
Conditional verification with VERSUS @ DWD – State September 2014

Ulrich Damrath



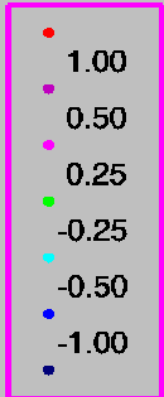
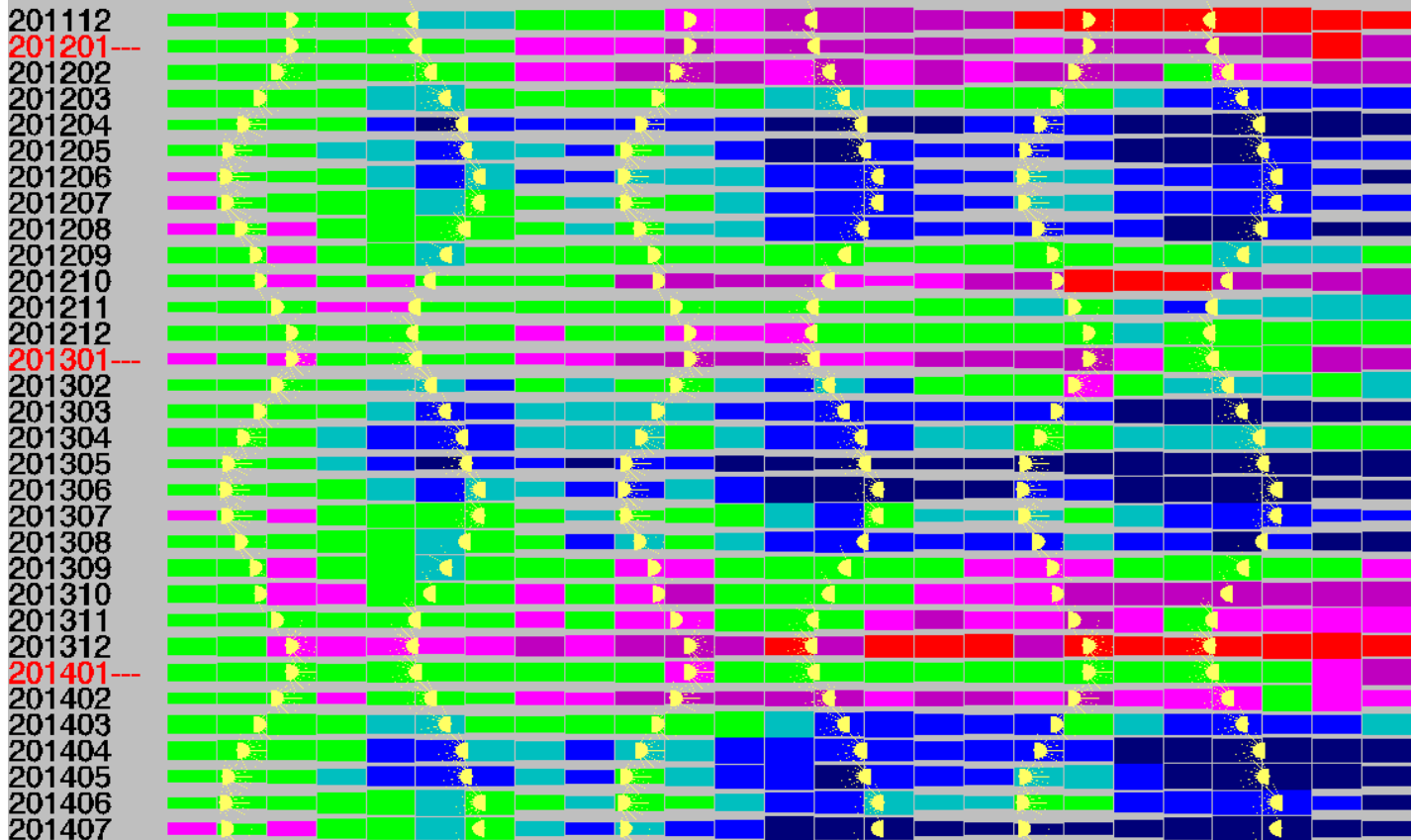
- **Monthly verification for T2m, Tdew, mslp, TCC, wind speed, wind u-component and wind v-component**
 - ❖ German stations below 800 m
- **Seasonal verification for T2m Tdew, mslp, TCC and wind speed**
 - ❖ German stations below 800 m
 - ❖ Common stations

Mean BIAS values over the region of Germany
for model CEU (00-UTC run)
Mean surface level pressure [hPa]

(Heights of bars sign the geographical variance of the BIAS within the month.)

Yellow symbols sign times of sunrise and sunset for 15. of each month in Offenbach.

Month\FCT 00 03 06 09 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72

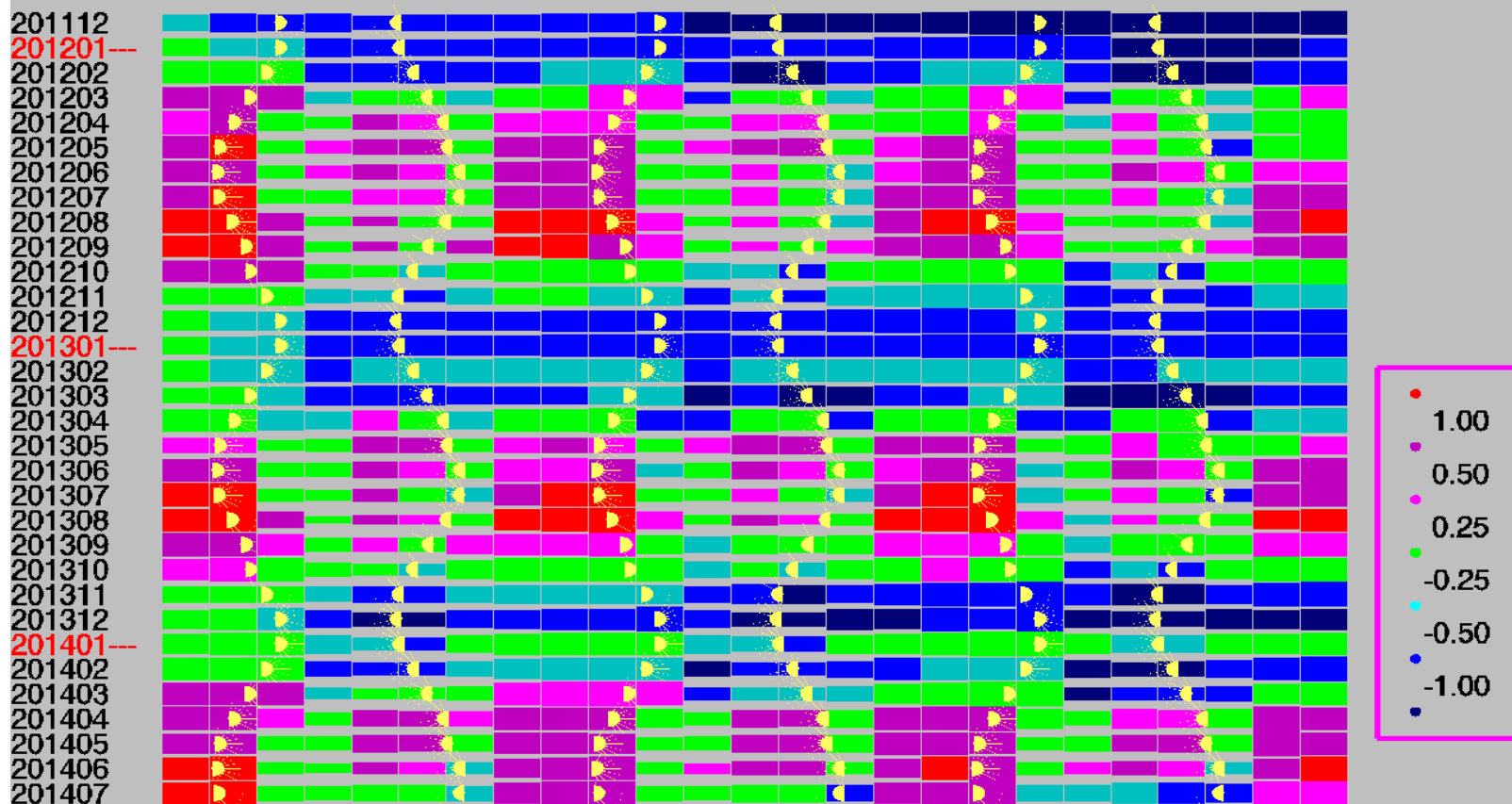


Mean BIAS values over the region of Germany for model CEU (00-UTC run) Temperature 2m [K]

(Heights of bars sign the geographical variance of the BIAS within the month.)

Yellow symbols sign times of sunrise and sunset for 15. of each month in Offenbach.

Month\FCT 00 03 06 09 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72

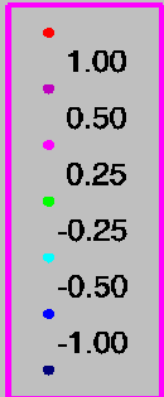
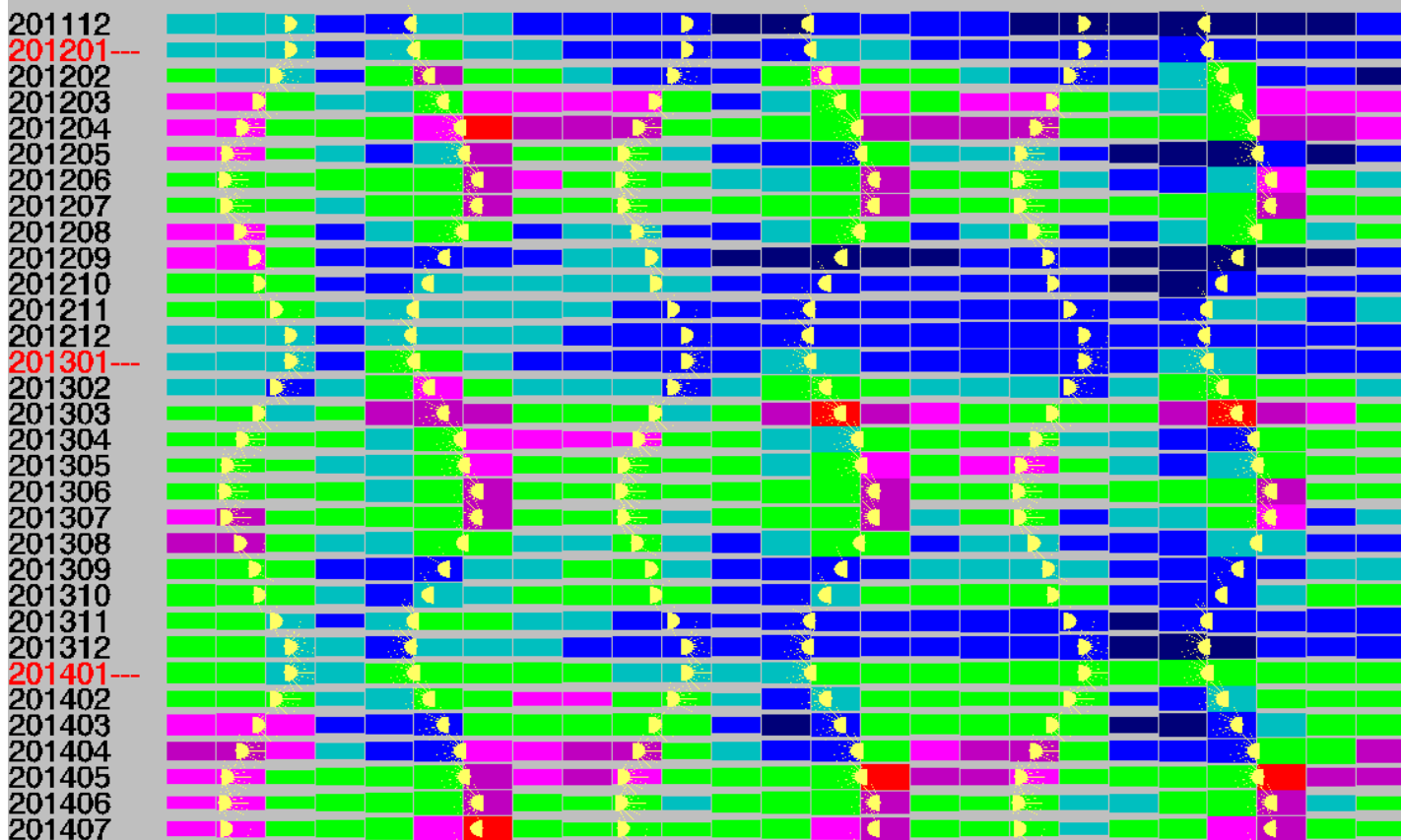


Mean BIAS values over the region of Germany
for model CEU (00-UTC run)
Dew point temperature 2m [K]

(Heights of bars sign the geographical variance of the BIAS within the month.)

Yellow symbols sign times of sunrise and sunset for 15. of each month in Offenbach.

Month\FCT 00 03 06 09 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72

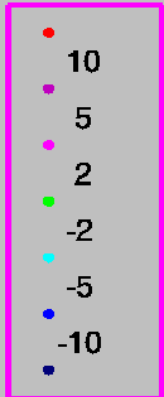
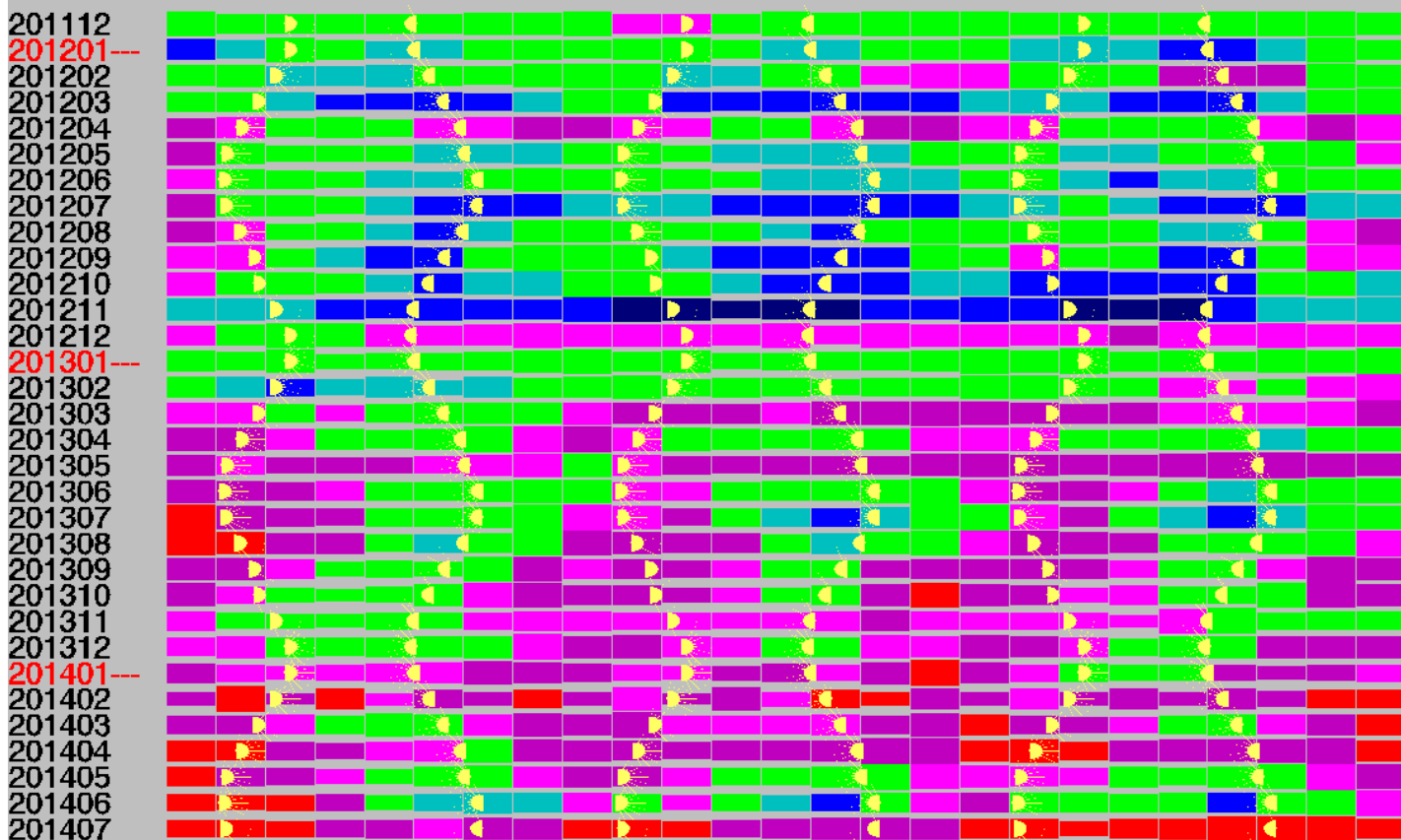


Mean BIAS values over the region of Germany for model CEU (00-UTC run) Total cloud cover [%]

(Heights of bars sign the geographical variance of the BIAS within the month.)

