



Global warming uncertainties due to the land carbon cycle may exceed those due to socioeconomics

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Unknowns in future global warming are usually assumed to arise from uncertainties in either the amount of anthropogenic greenhouse gas emissions or in the sensitivity of the climate to changes in greenhouse gas concentrations. Here we make use of two approaches to compare the relative importance of Carbon Cycle uncertainties with the more traditional estimates of Climate Sensitivity. In the first we diagnose the relative contributions of both, from the C4MIP ensemble; in the second we use a full coupled climate-carbon cycle model and a systematic method to explore uncertainties in the land carbon cycle. The former approach suggests for the C4MIP models that carbon cycle uncertainties contribute roughly 40% to the global temperature change (Huntingford et al., 2009), compared to climate sensitivity. In the latter systematic approach with a single GCM formulation we find a larger carbon cycle contribution, comparable with climate sensitivity uncertainties. The range of CO₂ concentrations arising from our single emissions scenario is greater than that previously estimated across the full range of IPCC SRES emissions scenarios when carbon cycle uncertainties were neglected.

Huntingford, C., Lowe, J.A., Booth, B.B., Jones, C.D., Harris, G.R., Gohar, L.K. and Meir, P.: 2009
"Contributions of carbon cycle uncertainty to future climate projection spread", TELLUS, 61, p355-360.