wege entstehen, indem wir sie gehen
paths emerge in that we walk them

Wegener Center
www.wegcenter.at

Regional and Local Climate Modeling Research Group
ReLoClim

Added value in the representation of mean and extreme precipitation in the CCLM EURO-CORDEX 0.11 simulation

A. F. Prein, A. Gobiet, H. Truhetz, K. Keuler, K. Görgen, C. Teichmann, C. Fox Maule, E. Van Meijgaard, M. Deque, N. Grigory, R. Vautard, E. Kjellström, A. Colette

COSMO-CLM user seminar, Offenbach, March 17.-20. 2014

Models and Simulation Period

	Model	Institute
1	ARPEGE-CNRM	Meto-France
2	HIRHAM5	DMI
3	RACMO 22E	KNMI
4	RCA4	SMHI
5	REMO	CSC
6	WRF	CRP-GL
7	WRF	IPSL and INERIS
8	**CCLM-CLMCOM**	**BTU**

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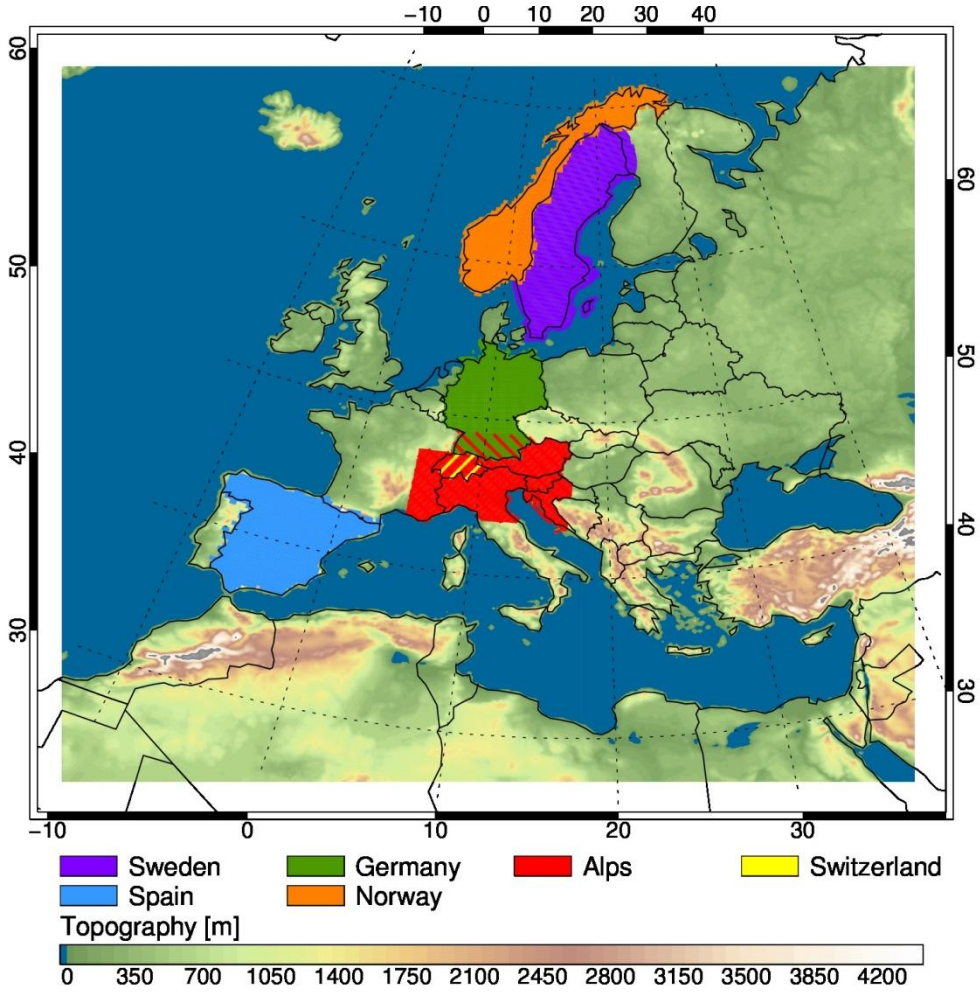
Domain and Observation Data-sets

Simulation Period: 1989-2008 (ERA-Interim)



Region	Data-set
Sweden	PTHBV (Johansson 2002)
Germany	REGNIE (DWD 2009)
Alps	EURO4MAPGD (Isotta et al. 2013)
Spain	Spain011 (Herrera et al. 2012)
Norway	KLIMAGRID (Mohr 2009)

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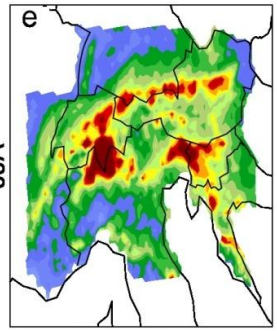
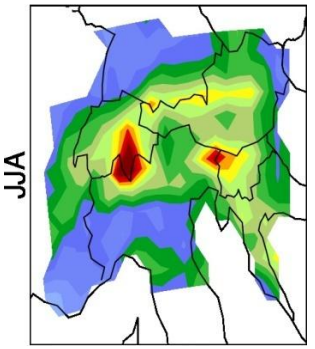
Common grid and precipitation intensities