Yellow symbols sign times of sunrise and sunset for 15. of each month in Offenbach.

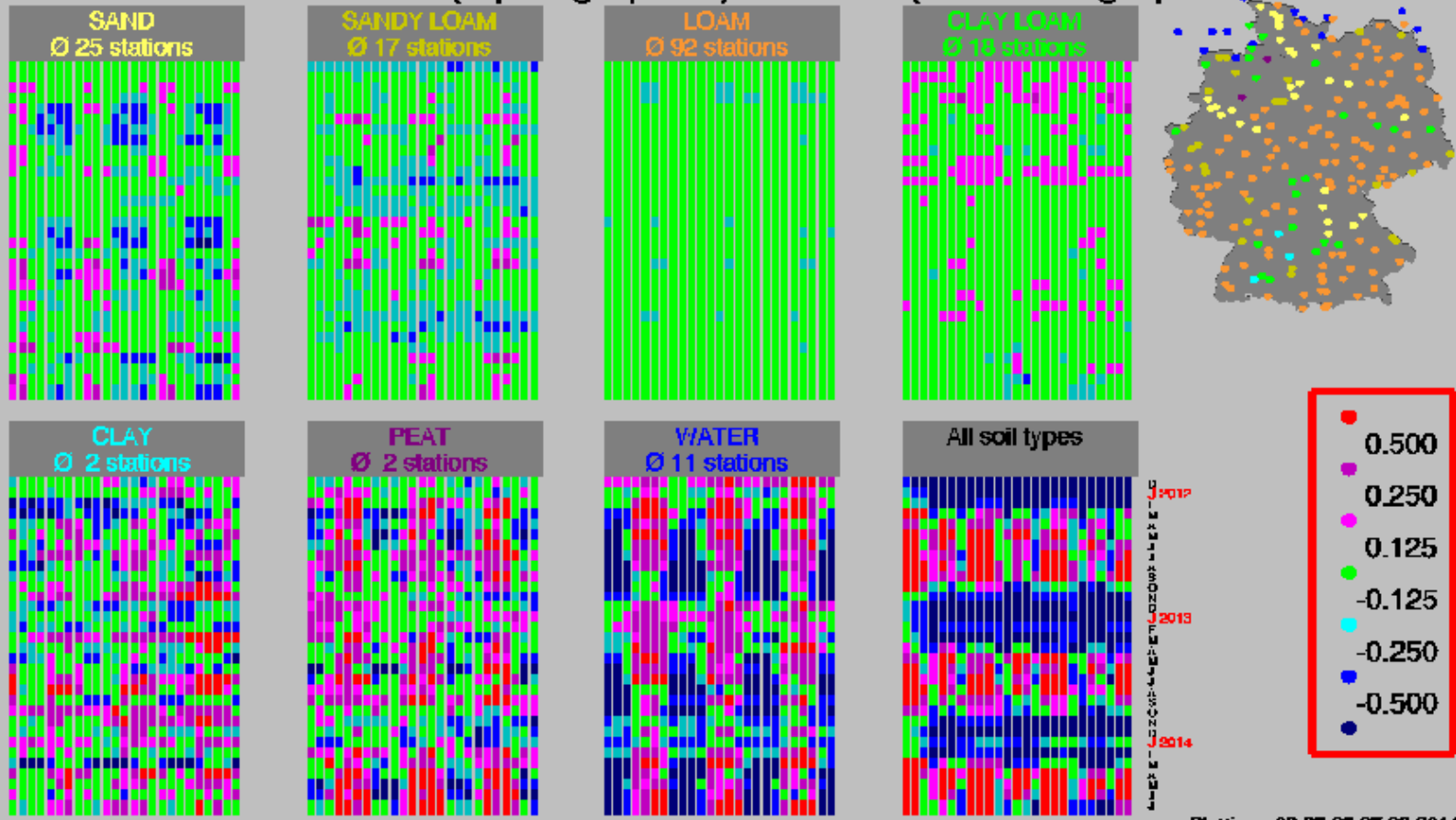
Month\FCT 00 03 06 09 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72



- **Monthly CV for T2m, Tdew, mslp, TCC , wind speed, wind u-component and wind v-component depending on**
 - ❖ soil texture type
 - ❖ geographical position
 - ❖ elevation of the station
 - ❖ Analysis of variances
- **Monthly CV for T2m depending on**
 - ❖ observed cloud cover
 - ❖ forecasted cloud cover (see common plots)
- **Seasonal CV for T2m depending on**
 - ❖ observed wind speed below and above 2 ms^{-1} (see common plots)
 - ❖ observed and forecasted cloud cover
 - ❖ soil moisture (see common plots)
 - ❖ roughness length (see common plots)

Example for the effect of soil texture

Mean BIAS values over the region of Germany depending on soil type
 Model :CEU (00-UTC run) (horizontal: forecast time in steps of 3 hours till 72 hours)
 Temperature 2m [K]
 (differences between bias for all soil types and bias for single soil types)
 Period: 201112 (top of graphics) - 201407 (bottom of graphics)



Plottime: 09:27:28 07.08.2014



Example for the effect of geographical position

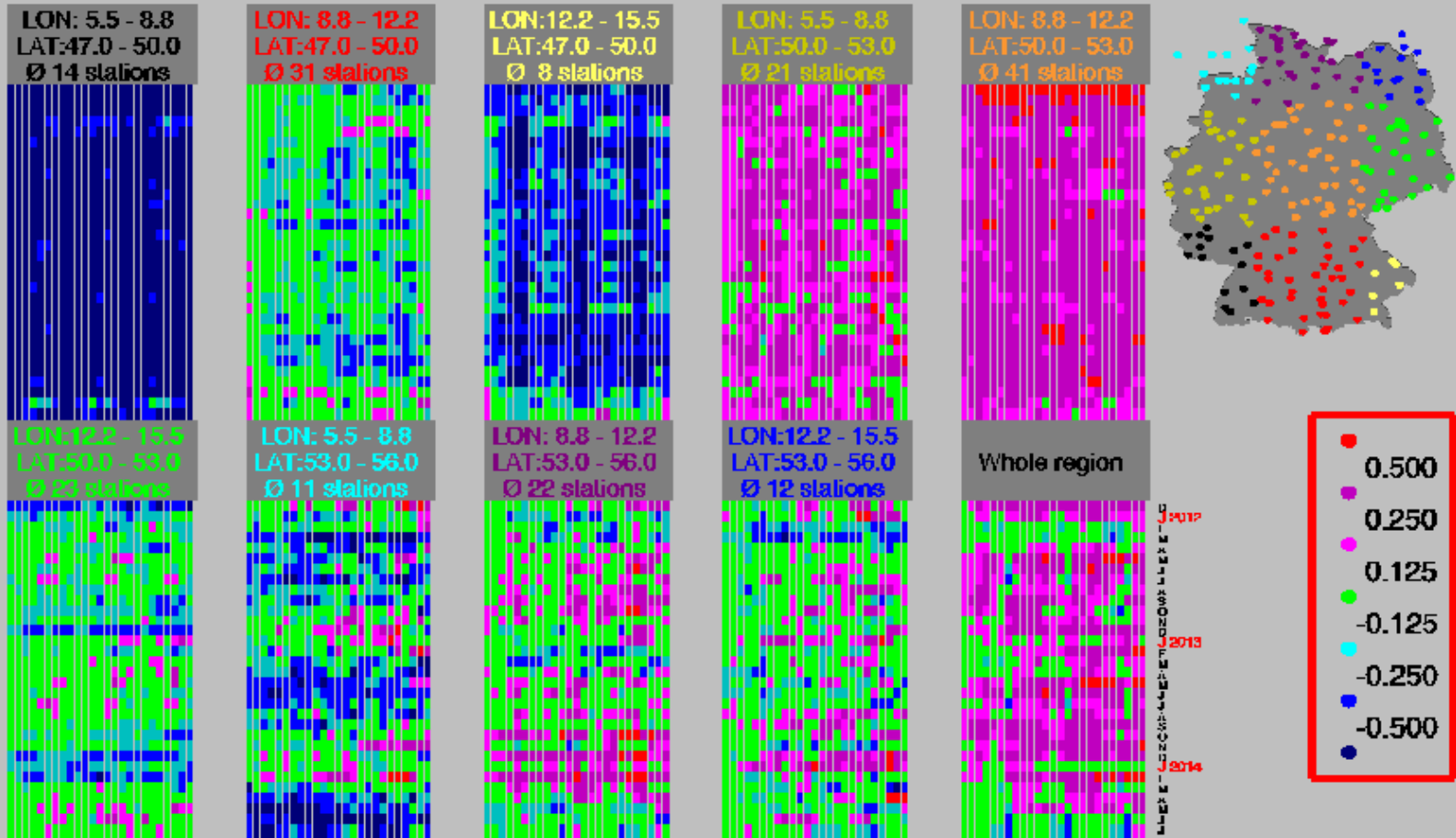
Mean BIAS values over the region of Germany depending on geographical position

Model :CEU (00-UTC run) (horizontal: forecast time in steps of 3 hours till 72 hours)

Wind speed [$m s^{-1}$]

(differences between bias for all geographical regions and bias for single geographical region)

Period: 201112 (top of graphics) - 201407 (bottom of graphics)



Plottime: 09:28:53 07.08.2014



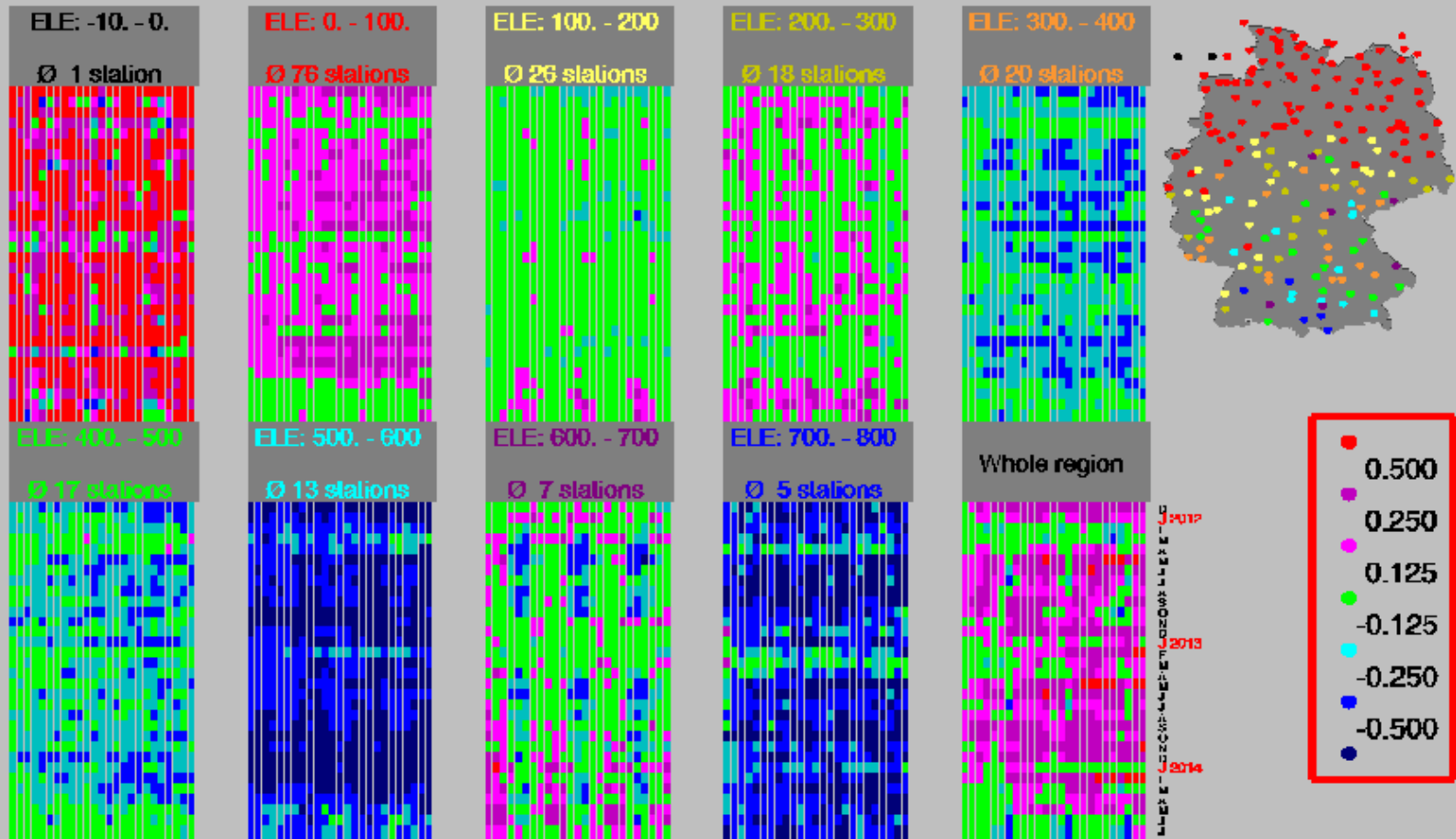
Example for the effect of elevation of stations

Mean BIAS values over the region of Germany depending on elevation of stations
Model :CEU (00-UTC run) (horizontal: forecast time in steps of 3 hours till 72 hours)

Wind speed [$m s^{-1}$]

(differences between bias for all geographical regions and bias for single geographical region)

Period: 201112 (top of graphics) - 201407 (bottom of graphics)



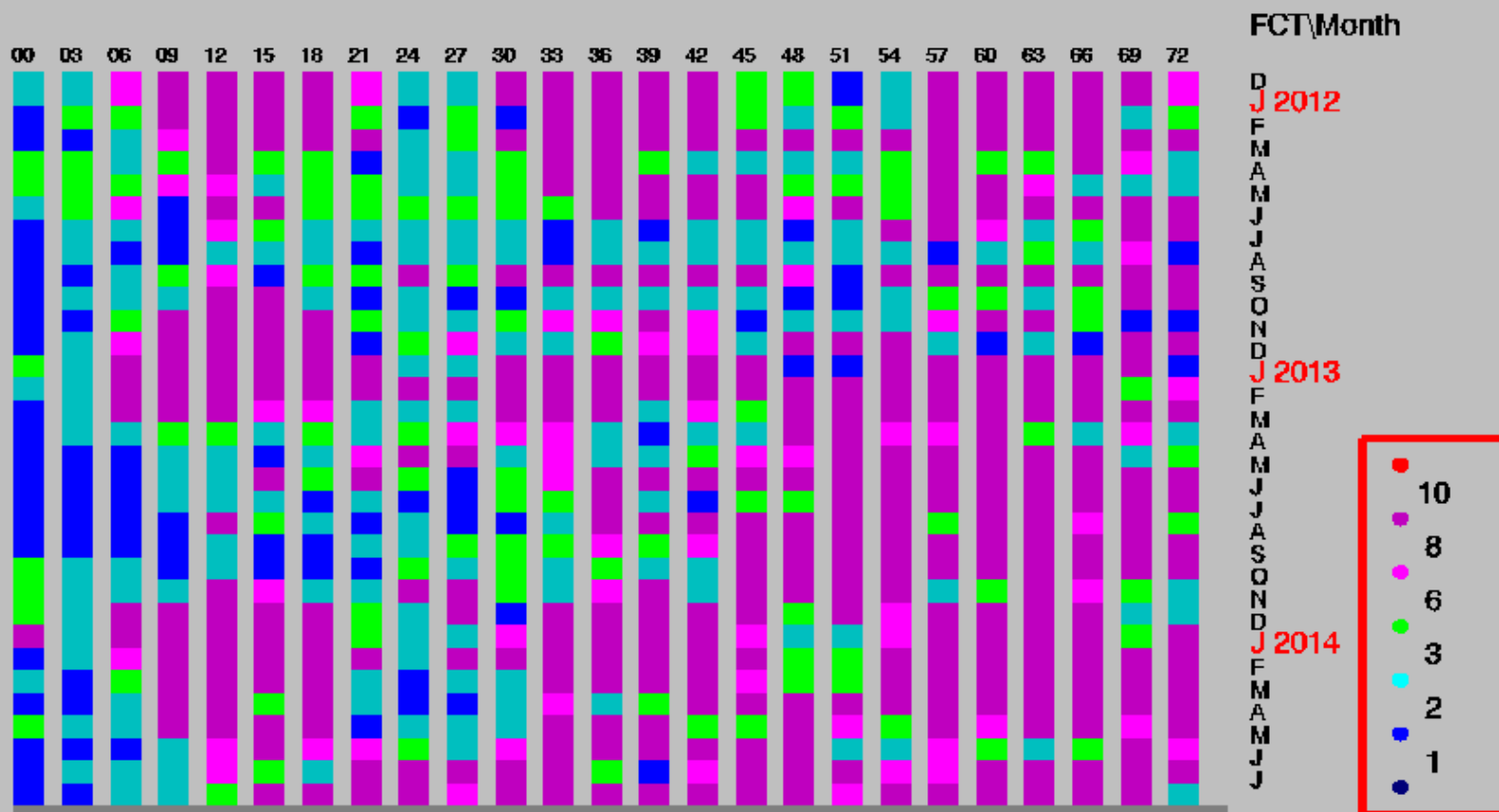
Plottime: 09:30:39 07.08.2014



F value for analysis of variance



Results of analysis of variance over the region of Germany depending on geographical position
 Model :CEU (00-UTC run) (horizontal: forecast time in steps of 3 hours till 72 hours)
 Mean surface level pressure [hPa]
 Period: 201112 (top of graphics) - 201407 (bottom of graphics)



