

Use of ECMWF products at the MeteoGroup

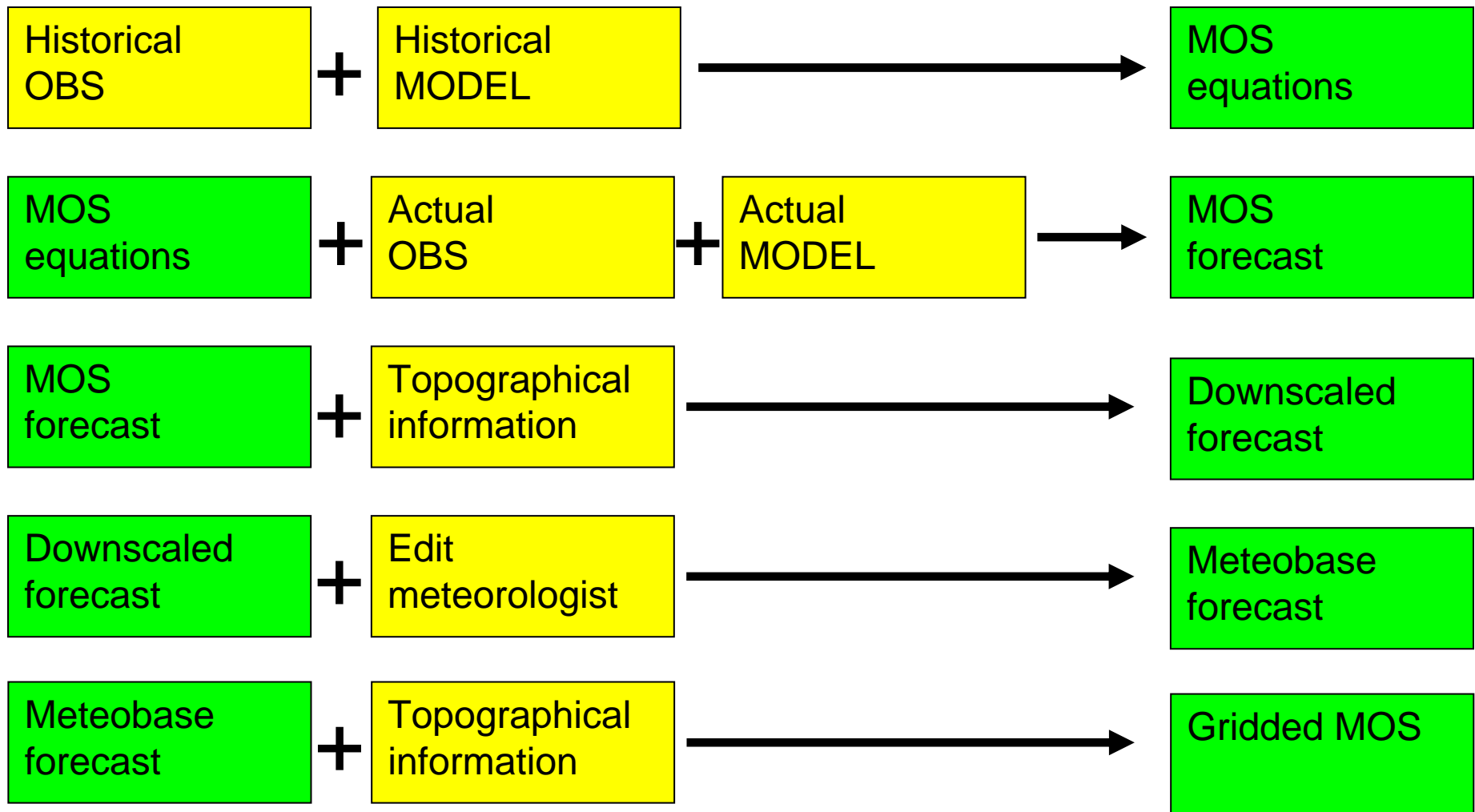
ECMWF User Meeting
Reading, 11-06-2009

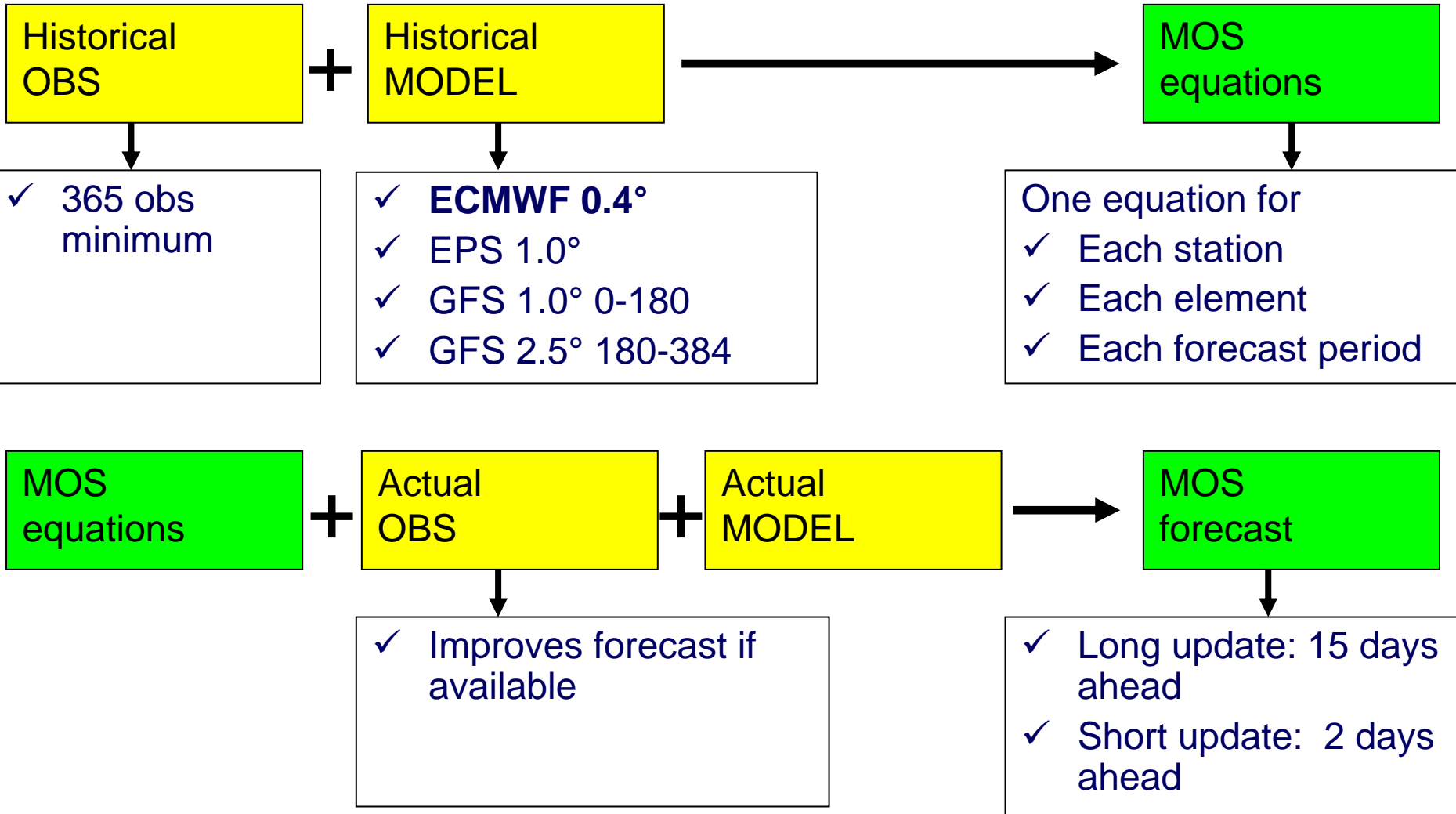
Gerald van der Grijn

- Who are we?
- Post-processing the ECMWF forecast
- Other usage of ECMWF data

- Part of Press Association, UK
- Meteogroup: Netherlands, UK, Belgium, Germany, Spain, Poland, Sweden
- Meteorological Research Department
- Over 200 employees in total; 100 in NL
- www.meteogroup.com
- research.meteogroup.com

