

Large Divergence in Tropical Hydrological Projections Caused by Model Spread in Elevated CO₂ Responses

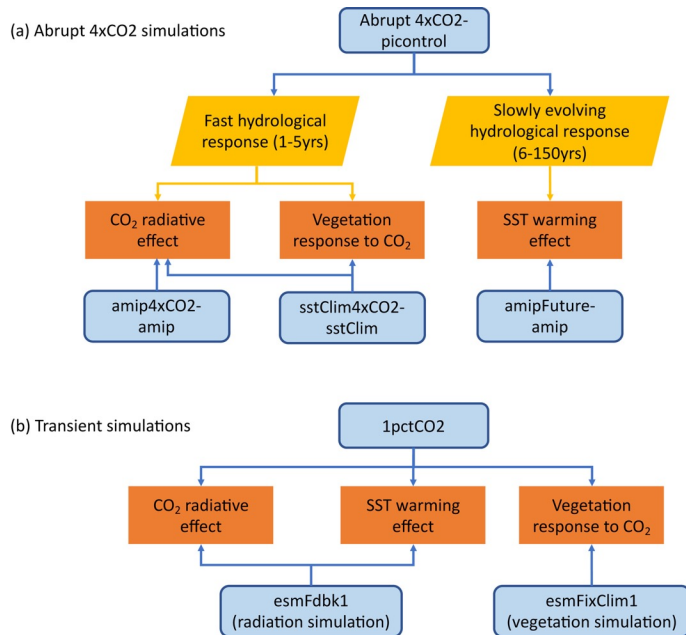


Figure. Illustration of CMIP CO₂ sensitivity experiments used to isolate the contributions of controlling mechanisms of hydrological changes in abrupt 4×CO₂ simulations and transient simulations.

Zhou S, Keenan TF, Williams AP, Lintner B, Zhang Y, Gentile P (2022) Large divergence in tropical hydrological projections caused by model spread in vegetation responses to elevated CO₂. *Earth's Future* 10, e2021EF002457

Scientific Achievement

- We identify the processes accounting for model differences in tropical hydrological changes using multiple experiments in the Coupled Model Intercomparison Project.
- We show that differences mainly arise from model representations of vegetation responses to elevated CO₂, and associated changes in atmospheric moisture and circulation.

Significance and Impact

- Vegetation responses to elevated CO₂ and associated atmosphere feedbacks are of huge importance.
- Our results underscore the need to improve representations of the vegetation physiological response to rising CO₂, to provide reliable tropical hydrological projections.

Research Details

This analysis leverages multiple CMIP experiments and an attribution framework to understand sources of between model variability in future hydrological projections.