F-value for analysis of variance

Plottime: 09:32:23 07.08.2014

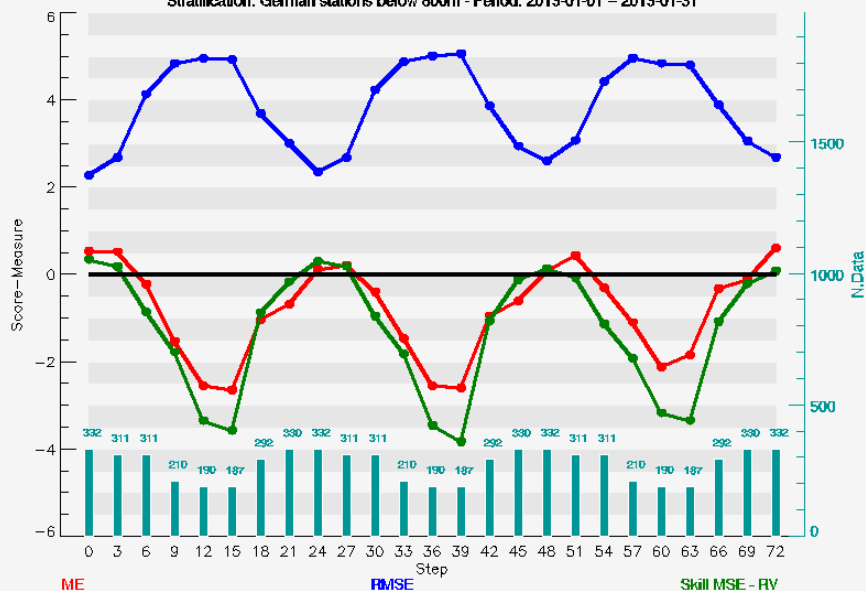


CV for T2m depending on observed TCC (January 2013)



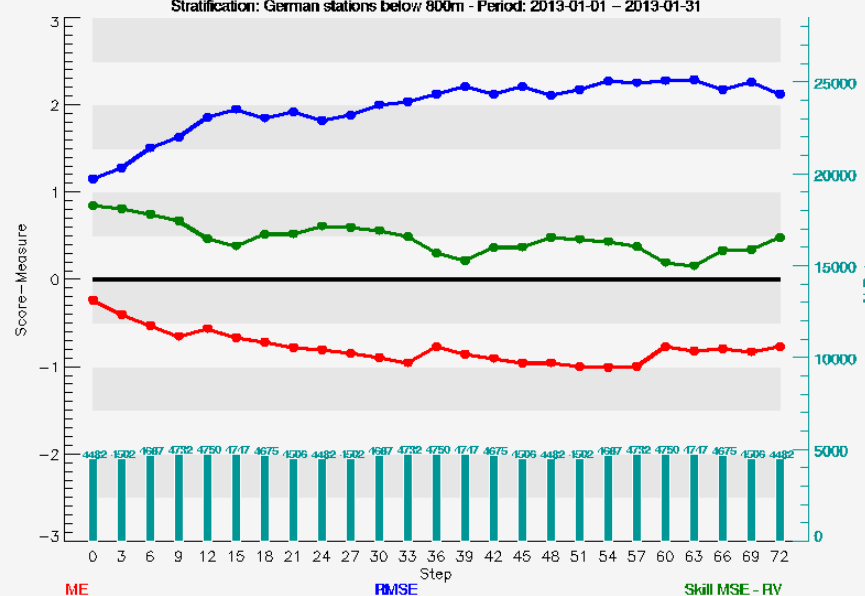
Conditional verification CEU Temperature 2m TCC < 25% - 00 Run

Stratification: German stations below 800m - Period: 2013-01-01 - 2013-01-31

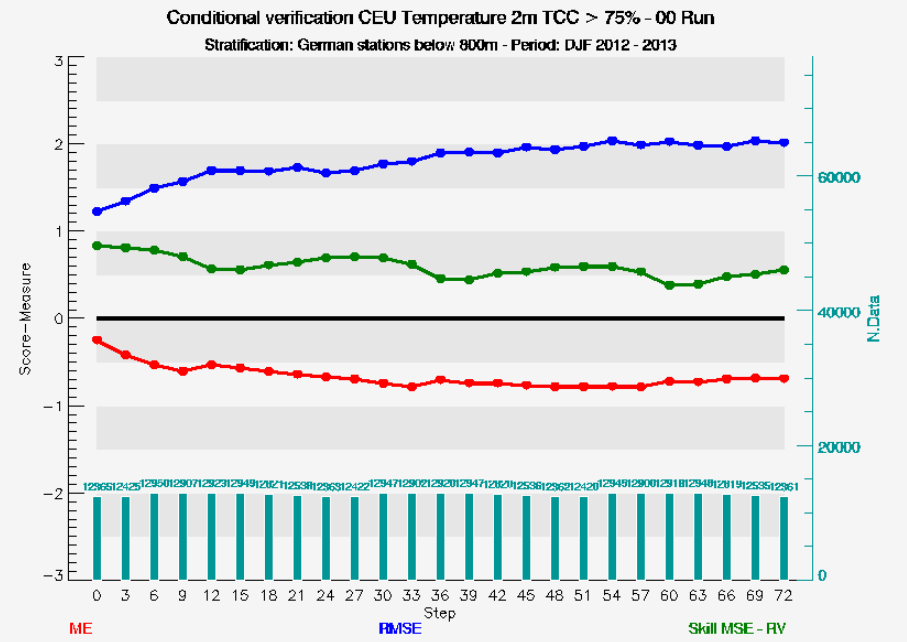
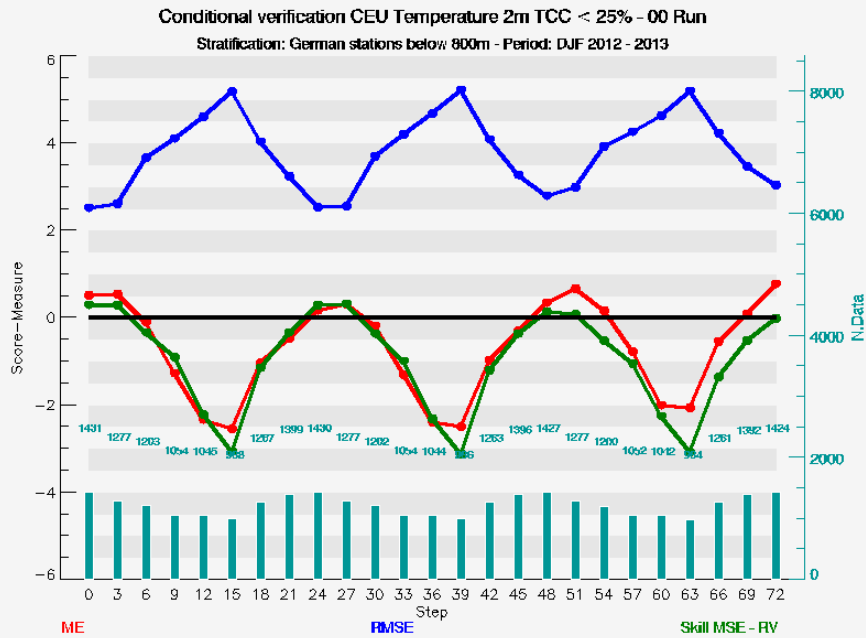


Conditional verification CEU Temperature 2m TCC > 75% - 00 Run

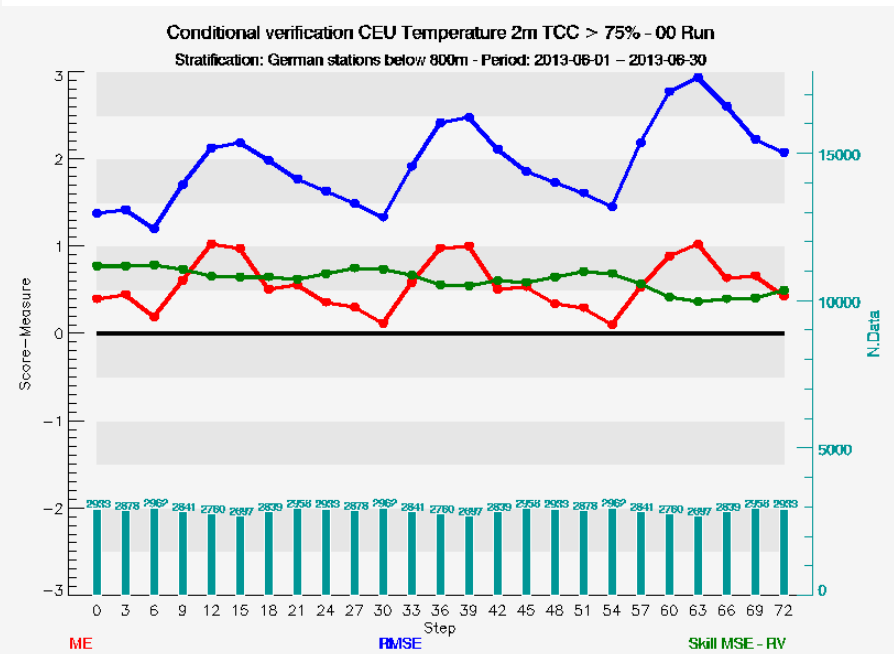
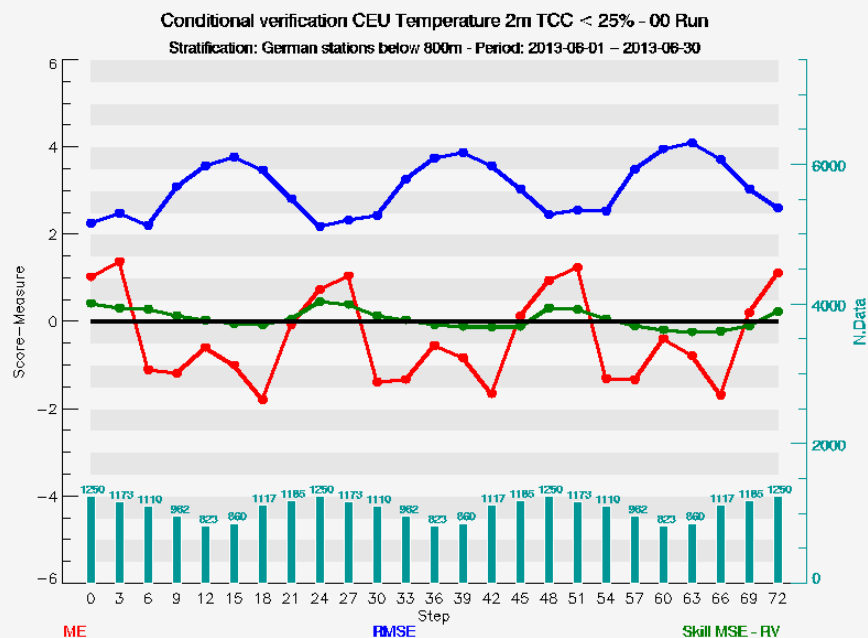
Stratification: German stations below 800m - Period: 2013-01-01 - 2013-01-31



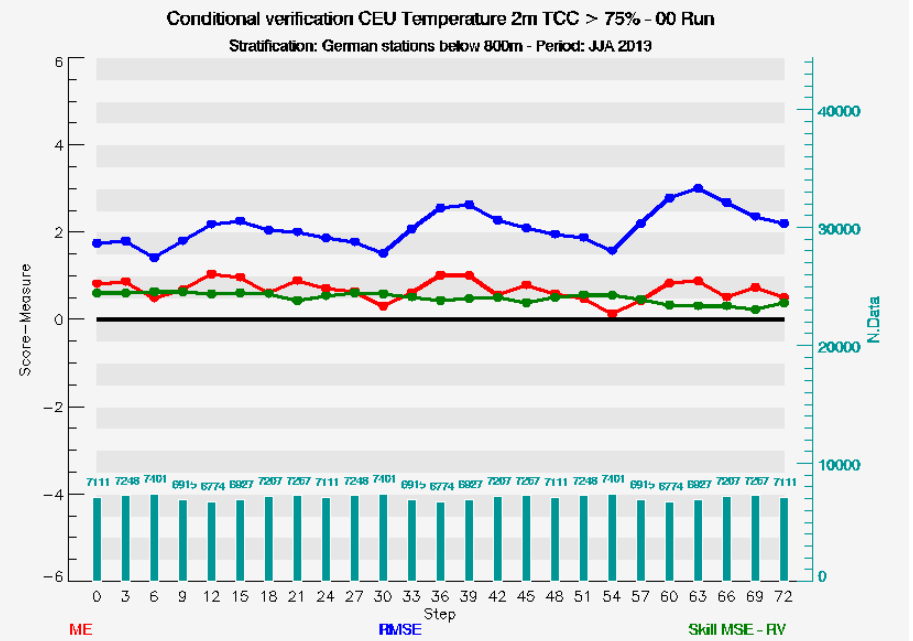
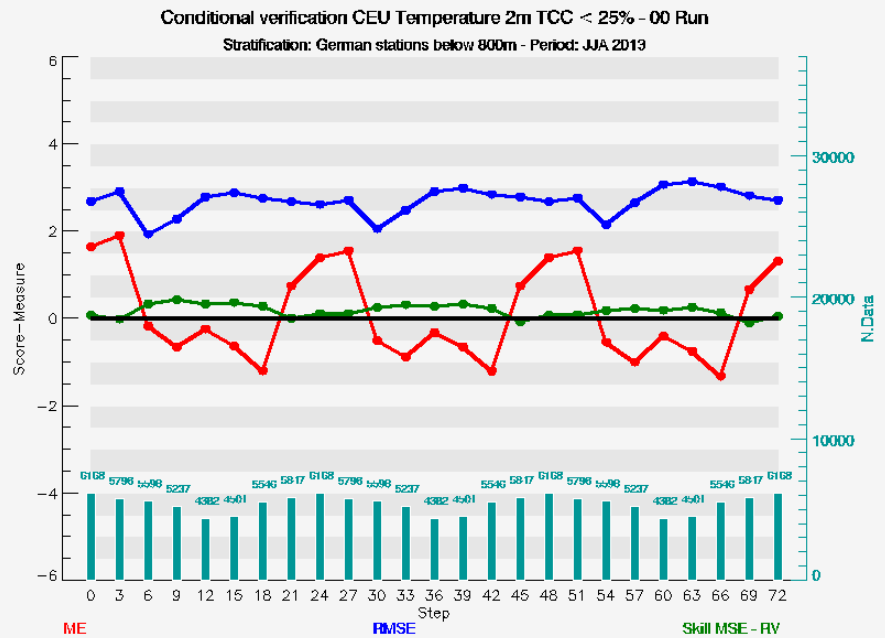
CV for T2m depending on observed TCC (Winter 2012/2013)



