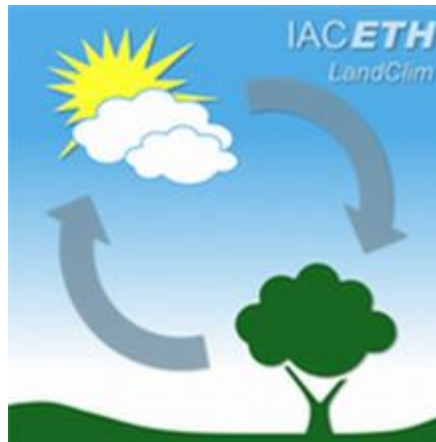


COSMO activities in the Land-Climate Dynamics group

Edouard Davin, Quentin Lejeune, Stefanos Mystakidis, Stefan Rüdisühli,
Sonia Seneviratne



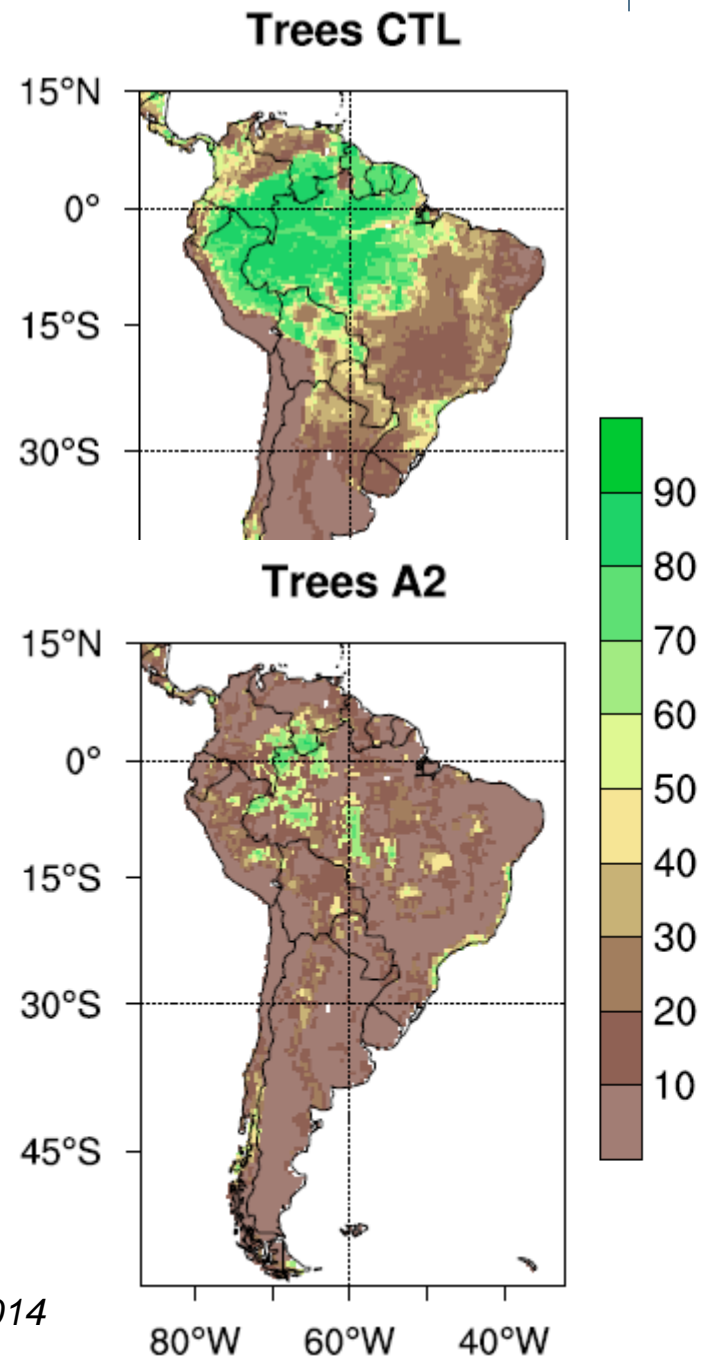
Outline

- Amazon deforestation
- Land management
- Status of COSMO-CLM² development
- Carbon cycle

