Geophysical Research Abstracts
Vol. 17, EGU2015-2776, 2015
EGU General Assembly 2015

Holocene peatland initiation in the Greater Everglades

Stefan Dekker (1), Hugo de Boer (1), Brian Dermody (1), Friederike Wagner-Cremer (2), Martin Wassen (1), and Maarten Eppinga (1)

(1) Utrecht University, Environmental Sciences, Copernicus Institute of Sustainable Development, Utrecht, Netherlands (s.c.dekker@uu.nl), (2) Utrecht University, Dept of Physical Geography

The mechanisms involved in the initiation and development of the Greater Everglades peatland ecosystems in South Florida (USA) remain a topic of discussion. In this study, we present an overview of basal ages of peat deposits in South Florida, which shows two major episodes of peatland initiation between 7.0-4.5 kyr and 3.5-2.0 kyr. Our analysis of regional climate proxy datasets led to three alternative hypotheses that may explain the timing and duration of these two peatland initiation episodes: (1) decreased drainage due to relative sea level (RSL) rise during the Holocene (2) gradual increase in precipitation throughout the Holocene, and (3) a combination of increasing precipitation, rising RSL and oscillations in the climate system. We test whether these three hypotheses can explain the pattern of initiation and development of the Greater Everglades peatlands using models that simulate the non-linear processes involved in peat production and decomposition in combination with the local drainage conditions of Southern Florida. The model results suggest that RSL-rise alone cannot predict the onset of peat initiation in the Greater Everglades using our model setup. The model also implies that the climate was wet enough for peat development also during the early Holocene. The first two hypothesized mechanisms in combination with climate oscillations may explain the onset of peat accumulation at 8.2 kyr BP. The two-phased character of peat land initiation may be explained by the spatial distribution of local drainage conditions. As peatland development is highly non-linear, our model uncovers a mechanistic way how peats can suddenly shift from a dry high equilibrium to a wet low equilibrium resulting in lake formation as observed in paleo-ecological studies in the Greater Everglades.