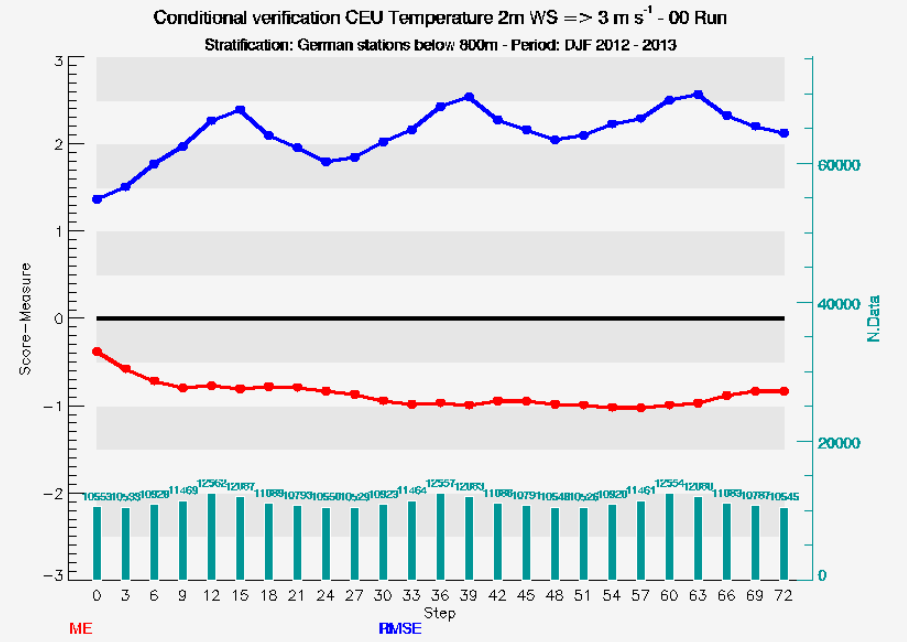
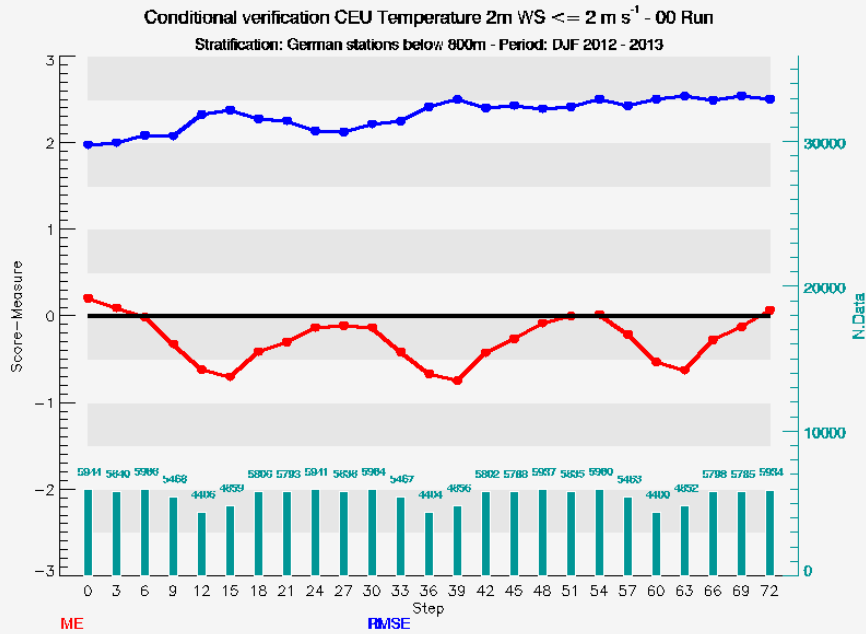
CV for T2m depending on observed TCC (June 2013)



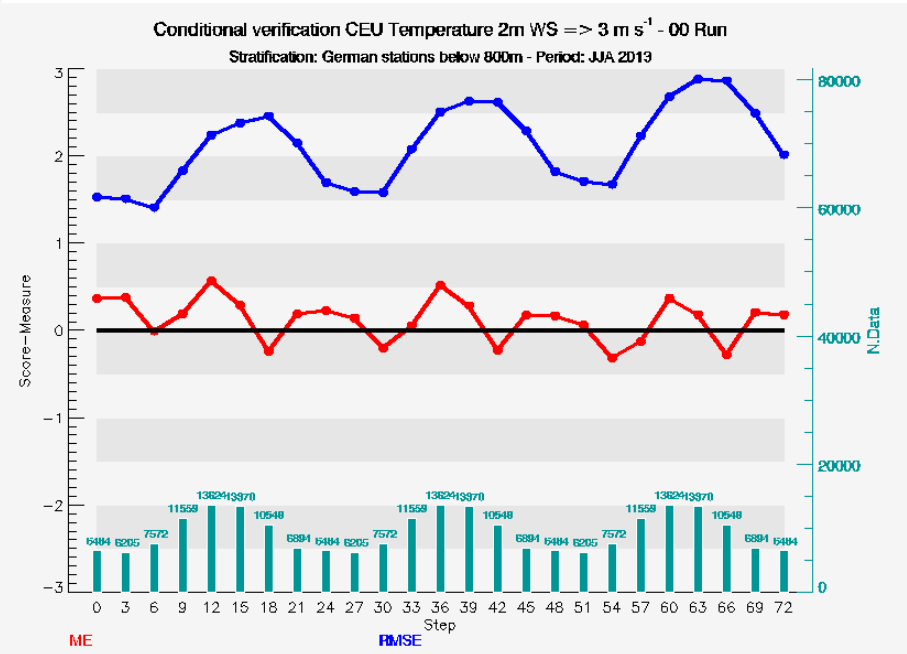
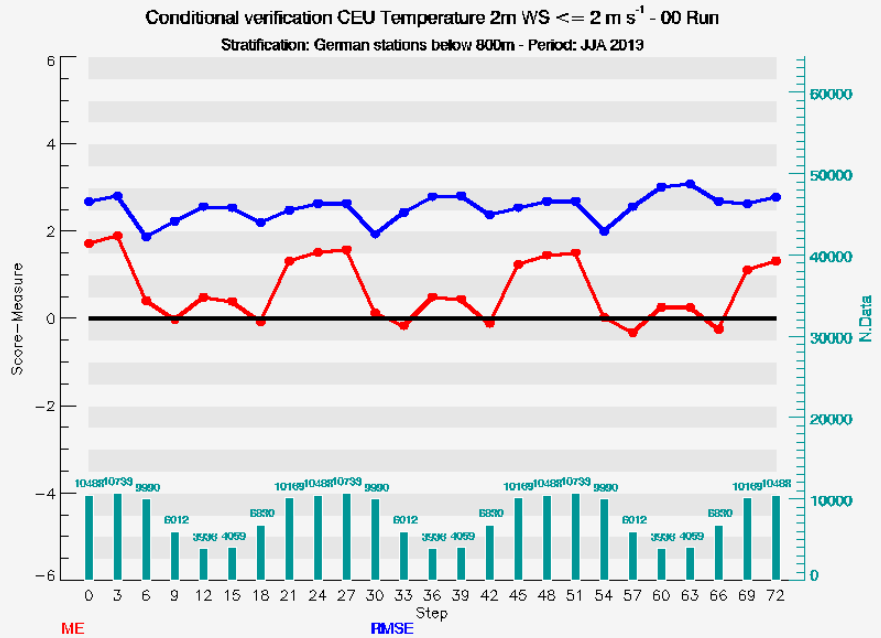
CV for T2m depending on observed TCC (Summer 2013)



CV for T2m depending on observed wind speed (Winter 2012/2013)

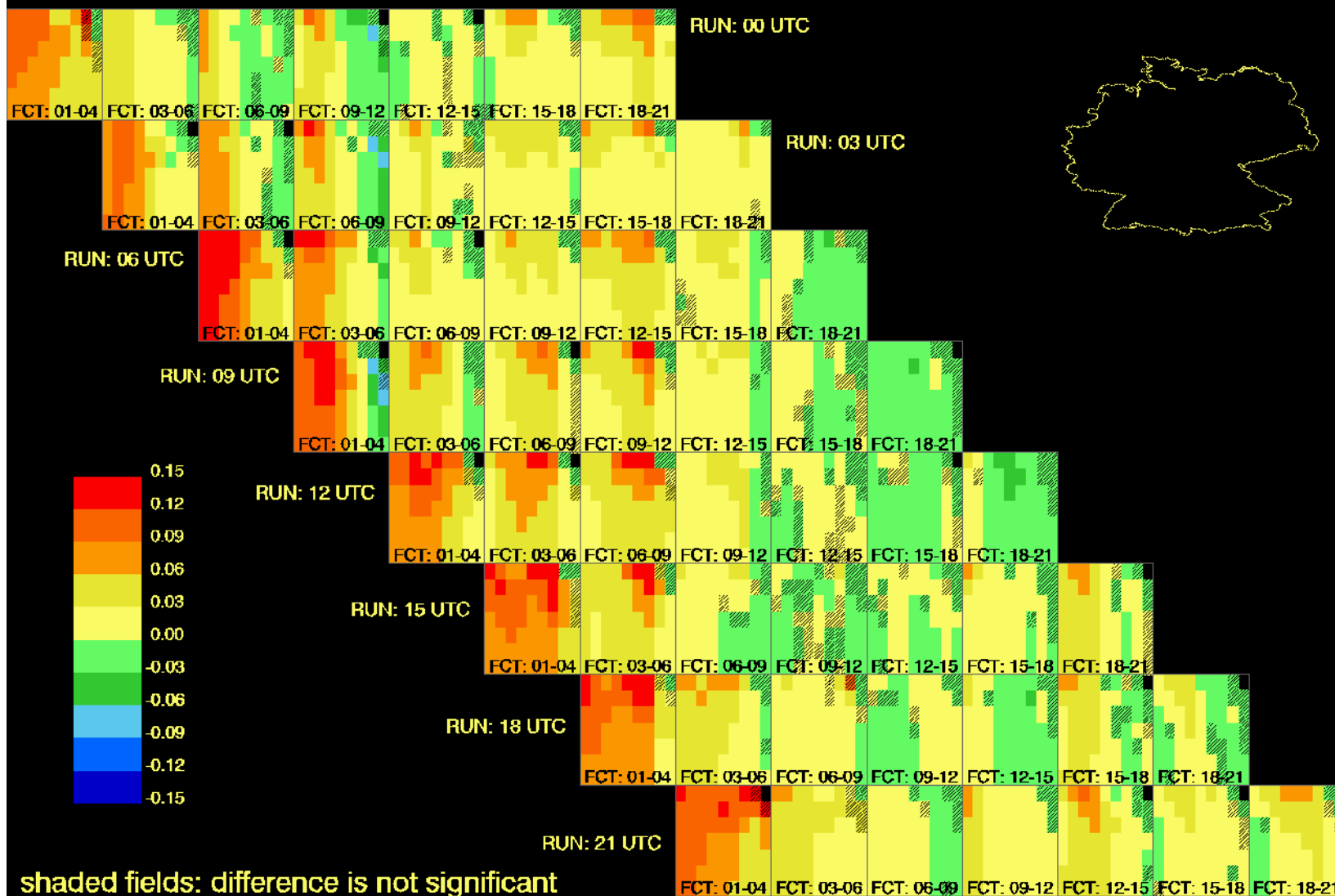


CV for T2m depending on observed wind speed (Summer 2013)



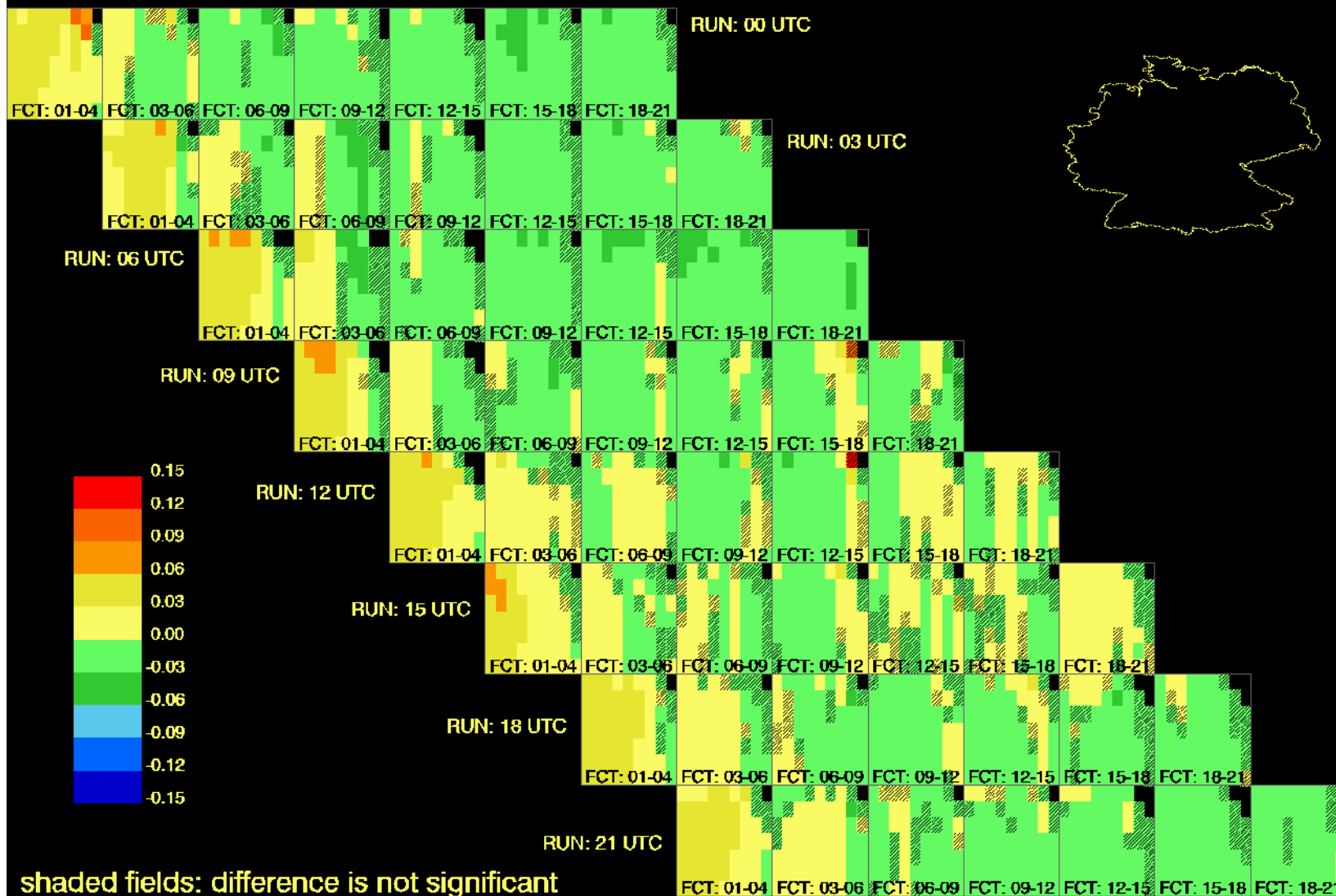
Fuzzy verification: CDE against CEU (Summer 2013)

Differences between CDE and CEU for score ETS Upscaling, Period: 01.06.2013 - 31.08.2013

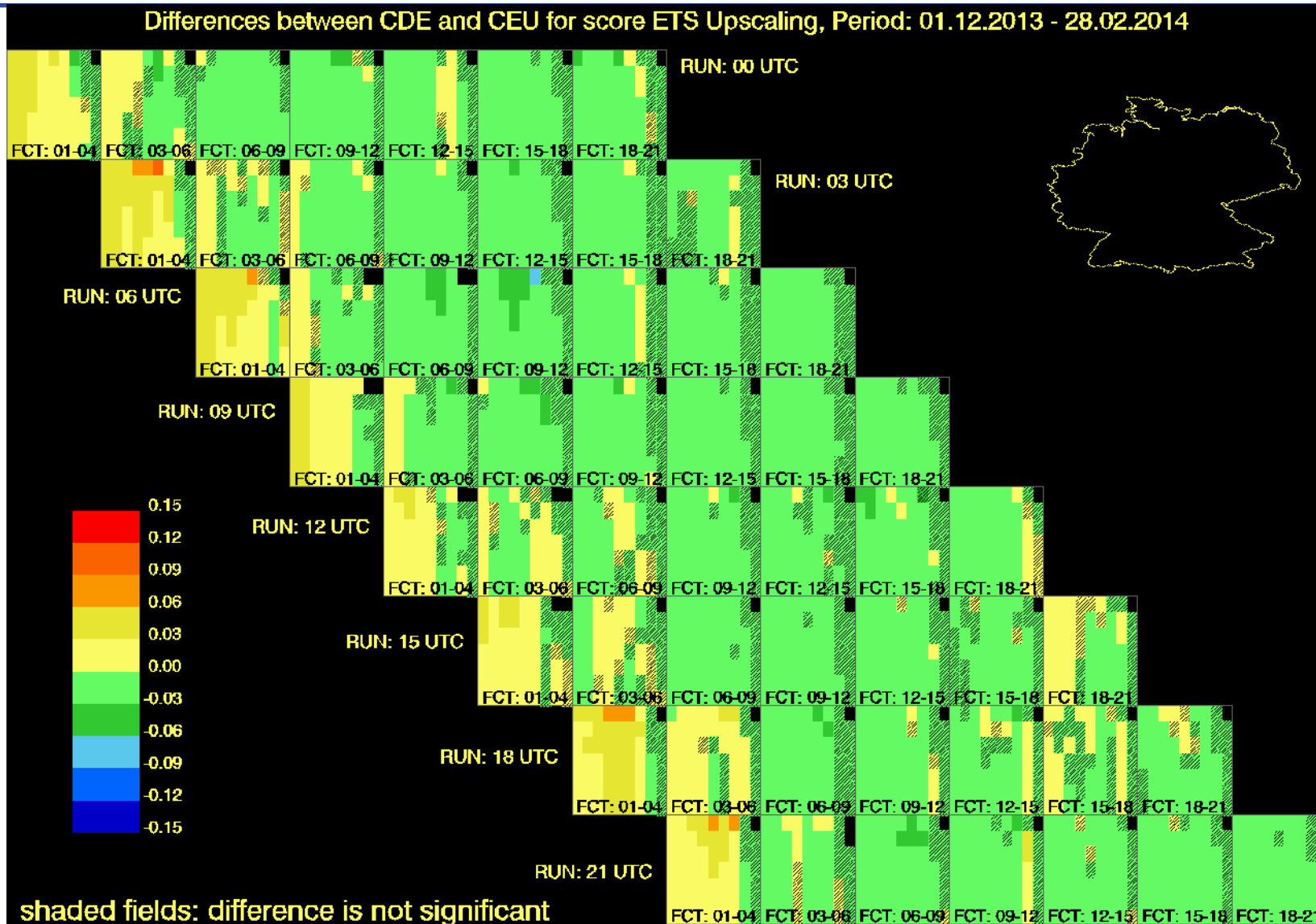


Fuzzy verification: CDE against CEU (Autumn 2013)

