



Verification of the diurnal cycle for surface weather elements of aLMo-forecasts over Switzerland, LAMI-forecast over Italy and LM-forecasts over Germany

Ulrich Damrath – DWD

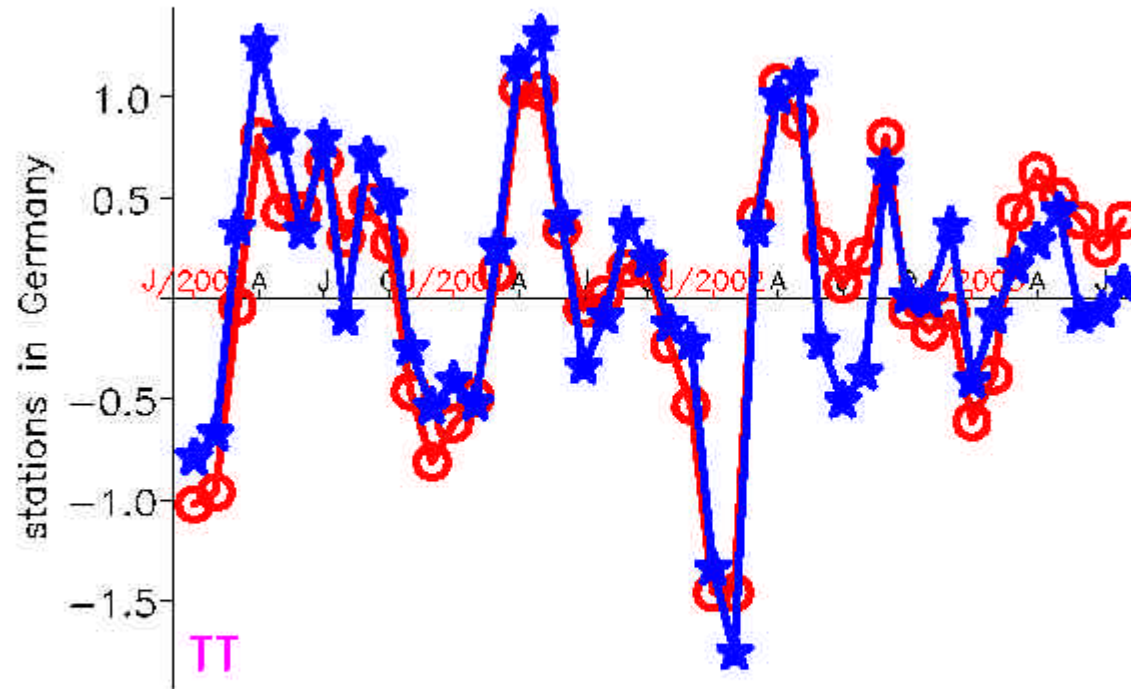
Francis Schubiger – MeteoSwiss

Patrizio Emiliani - CNMCA



Typical result for verification of LM-forecasts @ DWD up to now

- 012-h-forecasts of LM from 01.01.2000 till 31.08.2003 valid 12 UTC
- 036-h-forecasts of LM from 01.01.2000 till 31.08.2003 valid 12 UTC

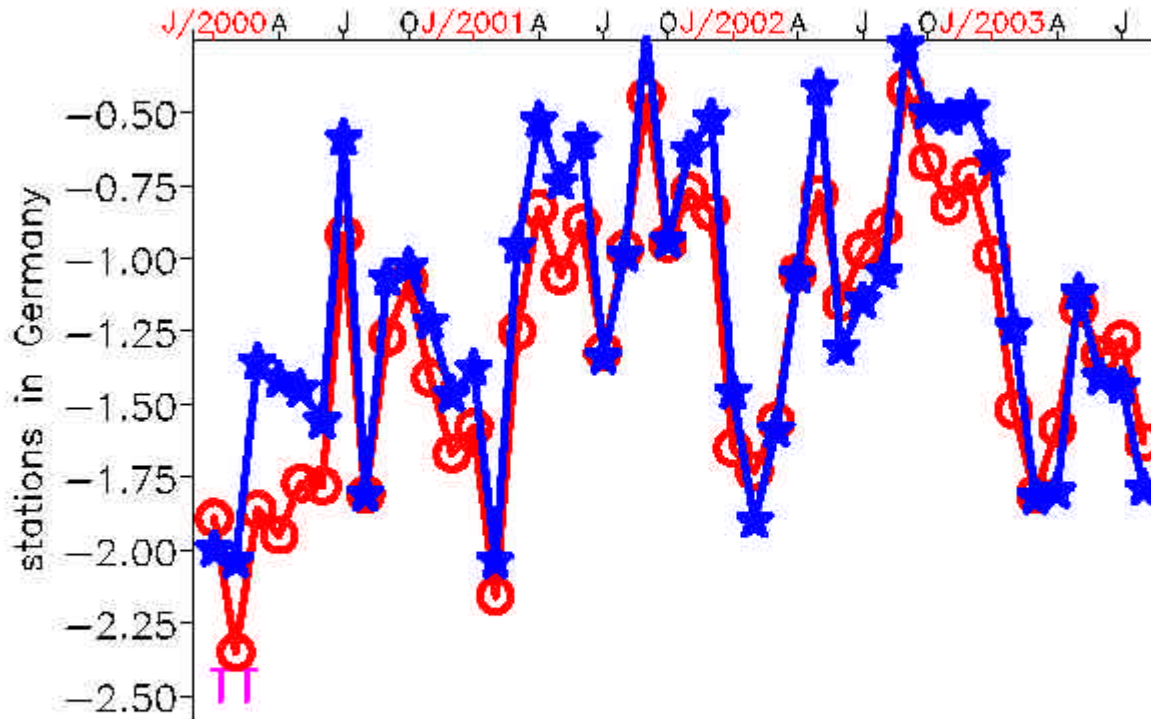


Results of verification of forecasts for local weather elements at surface stations
 frequency bias for cloud covers (—: 0-2/8, - - : 7-8/8), gusts
 and precipitation T-8 till T, mean error for other elements



Typical result for verification of LM-forecasts @ DWD up to now

- 006-h-forecasts of LM from 01.01.2000 till 31.08.2003 valid 18 UTC
- 030-h-forecasts of LM from 01.01.2000 till 31.08.2003 valid 18 UTC

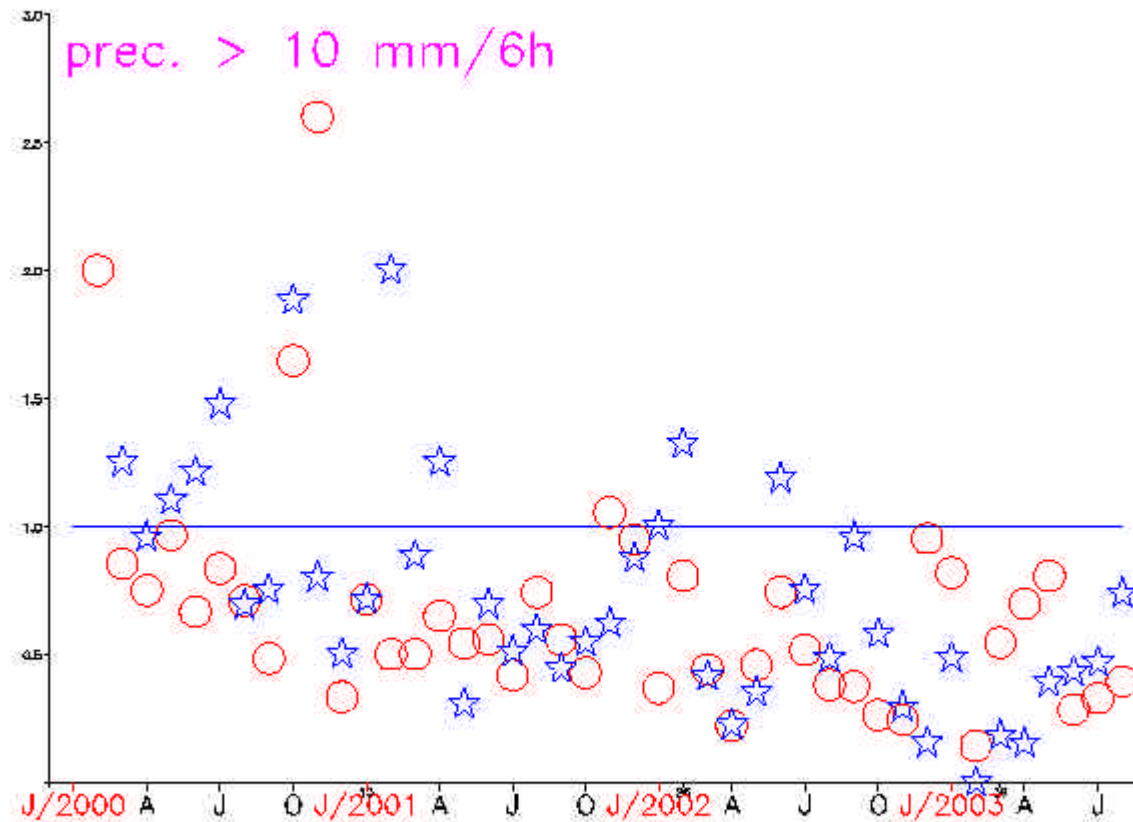


Results of verification of forecasts for local weather elements at surface stations
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Typical result for verification of LM-forecasts @ DWD up to now

