

Verification of early common UWC-W forecasts

Eoin Whelan

Sander Tijm, Bolli Palmason, James Fannon, Carlos Andrés Peralta Aros, Fabiola De Souza Silva
& UWC-W Development Team

Outline

- UWC-W Status
- Verification infrastructure
- ECDS – Early Common DINI Suite
 - Icelandic winds and fake trees
 - Gust verification across Europe
- Next steps:
 - Radiosonde displacement correction
 - Scatterometer winds
 - Verification using Screening

WARNING:
Contains one “**BUFR**” and three “**ODB**”s

Status

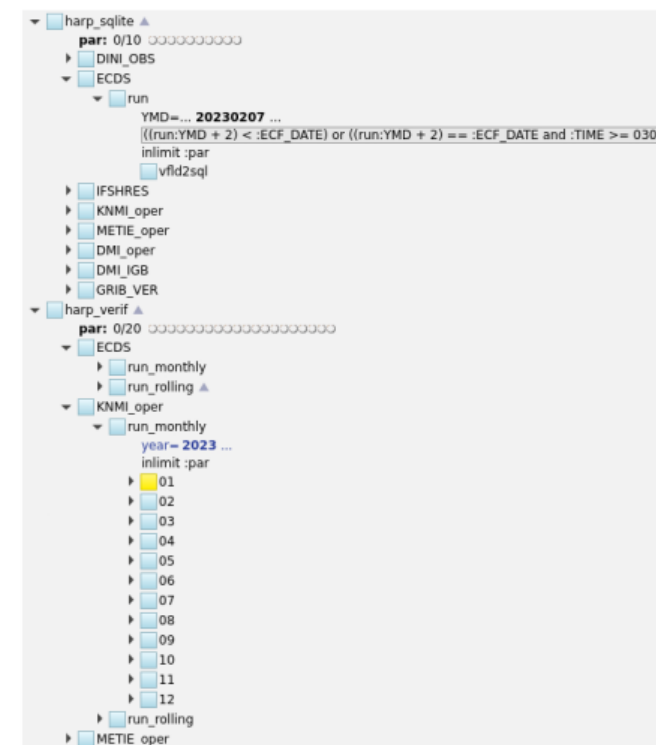
Status

- Hardware installation complete
- SAT 17-21 April
- Stability test (30 days) during May
 - Real-time suites
 - EPS tests
- Acceptance June 1st
- ECDS continues to run at ECMWF

Verification infrastructure

harp

- Point verification scripts on **harp-verif** gitlab repo:
 - Based on **harp** (ACCORD R package for NWP verification)
 - Generalised for deterministic and ensemble experiments
 - All standard summary/threshold scores and scorecards
 - Monthly comparison of ECDS, IFRES and local op. models
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 - Outputs:
 - harp .rds files (for use with harp's built in shiny app)
 - Selection of standard results as png files
 - Scripts deployed with ecFlow at ECMWF
 - Dissemination via shiny app/monitor-like interface



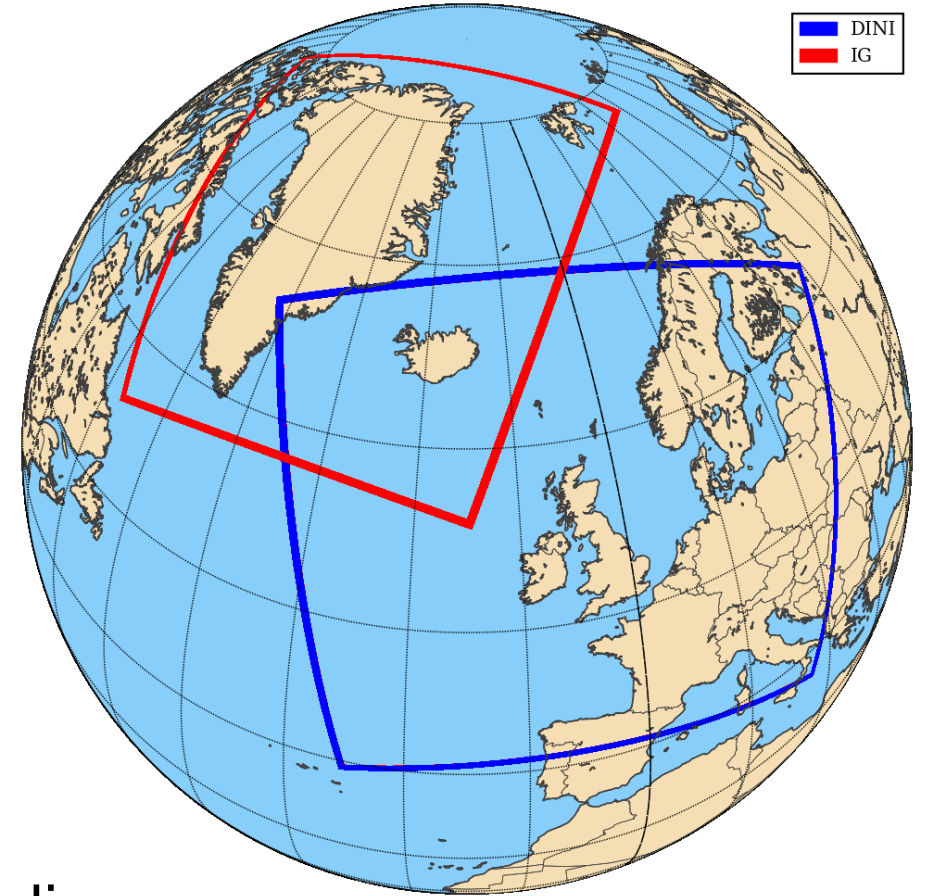
Forecaster feedback

- Weekly feedback meetings
 - All four members take their turns
 - Developers take their turn too!
 - ECDS has been the focus for this feedback
- “Known Issues” page
 - Maintain list of issues
 - Track feedback/developments