Differences between CDE and CEU for score ETS Upscaling, Period: 01.09.2013 - 30.11.2013

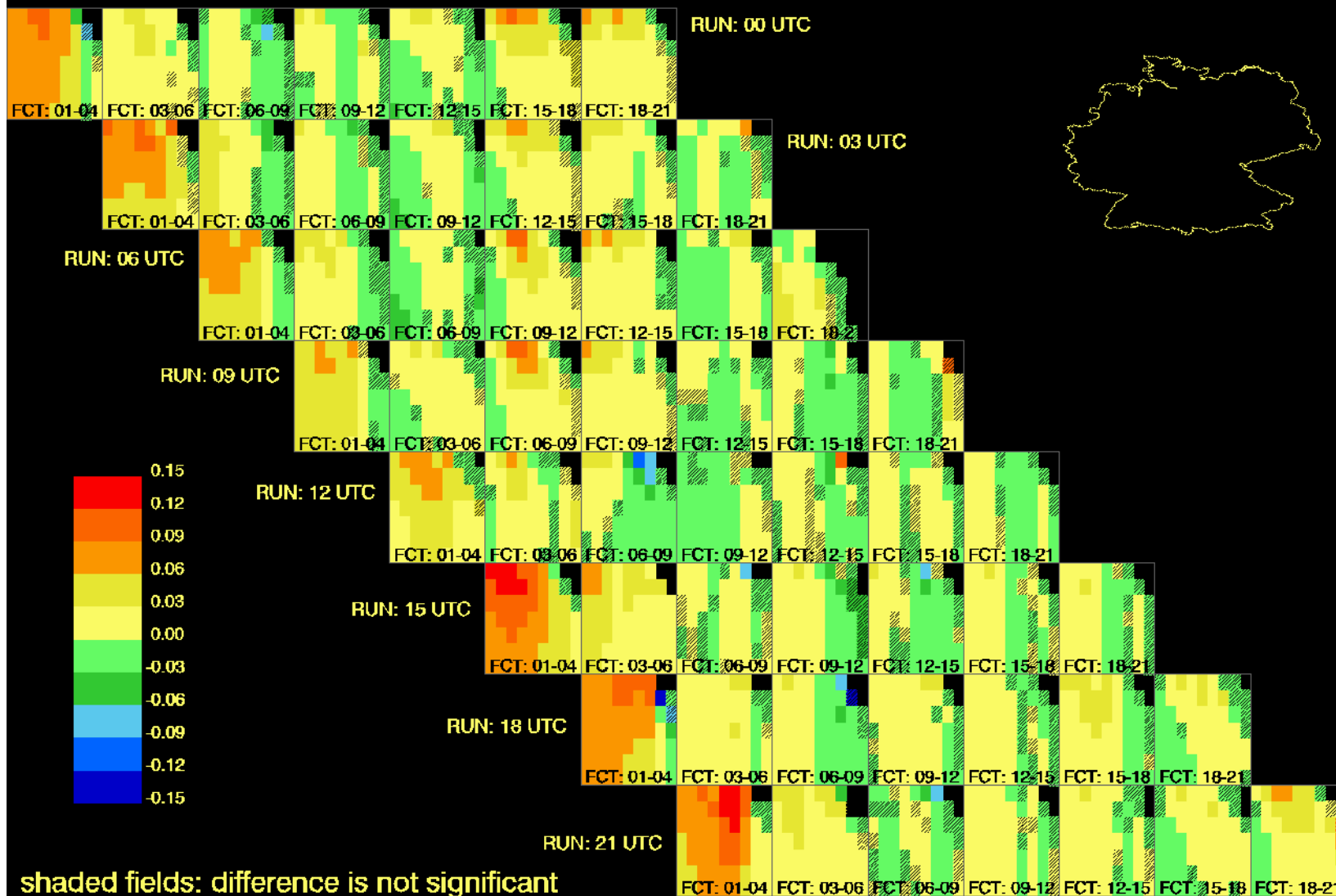


Fuzzy verification: CDE against CEU (Winter 2013/2014)

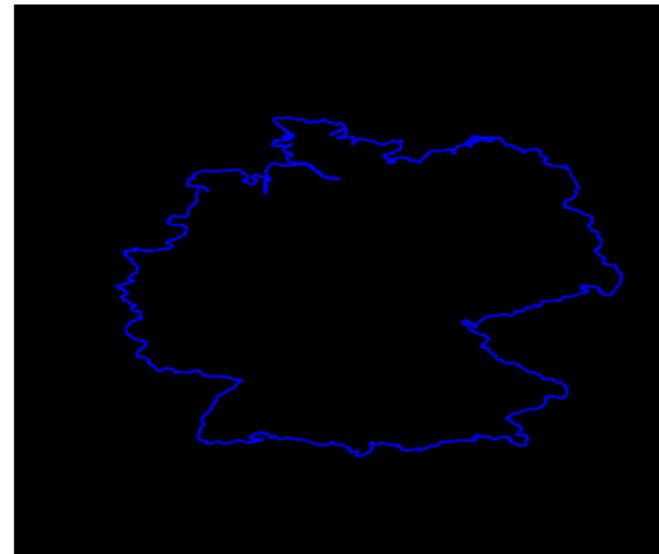
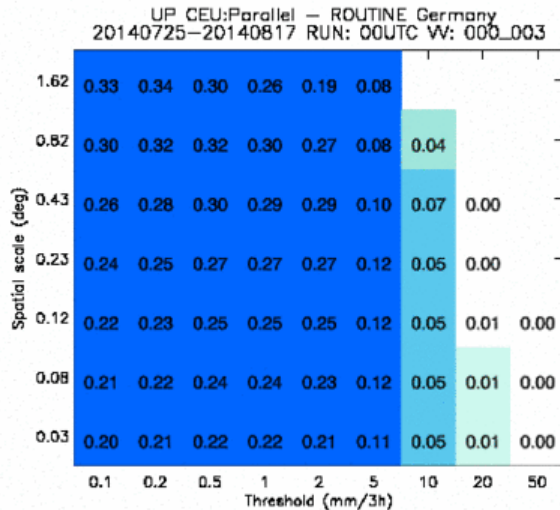
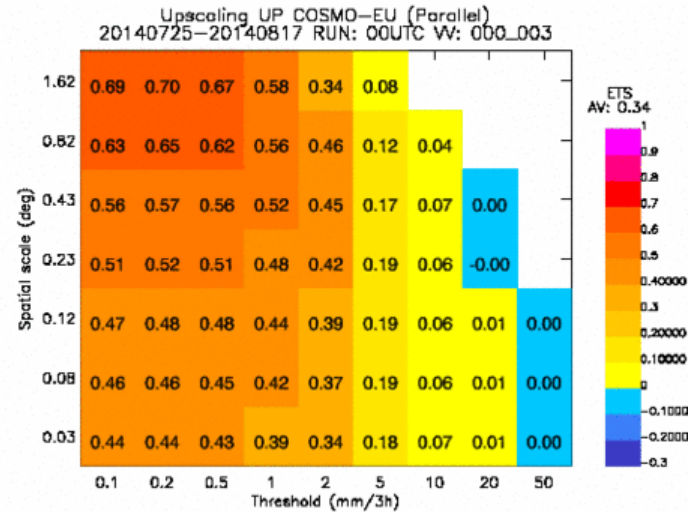
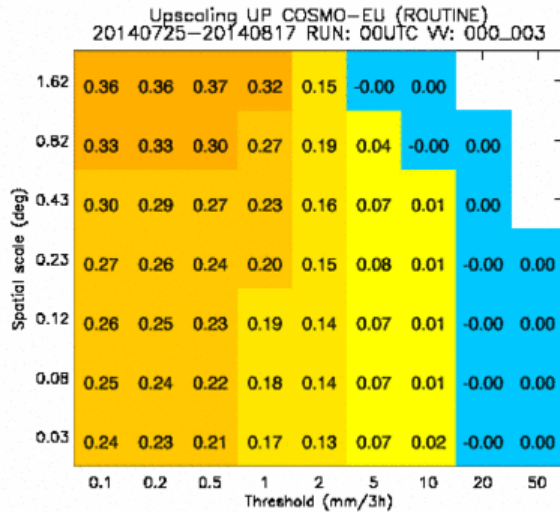


Fuzzy verification: CDE against CEU (Spring 2014)

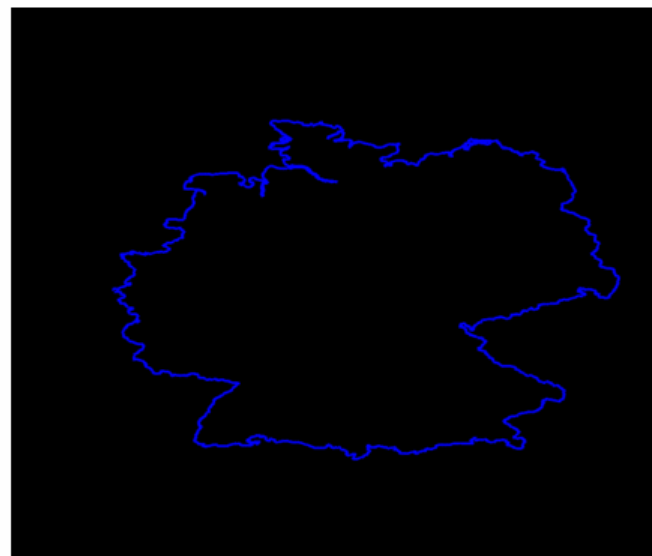
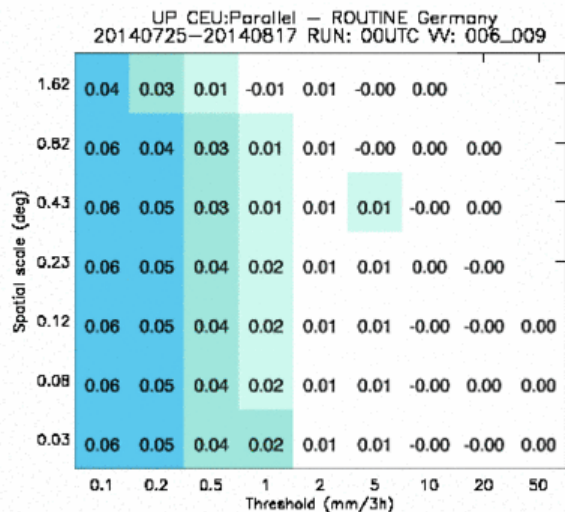
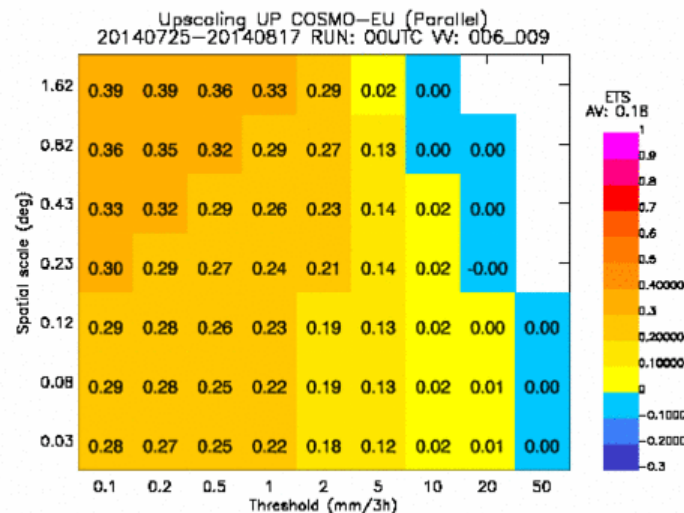
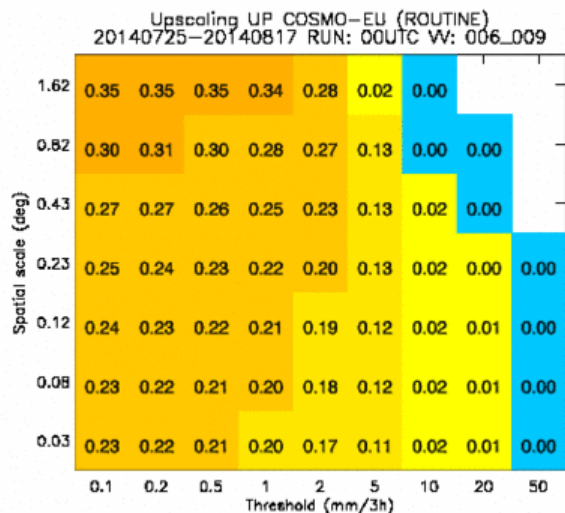
Differences between CDE and CEU for score ETS Upscaling, Period: 01.03.2014 - 31.05.2014



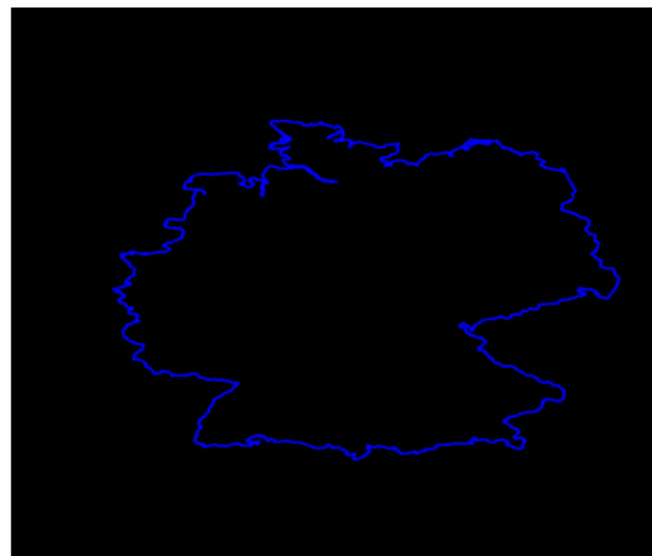
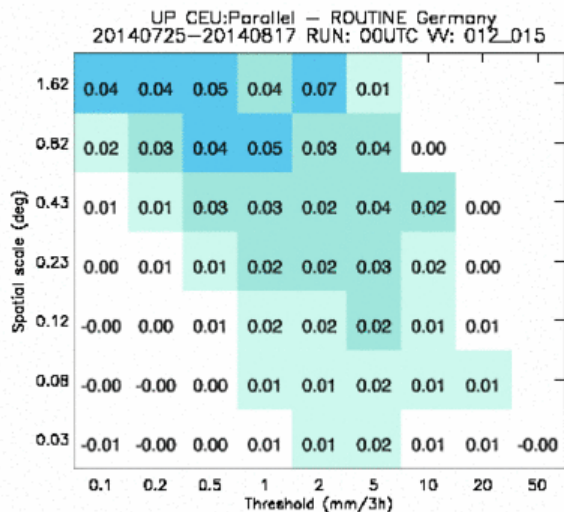
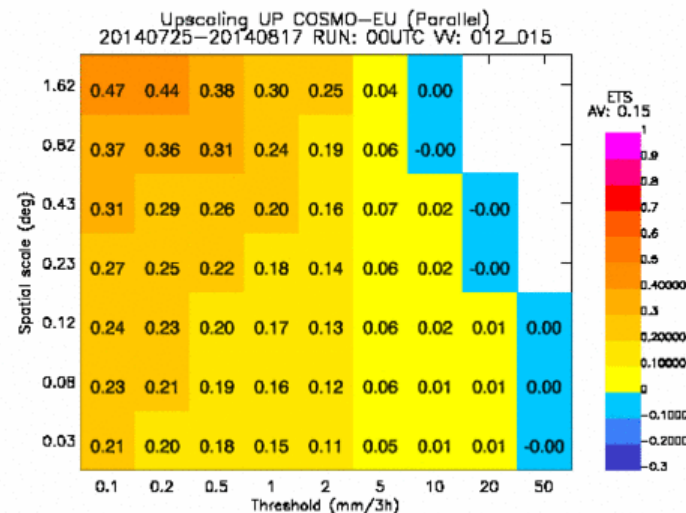
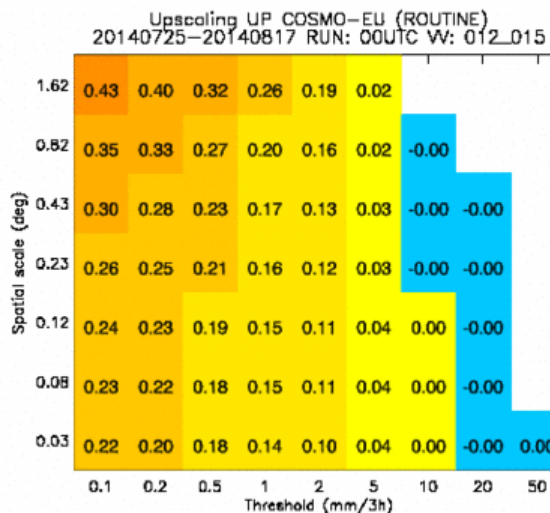
Fuzzy verification: CEU(with OPERA data) against CEU (operational) (vv=00-03)



