Geophysical Research Abstracts, Vol. 7, 03800, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03800

Understanding terrestrial carbon cycle feedback under global warming

Ning Zeng and Haifeng Qian

Department of Meteorology and Earth System Science Interdisciplinary Center University of Maryland (zeng@atmos.umd.edu)

Initial results from the first coupled carbon cycle-climate models have revealed remarkably large differences in response to anthropogenic global warming. As it stands, the uncertainty associated with carbon-climate feedback is as large as, if not larger than uncertainty due to any other single identifiable climate feedback such as cloud-radiative feedback. The ongoing Coupled-Carbon-Cycle-Climate Model Intercomparison Project (C4MIP) suggests this is to large extent due to terrestrial carbon cycle response to anthropogenic global climate change. Here we show results from several sensitivity studies from coupled simulations in identifying the key contributors to the feedback. We have also developed a semi-analytical framework applicable to carbon cycle perturbations. The analytical framework explains the numerical model results surprisingly well, and shed light on several key processes, in particular, the growth enhancement due to CO2 fertilization effect, positive or adverse effects of warming on vegetation growth, and vegetation and soil respiration sensitivity to temperature.