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Implications of plant acclimation for future climate-carbon cycle feedbacks

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The response of land ecosystems to climate change and associated feedbacks are a key uncertainty in future climate prediction (Friedlingstein et al. 2006). However global models generally do not account for the acclimation of plant physiological processes to increased temperatures. Here we conduct a first global sensitivity study whereby we modify the Joint UK land Environment Simulator (JULES) to account for temperature acclimation of two main photosynthetic parameters, Vcmax and Jmax (Kattge and Knorr 2007) and plant respiration (Atkin and Tjoelker 2003). The model is then applied over the 21st Century within the IMOGEN framework (Huntingford et al. 2004). Model simulations will provide new and improved projections of biogeochemical cycling, forest resilience, and thus more accurate projections of climate-carbon cycle feedbacks and the future evolution of the Earth System.

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