ECDS Verification

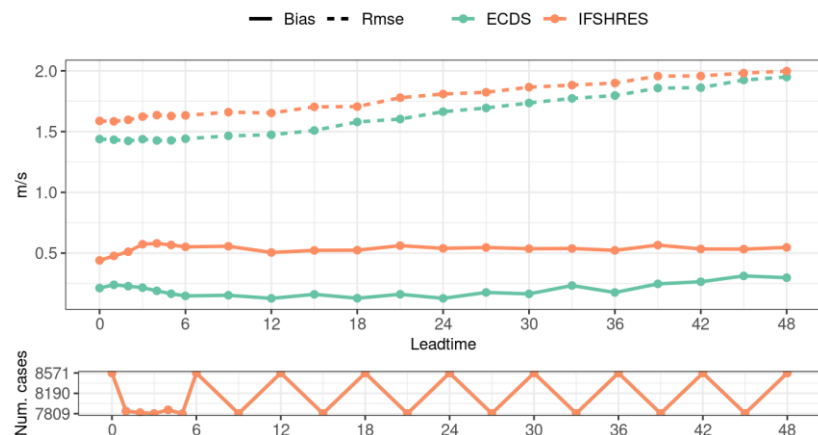
Status

- ECDS – Early Common DINI Suite
- HARMONIE-AROME 43h2.1.1
- $\Delta x = 2.0$ km; L90
- Single-precision
- 48 hour forecast every six hours
- 3D-Var
 - Conv./Mode-S/ASCAT/GPS-RO/MW Radiances



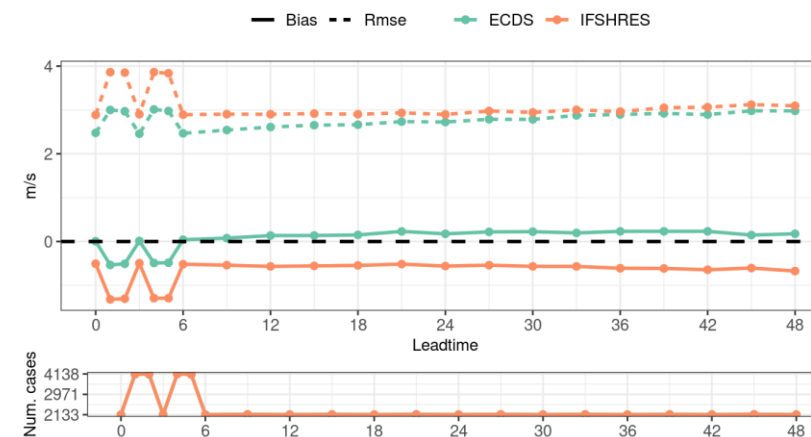
Icelandic winds and fake trees

Bias, Rmse : S10m : 2022-12-01-00 - 2022-12-31-18
DK stations (77) : All cycles used



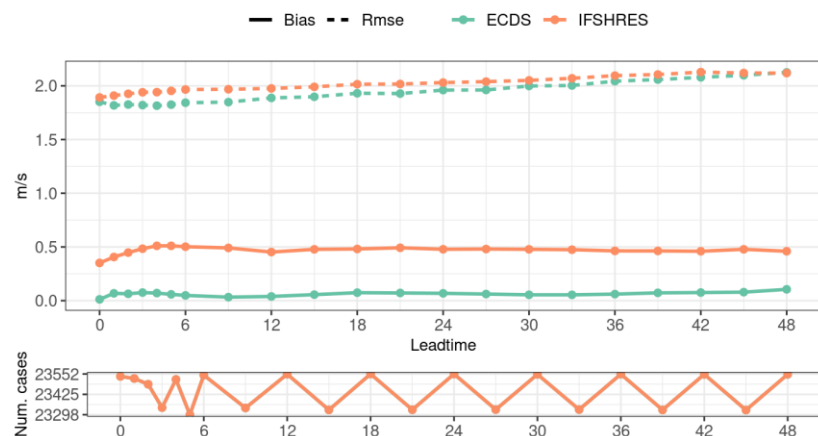
DK

Bias, Rmse : S10m : 2022-12-01-00 - 2022-12-31-18
IS stations (45) : All cycles used



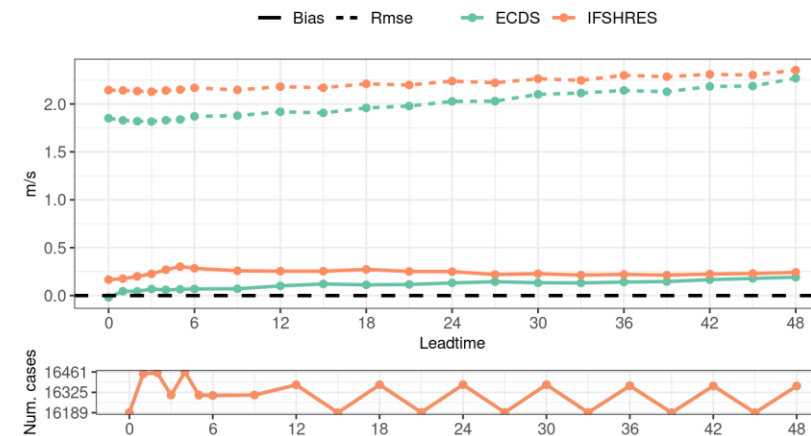
IS

Bias, Rmse : S10m : 2022-12-01-00 - 2022-12-31-18
NL_OP stations (212) : All cycles used



