

Daily Precipitation Analysis using the CLARIS-LPB RCMs

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WCRP VAMOS/CORDEX Workshop on Latin-America and Caribbean CORDEX LAC:
Phase I - South America

Lima, 12.09.2013

Outline

1. Motivation
2. Methods
3. Results
4. Conclusion
5. Outlook



CLARIS | LPB

2008–2012

...ongoing collaboration:

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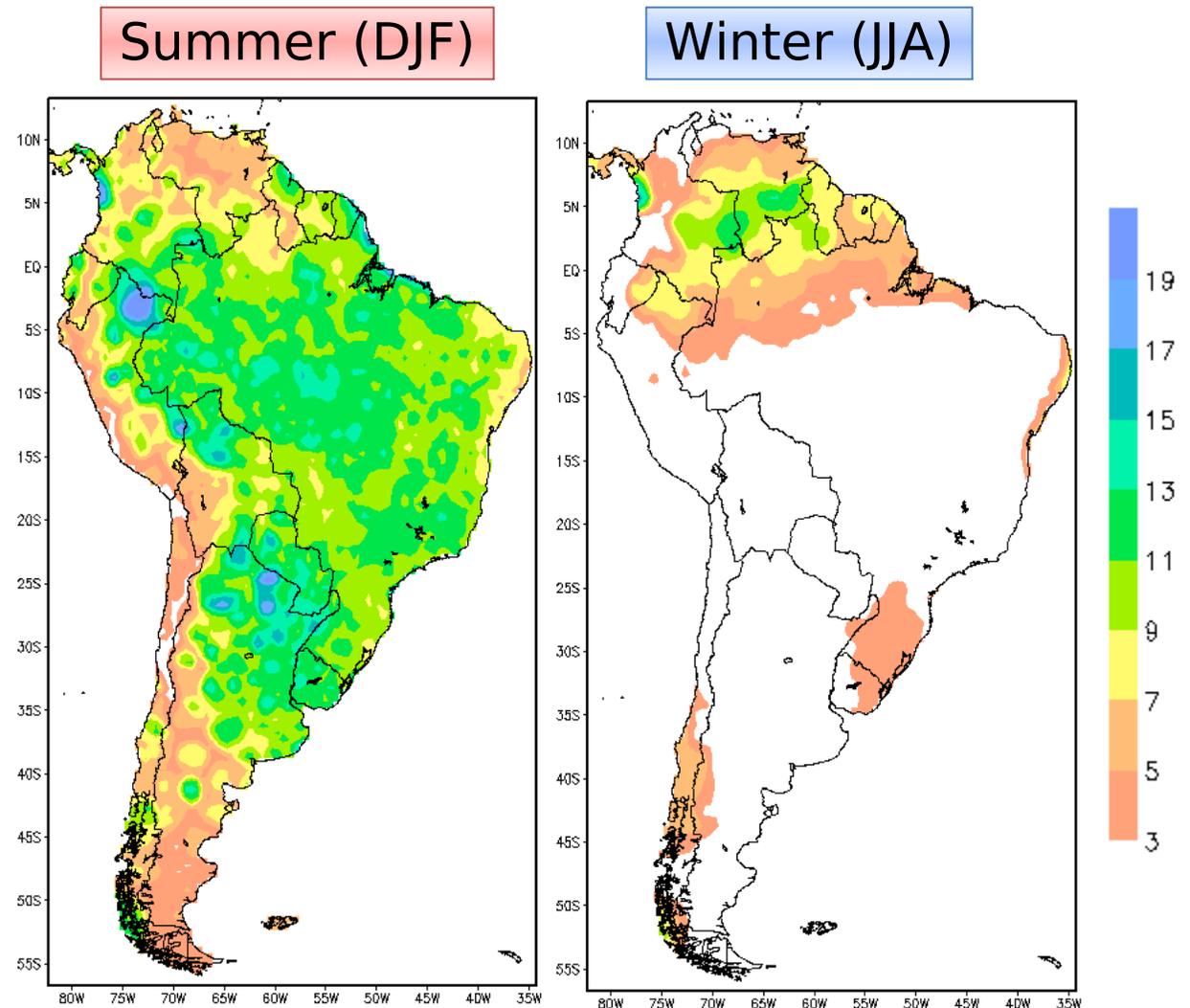
Motivation

... during the last decade
(1999–2008)

