

HARMONIE results and lessons

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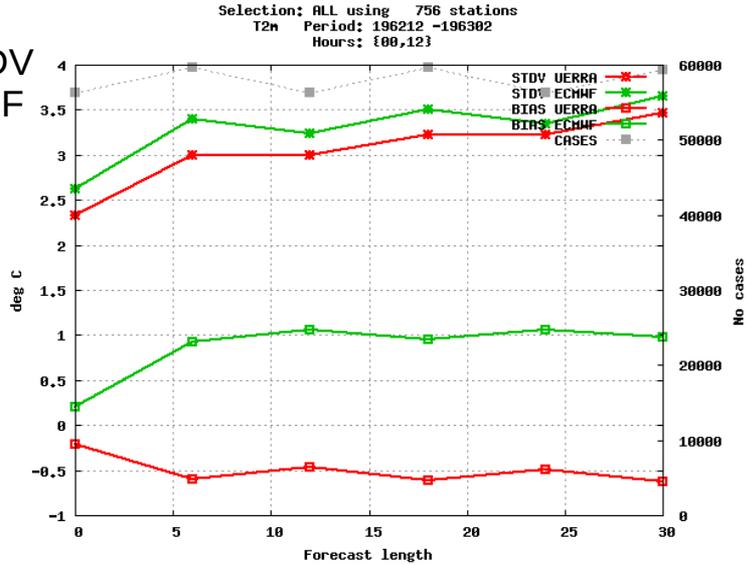
Contents

- Verification
- Climatology
- Lessons learned

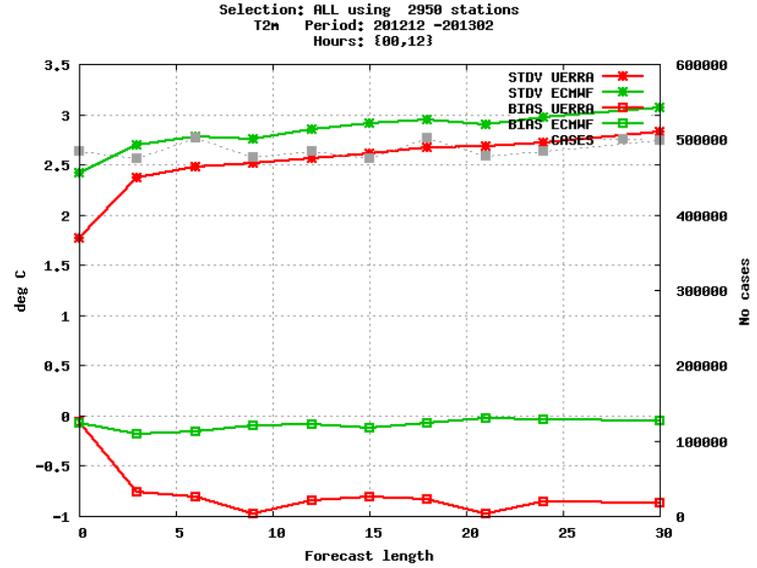
The HARMONIE verification system WebgraF has been used

- Surface: mslp, 10m-wd, 10m-ws, t2m, td2m, rh2m, cloud cover, 12-h precip.
- Upper air: temp, rh, wd, ws, geop.
- Comparison with ERA-40/ERA-interim.
- Seasonal scores.