- 006-h-forecasts of LM from 01.01.2000 till 31.08.2003 valid 18 UTC
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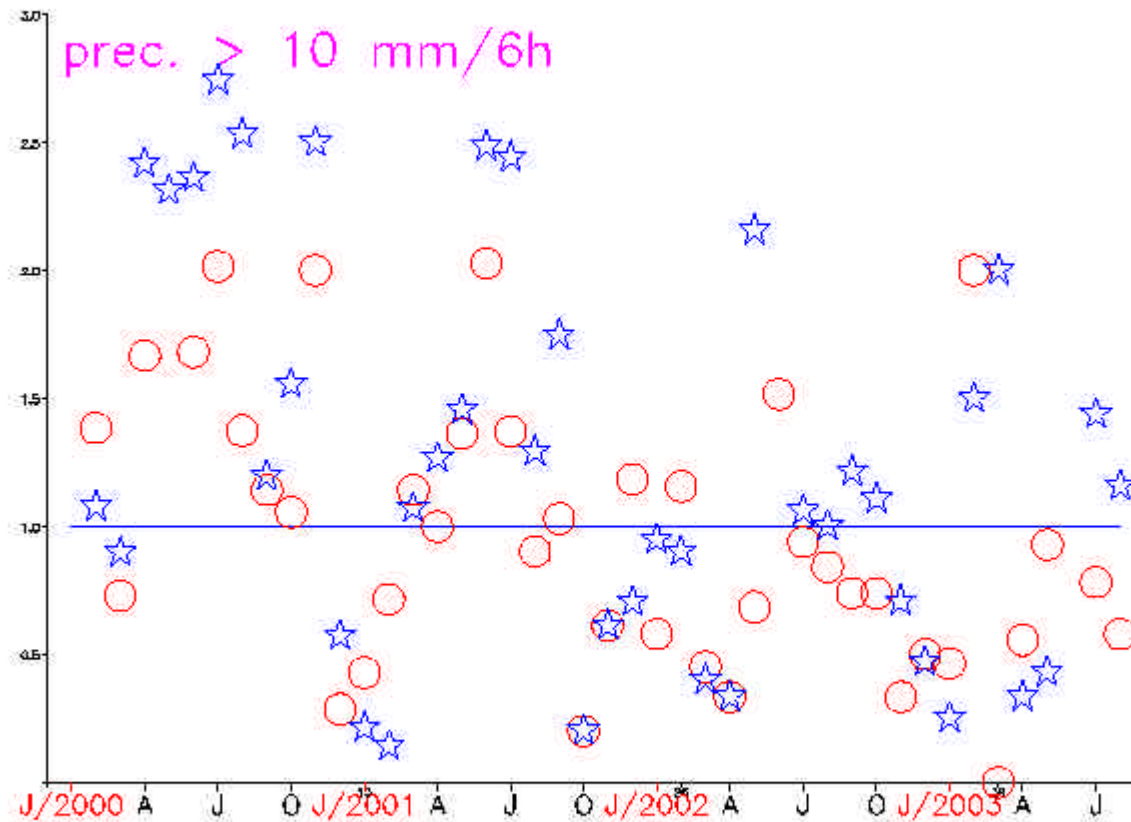


Results of verification of forecasts for local weather elements at surface stations
 frequency bias for cloud cover (—; 0–2/8, — —; 7–8/8),
 and precipitation T–5 till T, mean error for other elements



Typical result for verification of LM-forecasts @ DWD up to now

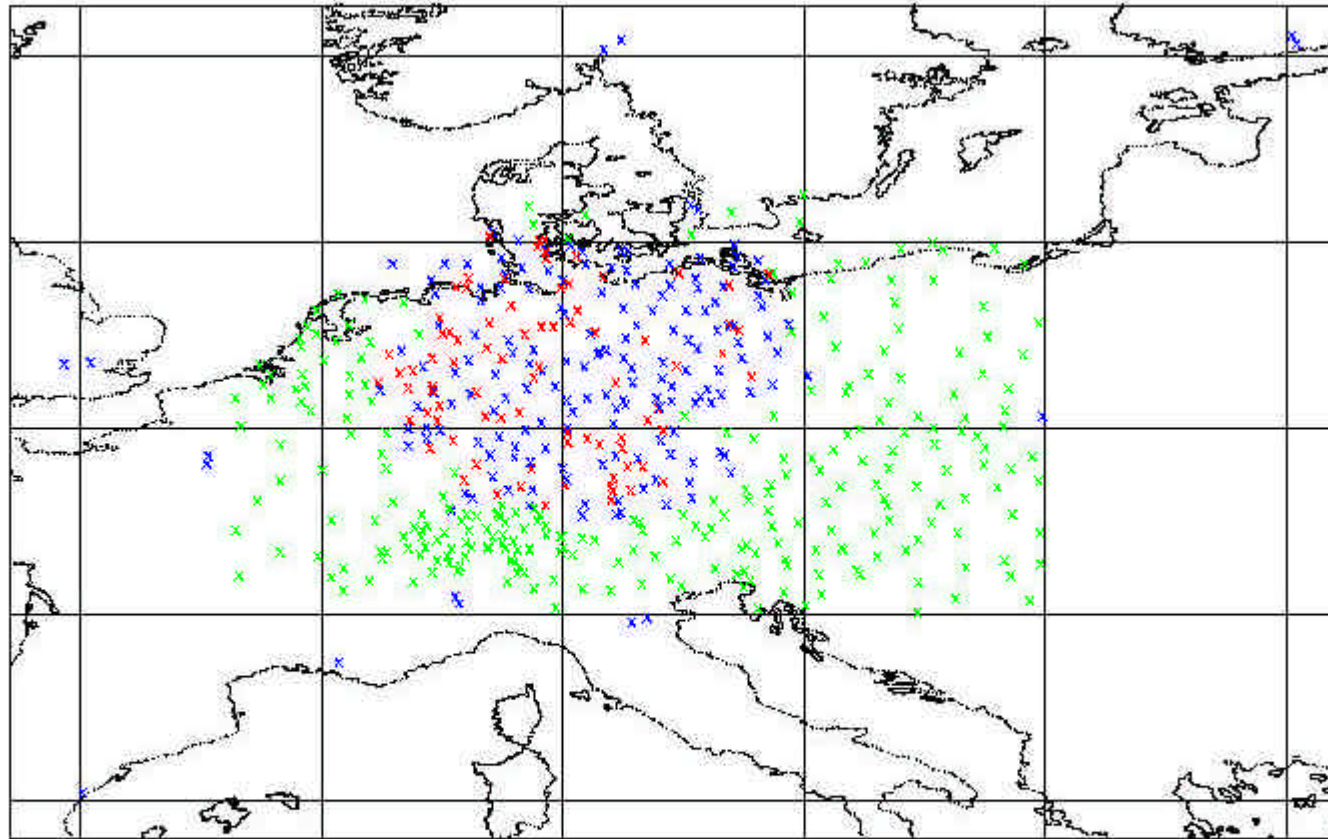
- 012-h-forecasts of LM from 01.01.2000 till 31.08.2003 valid 12 UTC
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Results of verification of forecasts for local weather elements at surface stations
 frequency bias for cloud cover (—; 0–2/8, — —; 7–8/8),
 and precipitation T–5 till T, mean error for other elements



