Overview of Italian verification

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Cosmo General Meeting 2016 – Offenbach
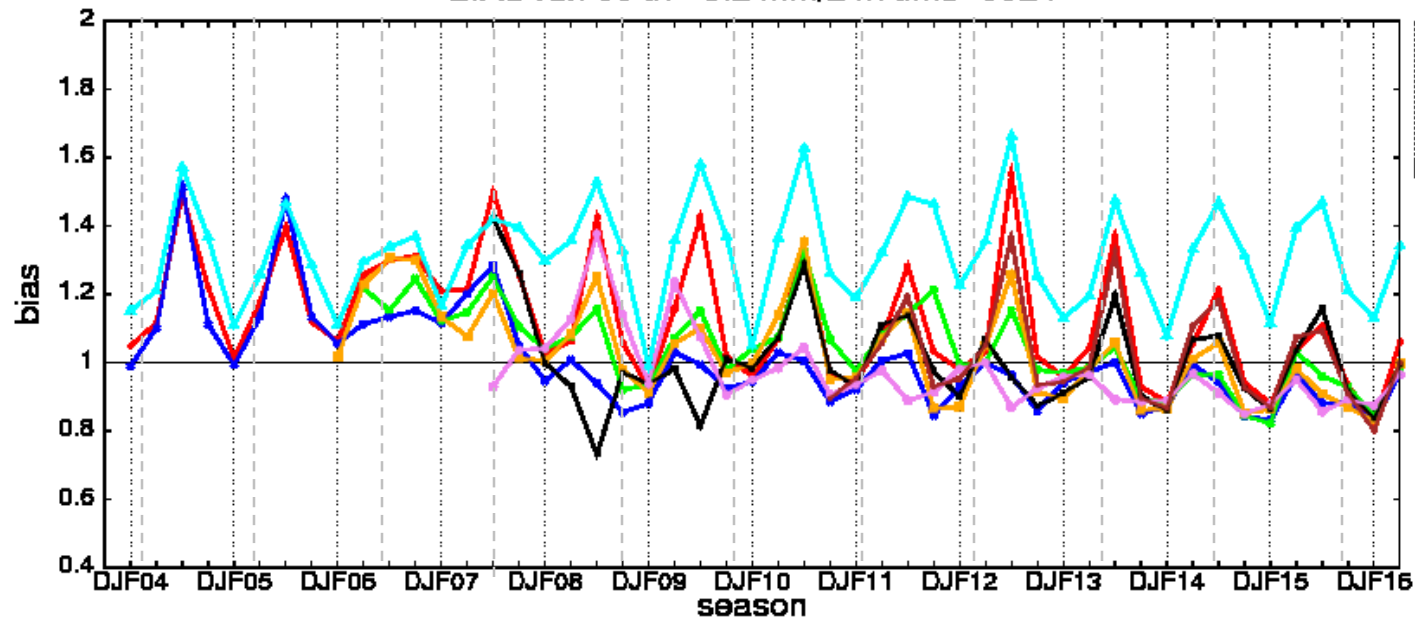
The methodology

Precipitation- high resolution network

- Common area → Italy
- Dataset → high res raingauges
- Method → 24h/6h averaged cumulated precipitation or maximum values (both observed and forecasted) over meteo-hydrological basins

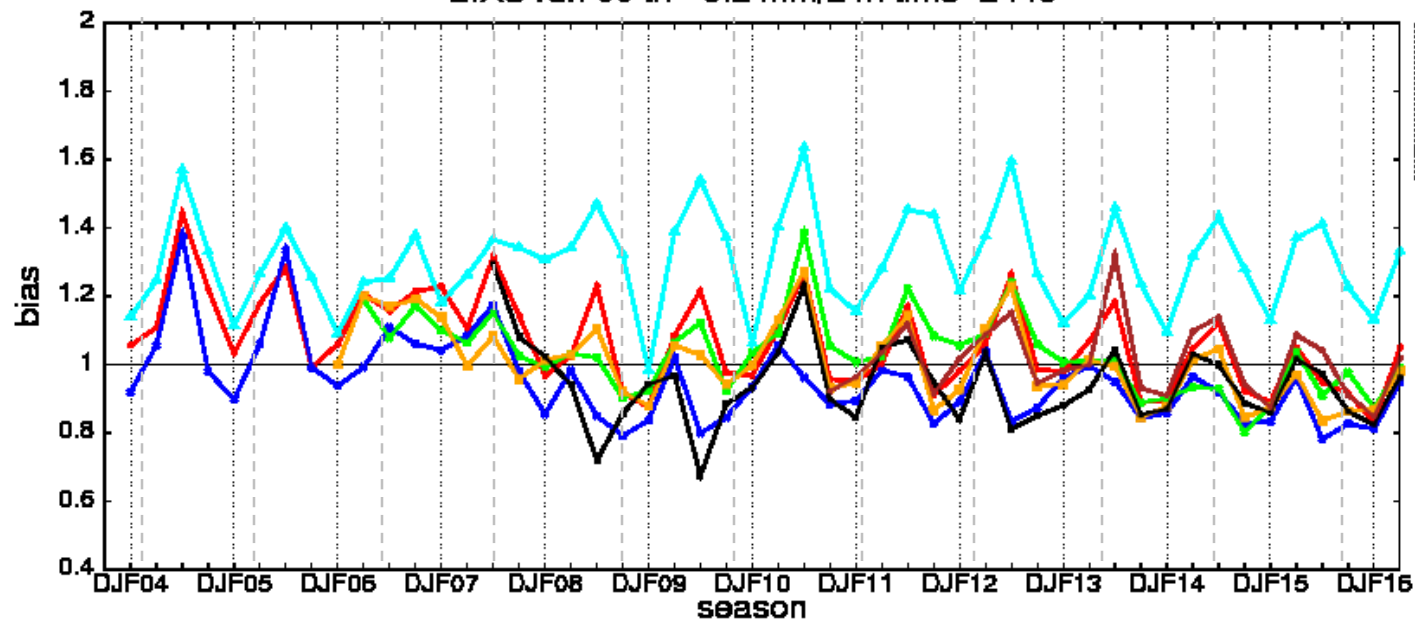# LONG TREND PRECIPITATION with high resolution stations

BIAS run 00 th= 0.2 mm/24h time=0024

LOW THRESHOLDS

- Ecmwf overestimation
- Summer overestimation
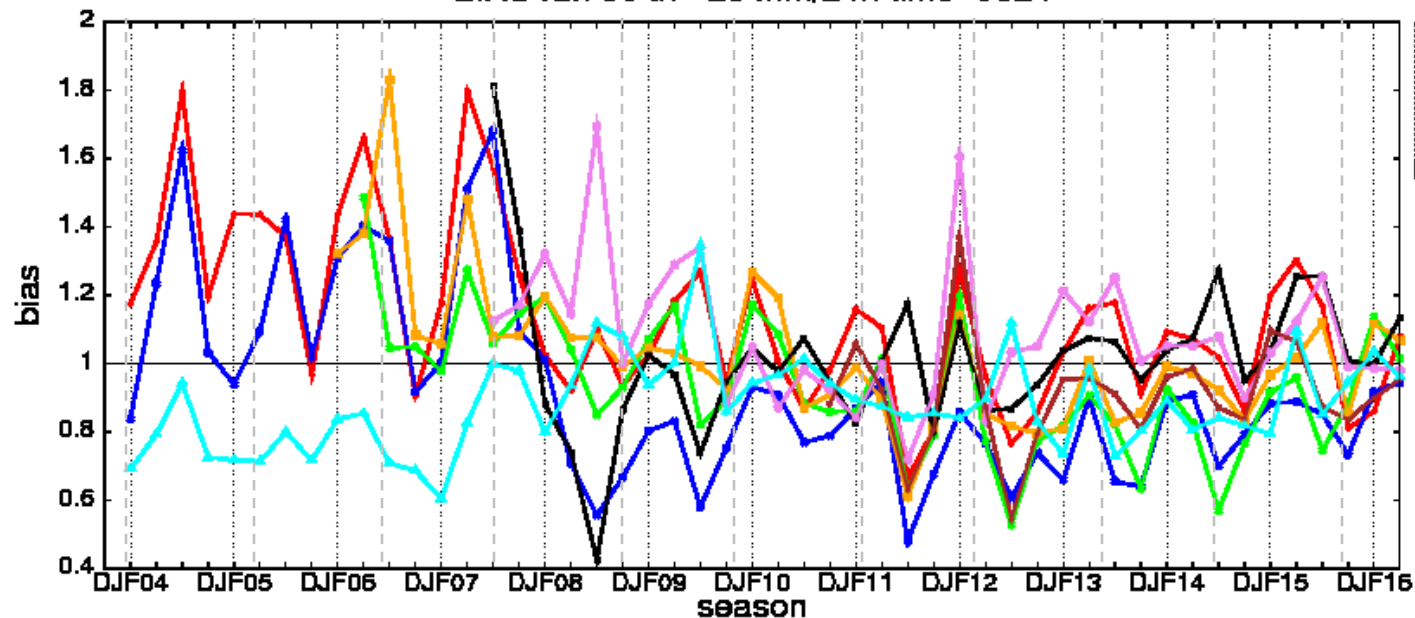- Reduction of the overestimation for LAM

BIAS run 00 th= 0.2 mm/24h time=2448

- Ecmwf overestimation
- Reduction of bias
- Increasing winter underestimation

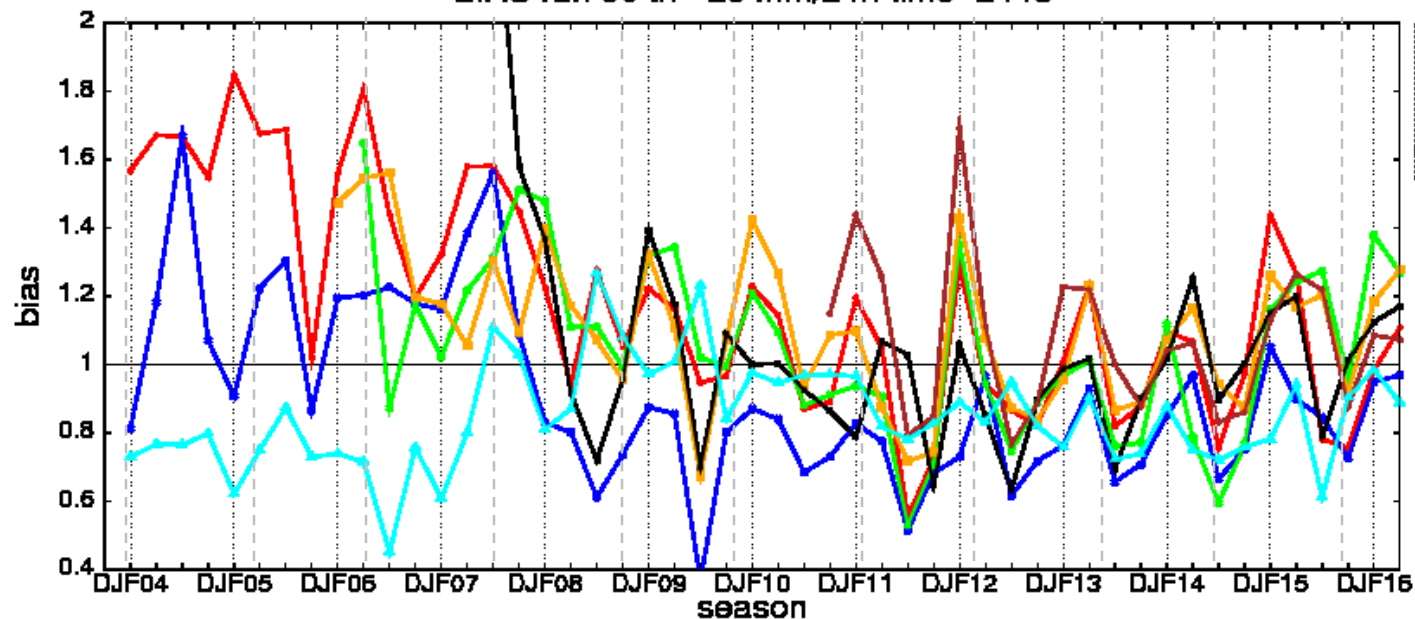# LONG TREND PRECIPITATION with high resolution stations

