ArpaP contributions in PT-CIAO

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Task 1: benchmark

- Model version: 5.04e
- Domain: operational COSMO-I7
- Namelists: operational COSMO-I7
- Forecast time: +48h
- Boundary frequency: 3h, from IFS
- Output frequency: 1h
- Data assimilation: no (cold start)
- Case study: 18 May 2017
- Number of cores: 64 (8x8)
- Simulation 1: ctrl (Tiedke scheme)
- Simulation 2: becht (Bechtold scheme)
- Simulation 3: ctrl_16 (ctrl with 16 cores, 4x4)
- Simulation 4: becht_16 (becht with 16 cores, 4x4)

Task 1: conclusions

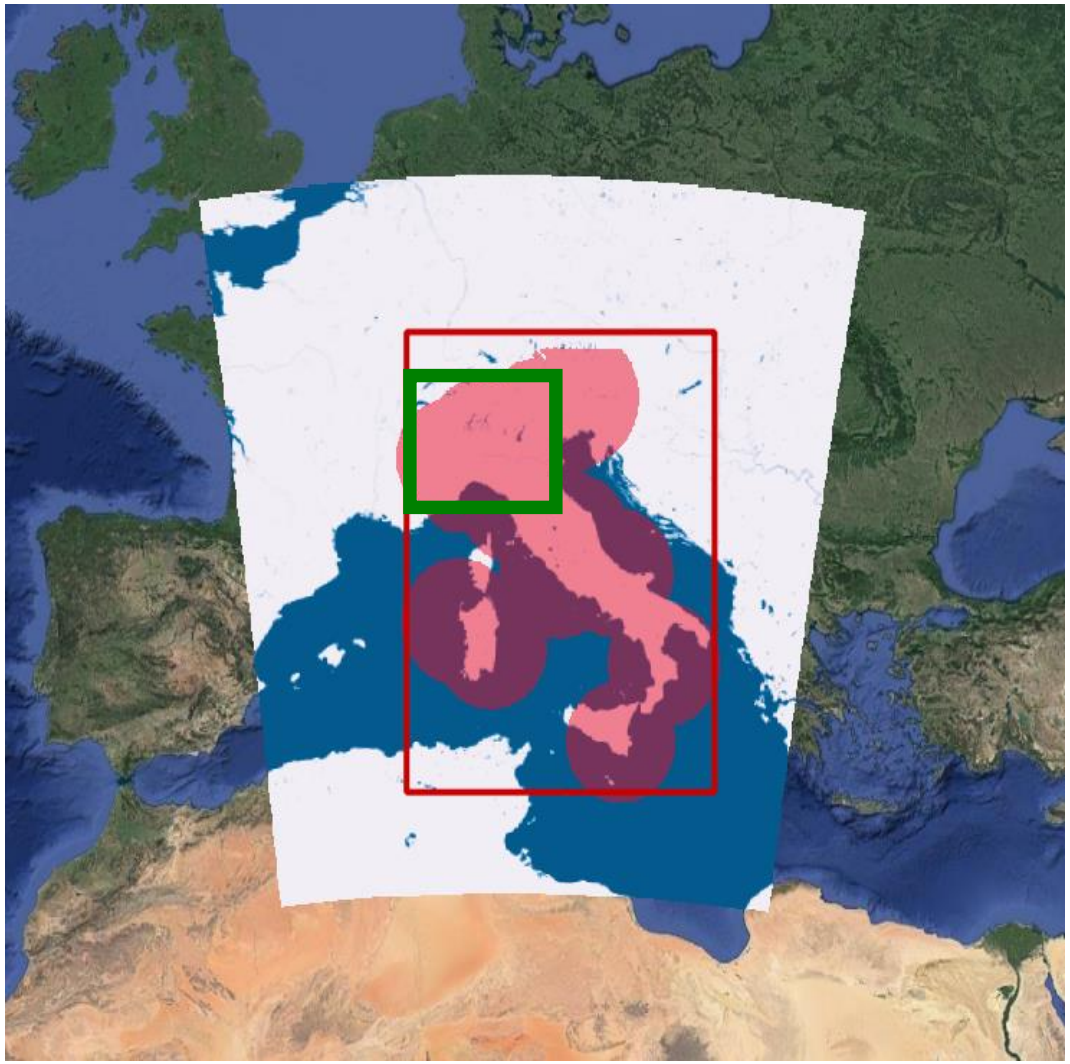
	CTRL	BECHT	CTRL_16	BECHT_16
Run time (s)	1304	1507	4636	4835