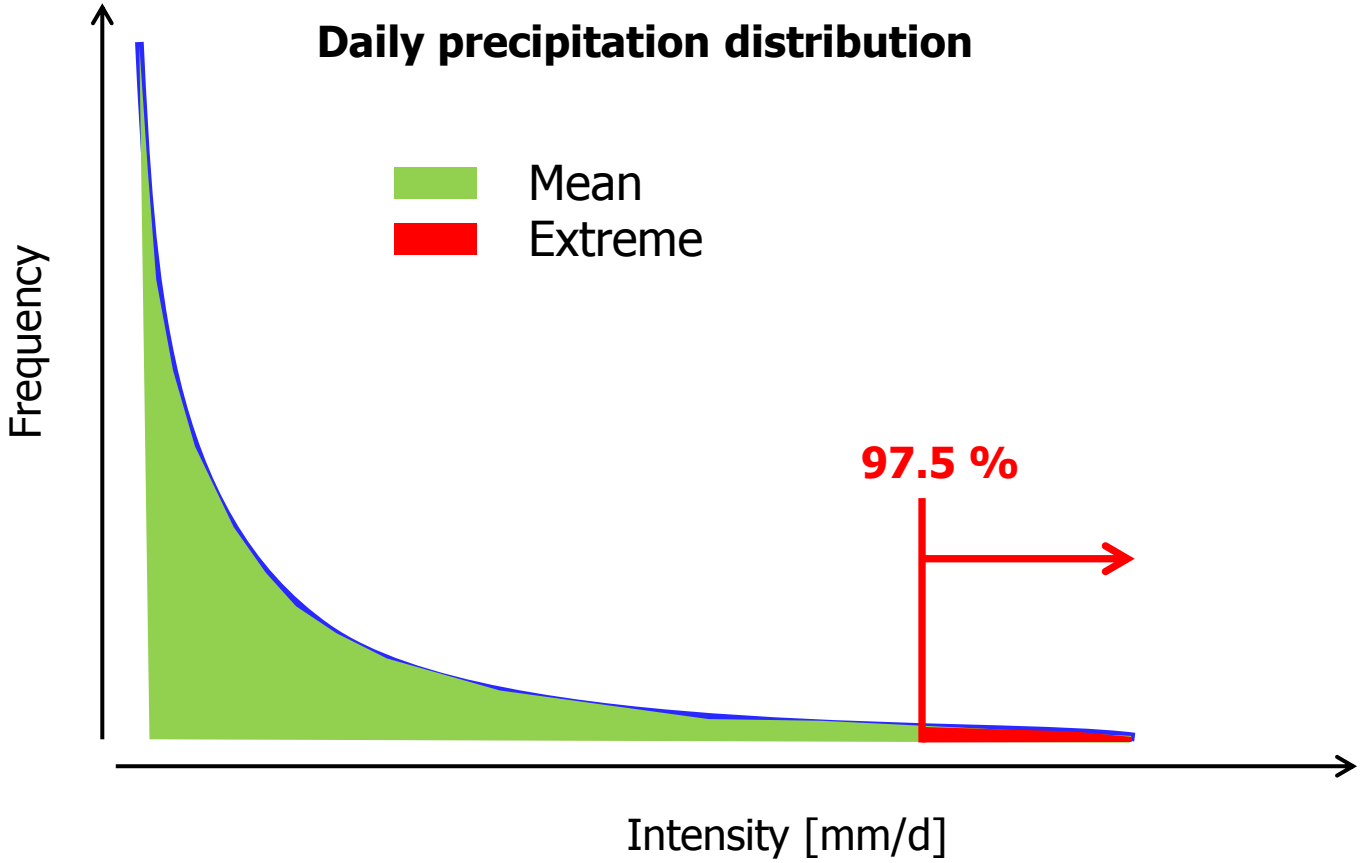
Common grid is 0.44



Conservative remapping



Daily precipitation distribution



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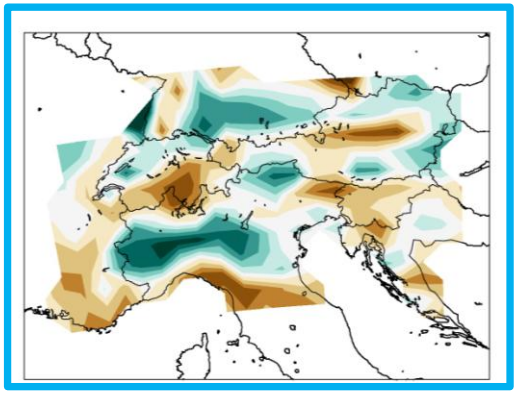
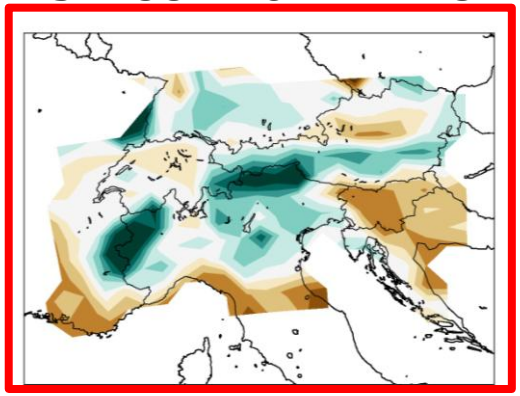
Biases and Error Variability: Extremes DJF Alps

DJF: CCLM 0.44 - Ref.

