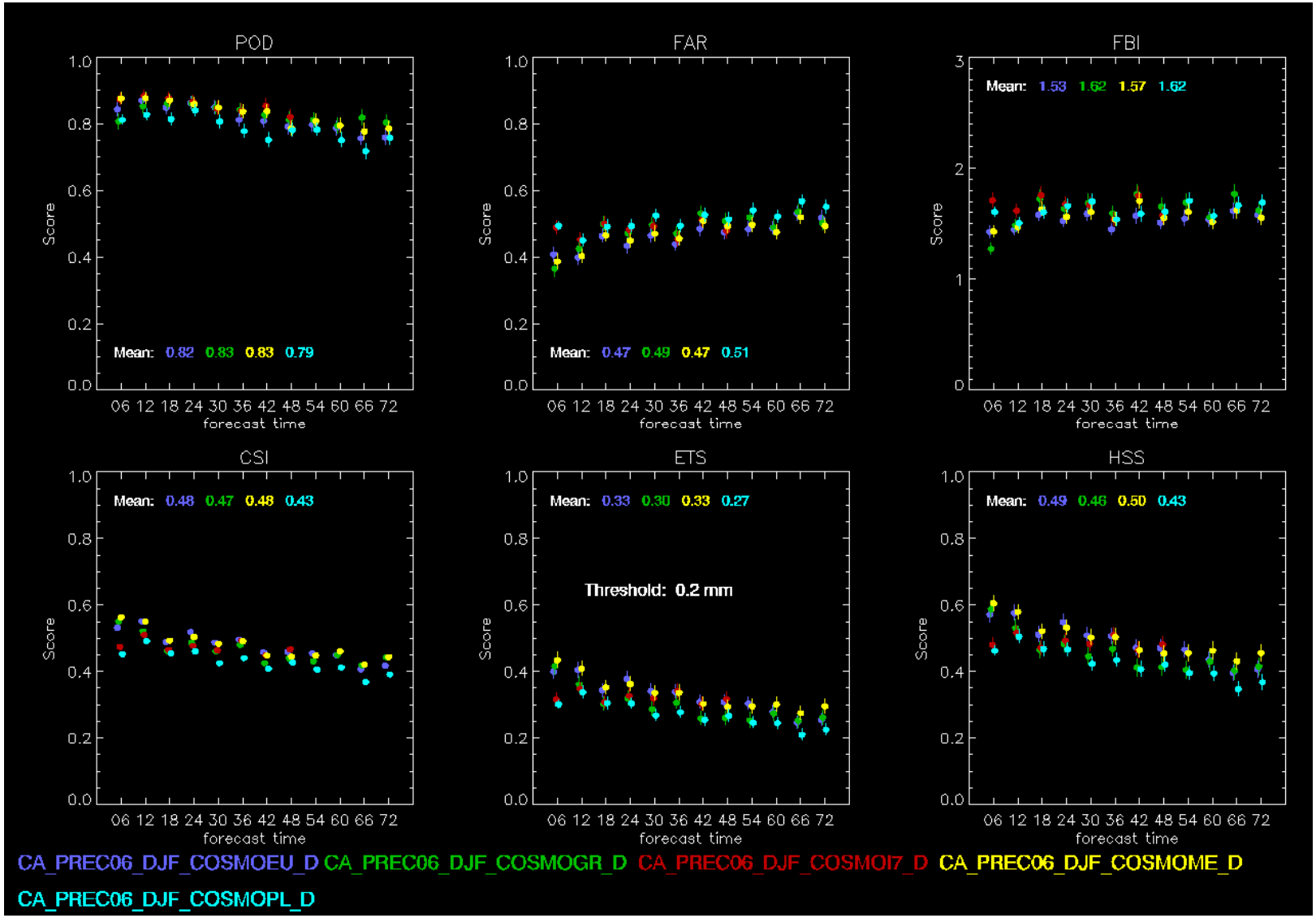
Deutscher Wetterdienst
Wetter und Klima aus einer Hand

About common plots for precipitation

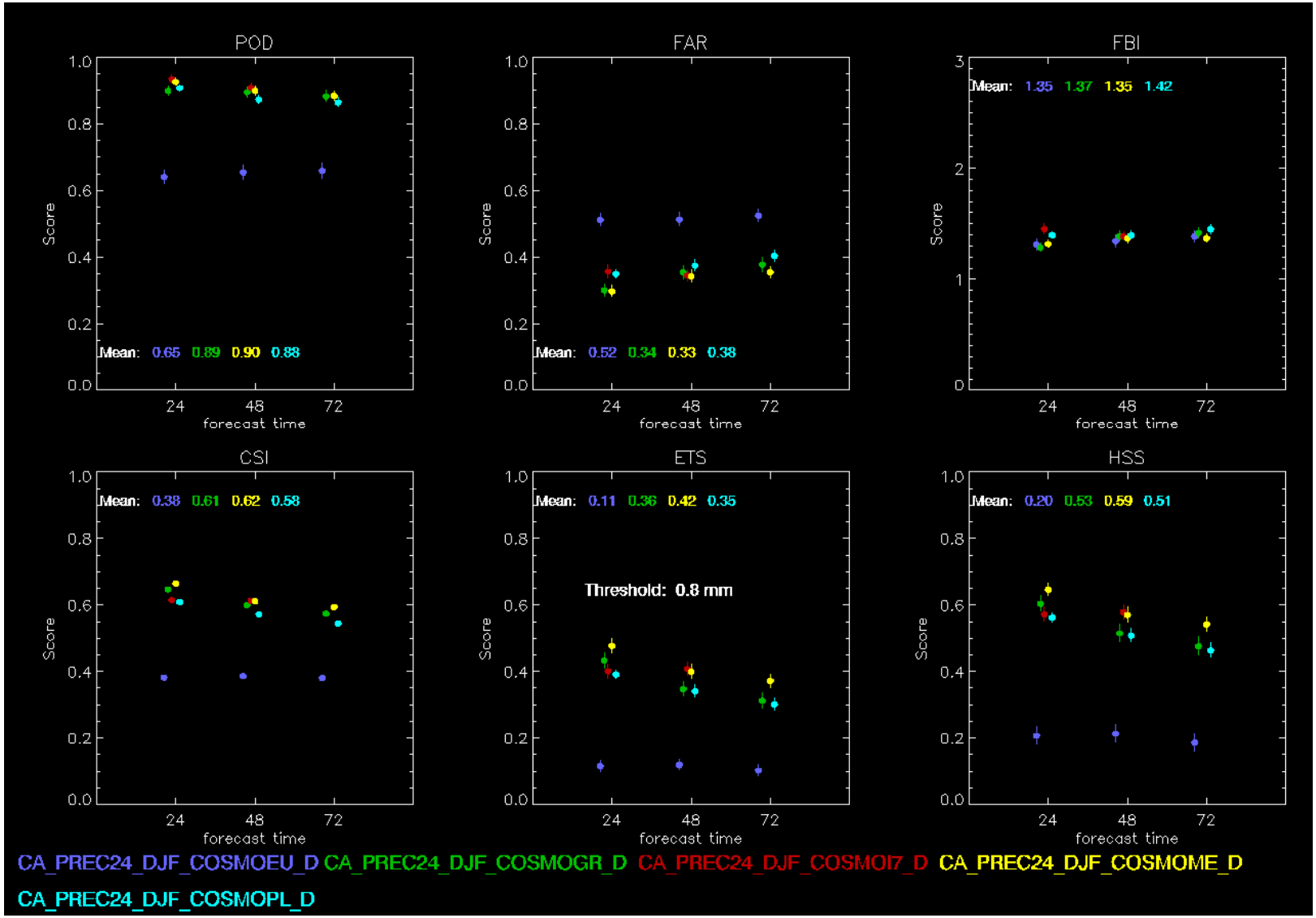
Ulrich Damrath

Common area DJF 2012/2013, threshold 0.2 mm /6h, all centers



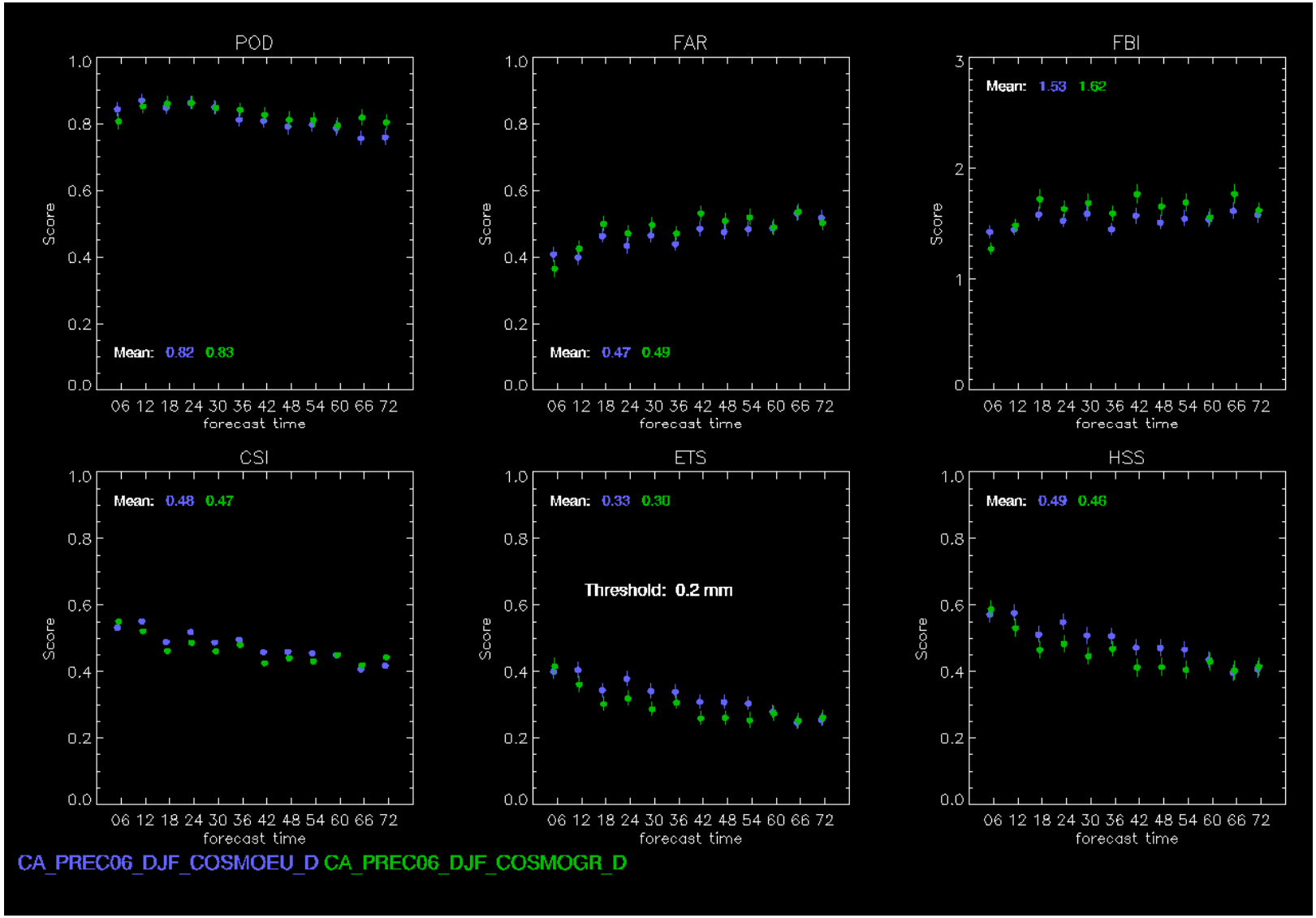
UD: About common plots for precipitation