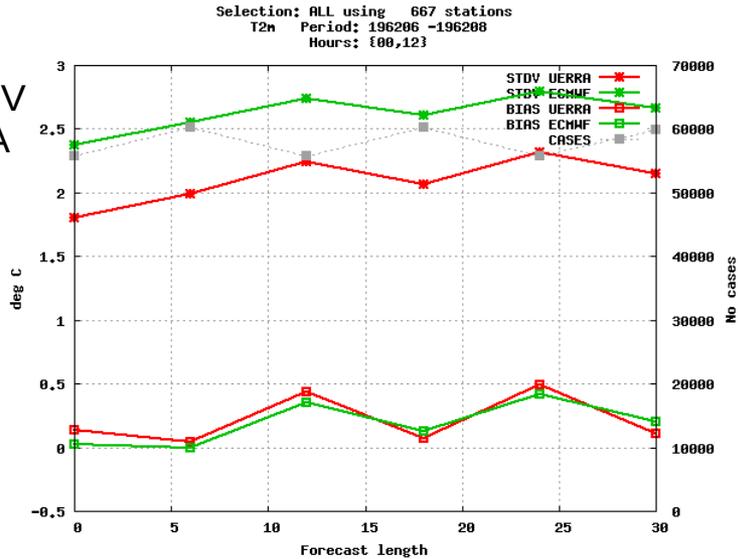
T2m STDV
BIAS DJF
1962



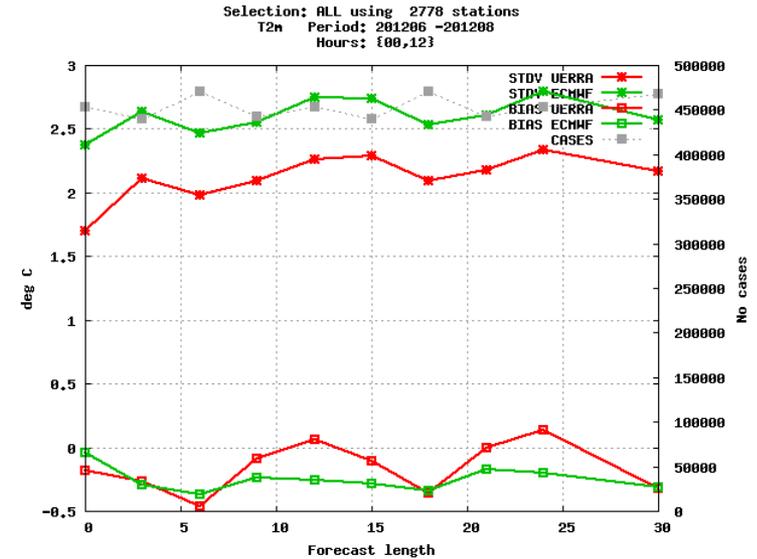
T2m STDV
BIAS DJF
2012



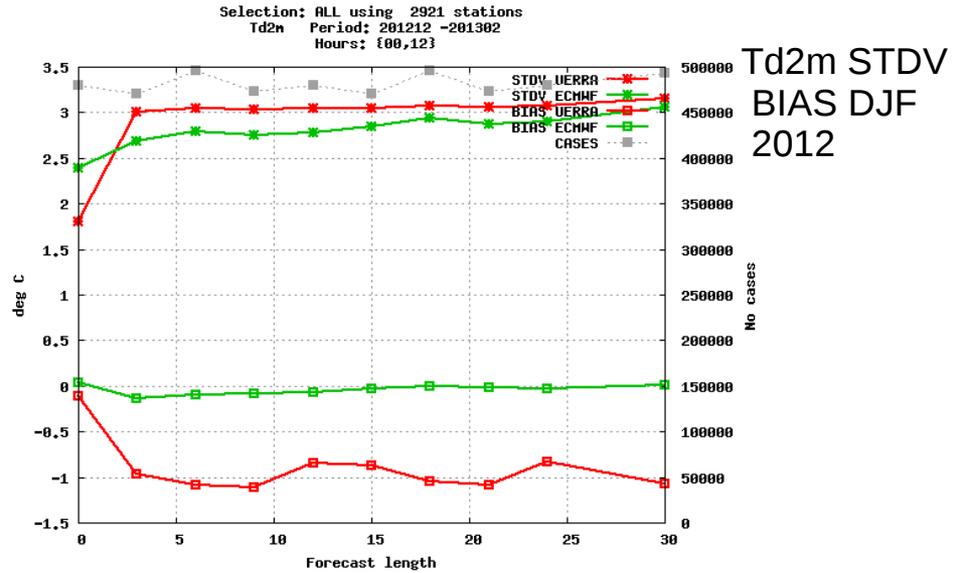
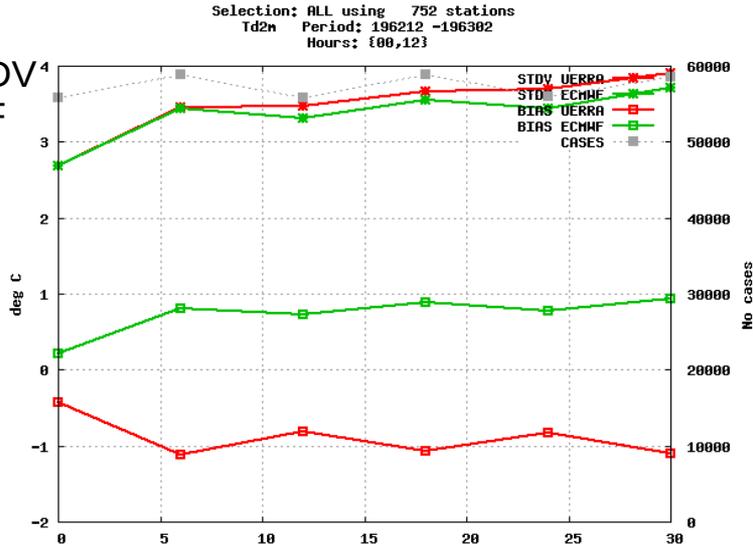
T2m STDV
BIAS JJA
1962



T2m STDV
BIAS JJA
2012

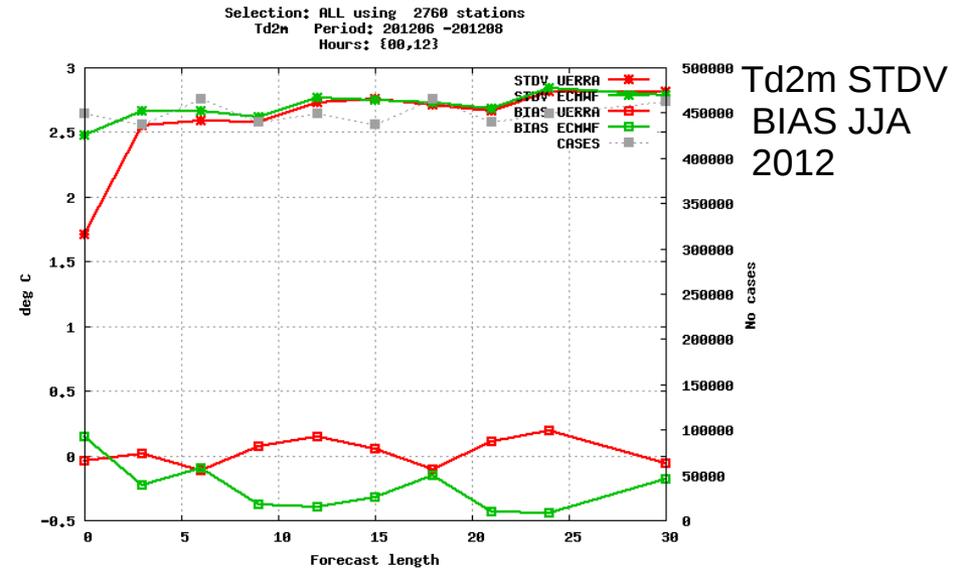
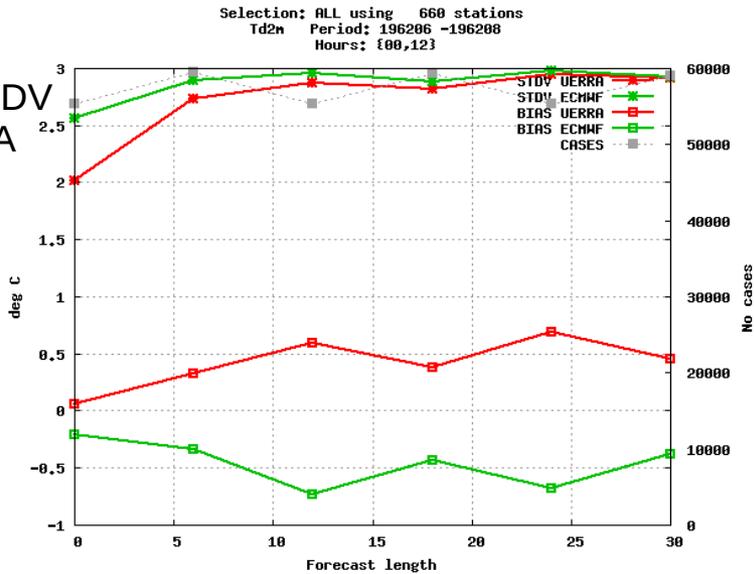