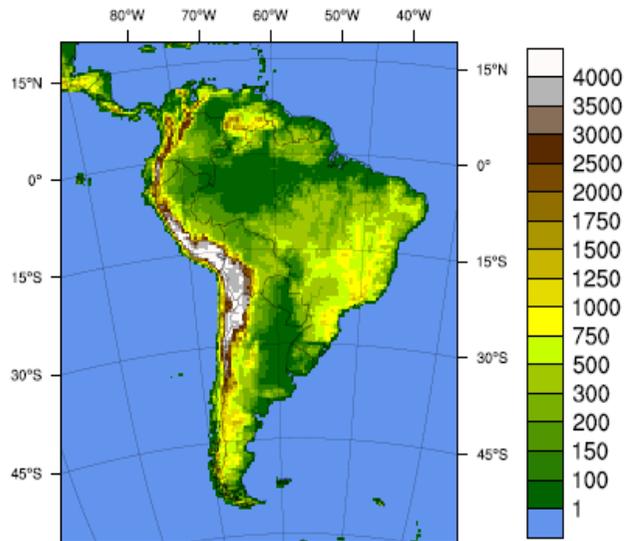
Precipitation sources:

- **Summer** – convective activity
- **Winter** – large scale influences such as ITCZ and the SACZ

AIM: To characterize the uncertainty in simulating the distribution and mean daily precipitation in South America



Methods



Domain: CORDEX South America
about 50 km resolution
Validation period: 1989-2008

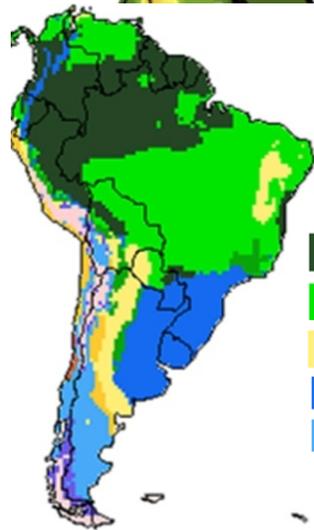
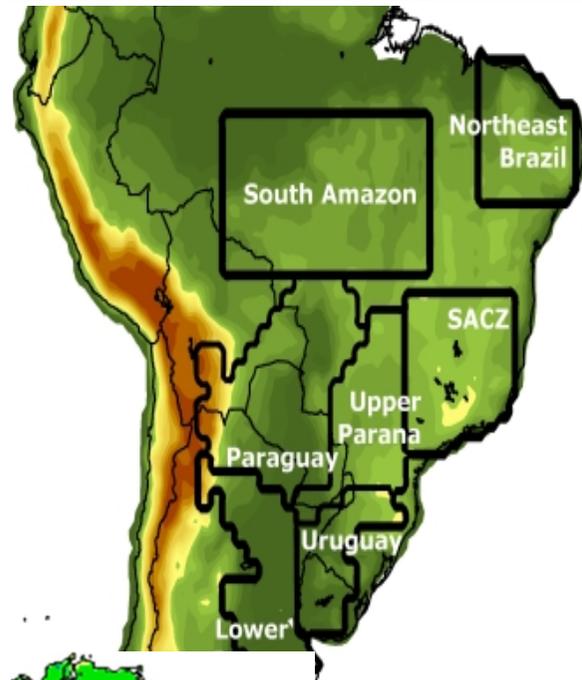
Model	Institute	Cumulus Parameterization Schemes
RCA	SMHI, Sweden	KF: Kain and Fritsch (1993)
PROMES	UCLM, Spain	KF: Kain and Fritsch (1993)
REMO	MPIM/CSC, Germany	TN: Tiedtke (1989), Nordeng (1994)
MM5	CIMA, Argentina	GR: Grell (1993)
RegCM3	USP, Brazil	GR: Grell (1993)
ETA	INPE, Brazil	BM: Betts and Miller (1986)
LMDZ	LMDZ, France	EM: Emanuel (1993)



Methods

Skill score based on the probability density functions (Perkins et al., 2007):