Common area DJF 2012/2013, threshold 0.8 mm /24h



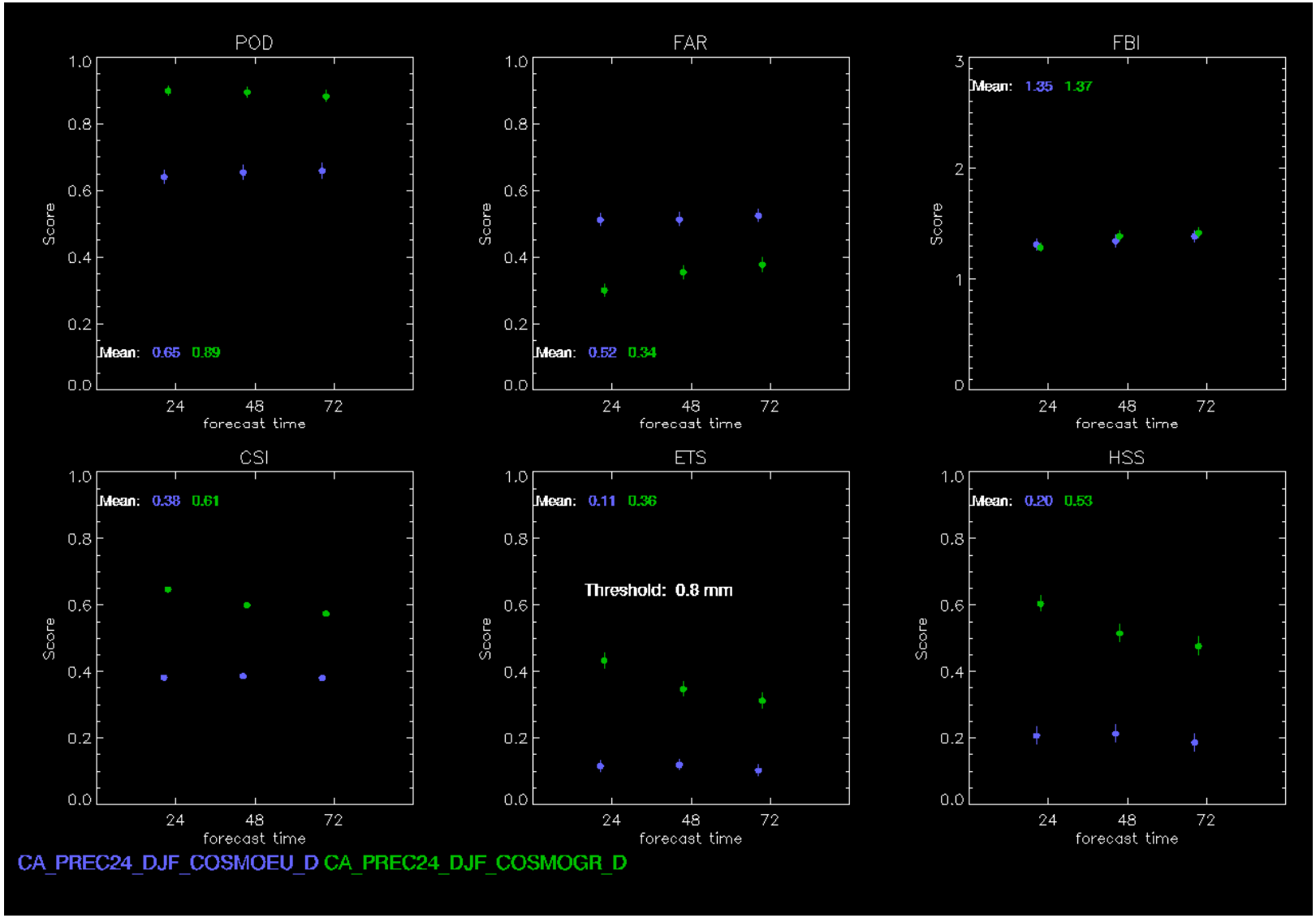
Common area DJF 2012/2013, threshold 0.2 mm /6h, COSMO-GR and COSMO-EU