Td2m STDV
BIAS DJF
1962



Td2m STDV
BIAS DJF
2012

Td2m STDV
BIAS JJA
1962

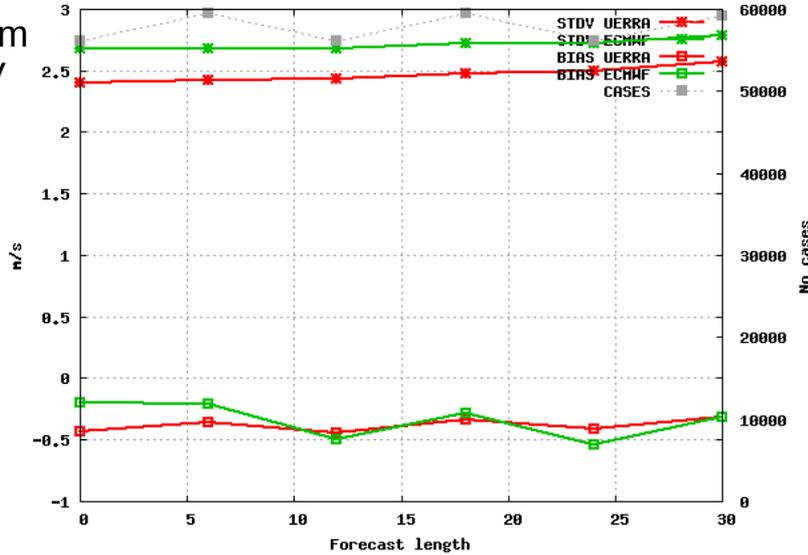


Td2m STDV
BIAS JJA
2012

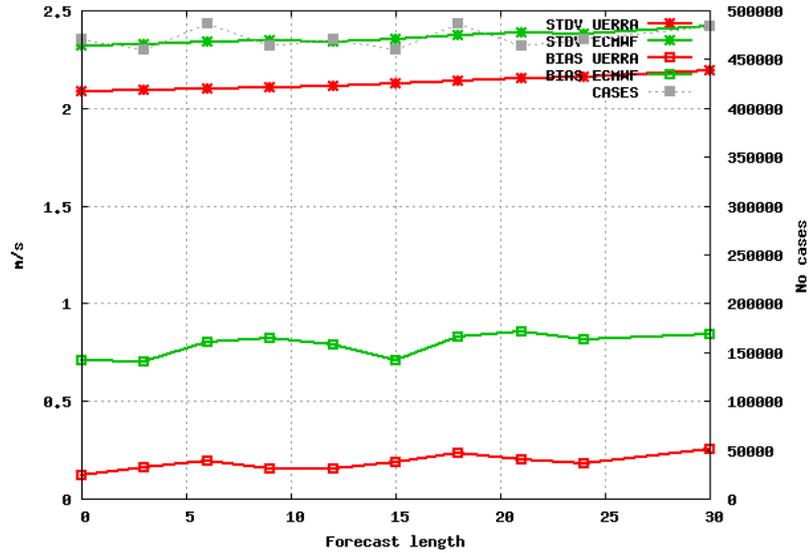
Selection: ALL using 759 stations
 U10m Period: 196212 -196302
 Hours: {00,12}

