IN-SITU MEASUREMENT TECHNIQUES IN REMOTE SENSING RESEARCH OVER WETLANDS

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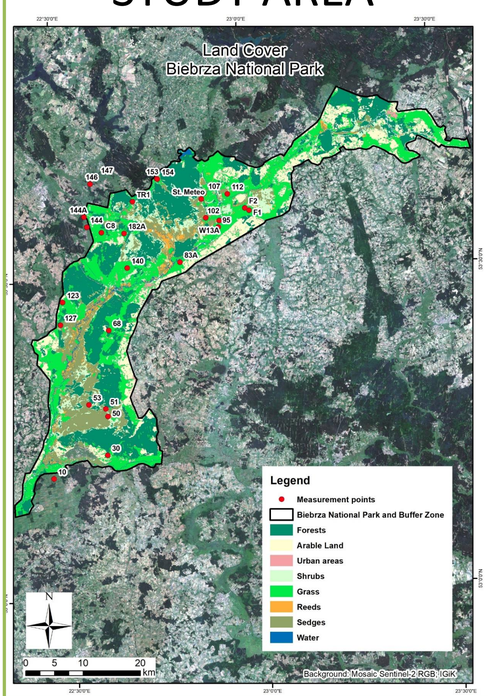
INTRODUCTION

The main objective of this research is **to present various method of in-situ measurements** of spectral reflectance, LAI, APAR and fAPAR, CO_2 fluxes, land surface temperature, air temperature, soil moisture, biomass, height of vegetation and soil temperature **in respect to satellite remote sensing measurements.**

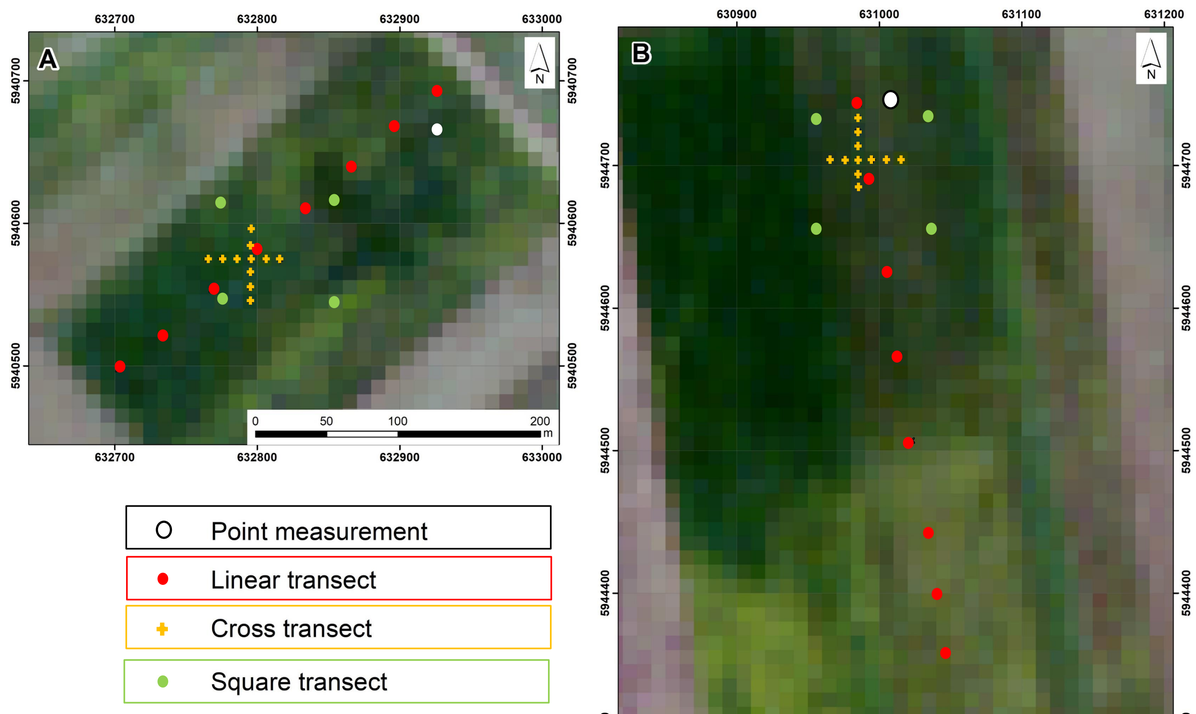
STUDY AREA



MEASUREMENTES

- Spectral reflectance
- LAI
- APAR and fAPAR
- CO_2 fluxes
- Land Surface and air temperature
- Weight of biomass (wet and dry) and its height
- Soil moisture

SAMPLING METHODS



LINEAR TRANSECT

- 7 – 9 measurement points
- Distances between points 50–80 m.

SQUARE METHOD

- 4 measurement points
- North, south, east, and west corners
- Distances between points c.a. 80 m.

