1st TERRABITES Symposium
Hamburg, Germany, 9-11 February 2010
TERRABITES-14

© Author(s) 2009

Sensitivity of future vegetation patterns to the parametrization of vegetation in a dynamic vegetation model

S. Scheiter (1) and S. I. Higgins (2)

(1) Biodiversität und Klima Forschungszentrum (LOEWE BiK-F), Senckenberganlage 25, D-60325 Frankfurt am Main, Germany (scheiter@em.uni-frankfurt.de, Fax: ++49 (0)69 798-40169), (2) Institut für Physische Geographie, Johann Wolfgang Goethe-Universität Frankfurt am Main, Altenhoeferallee 1, D-60438 Frankfurt am Main, Germany (higgins@em.uni-frankfurt.de, Fax: ++49 (0)69 798-40169)

Dynamic vegetation models are a powerful tool to explore the current and future distribution of vegetation as well as the carbon cycle. However, these models generally simulate a fixed set of functional types where each functional type is characterized by a fixed set of plant traits. Yet, empirical studies show a high variability of traits even within sites and species. We used a dynamic savanna vegetation model (the aDGVM) to explore how the parametrization of vegetation influences simulation results. The model combines sub-models generally used in DGVMs with novel and flexible sub-models to simulate carbon allocation and phenology within an individual-based framework. The model can simulate the current distribution of vegetation patterns in Africa in good agreement to observed vegetation patterns. Under anticipated climate change, the model projects strong increases of tree biomass and a strong shift towards tree dominated biomes. However, a sensitivity analysis of the model shows that the simulation results and hence our projections of the future vegetation state in Africa are strongly biased by the parametrization of vegetation types used in the model. More specifically, the results are biased by leaf characteristics and by allometric relations used to parametrize trees. Thus, we aim to develop vegetation models that allow vegetation to be defined by a spectrum of trait combinations rather than by a fixed set of traits and that simulate vegetation dynamics based on tradeoffs between plant traits. Such models would allow a better link between vegetation models and available trait data.