Selection: ALL using 2880 stations
 U10m Period: 201212 -201302
 Hours: {00,12}

WS10m
 STDV
 BIAS
 DJF
 1962



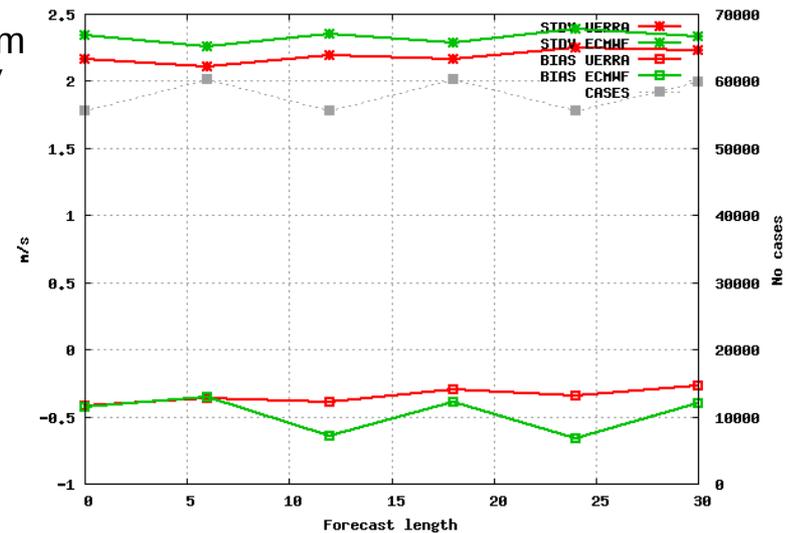
WS10m
 STDV
 BIAS
 DJF
 2012



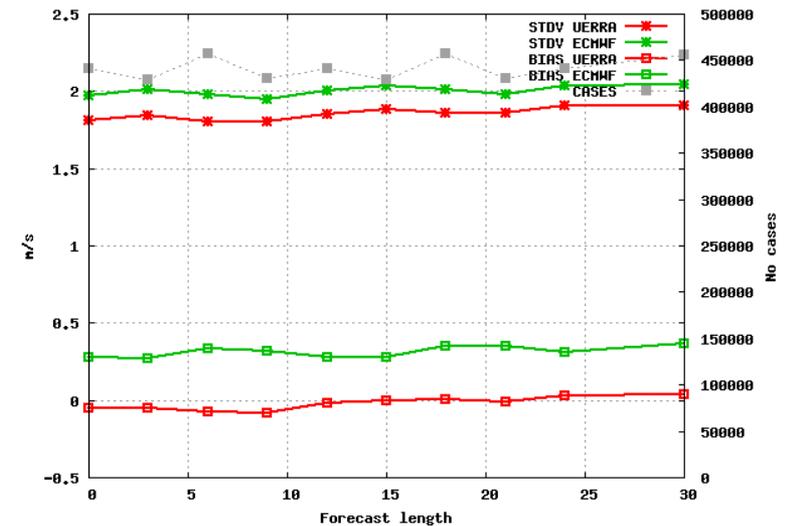
WS10m
 STDV
 BIAS
 JJA
 1962

Selection: ALL using 666 stations
 U10m Period: 196206 -196208
 Hours: {00,12}

Selection: ALL using 2738 stations
 U10m Period: 201206 -201208
 Hours: {00,12}

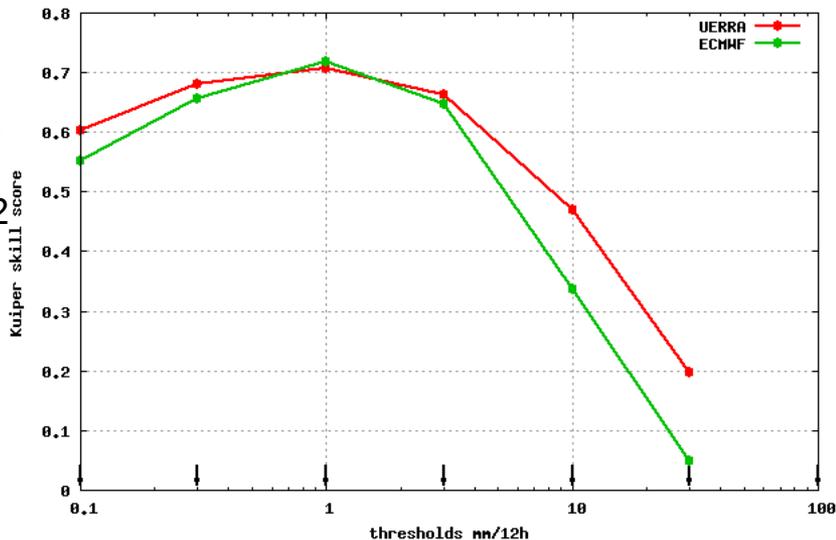


WS10m
 STDV
 BIAS
 JJA
 2012



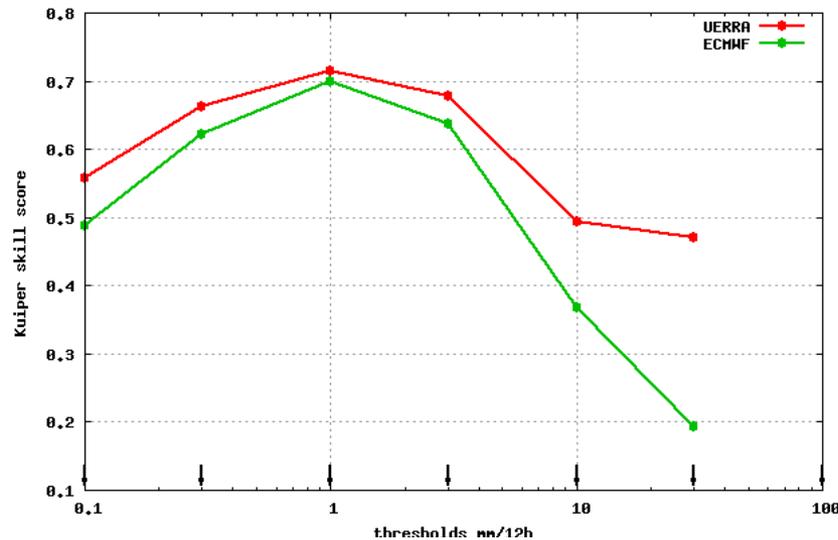
Kuiper skill score for 12h Precipitation (mm/12h)
 Selection: ALL 1555 stations
 Period: 198212
 Used {00,12} + 18-06

12h
 prec
 KSS
 DJF
 1982



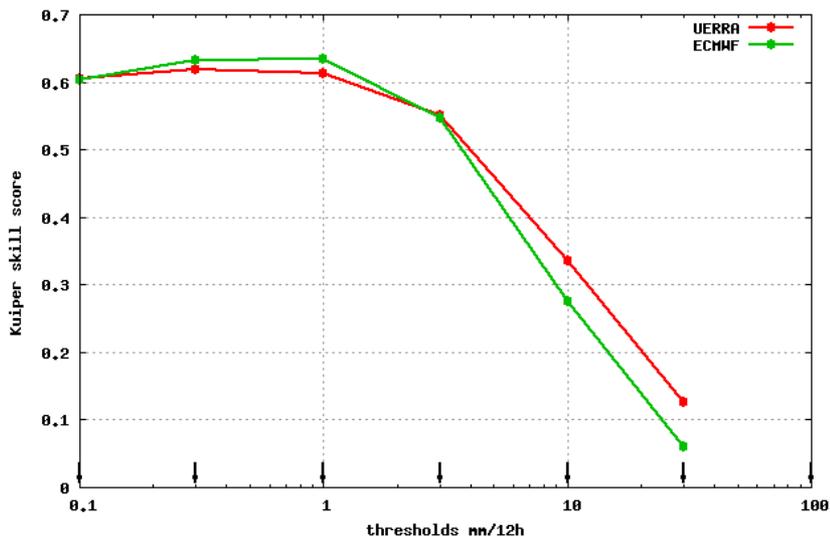
Kuiper skill score for 12h Precipitation (mm/12h)
 Selection: ALL 2486 stations
 Period: 201212
 Used {00,12} + 18-06

12h
 prec
 KSS
 DJF
 2012



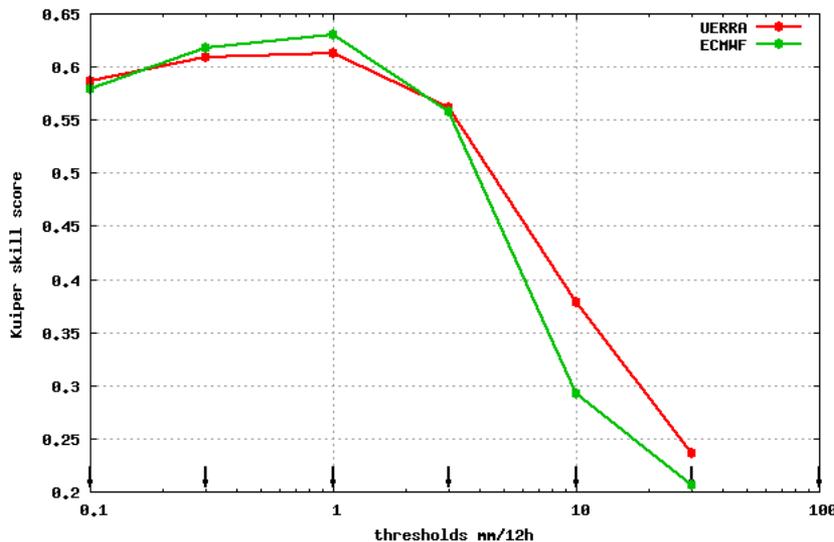
Kuiper skill score for 12h Precipitation (mm/12h)
 Selection: ALL 1483 stations
 Period: 198206
 Used {00,12} + 18-06

12h
 prec
 KSS
 JJA
 1982



Kuiper skill score for 12h Precipitation (mm/12h)
 Selection: ALL 2465 stations
 Period: 201206
 Used {00,12} + 18-06