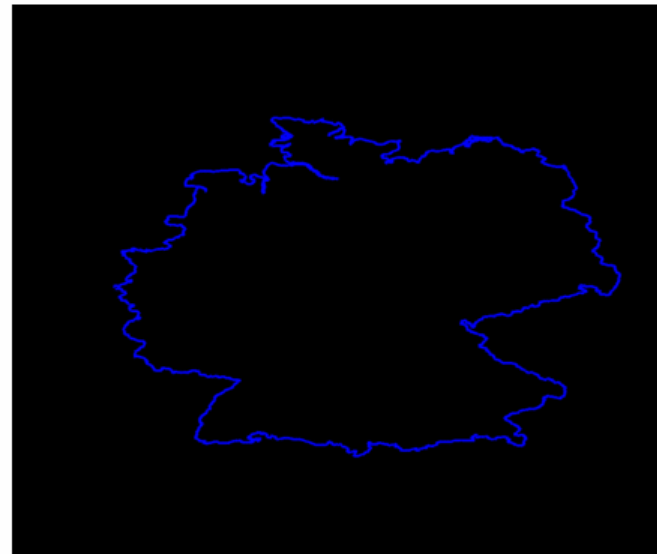
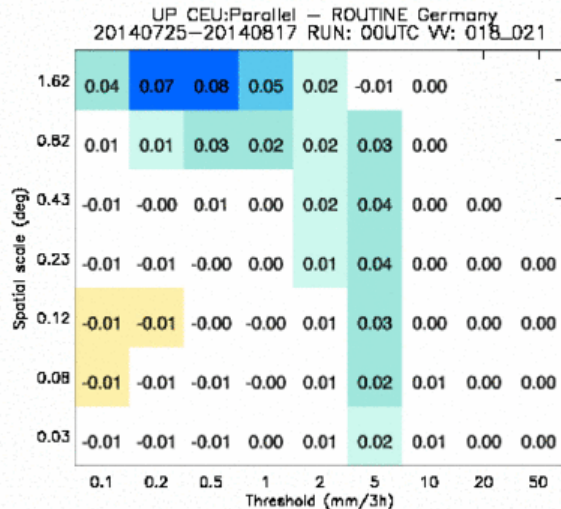
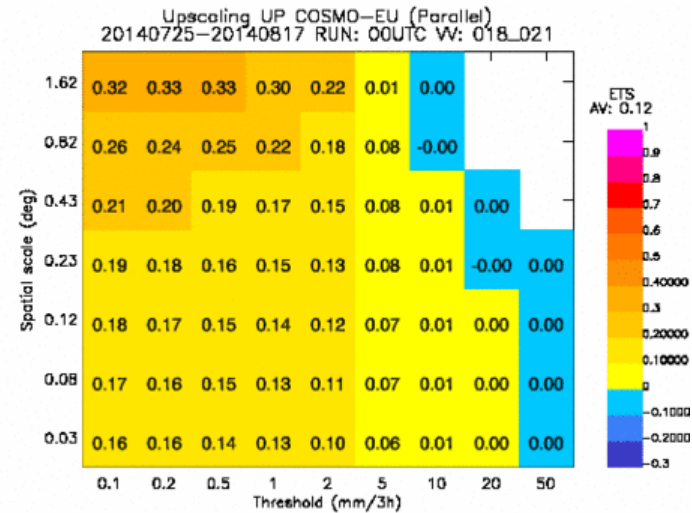
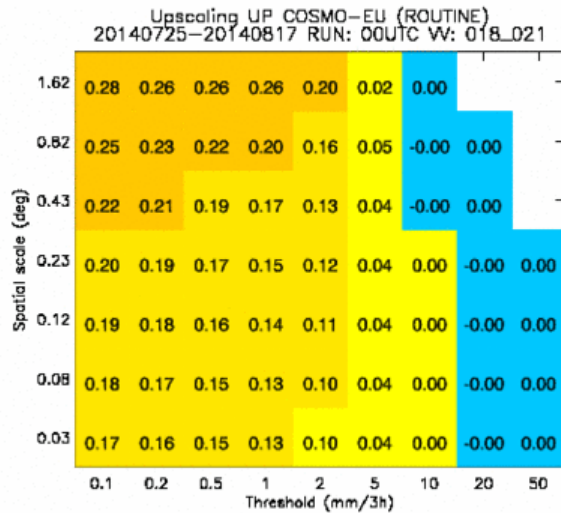
Fuzzy verification: CEU(with OPERA data) against CEU (operational) (vv=06-09)



Fuzzy verification: CEU(with OPERA data) against CEU (operational) (vv=12-15)

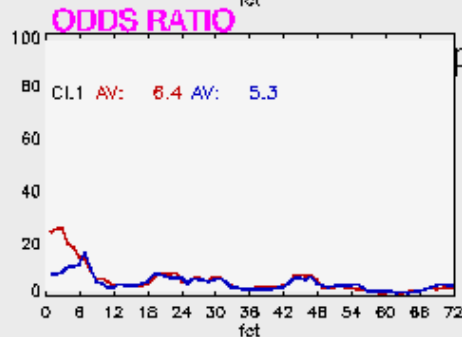
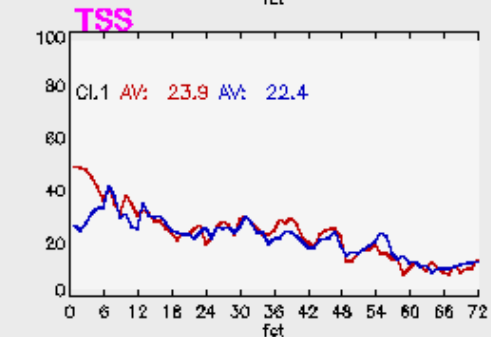
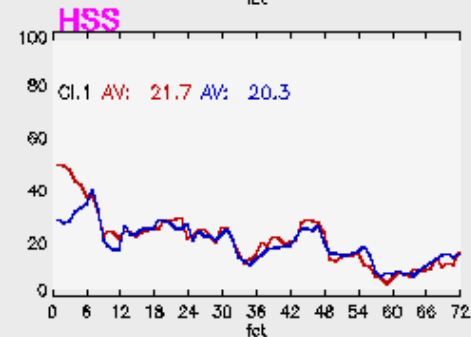
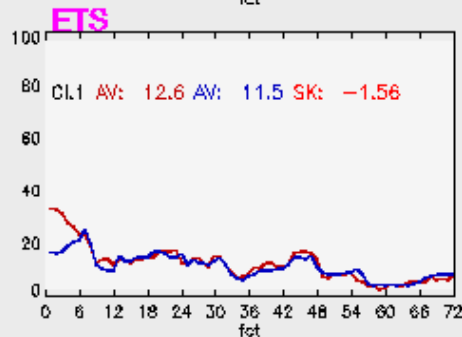
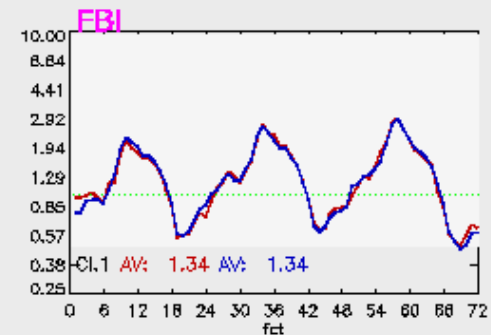
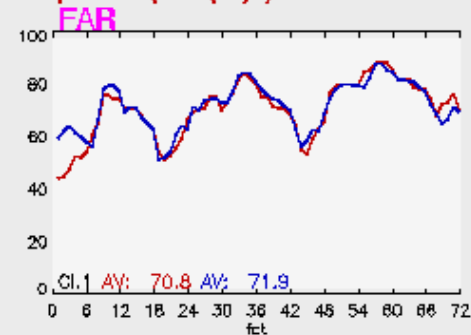
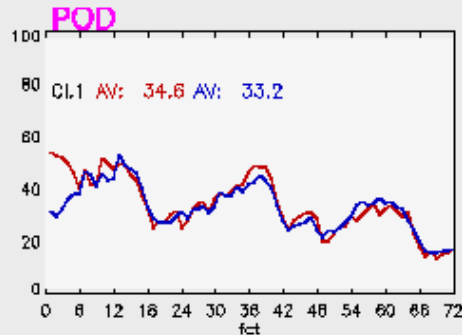


Fuzzy verification: CEU(with OPERA data) against CEU (operational) (vv=18-21)



Standardverification: CEU(with OPERA data) against CEU (operational) (vv=0-72, region: Germany)

Results of verification of forecasts for local weather elements at surface stations
Element: **Precipitation (mm (1h)⁻¹)** All stations



precipitation above 0.1 mm (1h)⁻¹

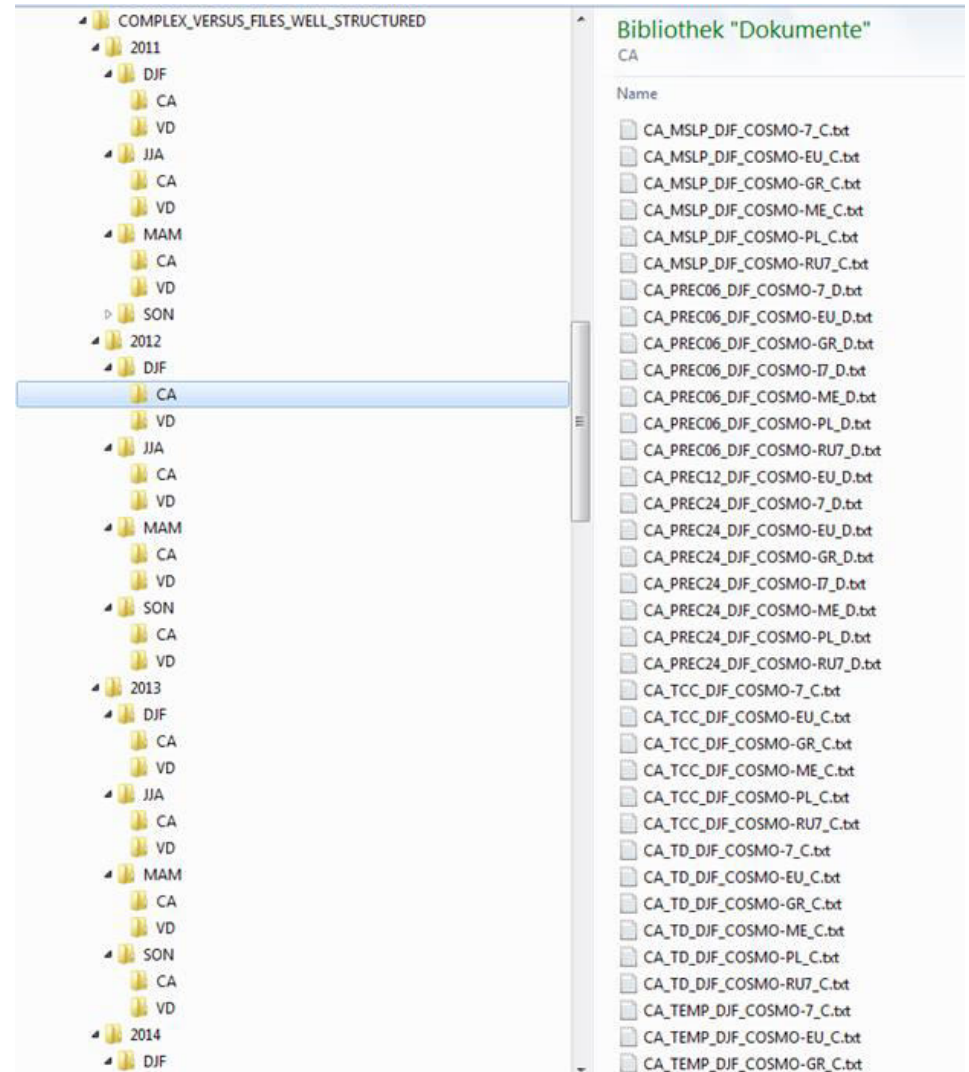
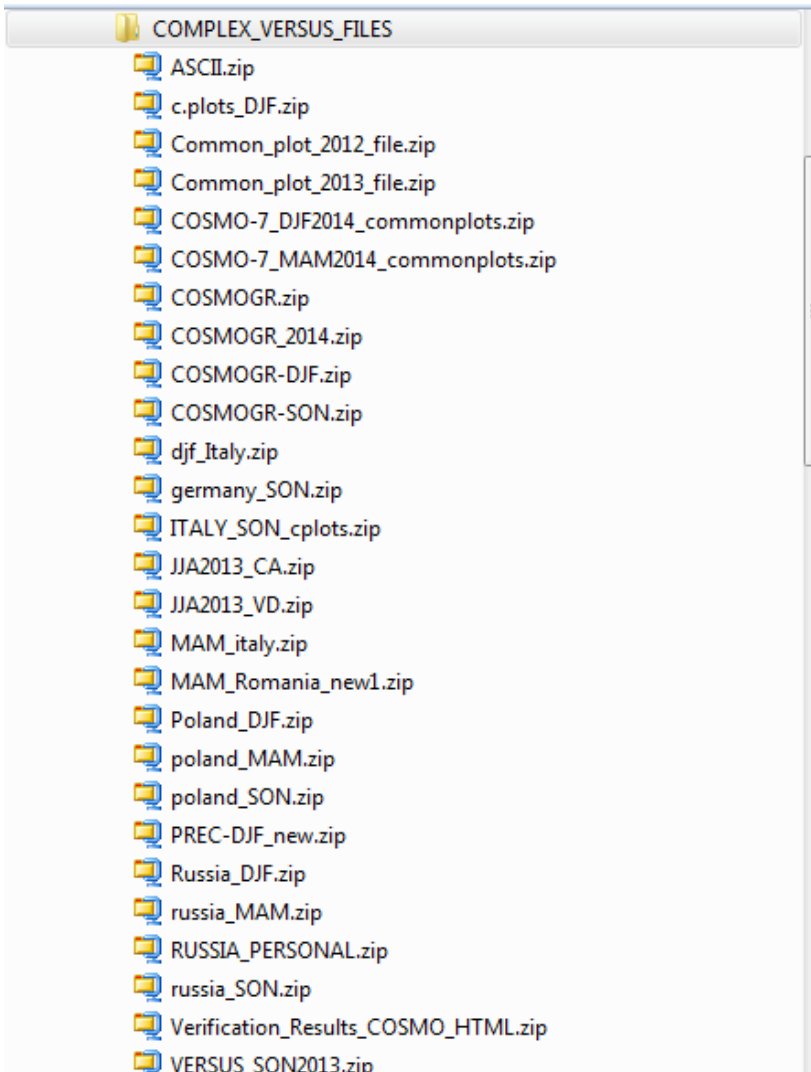
LM2MO: 25.07.2014 00 UTC – 20.08.2014 00 UTC (exp. run LME_p; LHN with OPERA-data)

lm2mo: 25.07.2014 00 UTC – 20.08.2014 00 UTC (ope. run LON: 5.5 – 15.5 LAT: 47. – 56.: nearest gridpoint)