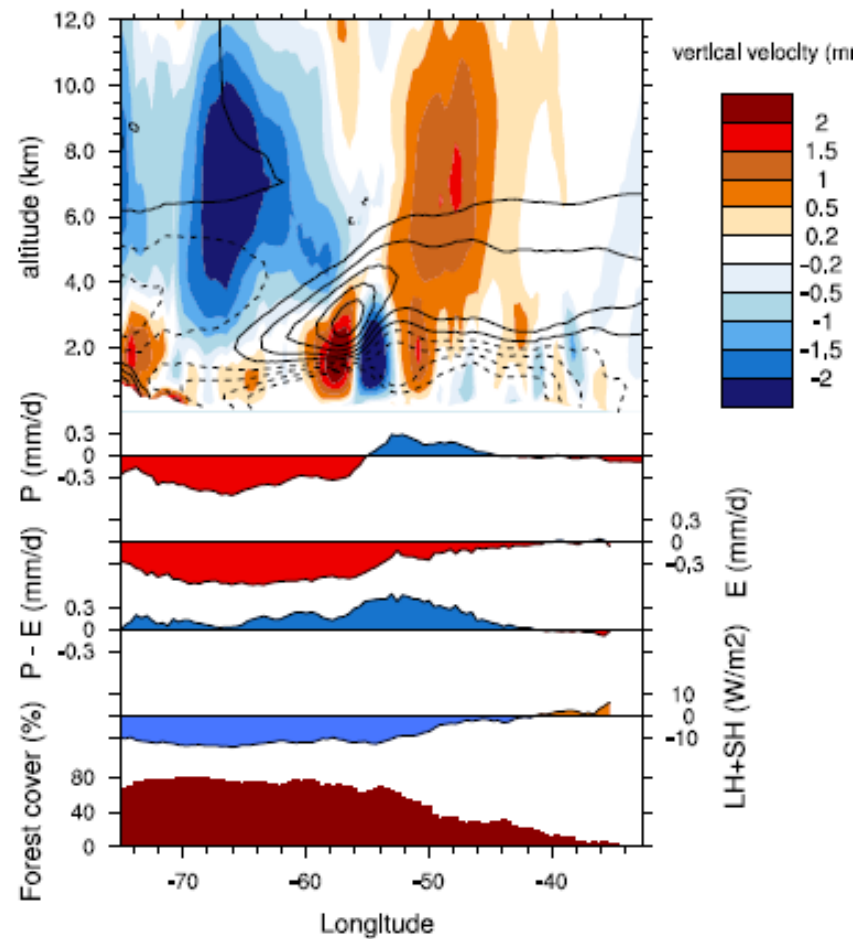
Future Amazon deforestation

- Amazon holds 40% of the world rainforest
- Deforestation rates are currently higher than in most other regions
- Most pessimistic scenarios project an almost complete loss of the rainforest by the end of the century (e.g. A2 scenario)

