VAST
Application on test cases

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September 7th, 2015

Test cases

- VAST has been used to verify the precipitation of COSMO I7 and COSMO I2 against the precipitation extrapolated from radar data

- The radar data have been upscaled to the model grid (7 km for COSMO I7 and 2.8 km dor COSMO I2) using the LIBSIM software

- Minimum box side – 1 grid point

  COSMO I7 ~ 7 km

  COSMO I2 ~ 2.8 km

- Maximum box side – 33 grid points:

  COSMO I7 ~ 230 km

  COSMO I2 ~ 92 km

Piemonte test cases: verified area

- Green area: visibility of the Piemonte radar mosaic
- 6 hours cumulation
- 0-6, 6-12, 12-18, 18-24
- COSMO I7 grid: 7 km
- COSMO I2 grid: 2.8 km
- Box is ok if more than 50% of pixel have data
- Mostly convective rain
- The Fraction Skill Score is shown for each case
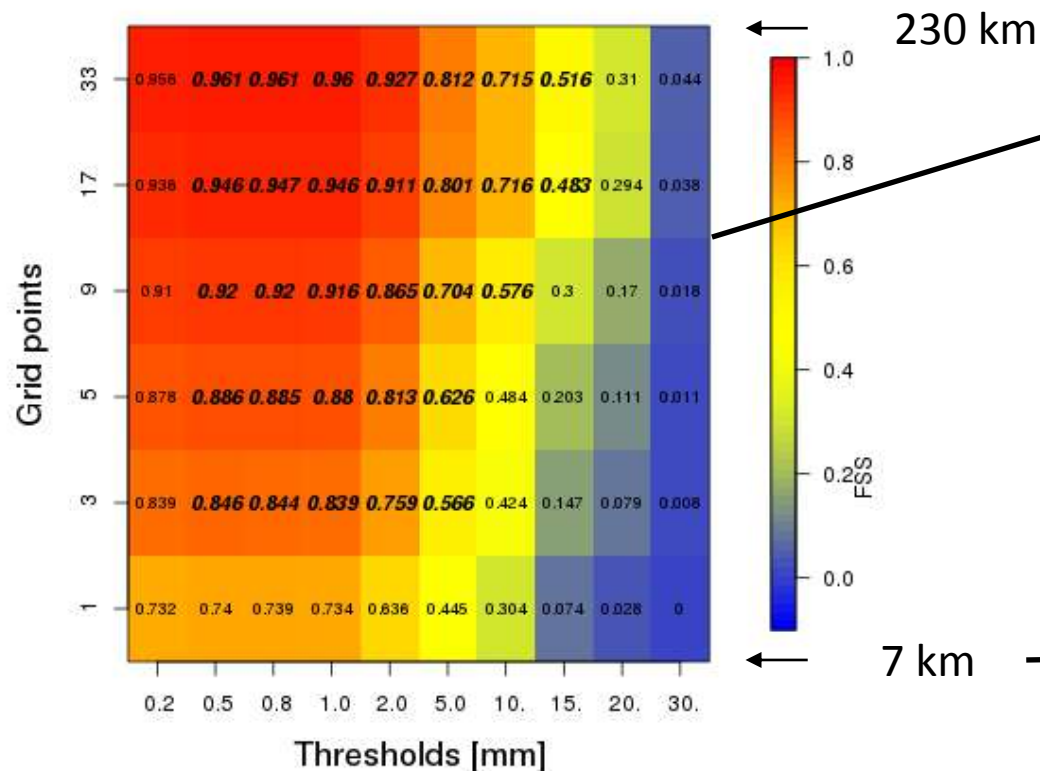 - 0 (blue) -> No skill
  - 1 (red) -> Perfect forecast

2014/07/23
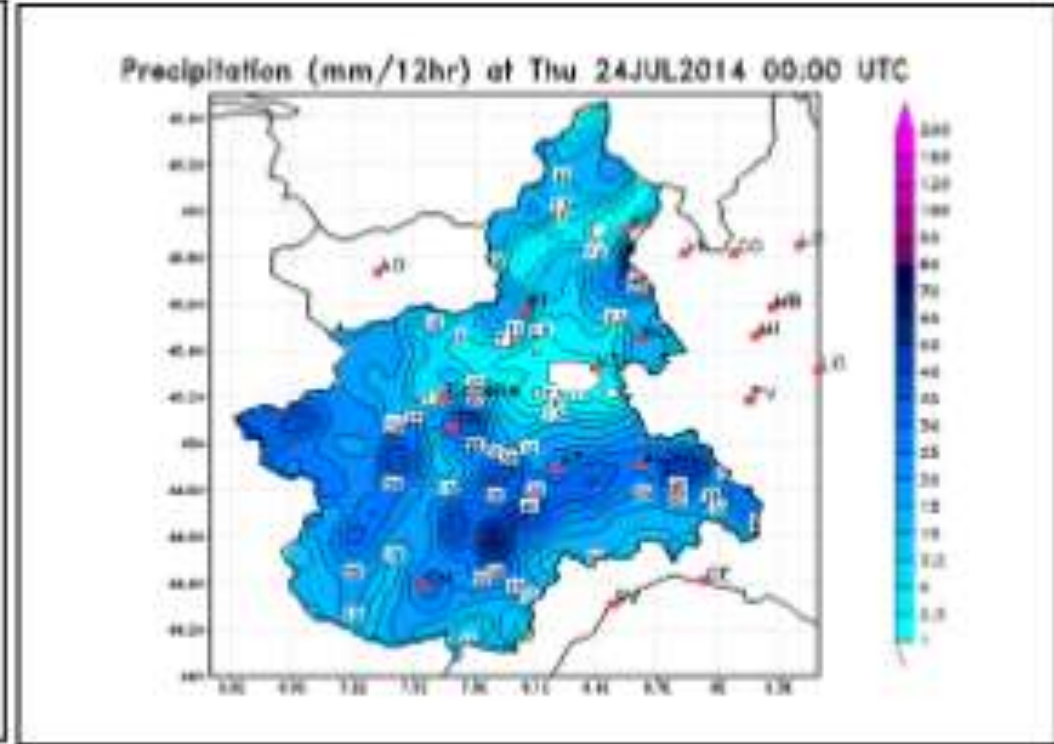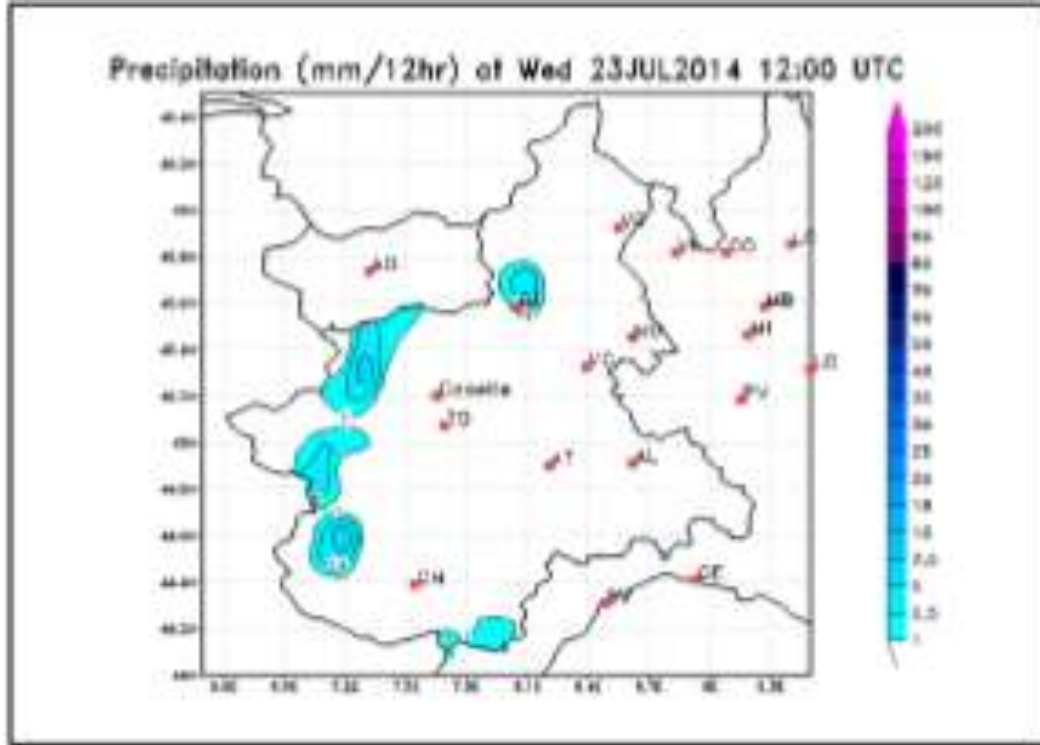
First rainfall in the late morning. Strong rainfall and well spread thunderstorms in the afternoon.
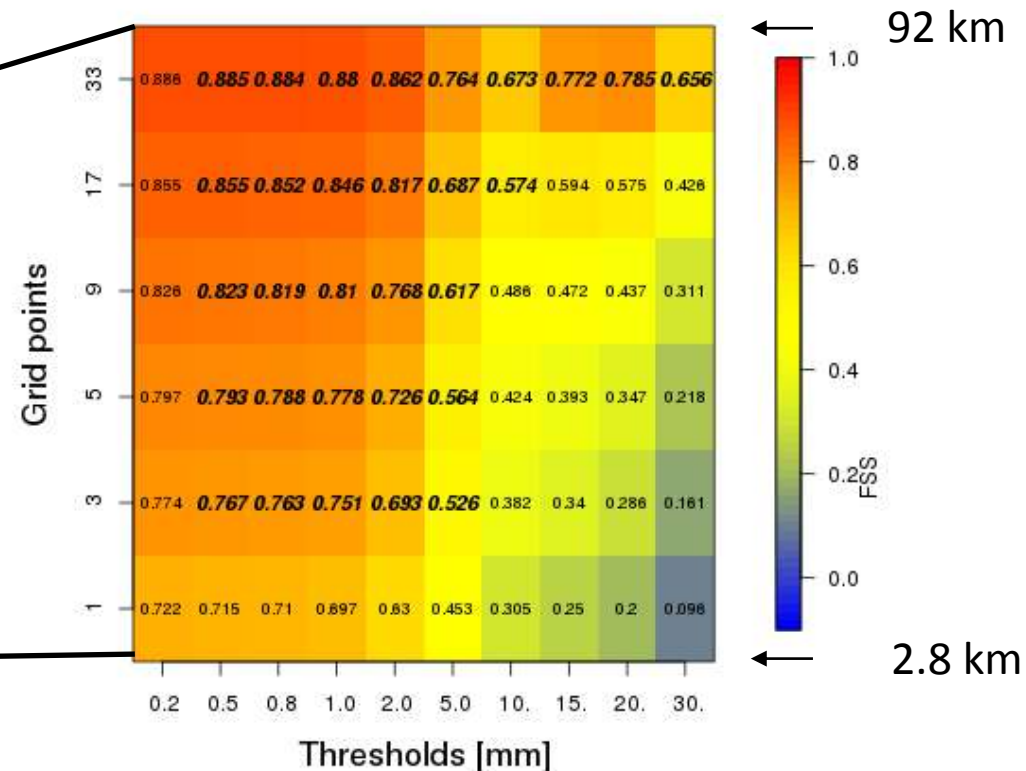
2014/07/23

