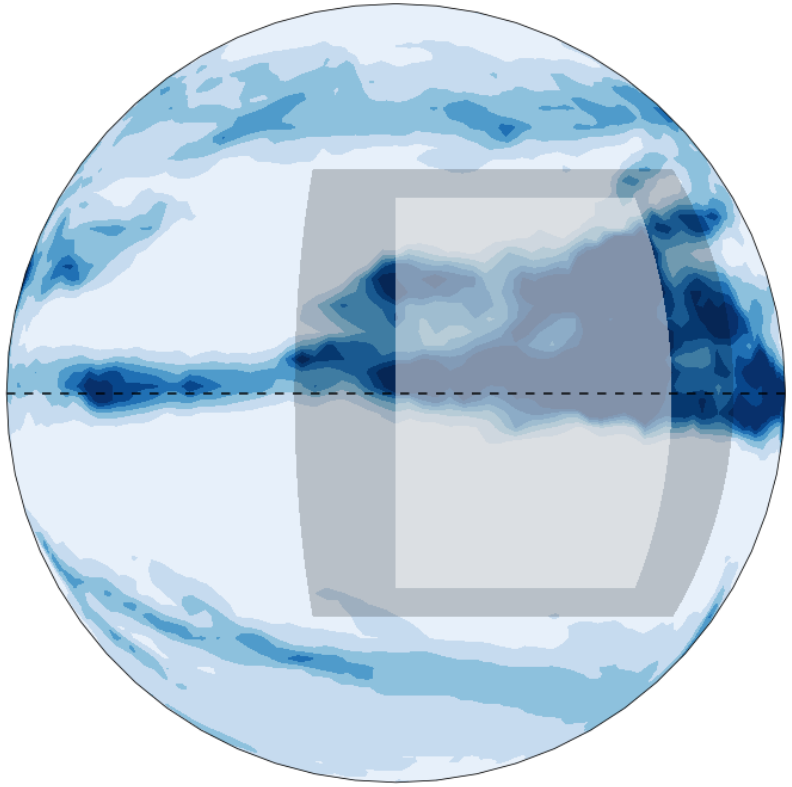


universität wien

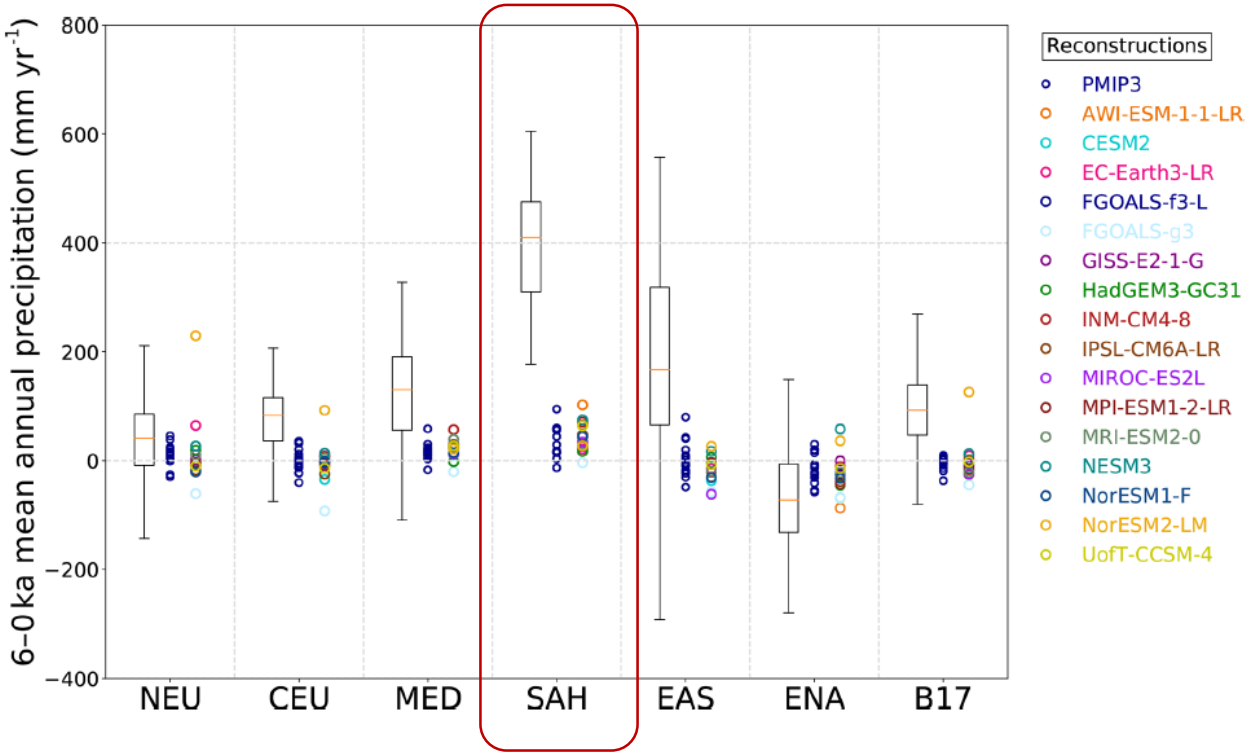
How does the representation of convection affect simulations of the mid-Holocene Green Sahara?