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

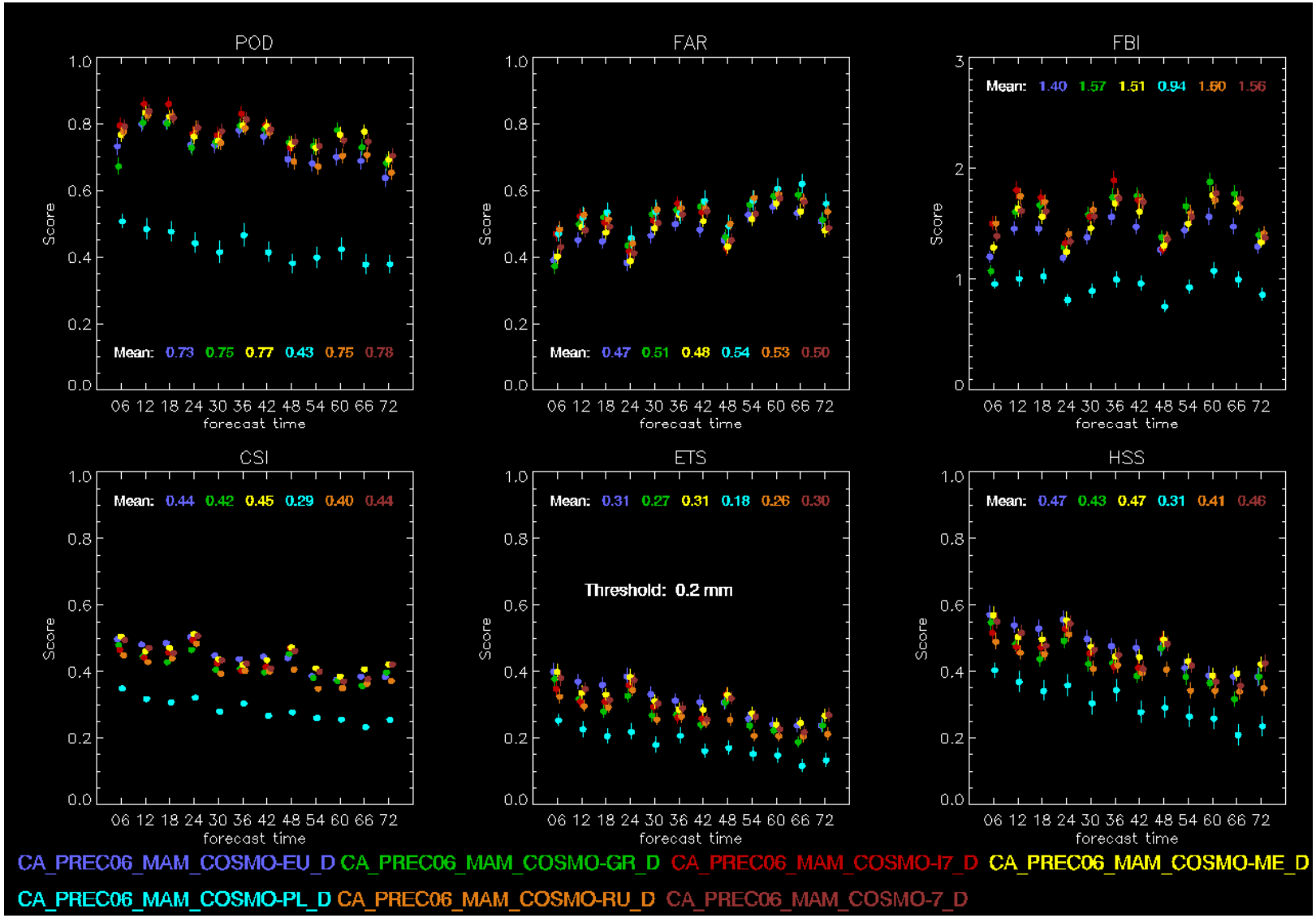


UD: About common plots for precipitation

Common area DJF 2012/2013, threshold 0.8 mm /24h, COSMO-GR and COSMO-EU

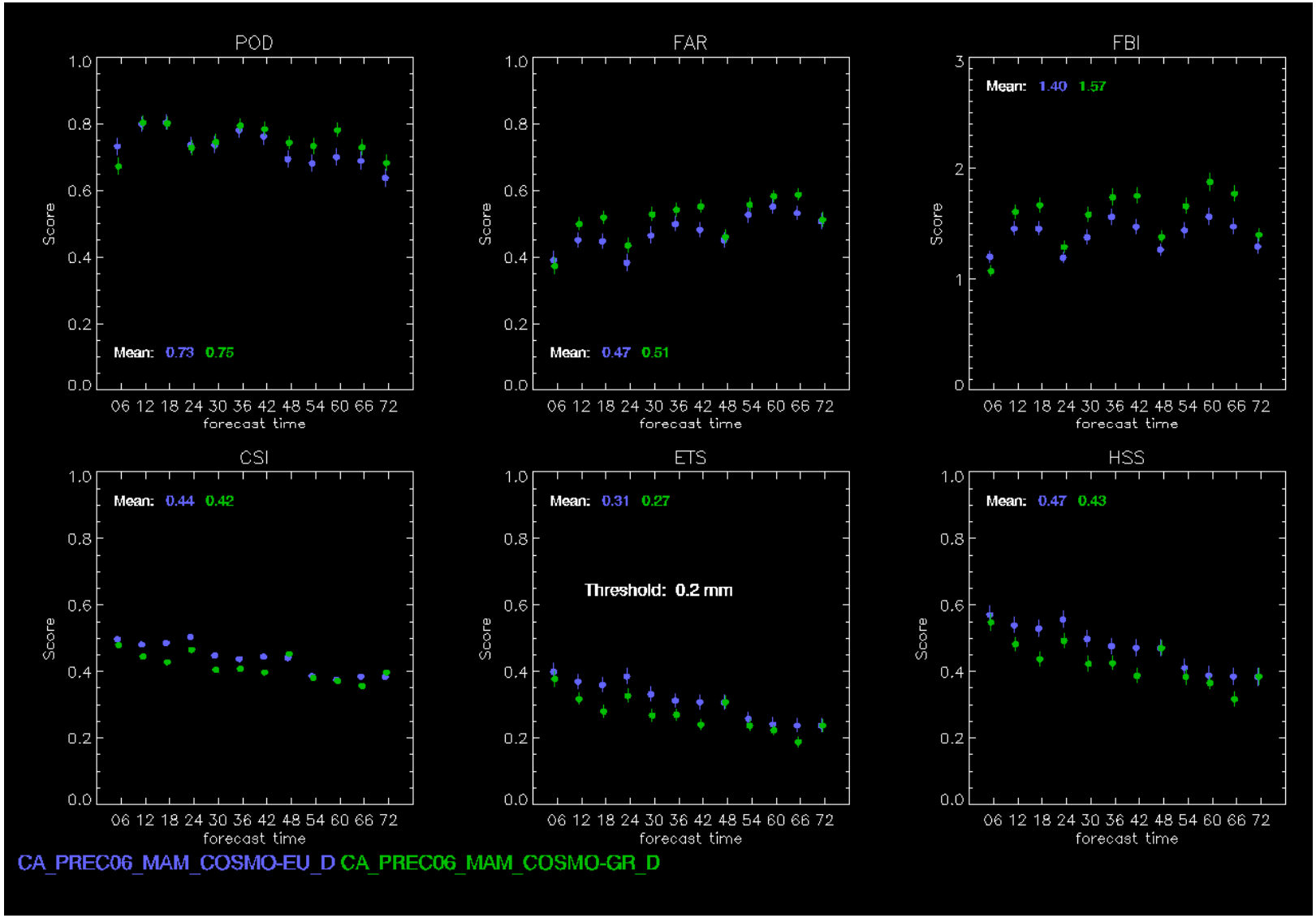


Common area MAM 2013, threshold 0.2 mm /6h, all centers



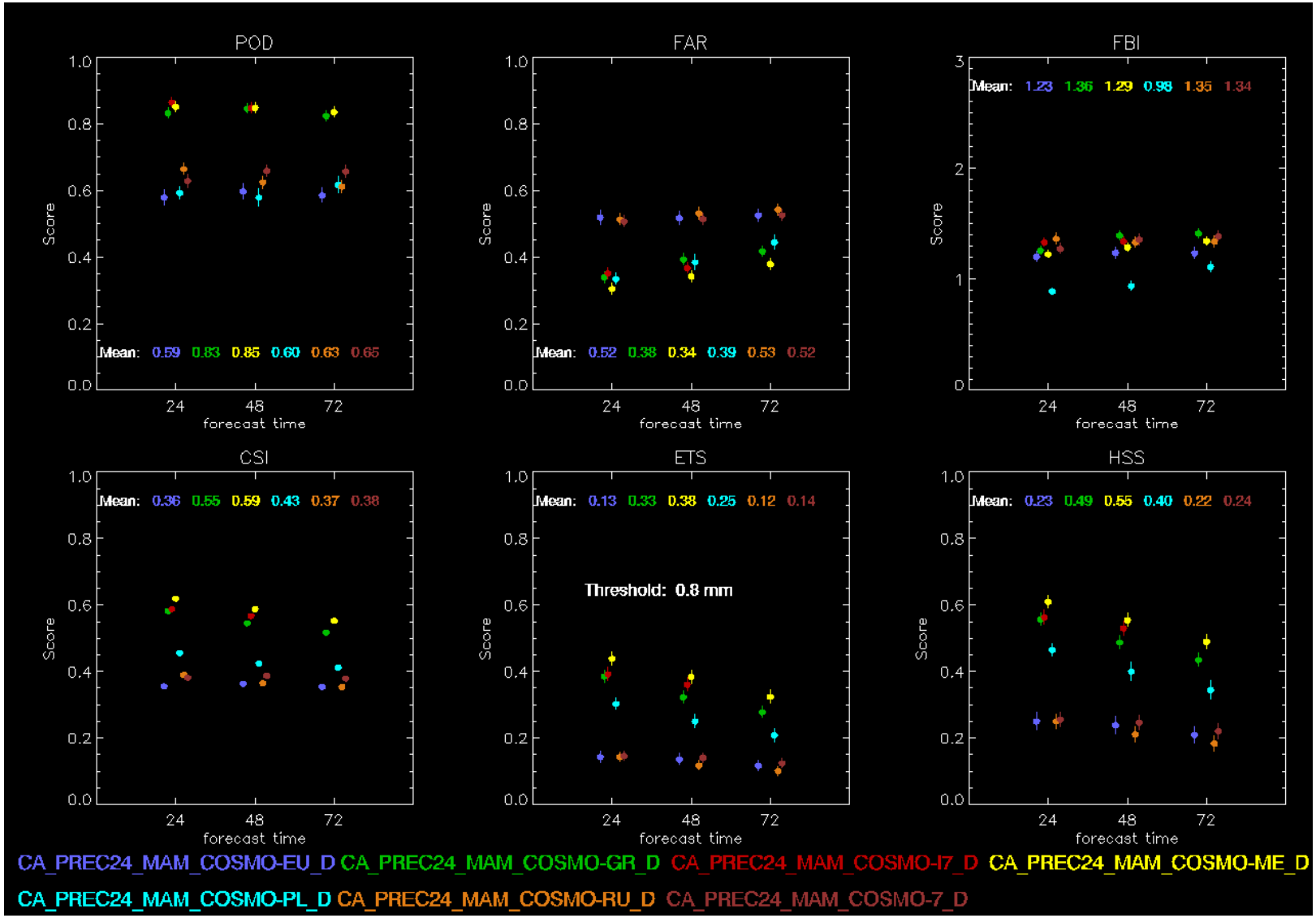
UD: About common plots for precipitation

Common area MAM 2013, threshold 0.2 mm /6h, COSMO-GR and COSMO-EU



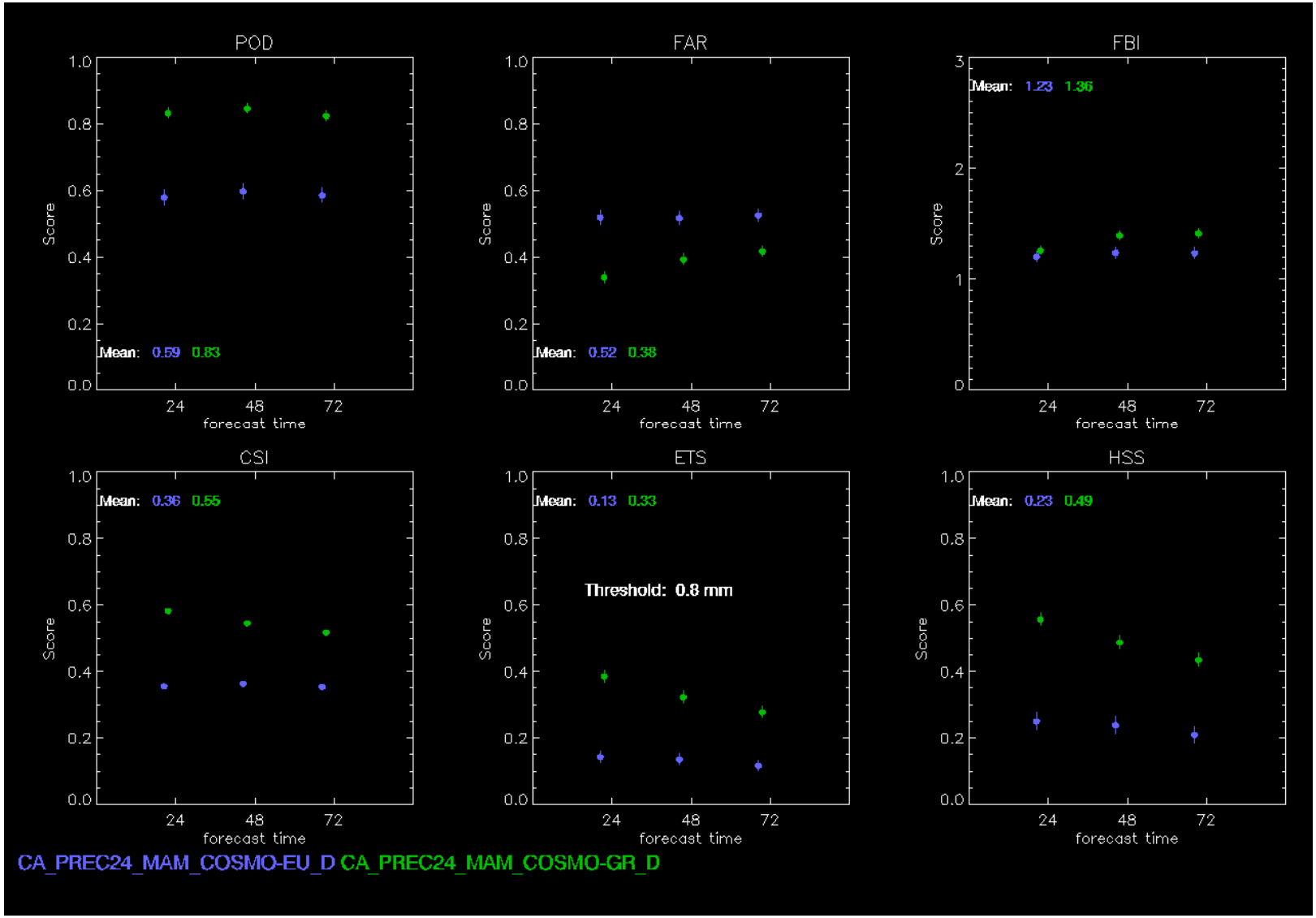
UD: About common plots for precipitation