Lejeune et al., Clim. Dyn., 2014



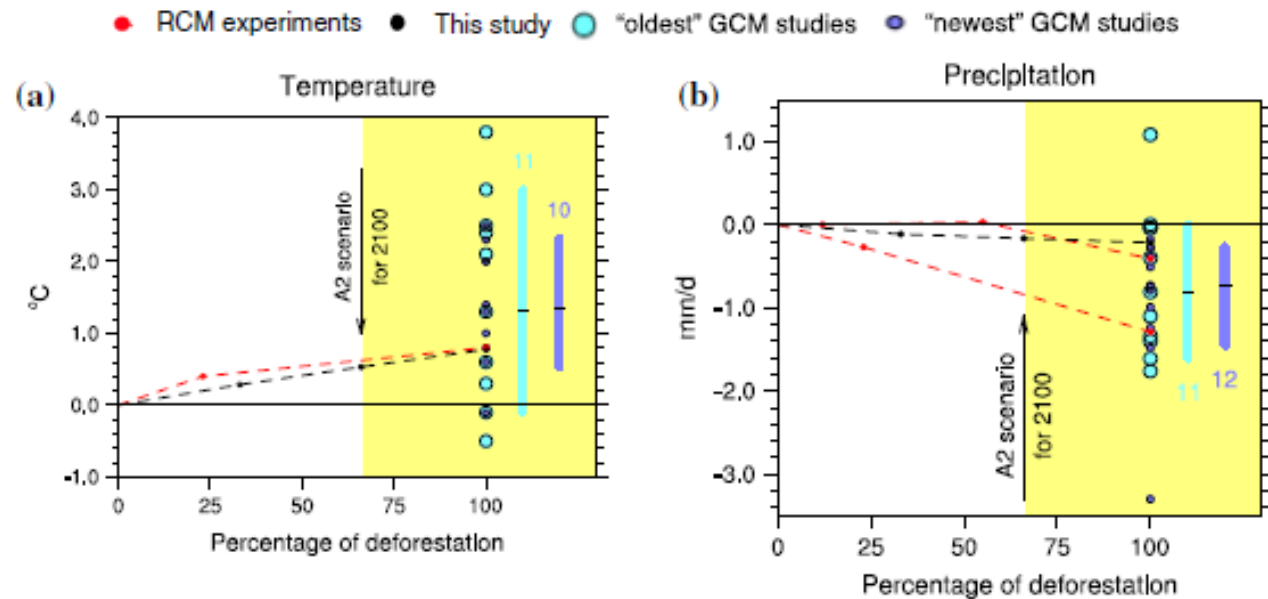
Impact on the regional climate



Lejeune et al., *Clim. Dyn.*, 2014

Comparison with GCMs

- Large spread in modelling results
- Most models agree on the sign of change: increase in temperature and decrease in precipitation due to lower evapotranspiration



Lejeune et al., *Clim. Dyn.*, 2014

Beyond deforestation: The importance of management



**Deforestation
(land conversion)**

Management

Example: tillage



Tillage

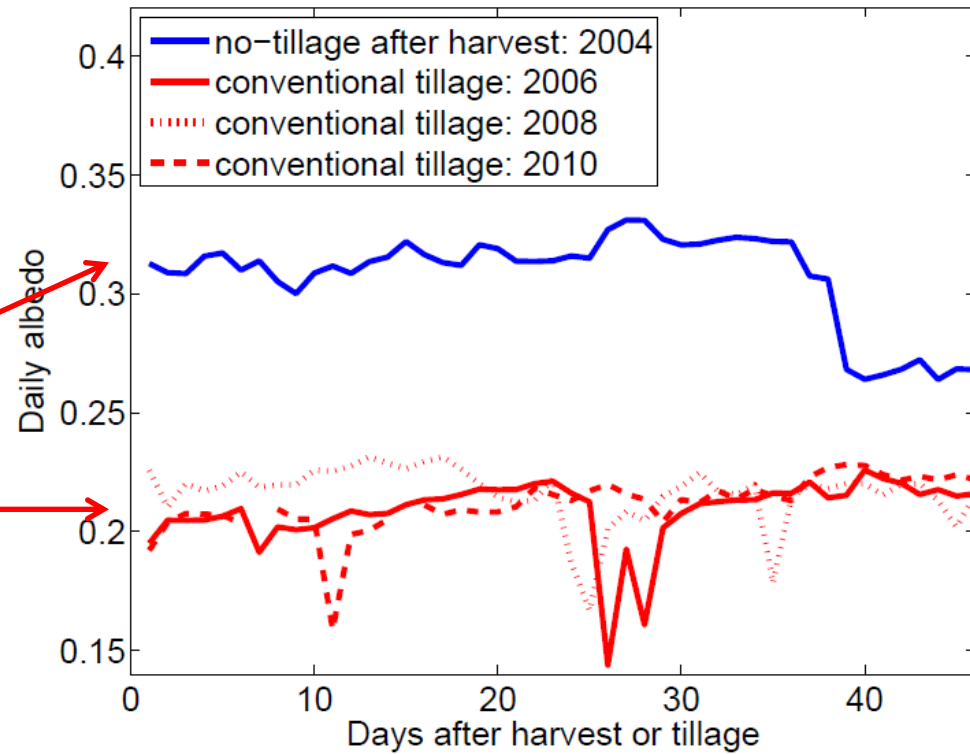
No tillage

Photograph by Jim Richardson (National Geographic)