Post-processing the deterministic ECMWF forecast





Station 6260, De Bilt (NL)

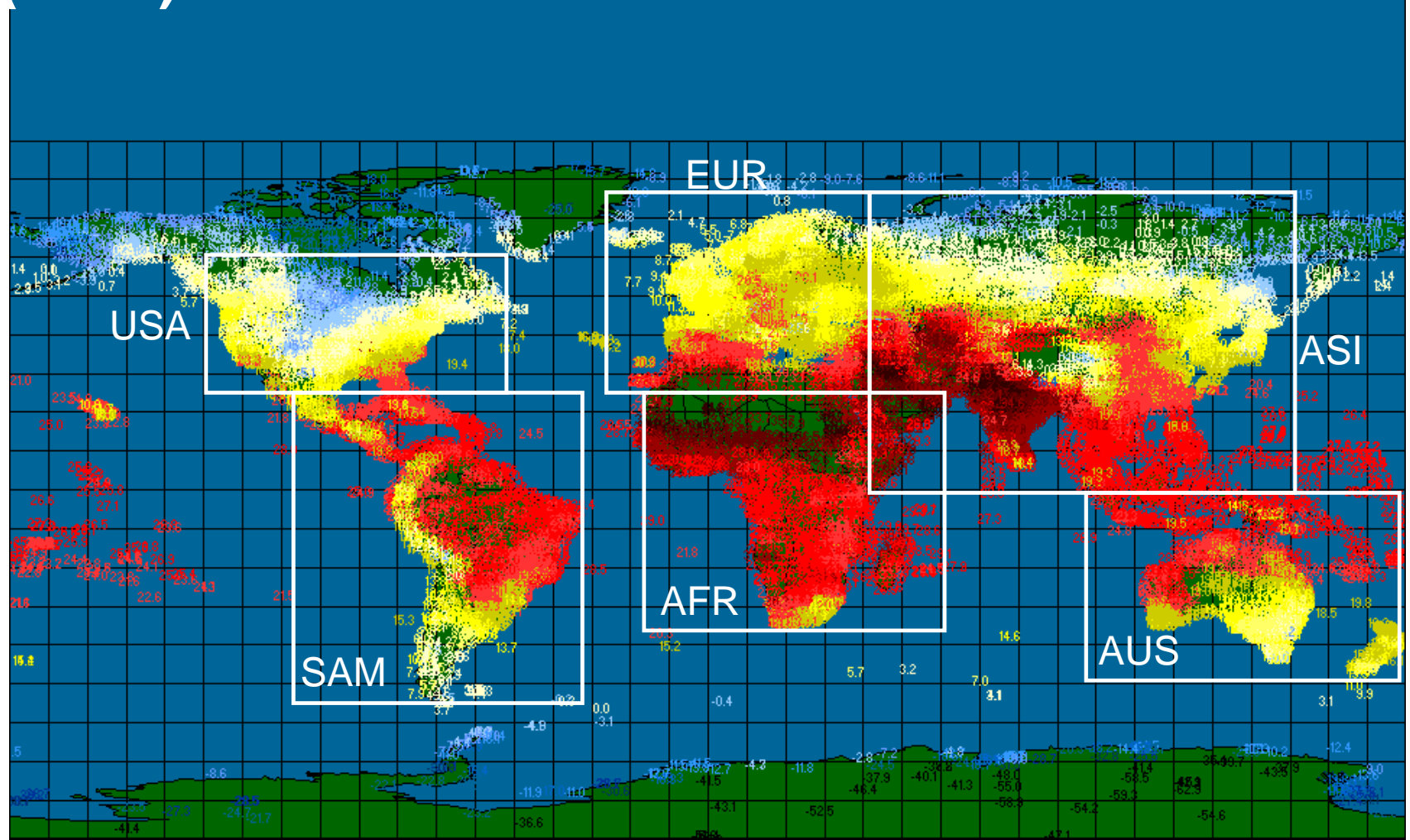
Issue 7

Forecast period + 30

Temperature equation

	Constant		Coefficient		Model variable
TT =	-1.56	+	0.8225	*	EC_TT98030
			- 0.0048	*	EC_T013024
			+ 0.2033	*	GF_TT98024
			+ 0.0168	*	EC_RH02030
			+ 0.0094	*	EC_SR98030
			+ 0.0403	*	GF_NM98030

Model Output Statistics (MOS)



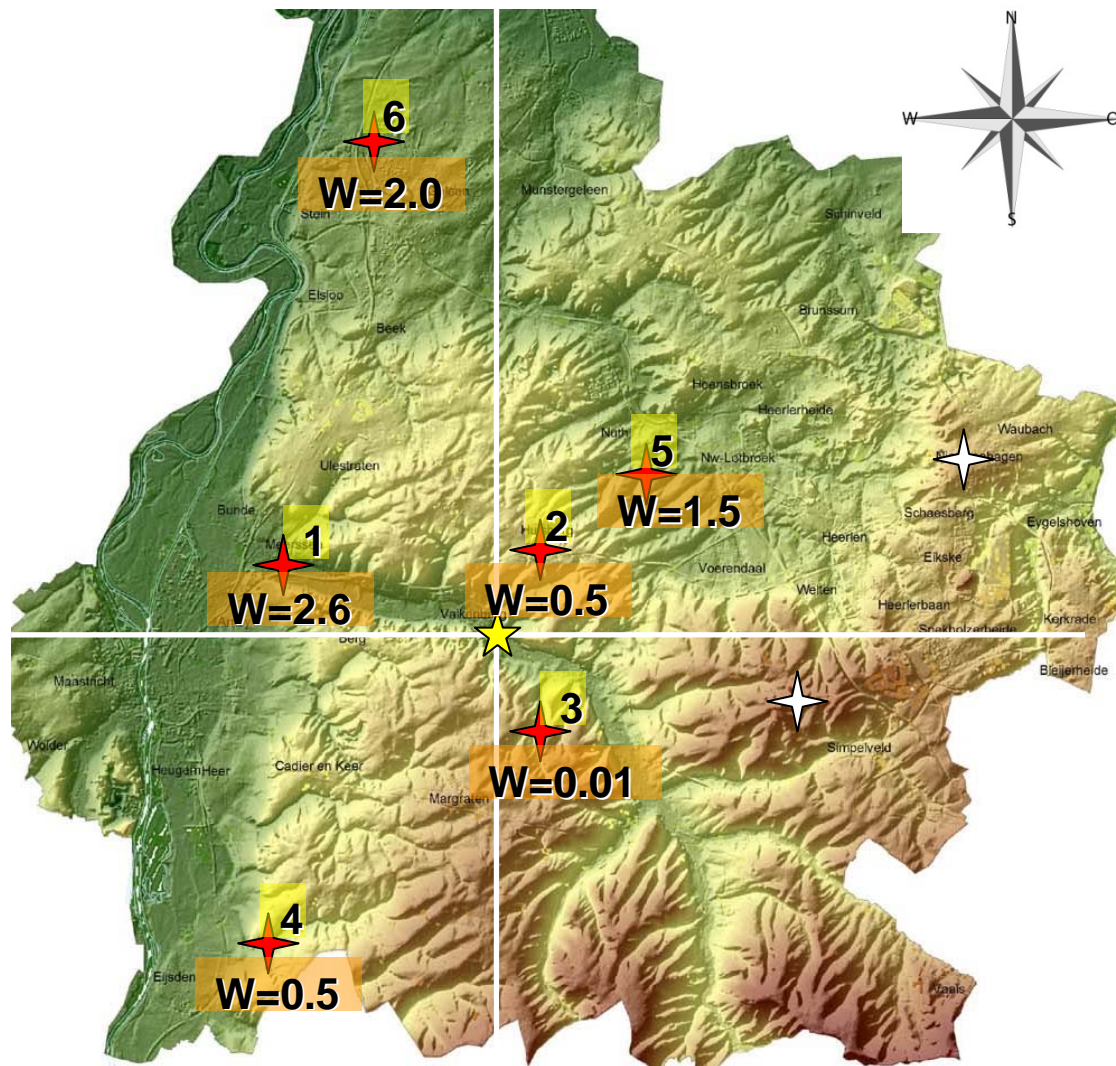
All areas: ECMWF 0.4°, GFS 1.0°/2.5°, EPS 1.0°

