



Validation of global leaf area index simulated by a land surface model through comparison with satellite products

A.-L. Gibelin (1), J.-C. Calvet (1), N. Viovy (2), J.L. Roujean (1), L. Jarlan (1) and S. Los (3)

(1) CNRM-GAME, Météo-France, 42 av Coriolis, 31057 Toulouse Cedex, France

(2) LSCE, IPSL, Orme des Merisiers, 91191 Gif-sur-Yvette Cedex, France

(3) University of Wales, Swansea, SA2 8PP, Wales, United Kingdom

(anne-laure.gibelin@meteo.fr)

The land surface model (LSM) ISBA-A-gs (Interactions between Soil, Biosphere and Atmosphere, CO₂-reactive) is specifically designed to simulate leaf stomatal conductance and Leaf Area Index (LAI) in response to climate, soil properties, and atmospheric carbon dioxide concentration. For the first time, the model is run at the global scale, forced by the GSWP-2 meteorological data at a resolution of 1 degree for the long-range period 1986-1995. We test the model by comparing the simulated LAI values against three satellite derived data sets, ISLSCP Initiative II data, MODIS data and ECOCLIMAP data. The major features of the spatial and temporal variability in vegetation are correctly reproduced by the model. As a result, the differences in mean maximum values of LAI between the model and the various satellite data sets are less than the discrepancies in LAI estimates. The model has particularly skill to capture the latitudinal onset of the growing season. The inter-annual variability is also well reported for numerous regions of the world, particularly where precipitation is the limiting factor. The overall comparisons demonstrate the potential of ISBA-A-gs model to simulate LAI in a realistic fashion at a global scale.

The coupling of ISBA-A-gs with a parameterization of soil heterotrophic respiration is also described and the simulated carbon fluxes are compared to the FLUXNET data set.