Distribution of stations in SYNOP-network for LM verification



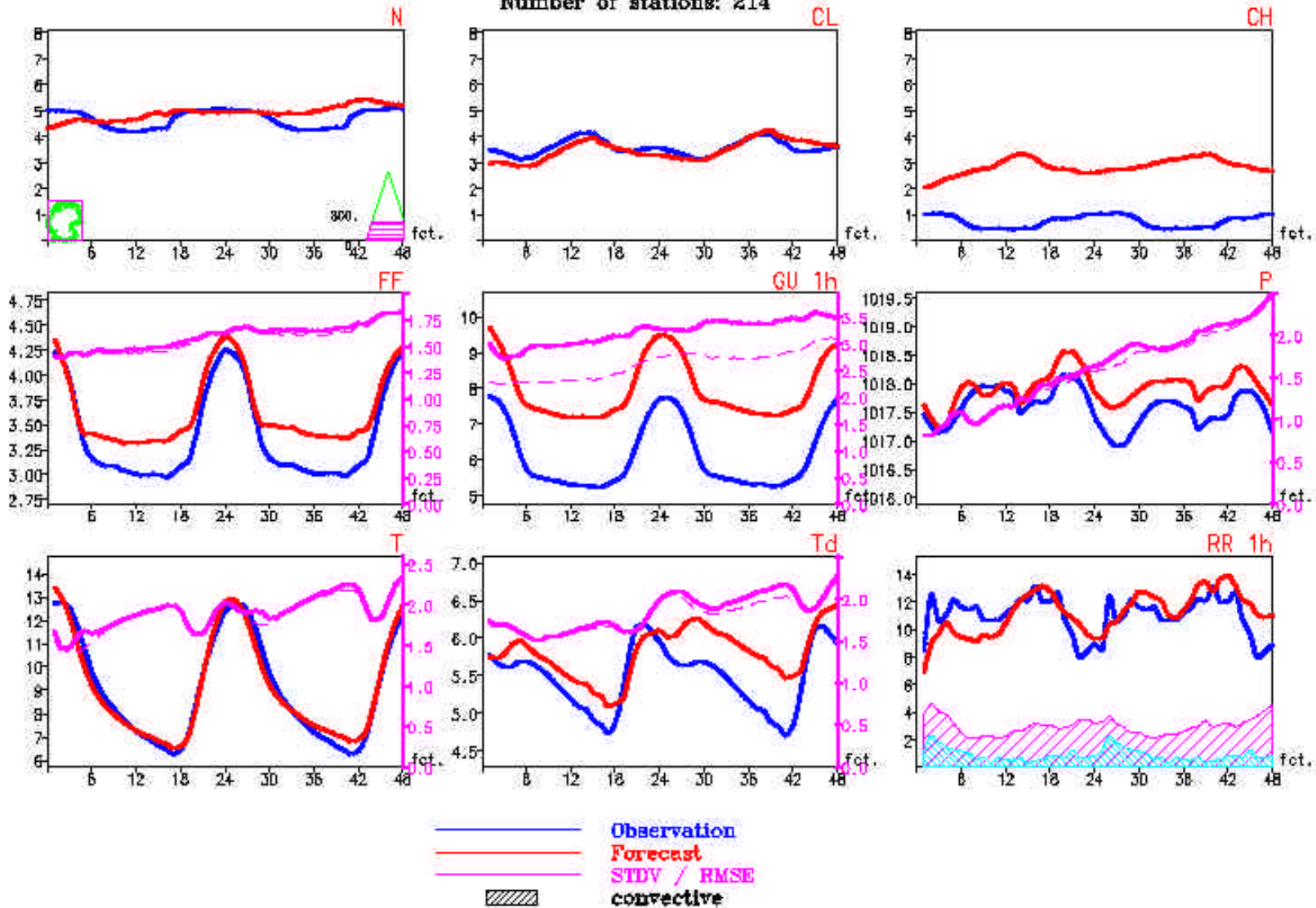
resolution in time 1-3h



Autumn 2003, start hour 12 UTC, stations 0. - 800 m



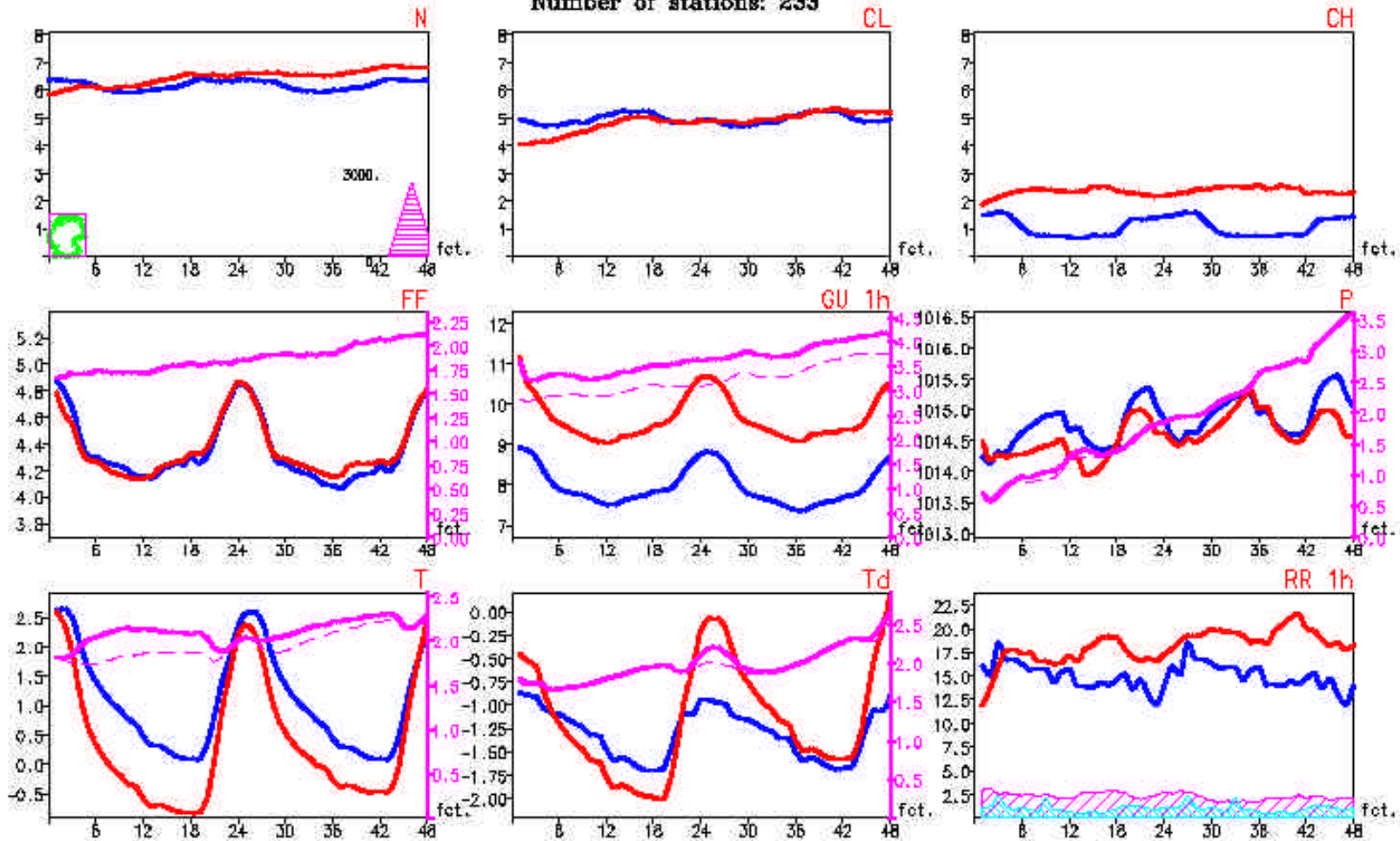
Diurnal cycle of observations and forecasts of LM in region: 05.87E - 15.03E 47.27N - 54.91N
Period: 03090312 - 0311012
Number of stations: 214





Winter 2003-2004, start hour 12 UTC, stations 0. - 3000 m

Diurnal cycle of observations and forecasts of LM in region: 05.87E - 15.03E 47.27N - 54.91N
 Period: 03120312 - 04022912
 Number of stations: 233

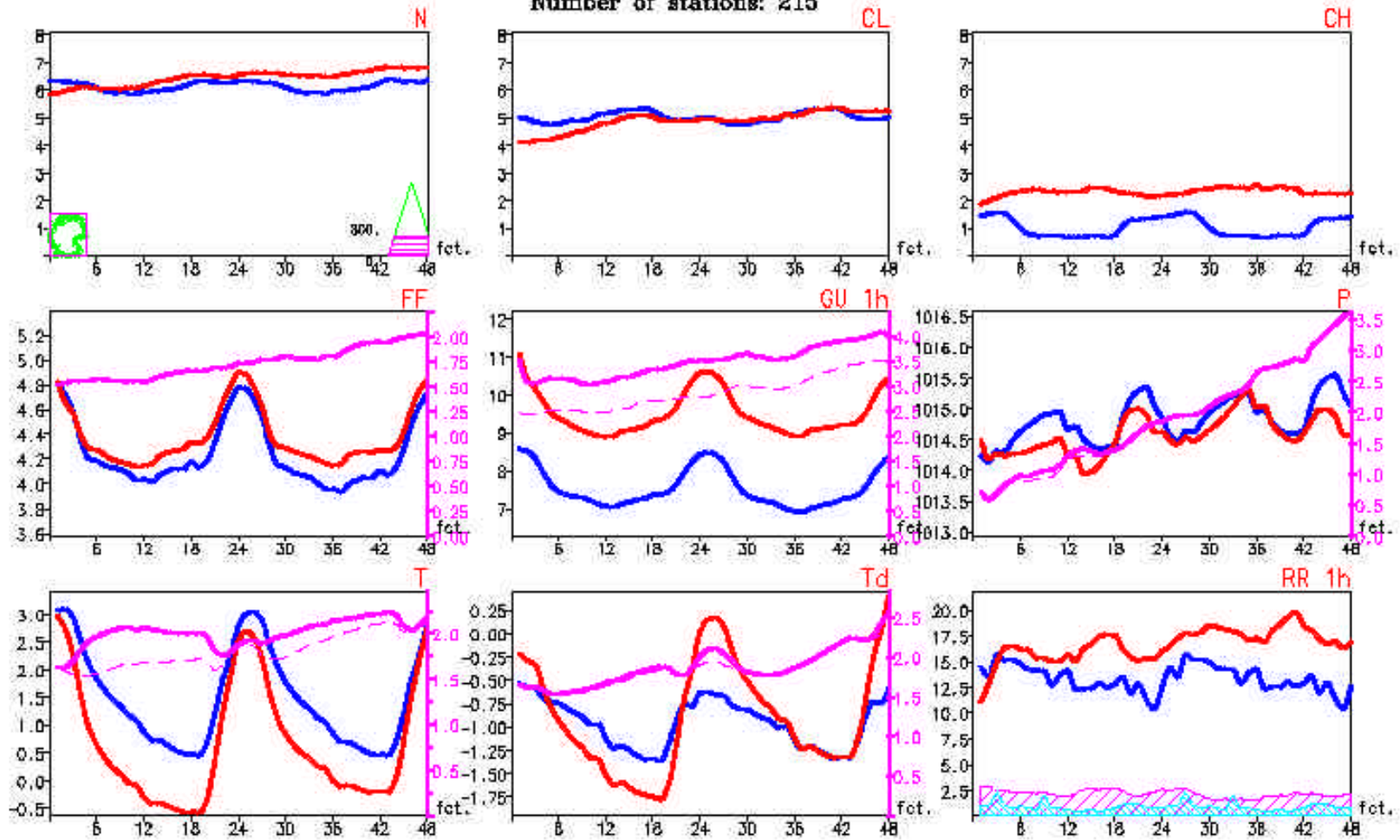


— Observation
— Forecast
— STDV / RMSE
 convective



Winter 2003-2004, start hour 12 UTC, stations 0. - 800 m

Diurnal cycle of observations and forecasts of LM in region: 05.87E - 15.03E 47.27N - 54.91N
Period: 03120312 - 04022912
Number of stations: 215