Common area MAM 2013, threshold 0.8 mm /24h, all centers



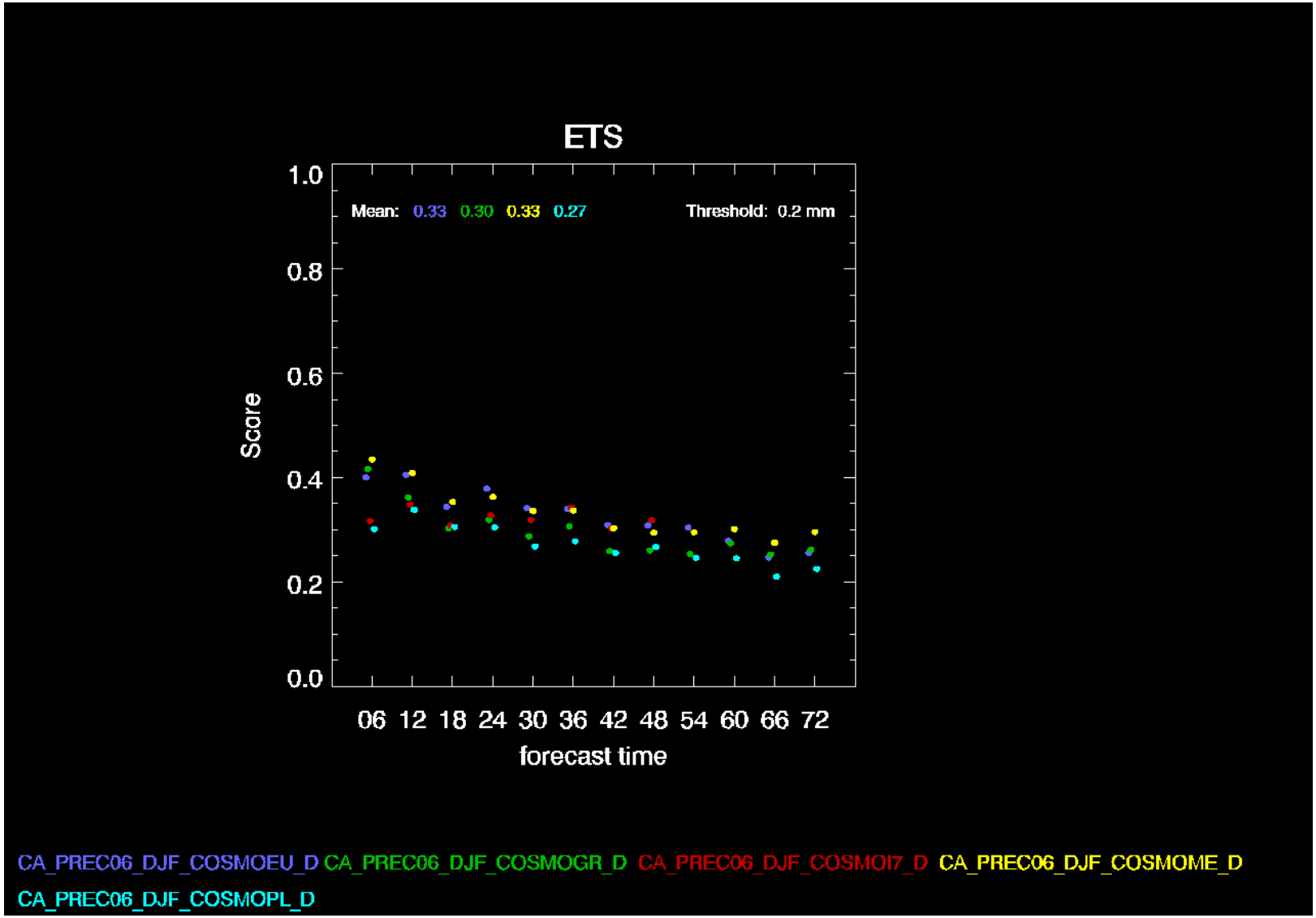
UD: About common plots for precipitation

Common area MAM 2013, threshold 0.8 mm /24h, COSMO-GR and COSMO-EU



UD: About common plots for precipitation

Common area DJF 2012/2013, threshold 0.2 mm /6h, all centers



UD: About common plots for precipitation

Ranks of QPF, common area DJF 2012/2013

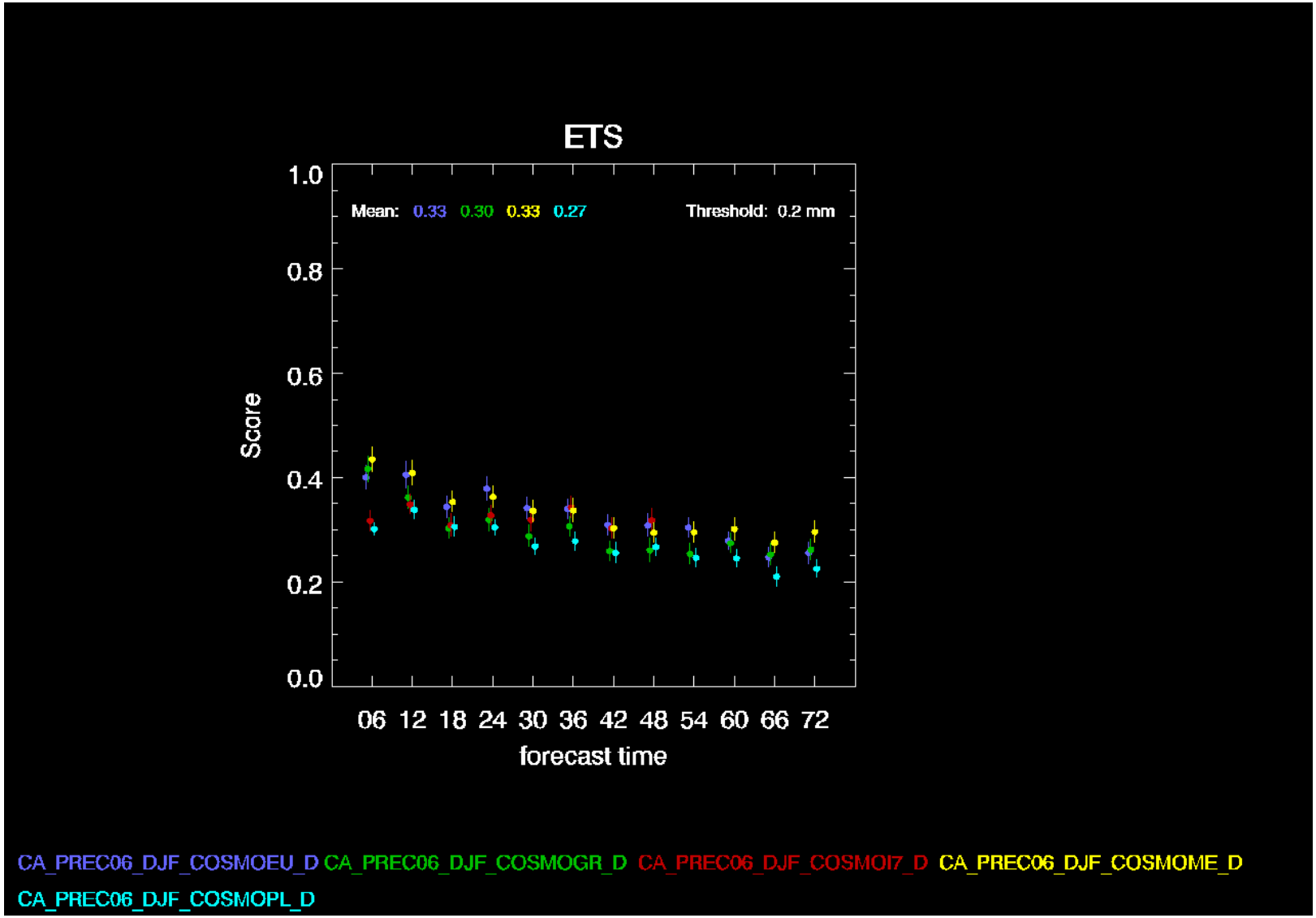
ETS DJF accumulation period: 06 H threshold: 0.2 mm COMMON area

FCT\RANK	1	2	3	4	5
6	ME	GR	EU	I7	PL
12	ME	EU	GR	I7	PL
18	ME	EU	I7	PL	GR
24	EU	ME	I7	GR	PL
30	EU	ME	I7	GR	PL
36	I7	EU	ME	GR	PL
42	EU	ME	I7	GR	PL
48	I7	EU	ME	PL	GR
54	EU	ME	GR	PL	–
60	ME	EU	GR	PL	–
66	ME	GR	EU	PL	–
72	ME	GR	EU	PL	–

Common area DJF 2012/2013, threshold 0.2 mm /6h, all centers, with confidence intervals 5-95%

(bootstrap results with assumption of Gaussian distribution of bootstrapped elements)

Deutscher Wetterdienst
Wetter und Klima aus einer Hand



UD: About common plots for precipitation

Ranks of QPF, common area DJF 2012/2013

with confidence intervals 5-95%

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

ETS DJF accumulation period: 06 H threshold: 0.2 mm COMMON area

FCT\RANK	1	2	3	4	5
6	ME **	GR **	EU **	I7	PL
12	ME ***	EU **	GR	I7	PL
18	ME ***	EU *	I7	PL	GR
24	EU ***	ME *	I7	GR	PL
30	EU **	ME **	I7 *	GR	PL
36	I7 *	EU *	ME *	GR	PL
42	EU **	ME **	I7 **	GR	PL
48	I7 **	EU **	ME	PL	GR
54	EU **	ME **	GR	PL	–
60	ME *	EU	GR	PL	–
66	ME *	GR *	EU	PL	–
72	ME *	GR	EU	PL	–

Asterisks sign the version with significant different results to the version left of these.

Confidence information: Gaussian

Ranks of QPF, common area DJF 2012/2013

with confidence intervals 5-95%

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

ETS DJF accumulation period: 06 H threshold: 0.8 mm COMMON area

FCT\RANK	1	2	3	4	5
6	ME **	EU **	GR *	I7	PL
12	ME **	EU *	GR *	I7 *	PL
18	ME ***	EU **	I7	GR	PL
24	EU **	ME **	I7	PL	GR
30	EU **	ME **	I7 *	GR	PL
36	I7 *	ME *	EU *	GR	PL
42	I7 *	ME *	EU	GR	PL
48	I7 **	EU	ME	GR	PL
54	EU **	ME **	GR	PL	–
60	ME *	EU *	GR *	PL	–
66	ME **	EU *	GR	PL	–
72	ME *	EU *	GR	PL	–

Asterisks sign the version with significant different results to the version left of these.