NL

IE_EN stations (150) : All cycles used



IE

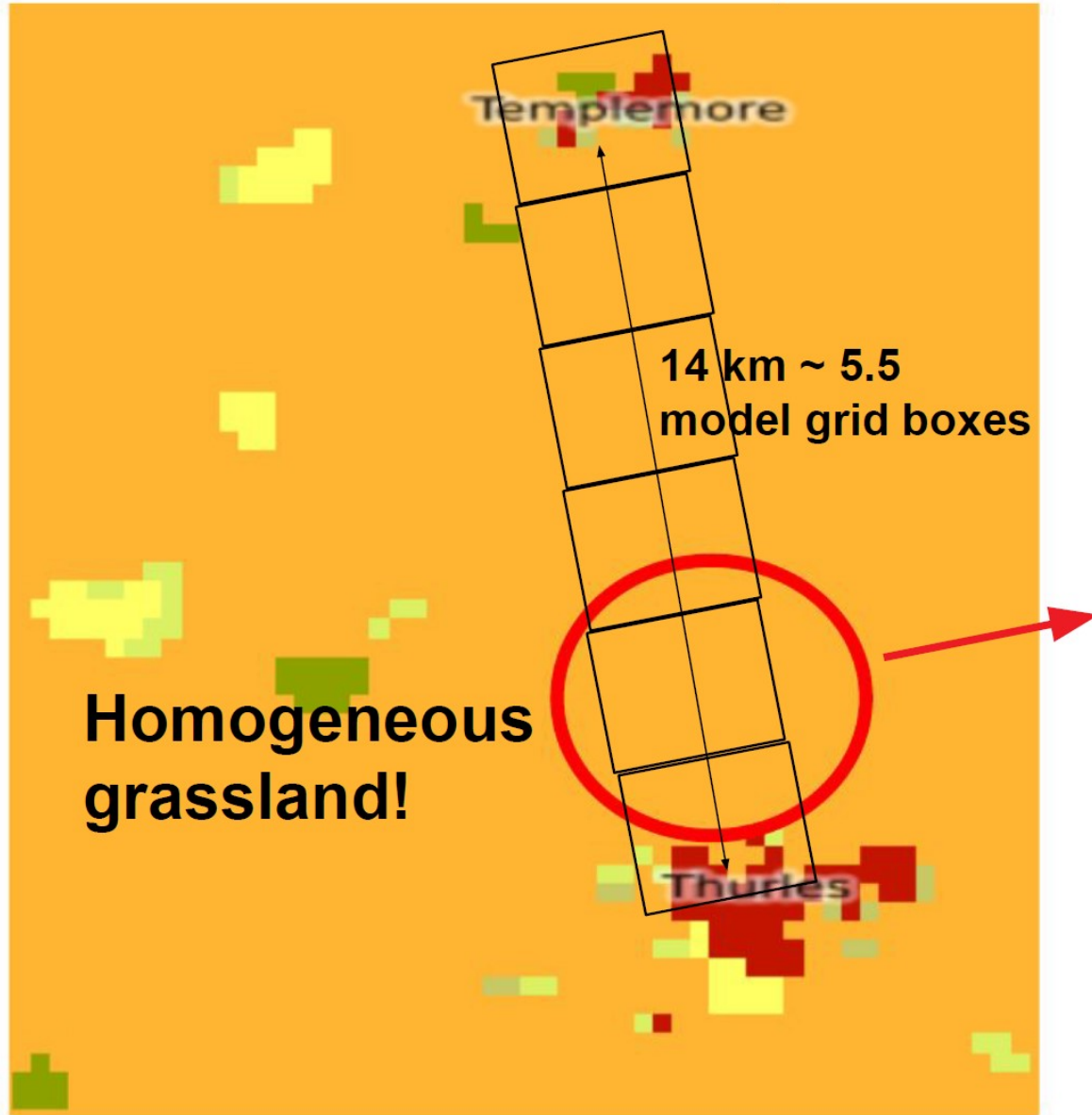


Icelandic winds and fake trees

- SYNOP verification looked good
- Feedback from IMO suggested wind speeds too low
- There are no fake trees in Iceland!