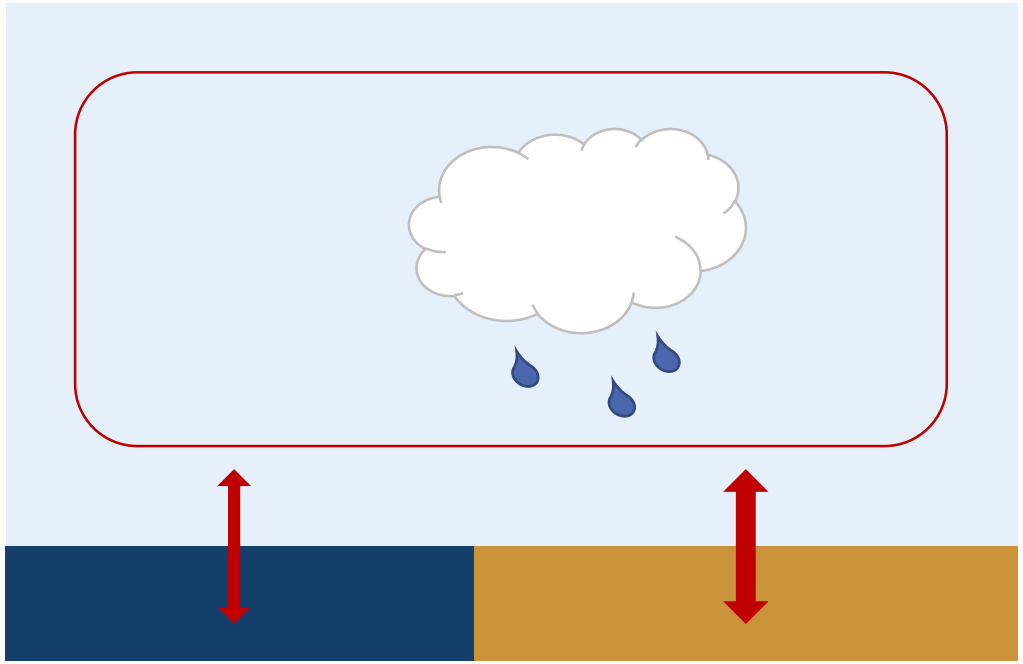
Dorian Spät, Aiko Voigt, Michela Biasutti

