, ... , 48 : DK stations

Denmark



Dailyvar : S10m : 2023-01-01-00 - 2023-01-31-18
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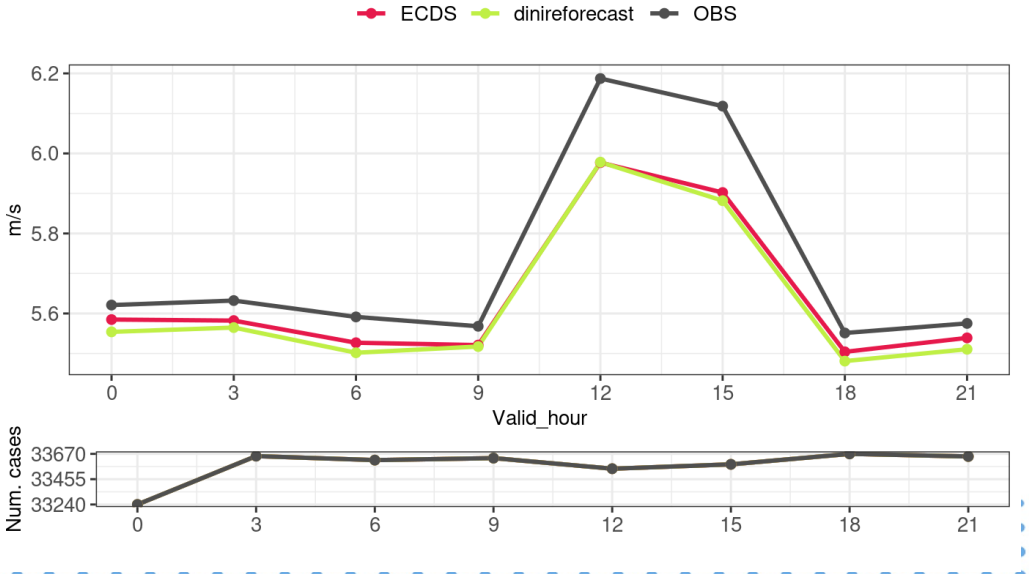
Ireland



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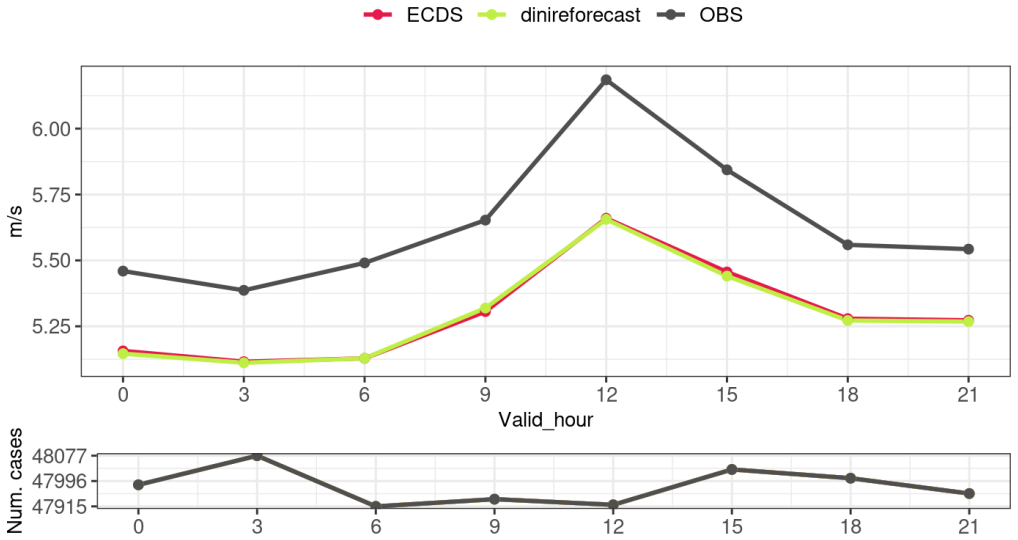
Netherlands



