P2.25 Evaluation of parameter sensitivity for different levels of land-surface model complexity

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The importance of properly representing the land surface when modeling the general climate system is nc widely recognized. Since the mid-1960s, and incorporation of the first "Bucket" model into Gener Circulation Models (GCMs), increasingly complex land-surface schemes have been introduced to bett represent energy and water fluxes over the Earth□s surface. These Land Surface Schemes (LSS) hav numerous parameters that must be estimated for the various vegetated and non-vegetated surfaces acros the globe. Typical parameter estimation has been via a global land-surface classification scheme wi standard values for various land-cover types. These "default" values are then either used as given or a sometimes manually adjusted (calibrated) via comparison of the off-line model performance against sit specific field data. Recently, studies have emerged to investigate the sensitivity of the global climate to th parameter values used in these land-cover schemes. Most of the LSS sensitivity studies have been base on the evaluation of a "one parameter at a time" effect on the land system. This study uses a recent developed systems-based approach to evaluate the sensitivity of energy and water fluxes to the paramet values used in LSS. Five land-surface types (grassland, boreal forest, semi-arid vegetation, agricultur cropland, and tropical rain forest) are analyzed using the Multi-Objective Generalized Sensitivity Analys (MOGSA). Sensitivity of energy and water fluxes to parameters is evaluated in LSS with varying levels complexity, from the simple Bucket model to the Biosphere-Atmosphere Transfer Scheme (BATS) ar NOAH Land Surface Model (LSM). Random parameter sets are generated with a set percentage change the baseline default values. Root mean squared error (from observed values), along with changes in late and sensible heat fluxes, are evaluated for each parameter set. Preliminary results using the BATS2 mod indicate varying sensitivity to parameters based on land-cover type. Semi-arid sites appear to have mo sensitivity to parameter values, with larger variations in fluxes, while temperate and boreal regions appear be less sensitive. Analysis of the sensitivity of parameters at various land-cover types will lead to bett estimation of parameters at specific biomes around the world, increasing confidence in predictions of futu climate from deforestation and other anthropogenic impacts on the land surface.

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