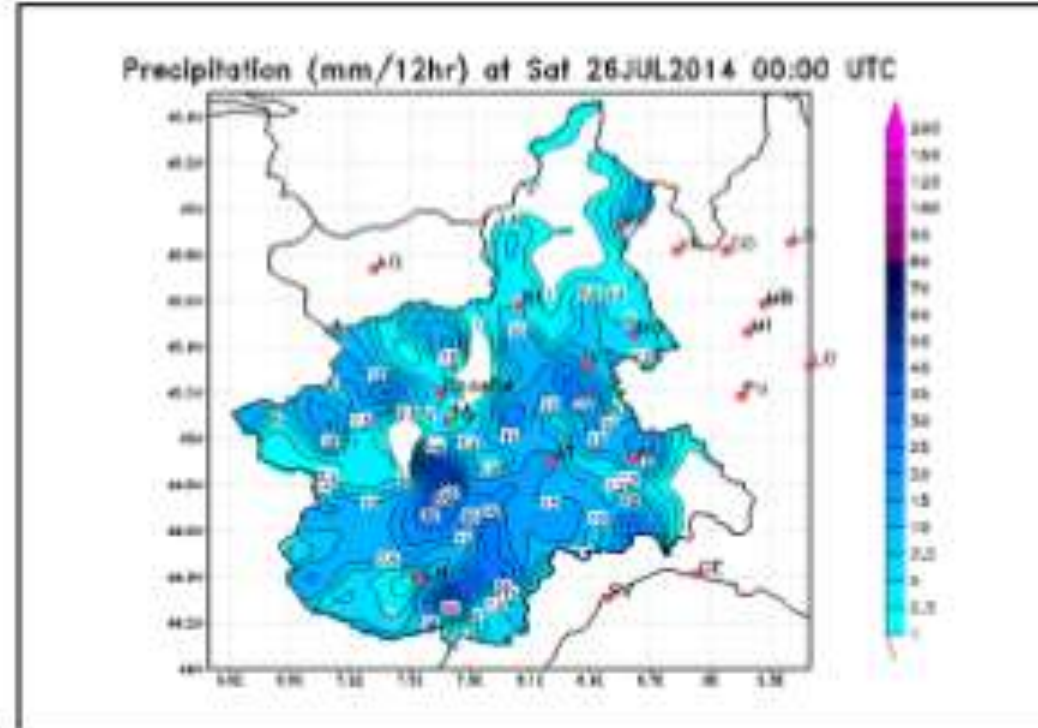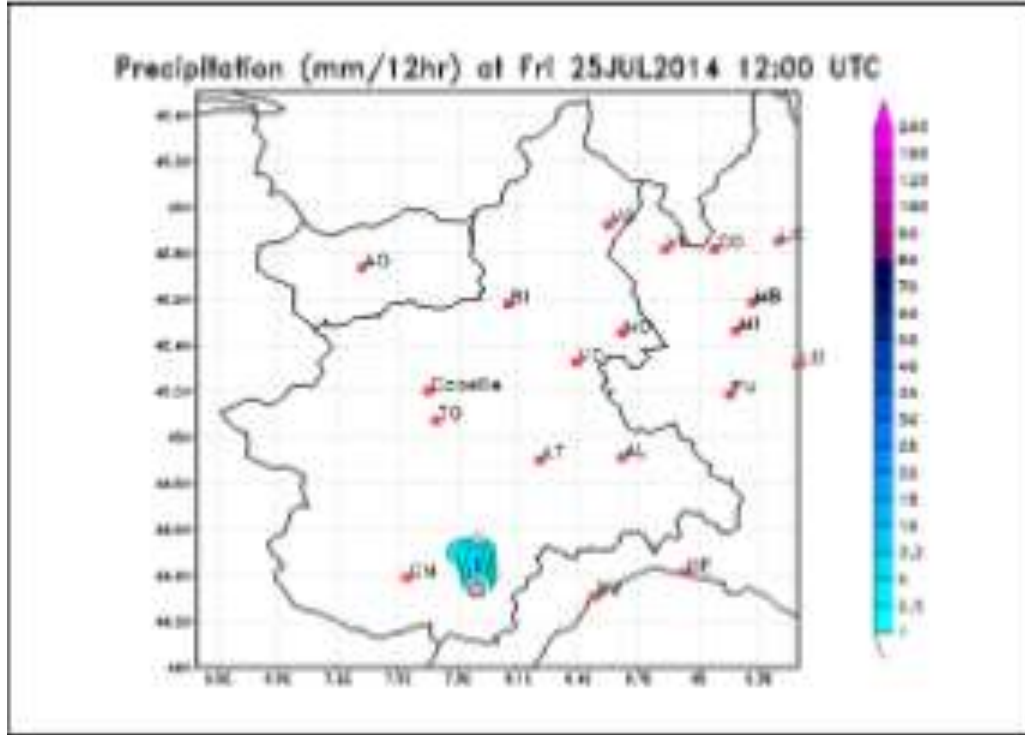Fractions skill score COSMO-I7 - FSS - 20140723_6h

Fractions skill score COSMO-I2 - FSS - 20140723_6h

230 km

92 km

7 km

2.8 km

Good results for COSMO I7 up to 15 mm. Better results (also at smaller scales and higher thresholds) for COSMO I2.