Example: tillage



Avignon, FR (wheat)

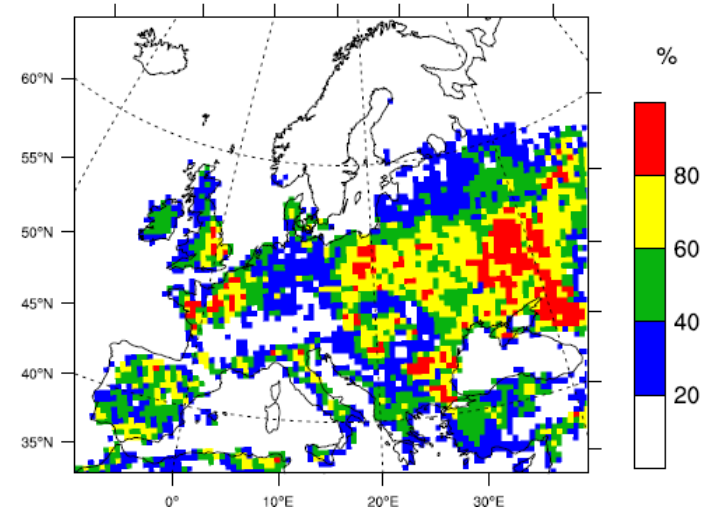


Photograph by Jim Richardson (National Geographic)

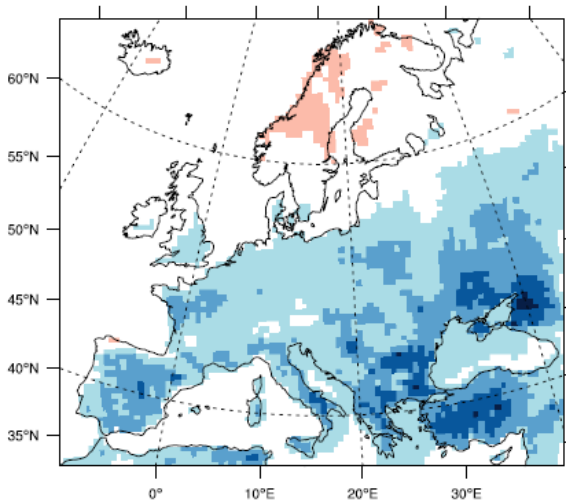
Davin et al., PNAS, 2014

T2m summer mean change

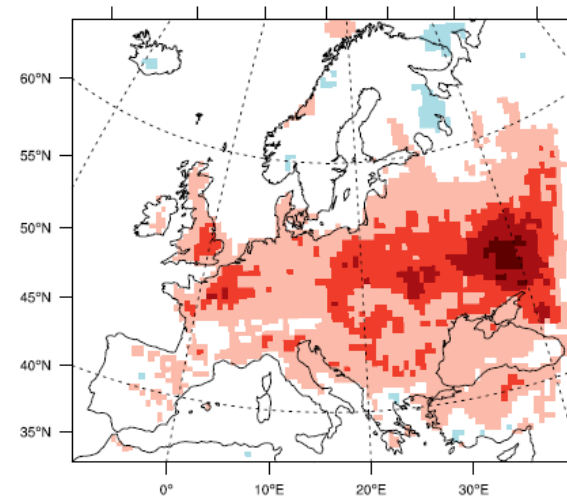
Crop distribution (%)