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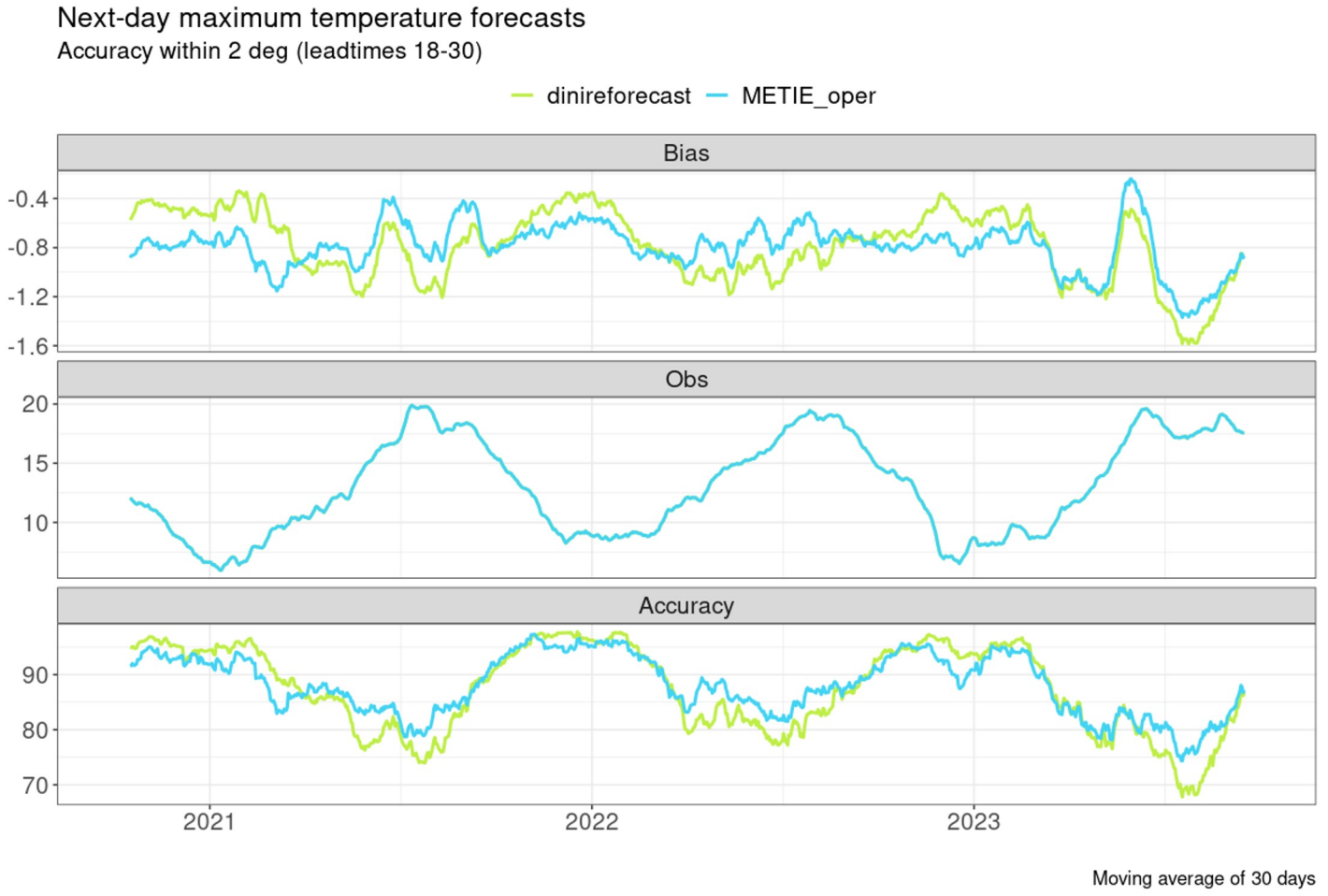
Reforecast verification

- Long time series verification can show features not clear in monthly verification
- Scores better in Winter, worse in Summer
- Some periods in Summer also show smaller bias



