

Documentation of SuaPan Transect Measurements in Botswana, August 2000

Summary

The MISR validation team collected data needed for validation of the MISR LAI/FPAR product. Ground measurements of LAI, FPAR, and canopy reflectance were made between August 20th and August 29th, 2000. Data was collected with a LAI-2000 plant canopy analyzer, an ASD handheld spectroradiometer, a Sunfleck PAR ceptometer, and Parabola at a grass site in Sua Pan, Botswana.

Objective

1. Obtain LAI/FPAR at a transect scale and validate the MISR LAI/FPAR algorithm.
2. Describe the spatial variability of LAI/FPAR.
3. Investigate the scale effect on LAI/FPAR measurements and retrievals.

Investigators

BU and MISR ground validation team: Mark Helmlinger, Wolfgang Buermann, Peter Yanick.

Title of Investigation

Collection of Parabola, ASD, LAI and FPAR Data Over SuaPan, Botswana

Site Description

The 1km to 1km grid is a homogenous, relatively dense grassland, with a height of 20-100cm. Different grass types are prevalent, some more like wheat (dominant) others like small bushes could be seen. At the southwest corner, at a distance of about 200m the shoreline of the pan appears. There was the plant to the east at about 1.5 km distance of the grid.

The GPS corner values of the grid are:

SE: 20 31.552S, 26 02.366E

SW: 20 31.551S, 26 01.795E

NW: 20 31.010S, 26 01.788E

NE: 20 31.015S, 26 02.365E

Sample Methods

At the grass site, LAI was measured at a 1km*1km transect scale and a 300m*250m pixel scale. At the transect scale, we have three straight transect lines parallel to one another from south to north, each spaced by 250m. The first line is A line, which is 250m north of the southern margin of the square kilometer. The second line is B line, which is 250 m north of A line. The last line is C line, which is 250 m north of B line. The length of each line is 750 m, centered in the square kilometer. We took LAI measurement in every 25 m interval from west to east. Therefore, there are 31 measurements (sample points) on each of the 750 m line. The transect points are counted from East to West (C1 to C31) for transect C, from West to East for transect B (B1 to B31) and again from East to West for transect A (A1 to A31).

The subgrid (300m x 250m with 50m grid point distance) is located between transect C and B at the most eastern side. The grid points are counted from East to West (D to J) and from North to South (1 to 6). Consequently, transect point C1 is identical to subgrid point D1 as well transect point B31 is identical to subgrid point D6. In summary, LAI and PAR readings were performed at 135 (93 transect and 42 subgrid) sample points.

LAI Measurements

Instrument: LAI-2000 plant canopy analyzer

Data Acquisition Methods

The LAI-2000 measures the attenuation of diffuse sky radiation at five zenith angles, simultaneously. Therefore, LAI measurements were made during the early morning and late afternoon under clear sky conditions and one measurement (Aug 20, 2000) was taken under overcast sky conditions. The sensor was held horizontal over the ground at a minimum height of 1 m, moving higher up to keep above the local understory. A 90-degree mask was placed over the sensor to prevent interference caused by the operator's

presence. Every data point represents an average of three separate measurements made in close proximity. Data are stored in a text file (SUALAI.txt)

FPAR Measurements

Instrument: Sunfleck PAR ceptometer.

Sample methods:

Measurements were taken at all 135 SuaPan grass sample sites (transect and grid). PAR readings of incident, transmitted and reflected radiation were collected. All measurements were made under clear sky conditions. The data are stored in an EXCEL file (SUAPAR.xls).

ASD Measurements

ASD measurements of canopy reflectance were taken on 30. Aug along all three transects, continuously.

Documentation of Parabola Measurements of Canopy Reflectance

Parabola measurements of canopy reflectance were taken on 30. Aug over the middle of the subgrid cell (between G3 and G4 sample points) and on 1.Sept. over transect A, about 300m west of the eastern margin of the square kilometer.