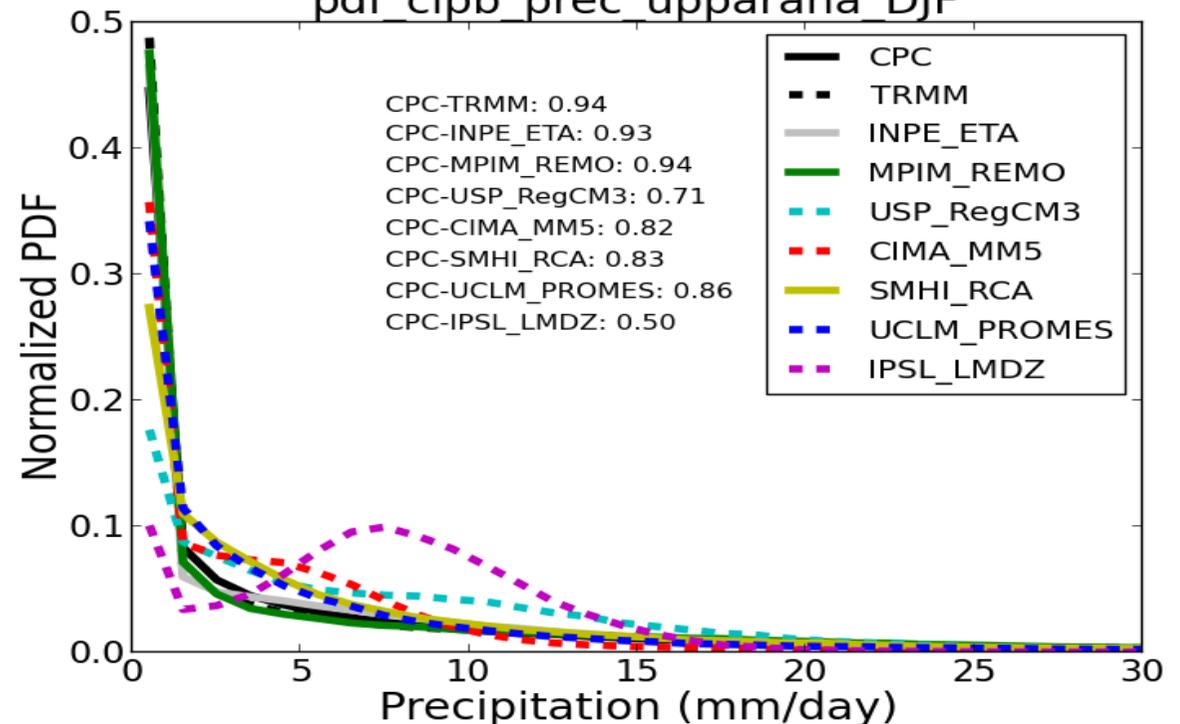
$$SS = \sum_1^N \min(Z_M, Z_{REF})$$



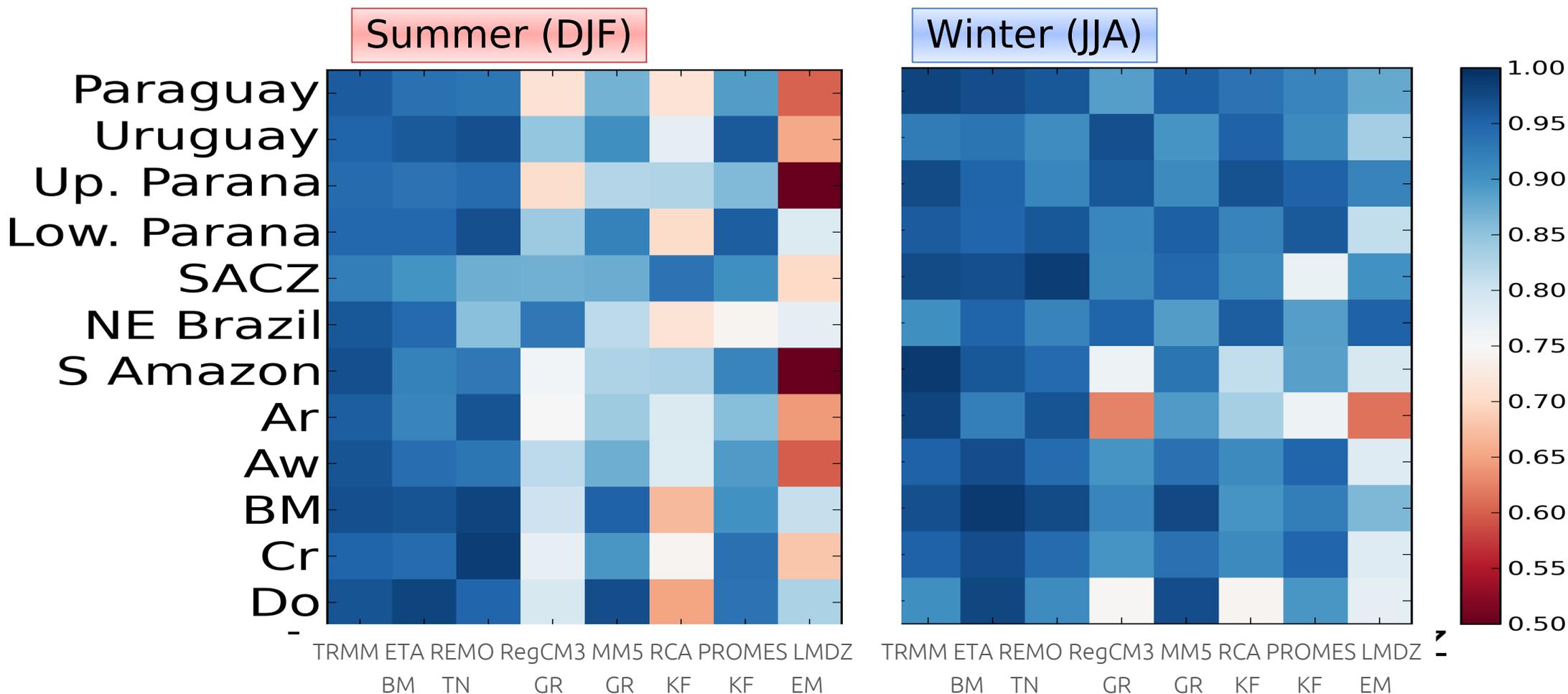
Köppen-Trewartha
climate classification

- Ar - Tropical Humid
- Aw - Tropical wet-Dry
- Bw - Dry semi-arid
- Cr - Subtropical humid
- Do - Temperate oceanic

pdf clpb prec upparana DJF



Results: PDF Skill Score relative to CPC



During winter, the models tend to represent the regional precipitation distribution except in Ar (tropical humid climate type)

During summer, regional differences are observed among the models

Mean Daily Precipitation Intensity DJF 1999-2008, (mm/day)