2014/07/25

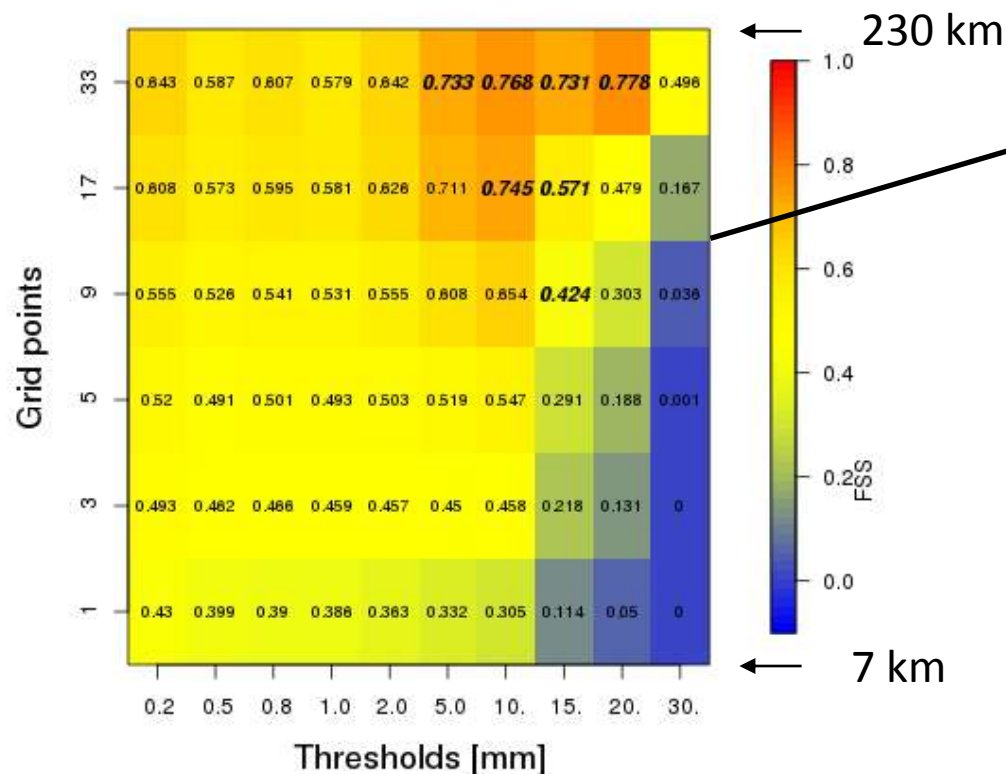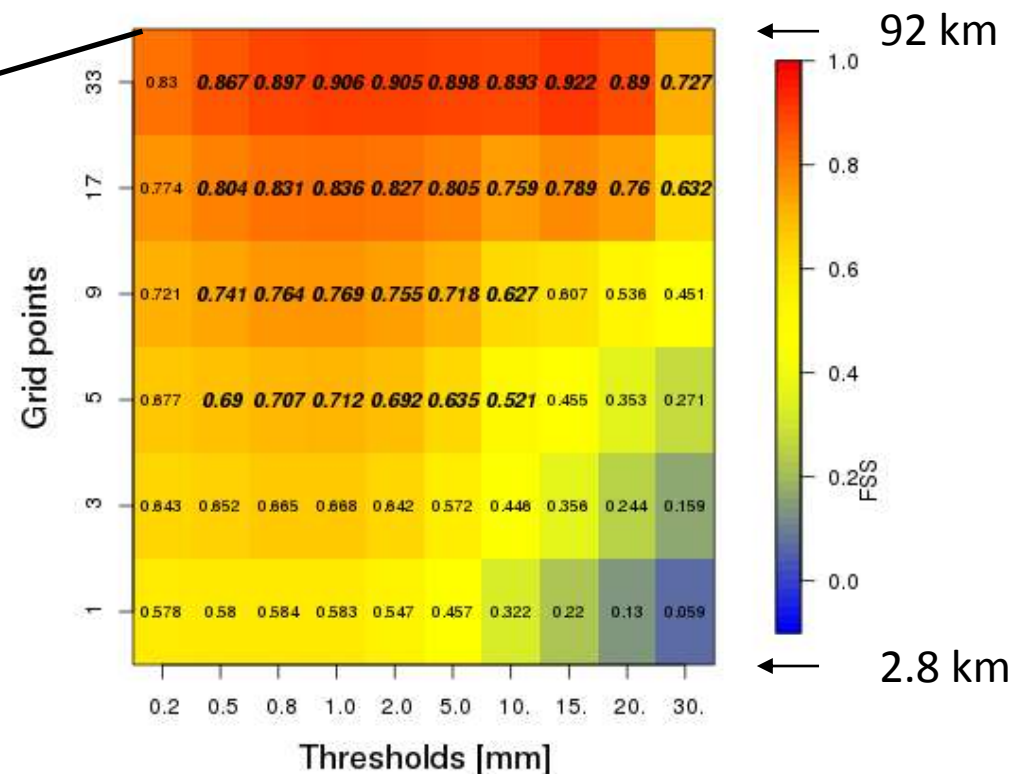Residual rainfall before sunrise, strong rainfall and well spread thunderstorms in the afternoon.

Good results for COSMO I7 for medium-high thresholds only for very large scales. Good results (also at smaller scales and lower and higher thresholds) for COSMO I2

2014/07/28

First rainfall in the morning over the northern Alps, strong and very strong rainfall and well spread thunderstorms in the afternoon.

