

EL NIÑO EFFECT ON AMAZON VEGETATION COVER THROUGH NOAA-AVHRR

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This paper shows results of an experiment that explored a long-term temporal variation of the vegetation index NDVI (Normalized Difference Vegetation Index) of several vegetation covers that occur in the Brazilian Legal Amazon. The value of NDVI obtained from NOAA satellites, has been shown for the estimation of a number of ecosystem variables, such as leaf area index and photosynthetic active absorbed radiation by the canopy, which in turn are essential for modeling of gases, mass, and energy exchange between the biosphere and the atmosphere, contributing therefore, for the understanding of global change processes. The phenology of natural vegetation under diverse climatic conditions due not only to seasonal variation but also episodic events such ENSO (El Niño Southern Oscillation) is important for the understanding of these processes. Long-term monitoring (August 1981 to June 1991) of 8 vegetation types (Dense Forest "Submontana" and "Terras Baixas"), open Forest ("Submontana" and "Terras Baixas"), transition Forest, Seasonal Forest ("Caatinga"), and tow types of "Cerrado" Wick occur in the northern part of Brazil (3 N-19S and 35 W and 74W) is discussed. For each vegetation type, 10 samples of 3x3 pixels were selected and monthly composites of NDVI were obtained from GAC ("Global Area Coverage") data. Yearly composites of NDVI were obtained to verify the inter-annual climatic variation due to El Niño occurrence. Throughout the analysis of 10 years of data is was clearly noticed the variation on the NDVI due to different satellites, indicating the need for calibration of AVHRR data for multitemporal studies. Therefore, a calibration procedure proposed by NASA Goddard Space Flight Center and the University of Maryland (Los, 1993) were applied to the data to make possible quantitative comparisons of NDVI values obtained at different times. Seasonality of "Cerrado" and especially of "Caatinga" is outstanding NDVI values vary from 3 to 4 times for the "Cerrado" and "Caatinga", respectively, in extreme years. Preserved "Cerrado" ("parque") was always distinct from Dense Forest ("Terra Firme") in any season of any year analyzed. however, better distinction is found during the dry season, especially in September. A comparison between normal and El Niño years indicated the influence of this phenomenon on the phenology of the forest vegetation. The phenology of forest cover, except "Caatinga" and "Cerrado" does not vary much throughout the year, however, for El Niño years, as 1983, there is a clear reduction in the NDVI values during the dry season, especially for the Transition Forest. This indicates the importance of multitemporal data for the characterization of forest ecosystems. Dense vegetation covers showed high NDVI values (- 0.5), "Caatinga" had an average NDVI of -0.35 with large seasonal variation, and "Cerrado" had average NDVI value -0.3 with great seasonal variation but never reaching the "Caatinga" greenness peak (NDVI-0.5).