12h
 prec
 KSS
 JJA
 2012



	1961-1969	1970-1979	1980-1989	1990-1999	2000-2010	2011-2015
PMSL STDV	▲	▲	●	●	●	●
T2m STDV	▲	▲	▲	▲	▲	▲
U10m STDV	▲	▲	▲	▲	▲	▲
Rh2m STDV	●	▼	▼	▼	●	▲
CC STDV		▲	▼	▼	▼	▼
Temp prof STDV	▲	▲	●	●	●	●
WS prof STDV	▼	▼	▼	▼	▼	●
Geop prof STDV	▲	▲	●	●	●	●
RH prof STDV	▼	▼	▼	▼	▼	▼

Scorecard (subjective):

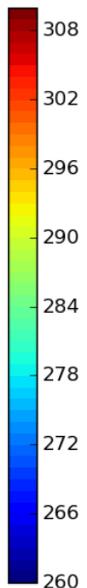
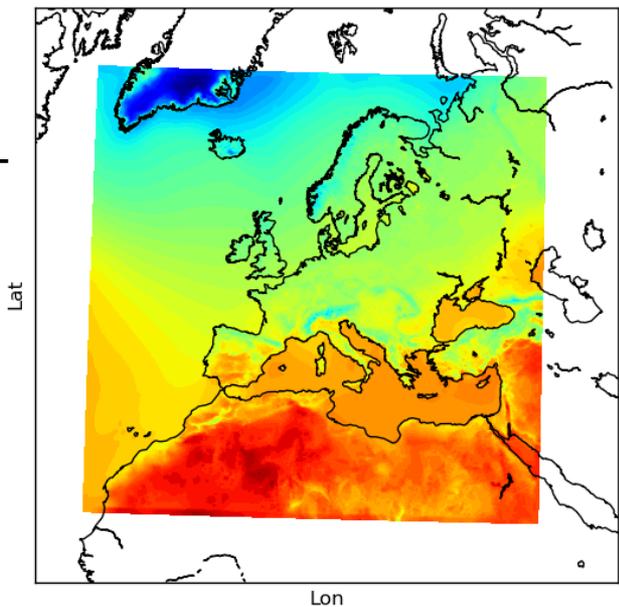
HARMONIE-ALADIN compared to ERA40 and ERA-Interim.

Green indicates that HARMONIE-ALADIN is better.

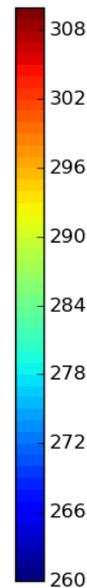
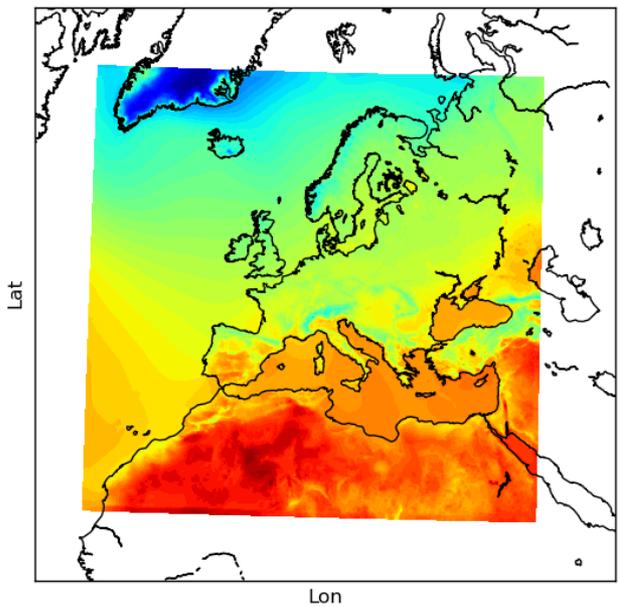
Red indicates that ERA is better.

Circle means no noticeable difference between the two

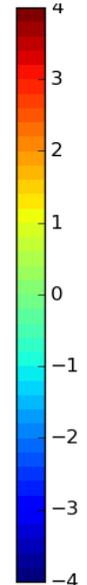
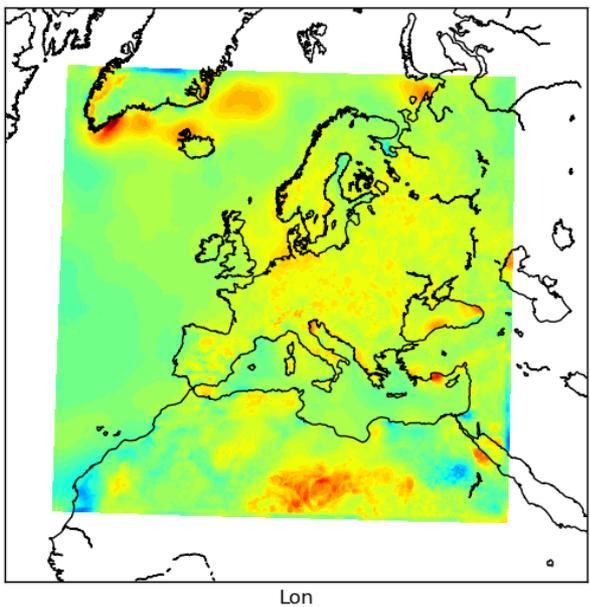
July
T2m
1961-
1980