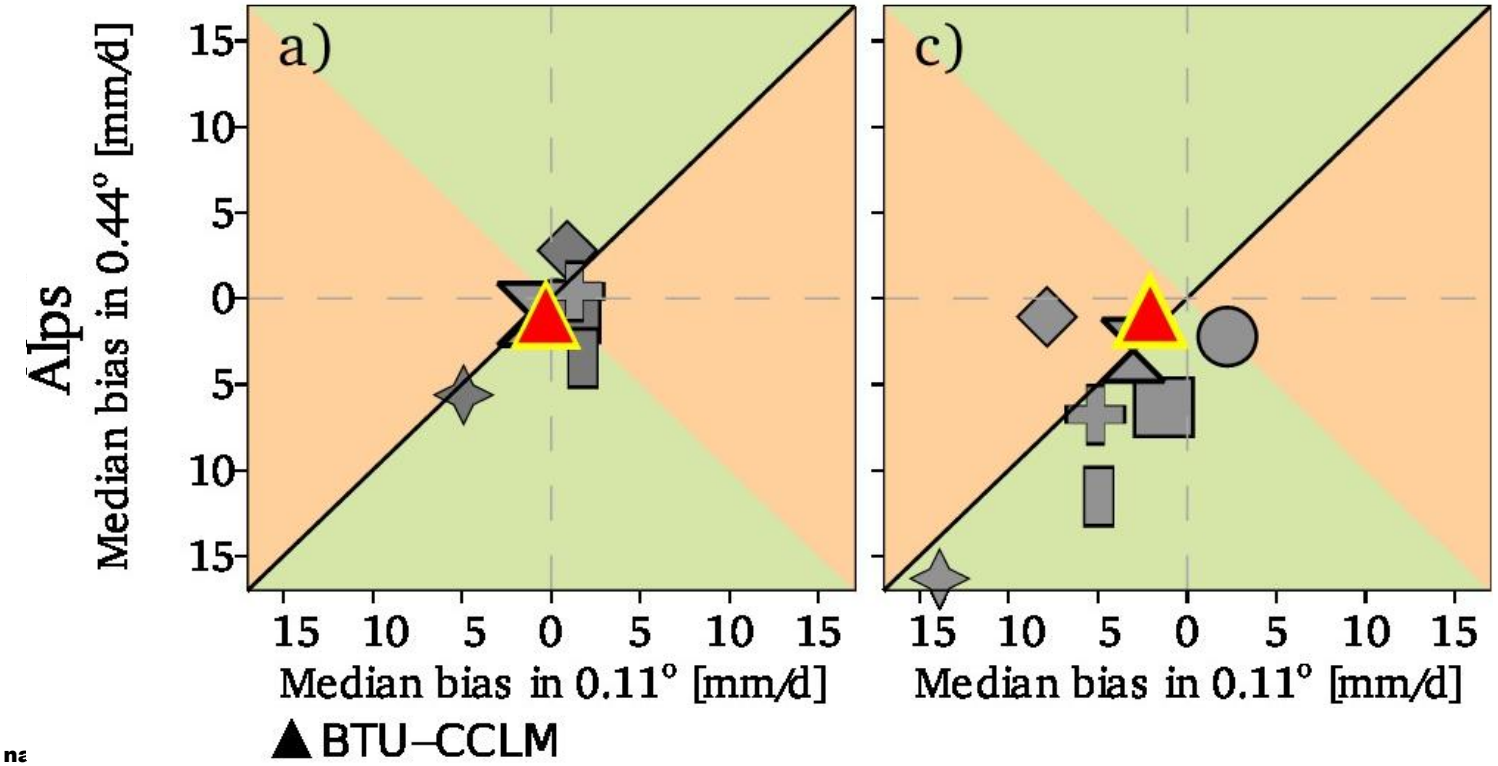


Mean Bias: -2.1 mm/d

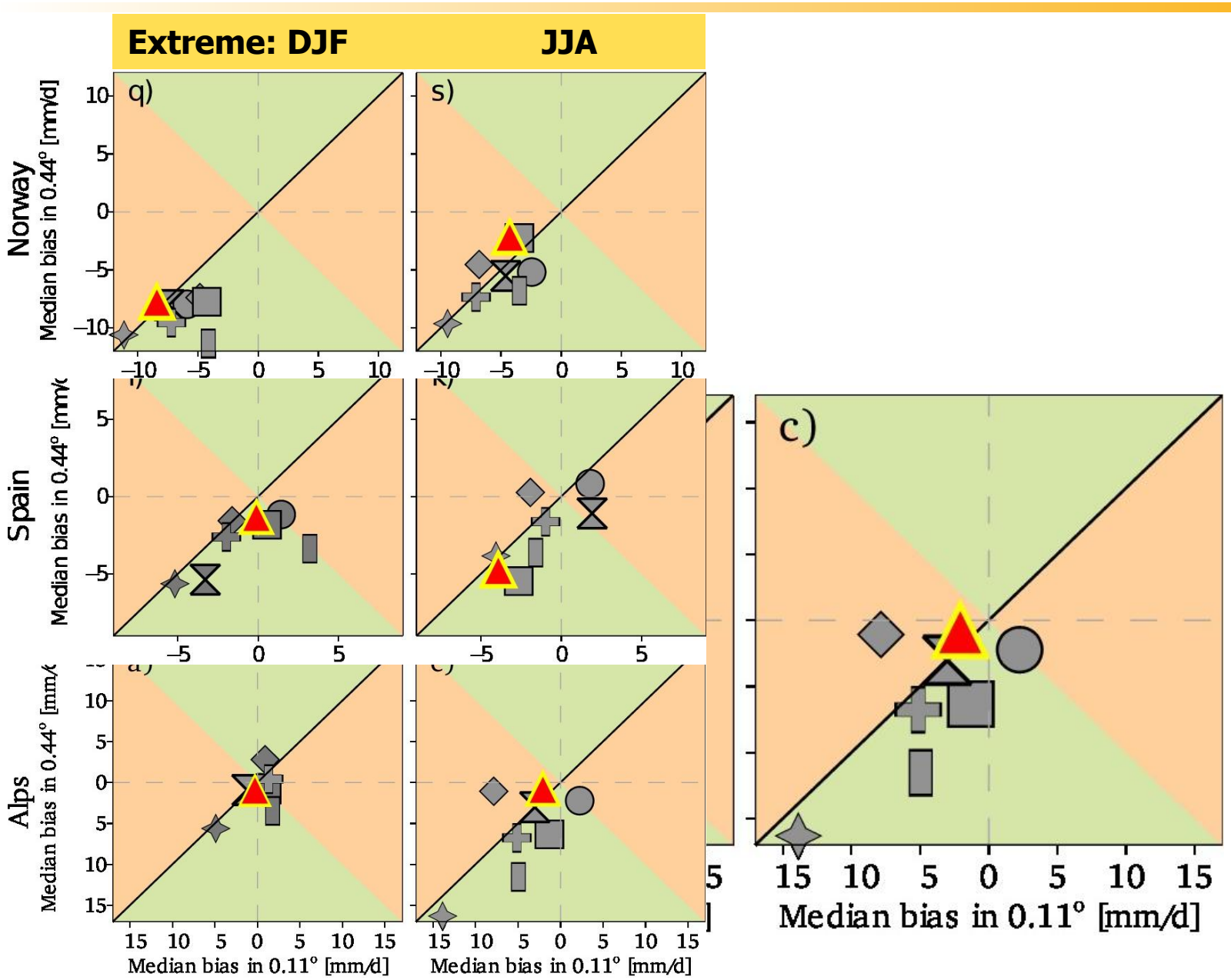
DJF: CCLM 0.11 - Ref.



