Reducing Uncertainty in Biogeochemical Interactions Through Synthesis and Computation

The RUBISCO Scientific Focus Area (SFA)

U.S. DEPARTMENT OF ENERGY

Office of Science

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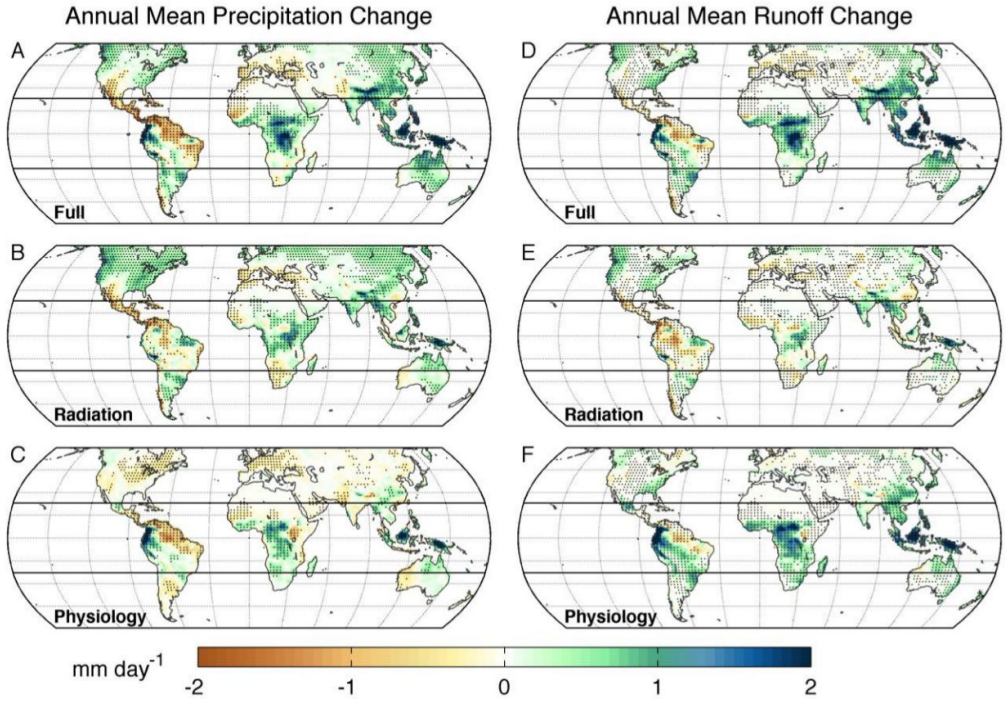
Plant-physiological responses to rising CO_2 increase tropical flood risk



- Assessments of future flood risk based only on precipitation changes ignore land processes
- Higher CO_2 may reduce stomatal conductance and transpiration
- We assessed relative impacts of plant-physiological and radiative- greenhouse effects on changes in daily runoff intensity over tropical continents using CESM
- Extreme percentile rates increase more than mean runoff
- Plant-physiological effects have a small impact on precipitation intensity, but are a dominant driver of runoff intensification

Kooperman, G. J., **M. D. Fowler**, **F. M. Hoffman**, **C. D. Koven**, K. Lindsay, M. S. Pritchard, A. L. S. Swann, and **J. T. Randerson** (2018), Plant-physiological responses to rising CO_2 modify simulated daily runoff intensity with implications for global-scale flood risk assessment, *Geophys. Res. Lett.*, 45(22):12,457–12,466. doi:10.1029/2018GL079901.