BIAS run 00 th= 20 mm/24h time=0024

HIGH THRESHOLDS

- General underestimation, especially 7, EU
- Different behavior

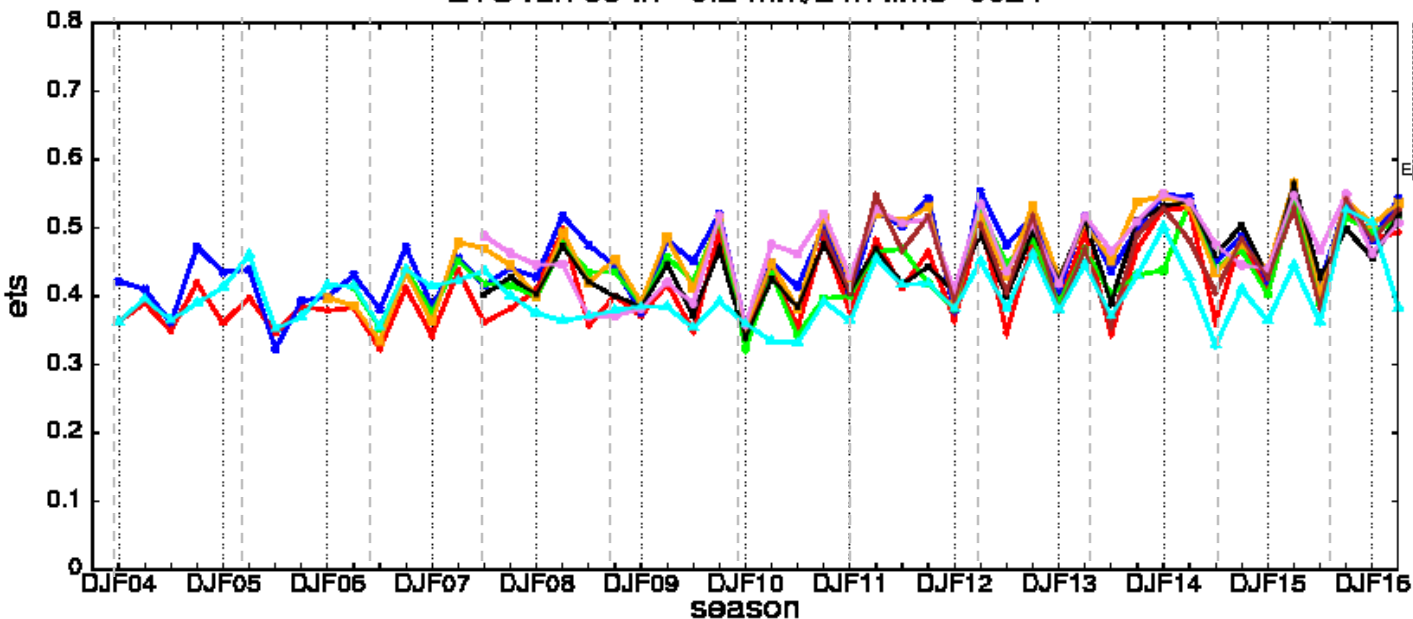### BIAS run 00 th= 20 mm/24h time=2448

- General overestimation
- ECMWF and 7 underestimation
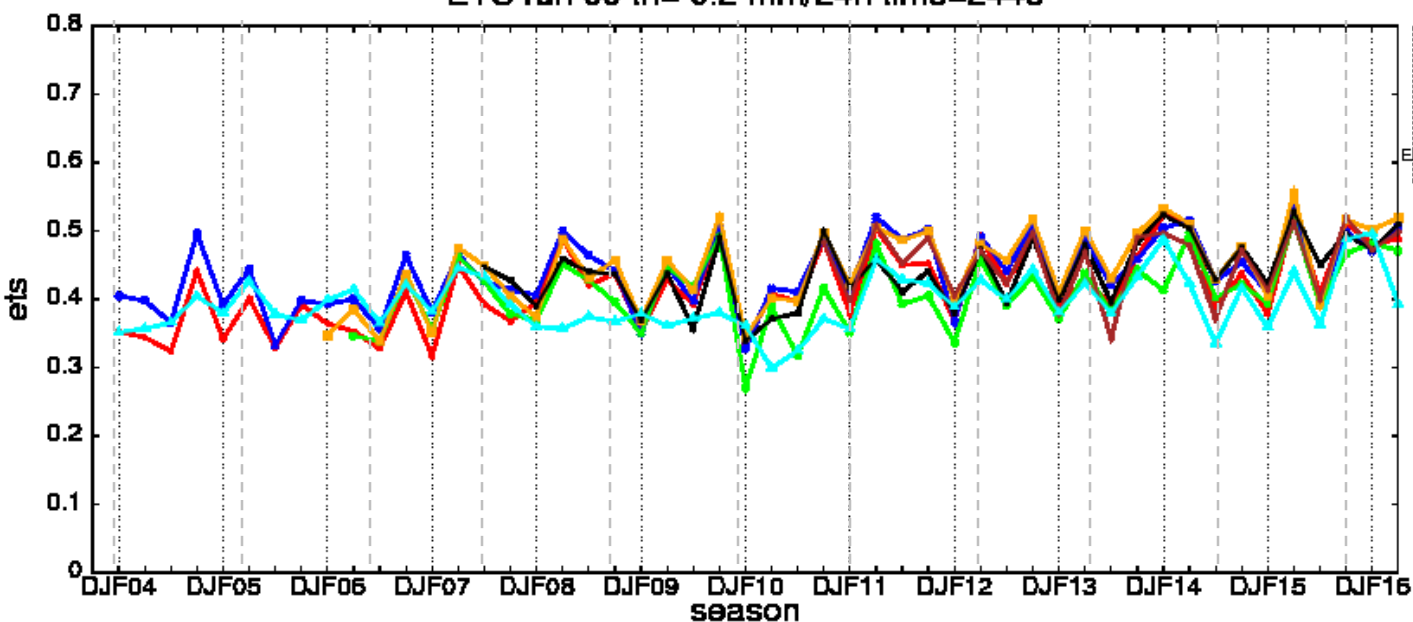
LONG TREND PRECIPITATION with high resolution stations
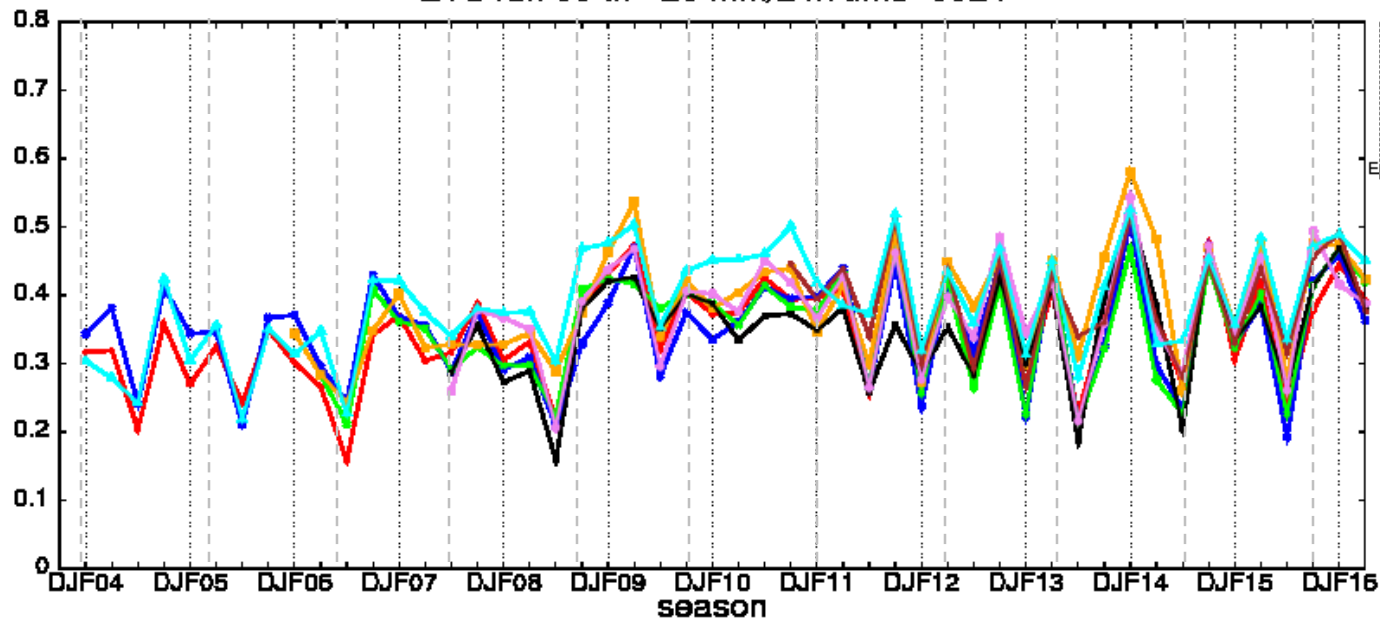
ETS run 00 th= 0.2 mm/24h time=0024

ETS run 00 th= 0.2 mm/24h time=2448

LOW THRESHOLDS

- Very slightly positive/steady trend
- Good ME,7
- Big seasonal oscillation
- LAM perform better than ECMWF

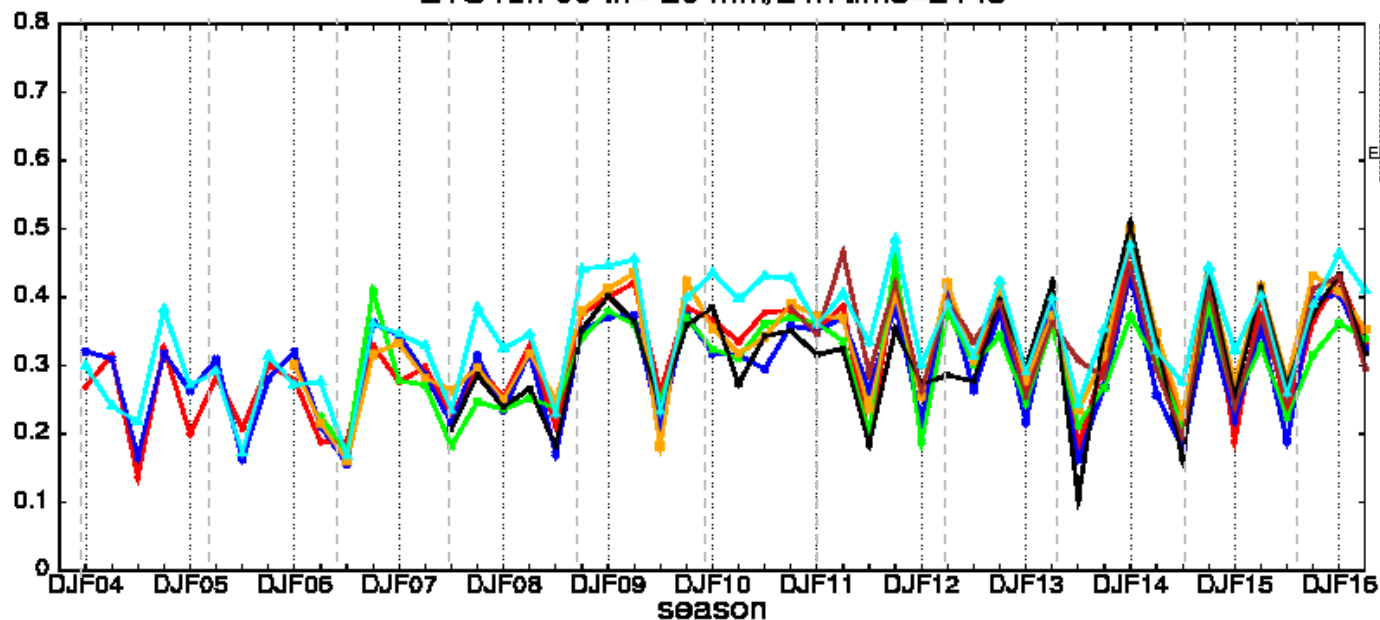# LONG TREND PRECIPITATION with high resolution stations
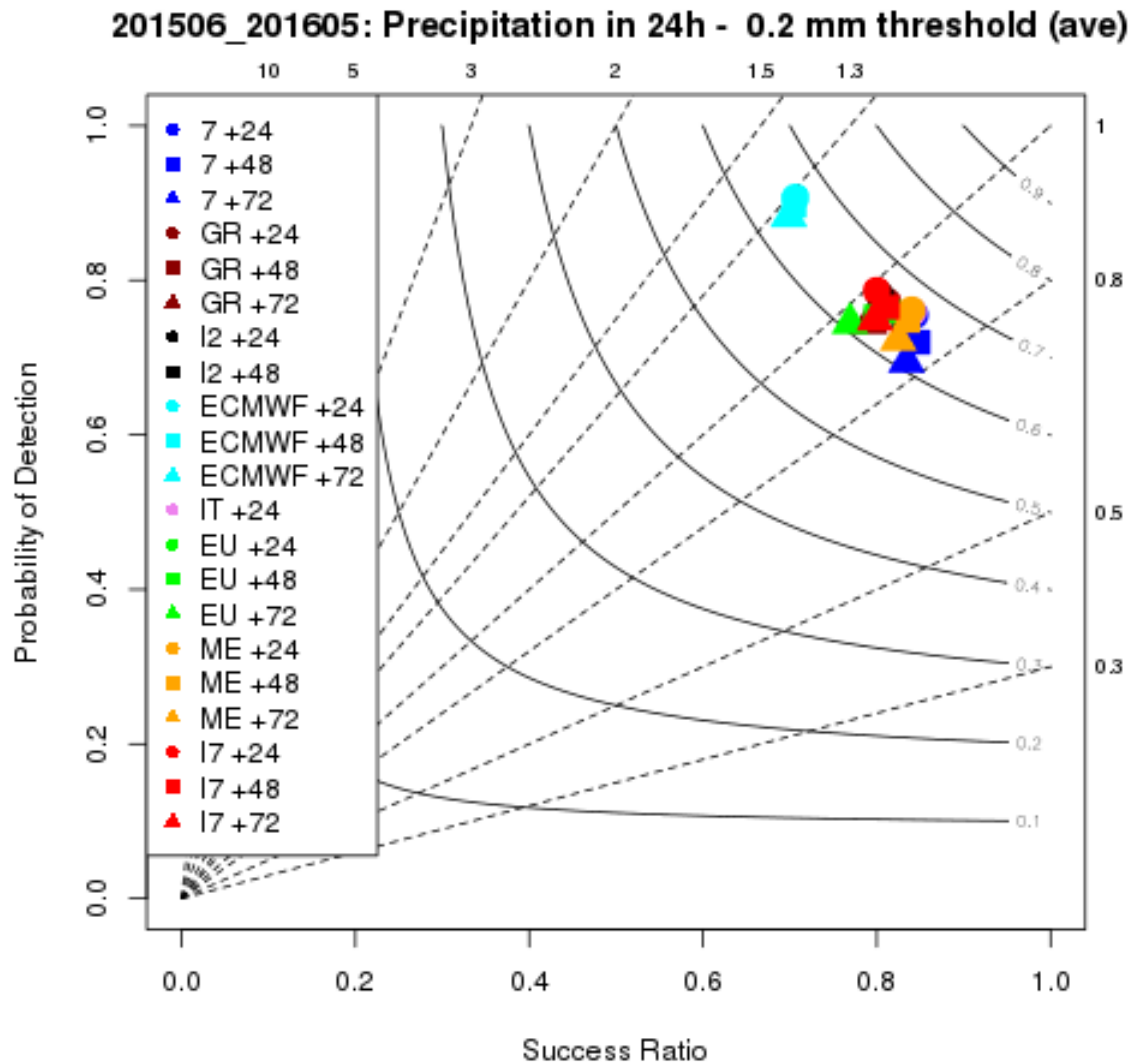
ETS run 00 th= 20 mm/24h time=0024