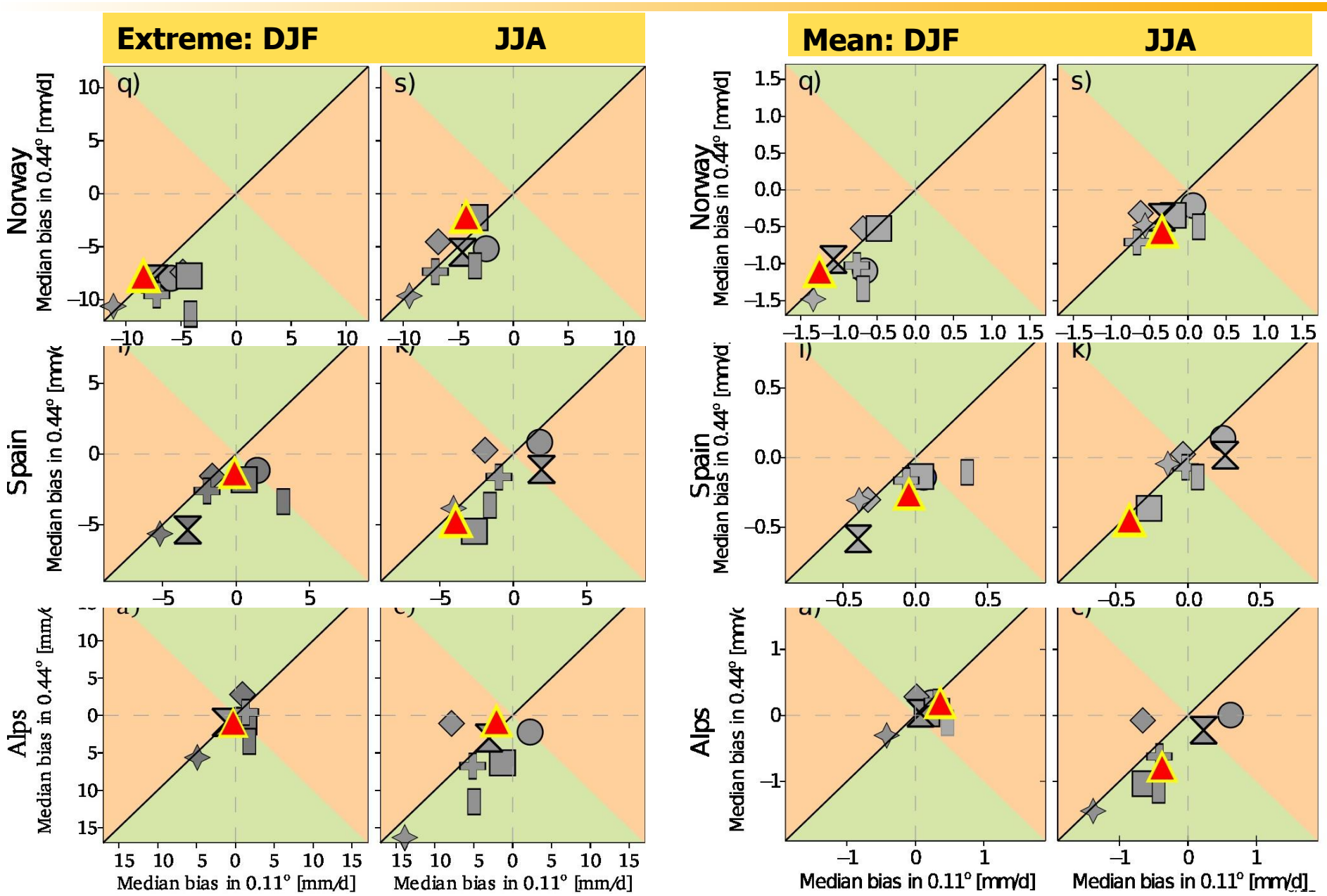
Mean Bias: -1.1 mm/d



Biases and Error Variability: Extremes DJF Alps



Biases and Error Variability: Extremes DJF Alps



Research questions and conclusions

1

- **Average Biases compared to other RCMs?**