dorian.spaet@univie.ac.at

EGU General Assembly 2022

Green Sahara in Climate Models





We focus on atmospheric dynamics, not interactions with lower boundary

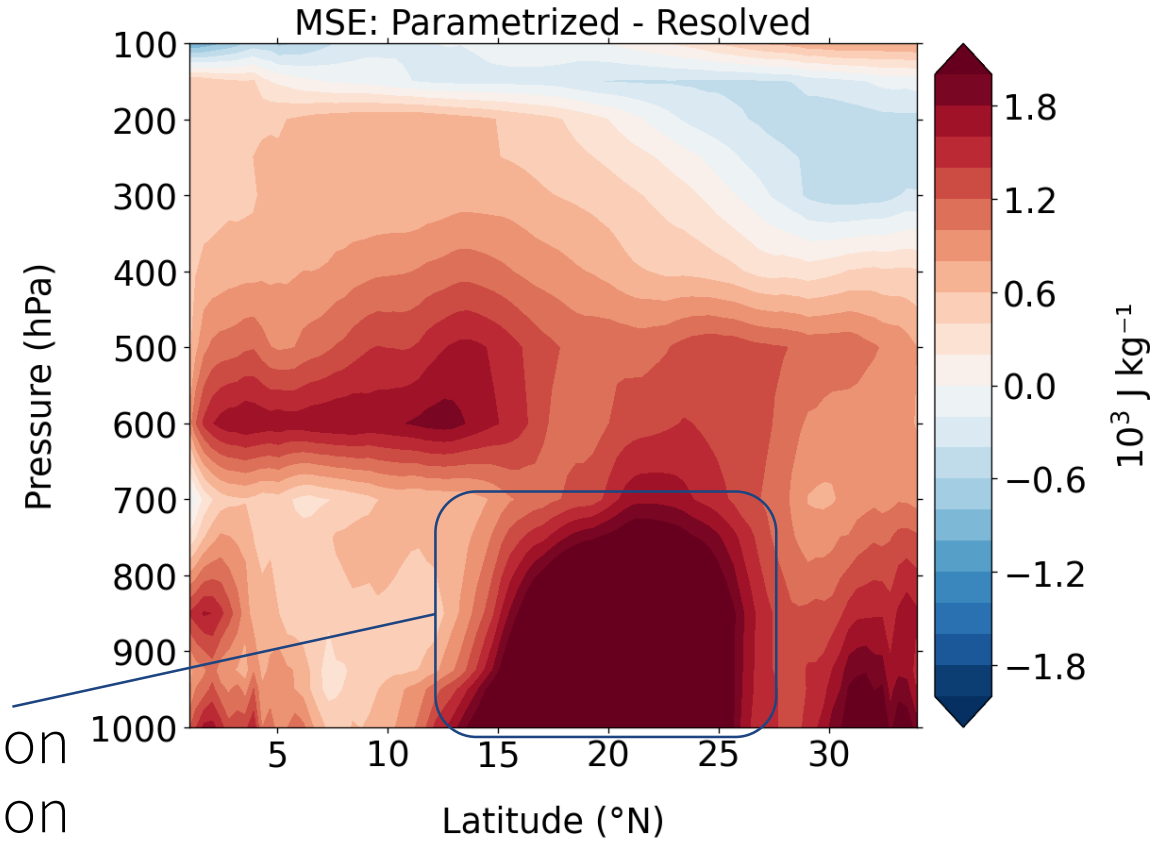
Brierley et al. (2020) https://doi.org/10.5194/cp-16-1847-2020

dorian.spaet@univie.ac.at

Influence of the representation of convection on the mid-Holocene West African Monsoon

Jungandreas et al., 2021. 10.5194/cp-17-1665-2021

- More realistic spatial distribution and intensity of precipitation with resolved convection
- Further northward extend of precipitation with parametrized convection



Due to enhanced runoff of precipitation with resolved convection

Influence of the representation of convection on the mid-Holocene West African Monsoon