A ECOCLIMAP 2nd generation problem example from the interior of southern Ireland

ESA-CCI land cover with 300 m pixels



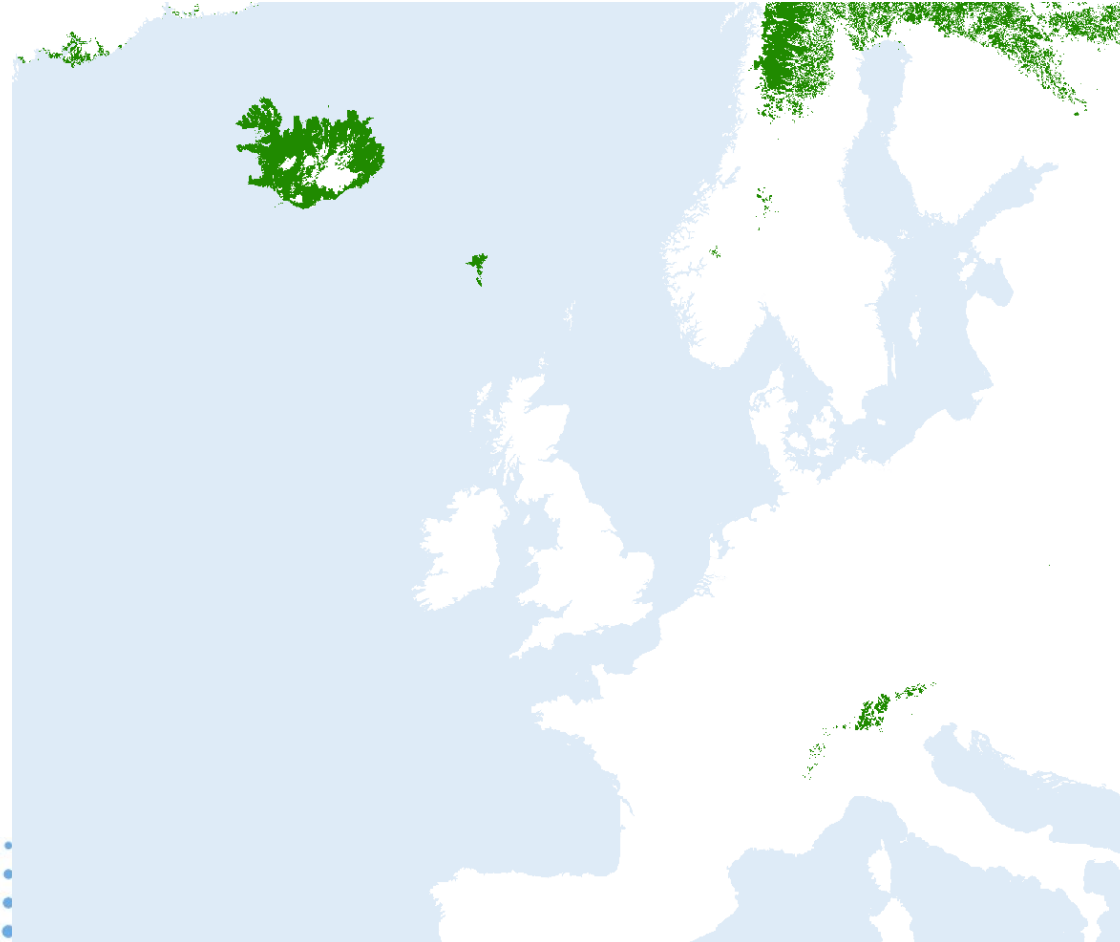
This area in reality (Google maps)!



Figures from Emily Gleeson and
Geoffrey Bessardon (Met Éireann)