Determine weights

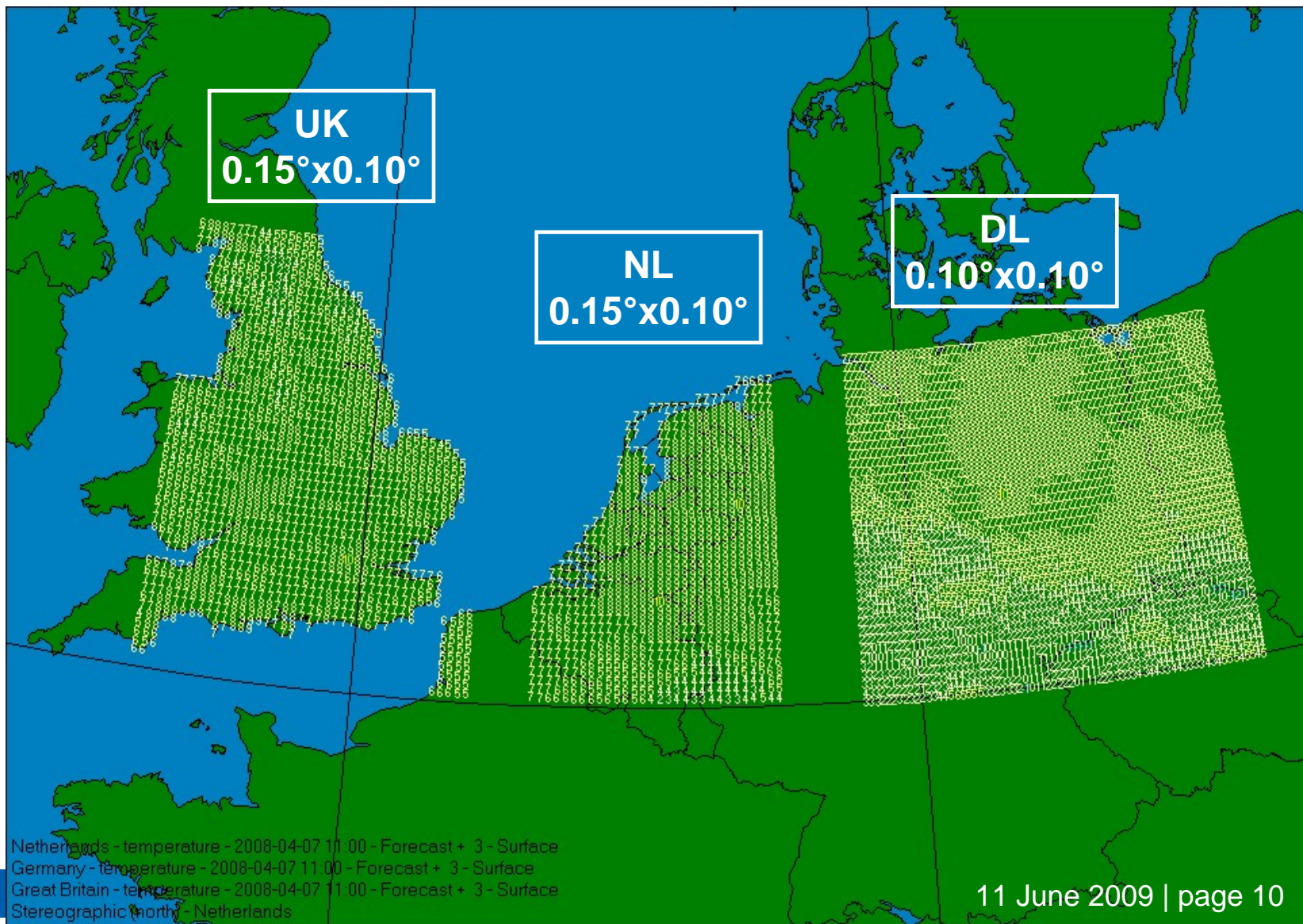
- 1) Same valley?
- 2) Same height?
- 3) Distance to sea?

Finally

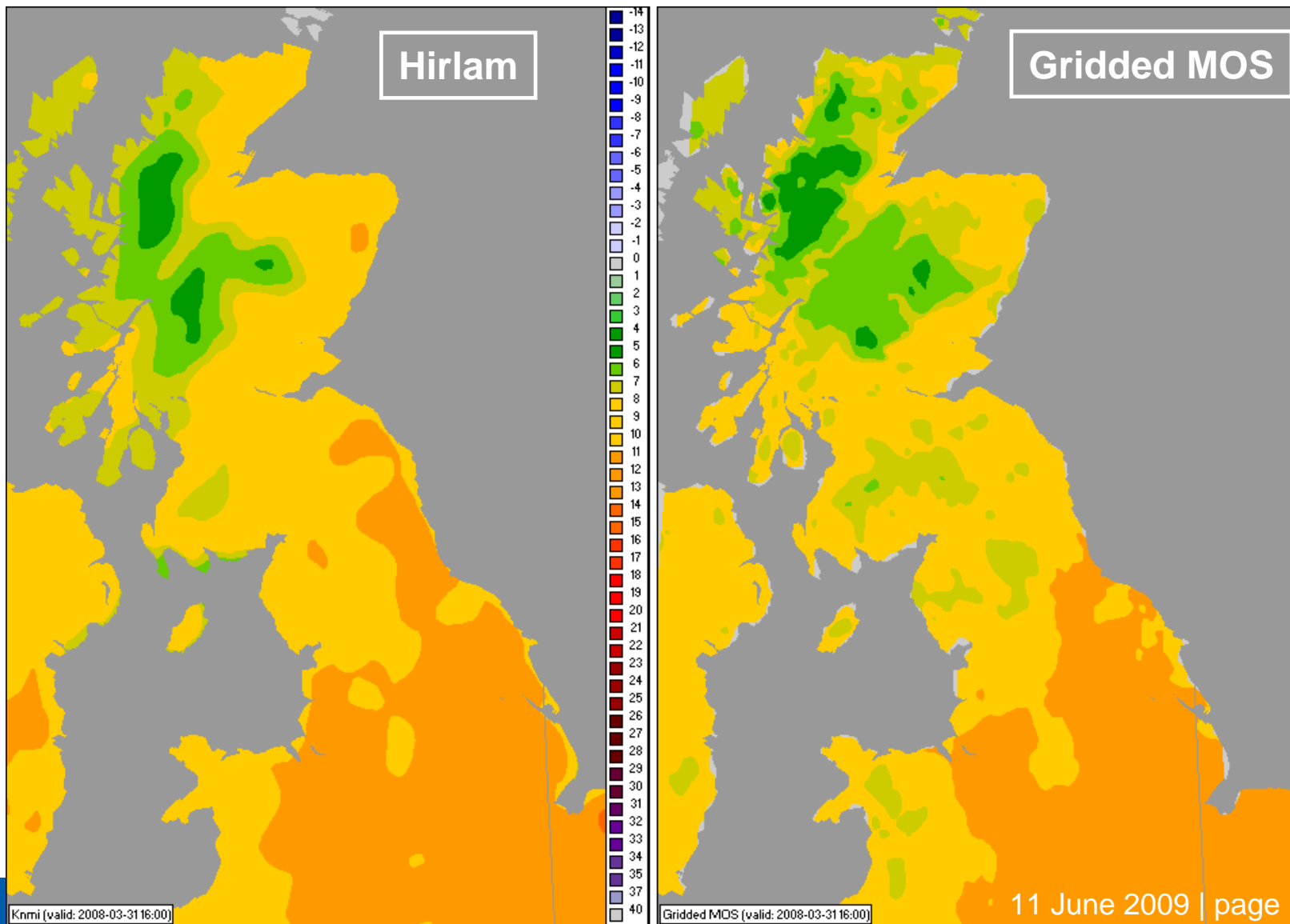
- Correct height difference with model TT profile
- Kwadratic interpolation with distance