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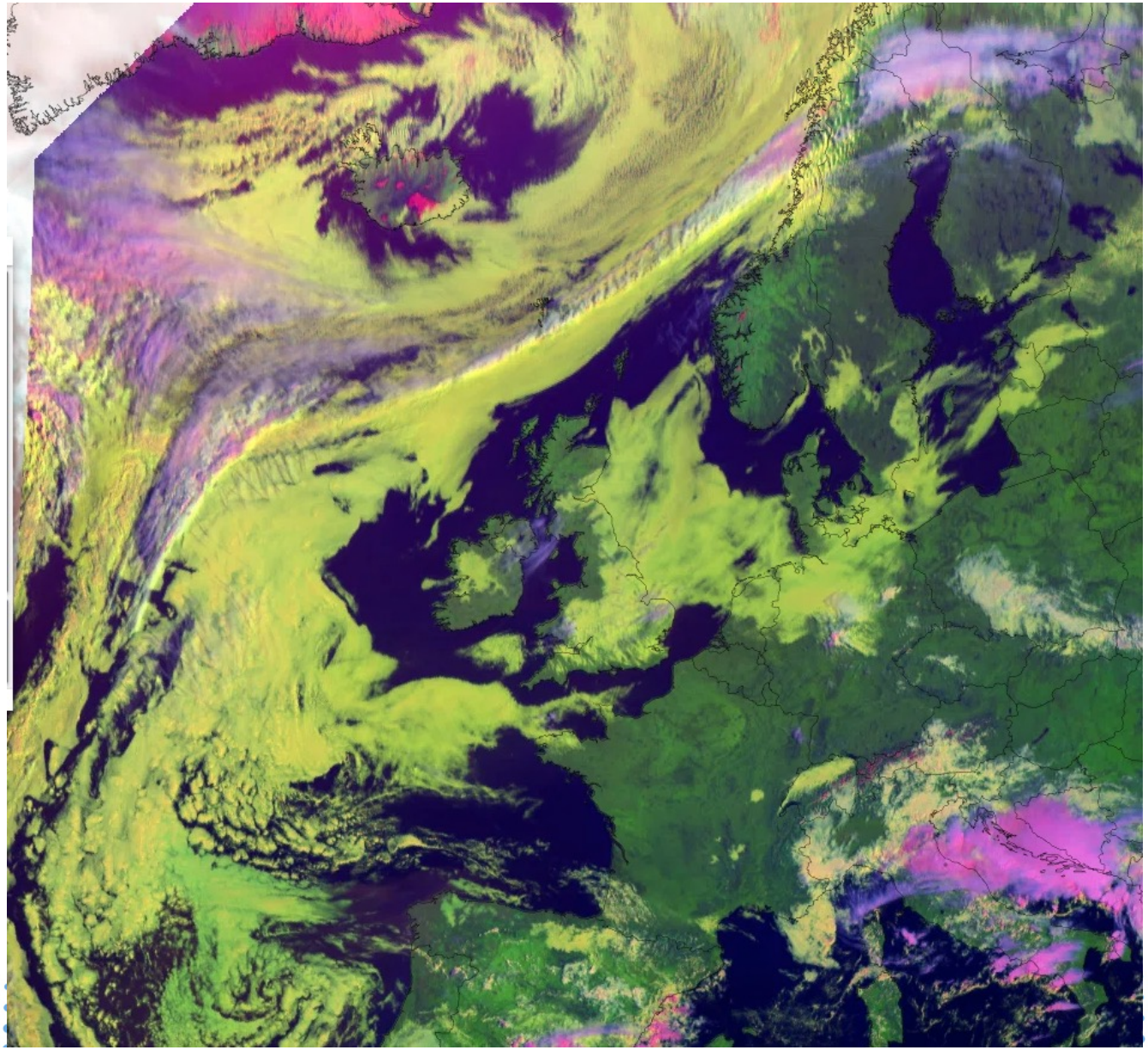
Fog and low clouds

- New meteorological work tool for forecasters: Geoweb
- Overlay of model and observations, good comparison of model and satellite possible



