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Energy partitioning in tropical grassland ecosystems

P. Wohland (1,2), E. Veenendaal (3,4), B Mantlana (2,5) and O.Kolle (2)

(1) School of Geography, Earth and Biosphere Institute, University of Leeds, Leeds, UK (geopnw@leeds.ac.uk / Phone: 0044 113 343 3286) (2) Max-Planck Institute for Biogeochemistry, Jena, Germany (3) Wageningen University, Nature Conservation and Plant Ecology Group, Wageningen, The Netherlands (4) HOORC, Maun, Botswana (5) South African National Biodiversity Institute, Kirstenbosch Research Centre, Cape Town, South Africa

Tropical grassland ecosystems account for about one sixth of the earth's land surface. This area might extend in future with the decline of tropical rainforests as a result of deforestation / climate change. The reduction of forested areas is envisaged to feedback on the climate system by reducing evapotranspiration and with that precipitation and increasing temperatures through a change in energy partitioning.

We measured the partitioning of net radiation into the major energy fluxes, latent heat flux, sensible heat flux and soil heat flux of three distinct tropical grassland ecosystems in the Okavango Delta, Botswana, using the eddy covariance method. Our research sites were along a strong hydrological gradient and the amount of biomass found at each site was positively correlated to the annual water supply.

During the growing season, maximum latent heat flux of the most densely vegetated grassland was similar to that reported from an Amazonian rainforest (about 500 W m^2), but decreased along the hydrological gradient by more than half. Surprisingly, at the same time sensible heat flux was almost the same for each site (about 140 W m^2). The reasons for this were variations in soil heat flux as well as albedo between the sites.