Gridded MOS

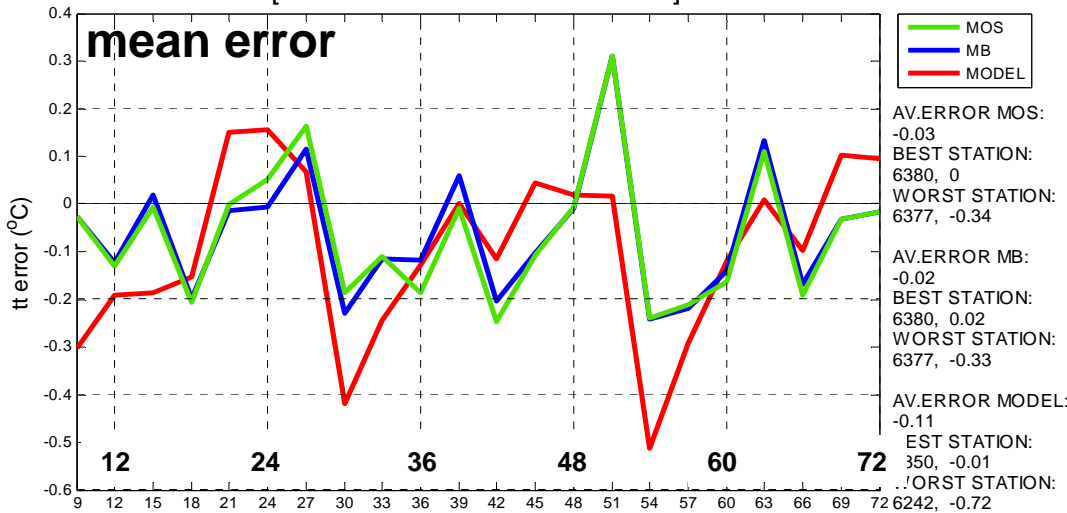


Gridded MOS

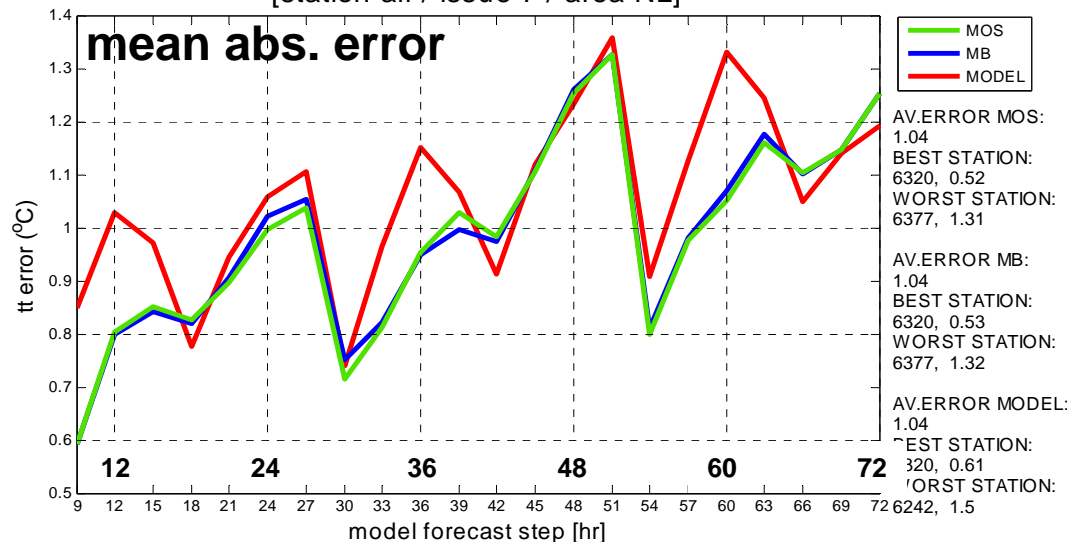


MOS verification - T2m (NL)

Mean error tt Forecast 01-05-09 - 31-05-09
[station all / issue 7 / area NL]



Mean absolute error tt Forecast 01-05-09 - 31-05-09
[station all / issue 7 / area NL]

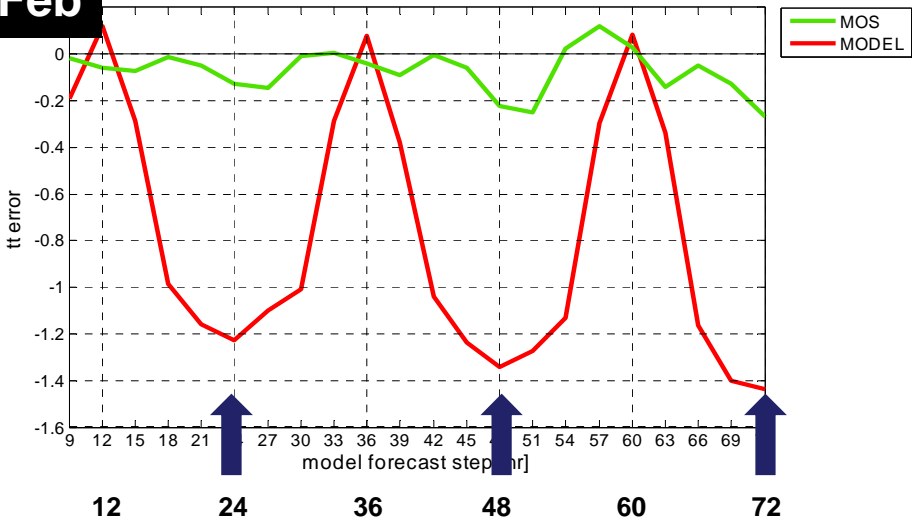


MOS verification is done against SYNOP observations.

The model is interpolated to the SYNOP location.

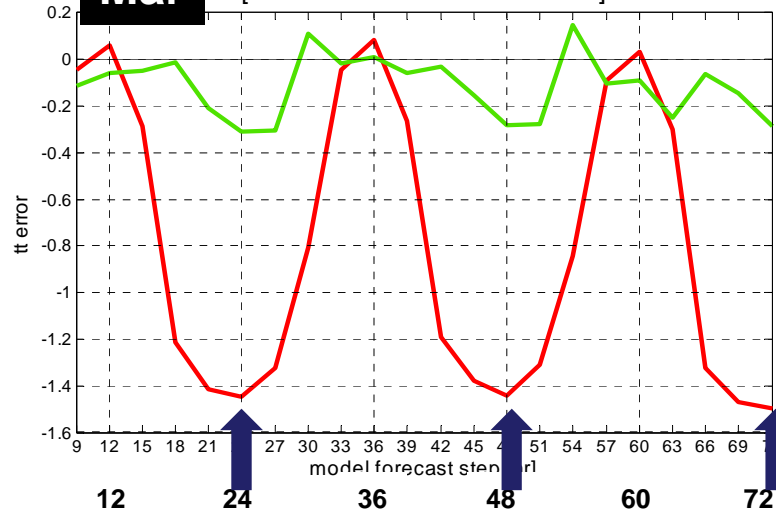
Feb

Mean error tt Forecast 01-02-09 - 28-02-09
[station all / issue 7 / area EU]



