

# **NDVI (MODIS SENSOR) RESPONSE TO INTERANNUAL VARIABILITY OF RAINFALL AND EVAPOTRANSPIRATION IN A SOYBEAN PRODUCING REGION, SOUTHERN BRAZIL**

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**Technical Commission VII Symposium 2010**

**KEY WORDS:** soybean (Glycine Max, L. Merr), NDVI, remote sensing, water balance, GIS

## **ABSTRACT:**

This study aimed at evaluating the response of the Normalized Difference Vegetation Index - NDVI (MODIS sensor, TERRA satellite) of soybean to interannual variability of rainfall and evapotranspiration in Campos Gerais, a region of the state of Parana in southern Brazil. Landsat TM 5 and 7 images were selected for analyzing the spatial soybean field distribution for the region from 2000/01 to 2006/07 and to identify soybean fields. We then identified 175 pixels (250 x 250m) that contained only soybean fields ("pure-pixels") based on the soybean maps obtained with the Landsat TM images. The next step was to extract the NDVI values for these soybean pure-pixels and to analyze the NDVI spectral curves considering the soybean phenology. Data from nearby meteorological stations were obtained and used to calculate the soil water balance for soybean fields in 5 locations distributed in the Campos Gerais region. To obtain actual evapotranspiration values, the water balance was calculated for each year, and for the same period covering the entire soybean growing season. Anomaly values were calculated for each year to verify the interannual rainfall variability. Linear regression models were adjusted between NDVI and i) rainfall and ii) actual evapotranspiration for all time series. Analysis of the evolution of NDVI values allowed identifying the soybean growing season (November to March) and also the dry season for this region according to rainfall anomaly values. Statistical analyses showed that actual evapotranspiration presented best agreement with soybean NDVI in relation to rainfall, probably due to the fact that this variable integrates information of rainfall, temperature and soil water holding capacity for the entire study period.

**TOPIC:** Remote sensing applications

**ALTERNATIVE TOPIC:** Not Specified