— Observation
— Forecast
— STDV / RMSE
▨ convective

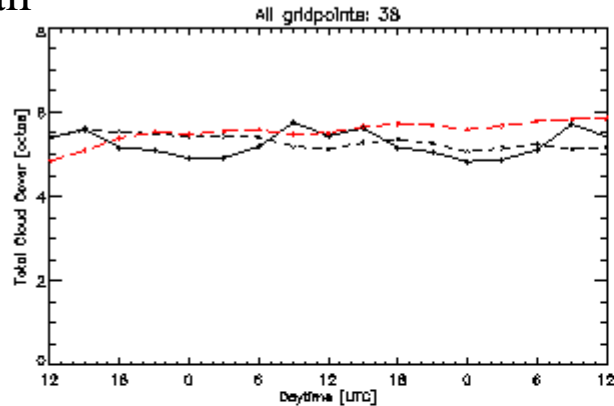


Winter 2003-2004, start hour 12 UTC, **aLMo + LM: N**

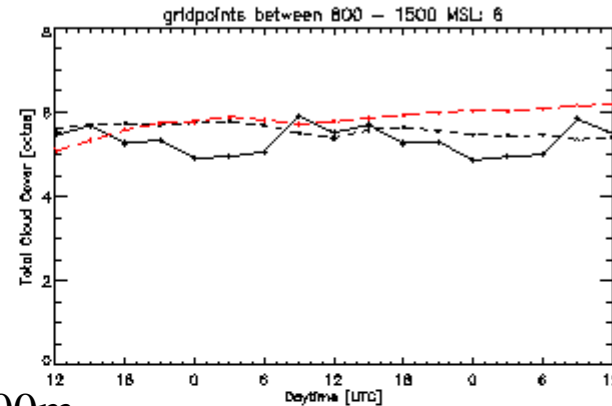
al Cloud Cover 12UTC Winter 2003/2004 missing forecasts: :

Total Cloud Cover 12UTC Winter 2003/2004 missing forecasts:

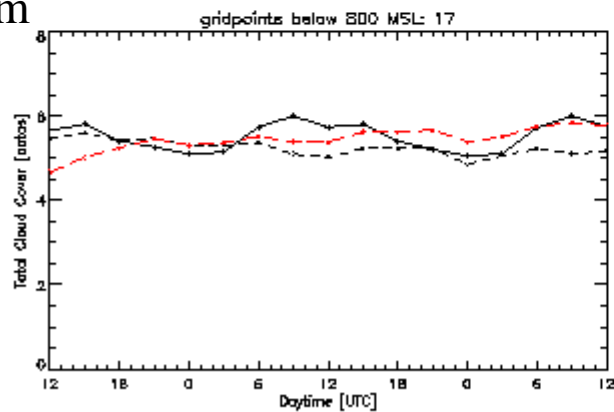
all



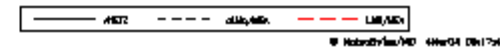
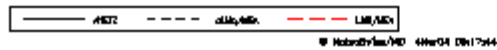
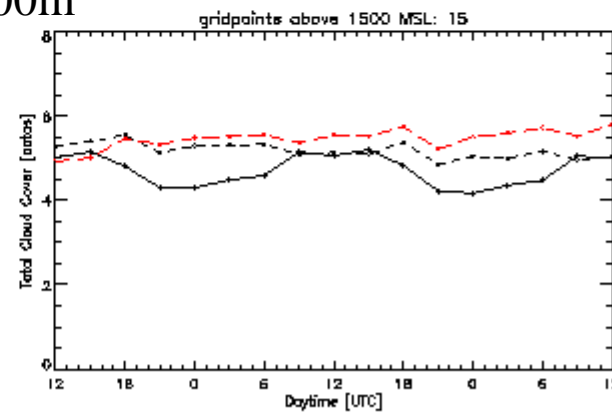
800 – 1500 m



< 800m



> 1500m



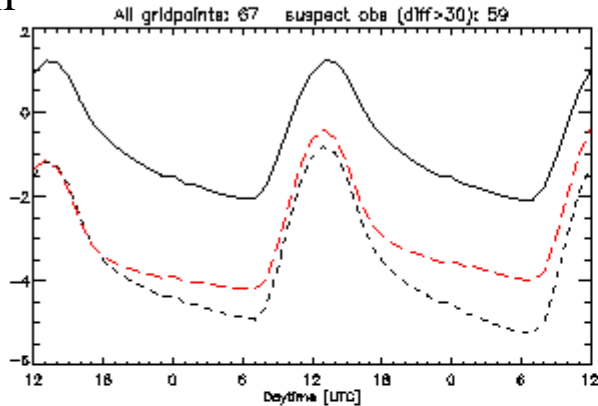
full line: obs (ANETZ) dashed black: aLMo dashed red: LM



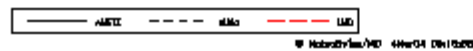
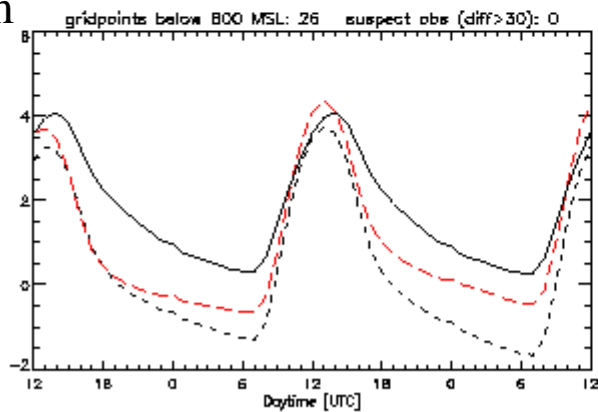
Winter 2003-2004, start hour 12 UTC, aLMo + LM: T2m

T2m 12UTC Winter 2003/2004 missing forecasts: 2

all

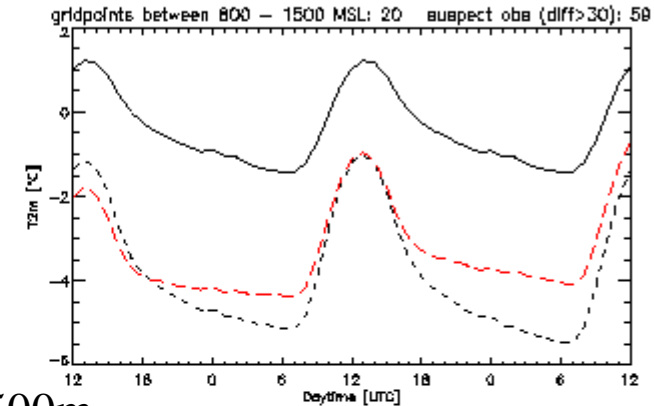


< 800m

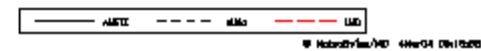
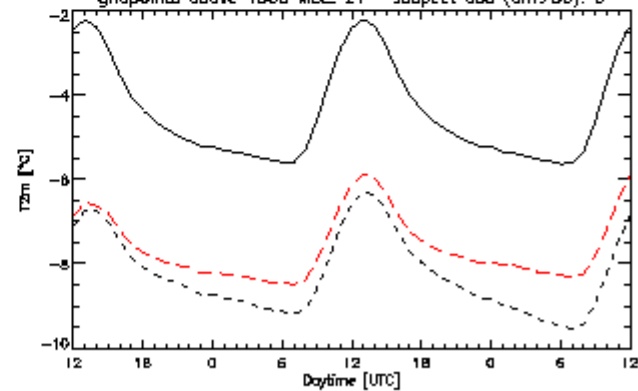