HIGH THRESHOLDS

- Very slightly positive trend
- Big seasonal oscillation
- ECMWF often performs better than LAM

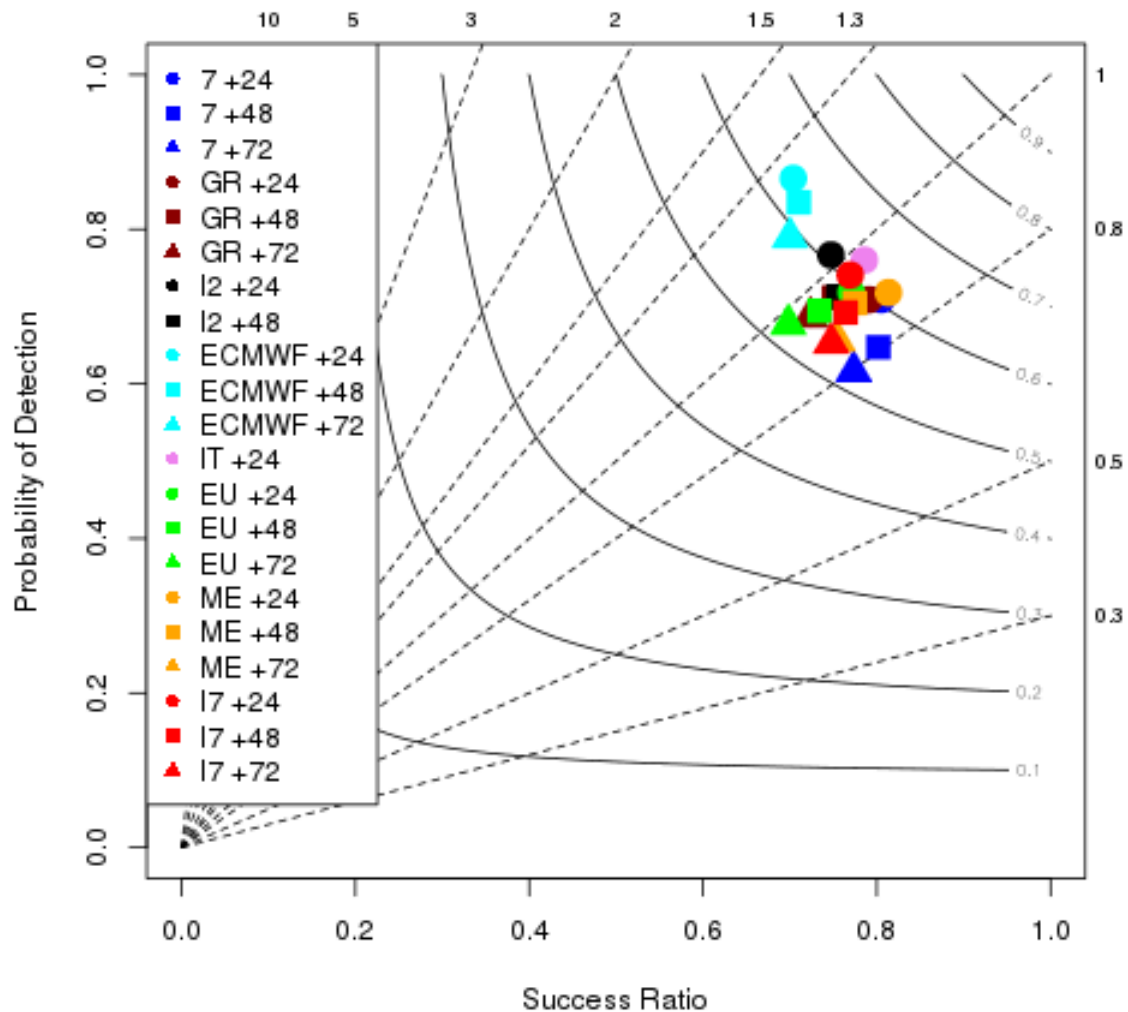## ETS run 00 th= 20 mm/24h time=2448

201506- 201605: Average over area > 0.2 mm/24h

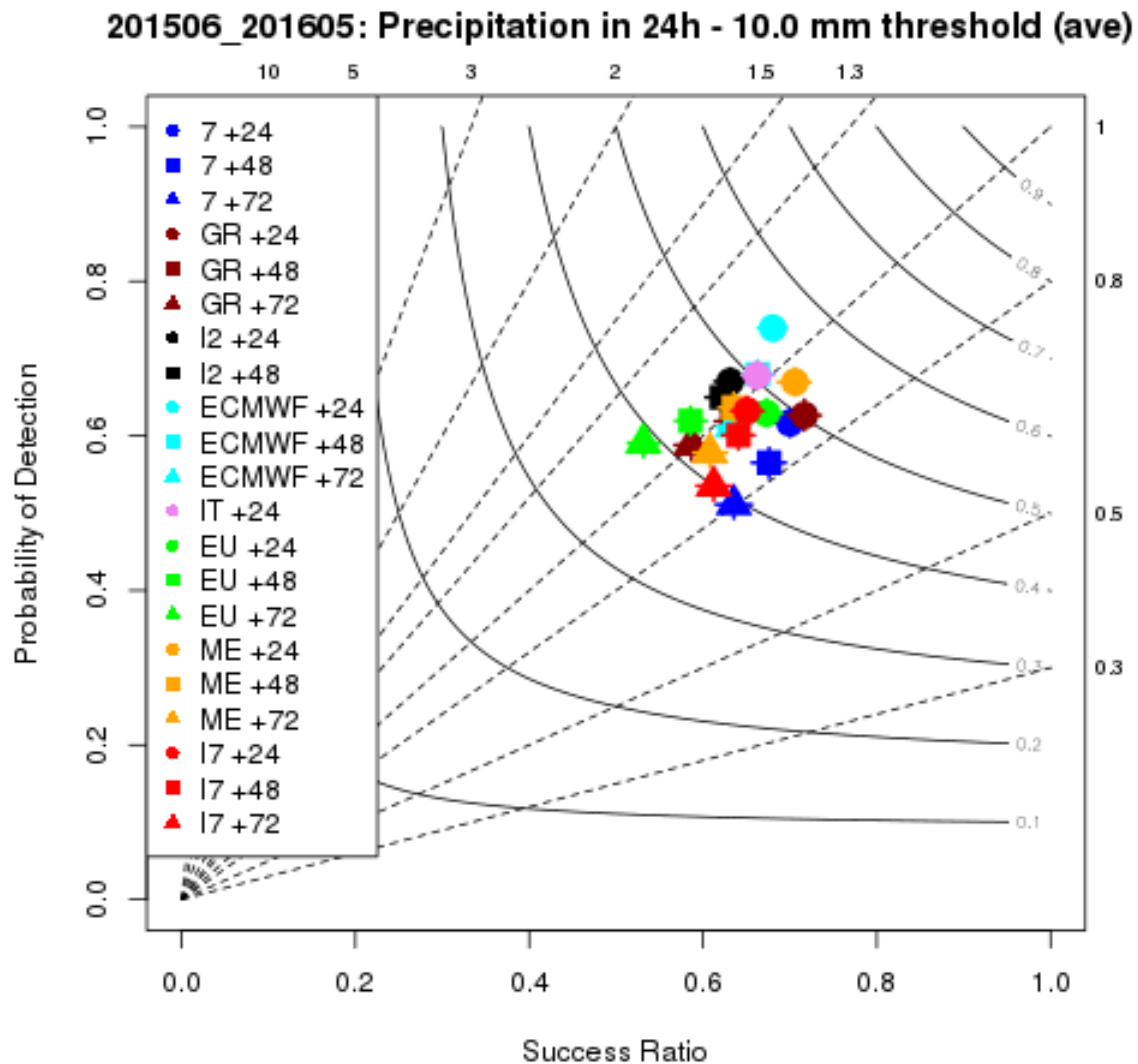201506_201605: Precipitation in 24h - 0.2 mm threshold (ave)

- ECMWF -> overestimation

201506- 201605: Average over area > 2 mm/24h

Ecmwf →
overestimation

IT, ME, I2, I7
→ good

201506_201605: Precipitation in 24h - 2.0 mm threshold (ave)

201506- 201605: Average over area > 10 mm/24h

201506_201605: Precipitation in 24h - 10.0 mm threshold (ave)

- ECMWF -> best performance

Ecmwf -> best

ME, I2, I7,GR,IT, EU → good

7 → lower skills

201506_201605: Precipitation in 24h - 20.0 mm threshold (ave)

201506- 201605: Average over area > 30 mm/24h

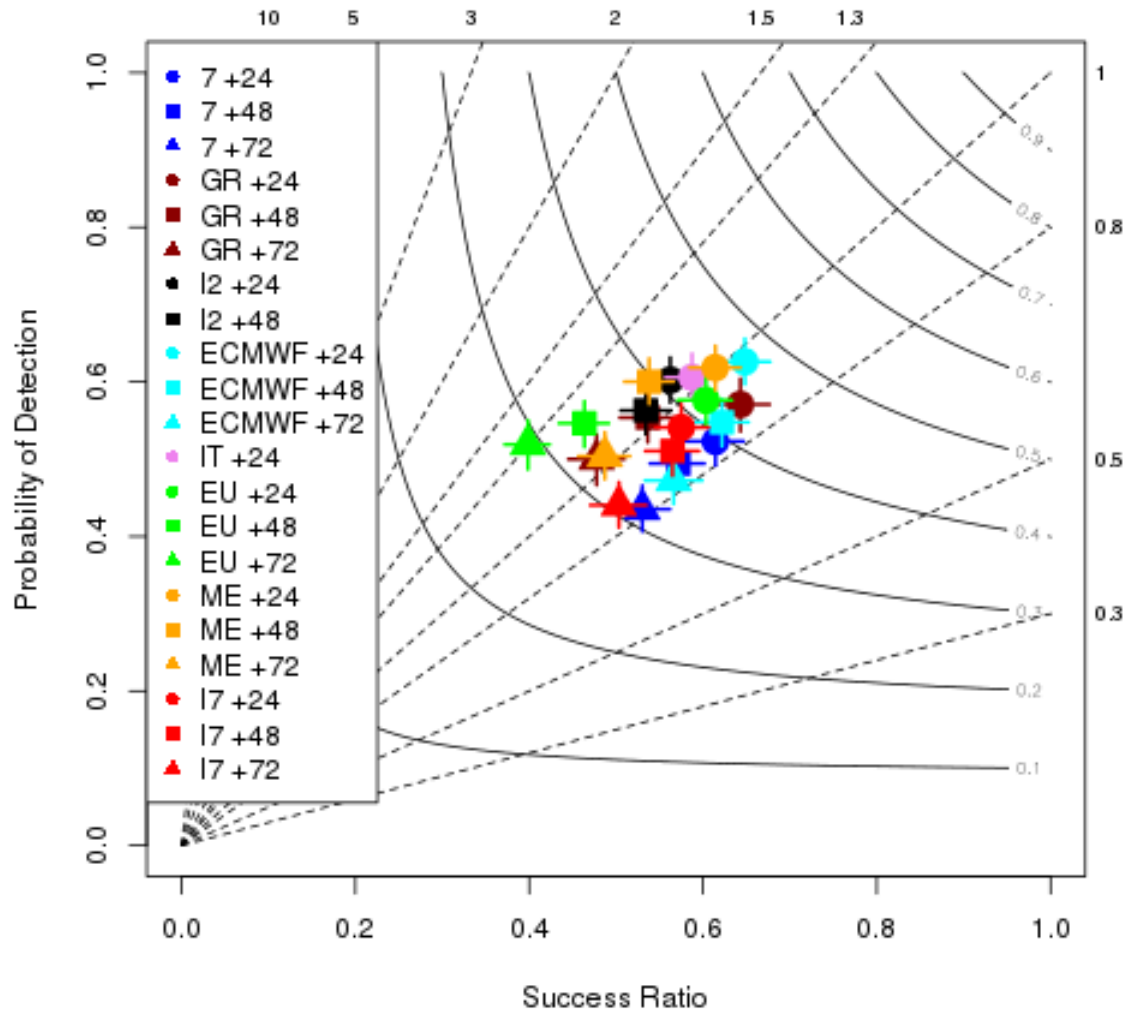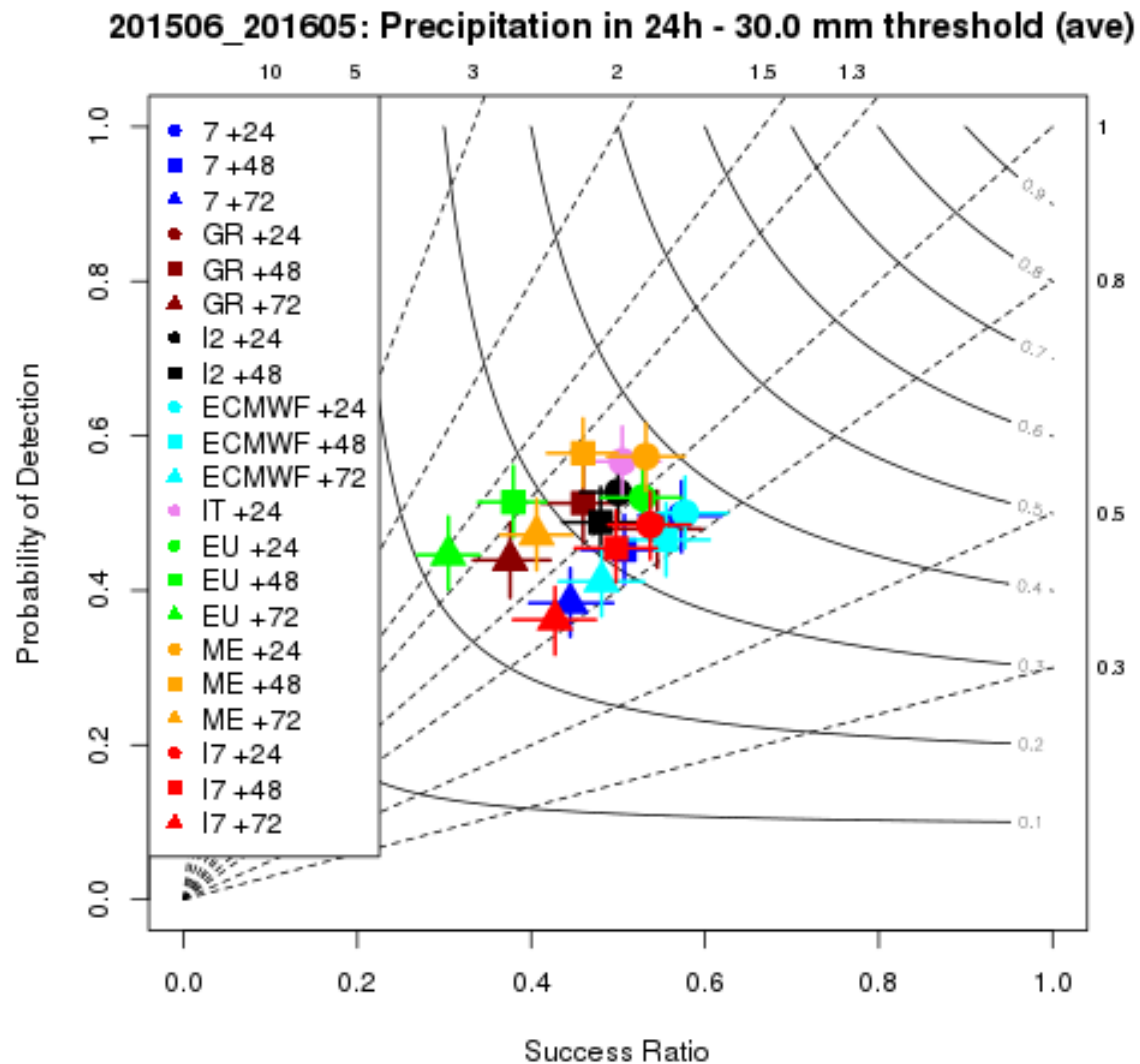201506_201605: Precipitation in 24h - 30.0 mm threshold (ave)