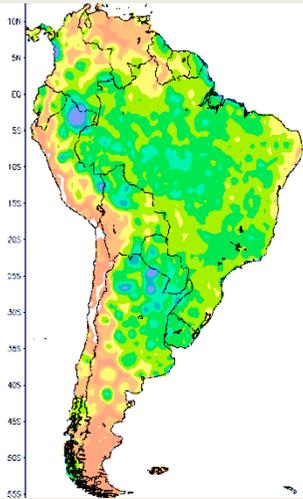


CSC
Climate Service Center
Germany

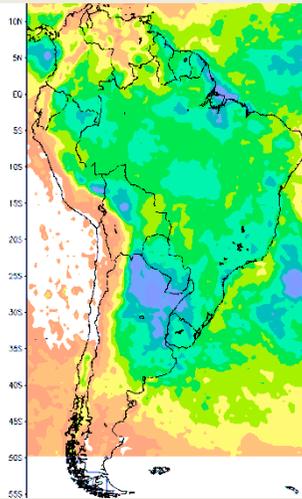


CLARIS | LPB Eine Einrichtung des Helmholtz-Zentrums Geesthacht

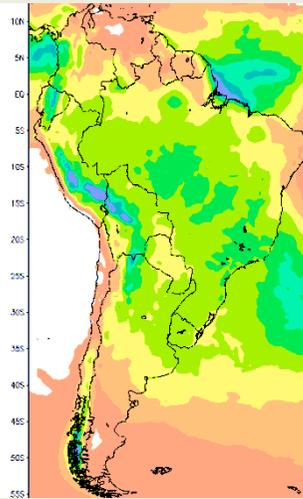
CPC



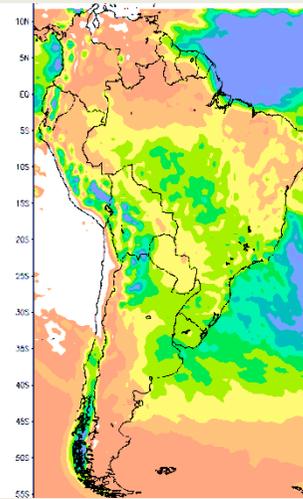
TRMM



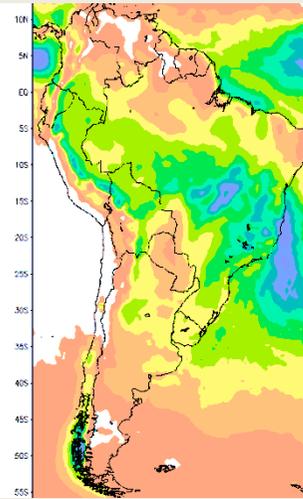
ENS



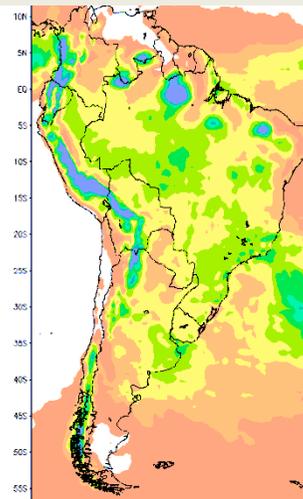
MM5-GR



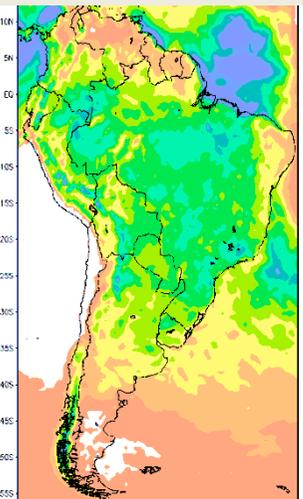
ETA-BM



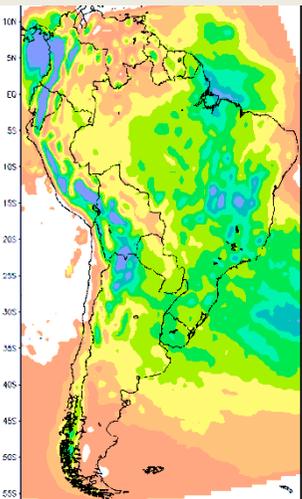
LMDZ-EM



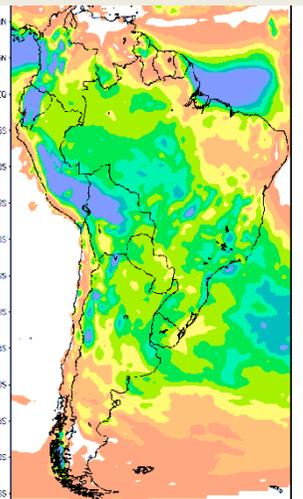
REMO-TN



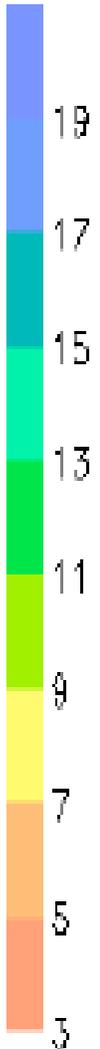
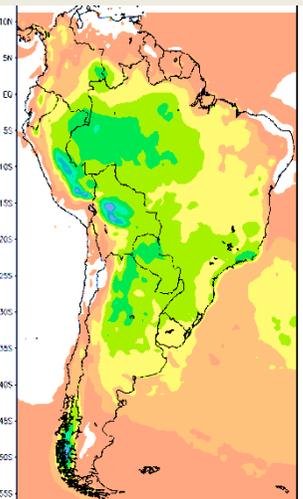
RCA-KF



PROMES-KF



RegCM3-GR



Conclusion

1. Different methods of model intercomparison across different regions (basins and climate types) are explored to characterize the uncertainty in simulating the daily precipitation distribution, mean and extreme values in South America
 2. The relative skill of models in simulating the seasonal daily precipitation are measured using probability distribution functions (PDFs)
 3. The skill of simulating the daily precipitation distribution is not solely dependent on the convective scheme
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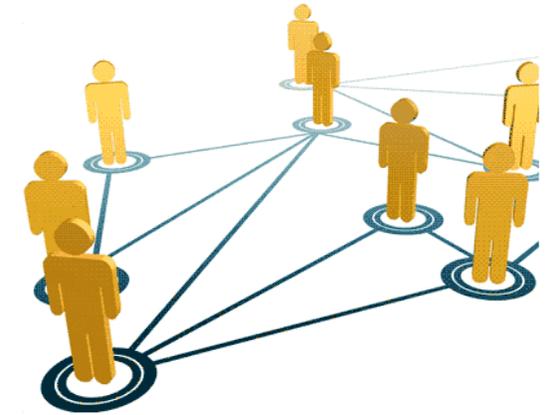
Outlook

1. Available RCP scenarios: 2.6, 4.5, 8.5
 - Driven by 1 GCM – MPI-ESM
 - Postprocessing for CORDEX
 - Teichmann et al., 2013
 2. Collaborations are welcome :)
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Climate Service Center

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Maraming Salamat po! Vielen Dank!

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