T2m 12UTC Winter 2003/2004 missing forecasts: 2

800 – 1500 m



> 1500m



full line: obs (ANETZ) dashed black: aLMo dashed red: LM

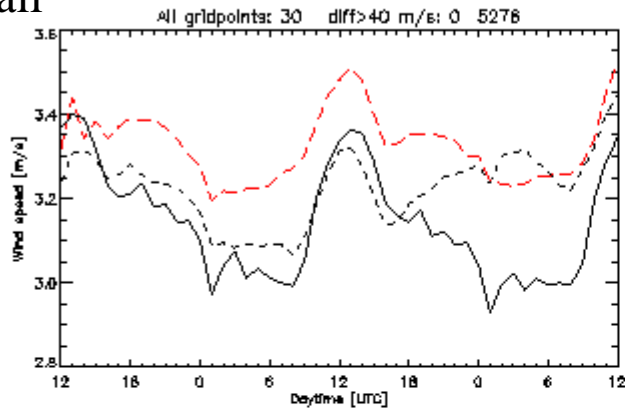


Winter 2003-2004, start hour 12 UTC, **aLMo + LM: FF**

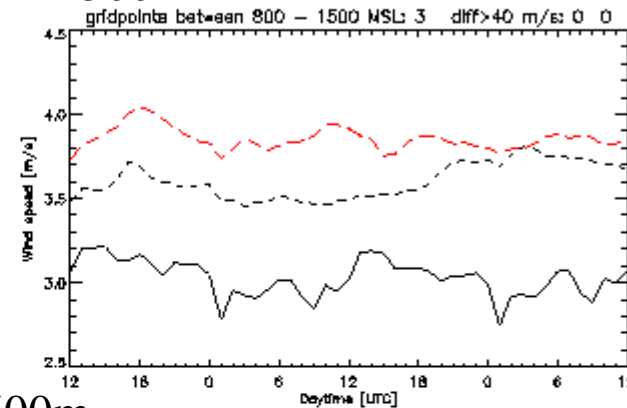
Wind speed 12UTC Winter 2003/2004 missing forecasts: 2

Wind speed 12UTC Winter 2003/2004 missing forecasts: 2

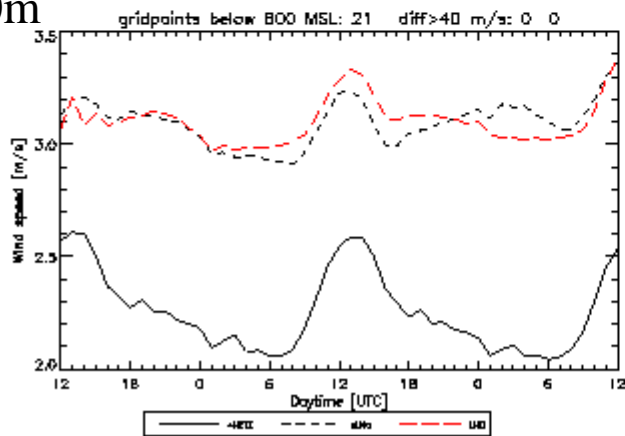
all



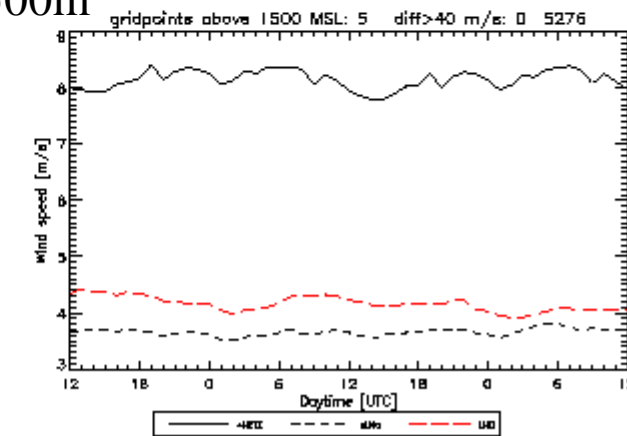
800 – 1500 m



< 800m



> 1500m



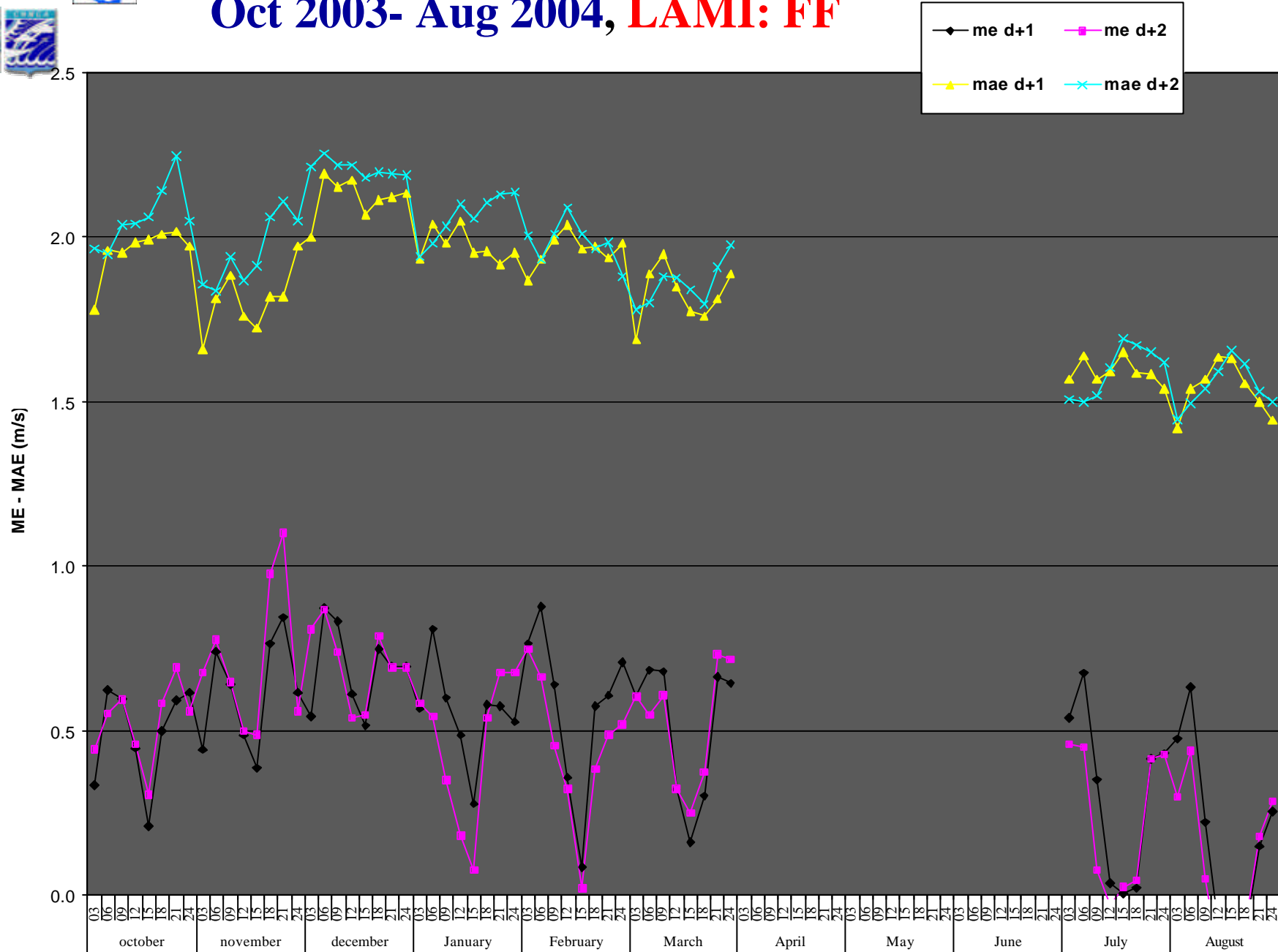
© MeteorSwiss/MO 4Mar04 09:17:52

© MeteorSwiss/MO 4Mar04 09:17:52

full line: obs (ANETZ) dashed black: aLMo dashed red: LM



Oct 2003- Aug 2004, LAMI: FF

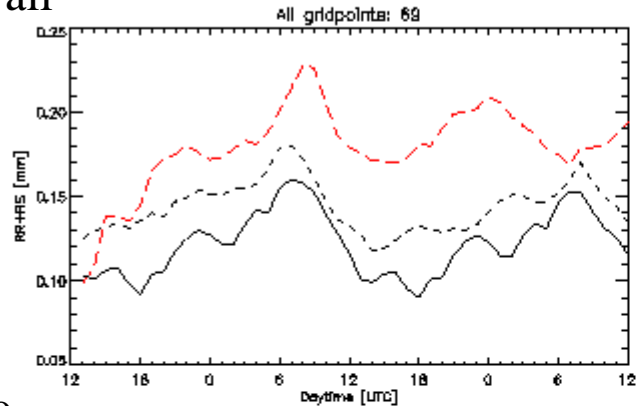




Winter 2003-2004, start hour 12 UTC, **aLMo + LM: RR**

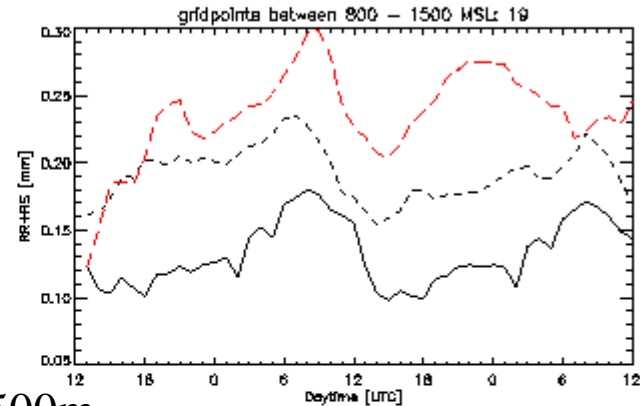
RR+RS 12UTC Winter 2003/2004 missing forecasts: 2
mean of 5 grid points for LM