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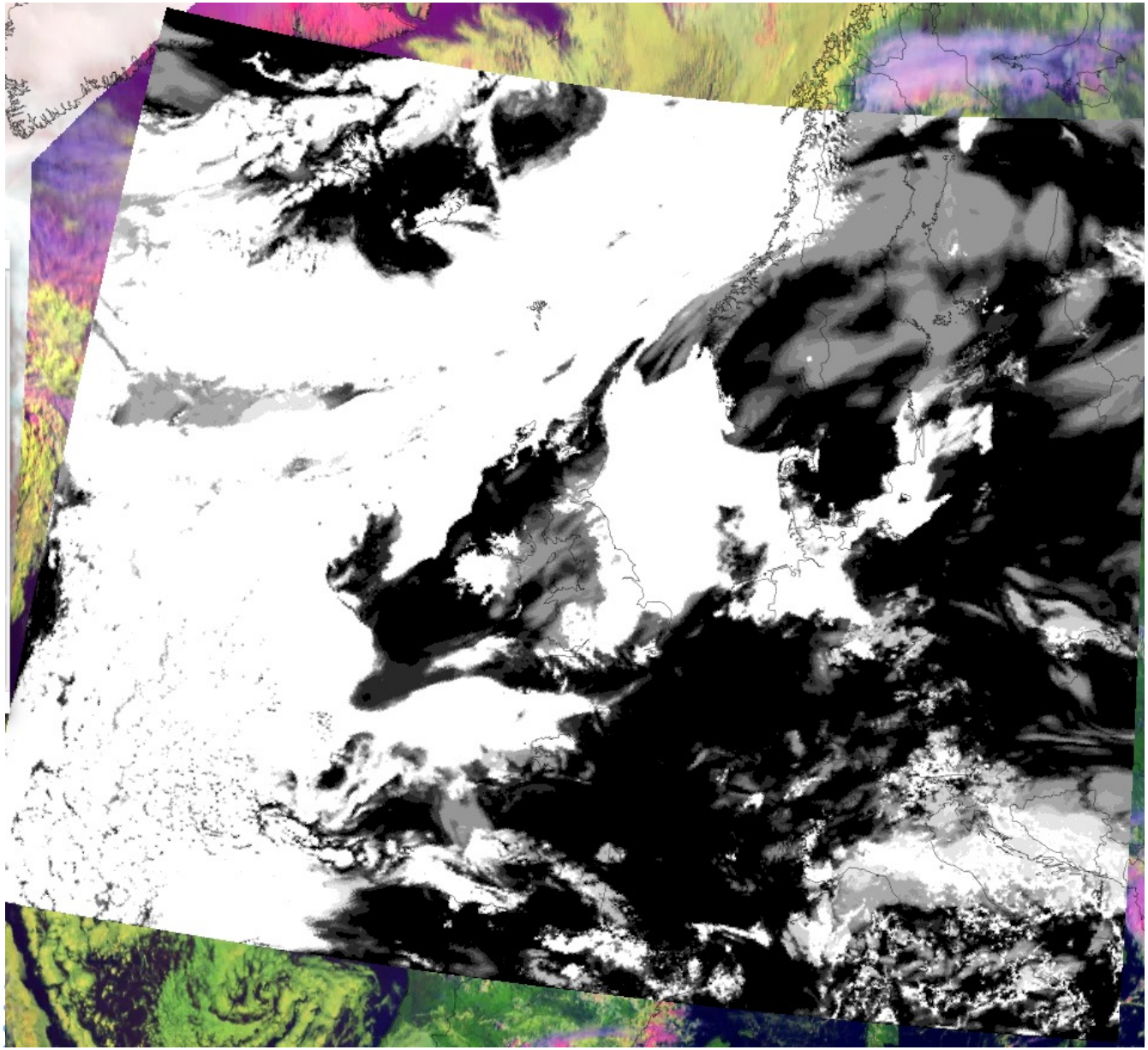