ME, I2,IT, EU →
good

I7,7, ecmwf→
underestimation

201506- 201605: Average over area > 50 mm/24h
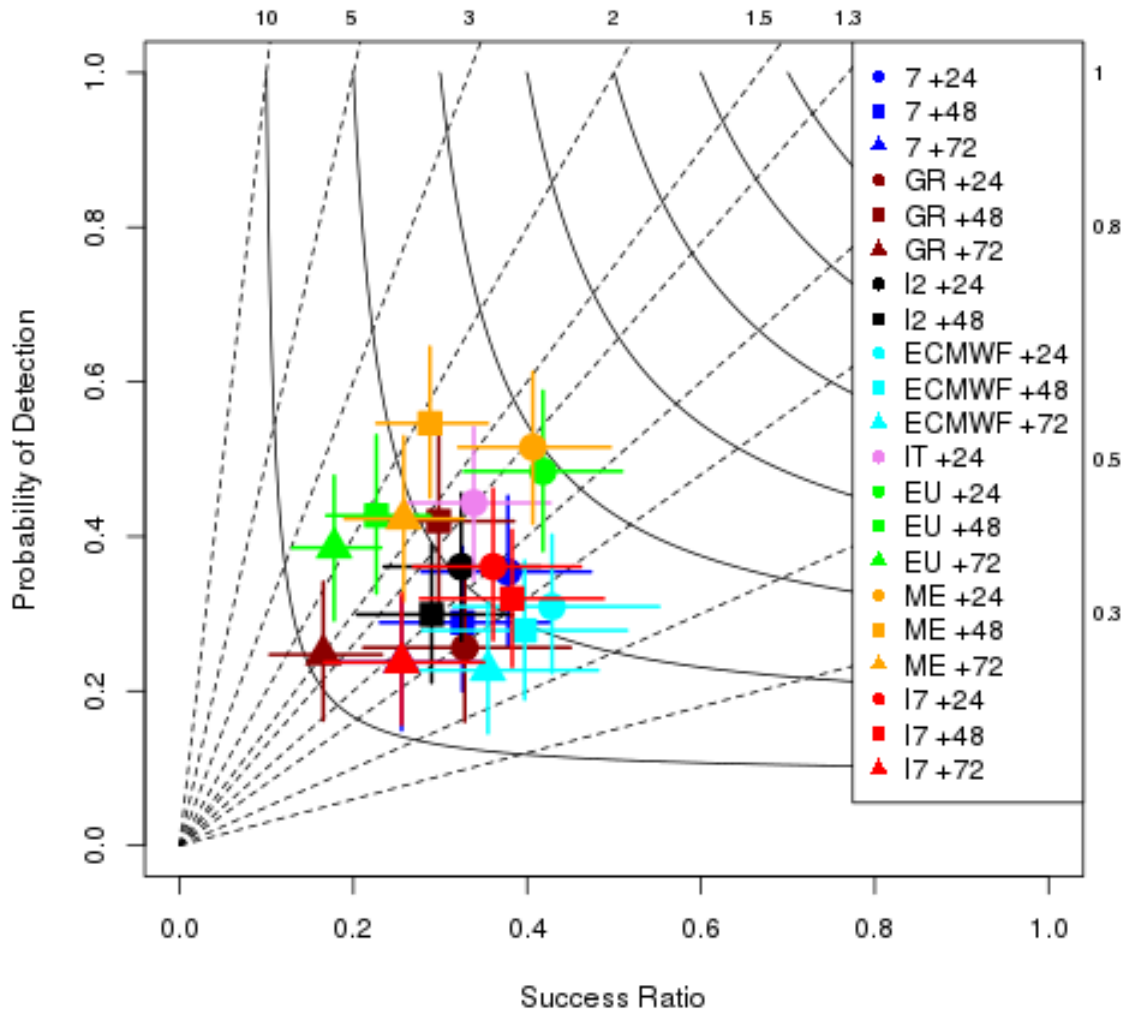
ME, EU → best

IT -> good

7, I7, GR, ecmwf→ low skills/underesti mation

201506_201605: Precipitation in 24h - 50.0 mm threshold (ave)

Legend:
- 7 +24
- 7 +48
- 7 +72
- GR +24
- GR +48
- GR +72
- I2 +24
- I2 +48
- ECMWF +24
- ECMWF +48
- ECMWF +72
- IT +24
- EU +24
- EU +48
- EU +72
- ME +24
- ME +48
- ME +72
- I7 +24
- I7 +48
- I7 +72

201506-201605: Maximum over area > 0.2 mm/24h

ecmwf→ good

other→ underestimation

ECMWF -> best performance

201506_201605: Precipitation in 24h - 0.2 mm threshold (max)

Legend:
- 7 +24
- 7 +48
- 7 +72
- GR +24
- GR +48
- GR +72
- I2 +24
- I2 +48
- ECMWF +24
- ECMWF +48
- ECMWF +72
- IT +24
- EU +24
- EU +48
- EU +72
- ME +24
- ME +48
- ME +72
- I7 +24
- I7 +48
- I7 +72

Probability of Detection (y-axis), Success Ratio (x-axis)

201506-201605: Maximum over area > 2 mm/24h
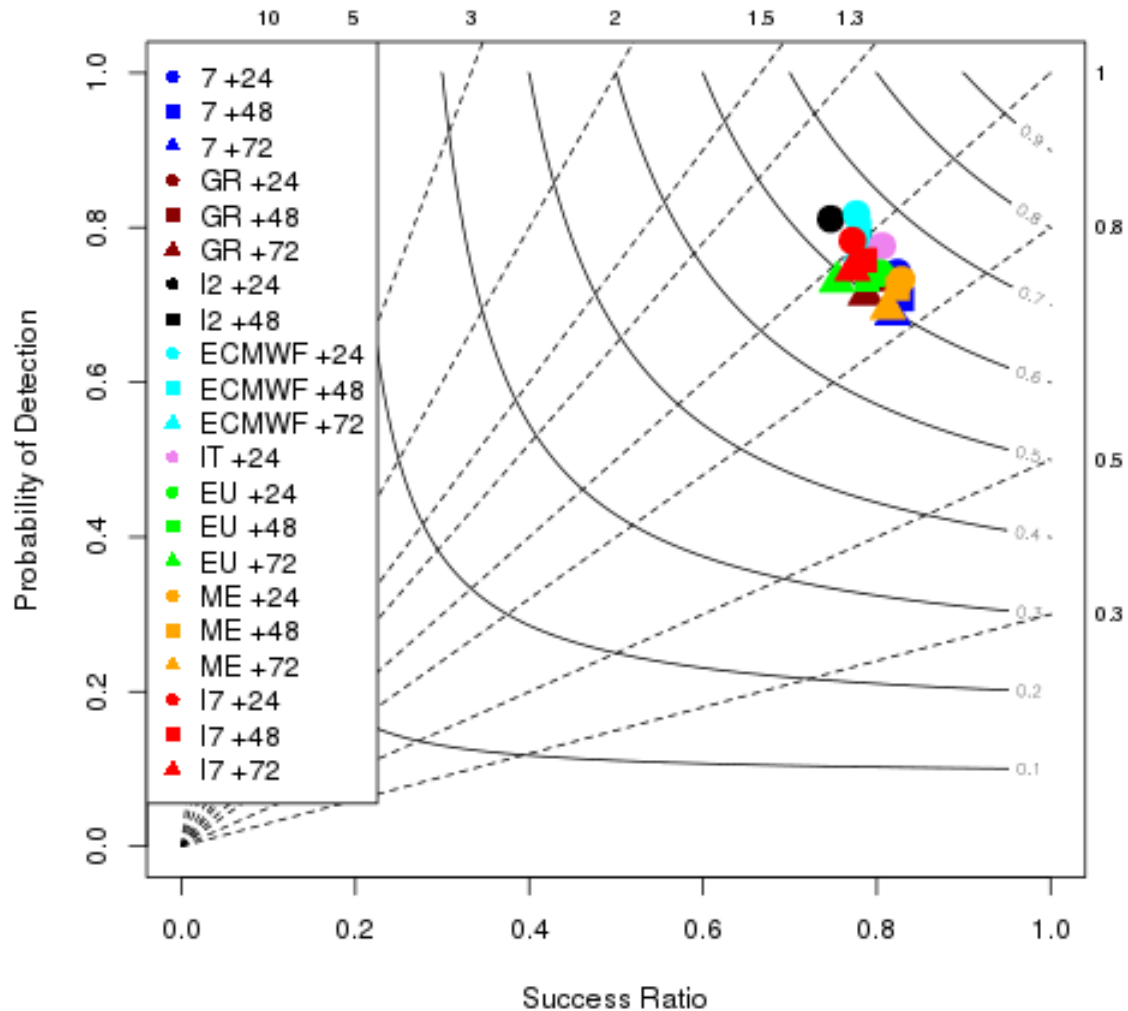
Same behaviour for all models

201506_201605: Precipitation in 24h - 2.0 mm threshold (max)

201506-201605: Maximum over area > 10 mm/24h

Splitted into 2 groups:

1) 2,8km overestimation

2) Ecmwf and 7km underestimation

201506_201605: Precipitation in 24h - 10.0 mm threshold (max)

Legend:
- 7 +24
- 7 +48
- 7 +72
- GR +24
- GR +48
- GR +72
- I2 +24
- I2 +48
- ECMWF +24
- ECMWF +48
- ECMWF +72
- IT +24
- EU +24
- EU +48
- EU +72
- ME +24
- ME +48
- ME +72
- I7 +24
- I7 +48
- I7 +72

