



## **Modification of land-atmosphere interactions by CO<sub>2</sub> effects**

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Plant stomata couple the energy, water and carbon cycles. Increased CO<sub>2</sub> modifies the seasonality of the water cycle through stomatal regulation and increased leaf area. As a result, the water saved during the growing season through higher water use efficiency mitigates summer dryness and the impact of potential heat waves. Land-atmosphere interactions and CO<sub>2</sub> fertilization together synergistically contribute to increased summer transpiration. This, in turn, alters the surface energy budget and decreases sensible heat flux, mitigating air temperature rise. Accurate representation of the response to higher CO<sub>2</sub> levels, and of the coupling between the carbon and water cycles are therefore critical to forecasting seasonal climate, water cycle dynamics and to enhance the accuracy of extreme event prediction under future climate.