all

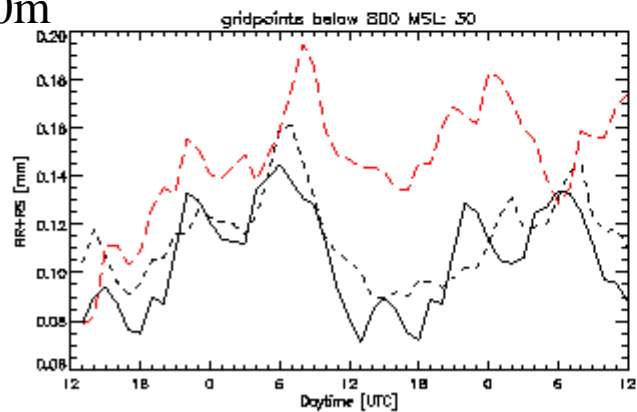


RR+RS 12UTC Winter 2003/2004 missing forecasts: 2
mean of 5 grid points for LM

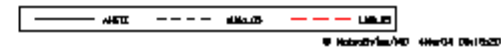
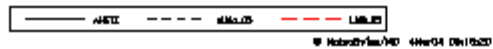
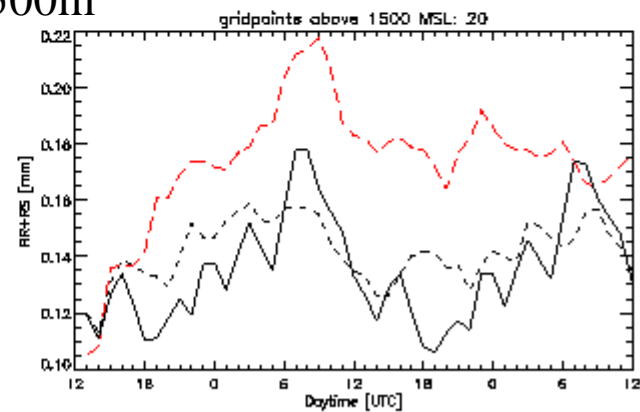
800 – 1500 m



< 800m



> 1500m



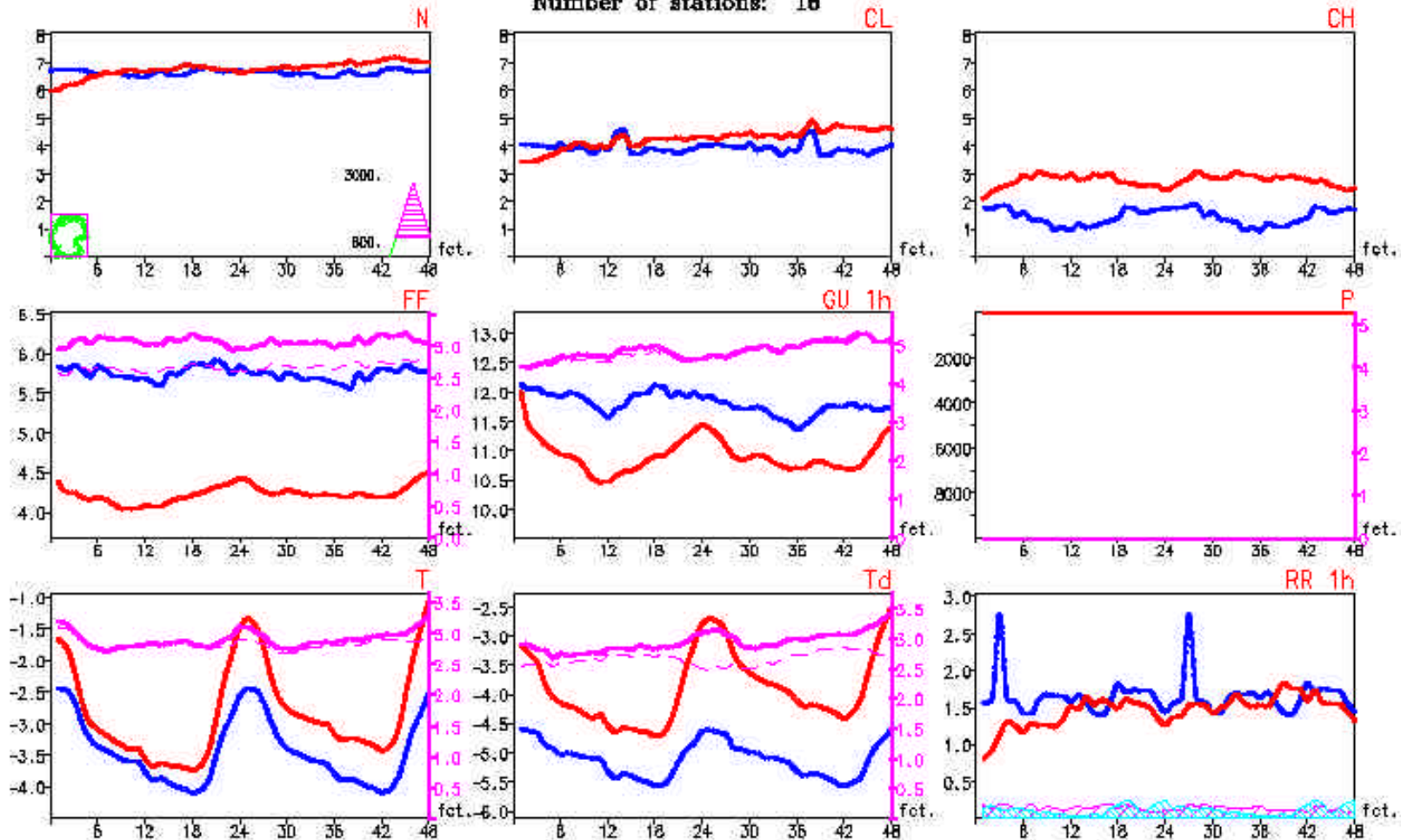
full line: obs (ANETZ) dashed black: aLMo dashed red: LM



Winter 2003-2004, start hour 12 UTC, stations 800. - 3000 m



Diurnal cycle of observations and forecasts of LM in region: 05.87E - 15.03E 47.27N - 54.91N
Period: 03120312 - 04022912
Number of stations: 16



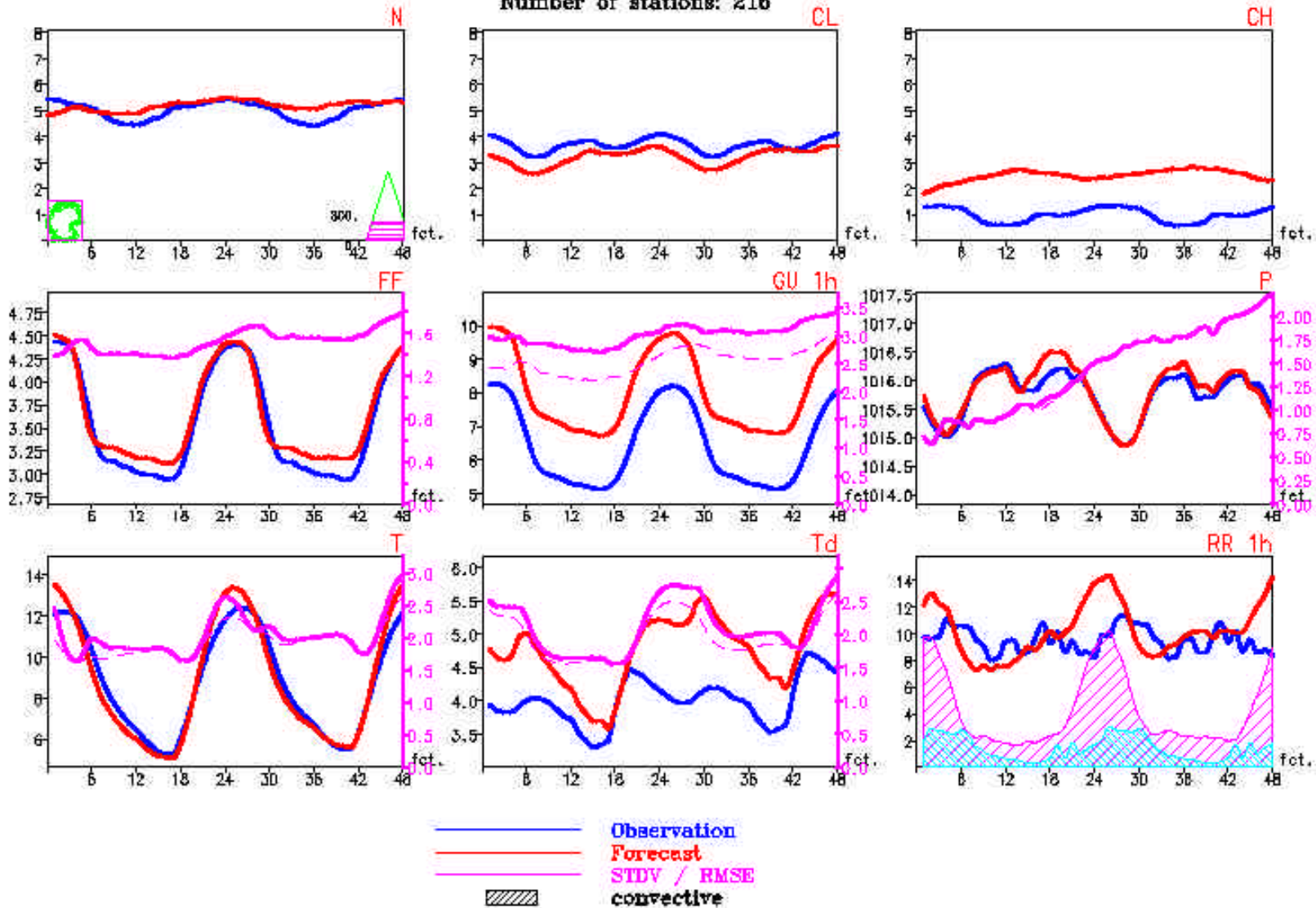
— Observation
— Forecast
— STDV / RMSE
▨ convective