Plottime: 23.08.2014 08:35:18 MESZ ● led02



From zip.file to .txt-folder

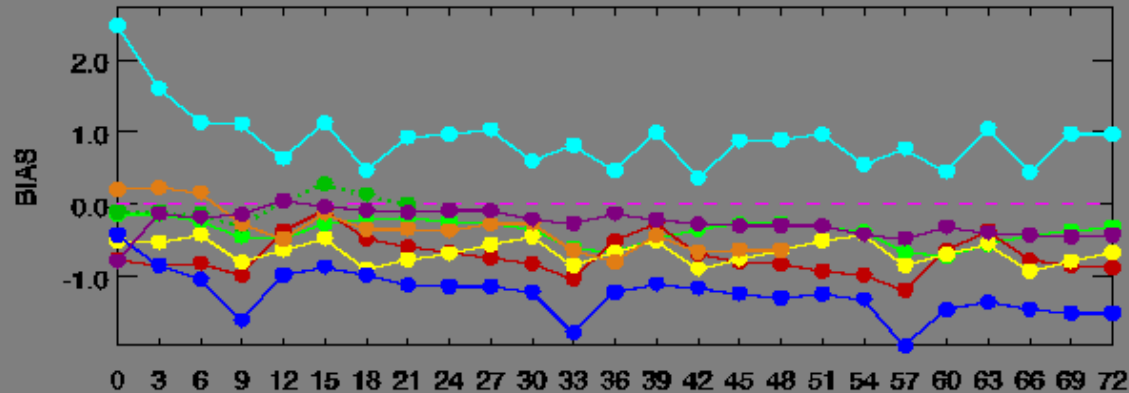


From txt-file to txt-file

```
get_real_file_name_of_COMPLEX_VERSUS_FILES (C:\Users\udamrath\Documents\Daten\COMPLEX_VERSUS_FILES_WELL_STRUCTURED) - GVIM
Datei Editieren Werkzeuge Syntax Puffer Ansicht Hilfe
[Icons] ? ?
if [ -f $file ];then
  line=$(head -3 $file|tail -1)
  firs_value=$(echo $line|awk '{print $(NF-2)}')
  last_value=$(echo $line|awk '{print $NF}')
  star_year=$(echo $firs_value|tr '-' ' '|awk '{print $1}')
  star_mont=$(echo $firs_value|tr '-' ' '|awk '{print $2}')
  last_year=$(echo $last_value|tr '-' ' '|awk '{print $1}')
  last_mont=$(echo $last_value|tr '-' ' '|awk '{print $2}')
  period=unk
  typ=UD
  if [ $(left $(basename $file) 3) = 'CA_' ];then
    typ=CA # Define the common domain as directory
  fi
  if [ $star_mont -eq 03 -a $last_mont -eq 05 ];then
    period=MAM # Define MAM with start month 03 and end month 05
  fi
  if [ $star_mont -eq 06 -a $last_mont -eq 08 ];then
    period=JJA # Define JJA ...
  fi
  if [ $star_mont -eq 09 -a $last_mont -eq 11 ];then
    period=SON # Define SON ...
  fi
  if [ $star_mont -eq 12 -a $last_mont -eq 02 ];then
    period=DJF # Define DJF ...
  fi
  file_name=/uwork1/for3dam/COMPLEX_VERSUS_FILES_WELL_STRUCTURED/${star_year}/${period}/${typ}/${basename $file}
  nat_list="EU DE 7 ME 17 GR PL RU7 RO"
  for nat in $nat_list;do
    file_name=$(echo $file_name|sed s:COSSH0${nat}:COSSH0-${nat}:g) # Define model as COSMO-model
    file_name=$(echo $file_name|sed s:COSSH0_${nat}:COSSH0-${nat}:g)
  done
  file_name=$(echo $file_name|sed s:'.txt.txt':'.txt':g) # omit strange extensions
  file_name=$(echo $file_name|sed s:'PREC.':'PREC':g) # set PREC_ as PREC
  file_name=$(echo $file_name|sed s:'_ALL':':':g) # set _ALL as nothing to coincide with old names
  file_name=$(echo $file_name|sed s:'_new':':':g) # omit strange strings
  if [ $(index $file_name 'PREC') -gt 0 ];then
    file_name=$(echo $file_name|sed s:'C.txt':'D.txt':g) # get real extension for precipitation
  fi
  echo L3: $line
  echo ST: $star_year $star_mont
  echo FI: $last_year $last_mont
  echo FU: $firs_value
  echo LV: $last_value
  echo PE: $period
  echo TV: $typ
  echo 0 : $file
  echo N : $file_name
  echo $file_name $star_year $period > $TMPDIR/real_file
else
  echo NIX
  rc=1
fi
```



Perhaps suspect data (in this case probably COSMO-RO)



C-EU

C-DE

C-7

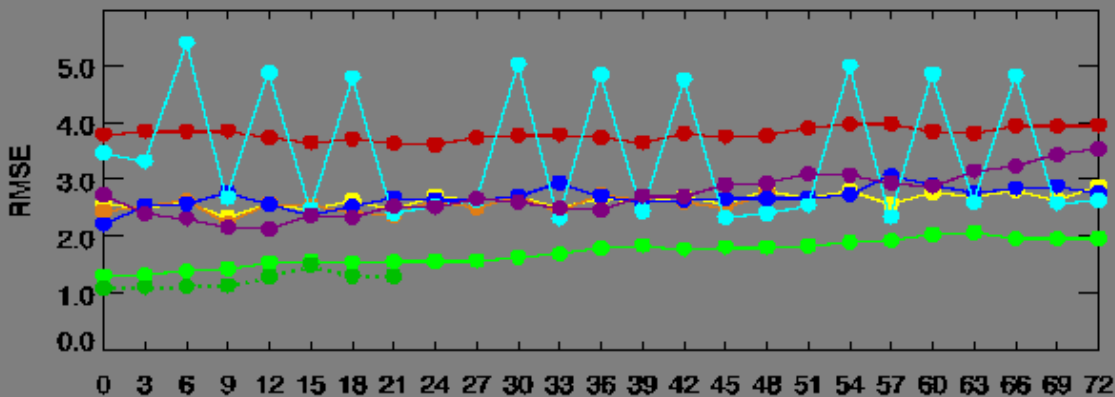
C-ME

C-I7

C-GR

C-RO

C-RU7

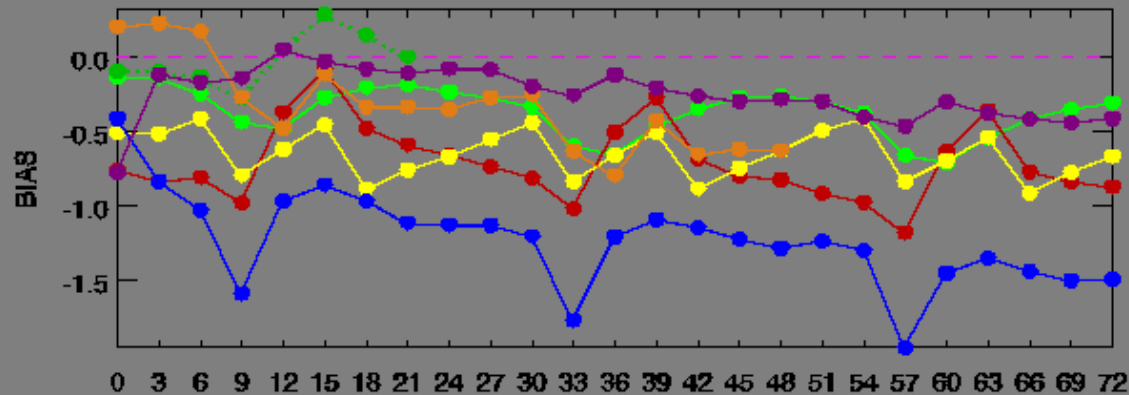


VD DJF 2013: BIAS and RMSE for Dew point temperature 2m [K]

Suspect files (not included into the plots)

2011/DJF/VD/TEMP_DJF_COSMO-RO_C.txt
2011/DJF/VD/TD_DJF_COSMO-RO_C.txt
2012/DJF/CA/CA_MSLP_DJF_COSMO-GR_C.txt
2012/DJF/VD/TD_DJF_COSMO-RO_C.txt
2013/SON/CA/CA_PREC06_SON_COSMO-GR_D.txt
2013/DJF/CA/CA_PREC06_DJF_COSMO-GR_D.txt
2013/MAM/CA/CA_MSLP_MAM_COSMO-PL_C.txt
2013/JJA/CA/CA_WS_JJA_COSMO-GR_C.txt
2013/DJF/CA/CA_WS_DJF_COSMO-PL_C.txt
2013/DJF/VD/TD_DJF_COSMO-RO_C.txt
2014/MAM/VD/TD_MAM_COSMO-PL_C.txt
2014/MAM/CA/CA_WS_MAM_COSMO-RU7_C.tx

Perhaps suspect data (in this case without COSMO-RO, but COSMO-I7 ???)



C-EU

C-DE

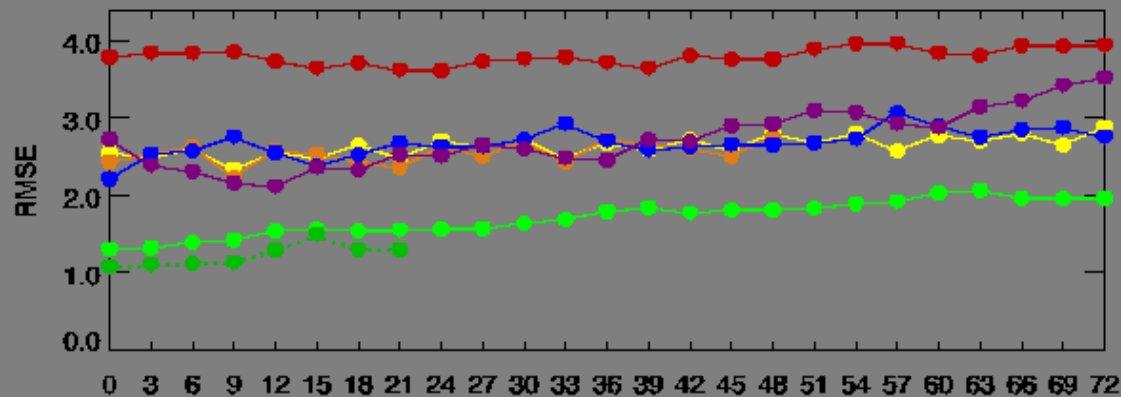
C-7

C-ME

C-I7

C-GR

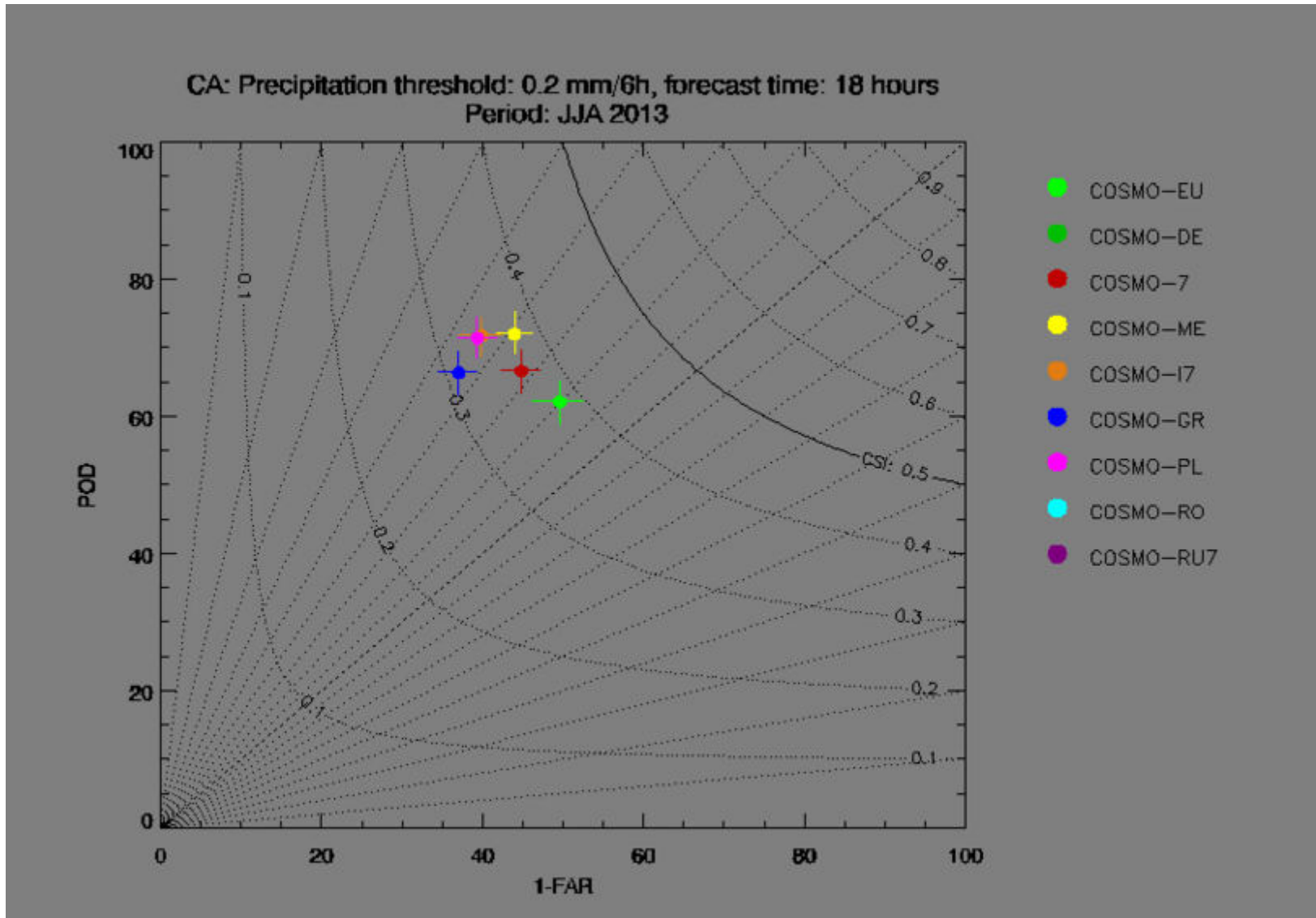
C-RU7



VD DJF 2013: BIAS and RMSE for Dew point temperature 2m [K]