Scaling Ratio CTRL: 3.5
Scaling Ratio BECHT: 3.2

→ **Computational time and scaling are comparable**

Task 2: case studies

- Runs at 5 km and 7 km
- 3 case studies of heavy rain investigated: May 2017 and January 2018 in Piedmont, September 2017 in Tuscany
- Runs with COSMO v5.04h (loldtur=true, itype_conv=?)
- Fuzzy verification over Italy (red rectangle, I-domain) or over a restricted area of interest (green rectangle, P-domain)

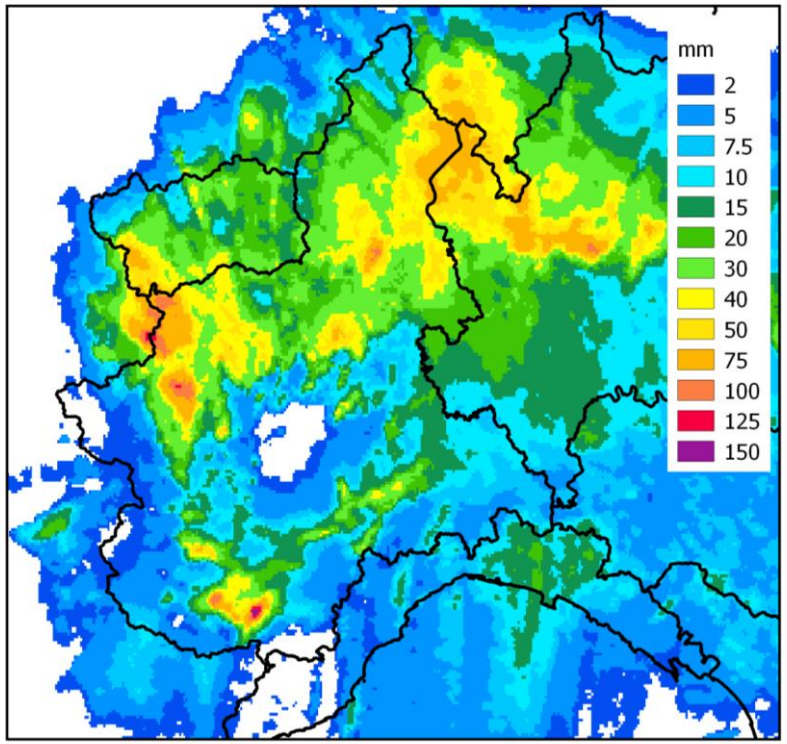


Task 2: May 2017

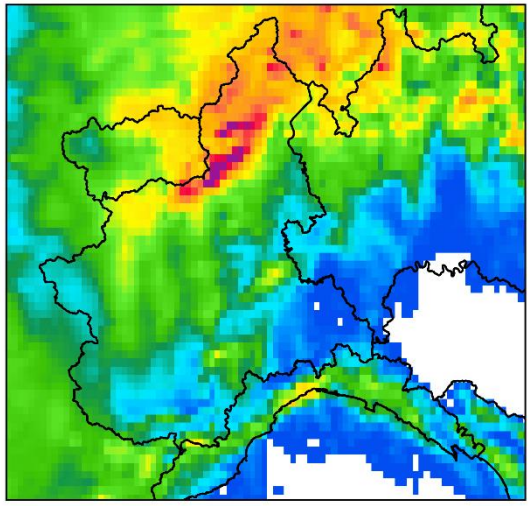
CONSORTIUM FOR SMALL SCALE MODELING

COSMO