2014/07/28
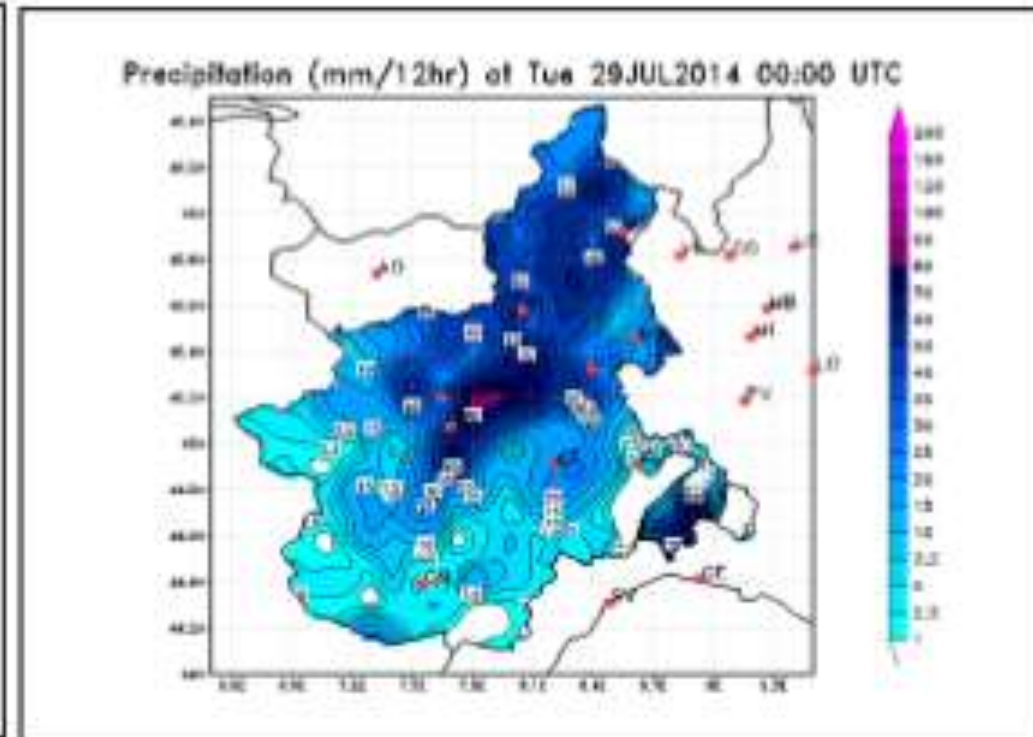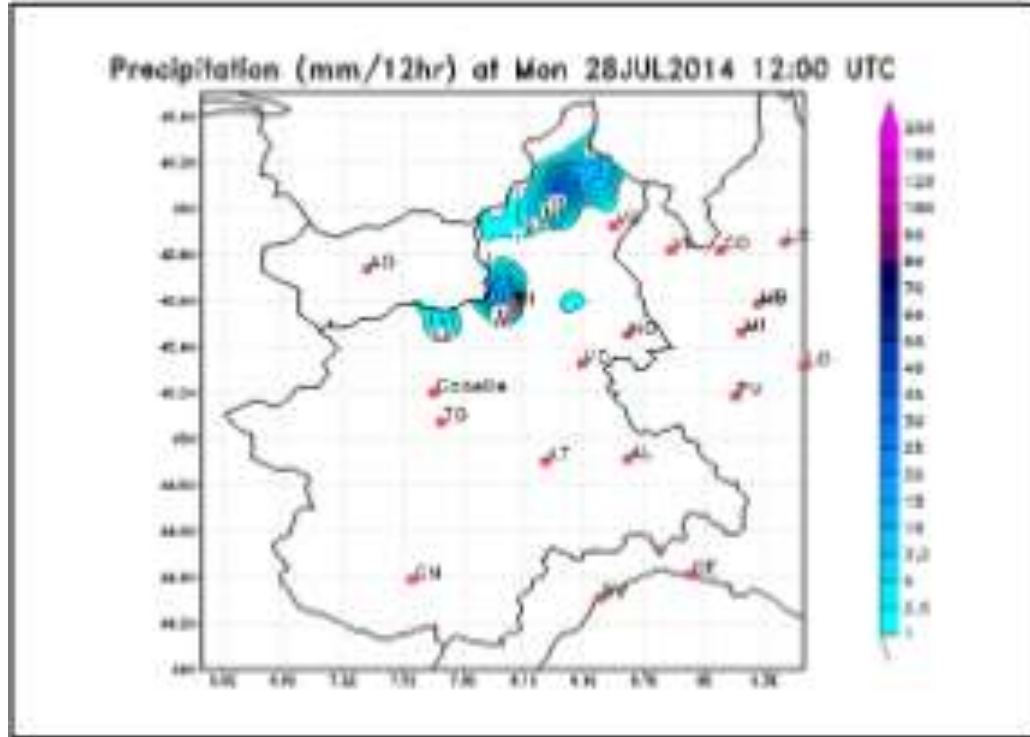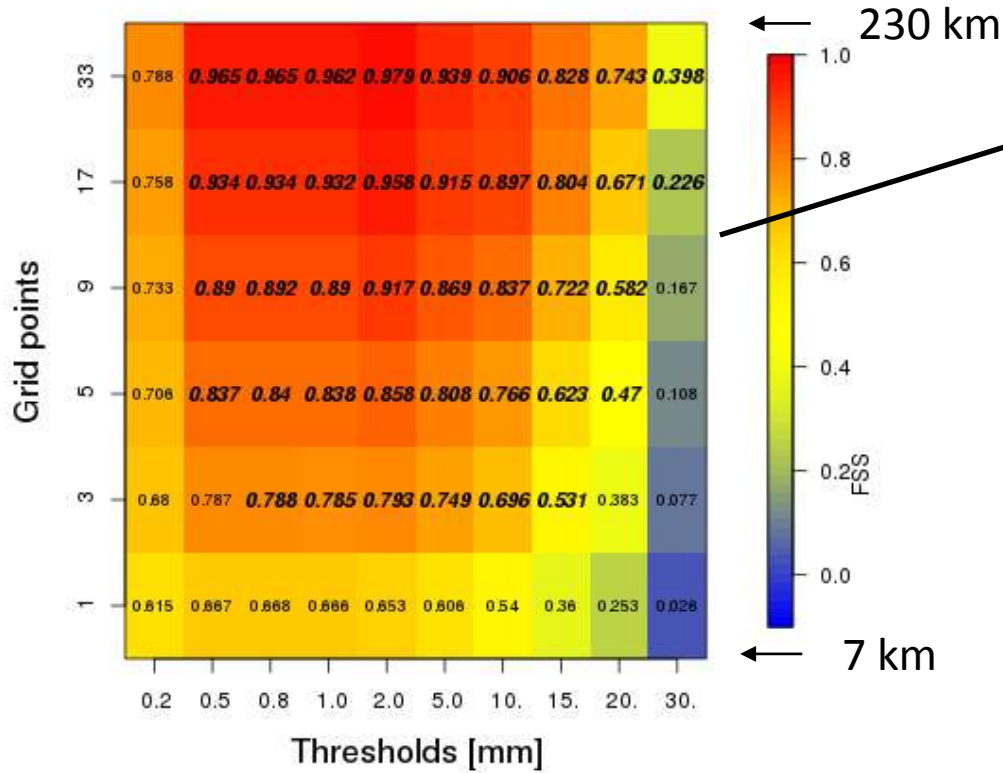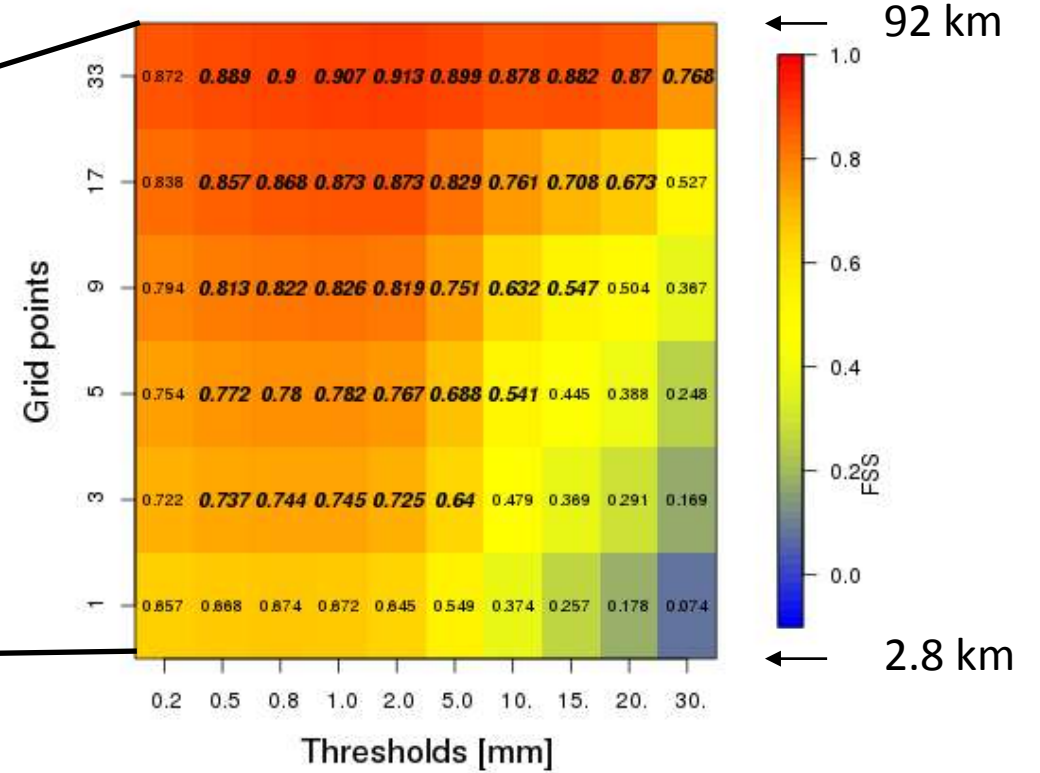

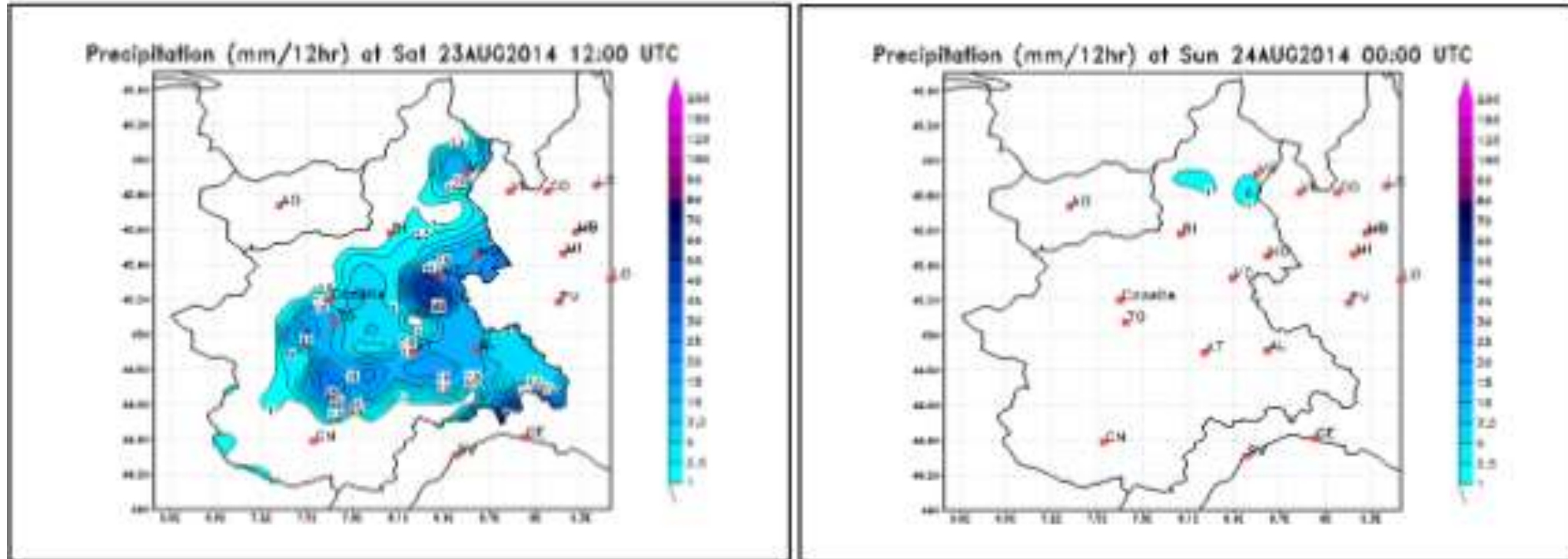Fractions skill score COSMO-I7 - FSS - 20140728_6h

