

How much do different land models matter for climate simulation: results from an atmospheric model coupled to three land models

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An Atmospheric General Circulation Models (AGCM) is coupled to three land surface models individually and combinedly (land models receive the same atmospheric forcing and the average surface fluxes are passed back to the atmosphere) to study the uncertainties of simulated climatology caused by different land models. The combined experiment simulates a precipitation climatology that falls into the range of three individually coupled experiments in warm/wet seasons, but not in cold/dry seasons. No matter individually or combinedly coupled, the three land models give significantly different evaporative fraction and surface fluxes over most of the land. The inter-model variances of surface fluxes are doubled in the individually coupled experiments compared to the combined experiment, indicating the amplification of the signal of land model differences through land-atmosphere interaction.