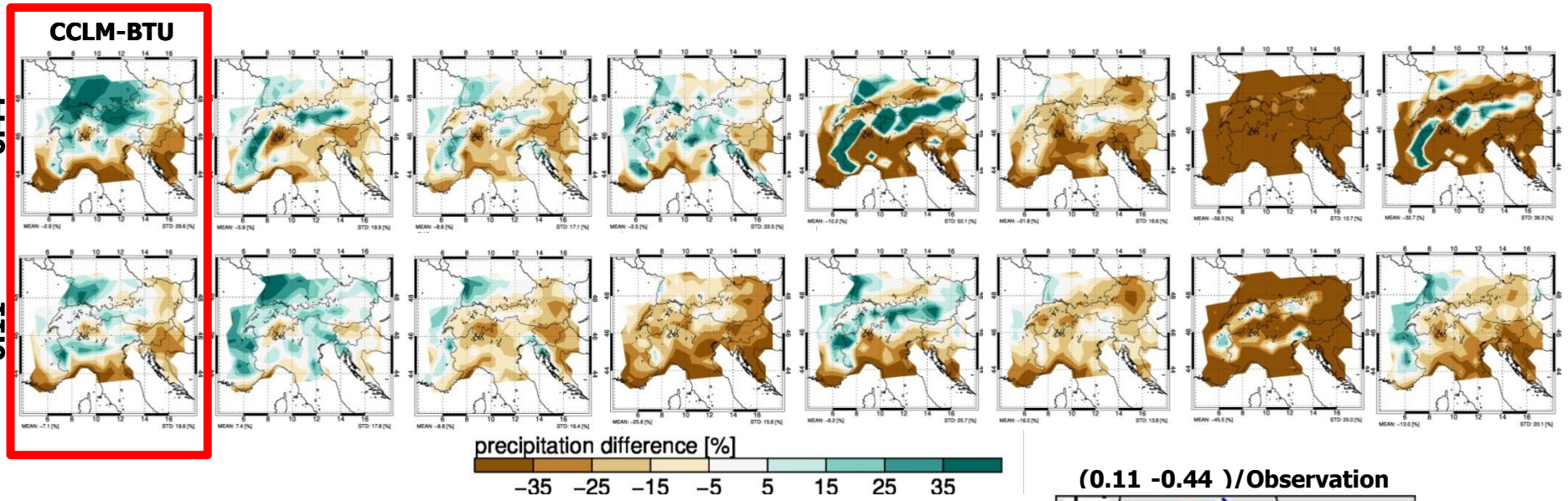
  - CCLM has similar biases
  - 0.11 does not decrease region average biases

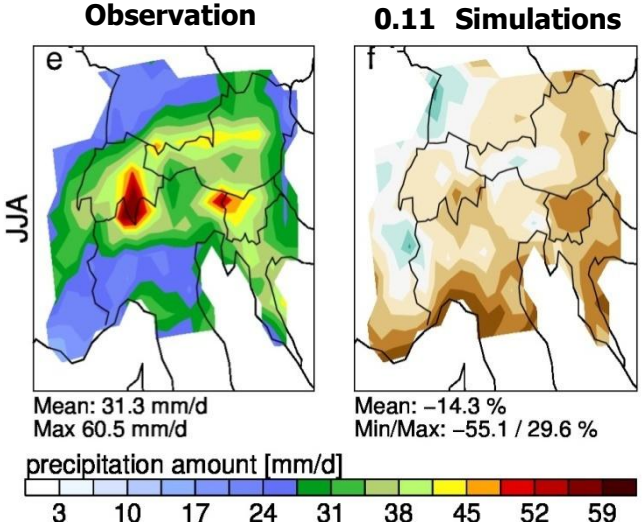
2

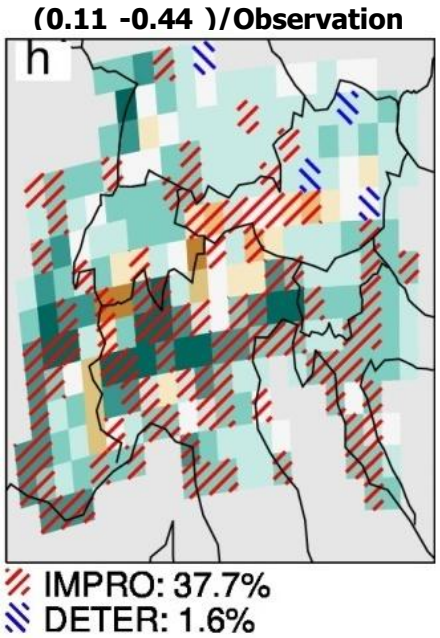
- **Added value on grid-point basis?**

Seasonal Average Biases in Extreme Precip.