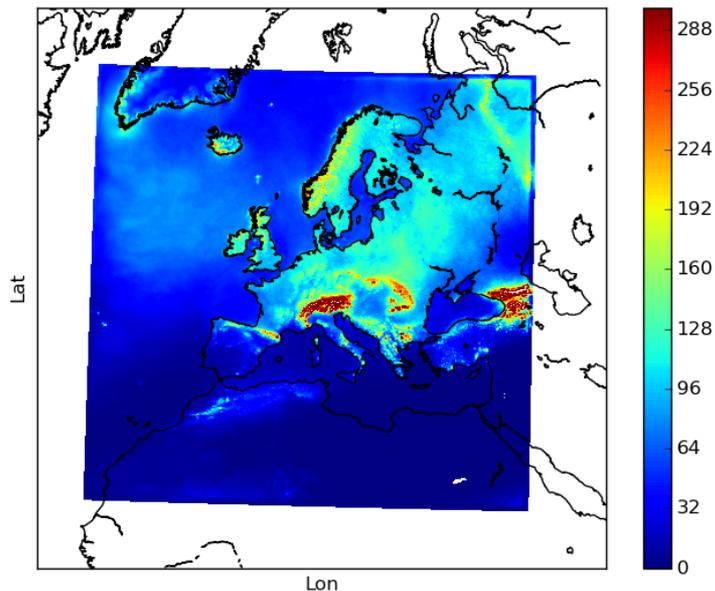
July
T2m
1981-
2014



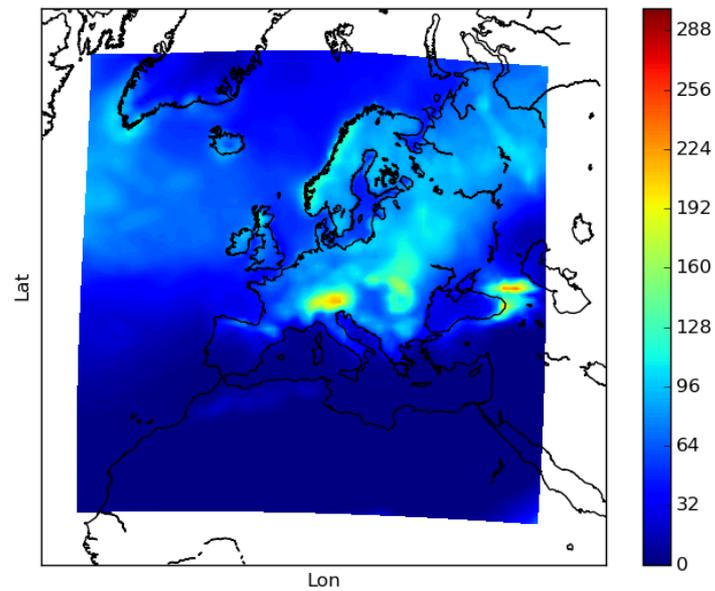
DIFF
(late-early)



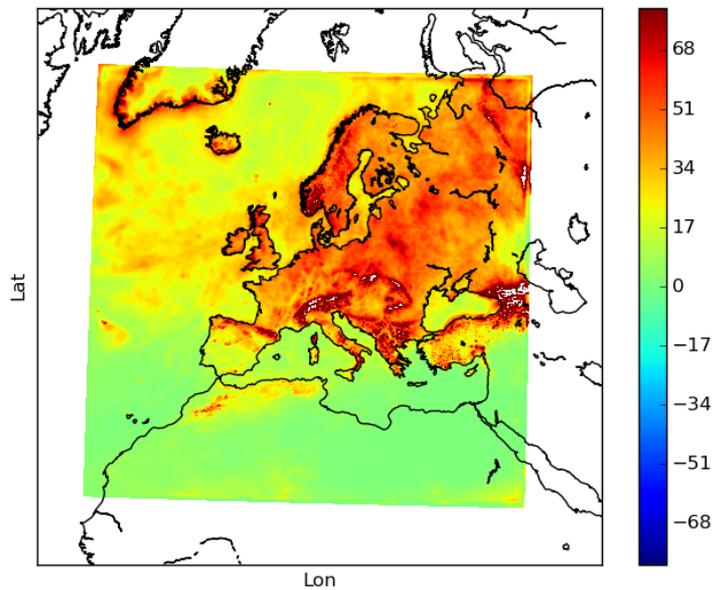
July
 prec
 1981-
 2014
 HARM



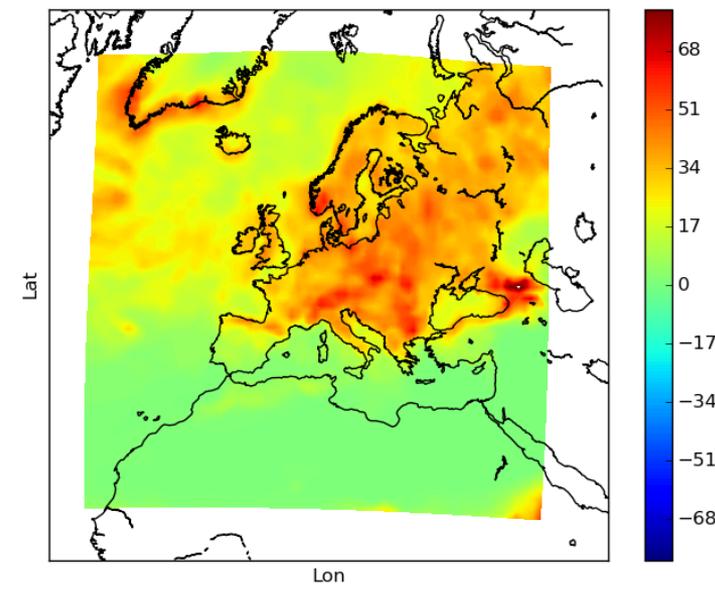
July
 prec
 1981-
 2014
 ERA-I



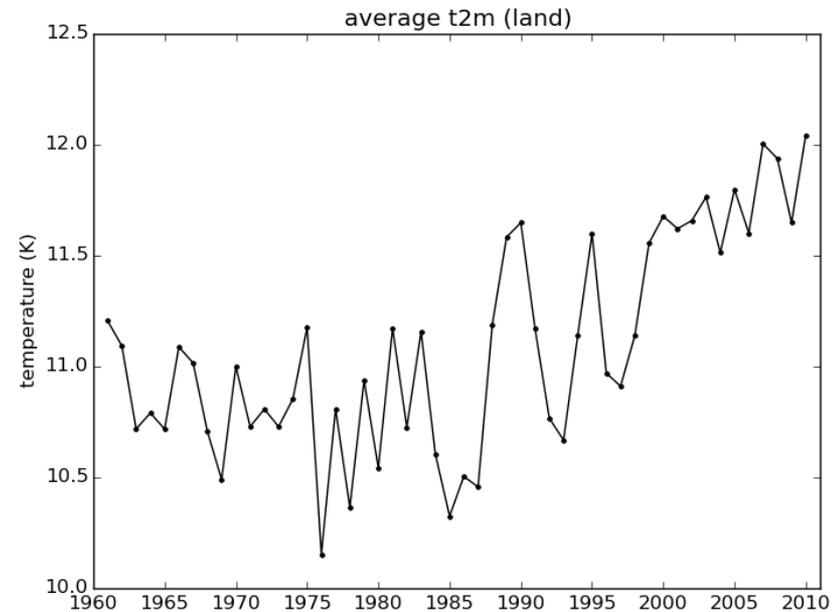
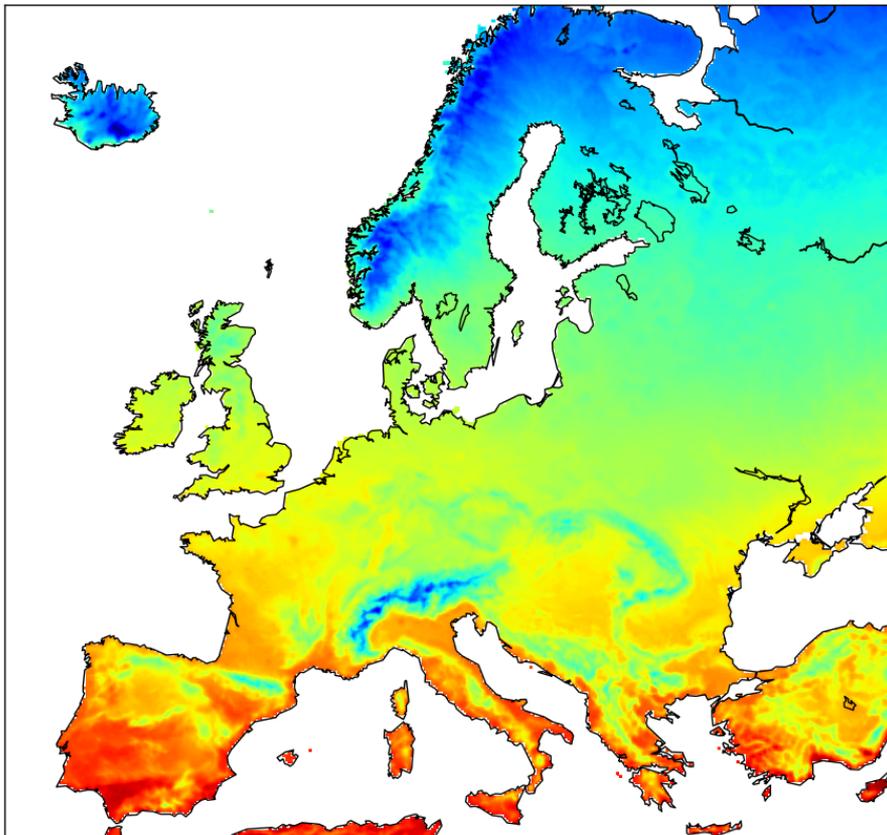
July
 prec
 STDV
 1981-
 2014
 HARM