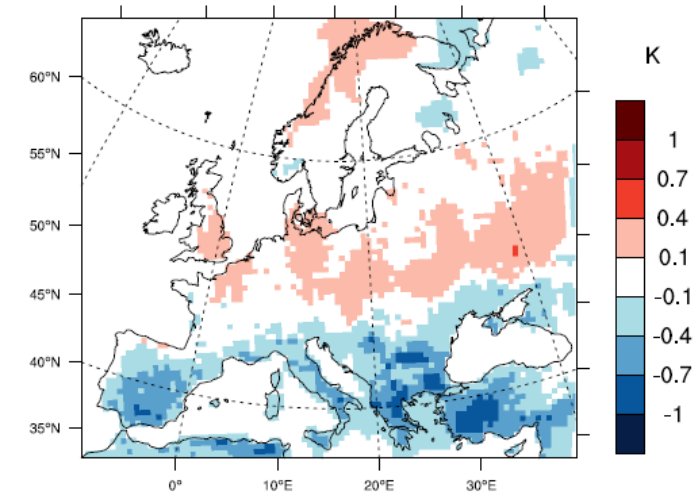
ALB - CTL



EVA - CTL

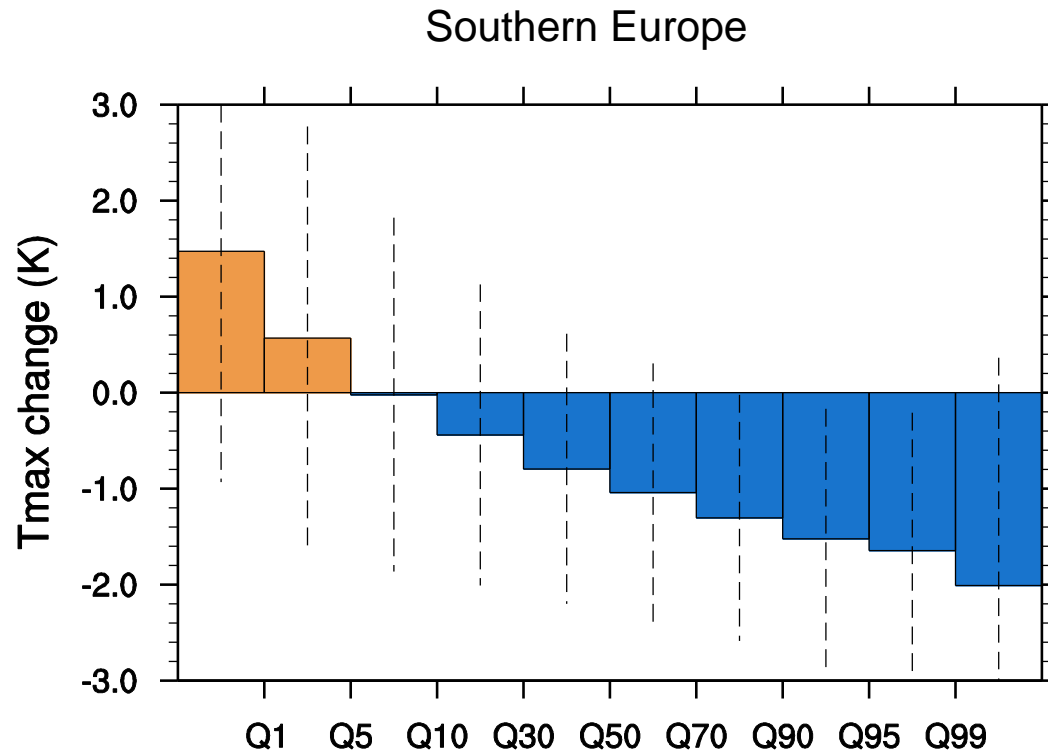


NOTILL - CTL



Davin et al., PNAS, 2014