Extreme precip. Bias in Alps (JJA)







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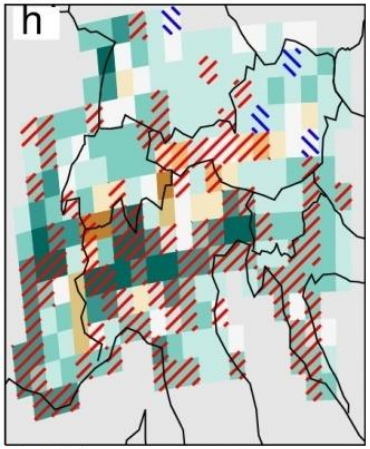
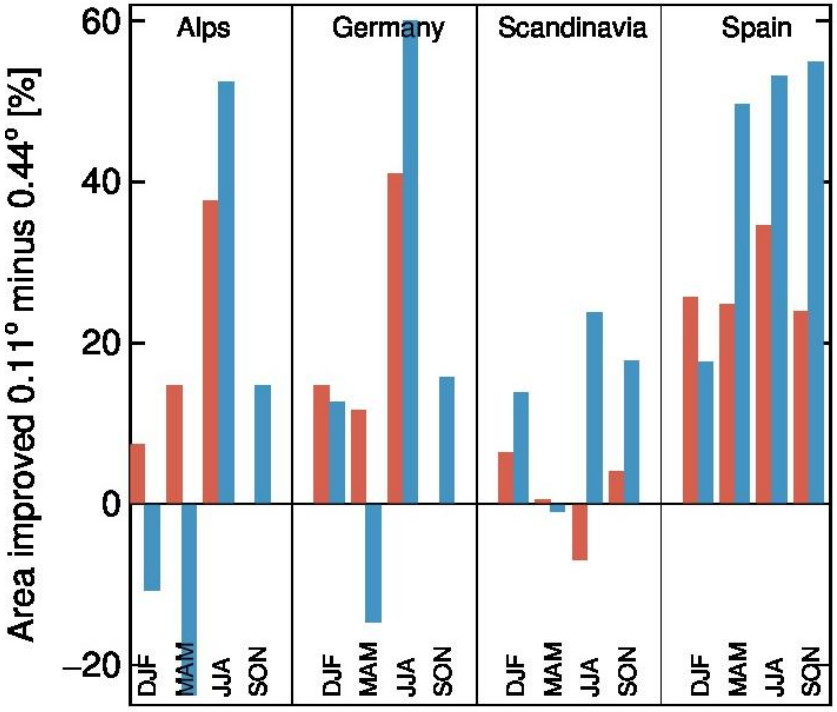
Extreme vs. Mean Improvements of Bias



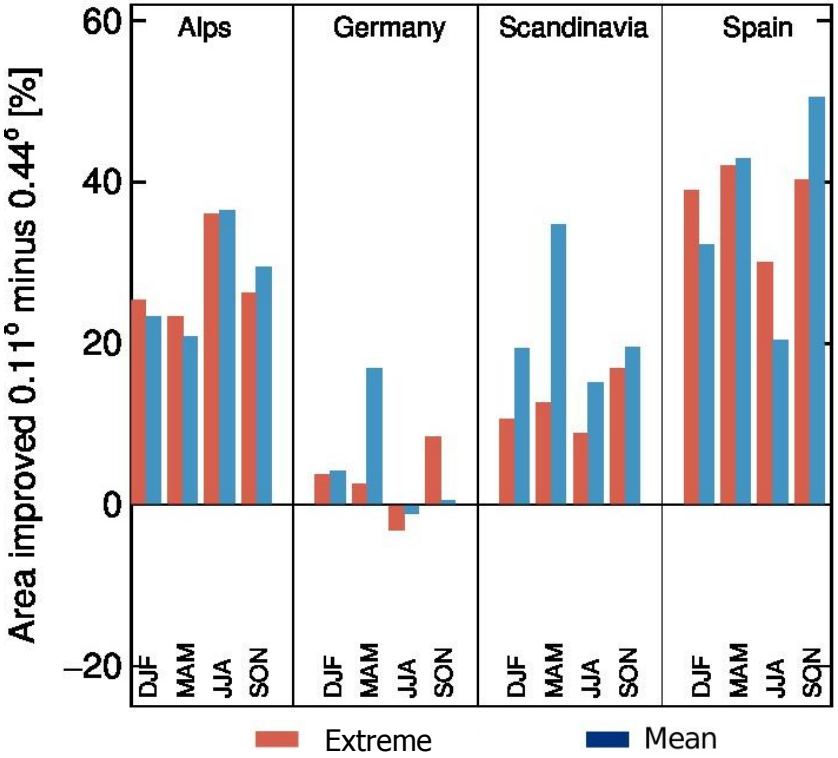
Net. Improved Area =
Improved Area – Deteriorated Area

