

EGU22-1381

<https://doi.org/10.5194/egusphere-egu22-1381>

EGU General Assembly 2022

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Uncertainty in projected changes in precipitation minus evaporation: Dominant role of dynamic circulation changes and weak role for thermodynamic changes

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End of century projections from Coupled Model Intercomparison Project (CMIP) models show a decrease in precipitation over subtropical oceans that often extends into surrounding land areas, but with substantial intermodel spread. Changes in precipitation are controlled by both thermodynamical and dynamical processes, though the importance of these processes for regional scales and for intermodel spread is not well understood. The contribution of dynamic and thermodynamic processes to the model spread in regional precipitation minus evaporation (P-E) is computed for 48 CMIP models. The intermodel spread is dominated essentially everywhere by the change of the dynamic term, including in most regions where thermodynamic changes dominate the multi-model mean response. The dominant role of dynamic changes is insensitive to zonal averaging which removes any influence of stationary wave changes, and is also evident in subtropical oceanic regions. Relatedly, intermodel spread in P-E is generally unrelated to climate sensitivity.