Fractions skill score COSMO-I2 - FSS - 20140728_6h

Good results for COSMO I7 for all thresholds starting from medium-small scales.
Good results for COSMO I2, even better for high thresholds.

2014/08/23

Precipitation (mm/12hr) at Sat 23AUG2014 12:00 UTC

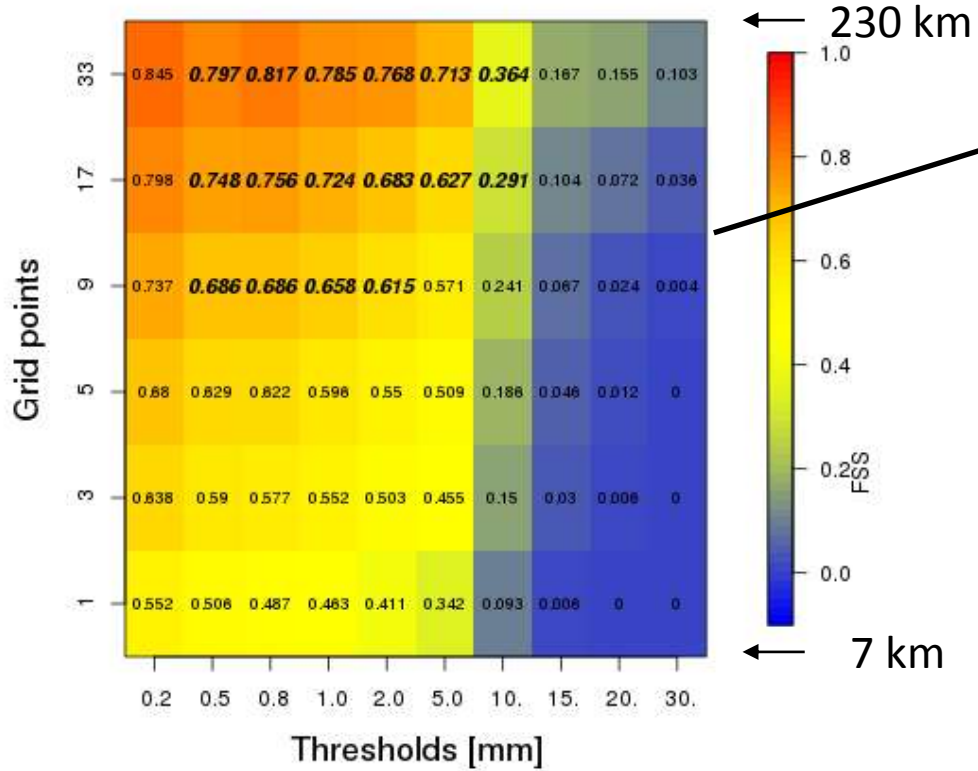Precipitation (mm/12hr) at Sun 24AUG2014 00:00 UTC

Rainfall and thunderstorms in the morning generally weak, but locally strong. Residual rainfall in the afternoon (not much rain).
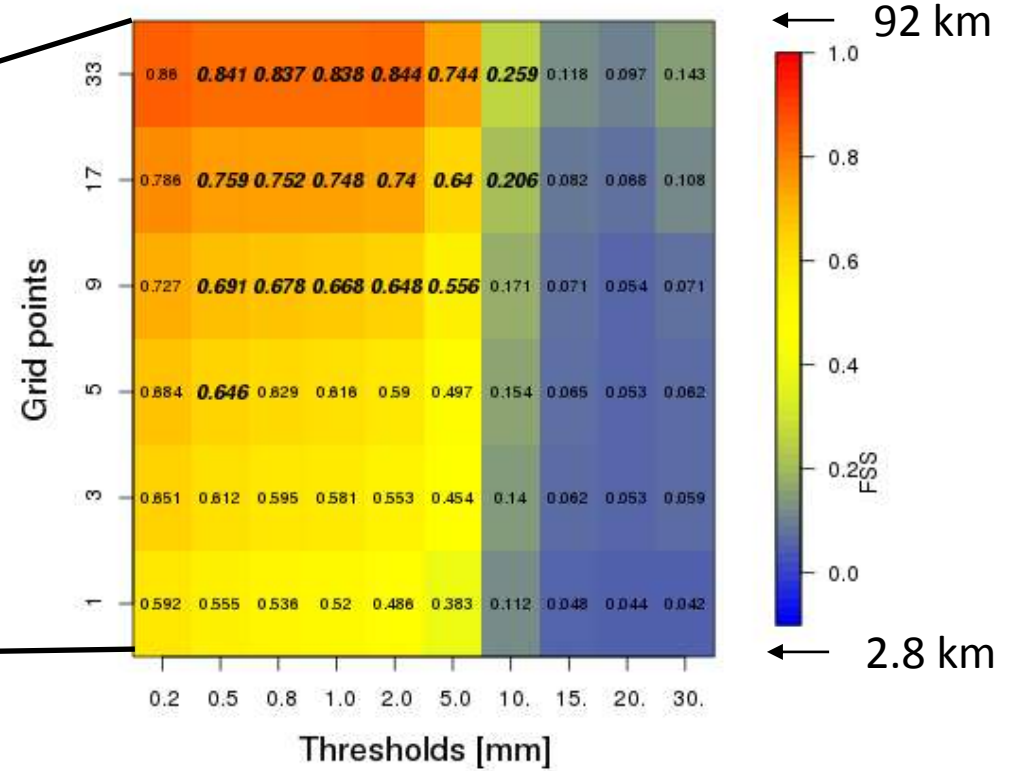
2014/08/23