Confidence information: Gaussian

Ranks of QPF, common area DJF 2012/2013
ONLY ONE SIGNIFICANT DIFFERENCE!!!

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

ETS DJF accumulation period: 06 H threshold: 10 mm COMMON area

FCT\RANK	1	2	3	4	5
6	ME	I7	GR	PL	EU
12	EU	ME	PL	GR	I7
18	GR	I7	EU	ME	PL
24	GR	ME	PL	I7	EU
30	ME	GR	EU	PL	I7
36	GR	EU	PL	ME	I7
42	I7	EU	PL	GR	ME
48	I7	GR	ME	PL	EU
54	ME *	GR	PL	EU	–
60	GR	ME	PL	EU	–
66	GR	ME	EU	PL	–
72	ME	GR	EU	PL	–

Asterisks sign the version with significant different results to the version left of these.

Confidence information: Gaussian

UD: About common plots for precipitation

Ranks of QPF, common area MAM 2013

with confidence intervals 5-95%

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

ETS MAM accumulation period: 06 H threshold: 0.2 mm COMMON area

FCT\RANK	1	2	3	4	5	6	7
6	EU ***	ME ***	7 **	GR **	I7 *	RU *	PL
12	EU ****	7 ***	ME **	GR *	I7 *	RU *	PL
18	EU *****	ME ***	7 *	I7 *	RU *	GR *	PL
24	EU ***	ME ***	7 **	I7 *	RU *	GR *	PL
30	EU ***	ME ***	7 ***	I7 **	GR *	RU *	PL
36	EU ****	7 *	ME *	GR *	RU *	I7 *	PL
42	EU *****	ME ***	I7 *	7 *	RU *	GR *	PL
48	I7 **	ME **	7 **	GR **	EU **	RU *	PL
54	ME **	7 **	EU **	GR *	RU *	PL	–
60	EU *	ME *	7 *	GR *	RU *	PL	–
66	ME ***	EU **	7 *	RU *	GR *	PL	–
72	7 **	ME **	GR *	EU *	RU *	PL	–

Asterisks sign the version with significant different results to the version left of these.

Confidence information: Gaussian

Ranks of QPF, common area MAM 2013

with confidence intervals 5-95%

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

ETS MAM accumulation period: 06 H threshold: 0.8 mm COMMON area

FCT\RANK	1	2	3	4	5	6	7
6	EU ***	ME ***	GR **	7 **	I7 *	RU *	PL
12	EU ****	7 ***	ME *	I7 *	RU *	GR *	PL
18	EU ***	ME *	7 *	I7 *	GR *	RU *	PL
24	ME **	EU *	7 *	RU *	I7 *	GR *	PL
30	EU ***	7 **	I7 **	ME *	GR *	RU *	PL
36	EU **	7 *	ME *	I7 *	GR *	RU	PL
42	ME *	7 *	EU *	I7 *	GR *	RU *	PL
48	7 **	ME **	I7 **	EU **	GR **	RU *	PL
54	7 ****	ME **	EU **	GR *	RU *	PL	–
60	ME *	EU *	GR *	RU *	7 *	PL	–
66	EU **	ME *	7 *	RU *	GR *	PL	–
72	ME **	7 *	EU *	GR *	RU *	PL	–

Asterisks sign the version with significant different results to the version left of these.

Confidence information: Gaussian

Ranks of QPF, common area MAM 2013

with confidence intervals 5-95%

(bootstrap results with assumption of Gaussian distribution of bootstrapped elements)

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

ETS MAM accumulation period: 06 H threshold: 10 mm COMMON area

FCT\RANK	1	2	3	4	5	6	7
6	ME *	GR	EU	7	I7	PL	RU
12	ME	I7	GR	EU	7	RU	PL
18	ME	EU	GR	RU	I7	7	PL
24	I7	ME	RU	7	EU	GR	PL
30	EU	RU	I7	PL	7	GR	ME
36	ME *	I7	7	RU	GR	PL	EU
42	GR	EU	I7	RU	ME	PL	7
48	EU *	7	GR	I7	ME	RU	PL
54	PL	EU	ME	RU	7	GR	–
60	GR	RU	PL	ME	7	EU	–
66	GR *	ME	RU	EU	PL	7	–
72	ME	GR	EU	7	PL	RU	–

Asterisks sign the version with significant different results to the version left of these.

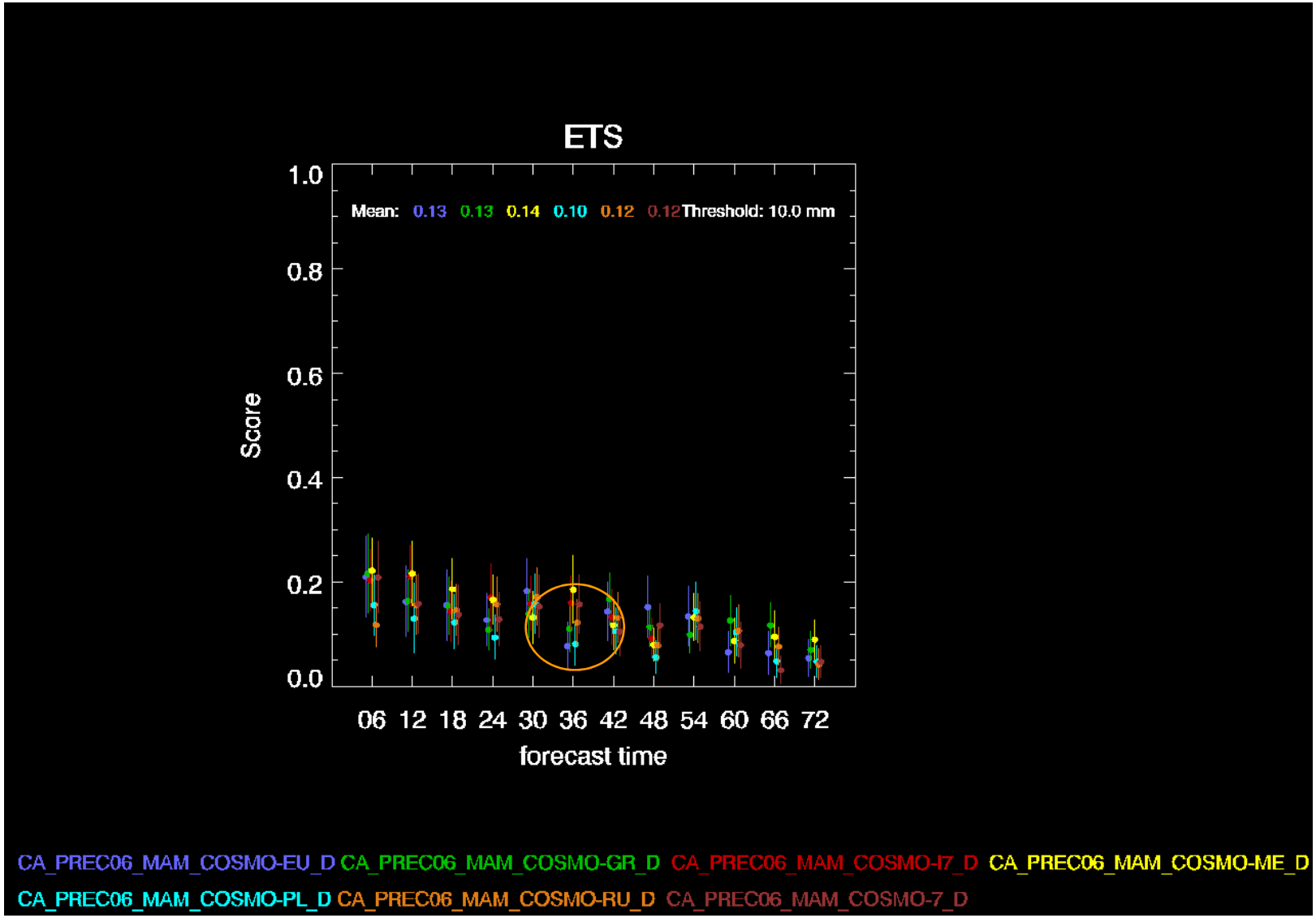
Confidence information: Gaussian

Common area MAM 2013, threshold 10 mm /6h, all centers

with confidence intervals 5-95%

(bootstrap results with assumption of Gaussian distribution of bootstrapped elements)

Deutscher Wetterdienst
Wetter und Klima aus einer Hand



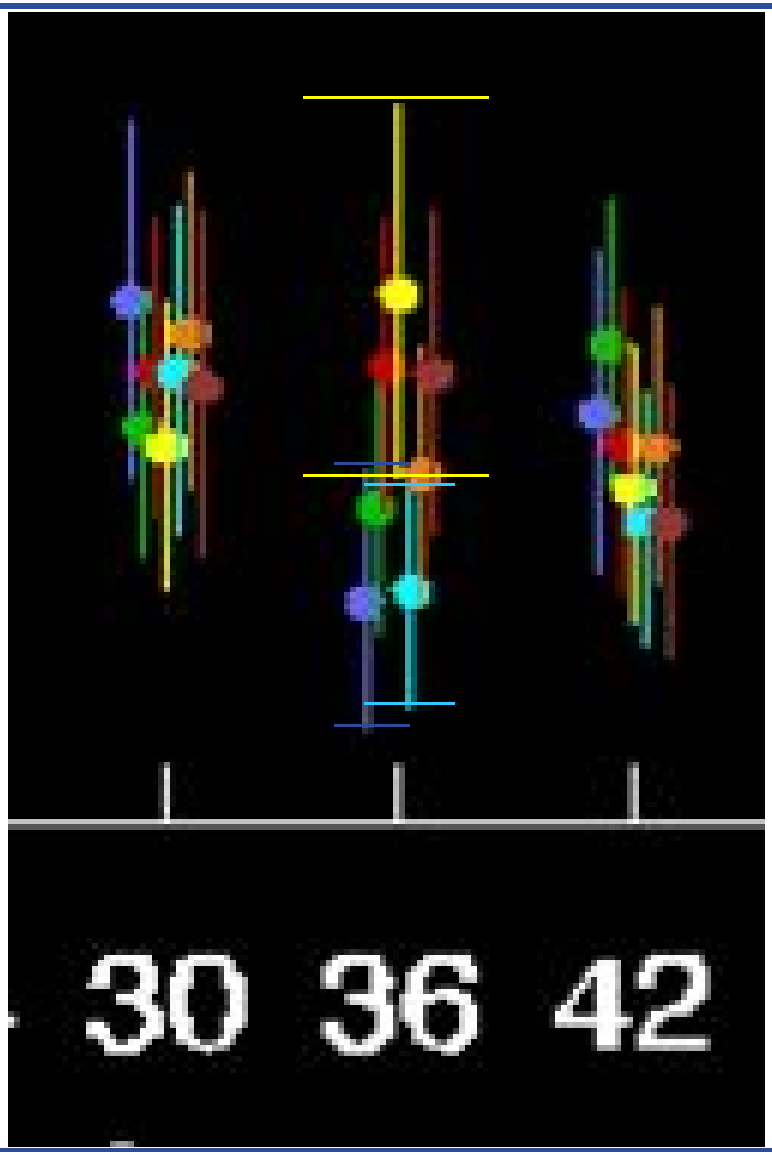
UD: About common plots for precipitation