201506-201605: Maximum over area > 20 mm/24h
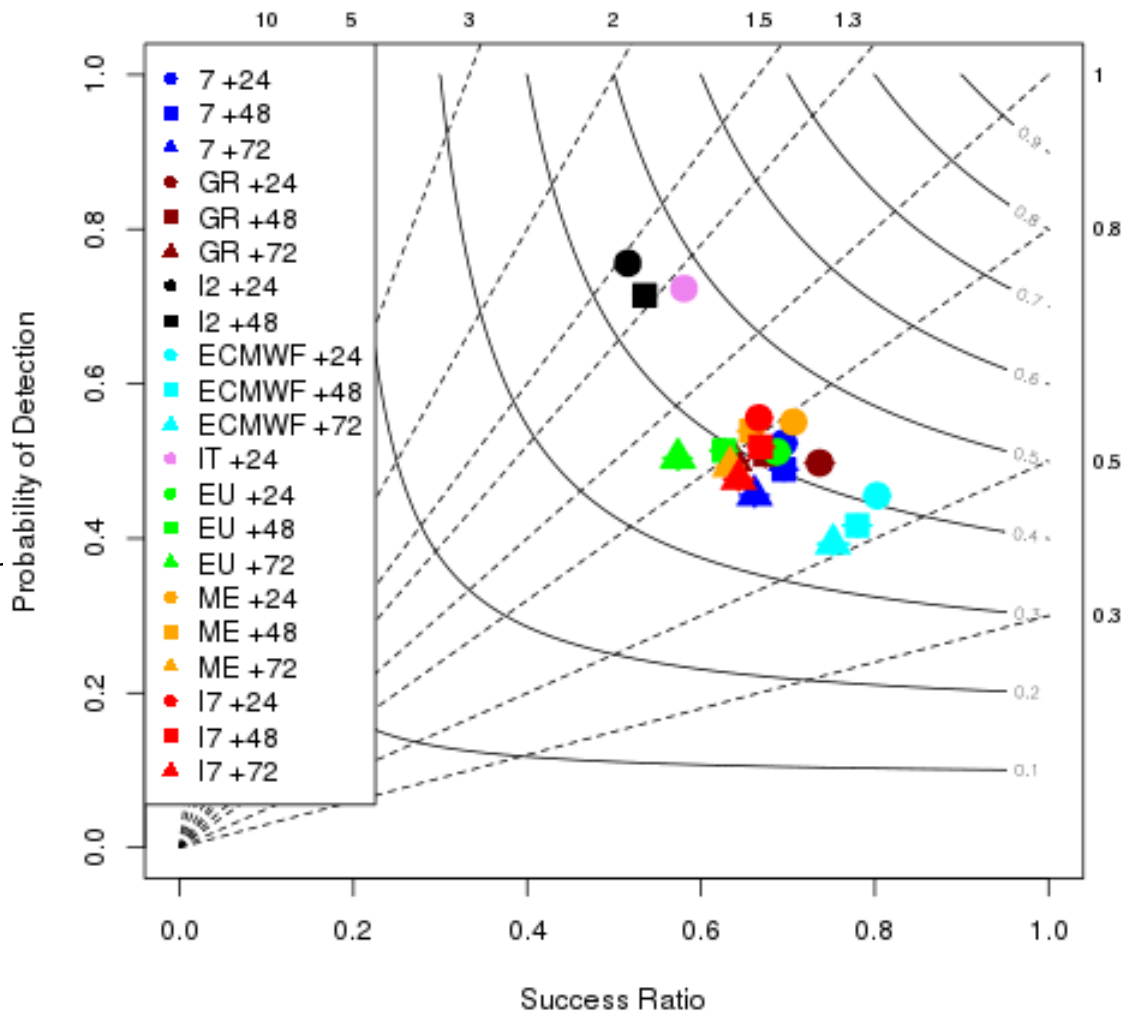
Splitted into 3 groups:

1) 2,8km overestimation

2) 7km below but close to bisector

3) ecmwf underestimation

201506_201605: Precipitation in 24h - 20.0 mm threshold (max)

201506-201605: Maximum over area > 30 mm/24h

Splitted into 3 groups:

1) 2,8km overestimation

2) 7km below but close to bisector

3) ecmwf underestimation

201506_201605: Precipitation in 24h - 30.0 mm threshold (max)

201306-201406: Maximum over area > 50 mm/24h
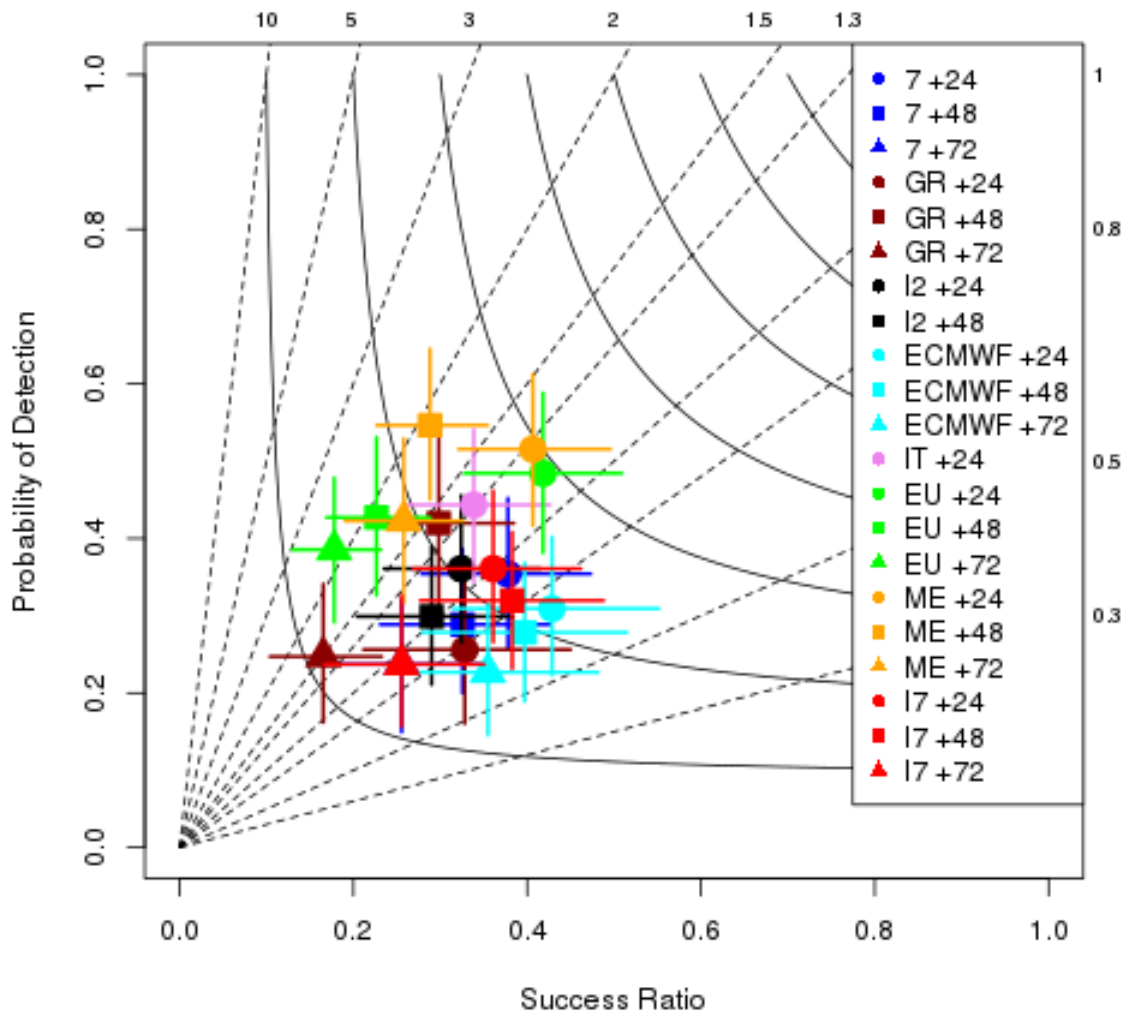
ME, EU -> best

IT -> good

Other LAM -> underestimation

Ecmwf -> worse

201506_201605: Precipitation in 24h - 50.0 mm threshold (ave)
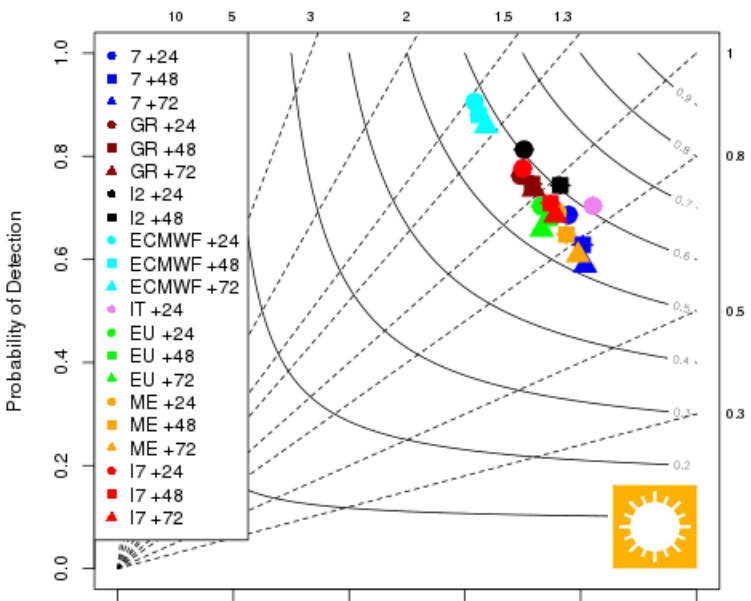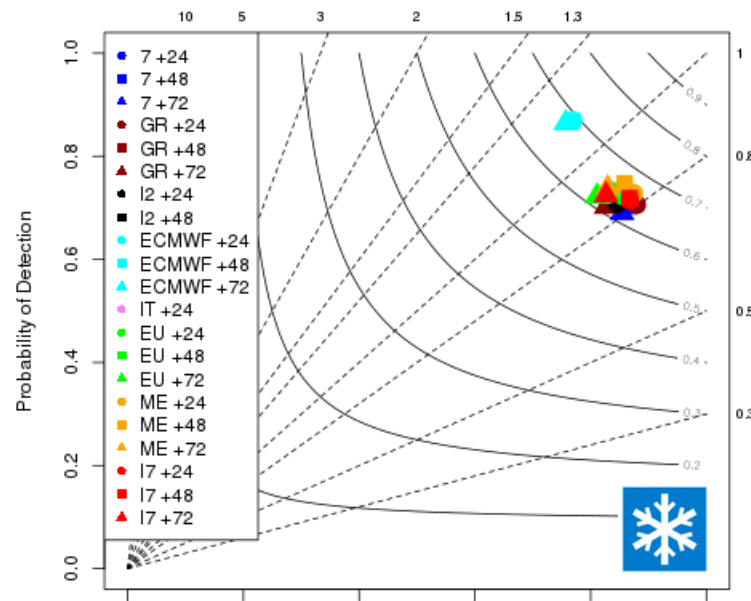
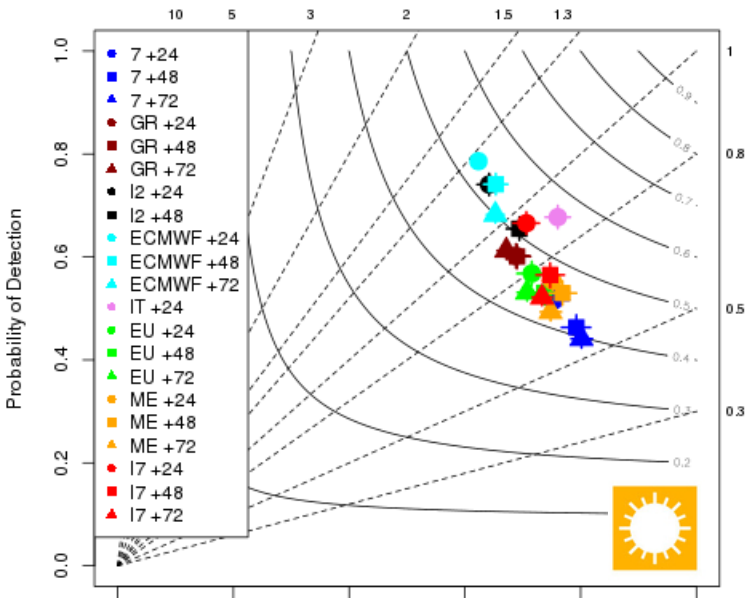**Average over area > 0.2 mm/24h**

