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Carbon balance of a grazed savanna grassland ecosystem in South Africa

Matti Räsänen et al.

Correspondence to: Matti Räsänen (matti.rasanen@helsinki.fi)

1 Vegetation sampling

The vegetation surrounding the measurement station was classified based on land-use and vegetation structure (Figure S1), for which a detailed sampling was performed four times during the period from April 2011 to January 2012. Seven homogeneous land-use units were identified, including maize fields, dry sandy grassland, moist sandy grassland, disturbed grassland, thornveld savannah, woodland savannah and plantation. Grasslands had a tree cover of less than 15%, whereas in savannas it was greater than 15%. Furthermore, savannas were divided into thornveld, which had sparsely distributed large trees, and woodland with a tree cover greater than 50%.

The central region of each homogeneous unit was sampled along a transect, which resulted in 42 plots in total, six per transect. Each of these plots had an area of 100 m^2. All of the plant species were counted and identified up to species level, and their major growth form was recorded. In addition, for all the woody species higher than 1m, the mean height, mean canopy height and width of each species were determined.

Within each plot, leaf material was collected from four 1 m^2 subplots during each of the four periods, and a one-sided leaf area index (LAI) of all the leaves was determined for grasses, forbs, shrubs and trees. After this all the plant material was dried for three days and weighed.

2 Tables

Table S1: Soil structural and chemical composition of each homogeneous land-use unit. MF, Maize fields; WL, Woodland; TV, Thornveld; P, Plantation; DSG, Dry sandy grassland, MSG, Moist sandy grassland, DG, Disturbed grassland.

	MF	WL	TV & P	DSG	MSG	DG
Medium-Coarse sand	43.1	49.1	45.1	47.2	37.9	44.1
Fine sand	44.0	37.8	40.1	37.7	41.3	45.6
Silt	3.5	7.6	7.8	8.0	8.5	3.4
Clay	9.4	4.7	7.0	7.2	12.3	7.0
Org. cont. (%)	3-6	3-6	3-6	3-6	3-6	3-6
Organic-C (%)	0.68	0.87	0.93	0.91	1.01	0.54
Acidity (pH)	5.12	5.73	5.69	5.09	6.52	5.22
CEC (cmol(+)/kg)	9.56	11.63	12.1	11.37	12.42	10.42
S-value (cmol(+)/kg)	2.63	4	3.42	2.29	9.51	1.05
Base saturation (%)	27.52	34.38	28.27	20.12	76.62	10.05
Nitrogen (%)	0.01	0.06	0.07	0.07	0.08	0.03
Calcium (mg/l)	373	605	449	267	1009	108
Magnesium (mg/ l)	74	97	101	69	477	37
Potassium (mg/l)	337	230	349	365	583	253
Phosphorus (mg/l)	3	3.54	3.31	2.89	3.42	2.78
Sodium (mg/l)	0.5	7.5	4.5	6.5	26	5.5
Sulphur (mg/l)	16.4	13.88	14.39	12.95	13.16	11.54
Arsenic (mg/kg)	1.074	1.06	1.213	1.436	1.402	1.2
Aluminium (mg/kg)	8205	4655	5993	6705	9517	5963
Cadmium (mg/kg)	0.016	0.026	0.022	0.026	0.028	0.017
Chromium(mg/kg)	163	48	110	84	111	86
Cobalt (mg/kg)	10.26	5.32	8.97	4.29	10.1	3.35
Copper (mg/kg)	11.83	7.97	9.85	9.3	13.03	7.16
Iron (mg/kg)	16365	9965	14778	12448	17313	11168
Lead (mg/kg)	3.28	3.34	3.51	3.86	5.3	3.1
Manganese (mg/kg)	465	350	395	218	625	157
Nickel (mg/kg)	38	11	29	18	30	10
Zinc (mg/kg)	9.9	8.32	7.36	9.57	11.15	6.21

