

Projected strengthening of Amazonian dry season by constrained climate model simulations

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Resumen

The vulnerability of Amazonian rainforest, and the ecological services it provides, depends on an adequate supply of dry-season water, either as precipitation or stored soil moisture. How the rain-bearing South American monsoon will evolve across the twenty-first century is thus a question of major interest. Extensive savanization, with its loss of forest carbon stock and uptake capacity, is an extreme although very uncertain scenario(1-6). We show that the contrasting rainfall projections simulated for Amazonia by 36 global climate models (GCMs) can be reproduced with empirical precipitation models, calibrated with historical GCM data as functions of the large-scale circulation. A set of these simple models was therefore calibrated with observations and used to constrain the GCM simulations. In agreement with the current hydrologic trends(7,8), the resulting projection towards the end of the twenty-first century is for a strengthening of the monsoon seasonal cycle, and a dry-season lengthening in southern Amazonia. With this approach, the increase in the area subjected to lengthy-savannah-prone dry seasons is substantially larger than the GCM-simulated one. Our results confirm the dominant picture shown by the state-of-the-art GCMs, but suggest that the model democracy view of these impacts can be significantly underestimated.

Palabras clave


KeyWords Plus: [Precipitation Change](#); [Hydrological Cycle](#); [Tropical Forest](#); [Carbon-Dioxide](#); [21st-Century](#); [Circulation](#); [Resilience](#); [Mechanism](#); [Rainfall](#); [Patterns](#)

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