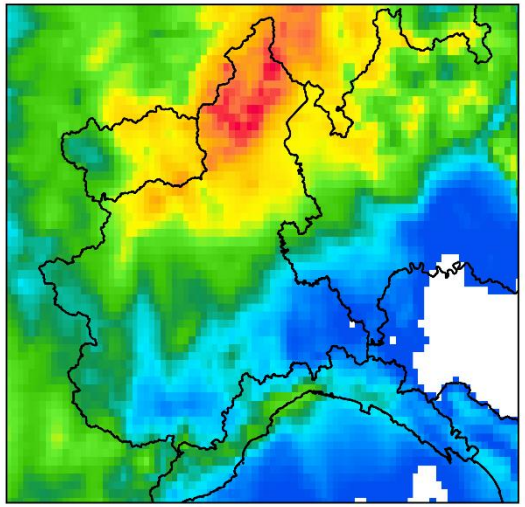
RADAR

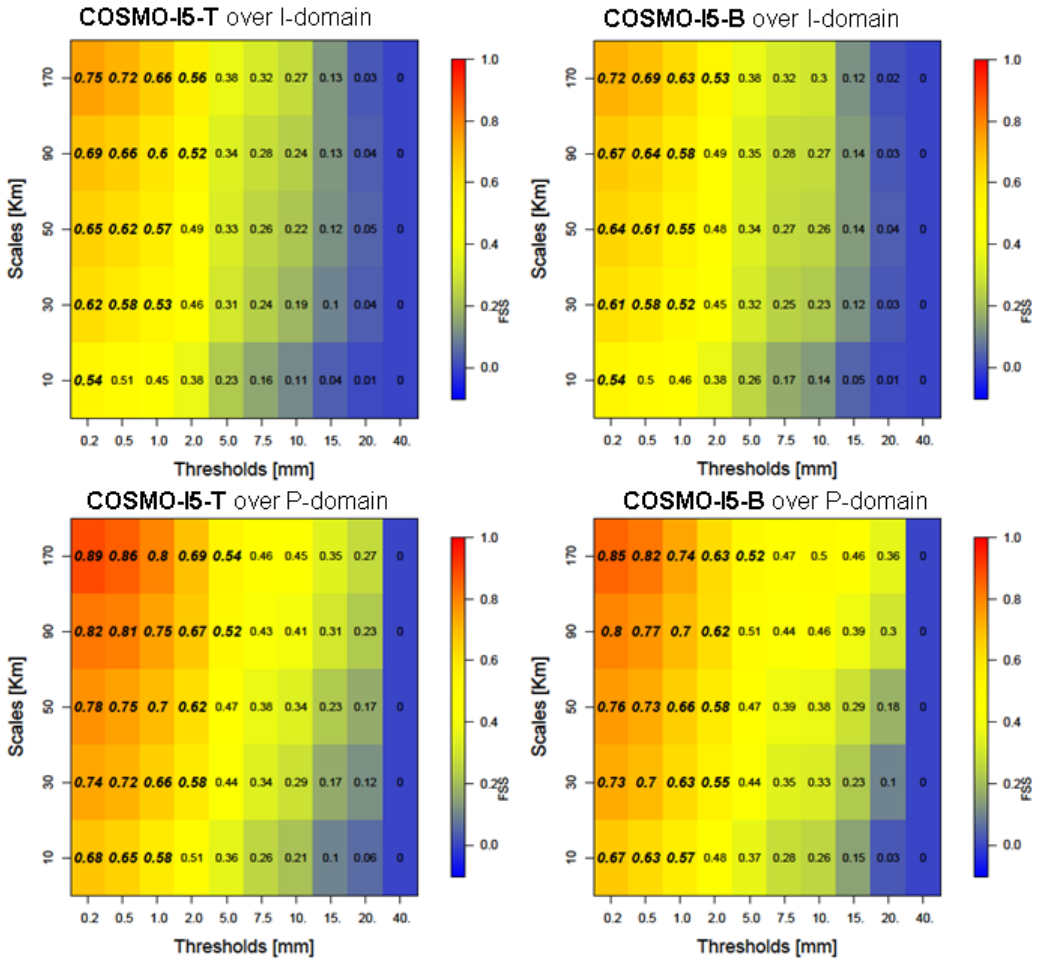


COSMO-I5-T



COSMO-I5-B



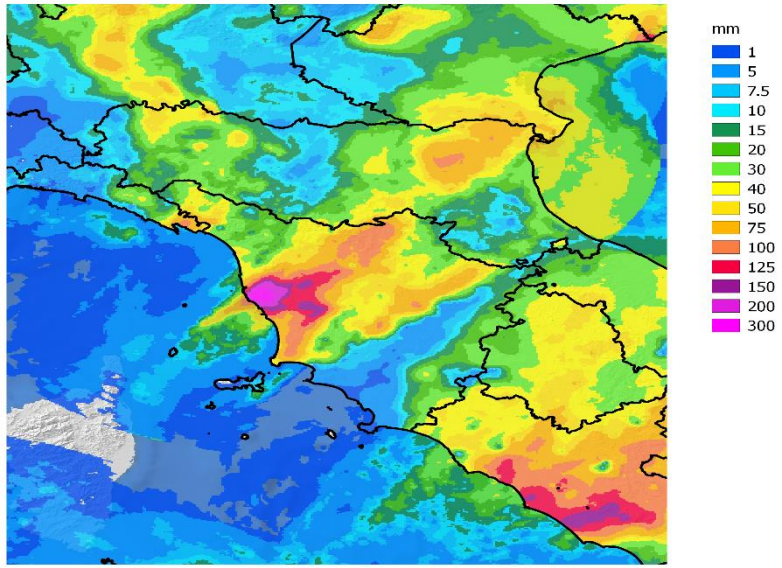


PIEMONTE Arpa Agenzia Regionale per la Protezione Ambientale

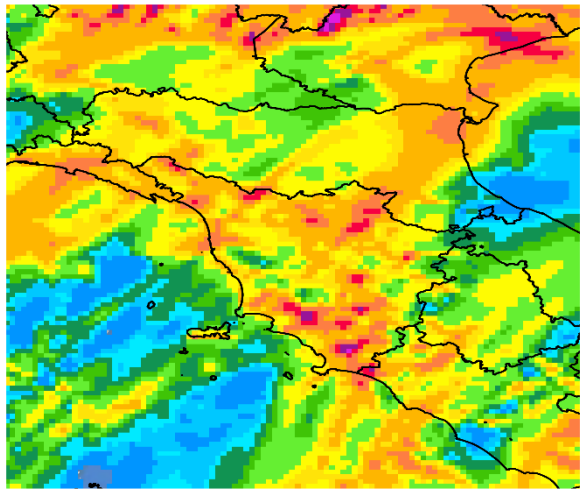
Sistema Nazionale per la Protezione dell'Ambiente