3 Figures

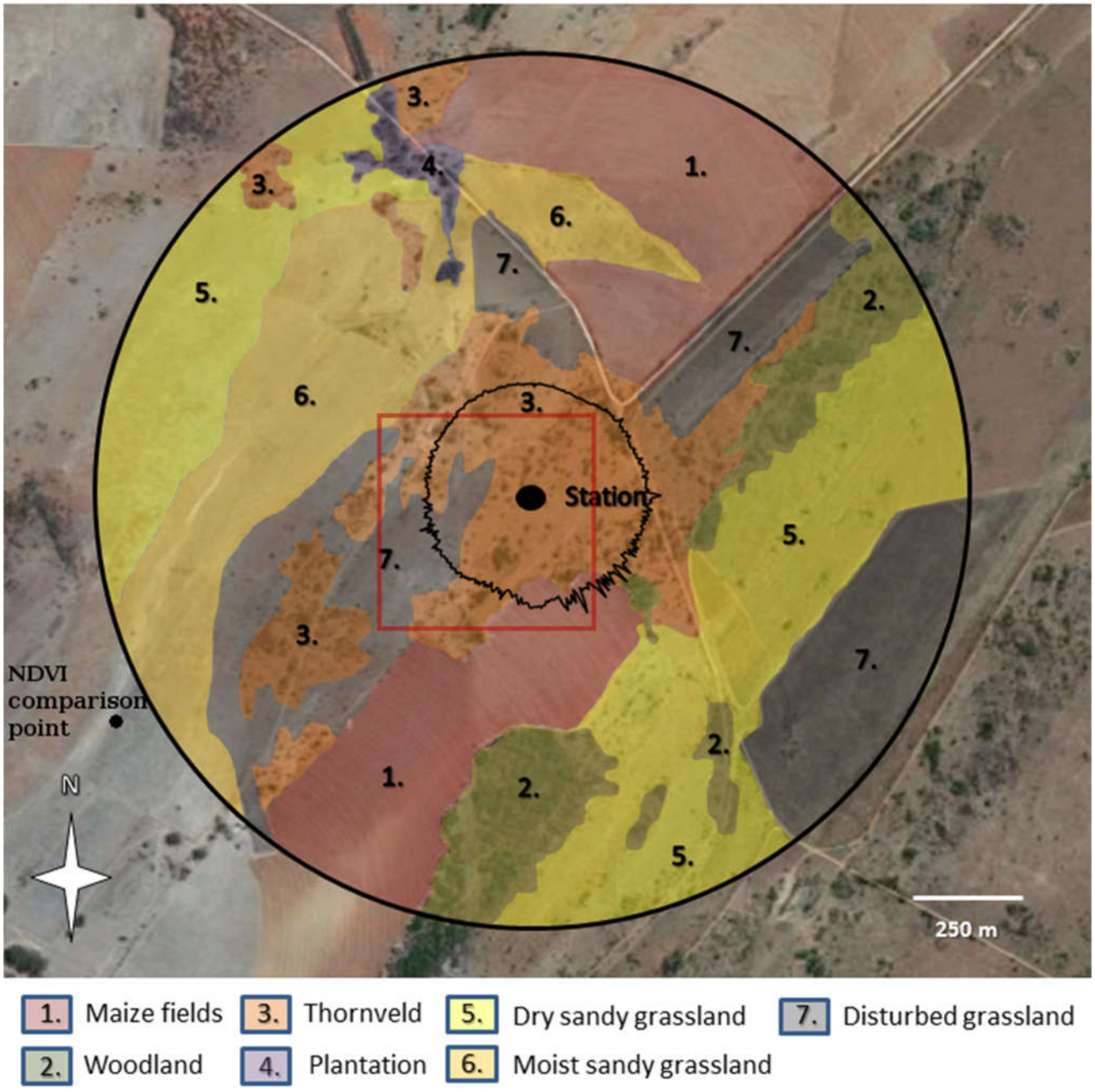

Figure S1. Satellite image of the Welgegund measurement site showing the seven different sampling regions based on different vegetation and land-use classes. The red square shows a MODIS NDVI pixel at 500 m spatial resolution. The black contour indicates mean 80% cumulative flux footprint. The black dot on the bottom left corner indicates the moist sandy grassland area which was used in the NDVI comparison.