Common area MAM 2013, threshold 10 mm /6h, all centers

with confidence intervals 5-95%

(bootstrap results with assumption of Gaussian distribution of bootstrapped elements)

Deutscher Wetterdienst
Wetter und Klima aus einer Hand



Relates to quantiles 2.5% and 97.5%

Ranks of QPF, common area MAM 2013

(bootstrap results with quantiles 5 and 95% of bootstrapped elements)

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

ETS MAM accumulation period: 06 H threshold: 10 mm COMMON area

FCT\RANK	1	2	3	4	5	6	7
6	ME *	GR *	EU	7 *	I7	PL	RU
12	ME	I7	GR	EU	7	RU	PL
18	ME	EU	GR	RU	I7	7	PL
24	I7	ME *	RU	7	EU	GR	PL
30	EU	RU	I7	PL	7	GR	ME
36	ME **	I7	7	RU	GR	PL	EU
42	GR	EU	I7	RU	ME	PL	7
48	EU **	7	GR	I7	ME	RU	PL
54	PL	EU	ME	RU	7	GR	–
60	GR	RU	PL	ME	7	EU	–
66	GR **	ME *	RU	EU	PL	7	–
72	ME	GR	EU	7	PL	RU	–

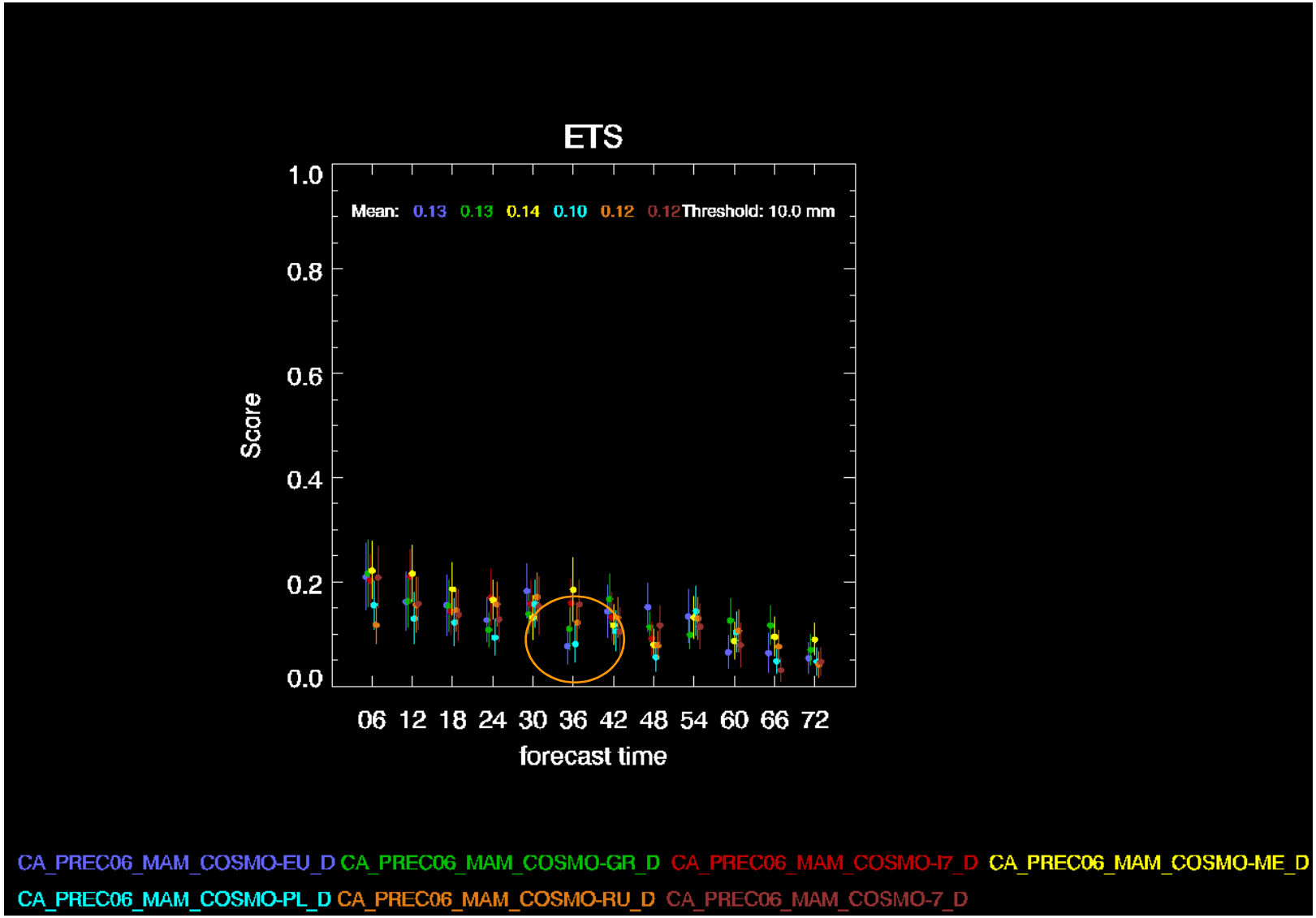
Asterisks sign the version with significant different results to the version left of these.

Confidence information: Quantile

Common area MAM 2013, threshold 10 mm /6h, all centers

(bootstrap results with quantiles 5 and 95% of bootstrapped elements)

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

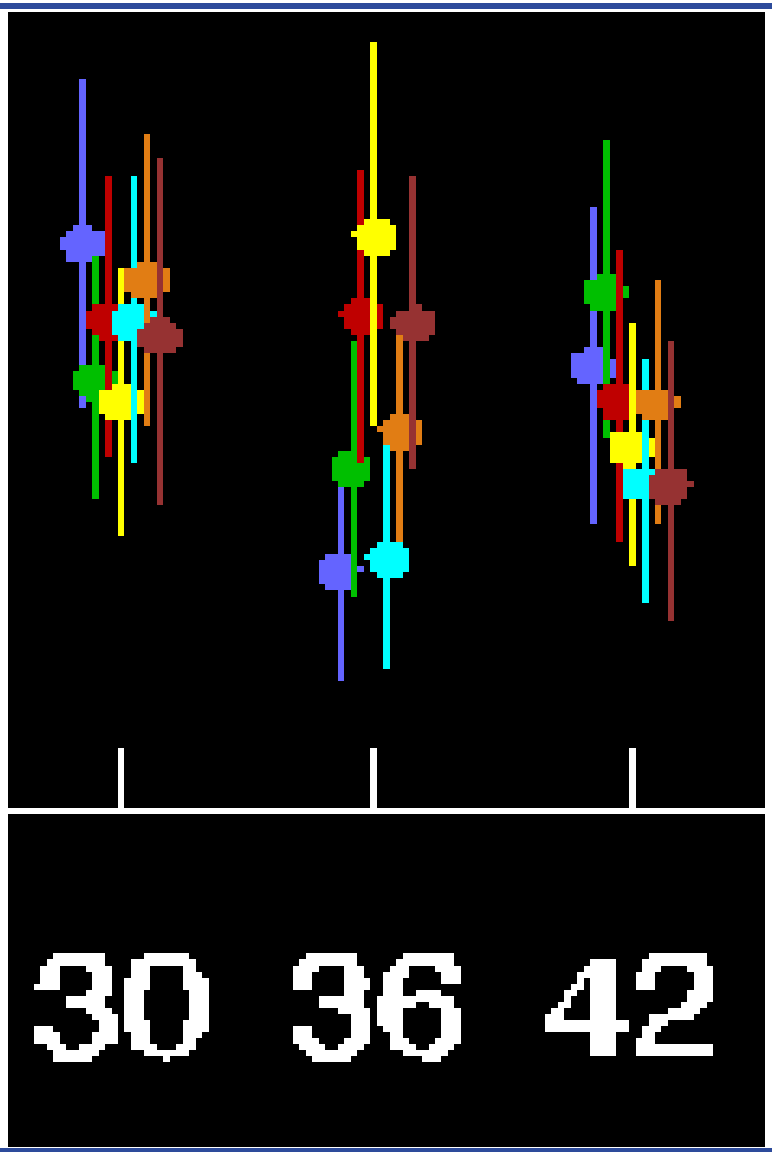


UD: About common plots for precipitation

Common area MAM 2013, threshold 10 mm /6h, all centers

(bootstrap results with quantiles 5 and 95% of bootstrapped elements)

Deutscher Wetterdienst
Wetter und Klima aus einer Hand



Relates to the significance level 10% of a Gaussian distribution

Current COSMO versions (excerpt from the website)