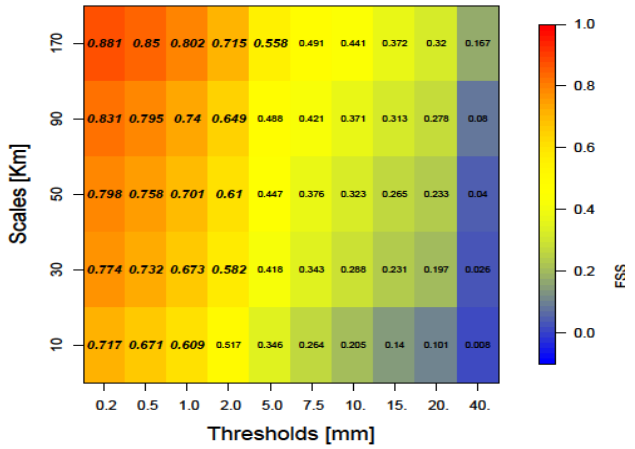
Task 2: September 2017

RADAR

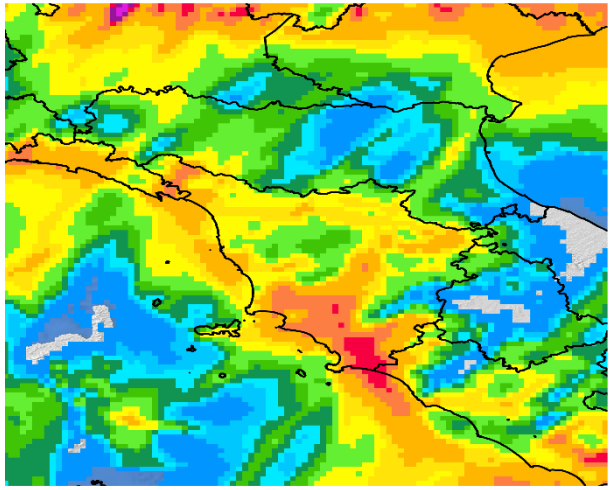


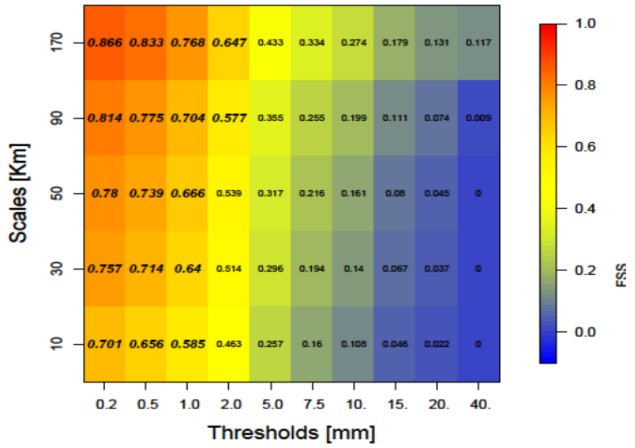
COSMO-I5-T over I-domain





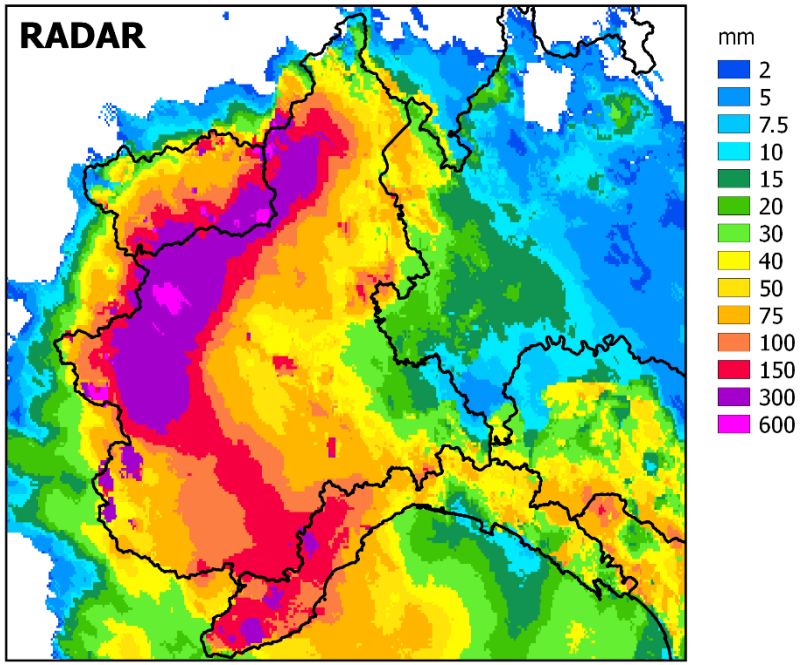
COSMO-I5-B over I-domain



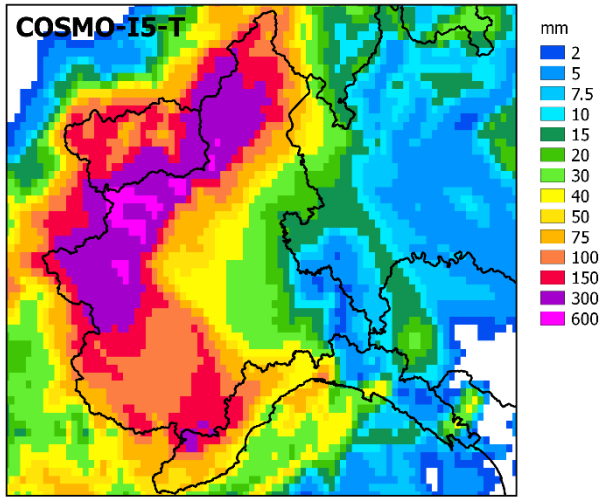


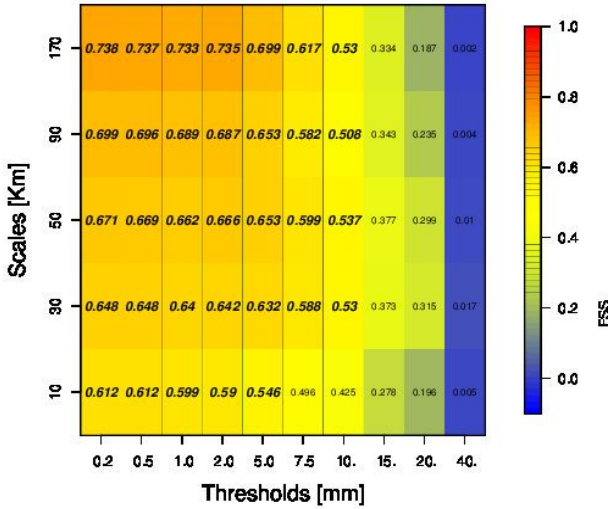
Task 2: January 2018

RADAR

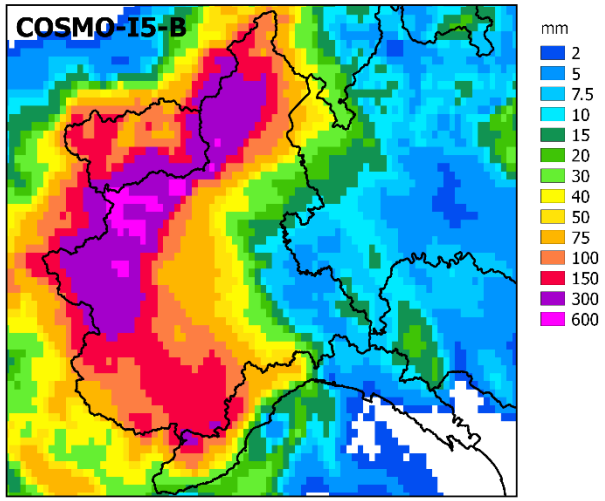


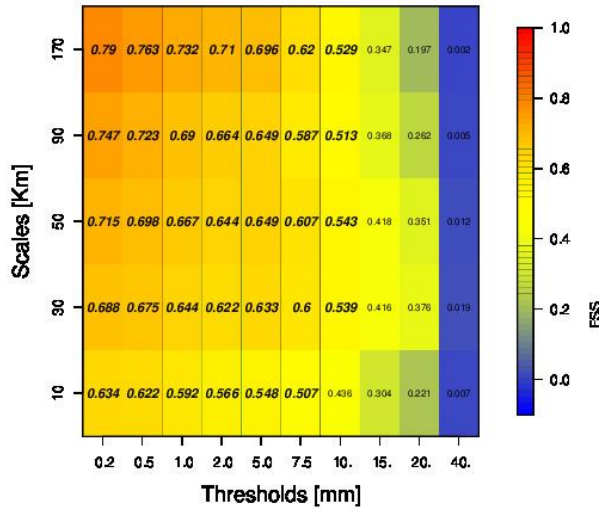
COSMO-I5-T over I-domain





COSMO-I5-B over I-domain





Task 2: conclusions

- both schemes have a quite good performance in term of FSS regarding the investigated case studies
- the best values concern the verification over the domain which delimits the rain event, since the fuzzy method can be misleading in case of a large area not covered by precipitation
- the Bechtold convection schemes performs better in precipitation detection at very low intensity of precipitation (<0.5 mm/h), although it has more false alarms (not shown here)
- the Tiedtke scheme shows an overall enhanced behavior, mostly for more intense precipitation (summer cases, less evident in winter case)
- the skill scores of both schemes remain quite unsatisfactory for high precipitation rate (>30mm/h), that means that models have not been able to accurately locate heavy rain events

To be done before December (end of the PT)

- Check vertical profiles
- Still one more run with Bechtold shallow convection (only possible now with the latest version of COSMO)

Thank you for the attention