Extreme
36.1 %

CCLM Net. Improved Areas



Net. Improved Areas



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  - 0.11 does not decrease region average biases

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- **Added value on grid-point basis?**

  - 0.11 does decrees biases on grid-points in mean and extreme precipitation
  - CCLM: above average improvement in JJA; below in Scandinavia and Alps

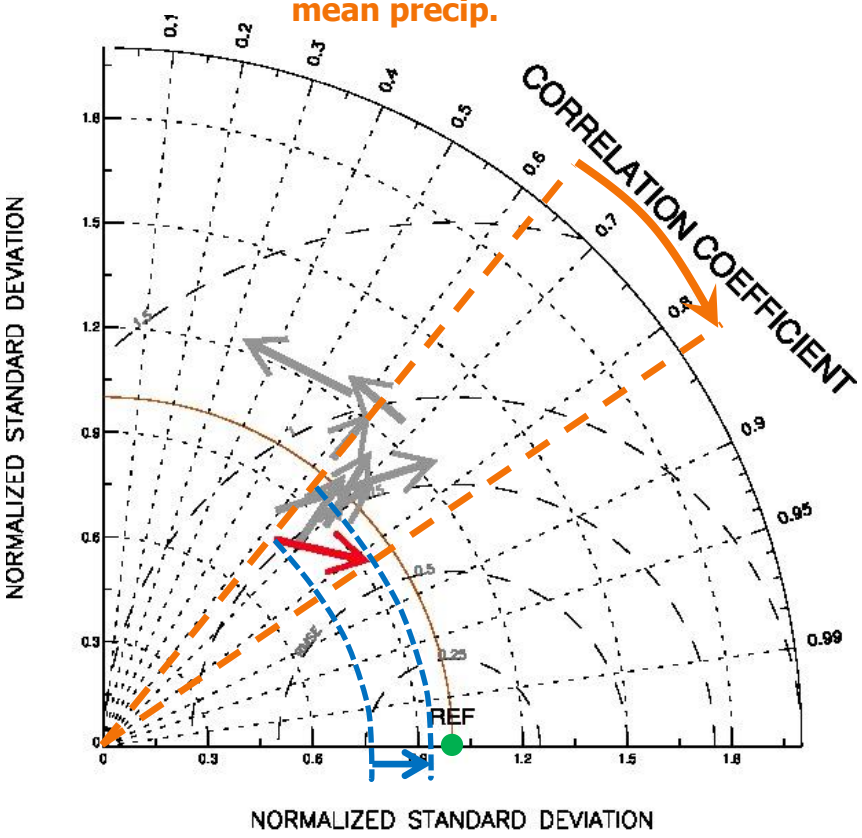
3

- **Do spatial structures and variabilities get improved?**

Taylor Diagram of Spatial average precip.

CCLM 0.44 → CCLM 0.11

GER: DJF
mean precip.



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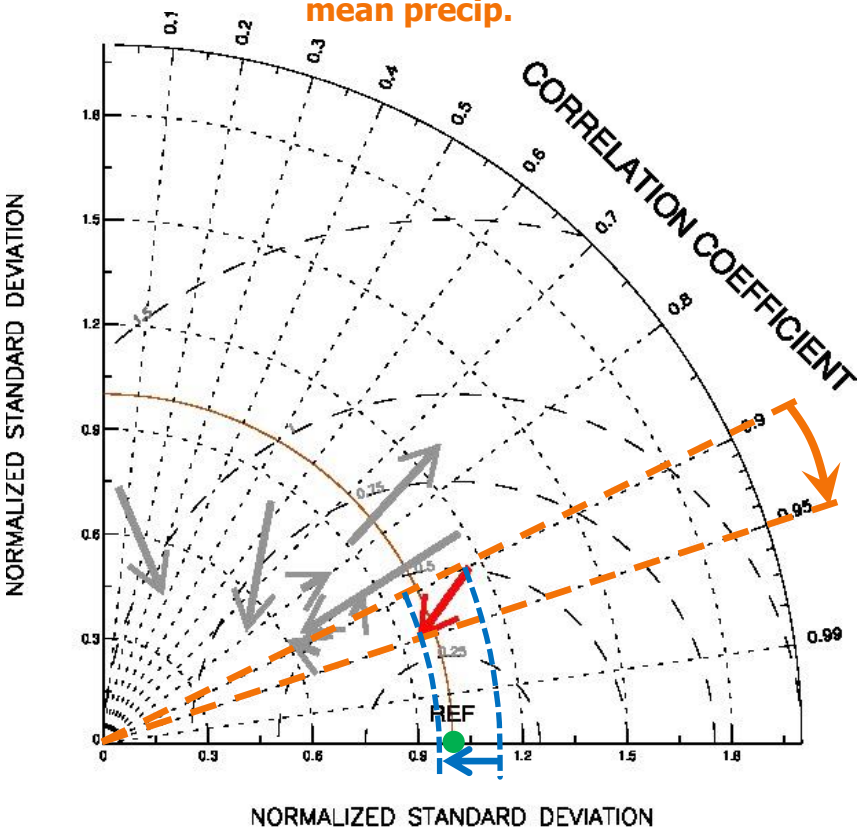