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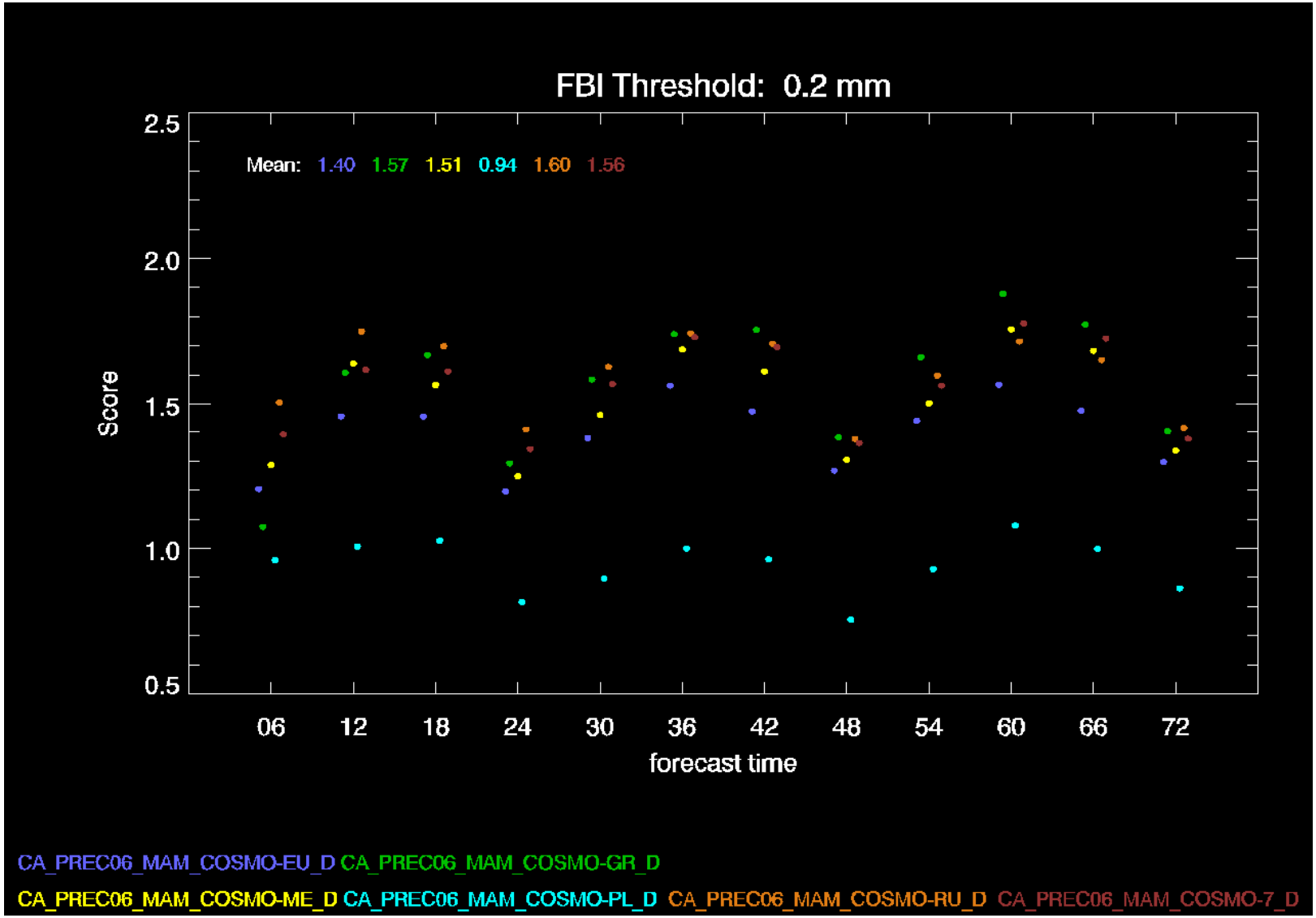
Wetter und Klima aus einer Hand

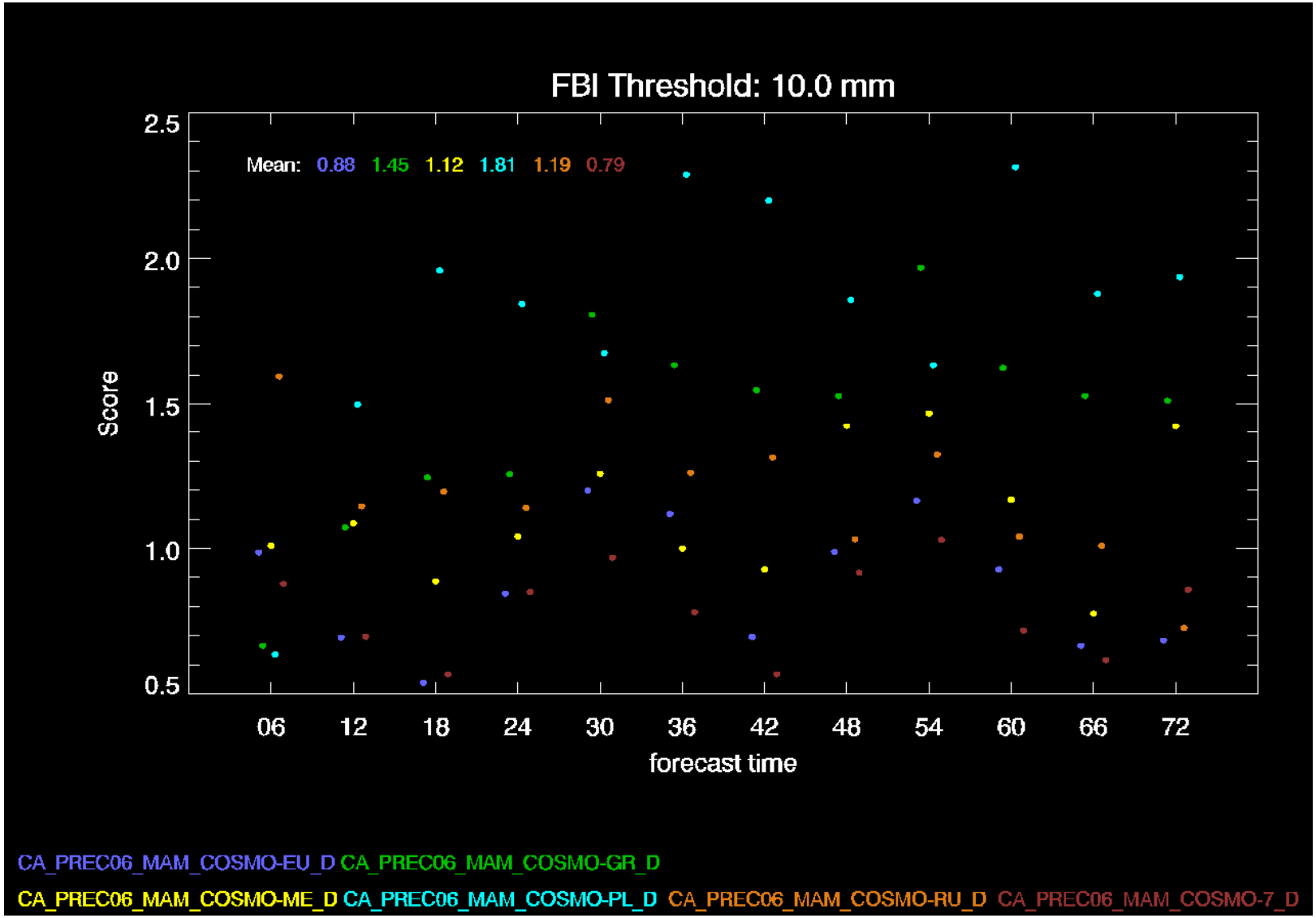
	ARPA−SIM	DWD	HNMS	IMGW	MeteoSwiss	NMA	Roshydromet	USAM
Domain Size (grid points)	297 x 313	665 x 657	649 x 393	193 x 161	393 x 338	201 x 177	700 x 620	779 x 401
Hor. Grid Spacing (degree / km)	0.0625 / 7	0.0625 / 7	0.0625 / 7	0.125 / 14	0.06 / 6.6	0.0625 / 7	0.0625 / 7	0.0625 / 7
Number of Layers	40	40	35	35	60	40	40	40
Lateral Boundary Conditions	IFS	GME	IFS	GME	IFS	GME	GME	IFS
LBC Update Frequency (h)	1	1	3	1	1	3	3	3
Initial State	Nudging Scheme	Nudging Scheme	IFS	GME	Nudging Scheme	GME	GME	CNMCA 3DVAR-FGAT
Cosmo Version	4.21	4.2	4.18	3.5	4.19+	4.18	4.21	4.21
How many points are affected by the R=15km criterion for QPF?	9-14	9-14	9-14	1-4	9-14	9-14	9-14	9-13

UD: About common plots for precipitation

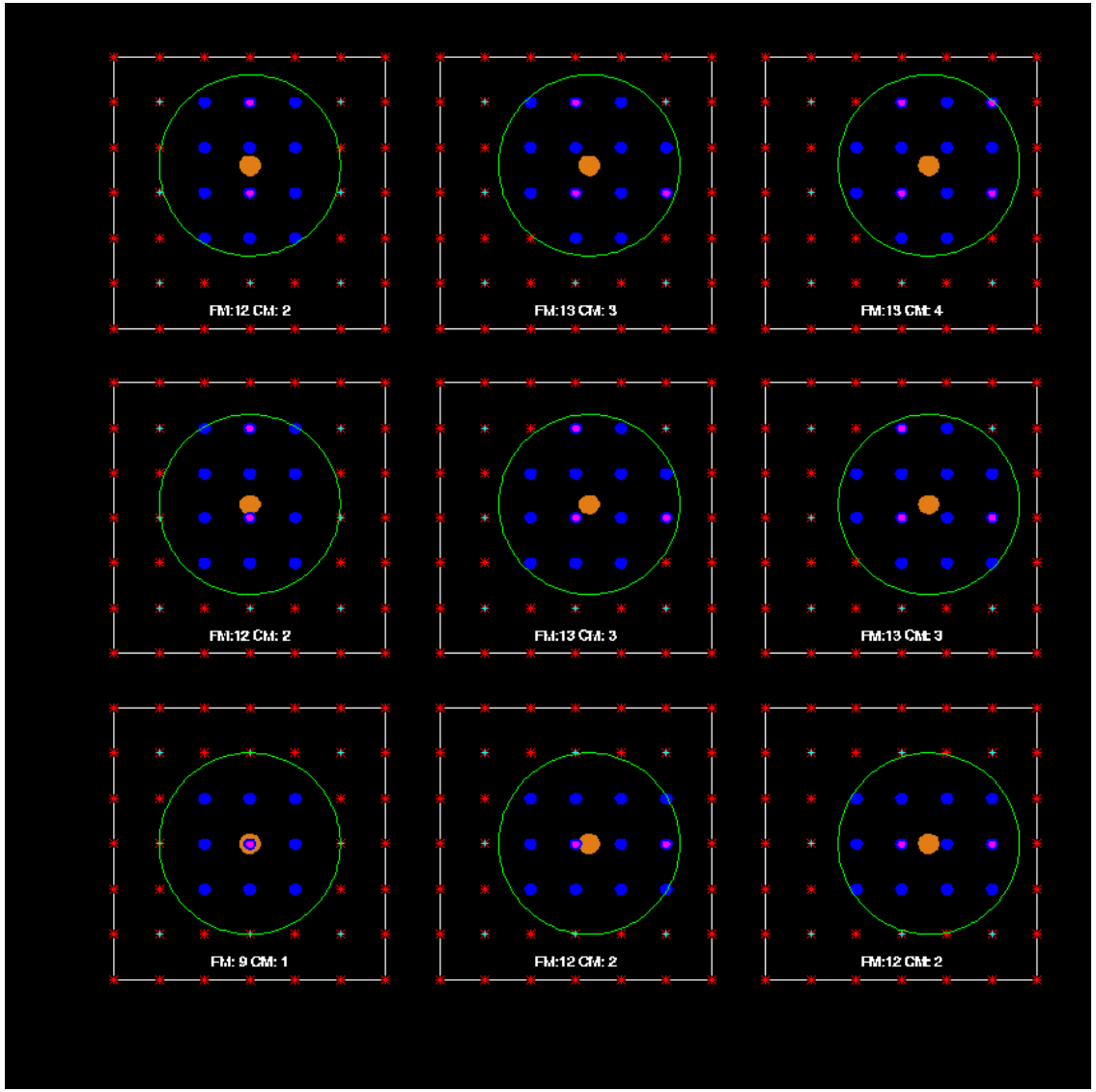
Common area MAM 2013, threshold 0.2 mm /6h, all centers



