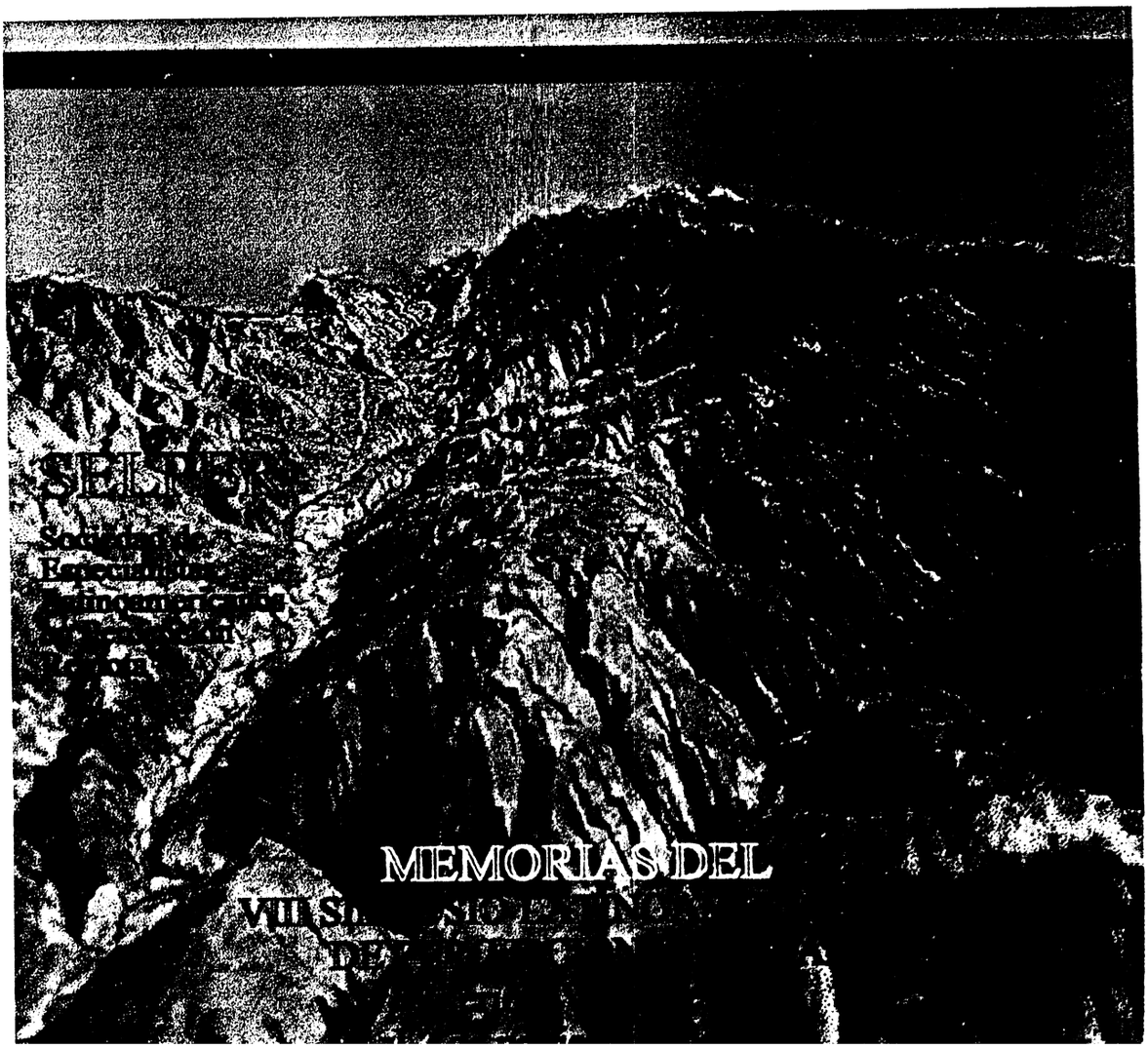
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RELATION BETWEEN FOREST AND OPTICAL AND MICROWAVE REMOTE SENSING PARAMETERS AT TAPAJOS NATIONAL FOREST IN BRAZILIAN AMAZON

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ABSTRACT

This paper presentes the relation between remote sensing and forest parameters obtained for two forest types at Tapajós National Forest, Pará state, Brazil. It in part of the activities developed in the PRORADAR project, a INPE/CCRS cooperation, to evaluate RADARSAT capabilities for forest applications. The study area comprises the Tapajós National Forest, located between the coordinates of 55° 30' and 54° 36' west Longitude and 2° 30' and 4° 18' south Latitude, south of Santarém city (Pará state), Brazilian Amazon. Despite of several ongoing research projects in this study area, the National Forest is under a management program(Brazilian Institute of Renewable Resources - IBAMA) to explore its forest resources. Tropical Dense Forest, with abundant economic wood species, dominates the two principal geomorphological regions: Amazon Low Plateaus and Xingu and Tapajós High Plateaus. Forest parameters such as height (H), diameter at breast height (DBH) for emergent trees(trees with DBH bigger than 40 cm), and the relative Leaf Area Index (LAI) for each stand were measured. Radar Backscattering of RADARSAT fine mode images and Normalized Difference Vegetation Index (NDVI) and Reflectance values of LANDSAT 5 - TM constituted the remoting sensing parameters. Height, DBH and LAI measurements were taken from two different vegetation types at Tapajós National Forest, in October 1996. For each vegetation type analyzed, two sample areas were surveyed: one along 6 transects of 400 m and another along 3 transects of 200 m. LAI values were measured using LAI-2000 (LICOR). The forest measurements ewre positioned with a GPS reference on the field and imported into a GIS. A semivariogram analysis was performed to evaluate the spatial relation between LAI measurements. It was obtained an average distance of 50 m from which the LAI measurements were not related to each other. The LAI, DBH and height values were used to generate a regular grid of the same spatial resolution as the remote

sensing finest resolution (12.5 m x 12.5 m)From the grid values, the average values of 50m x 50m were computed. LANDSAT 5 - TM image, acquired on July 08, 1996, was orthocorrected to the cartographic projection of the field work data and resampled to 12.5 m spatial resolution. For each sampled area, LANDSAT 5 - TM, channels 3, 4, and 5 digital values were extracted, and NDVI values were computed from channels 3 and 4. Four RADARSAT fine mode images, with different incidence angles (F2D and F5D), acquired in May and October 1996, were calibrated and ortho-corrected. They were resampled to the same pixel size as TM and Field data. The blackscattering values (Gamma nought) related to each sampled area were extracted and the average values (50m x 50m), 10 dB units were computed. Remote sensing variables were generally more correlated to height instead of LAI measurements, which can be assigned to the dossel structure variation. Medium correlation was obtained for RADARSAT fine mode (F2D) and channel 3 TM. The other resoults from correlation and multivariate regression between forest and remote sensing parameters were presented and discussed.