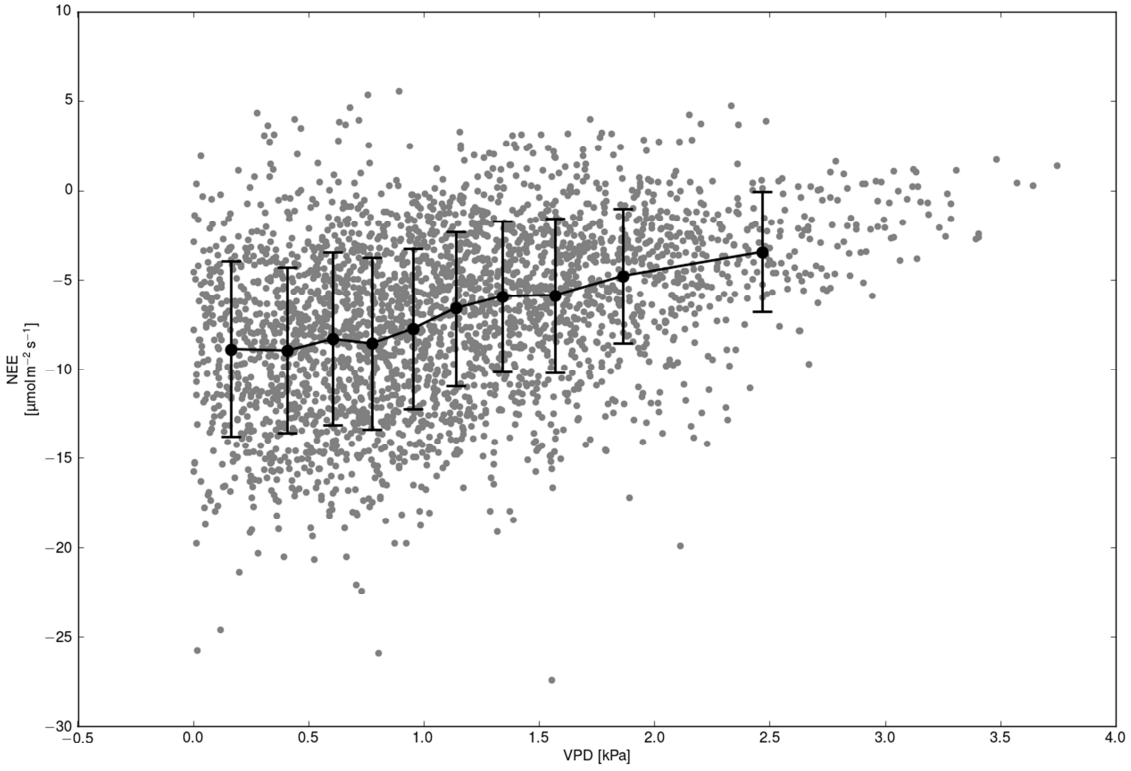

Figure S2. Relationship between VPD and daytime NEE (Net radiation > 500 W m^{-2}) between 1st of September 2010 and 31st of August 2013. Each bin contained 290 values.

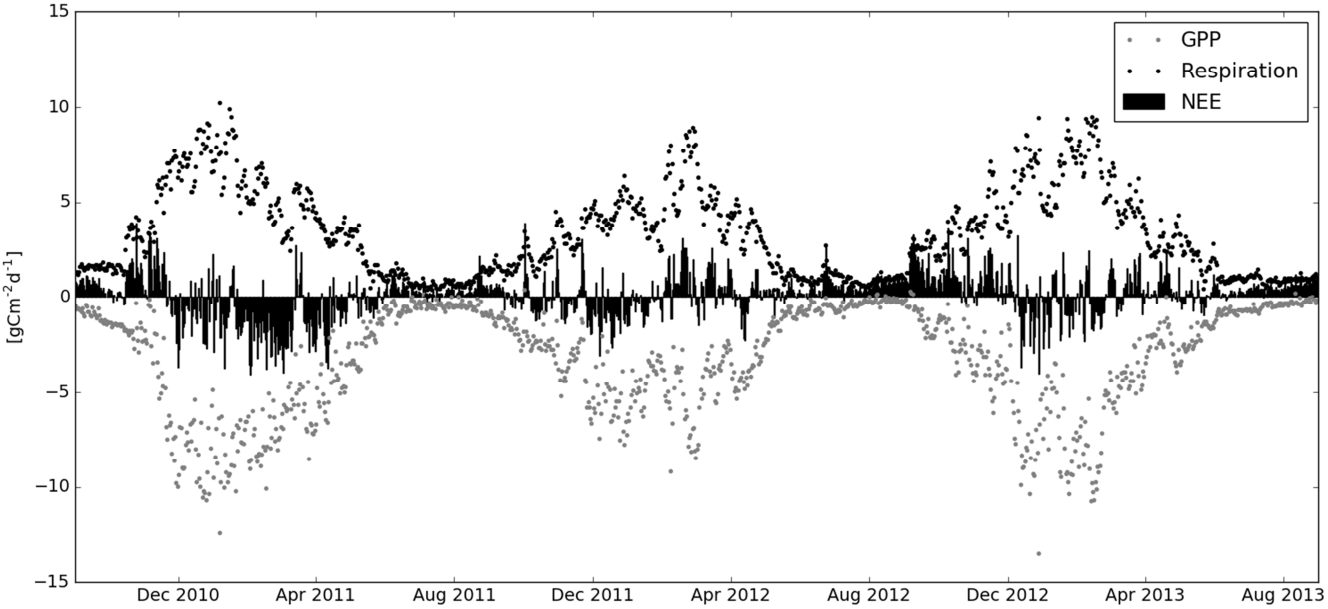

Figure S3. Daily sum of NEE, GPP and respiration for the whole measurement period.