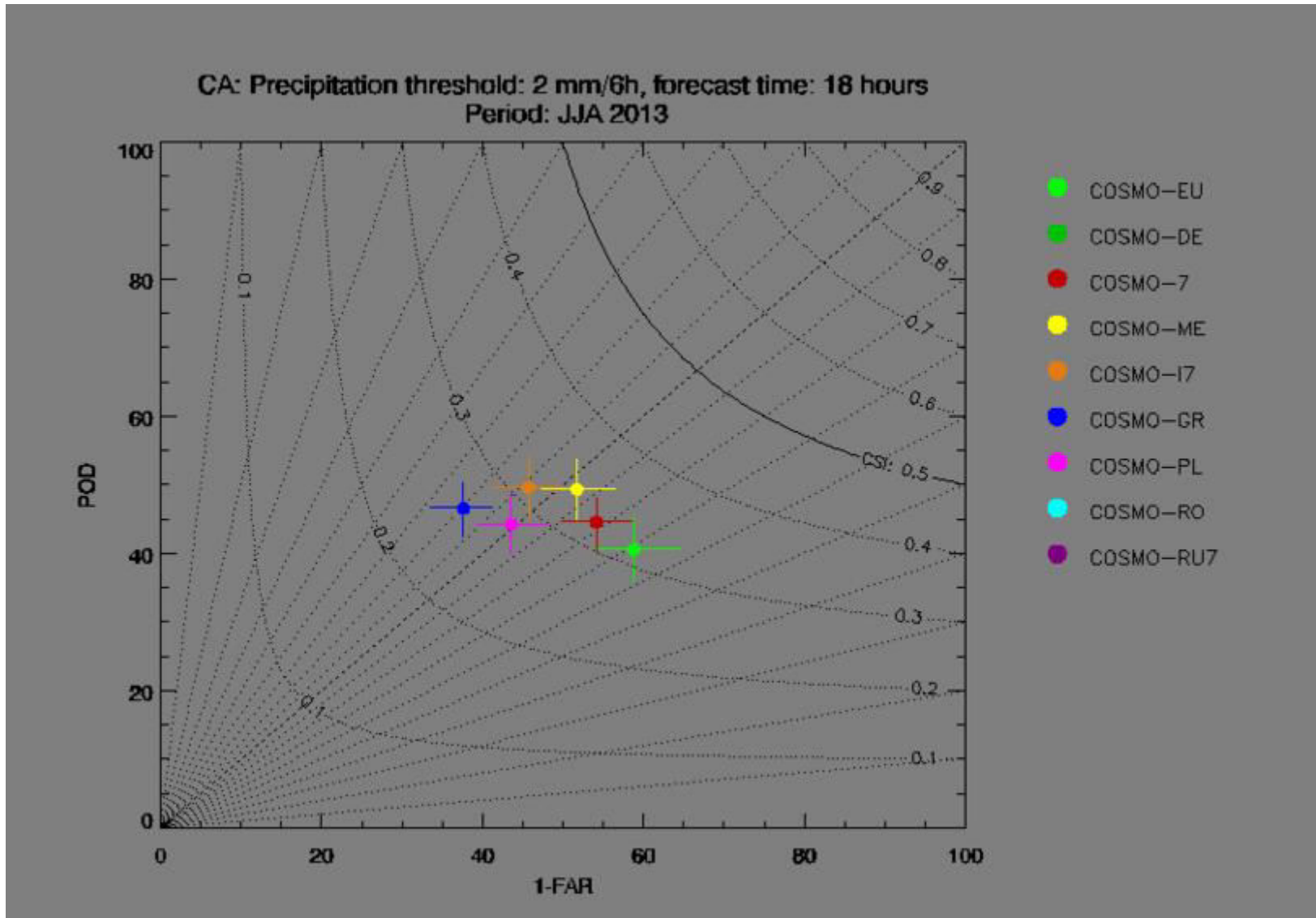
Rearranged performance diagrams

JJA 2013, all models, fct 12-18, PREC > 0.2 mm



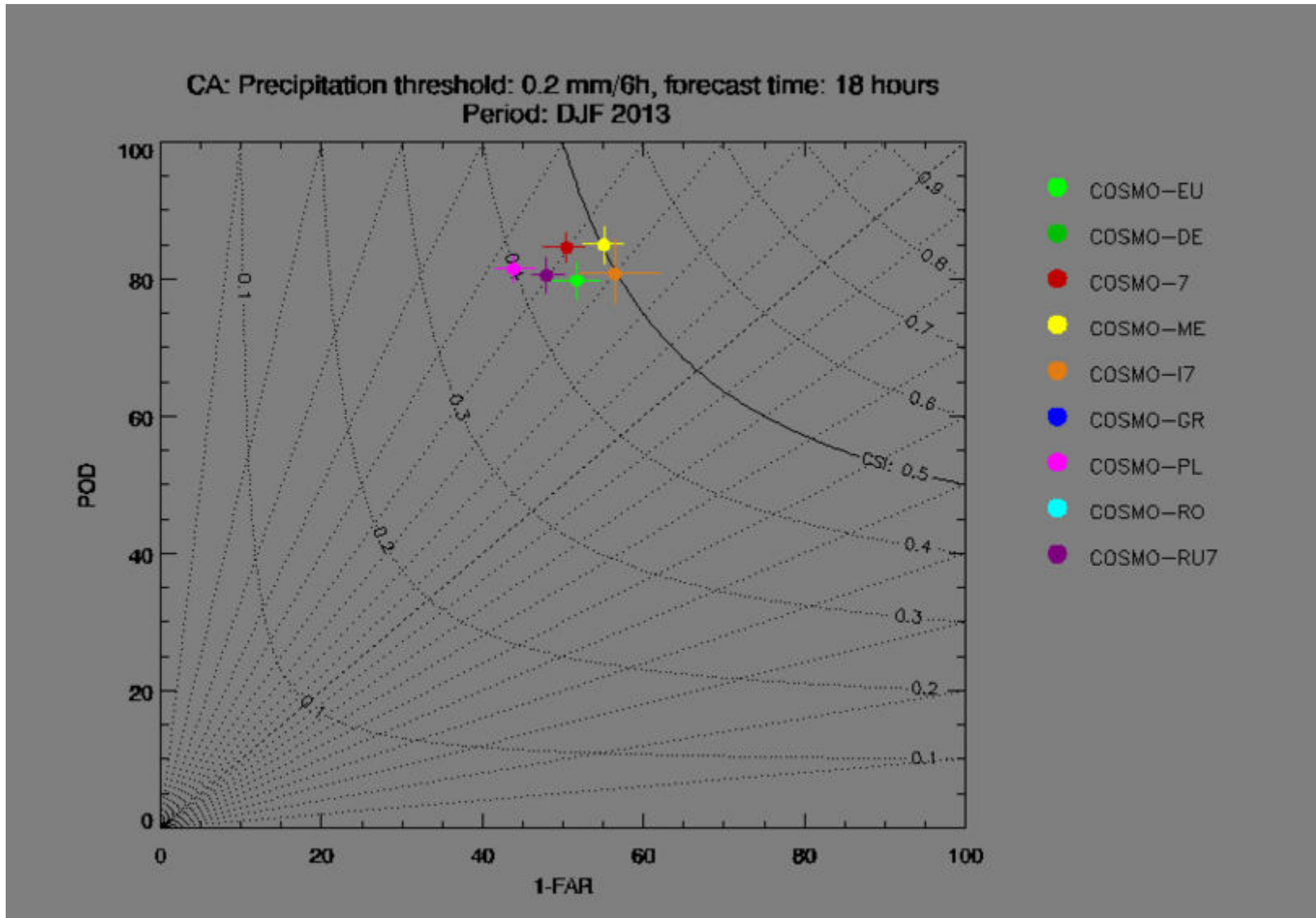
Rearranged performance diagrams

JJA 2013, all models, fct 12-18, PREC > 2 mm



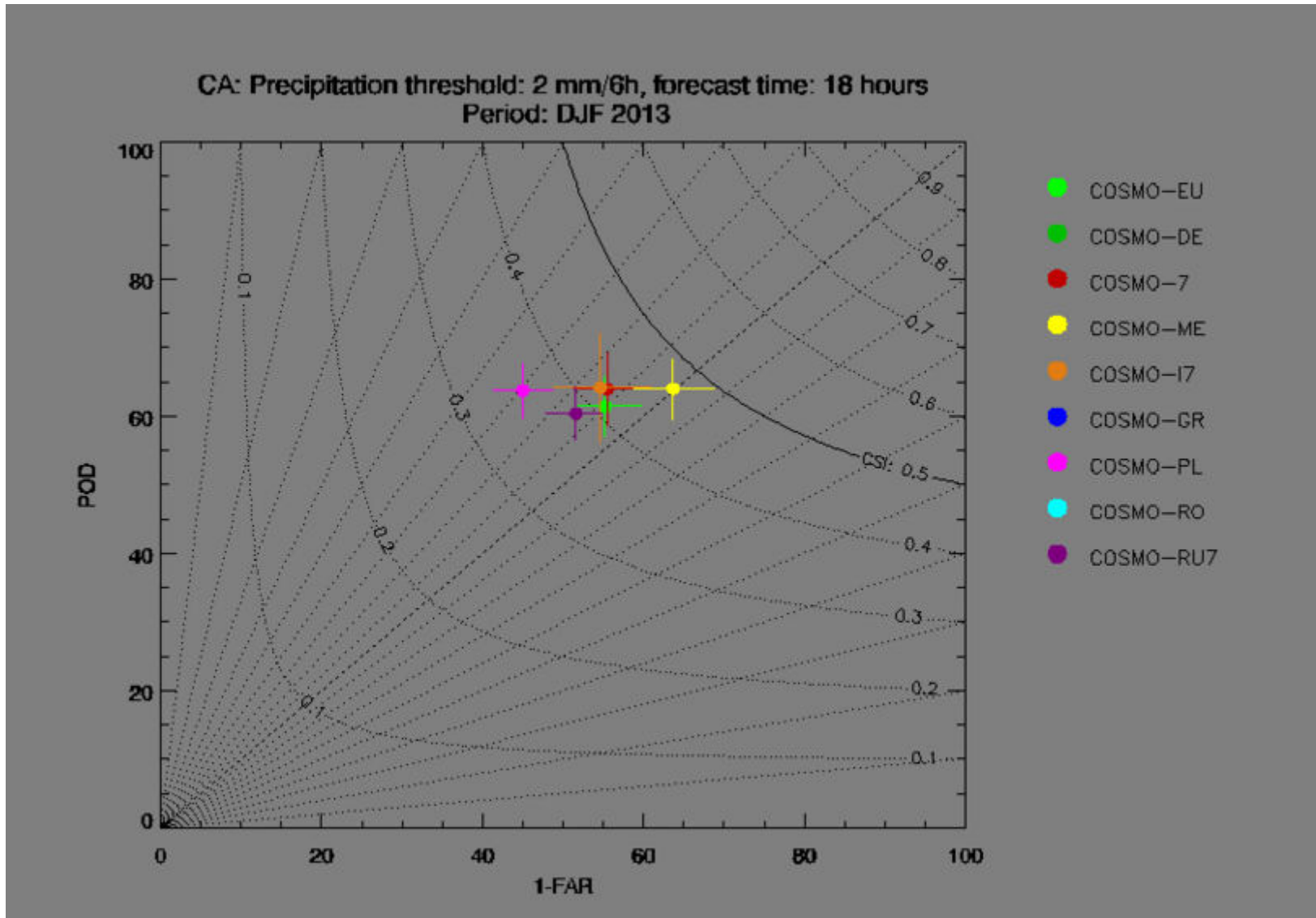
Rearranged performance diagrams

DJF 2013, all models, fct 12-18, PREC > 0.2 mm

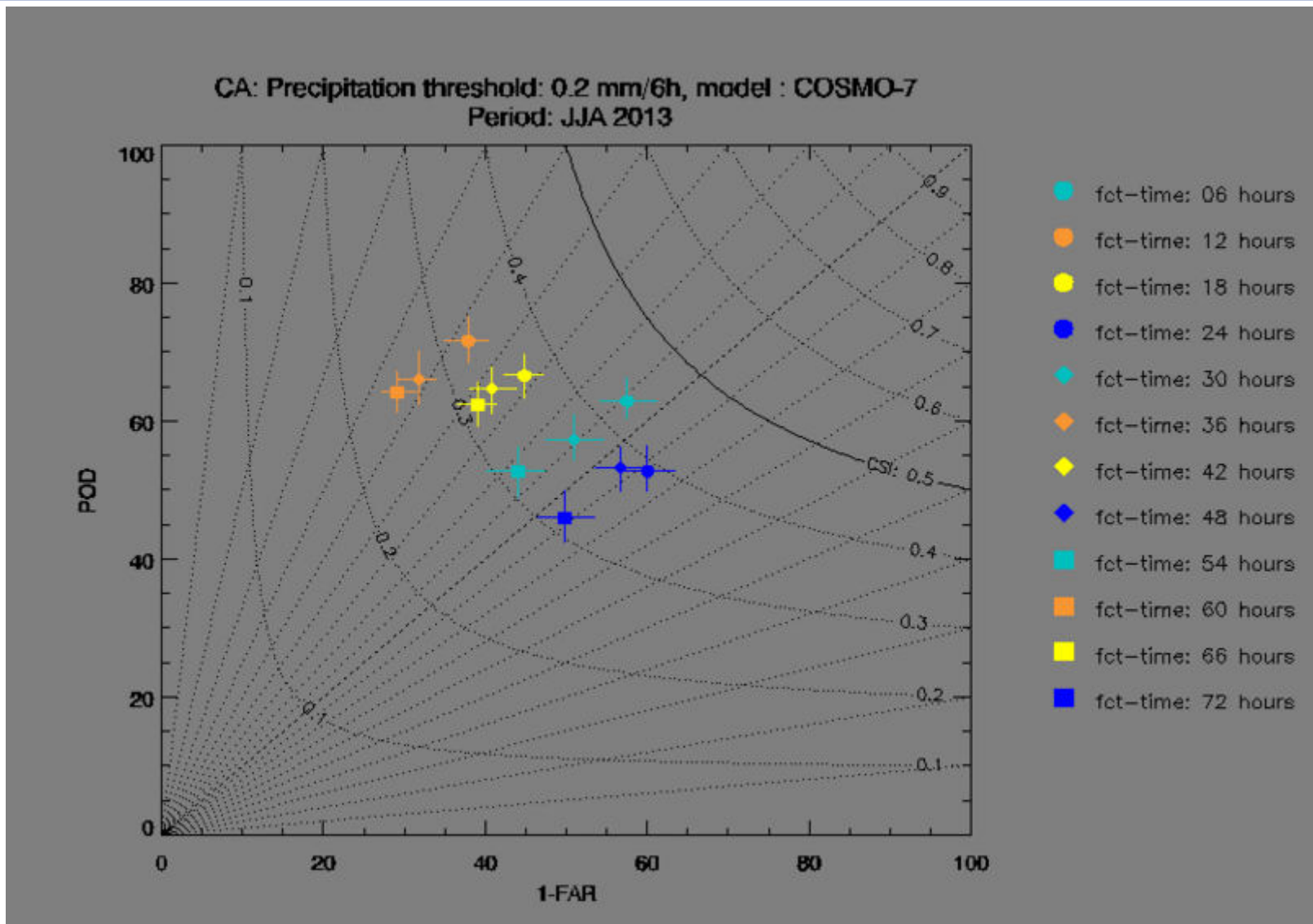


Rearranged performance diagrams

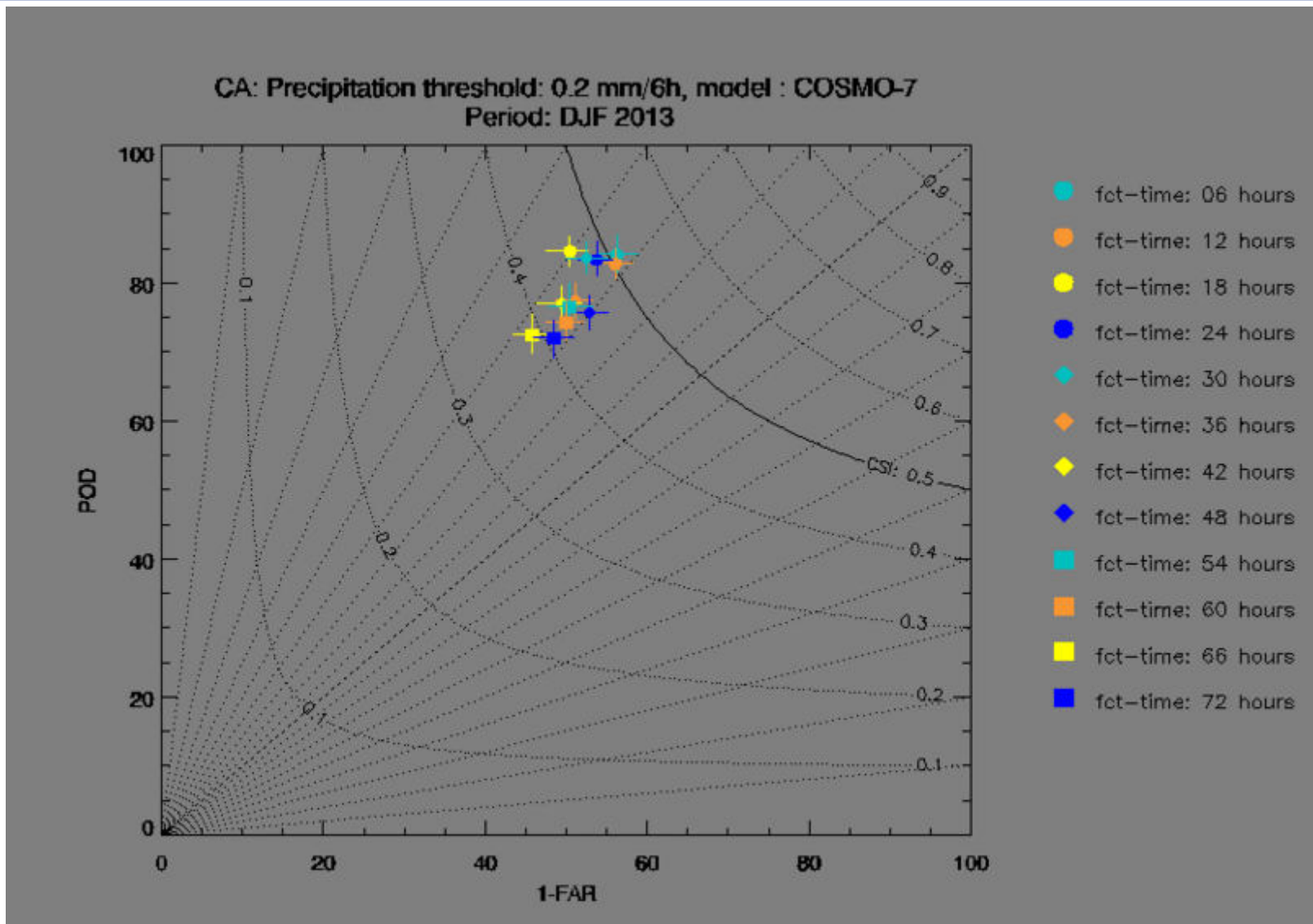
DJF 2013, all models, fct 12-18, PREC > 2 mm



Rearranged performance diagrams JJA 2013, COSMO-7, all forecast times, $PREC > 0.2$ mm



Rearranged performance diagrams DJF 2013, COSMO-7, all forecast times, $PREC > 0.2$ mm



And finally ...