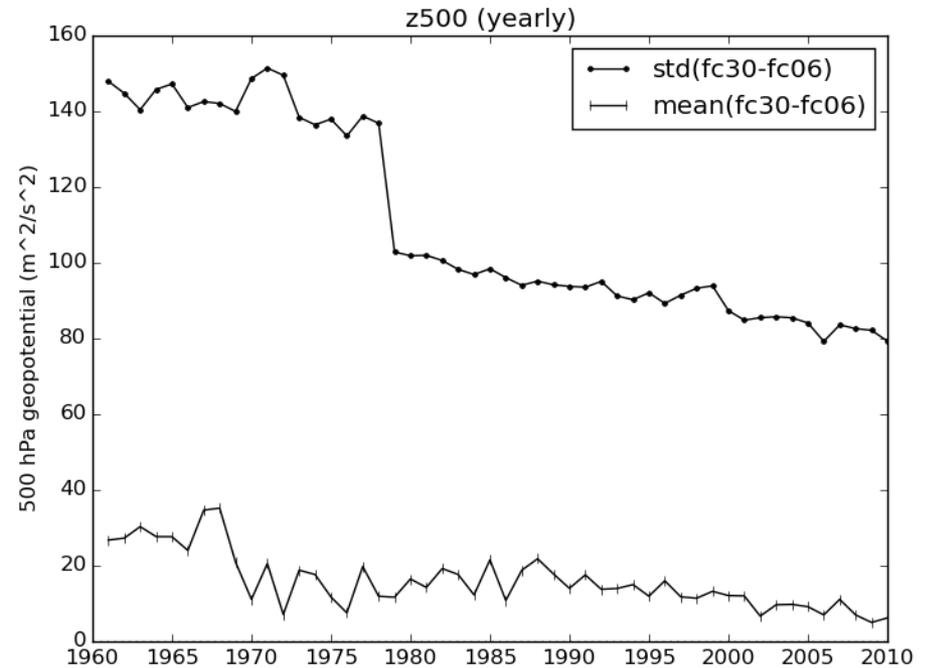
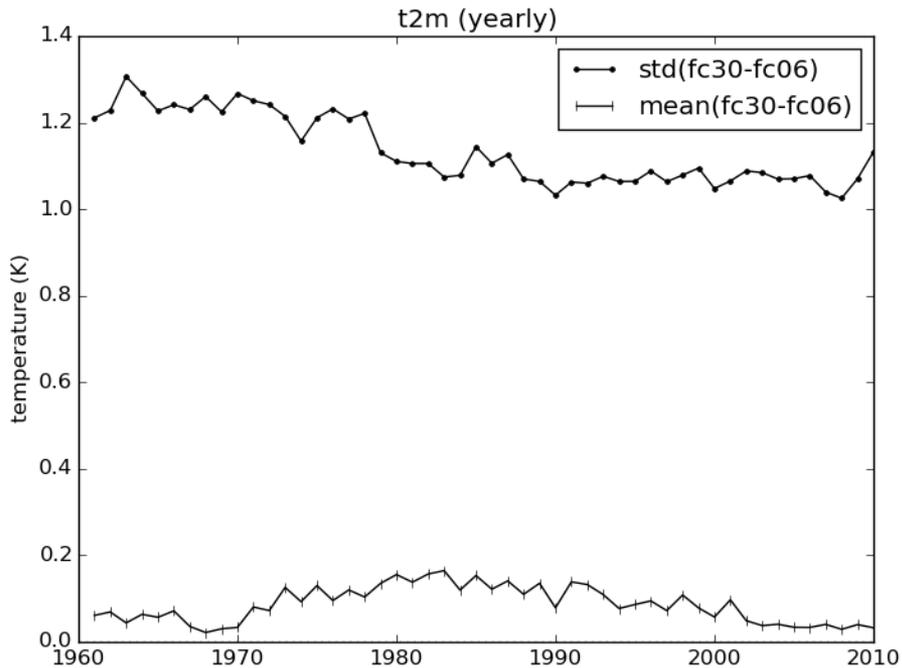
July
 prec
 STDV
 1981-
 2014
 ERA-I