Common area MAM 2013, threshold 10 mm /6h, all centers

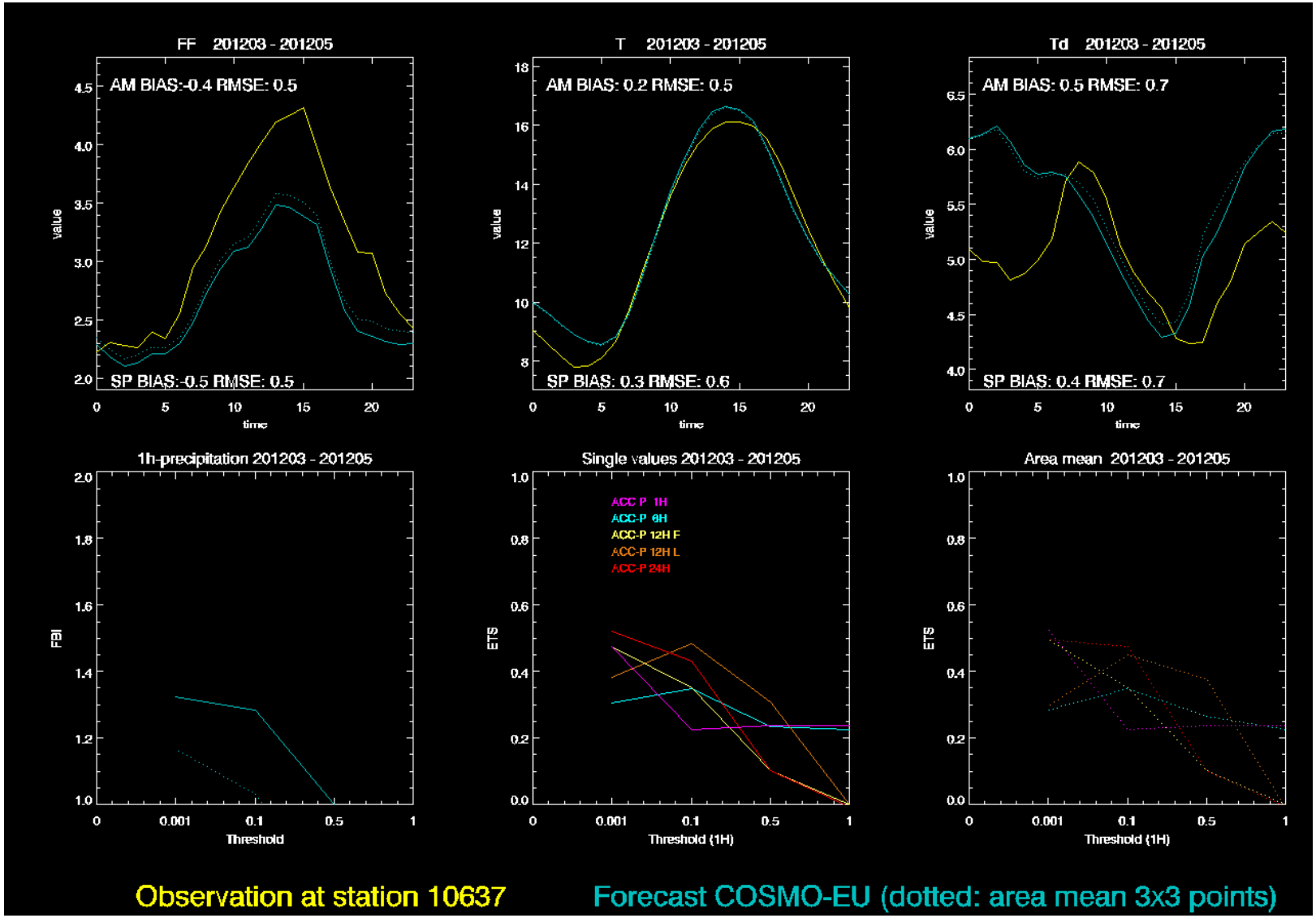


How the 15km-radius-criteria works



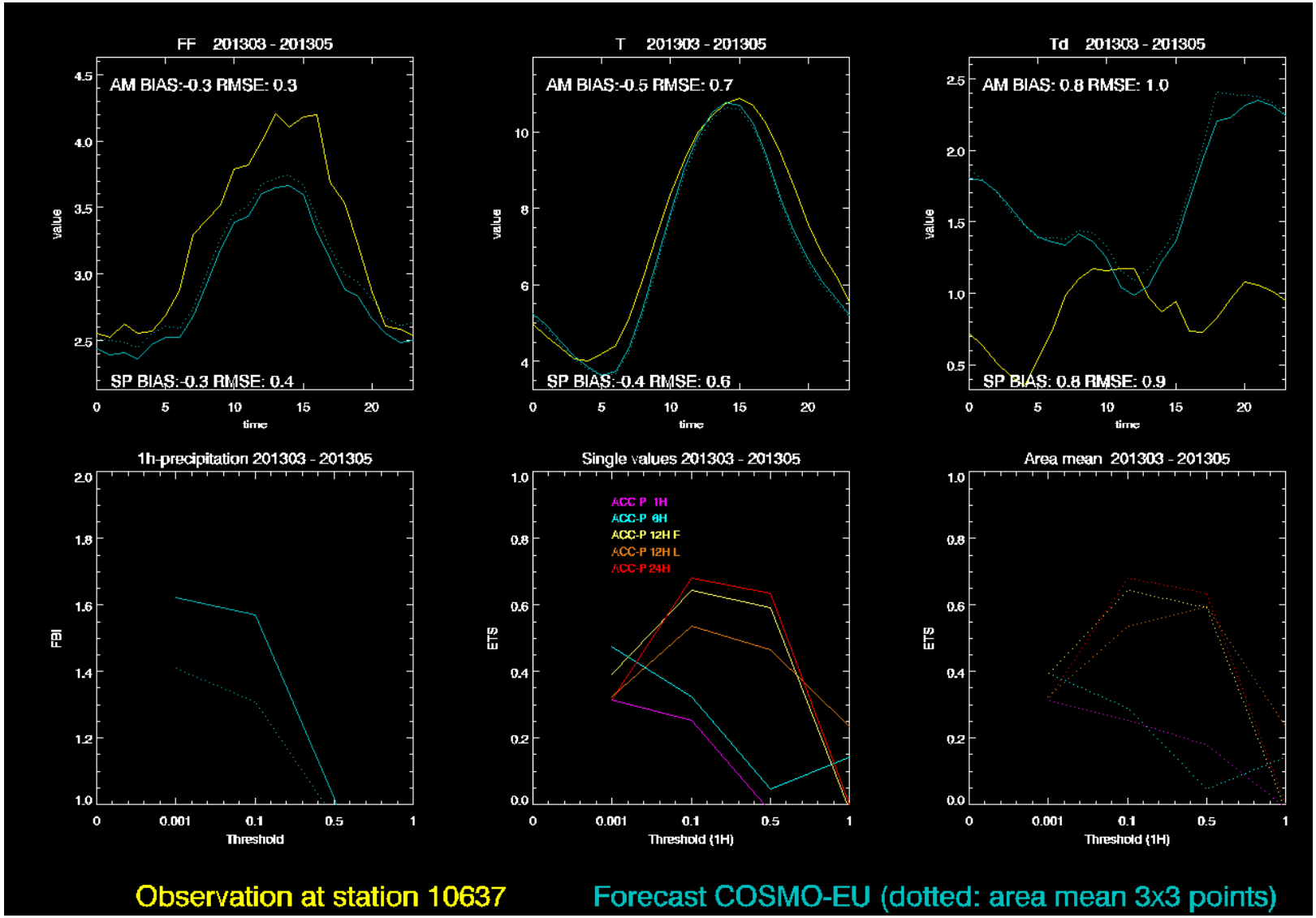
Number of points in the 15km-radius varies from 9 to 14 for the fine mesh (not shown here) and from 1 to 4 for the coarse mesh

10637 MAM 2012



UD: About common plots for precipitation

10637 MAM 2013



UD: About common plots for precipitation

What did we see?

- For all model version a distinct diurnal cycle of the FBI for 6h-acculated precipitation amounts is detected.
  - No surprise because of column made precipitation
- A spin up problem for COSMO-I7 and COSMO-PL for DJF 2012/2013
  - May be explained by using of pure GME BC and initialisation in COSMO-PL
  - and (perhaps???) the position of common area near boundary for COSMO-I7
  - Not visible for MAM 2013
- FBIs for COSMO-PL during MAM 2013:
  - For low precipitation amounts FBIs are in the order of one and clearly below the values of other COSMO installations.
  - For high precipitation amounts COSMO-PL-results are clearly above the values of all other model versions.
  - This can be partly explained by the coarser grid of COSMO-Pl compared to the other versions.
- A rank of QPF quality can be detected with statistical significance only for low precipitation amounts.
  - For some high precipitation amounts a significant difference between model quality can be derived in some cases. It is probably not significant in the sense of science.
- The question about the order of ETSes for different accumulation periods seems to be open.