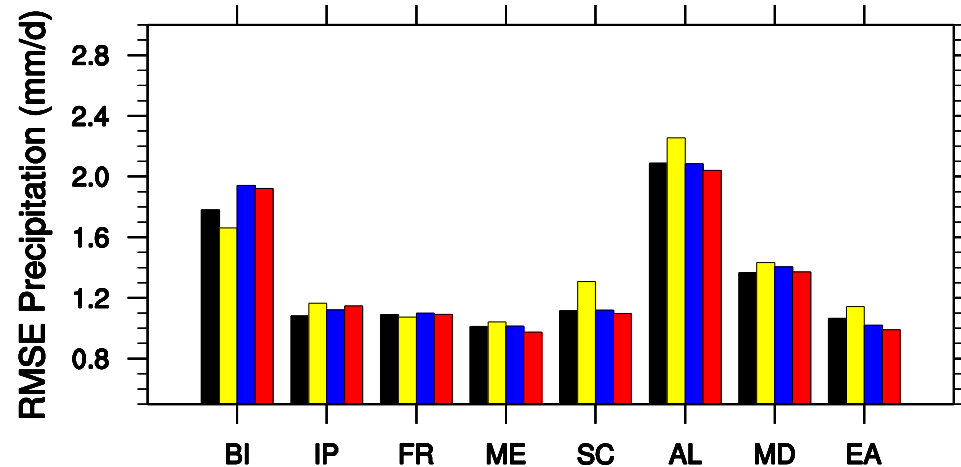
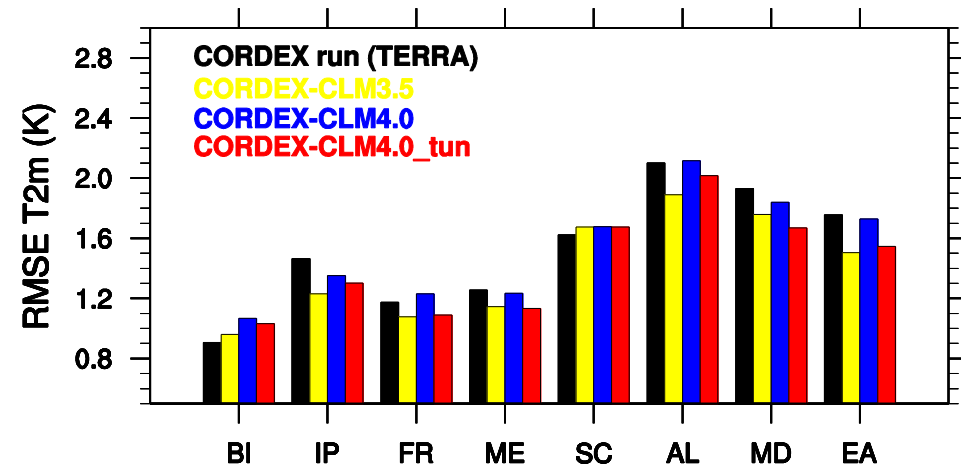
Asymmetric effect on temperature distribution