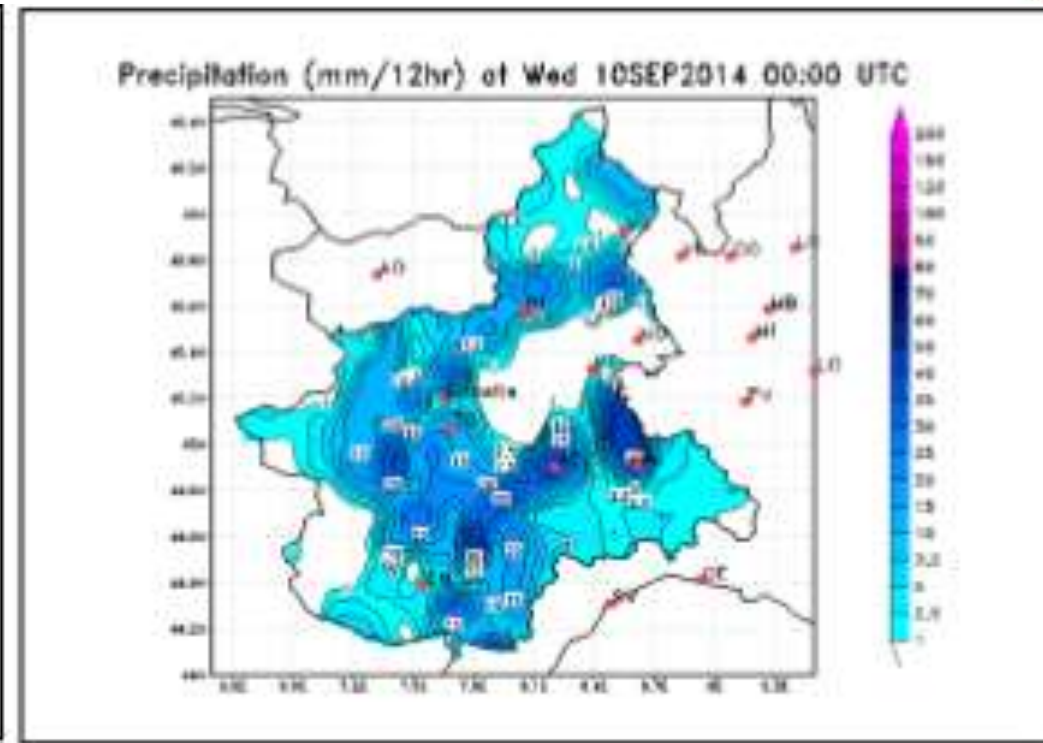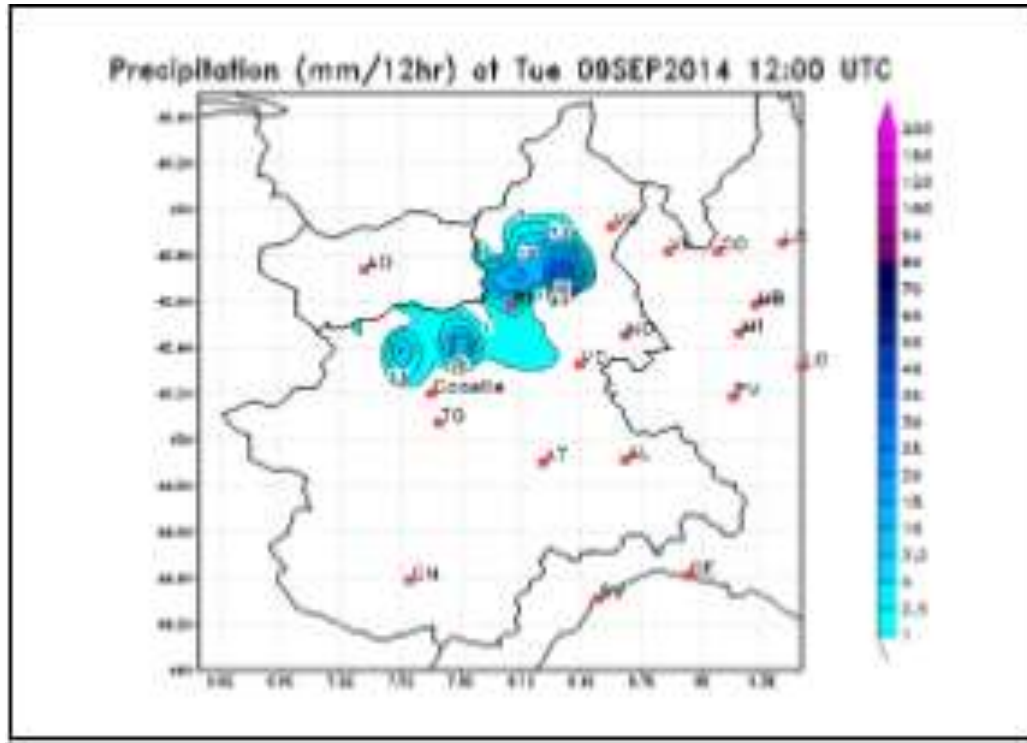Fractions skill score COSMO-I7 - FSS - 20140823_6h

Fractions skill score COSMO-I2 - FSS - 20140823_6h

Almost no skill for COSMO I7 for high thresholds up to large scales.
Better results for high thresholds for COSMO I2 also at medium-small scales.
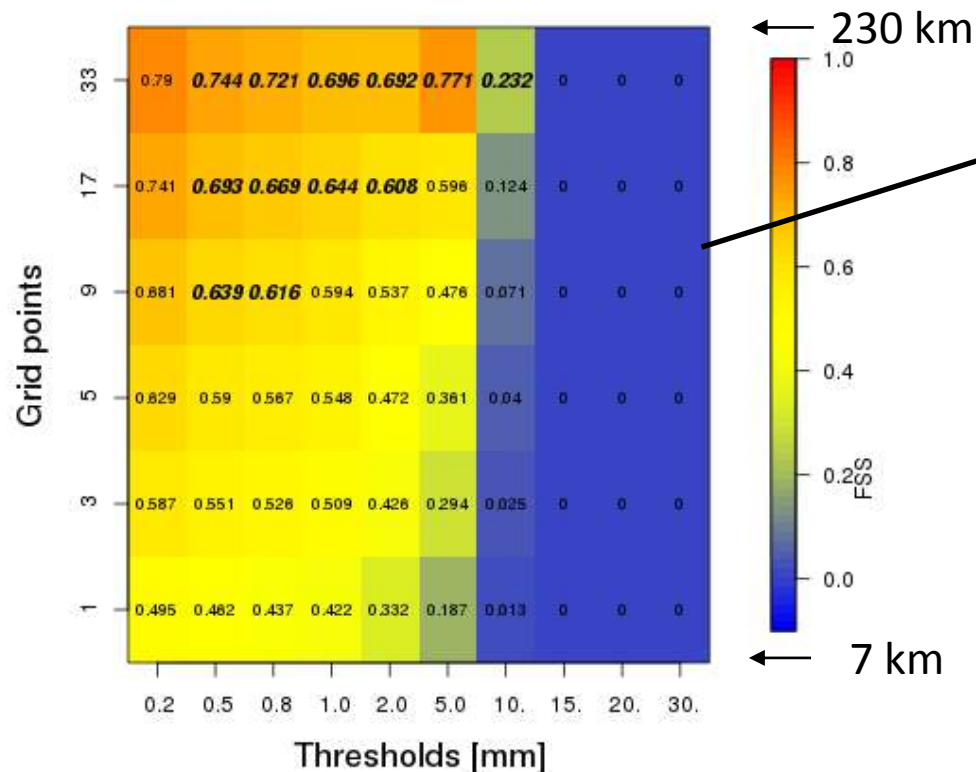
2014/09/09