ecmwf→ overestimation

other→ underestimation for SON15 and DJF16

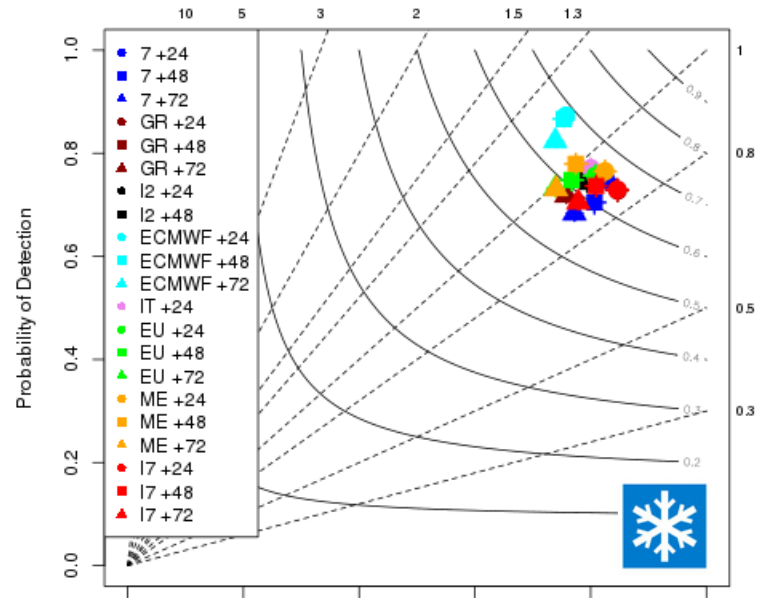201506_201508: Precipitation in 24h - 2.0 mm threshold (ave)
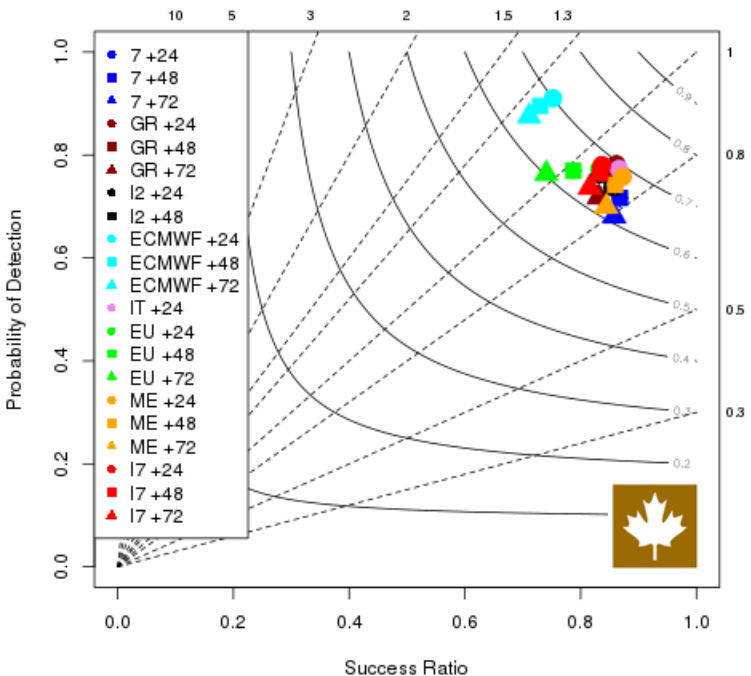
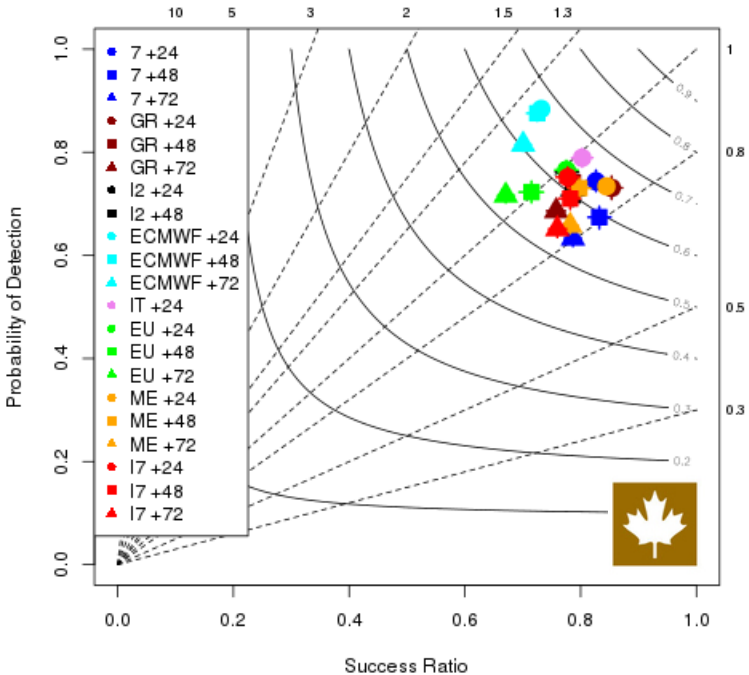201512_201602: Precipitation in 24h - 2.0 mm threshold (ave)
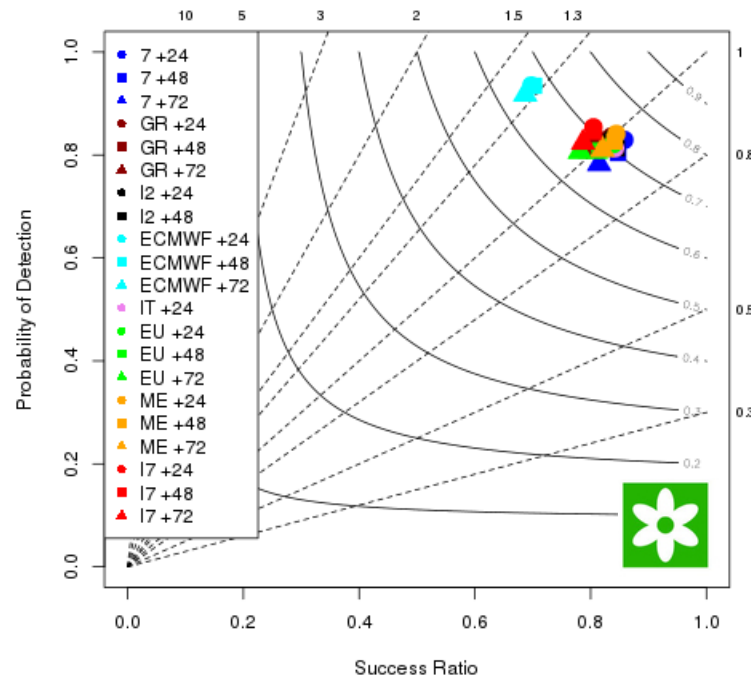
201509_201511: Precipitation in 24h - 2.0 mm threshold (ave)

201603_201605: Precipitation in 24h - 2.0 mm threshold (ave)
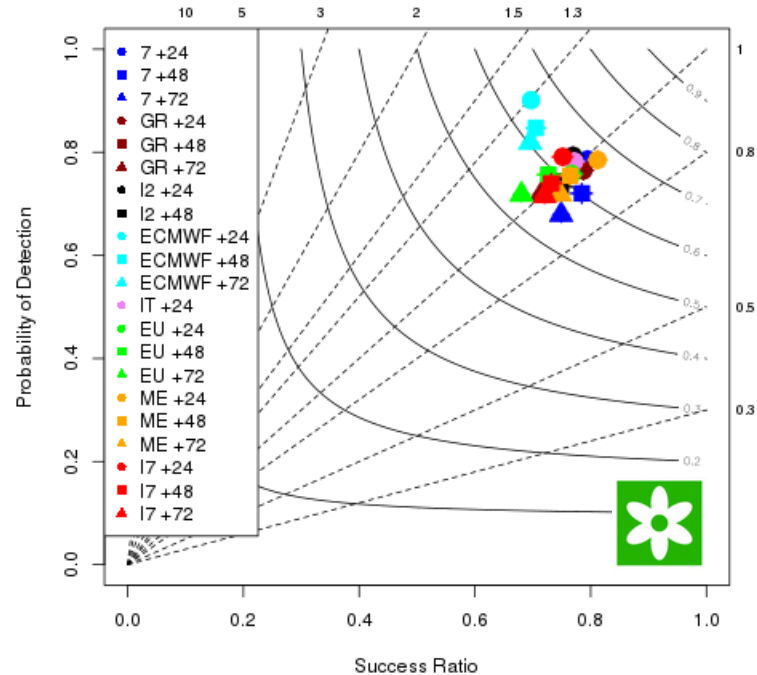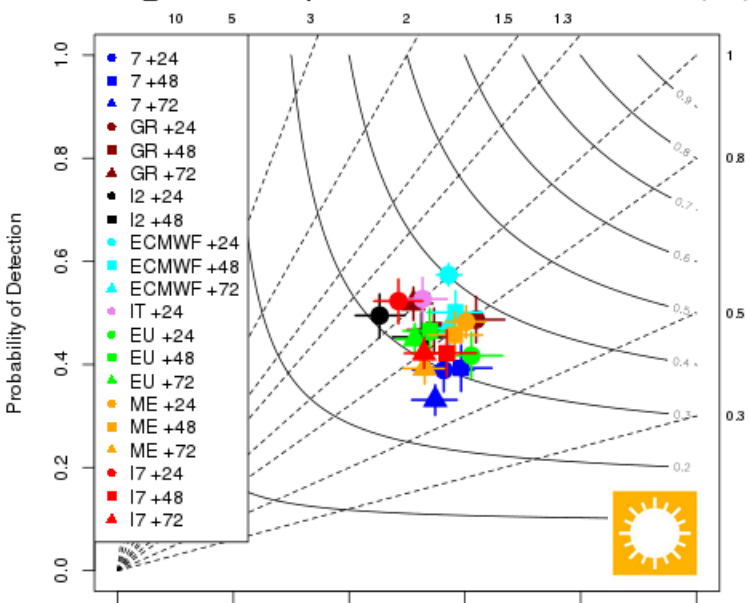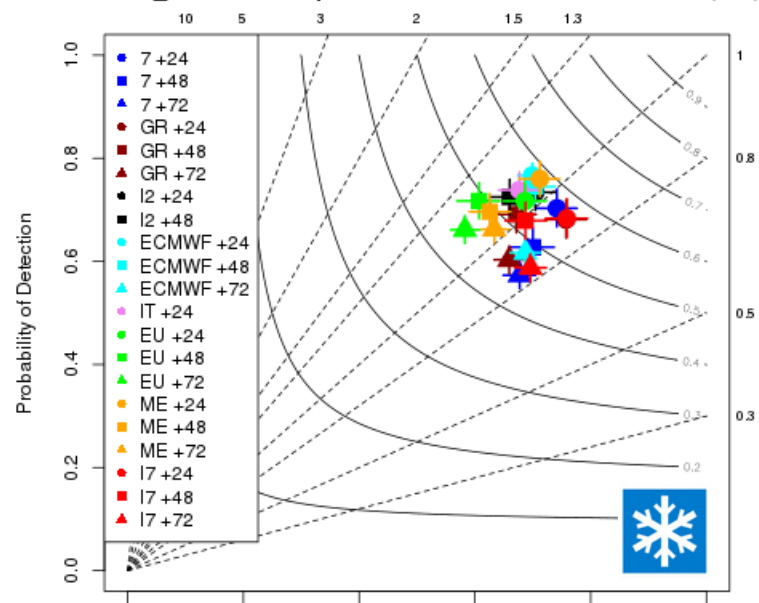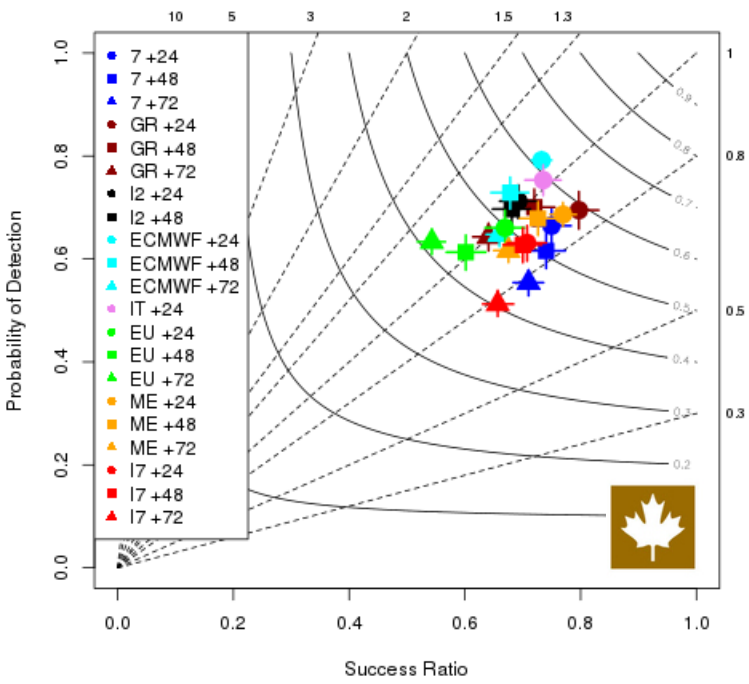
Average over area > 2 mm/24h

ecmwf→ overestimation

Jja15 -> low skill

201506_201508: Precipitation in 24h - 10.0 mm threshold (ave)

201512_201602: Precipitation in 24h - 10.0 mm threshold (ave)

201509_201511: Precipitation in 24h - 10.0 mm threshold (ave)

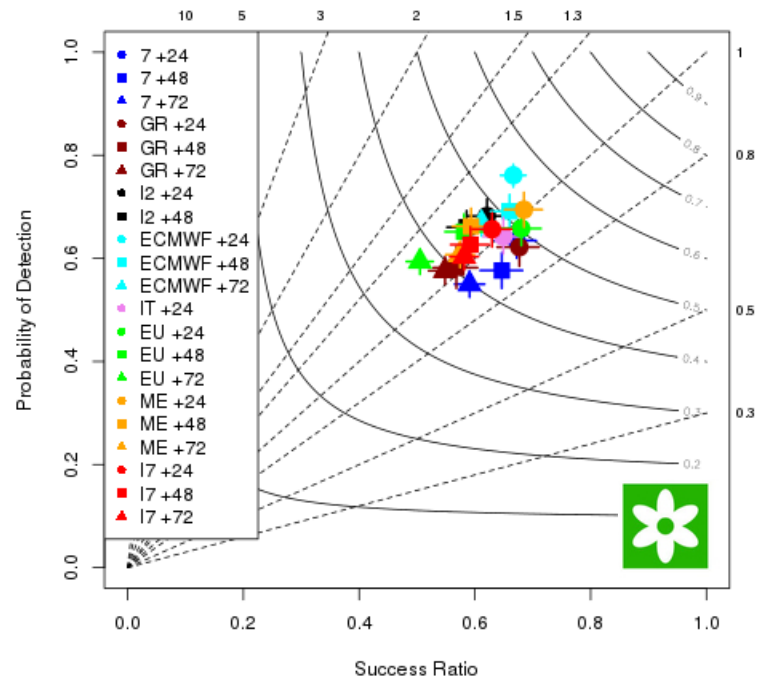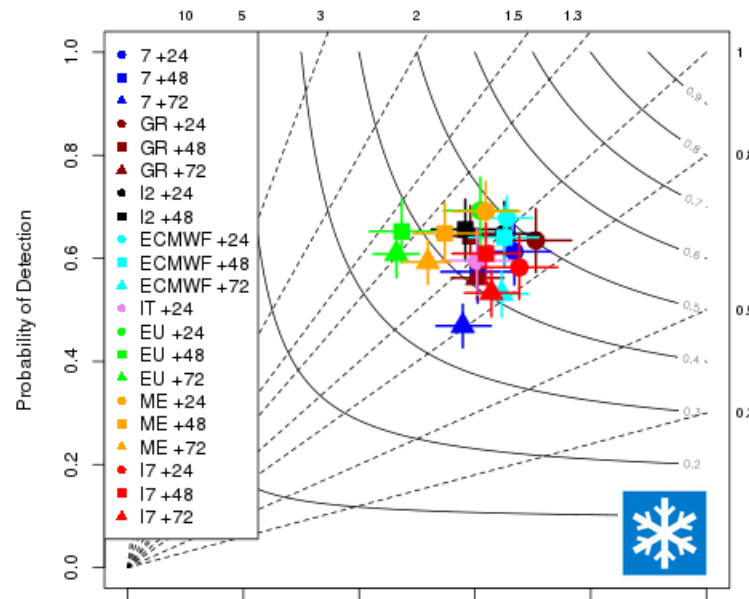**201603_201605: Precipitation in 24h - 10.0 mm threshold (ave)**