Mar

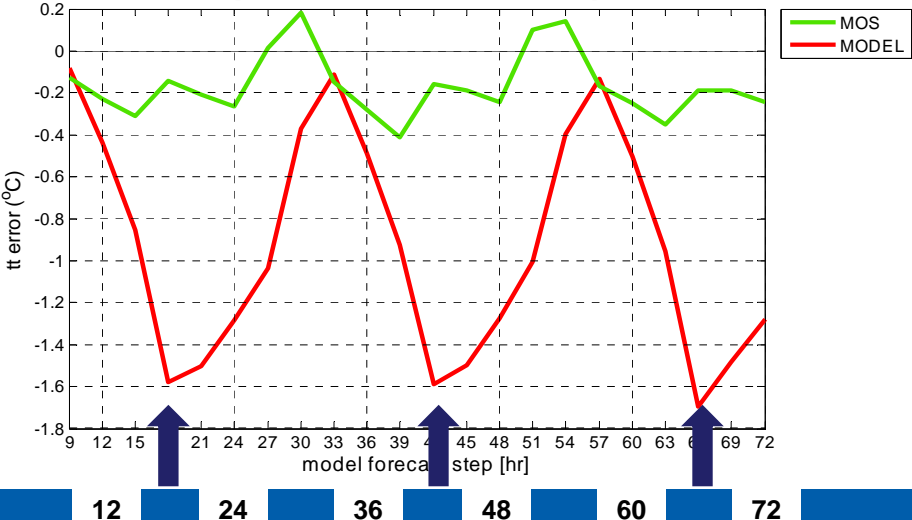
Mean error tt Forecast 01-03-09 - 31-03-09
[station all / issue 7 / area EU]



Mean Error (bias) 2m Temperature (Europe)

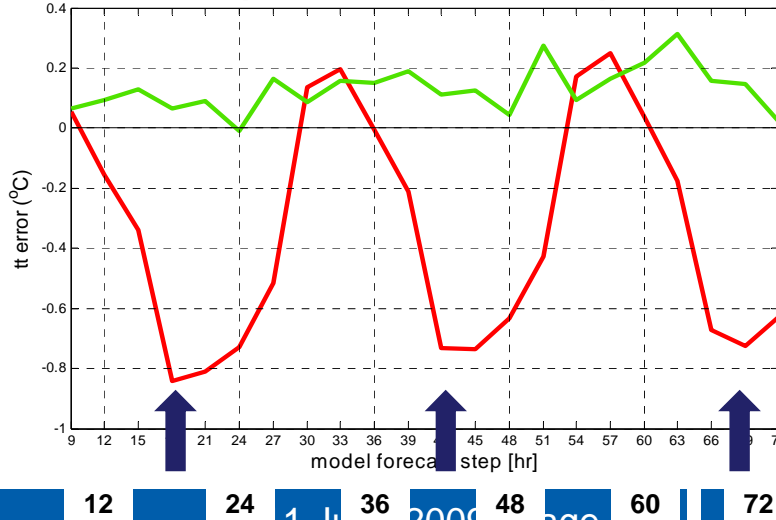
Apr

Mean error tt Forecast 01-04-09 - 30-04-09
[station all / issue 7 / area EU]

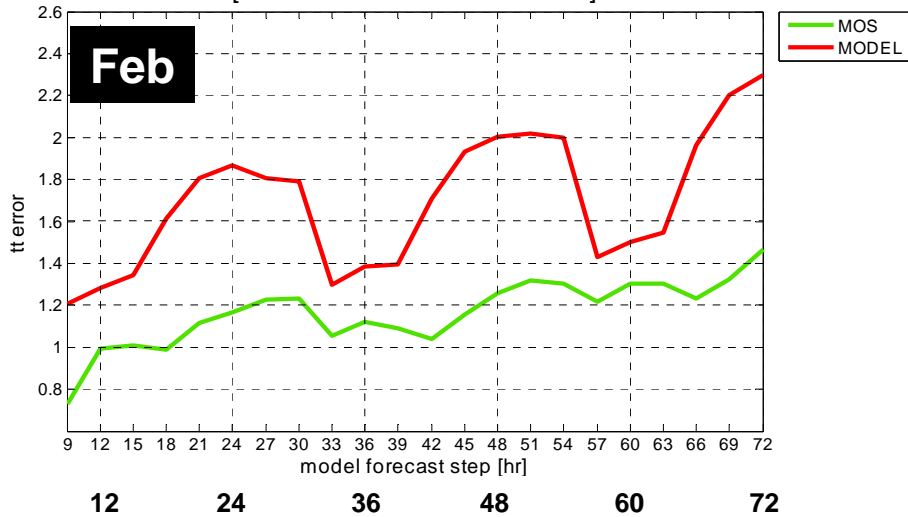


May

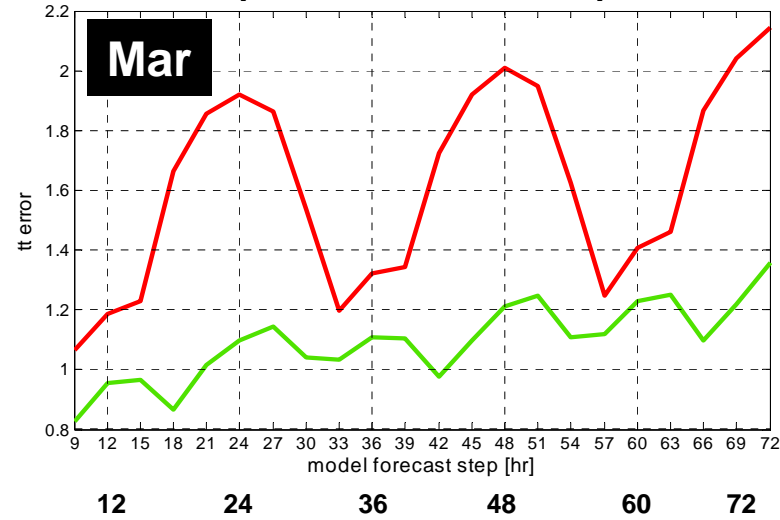
Mean error tt Forecast 01-05-09 - 31-05-09
[station all / issue 7 / area EU]



Mean absolute error tt Forecast 01-02-09 - 28-02-09
[station all / issue 7 / area EU]

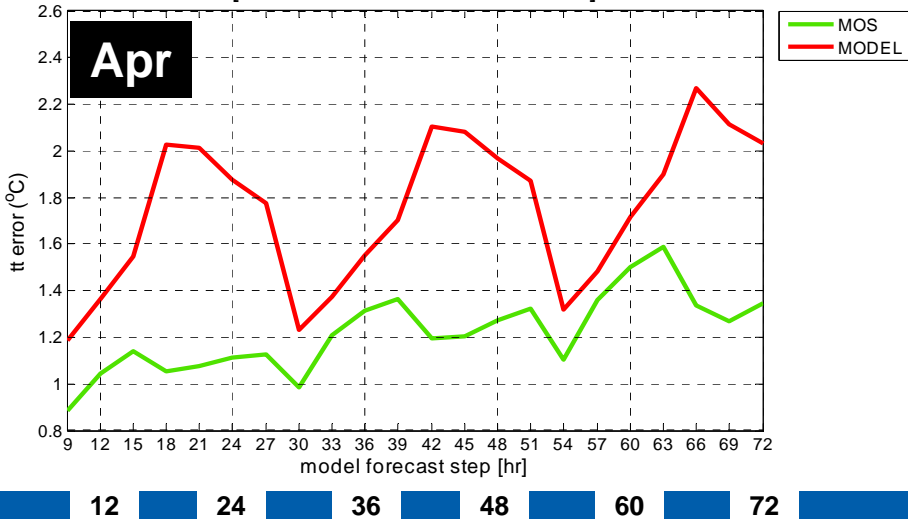


Mean absolute error tt Forecast 01-03-09 - 31-03-09
[station all / issue 7 / area EU]

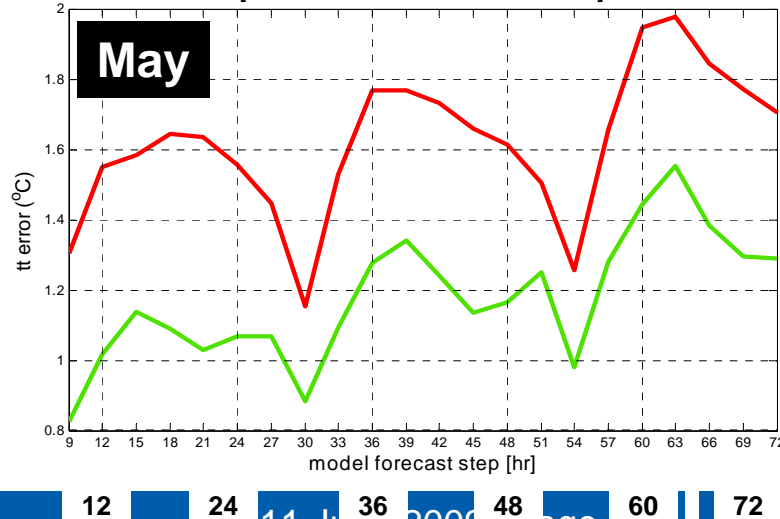


Mean Absolute Error 2m Temperature (Europe)