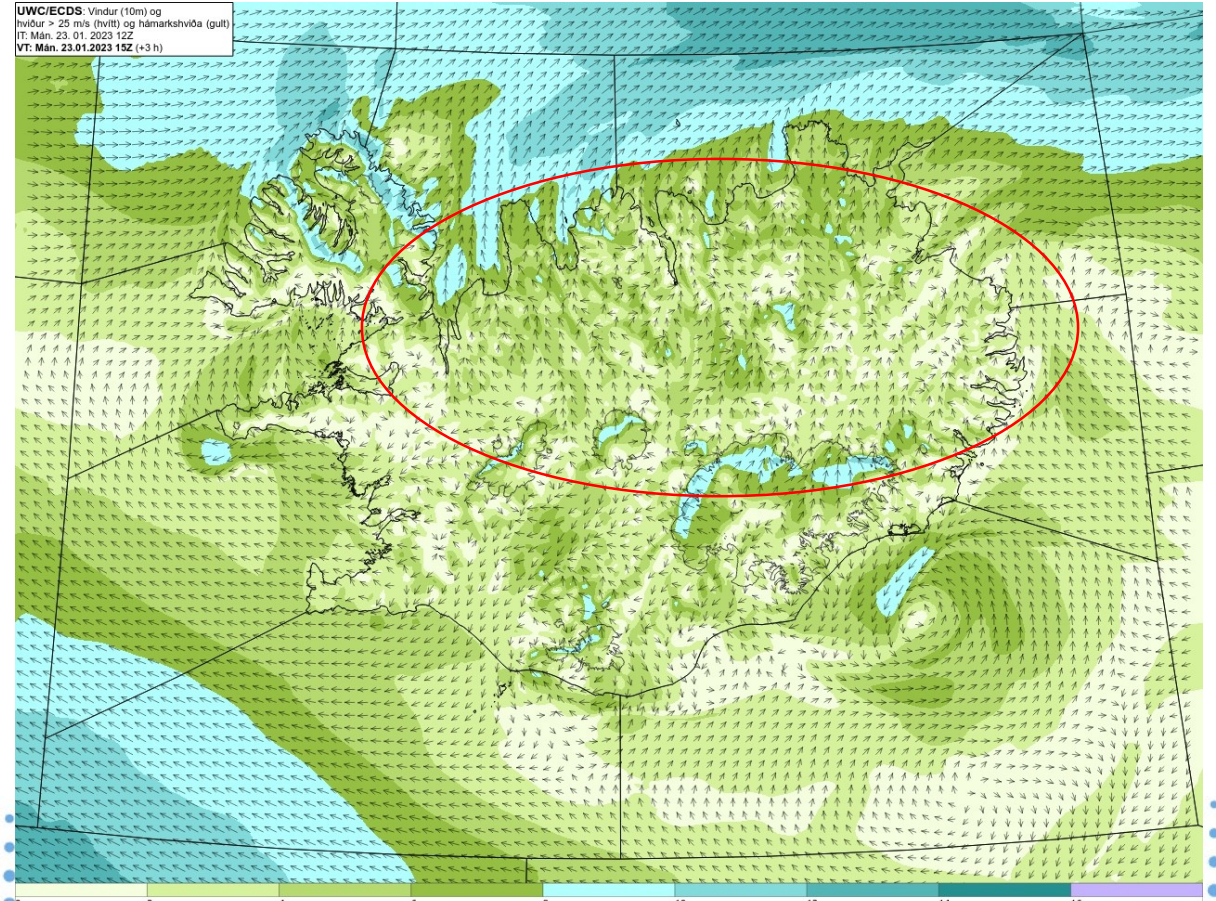
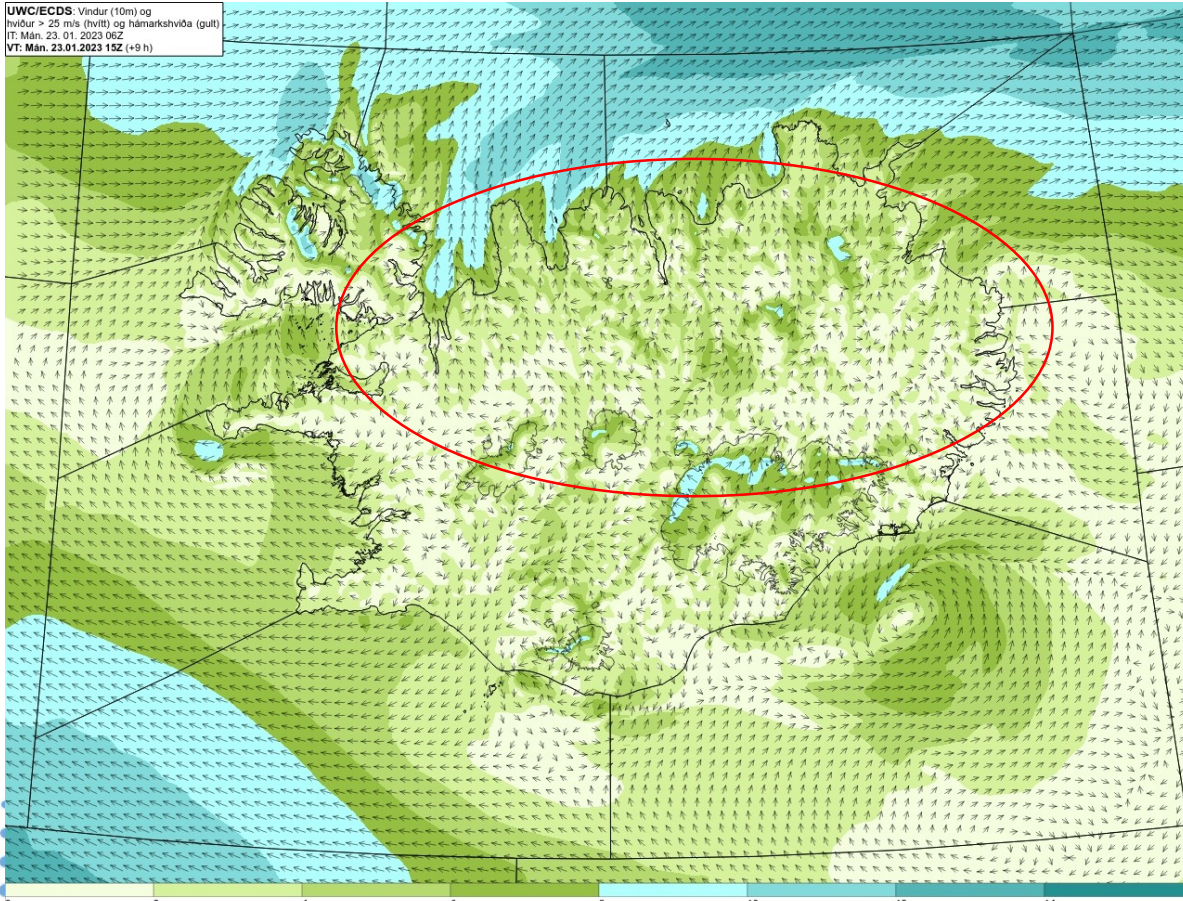
Icelandic winds and fake trees

- Grid-boxes with boreal grassland after the update to ECO-SG
... removal of FAKETREES should only affect these grid-boxes.



Icelandic winds and fake trees

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... removal of FAKETREES should only affect these grid-boxes.



Gust verification across Europe

- *“... wind speed is slightly underestimated both in England/Ireland and in the Netherlands. Interestingly, the wind gusts seem to have a significant negative bias at KNMI and an almost 0 bias in England/Ireland (see the attached monitor plots).”*
- ...