Jungandreas et al., 2021. 10.5194/cp-17-1665-2021

- More realistic spatial distribution and inte
  resolved
- Further
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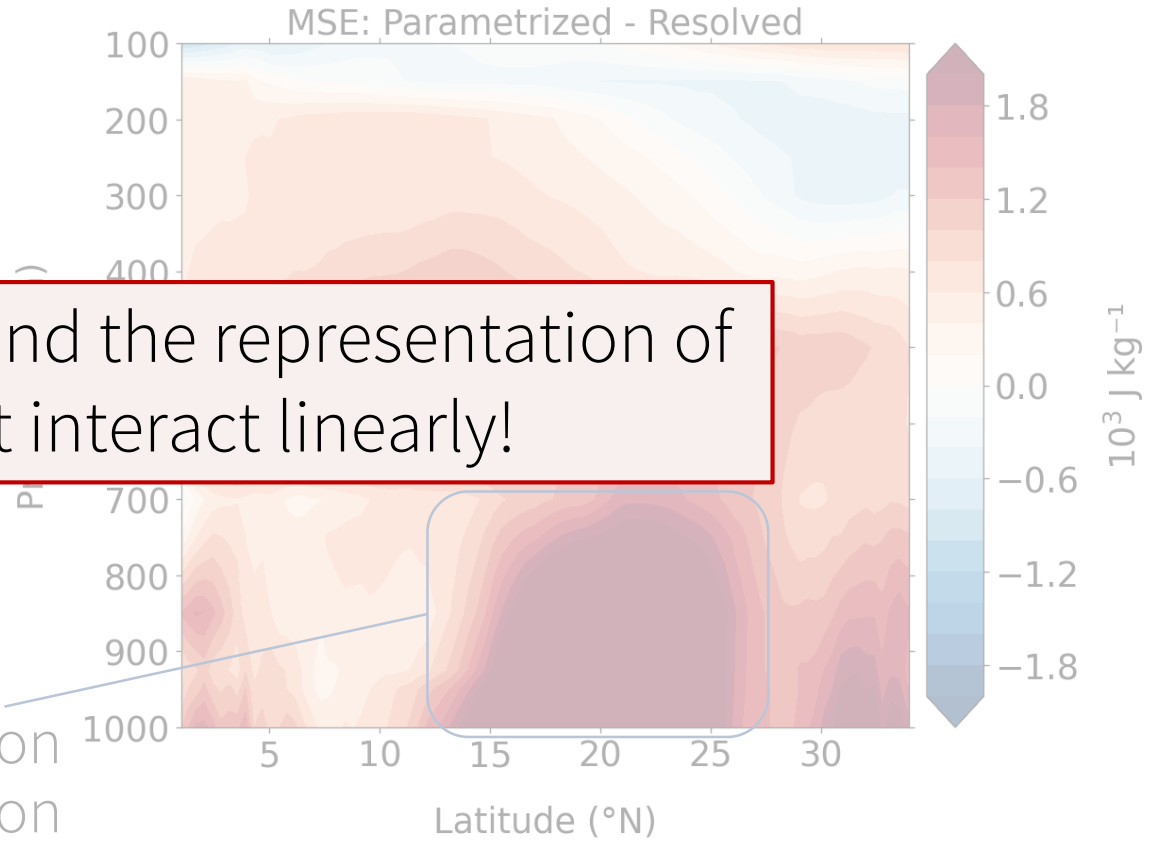
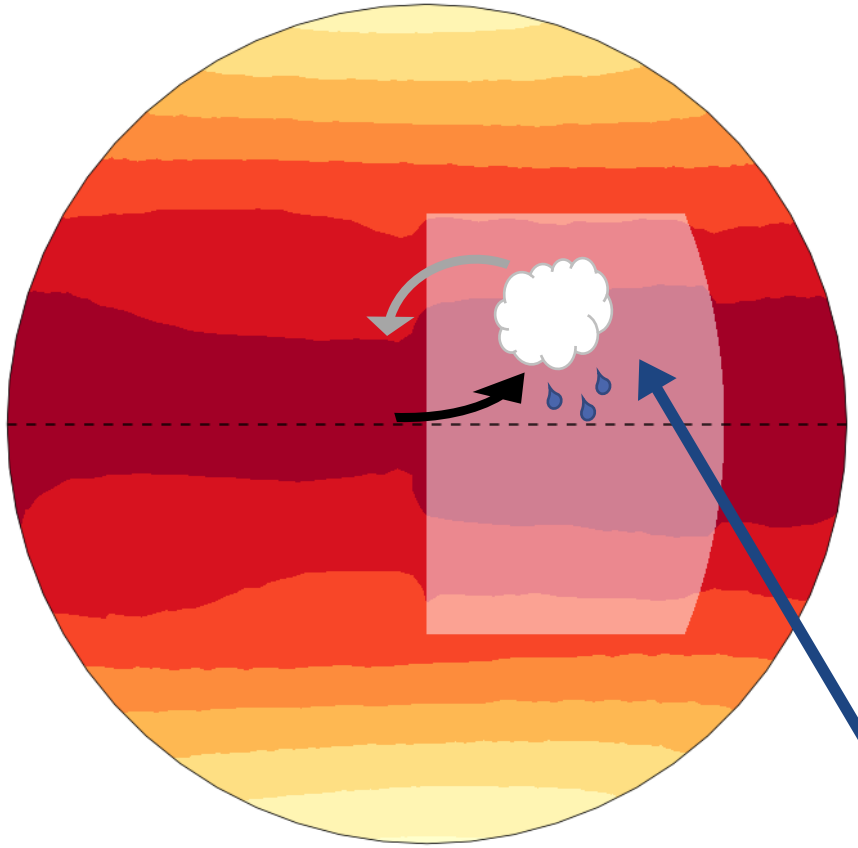
Due to enhanced runoff of precipitation with resolved convection