Spring 2004, start hour 12 UTC, stations 0. - 800 m



Diurnal cycle of observations and forecasts of LM in region: 05.87E - 15.03E 47.27N - 54.91N
Period: 04030312 - 04053112
Number of stations: 216



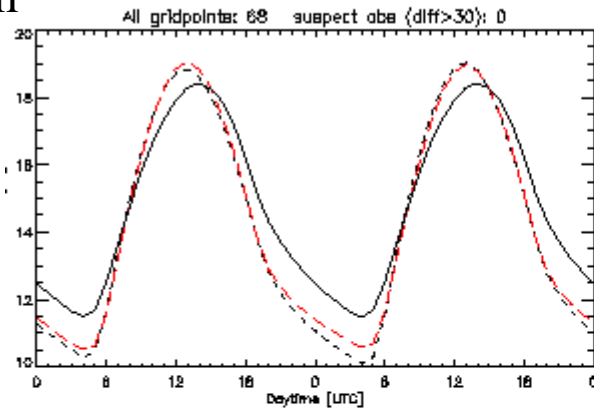


Summer 2004, start hour 12 UTC, aLMo + LM: T2m

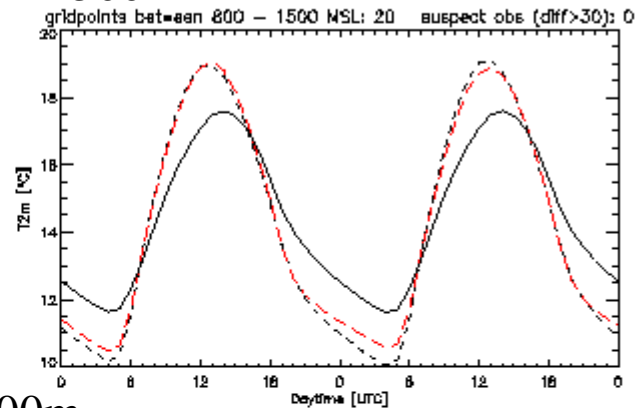
T2m 00UTC Summer 2004 missing forecasts: 1

T2m 00UTC Summer 2004 missing forecasts: 1

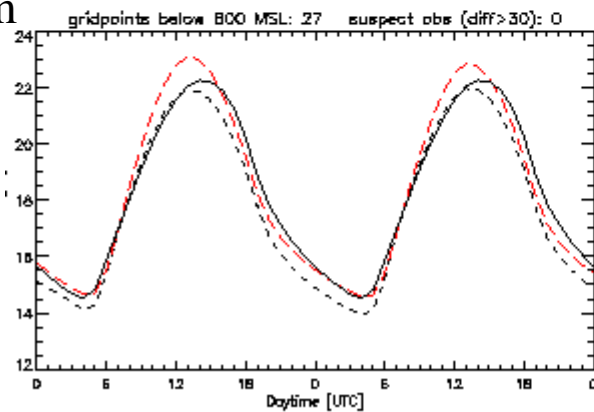
all



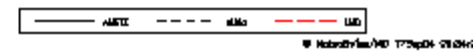
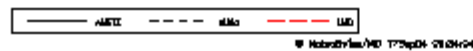
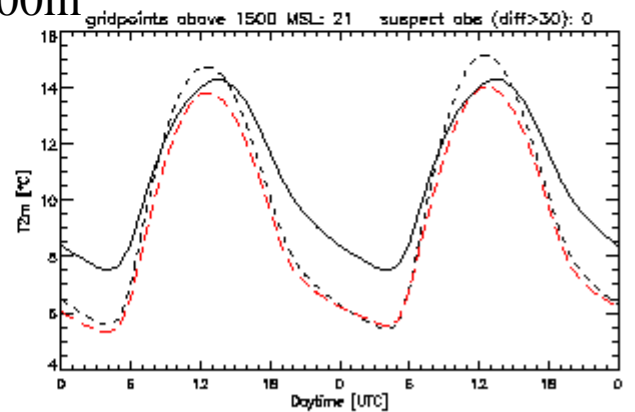
800 – 1500 m



< 800m



> 1500m



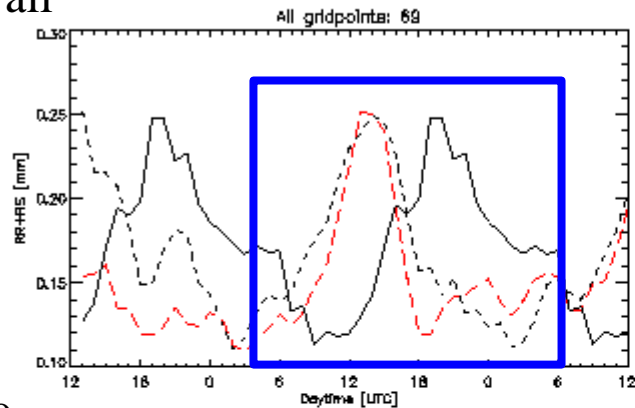
full line: obs (ANETZ) dashed black: aLMo dashed red: LM



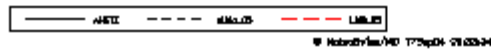
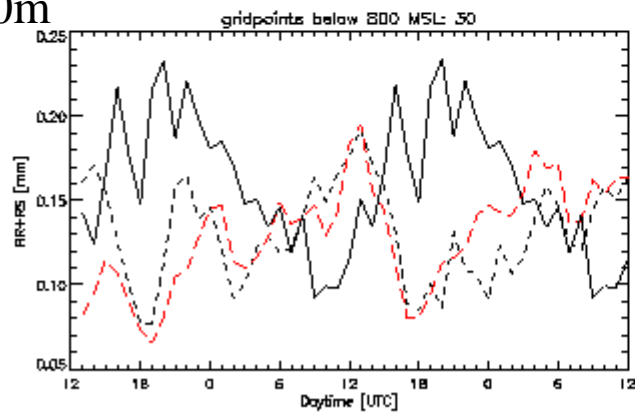
Summer 2004, start hour 12 UTC, **aLMo + LM: RR**

RR+RS 12UTC Summer 2004 missing forecasts: 1
mean of 5 grid points for LM

all

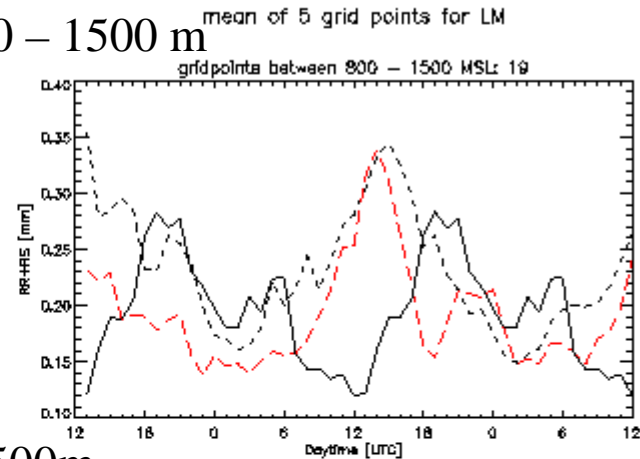


< 800m

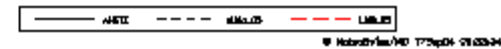
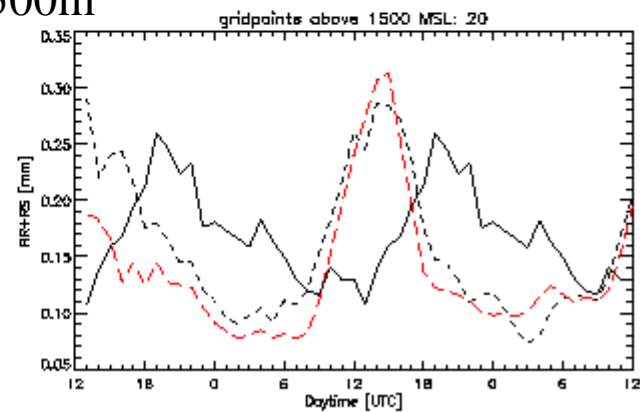