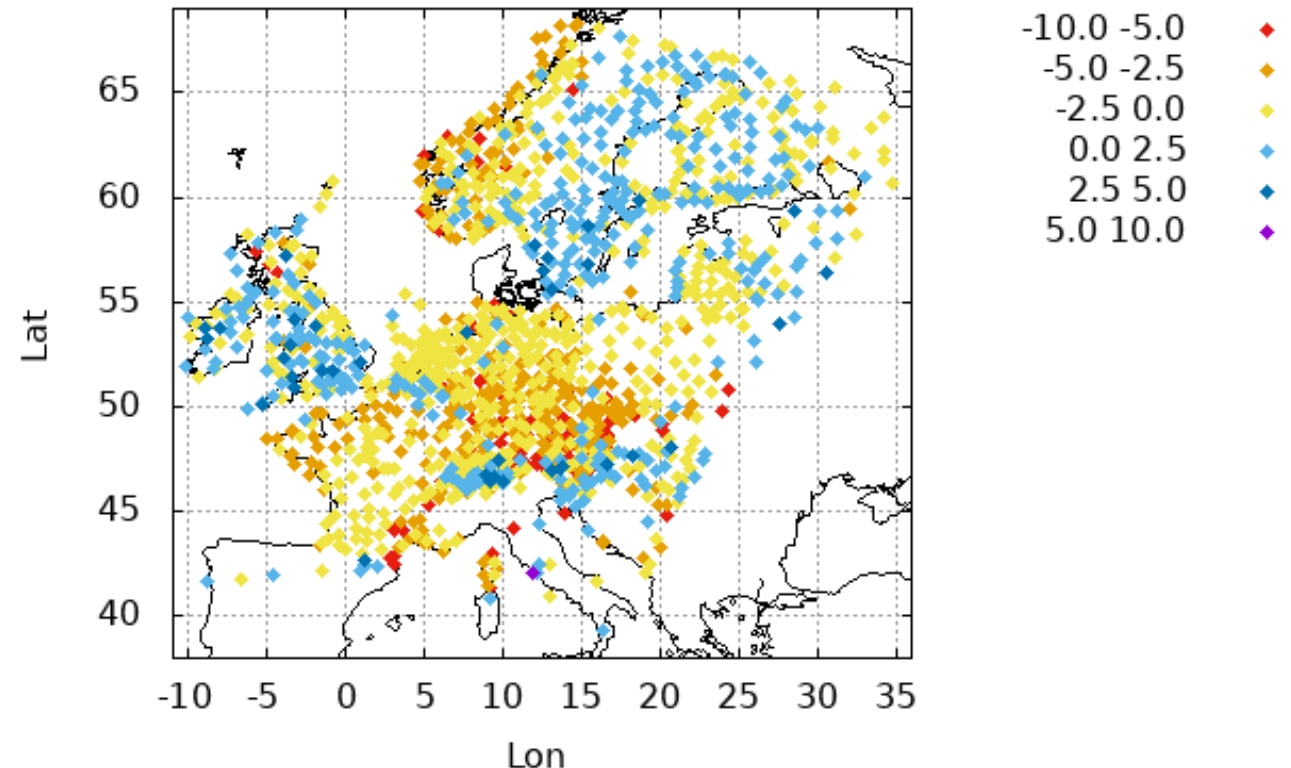
Gust verification across Europe

- *“... wind speed is slightly underestimated both in England/Ireland and in the Netherlands. Interestingly, the wind gusts seem to have a significant negative bias at KNMI and an almost 0 bias in England/Ireland (see the attached monitor plots).”*
- *“looking at the verification map of the wind gust bias, it almost looks like you can see differences between the different countries.”*
- ...

Gust verification across Europe

- Positive bias:
 - Ireland
 - UK
 - Belgium
 - Sweden
- Negative bias:
 - The Netherlands
 - Germany
 - France
 - Poland
 - Norway

Exp: v1p2 Selection: ALL 1532 stations
 Period: 20220201-20220227
 Max Wind Gust bias [m/s] at 00 UTC
 Used 00 + 24-23