T2m analyses climatology, land points

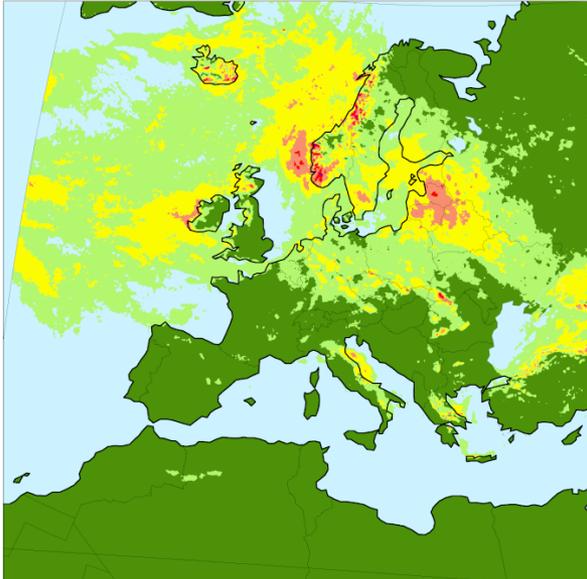


Comparing 6- and 30-hour forecasts, consistent comparison
 Considering the 6-hour forecast to be the “truth”



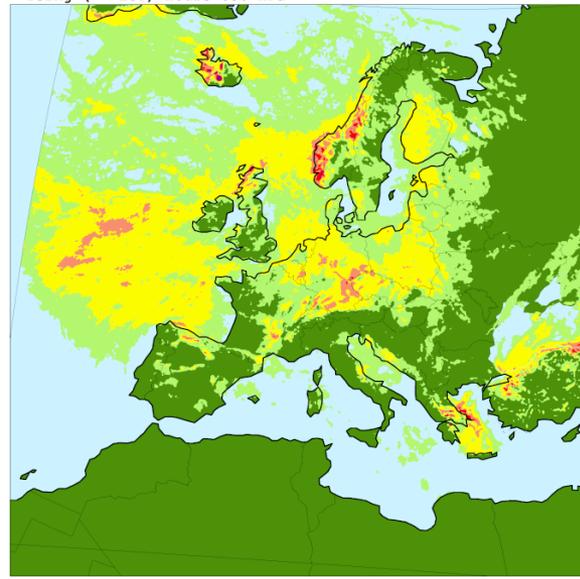
Number of hours of active aircraft icing (>LGT) at 850 hPa

UERRA Jan 1990
Icing (\geq LGT) hours 850 hPa



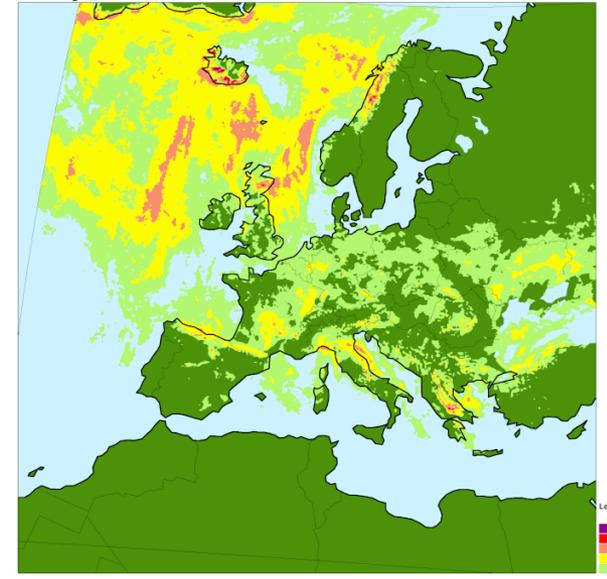
Jan 1990

UERRA Jan 2000
Icing (\geq LGT) hours 850 hPa



Jan 2000

UERRA Jan 2010
Icing (\geq LGT) hours 850 hPa



Jan 2010

Based on UERRA LWC and temp

Relative humidity:

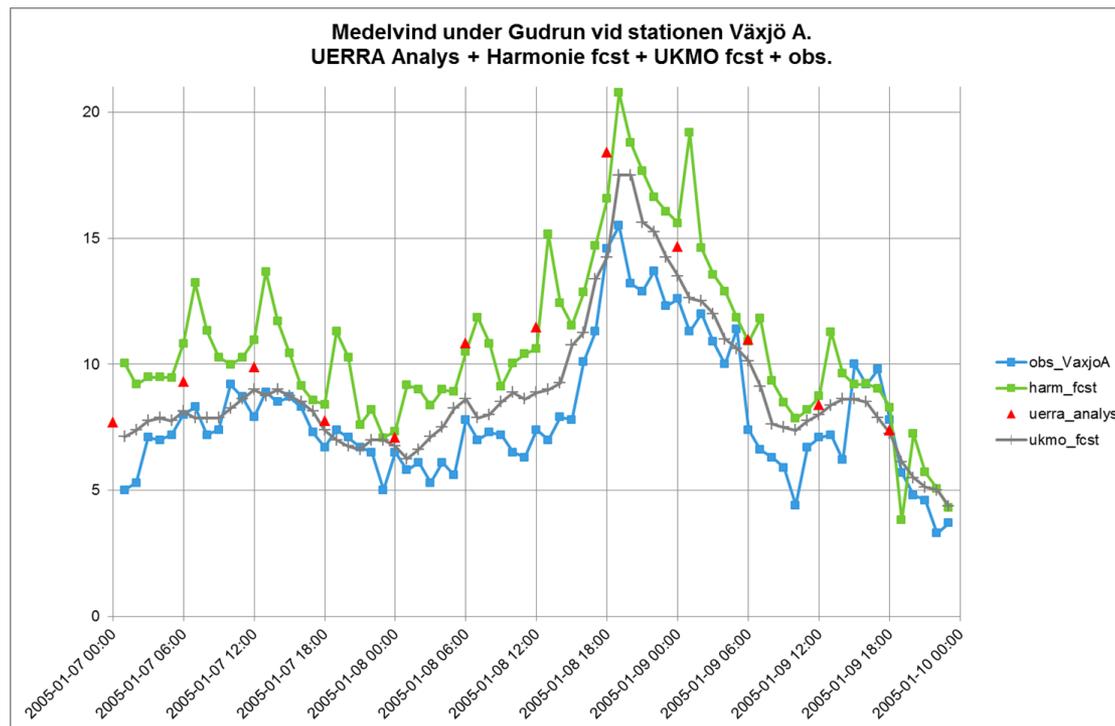
- Mistake in one of the scripts that converted the model grib1-files to grib2. Changing fraction to percent.
- All model values ≥ 1 . was set to zero.
- Will be re-calculated and re-archived.

Surface fluxes:

- Accumulated fluxes, sensible and latent heat, 1-6 hours forecasts erroneous over some land areas.
- Instantaneous fields are ok (not archived).
- Could be re-calculated and re-archived.

10m-wind speed and wind gust:

- In some situations too high wind speeds in the shortest forecasts (1-3 hours).
- Spin-up of TKE, the model starts with zero TKE.



Thank you

Any questions?