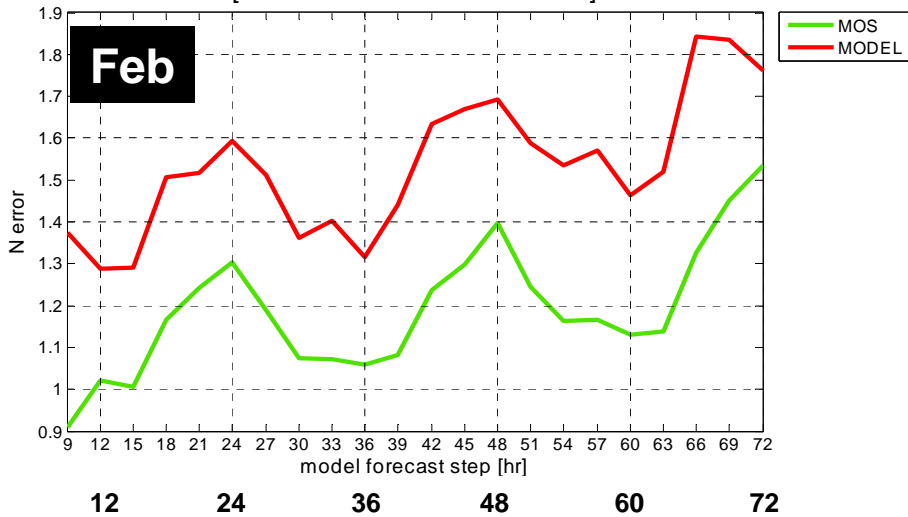
Mean absolute error tt Forecast 01-04-09 - 30-04-09
[station all / issue 7 / area EU]



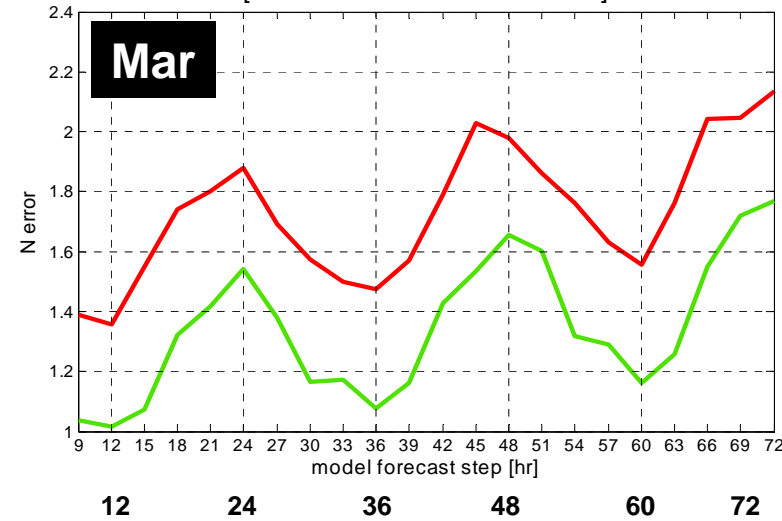
Mean absolute error tt Forecast 01-05-09 - 31-05-09
[station all / issue 7 / area EU]



Mean absolute error N Forecast 01-02-09 - 28-02-09
[station all / issue 7 / area EU]

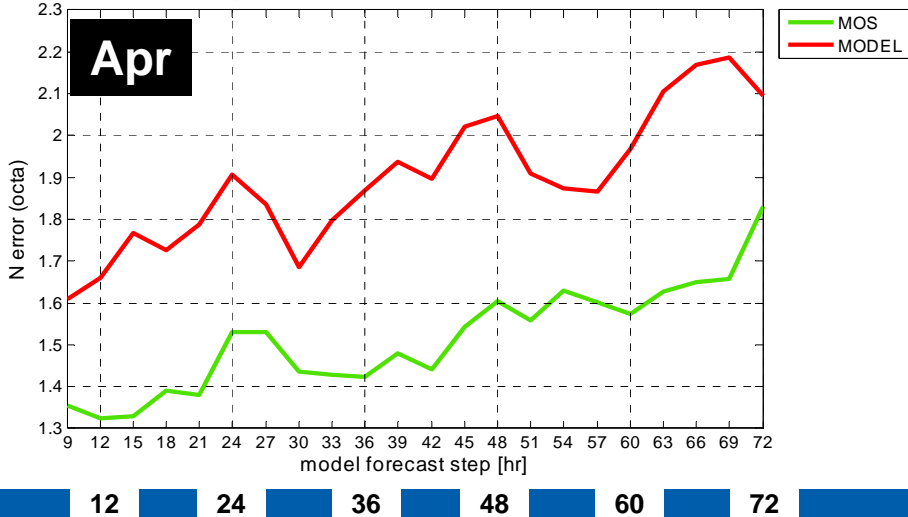


Mean absolute error N Forecast 01-03-09 - 31-03-09
[station all / issue 7 / area EU]

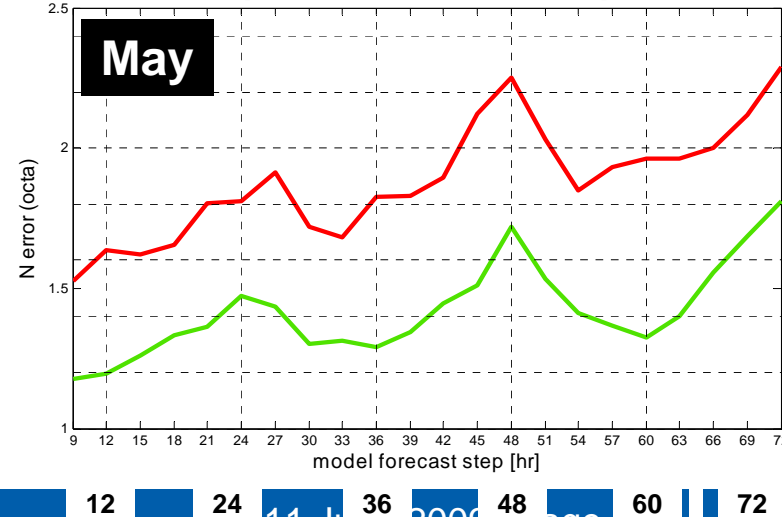


Mean Absolute Error Total Cloud Cover (Europe)

Mean absolute error N Forecast 01-04-09 - 30-04-09
[station all / issue 7 / area EU]



Mean absolute error N Forecast 01-05-09 - 31-05-09
[station all / issue 7 / area EU]