Effects of **soil feedbacks** and the representation of **convection** do not interact linearly!

Idealized Simulations – TRACMIP



IDEALIZED EQUATORIAL CONTINENT

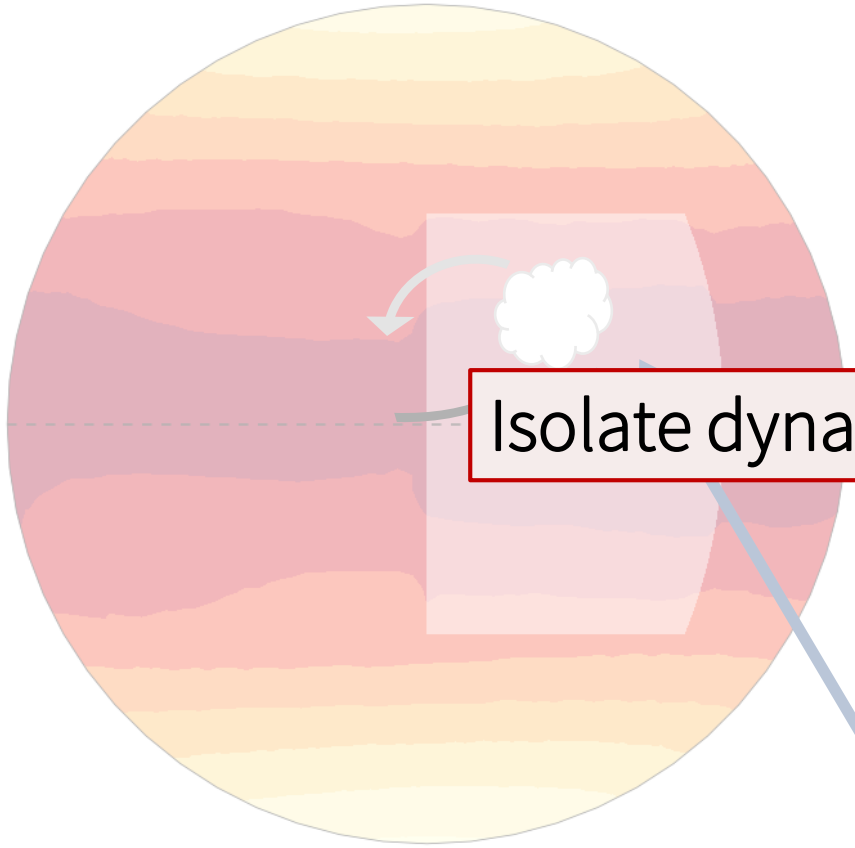
1. Low heat capacity
2. Brighter than water
3. Reduced evaporation
4. No heat transport