RR+RS 12UTC Summer 2004 missing forecasts: 1
mean of 5 grid points for LM

800 – 1500 m



> 1500m



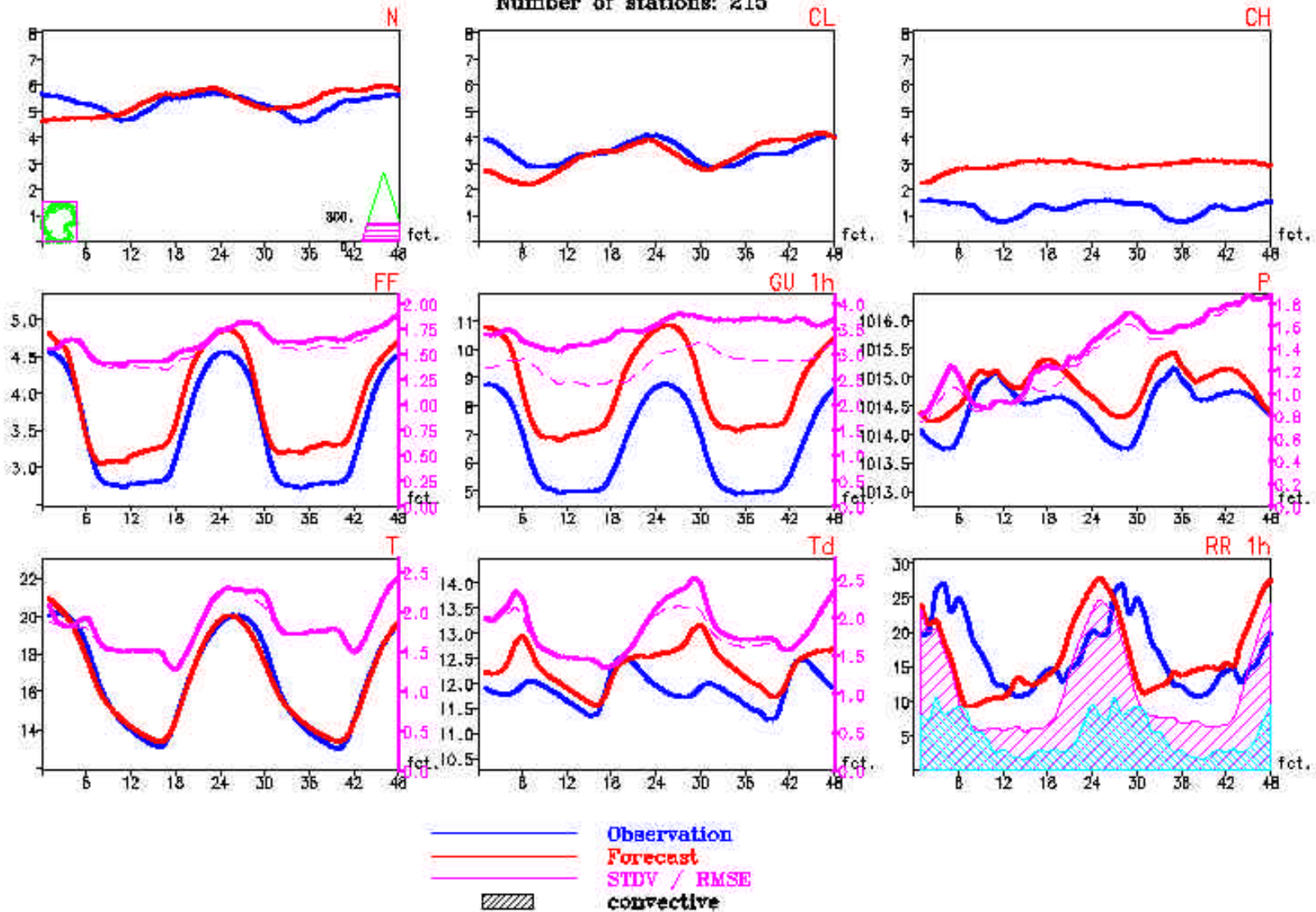
full line: obs (ANETZ) dashed black: aLMo dashed red: LM



Summer 2004, start hour 12 UTC, stations 0. - 800 m



Diurnal cycle of observations and forecasts of LM in region: 05.87E - 15.03E 47.27N - 54.91N
Period: 04060312 - 04083112
Number of stations: 215

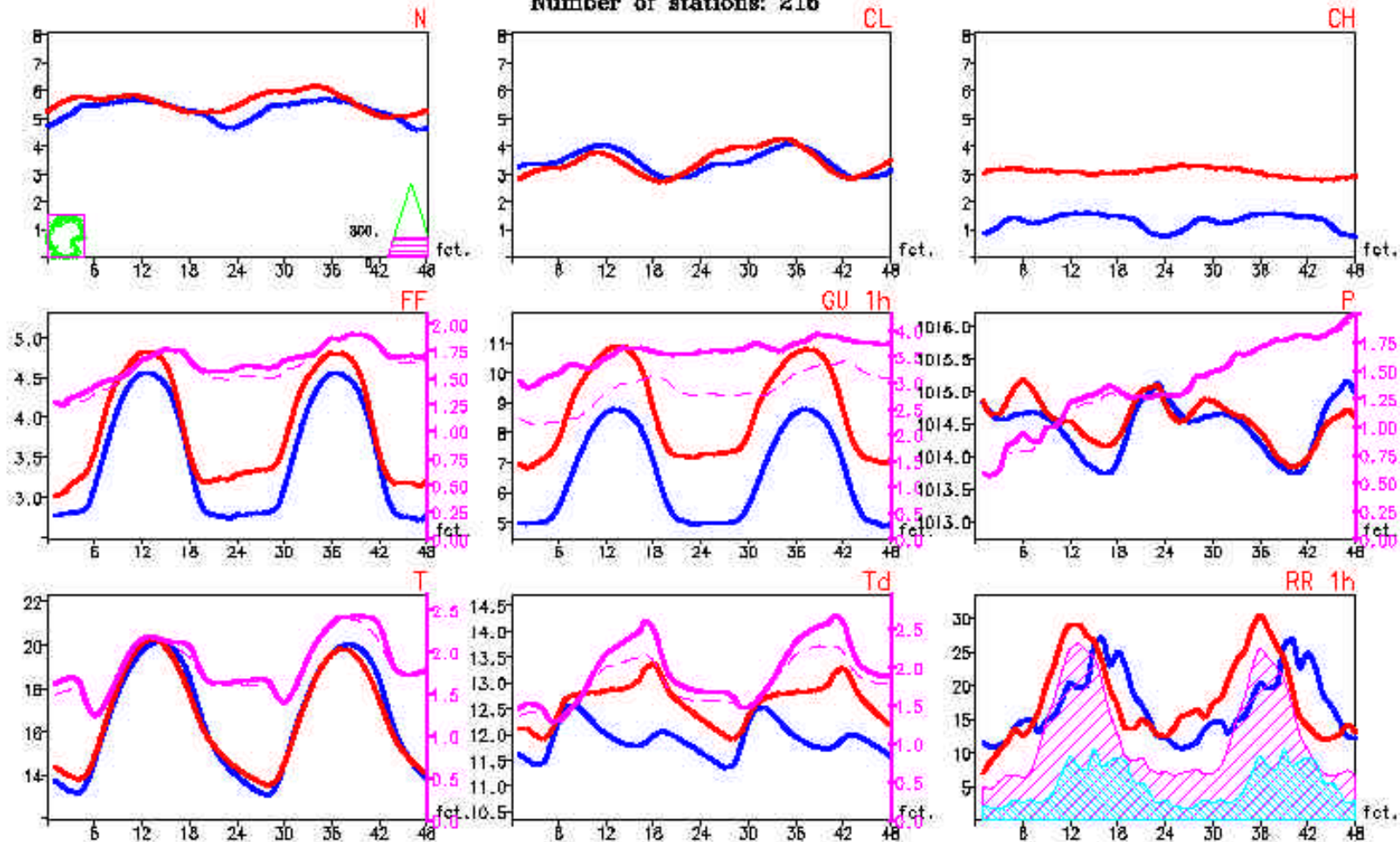




Summer 2004, start hour 00 UTC, stations 0. - 800 m



Diurnal cycle of observations and forecasts of LM in region: 05.87E - 15.03E 47.27N - 54.91N
Period: 04060300 - 04083100
Number of stations: 216



— Observation
— Forecast
— STDV / RMSE
▨ convective



Summary

- **Cloud cover shows different development with time in aLMo and LM ($dN_{LM}/dt > 0$, $dN_{aLMo}/dt < 0$) during winter!**
- **Generally overestimation of high cloud's cover**
- **Similar results in LM aLMo and LAMI concerning wind speed with underestimation for mountains and overestimation for remaining stations**
- **Diurnal wave of dew point modelled relatively good except amplitude**
- **Diurnal cycle of temperature shows too rapid increase during morning, too rapid decrease during afternoon. This (and perhaps other influences) causes**
- **Too early onset of convective precipitation, too rapid increase of convective precipitation during afternoon**
- **Constant overestimation of gusts (20-25%, some users believe 50%)**