First rainfall in the late morning over the northern part of the region generally mildly strong and locally strong. Rainfall and well spread thunderstorms in the afternoon with the exception of the eastern plains.
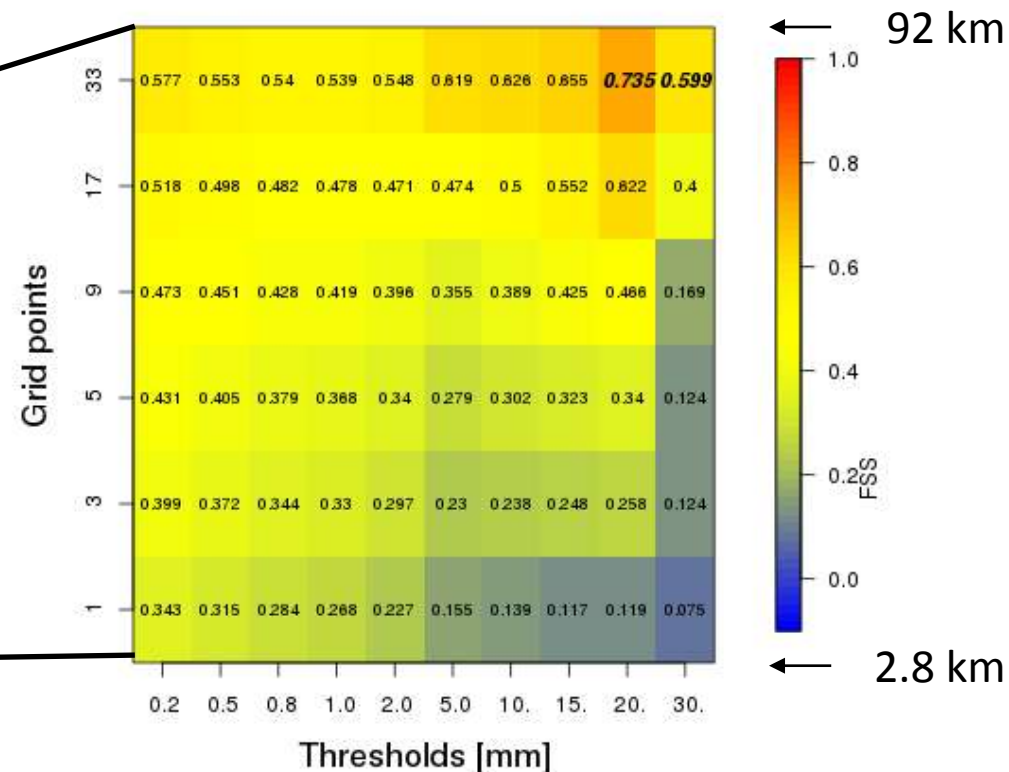
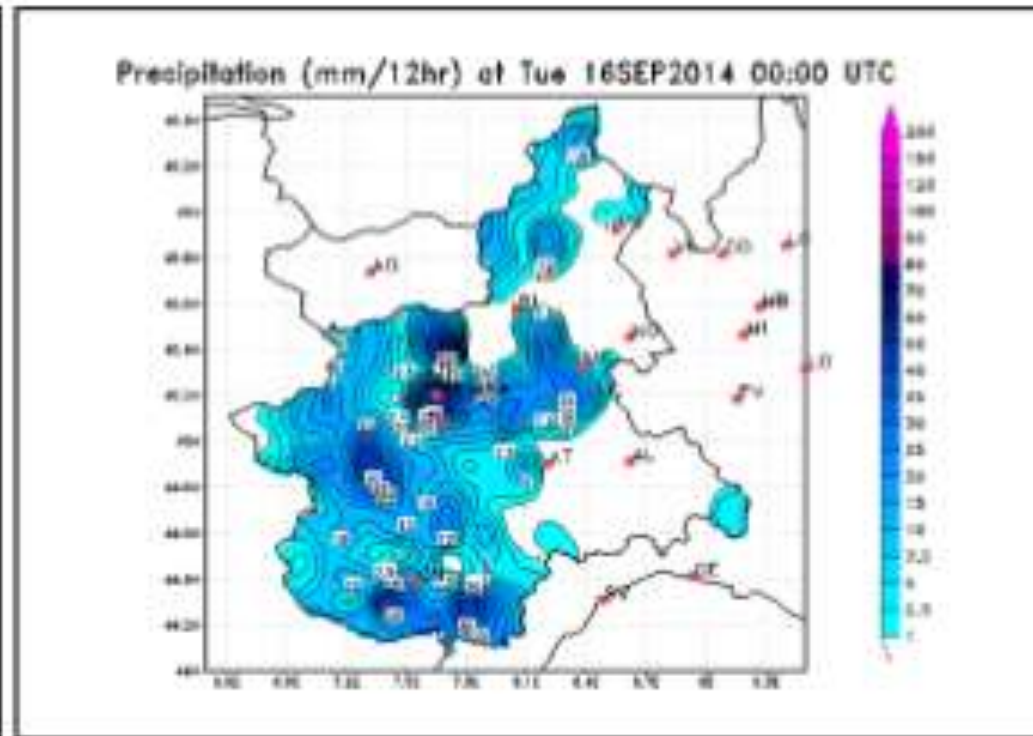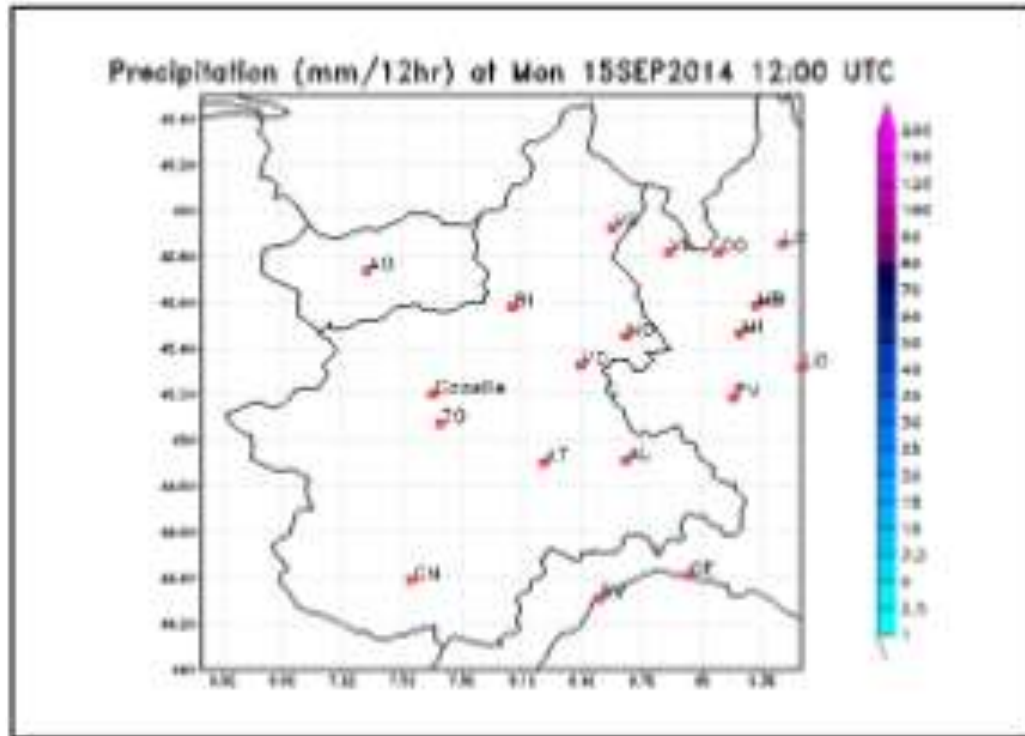Fractions skill score COSMO-I7 - FSS - 20140909_6h

Fractions skill score COSMO-I2 - FSS - 20140909_6h

No skill for COSMO I7 above 10 mm. Better results (at smaller scales and higher thresholds) for COSMO I2. Some problem at lower thresholds for COSMO I2. Completely different behavior for the two models.
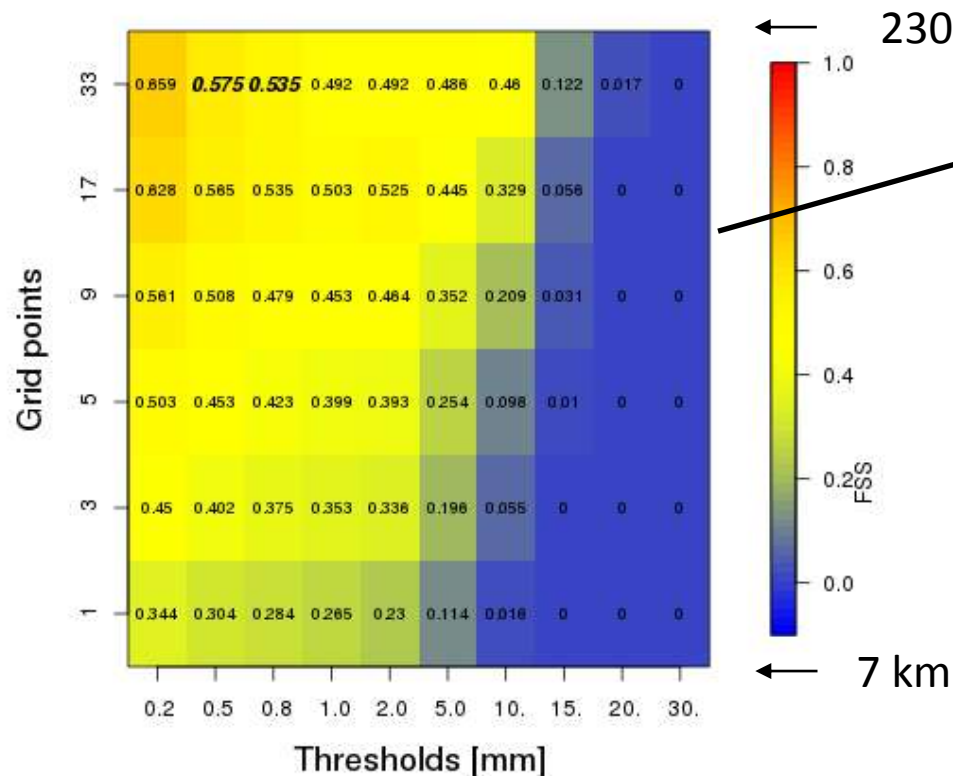
2014/09/15