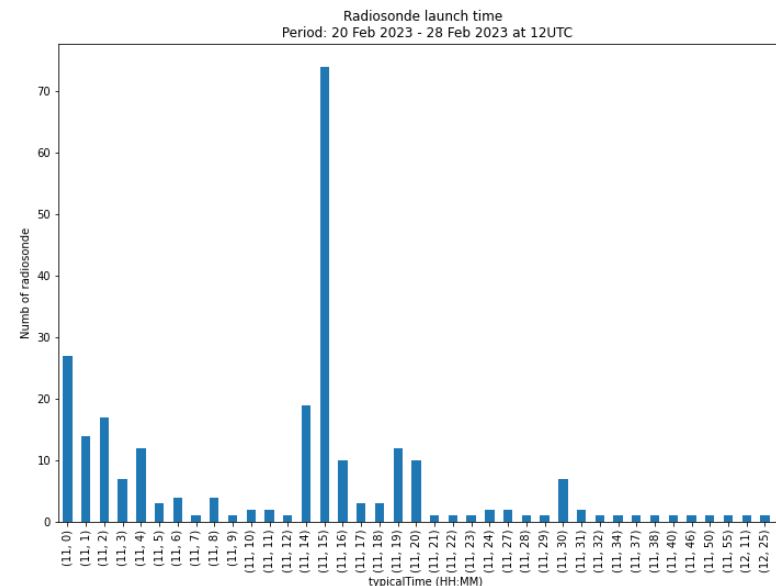
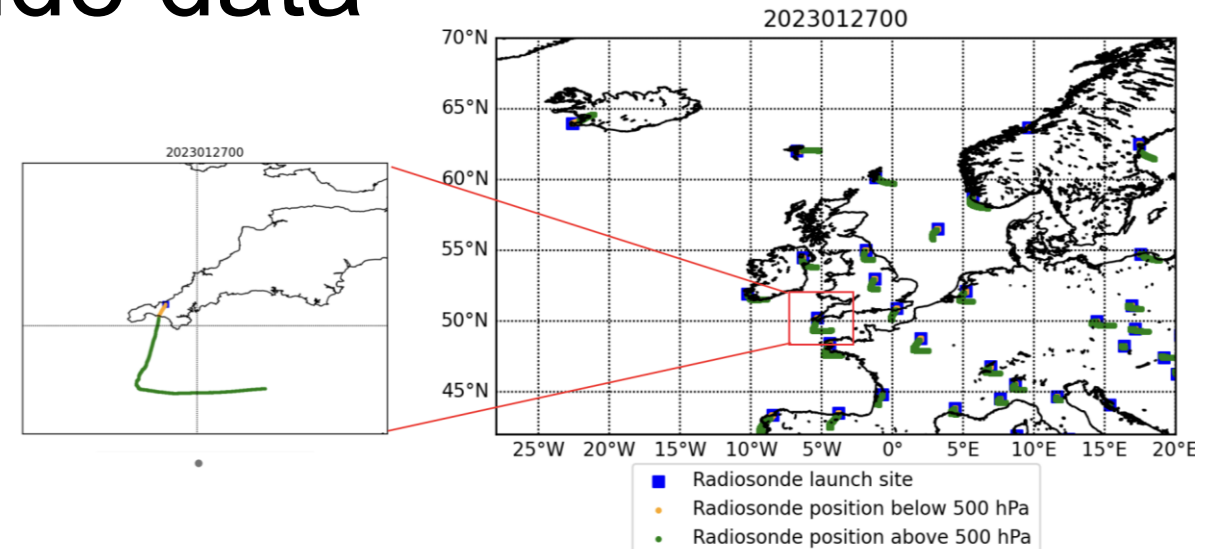
Gust verification across Europe

- ...
- *“looking at the verification map of the wind gust bias, it almost looks like you can see differences between the different countries.”*
- *“Taking a look at what [**BUFR**] KNMI put on the GTS I see that gusts are valid for `timePeriod=-360` for 0000/0600/1200/1800, `timePeriod=-180` for 0300/0900/1500/2100 and `timePeriod=-60` for all other hours.”*

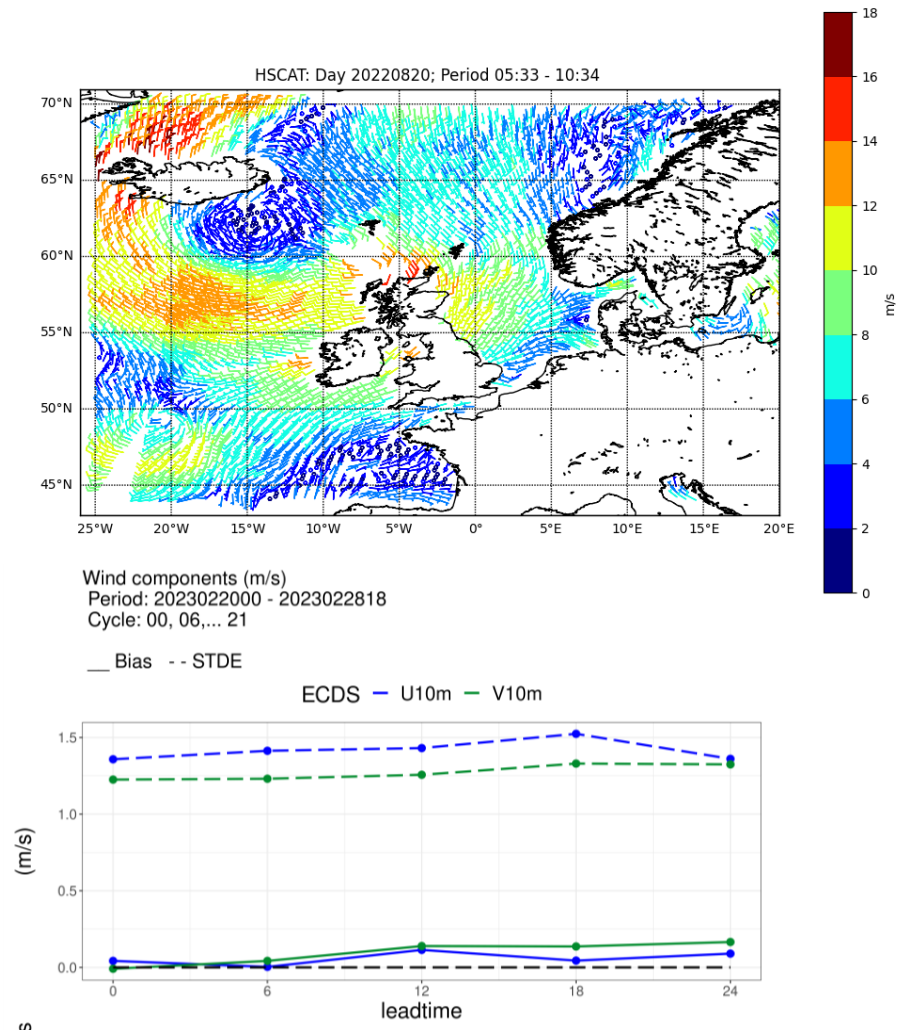
Next steps

Correct use of radiosonde data

- Current radiosonde verification:
 - Fixed time, latitude, and longitude
- Radiosondes are moving platforms:
 - Launch time not exactly 00/12UTC
 - Ascending time ~2 hours (horizontal displacement)
- Scripts developed to extract:
 - Exact time, position, obs from BUFR
 - Corresponding forecasts from grib
 - Depends on “pynwp” package (Siebren de Haan- KNMI)
 - Read function developed compatible with harp