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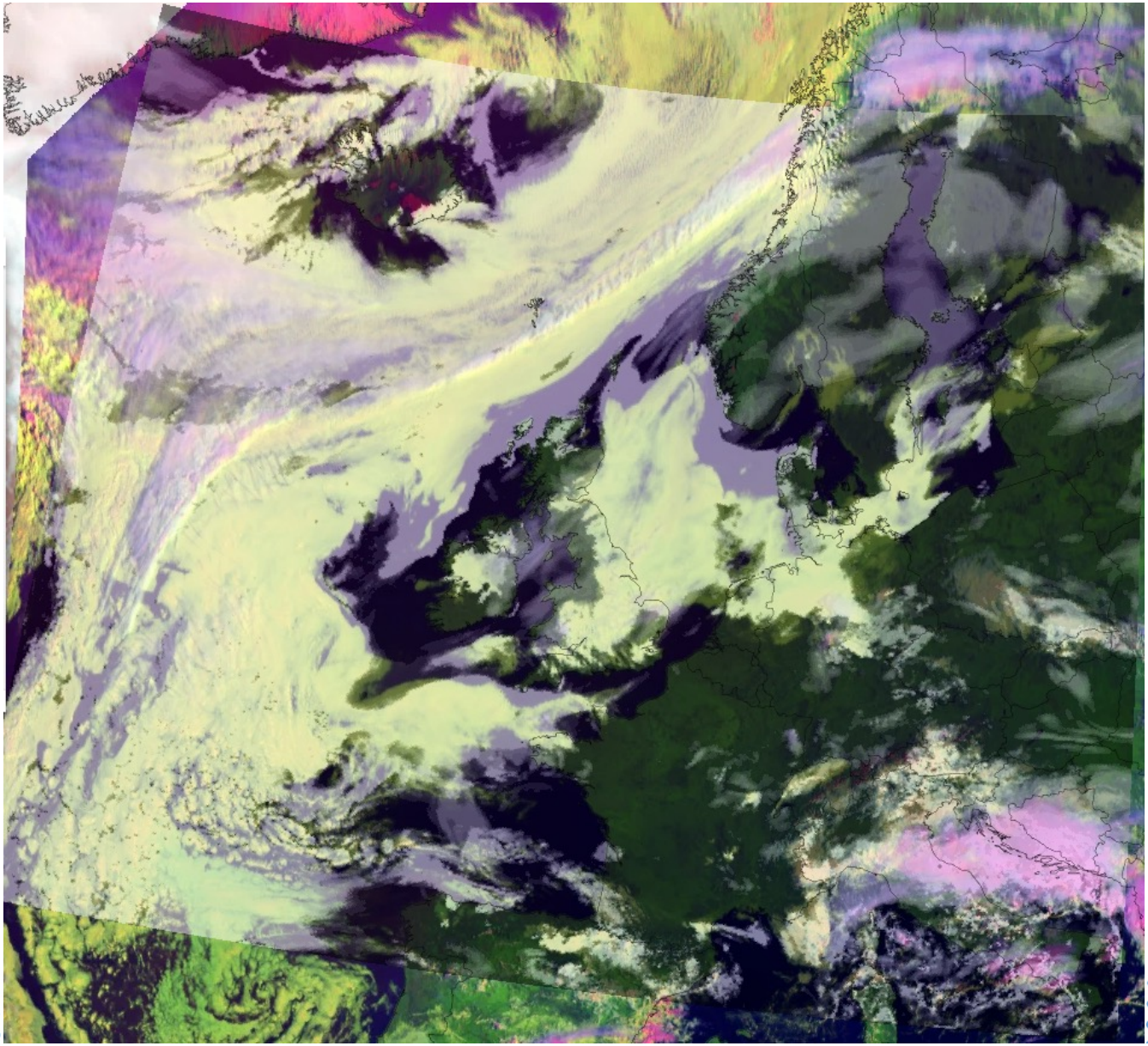

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Summary

- HARP + Shiny very nice verification tool
- Significant differences between different areas concerning model performance
- Different observations or way of reporting challenge for verification
- Reforecast and its verification can show model behaviour that are otherwise difficult to learn quickly from operational verification.