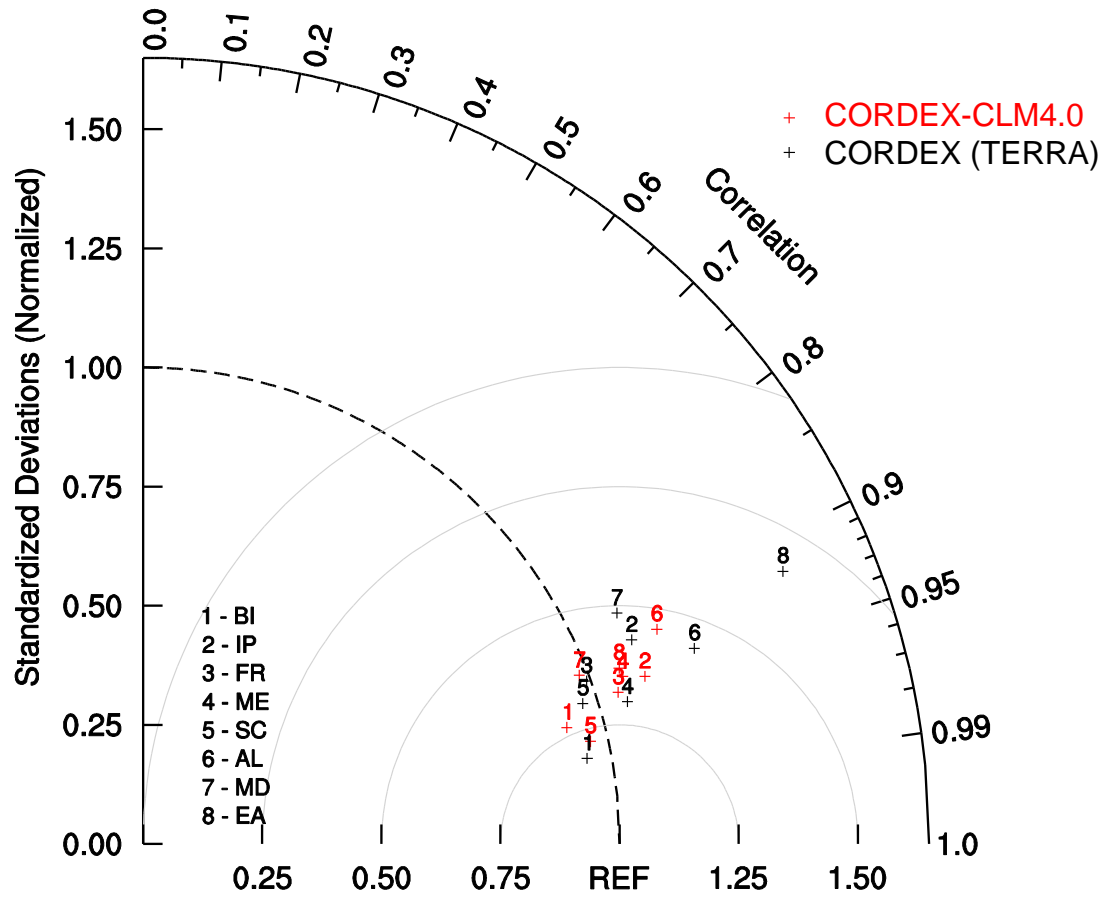
Davin et al., PNAS, 2014

Status of COSMO-CLM² development

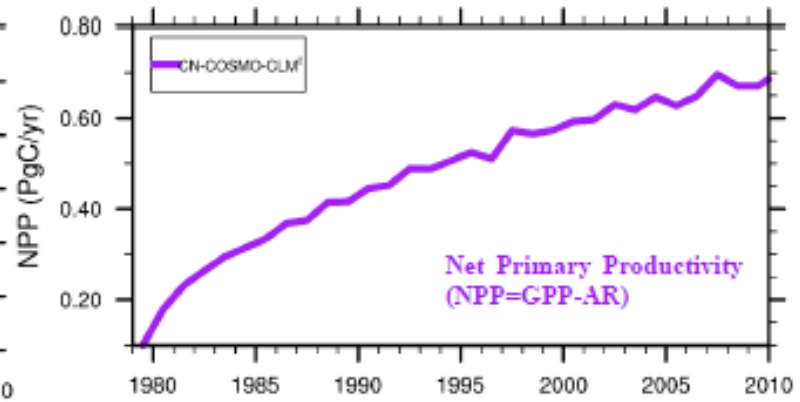
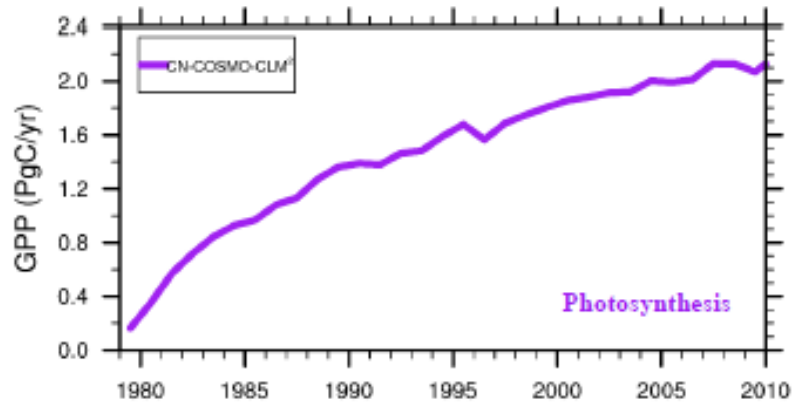
- Upgrade to OASIS-MCT coupler
- Upgrade to CLM4/CLM4.5



Summer temperature variability



Next challenge: Carbon-Nitrogen cycle



PhD Stefanos Mystakidis