



Carbon balance of grazed savanna grassland ecosystem in Welgegund, South Africa

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Tropical savannas and grasslands are estimated to contribute significantly to the global primary production of all terrestrial vegetation. It is suggested that semi-arid ecosystems dominate the inter-annual variation of the global land carbon sink. Most of the previous carbon flux measurements of African savannas have focused on the areas around national parks or nature reserves. However, large parts of African savannas and grasslands are used for agriculture or cattle grazing and there is a lack of measurements from these areas.

In this study, we present carbon dioxide fluxes measured with the eddy covariance method for three years at a grazed savanna grassland in South Africa. The tree cover around the Welgegund measurement site (26°34'10"S, 26°56'21"E, 1480 m.a.s.l.; www.welgegund.org) was around 15% and it was grazed by cattle and sheep. Weekly monitoring of the measurements produced high quality flux measurements and only 33% of the measured flux values were missing or discarded due to e.g. too small turbulence.

The inter-annual variation of yearly carbon balance was high. The carbon balance for the years 2010, 2011 and 2012 were -73, 82 and 167 gC m⁻² y⁻¹, respectively. The yearly variation in GPP and respiration followed the changes in precipitation, whereas the yearly variation in NEE was not explained by the changes in annual precipitation, the length of rainy season or peak NDVI. However, the number of days when soil was wet, seems to relate to the annual sum of NEE.