12 24 36 48 60 72

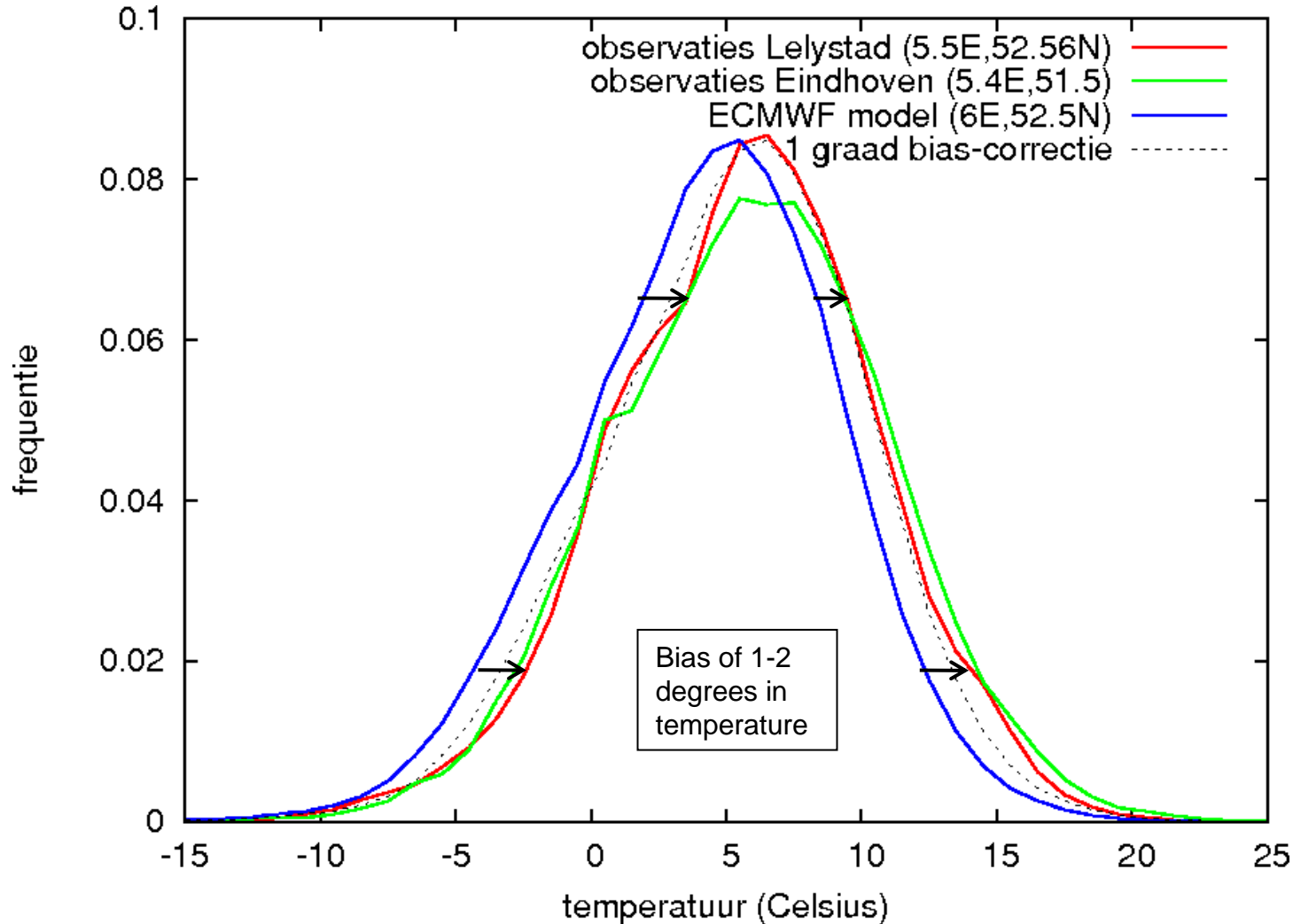
12 24 36 48 60 72

Other examples of using ECMWF data

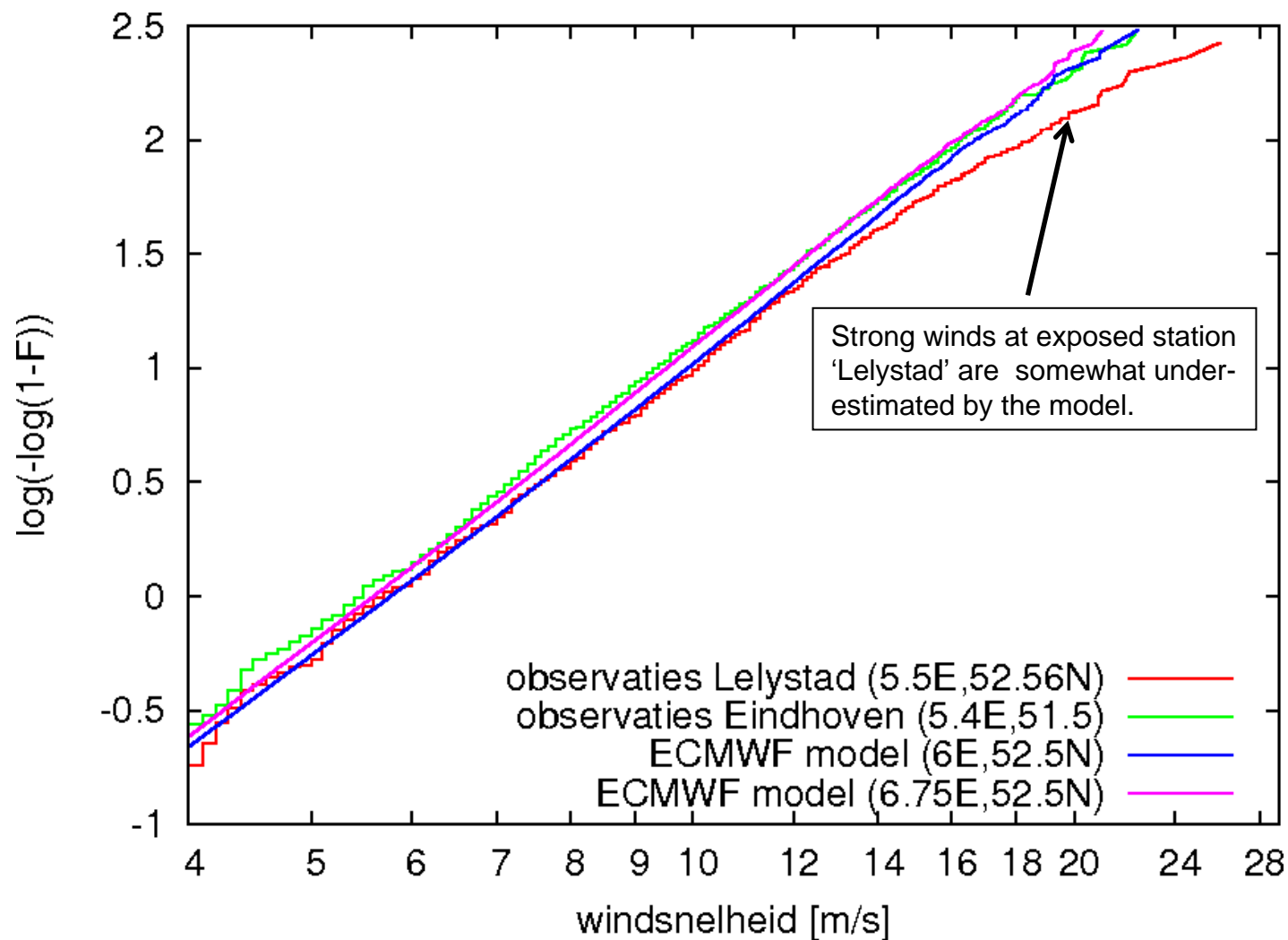
- Customer's question: What is the probability that certain rare weather events coincide, causing widespread damage?
- Problem: The observation records are too short to answer this question accurately.
- Possible answer: Can the VarEPS re-forecast data set provide robust PDF's?