CROSS TRANSECT

- 11 measurement points
- Distances between points 10 m.
- Crossroad at point no. 4

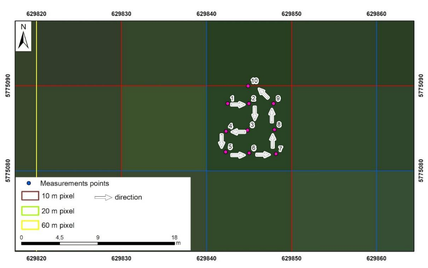
POINT MEASUREMENT

- 1 measurement point
- At least 30 metres from the edgde of the site

MEASUREMENTES' METHODS

SPECTRAL REFLECTANCE

10 measurementes at one point



LAI

ABOVE
BELOW
BELOW
BELOW
BELOW
} x2

ACCUPAR

PAR – direct PAR over the vegetation
RPARv – PAR reflected over the vegetation
TPAR – direct PAR under the vegetation
RPARs – PAR reflected under the vegetation

CO_2 CHAMBER METHOD

8 minutes – light phase (simulation of day)
8 minutes – dark phase (simulation of night)
+soil temperature

BIOMASS

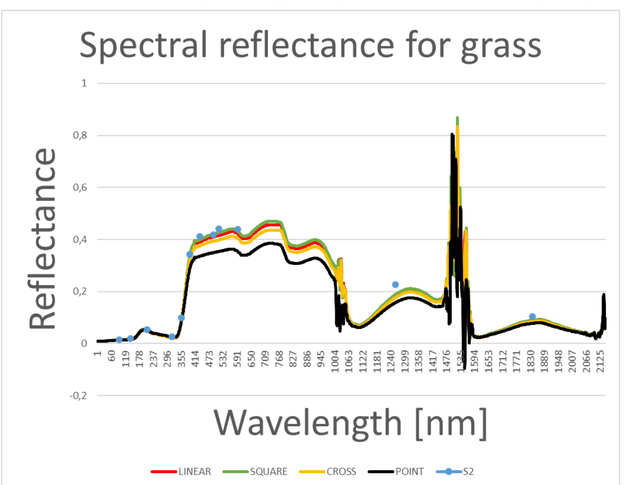
Collected from 0.4m x 0.4m
Wet biomass
Dry biomass
Content of water in the fresh biomass

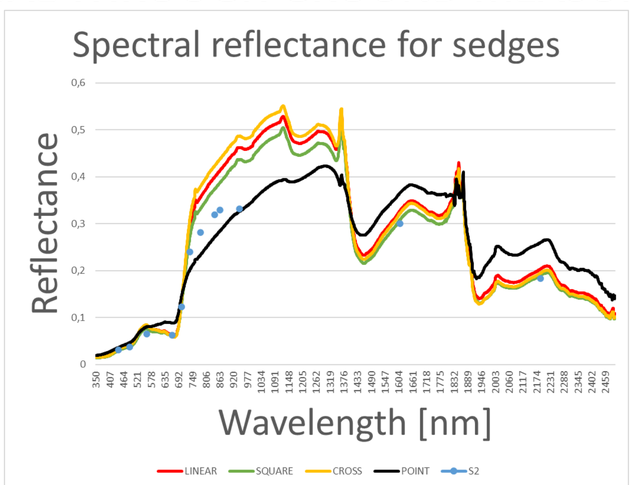
SOIL MOISTURE

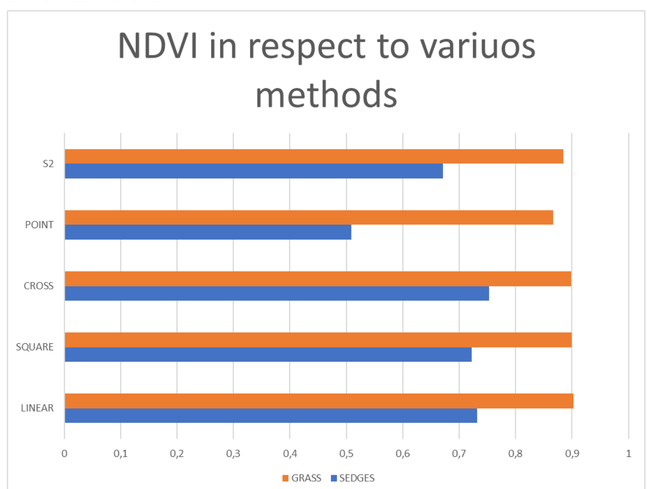
At least three measurementes per point
In the same places where LAI had been collected
If the value of one SM measurement differs a lot (15%) there are performed two additional ones in the different places on the site

Method	Test site	N	LAI [m² m-²]		SM [%]		Ts [°C]		Ts-Ta [°C]		fAPAR [-]	
			MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD	MEAN	SD
Point	Grass	1	4,73	-	67,63	-	22,2	-	-0,7	-	0,88	-
	Sedges	1	4,10	-	66,68	-	19,9	-	1,8	-	0,83	-
Linear transect	Grass	9	4,85	0,50	60,03	3,88	20,9	0,4	-3,2	0,9	0,83	0,04
	Sedges	8	3,62	0,27	80,66	2,40	22,1	1,6	-0,1	2,4	0,80	0,02
Cross transect	Grass	11	5,05	0,48	62,00	3,54	20,9	0,6	-4,8	0,8	0,84	0,04
	Sedges	11	3,67	0,19	81,35	2,36	22,3	1,4	-0,6	1,9	0,77	0,06
Square	Grass	4	4,86	0,49	63,64	6,39	20,9	0,3	-2,7	0,2	0,86	0,02
	Sedges	4	3,79	0,11	79,98	1,39	21,4	0,6	1,3	0,6	0,78	0,03

VALIDATION OF SATELLITE SIGNAL THROUGH GROUND MEASUREMENTS







SEDGES - Results obtained due to different methods vary from each other significantly

GRASS - Results obtained due to different methods are quite similar

SQUARE METHOD (4 points) seems to be accurate for collect data around wetlands

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