Average over area > 10 mm/24h

Good behaviour for ECMWF
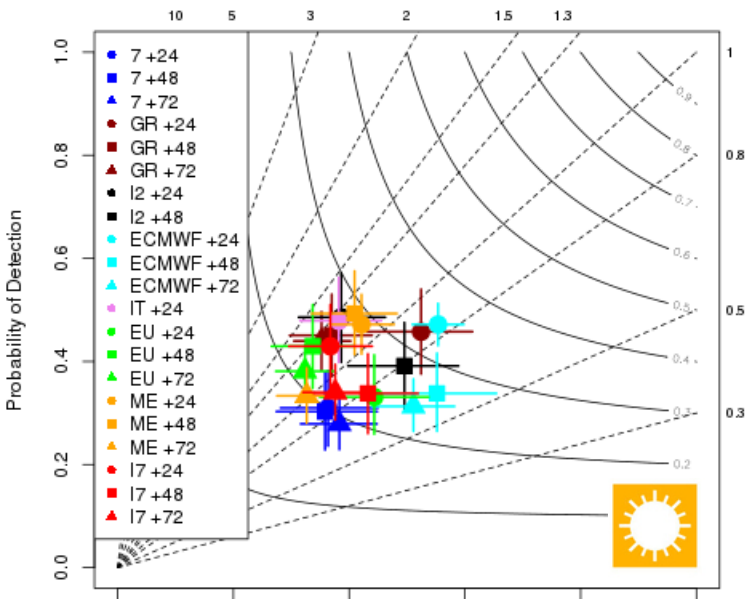
Jja15 -> low skill

Average over area > 20 mm/24h

Similar behaviour for all models

Jja15 -> low skill

Better performance during winter

201506_201508: Precipitation in 24h - 30.0 mm threshold (ave)

201512_201602: Precipitation in 24h - 30.0 mm threshold (ave)

201509_201511: Precipitation in 24h - 30.0 mm threshold (ave)
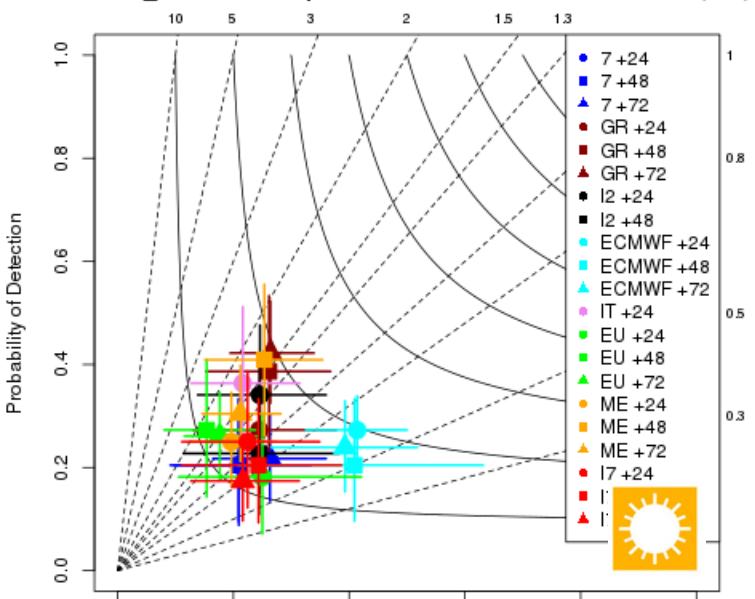
201603_201605: Precipitation in 24h - 30.0 mm threshold (ave)

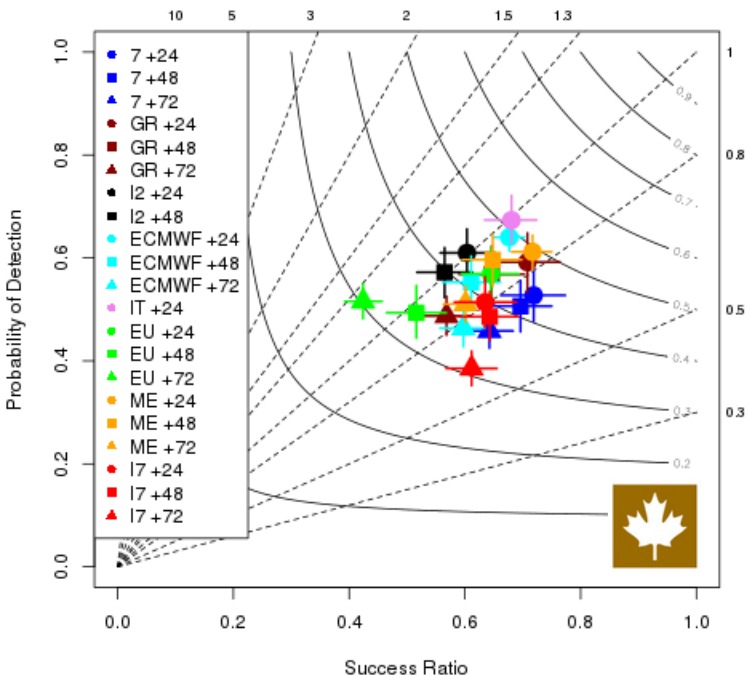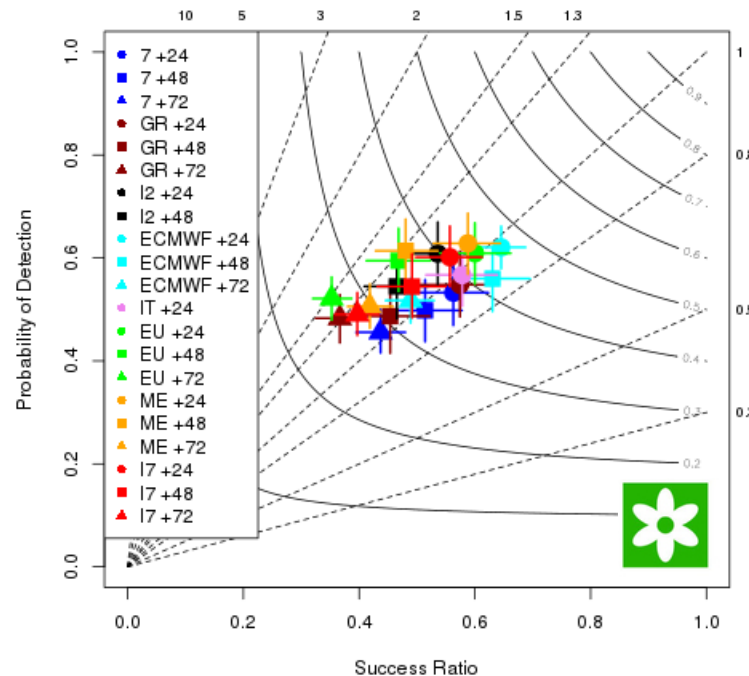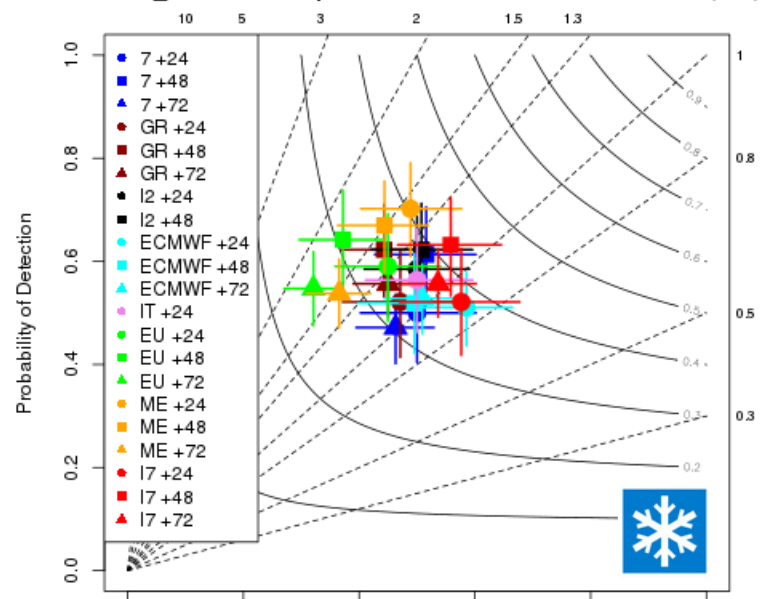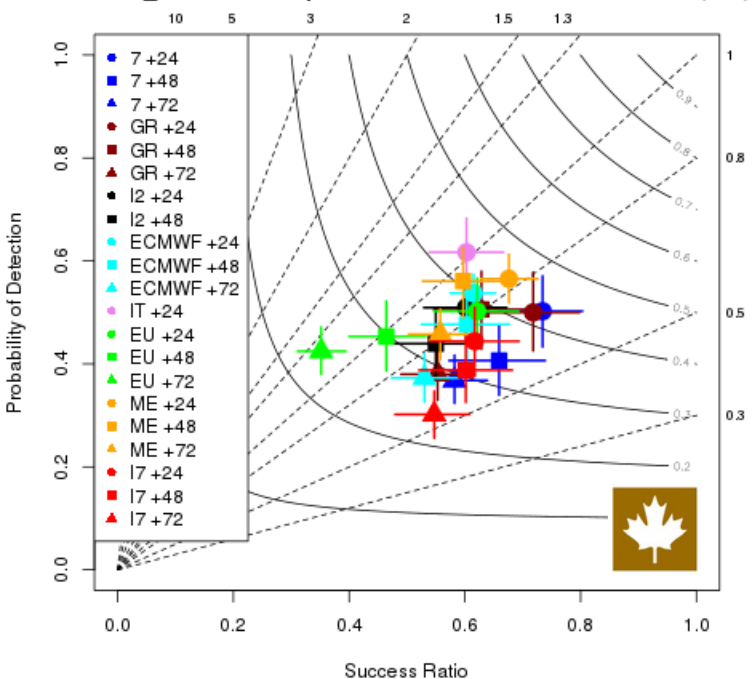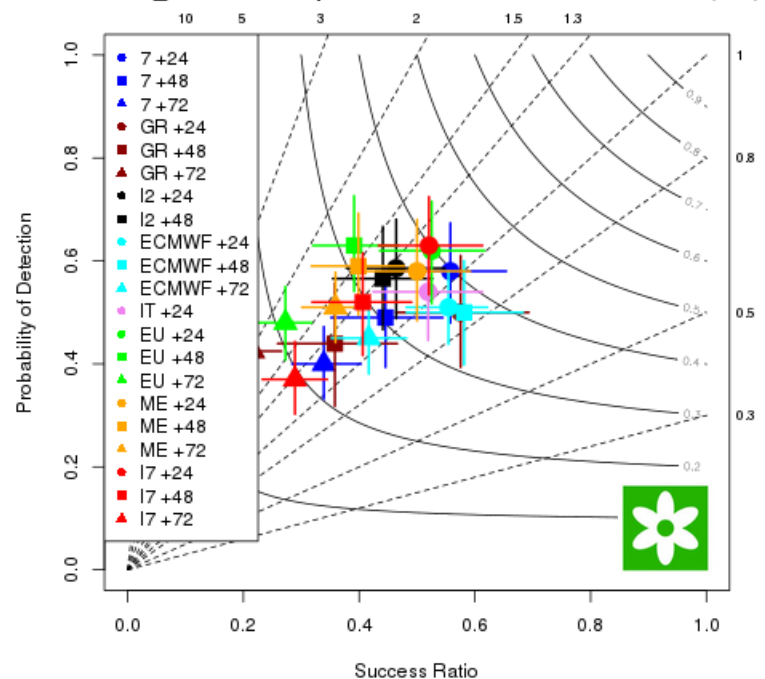**Average over area > 30 mm/24h**
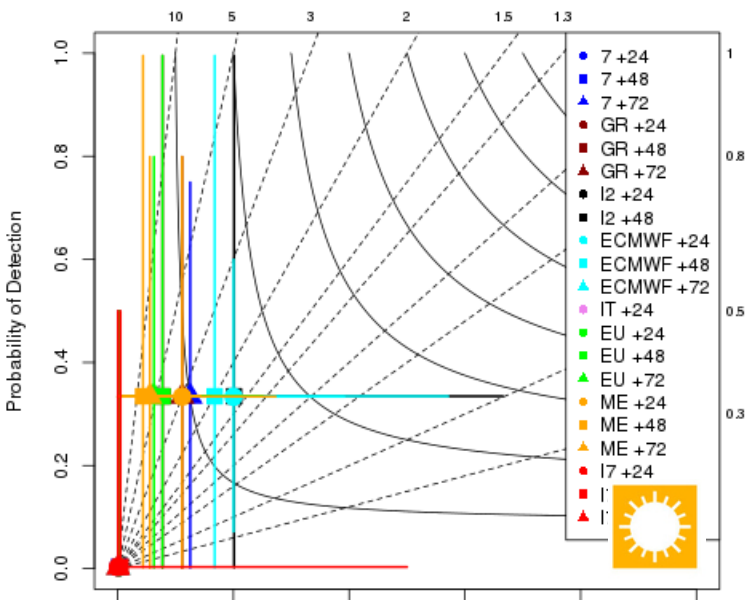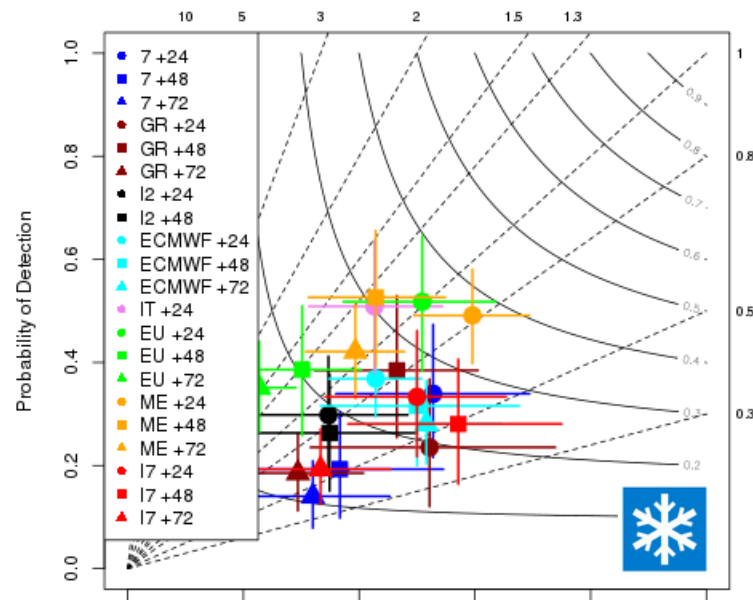
Jja15 -> low skill

