**Final Project Proposal**

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My proposal for the project is using R to execute two main operations: smoothing of a MODIS time series from cloud noise and a historical spectral analysis of the results.

The MODIS (Moderate Resolution Imaging Spectroradiometer) series is a well-known series of products in vegetation studies, and as the name implies is more adequate to wider ranges of areas. The specific product that is going to be used is the MOD09Q1, surface reflectance for 250 m of spatial resolution and 8-day acquiring interval. There are a few options of quality images in other bands, but the global adjustments are not ideal when zooming in specific areas. For this training experience I will use MODIS imagery from 3-4 months initially, and satisfied with the results bringing the process to a full year.

As a study area I chose to use the amazon savannas, in the far north of the Roraima State in Brazil. The choice was made by familiarity with the region and dynamics of the vegetation in interaction with weather and climate. I am still not sure of the subset of the scene, but the municipalities of Pacaraima (8,028 km²) and Normandia (6,966.81 km2) are candidates, being broadenough to be sensored with this spatial resolution and contain portions of the savanna type.

The special interest in this kind of methodology and in this area is justified by two reasons. First, the zone that is really close to the intertropical convergence has a permanent belt of clouds throughout the year, and therefore is an especially hard place to work with remote sensing. Second, the studies with remotely sensed data in the amazon ignore the non-forestry types, being still a gap in knowledge how those specific types behave in a different latitude than the Cerrado type.

The packages I chose for this are Raster, rgdal, rasterVis, ggplot2, noise.filter,signal and zoo. The first four are standard packages to dealing with raster datasets in an R environment, with importance to the rasterVis package that allows to create 4D (length, height, time and spectrum) visualizations of raster datasets. The subsequent ones noise.filter and Signal are filtering packages that use techniques for the denoising, with some possibilities being the median, Savitzky-Golay, mean and Gaussian. The last one zoo is a package designed to create and manage time series.

This particular dataset is of interest for me because I have been working with natural areas throughout my whole career, and especially in this section of the Amazon. So I thought that executing the routine of processing in an R environment would be interesting. At the time I did the processing I didn’t understood fully what I was doing, so for me it’s an opportunity to revisit my work and rethink about possible new directions of research.

Reviewing the methodological steps for this experiment 1.) acquiring imagery in a reduced time scale 3-4 months to a year; 2) executing the denoising with Saviztky-Golay and/or median filtering 3.) Running statistical analysis taking into account the temporal scale.

March 27th – End of Acquiring of information on packages and data

March 30th – Starting of Processing

April 20th – Processing finished

May 15th – Final Results