Scatterometer verification



- Model performance over sea
 - Utilising scatterometer data
- EUMETSAT OSE SAF product
 - HY-2b, HY-2c, METOP-B/C, etc
 - 10-m wind speed and direction
 - Spatial resolution: 25km
- Overpass the domain twice a day
- Scripts developed to:
 - Extract corresponding forecast data
 - Read function compatible with harp

Verification using Screening

- Loop over the forecast length to be verified
- Use the odbvar (after screening) ODB to perform screening
 - L_SCREEN_CALL=.FALSE. (no QC or thinning)
 - Keep the same number of observations in all verification

```
# **** Verification extraction ****
```

```
OBSEXTR=yes
```

```
FLDEXTR=yes
```

```
FLDEXTR_TASKS=1
```

```
VFLDEXP=$EXP
```

```
SCREXTR=yes
```

```
SCREXTR_TASKS=1
```

```
FGREFEXP=${FGREFEXP-undef}
```

```
OBREFEXP=${OBREFEXP-undef}
```

```
# Extract observations from BUFR (yes|no)
```

```
# Extract model data for verification from model files (yes|no)
```

```
# Number of parallel tasks for field extraction
```

```
# Experiment name on vfld files
```

```
# Use Screening (NCONF=002) to produce O-F data
```

```
# Number of parallel tasks for O-F extraction
```

```
# reference experiment name for FirstGuess
```

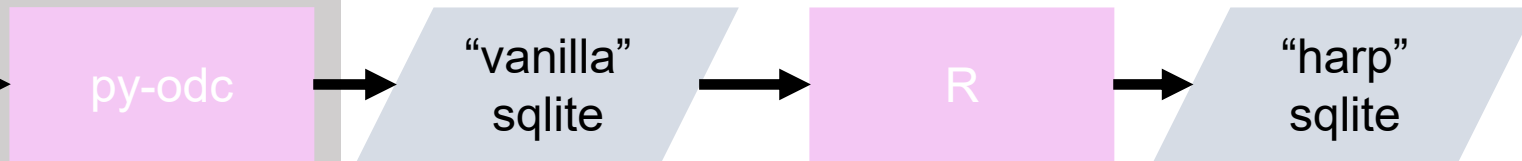
```
# reference experiment name for ODBs
```

Verification using Screening



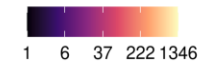
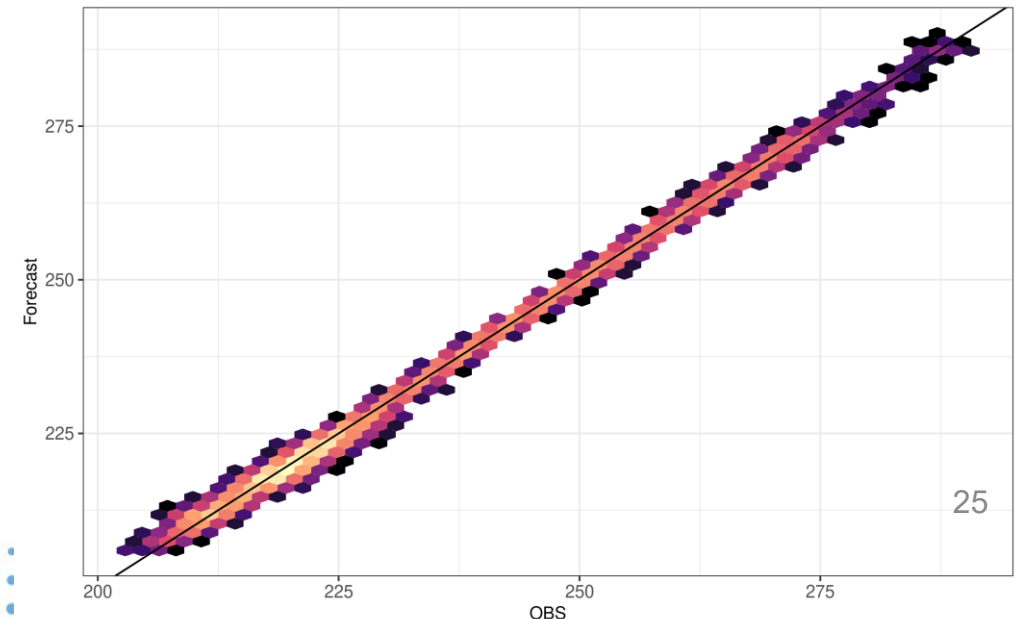
```

#!/bin/env python3
import pandas as pd
import sys
import os
sys.path.insert(0, os.path.abspath(""))
import codc as odc
import sqlite3
with open('conv_o_f.mfb', 'rb') as f:
    df_decoded = odc.read_odb(f, single=True)
conn = sqlite3.connect('conv_o_f.db')
df_decoded.to_sql('ver_table', conn,
if_exists='replace', index=False)
conn.close()
  
```



2023030100-2023030100: AIRCRAFT Temp observations for ECDS

1 6 37 222 1346

Thank you for your attention