Djf16 -> best skill

Average over area > 50 mm/24h
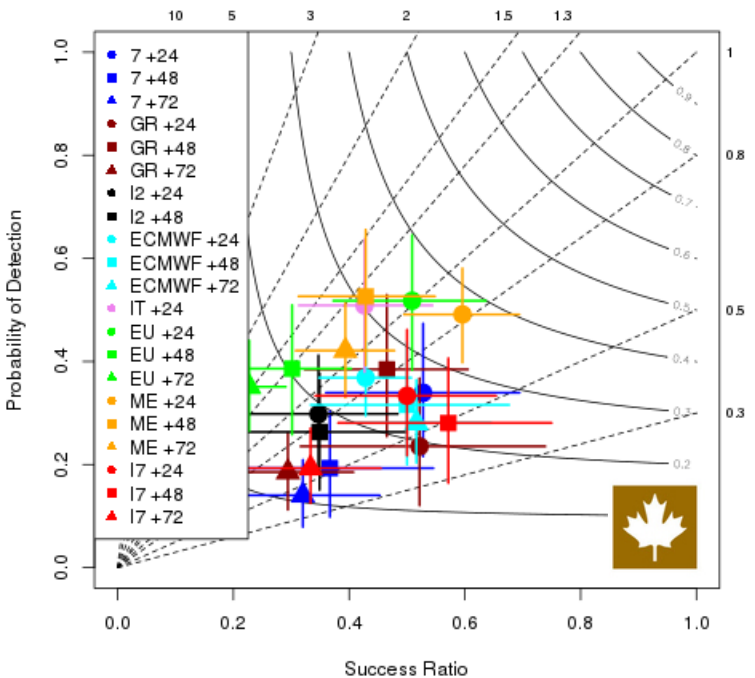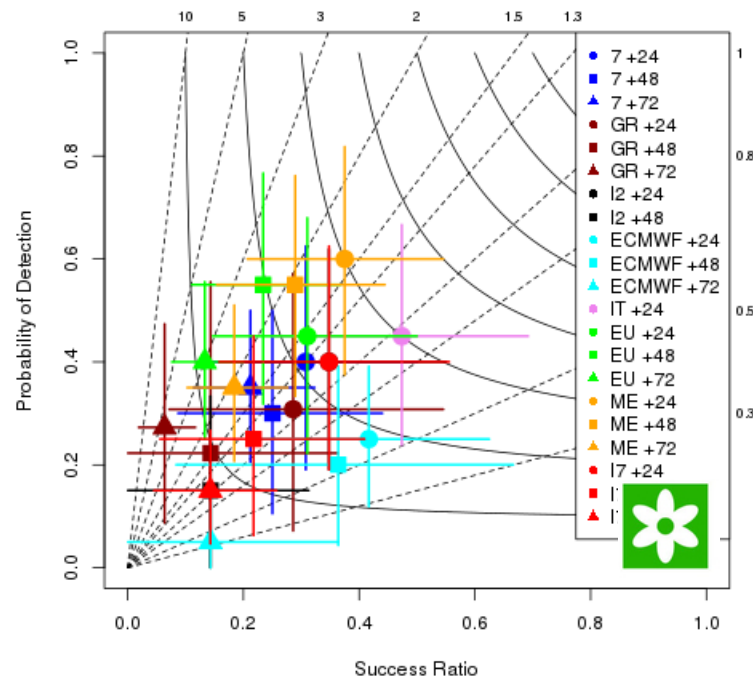
Jja15 -> low skill

ME -> good behaviour

Relative error – jja15

ECMWF

COSMOI7

COSMOI2

	NO DATA
	-100 - -60
	-60 - -20
	-20 - 20
	20 - 60
	60 - 100
	>100

COSMOME

COSMOIT

OBS

	NO DATA
	0 - 50 mm
	50 - 100 mm
	100- 150 mm
	150 - 200 mm
	200 - 250 mm
	250 - 300 mm
	300 - 350 mm
	350 - 400 mm
	400 - 450 mm
	450 - 500 mm
	>500 mm

Relative error – son15

ECMWF

COSMOI7

COSMOI2

	NO DATA
	-100 - -60
	-60 - -20
	-20 - 20
	20 - 60
	60 - 100
	>100

COSMOME

COSMOIT

OBS

	NO DATA
	0 - 50 mm
	50 - 100 mm
	100- 150 mm
	150 - 200 mm
	200 - 250 mm
	250 - 300 mm
	300 - 350 mm
	350 - 400 mm
	400 - 450 mm
	450 - 500 mm
	>500 mm

Relative error – djf16

ECMWF

COSMOI7

COSMOI2

COSMOME

COSMOIT

OBS

NO DATA
-100 - -60
-60 - -20
-20 - 20
20 - 60
60 - 100
>100

NO DATA
0 - 50 mm
50 - 100 mm
100- 150 mm
150 - 200 mm
200 - 250 mm
250 - 300 mm
300 - 350 mm
350 - 400 mm
400 - 450 mm
450 - 500 mm
>500 mm

Relative error – mam16

ECMWF

COSMOI7

COSMOI2

COSMOME

COSMOIT

OBS

NO DATA
-100 - -60
-60 - -20
-20 - 20
20 - 60
60 - 100
>100

NO DATA
0 - 50 mm
50 - 100 mm
100 - 150 mm
150 - 200 mm
200 - 250 mm
250 - 300 mm
300 - 350 mm
350 - 400 mm
400 - 450 mm
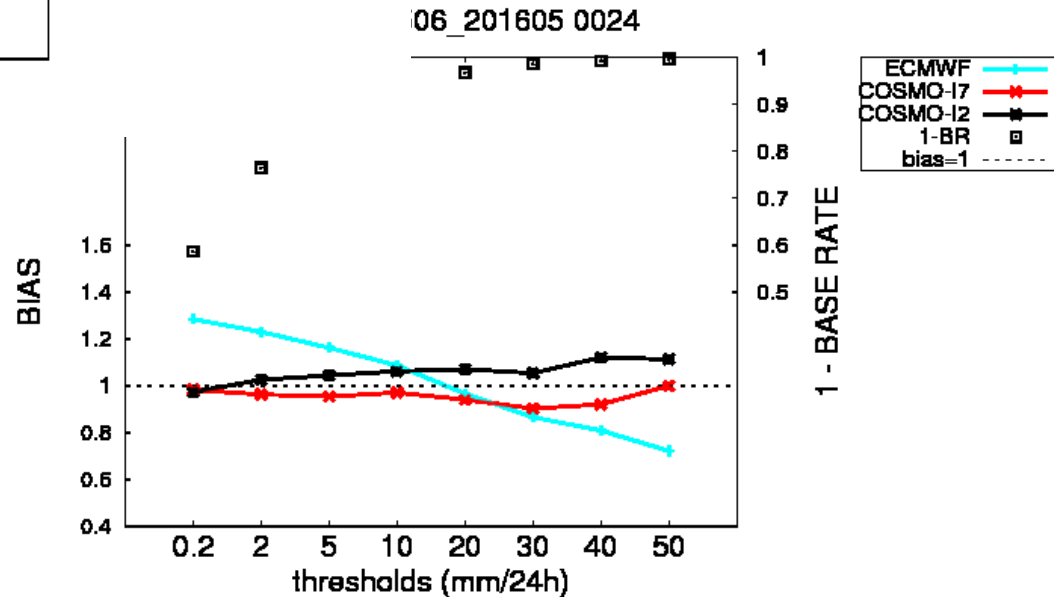450 - 500 mm
>500 mm

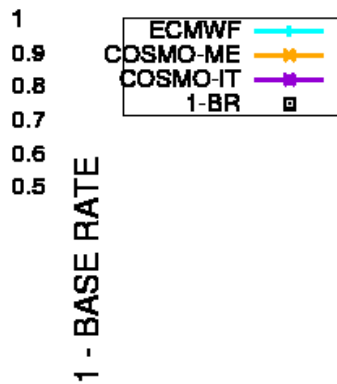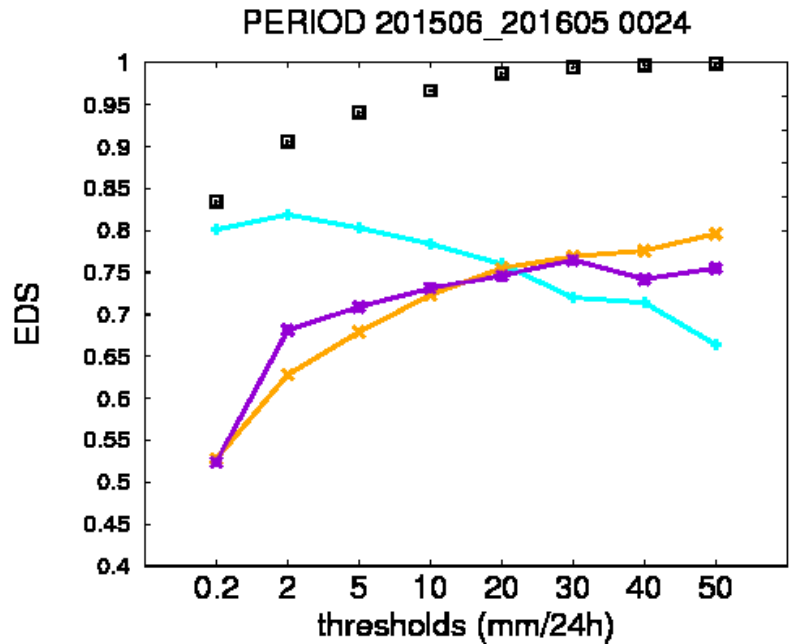# BIAS – ITALIAN MODELS

PERIOD 201506_201605 0024

ME, IT very related

*I7 underestimates
I2 overestimates*

EDS (Extreme Dependency Score)– ITALIAN MODELS
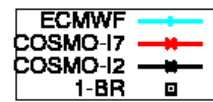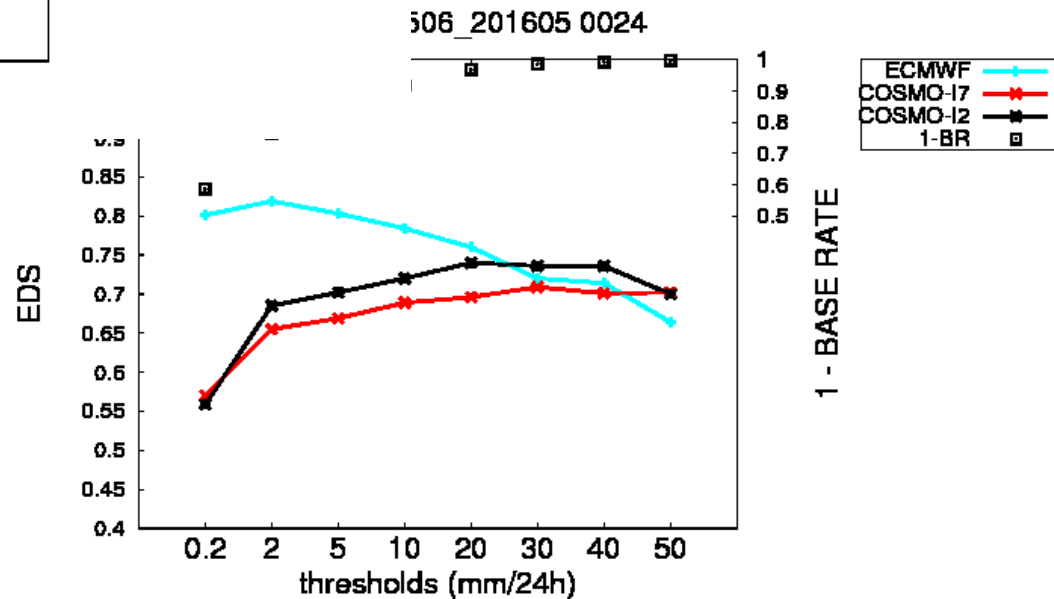

Better performance for COSMO ME

Worst performance for ECMWF

(High thresholds)

Similar behavior for ECMWF, COSMO I7 and COSMO I2

(High thresholds)

THANK YOU FOR YOUR ATTENTION!