- Re-forecast data used
 - 52 forecasts (1 year)
 - 18 years of initial conditions
 - 5 members
 - Only forecasts from d+8 until d+32 are kept.
- This gives a data set of
 $52 * 18 * 5 * 25 = 117000$ days (320 years)

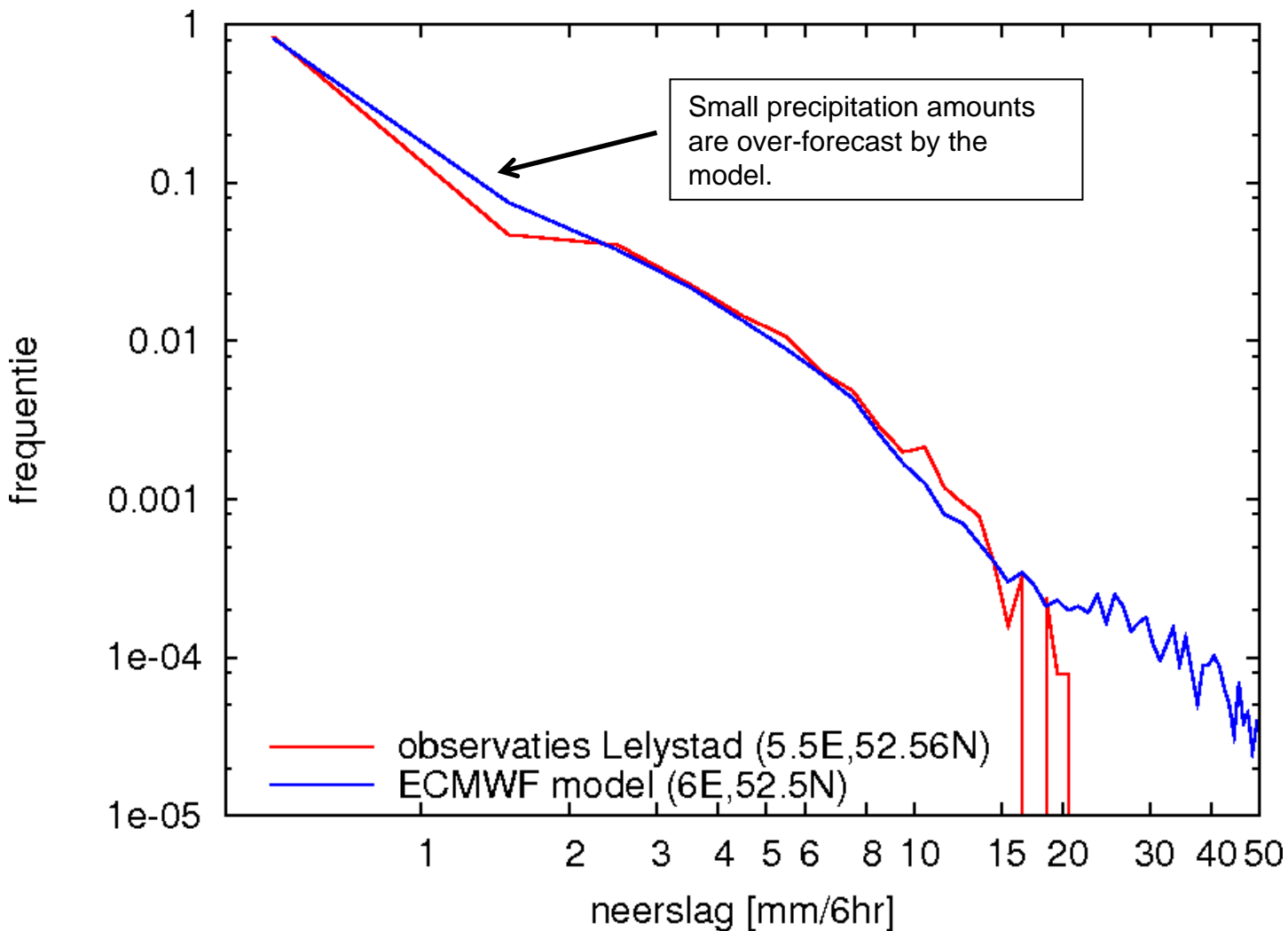
PDF of 2m Temperature



PDF of 10m Wind Speed



PDF of 10m Wind Speed

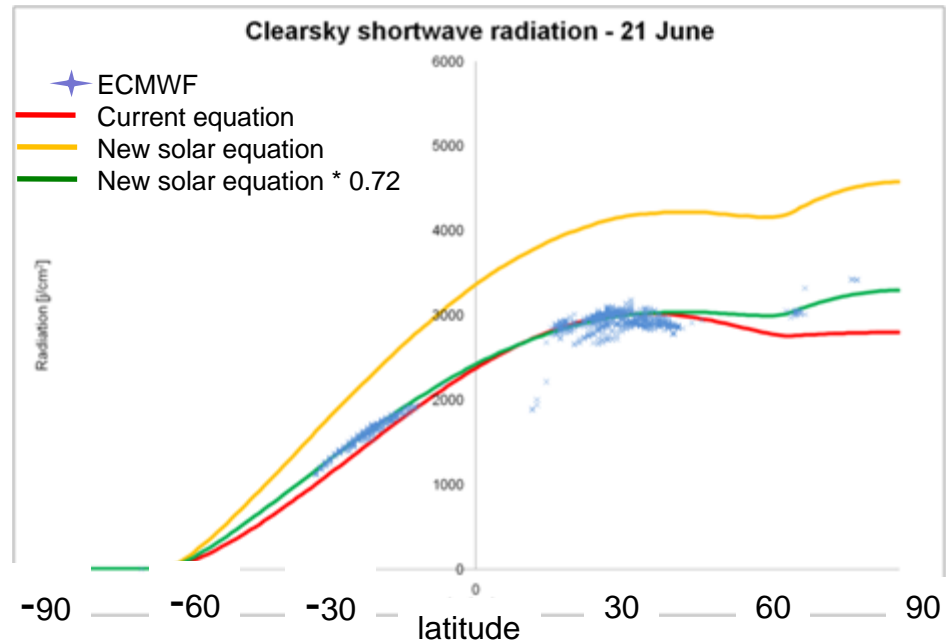
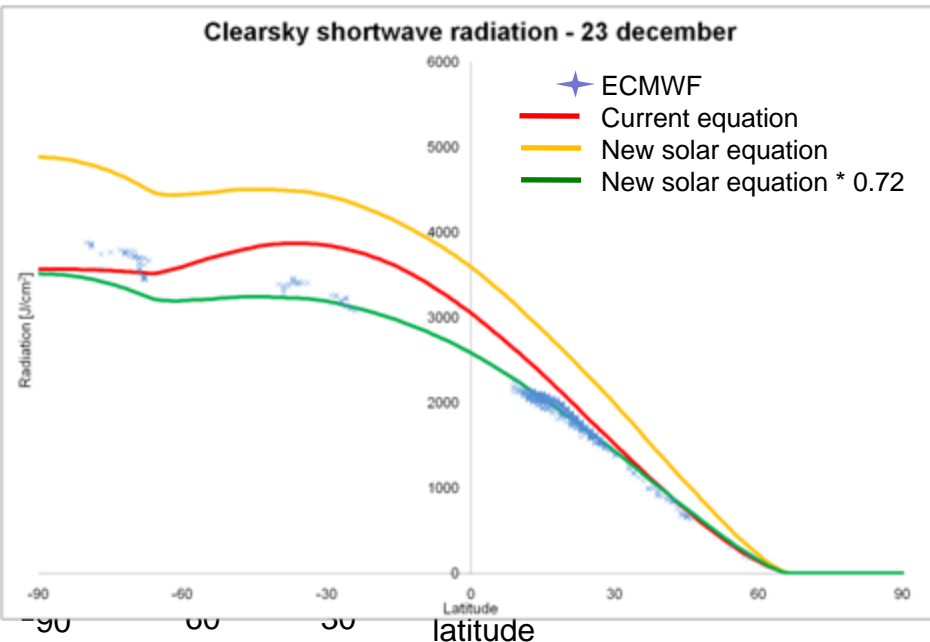


- MeteoGroup's post-processing scheme makes use of the maximum potential short-wave incoming radiation at the surface ($maxrad_{pot}$).
- It was found that the values of $maxrad_{pot}$ were not really accurate, particularly at higher latitudes.
- How does MeteoGroup's $maxrad_{pot}$ compare with the $maxrad_{pot}$ deduced from ECMWF direct model output?

Validation of $maxrad_{pot}$

The daily $maxrad_{pot}$ from ECMWF was deduced by taking only those gridpoints where the Total Cloud Cover is less than 0.5 octa at all timesteps of a given day. Mountain areas are excluded.

The new solar equation (green line) has a more precise description of the solar declination and compares much better with the ECMWF values for $maxrad_{pot}$. The factor 0.72 is to correct for the turbidity (haziness) of the atmosphere, affecting the transmission of visible light.



That's all folks!