Monsoon Circulation similar to WAM

Voigt et al. (2016) https://doi.org/10.1002/2016MS000748 | Biasutti et al. (2022) https://doi.org/10.1175/JCLI-D-21-0588.1

dorian.spaet@univie.ac.at

Idealized Simulations – TRACMIP



IDEALIZED

CONTINENT

Isolate dynamical effects of resolved convection

1. Low heat capacity
2. Brighter than water
3. Reduced evaporation
4. No heat transport

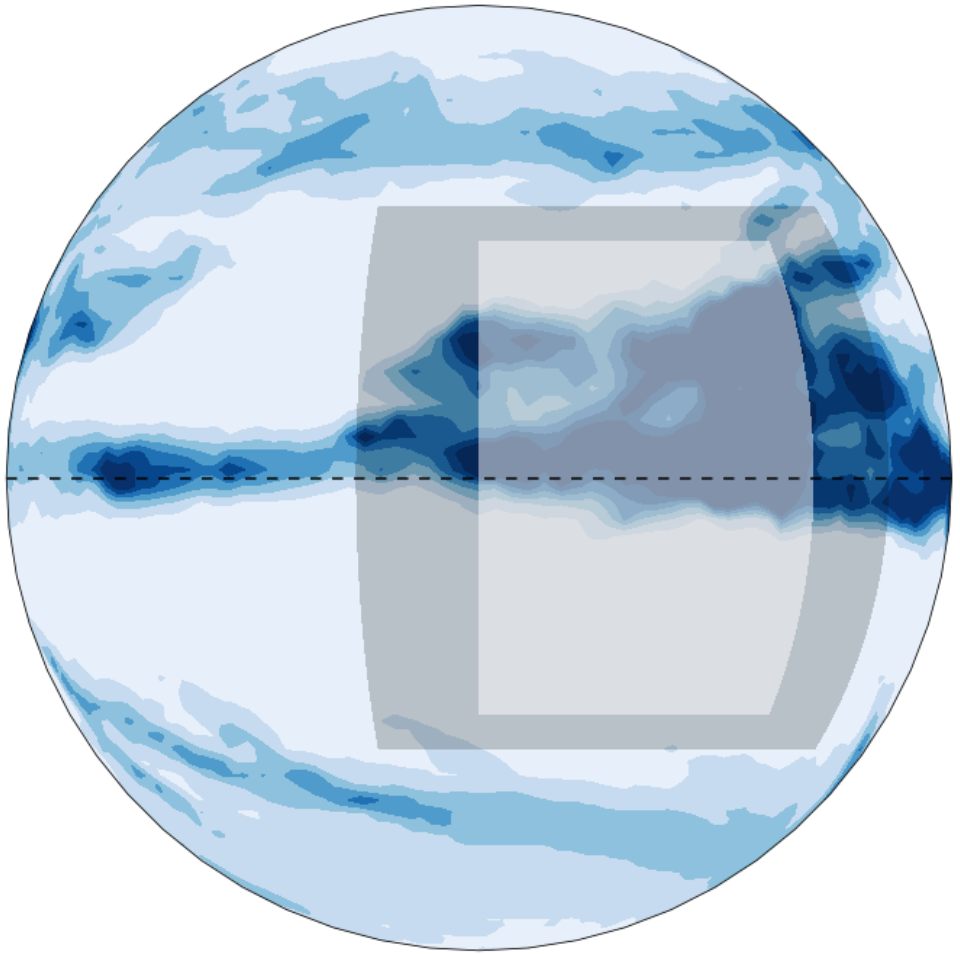
Monsoon Circulation
similar to WAM

Voigt et al. (2016) https://doi.org/10.1002/2016MS000748 | Biasutti et al. (2022) https://doi.org/10.1175/JCLI-D-21-0588.1

Current Status & Outlook

Implemented TRACMIP protocol in new climate model **ICON-ESM 1.0**

- Nested simulations with resolved convection
- Isolate effect of resolved convection on the NH monsoon/precipitation
- Might *help* to explain the gap between models & proxies



Jungclaus et al. (2022) https://doi.org/10.1029/2021MS002813