nach bedarf füllen

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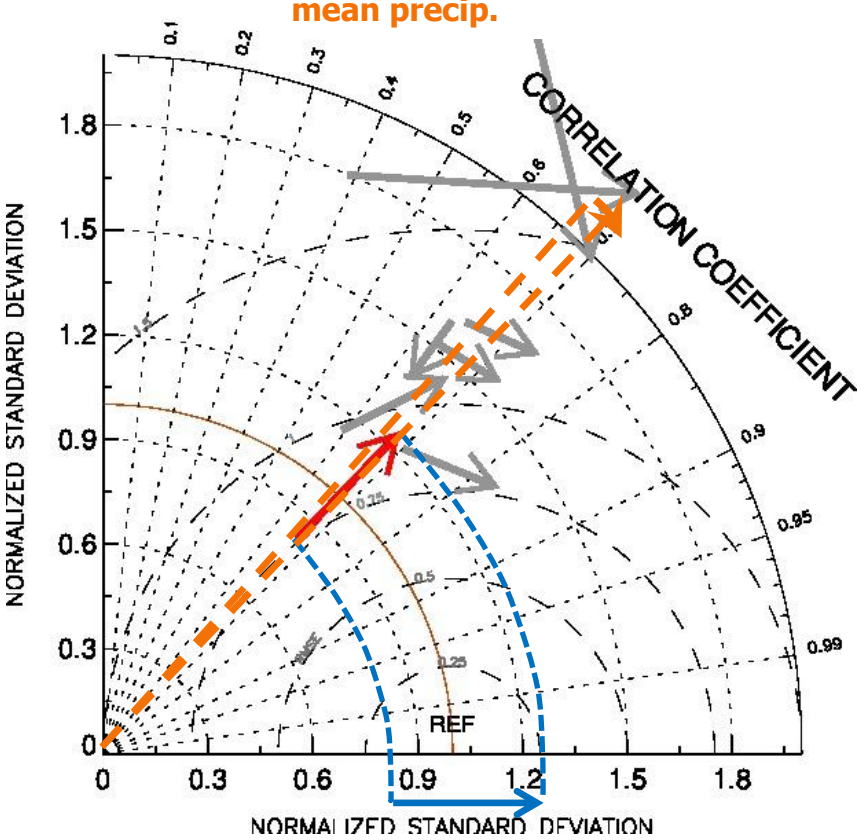

Alps: JJA
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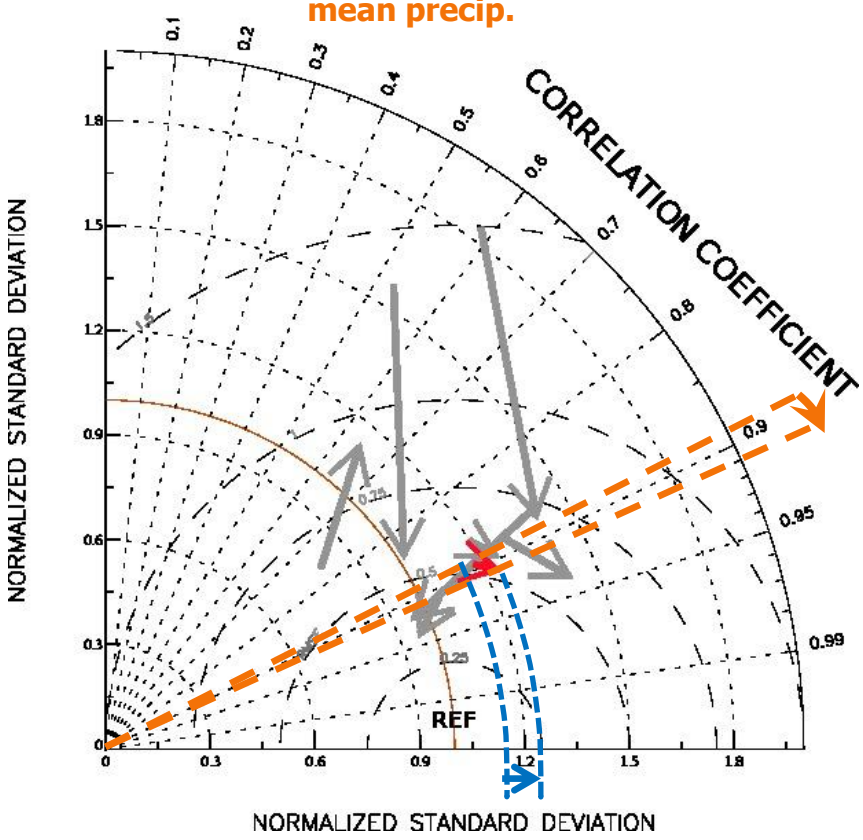

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- 0.11 does decrees biases on grid-points in mean and extreme precipitation
- CCLM: above average improvement in JJA; below in Scandinavia and Alps

3

- **Do spatial structures and variabilities get improved?**

- Partly smaller improvements than other RCMs (over average 0.44 performance)
- CCLM over average spatial correlation and variabilities of mean precipitation

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Precipitation in the EURO-CORDEX 0.11 and 0.44 simulations: High resolution, High benefits?

To be submitted to Climate Dynamics