Strong rainfall and well spread thunderstorms in the afternoon starting from the westerns Alps and moving towards the plains.
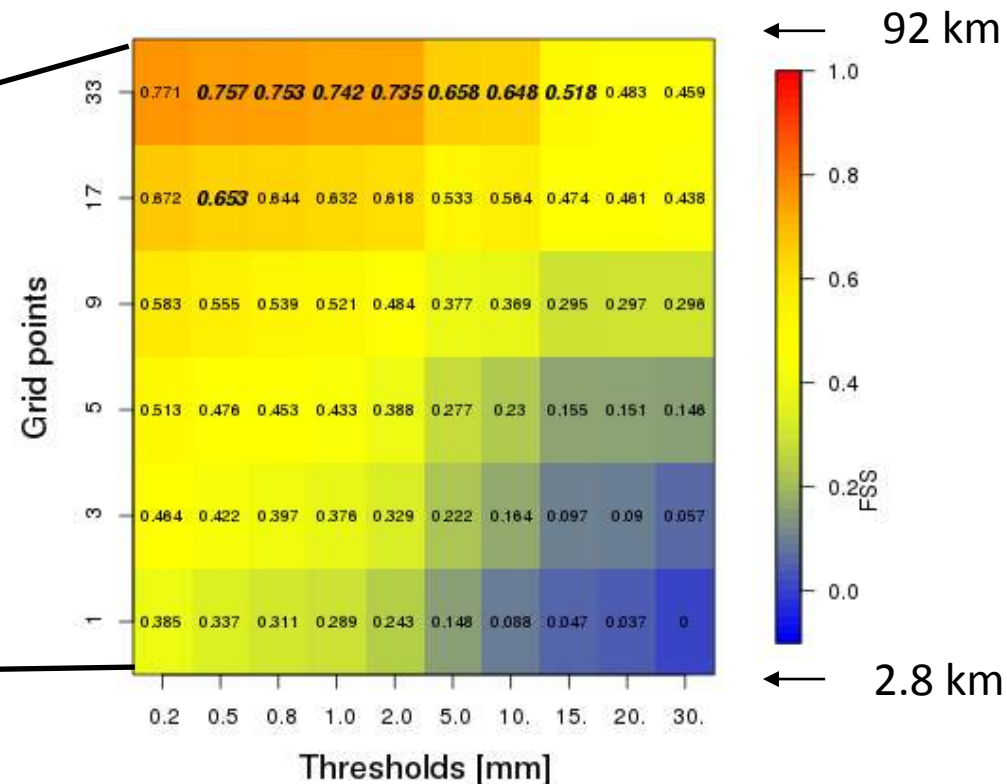
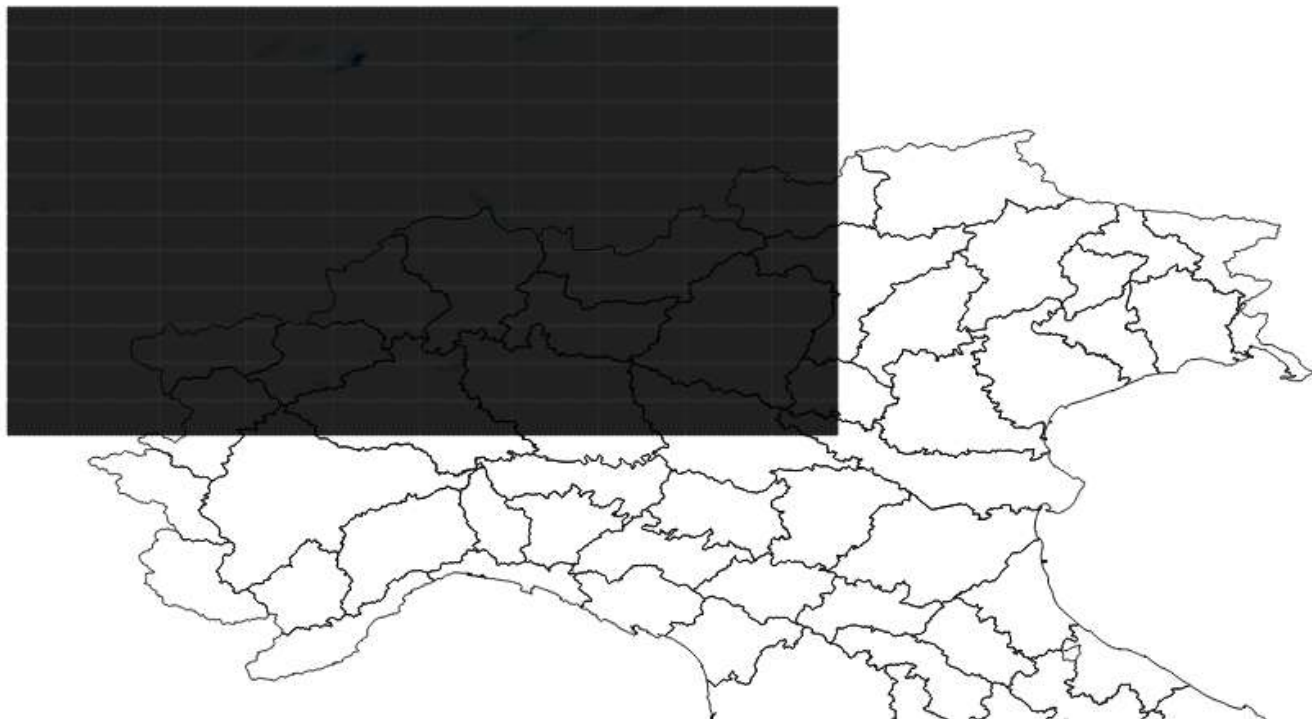Fractions skill score COSMO-I7 - FSS - 20140915_6h

Fractions skill score COSMO-I2 - FSS - 20140915_6h

Some useful skill for COSMO I7 only at the biggest scale for medium-low thresholds.
No skill for highest thresholds for COSMO I7. Better results (also at smaller scales and higher thresholds) for COSMO I2

COSMO 1 (MCH)

- Very preliminary test: can VAST handle big amount of data?
- Based on the more regular area MCH (~850000 points x 24 time steps)
- A few points are missing in the eastern part of the given domain (not regular)
- One hour cumulation
  (not fair, but useful to verify the ability of the program to handle big amount of data)
- Minimum box -> 1 grid point
- Maximum box -> 65 grid points

COSMO 1 (1h cumulation)

Fractions skill score COSMO-1 - FSS - 20150615_1h
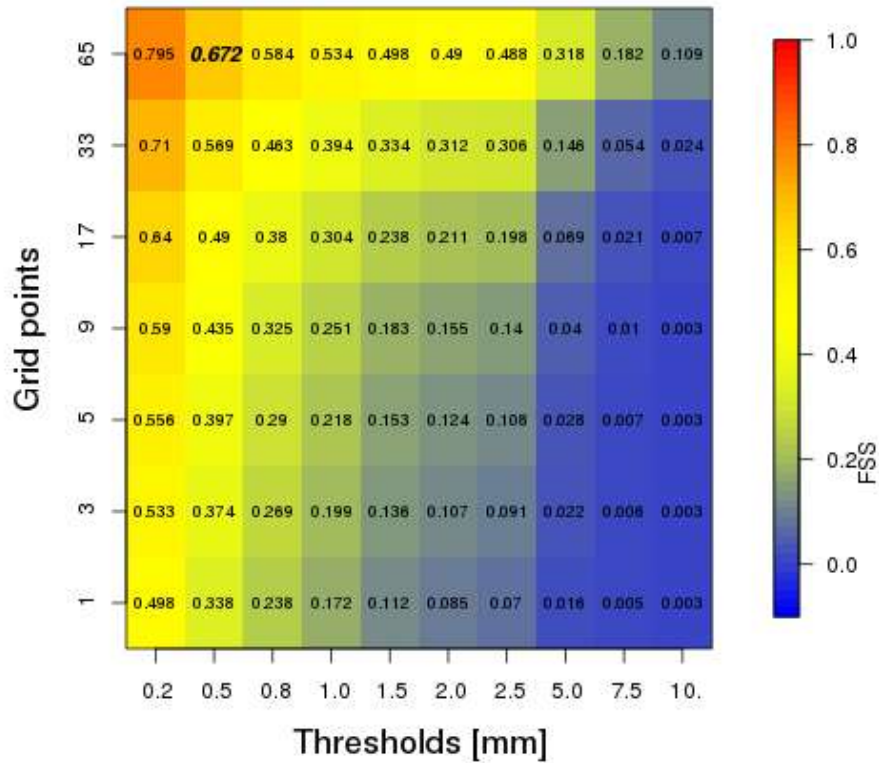
- Good skill for 1h cumulation
- Regular behaviour: better for low thresholds and bigger scales, worse for high thresholds and smaller scales
- VAST is able to handle this amount of data

THANK YOU FOR YOUR ATTENTION