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Term Project Status Update
GIS for Water Resources
October 26, 2011

Title:

Terrain and satellite imagery analysis for the Madre de Dios watershed, Peru

Objective of Project:

The objective of this term project is to delineate the Madre de Dios upper watershed in southeastern Peru and to analyze Landsat Thematic Mapper imagery for the same region. The goal is to create a good basemap of the upper watershed and to analyze the changes to the fluvial geomorphology of the region through Landsat Thematic Mapper imagery over the past 25 years. Since the 1980's, small-scale miners have been mining alluvial sediments for gold, and in the past decade gold mining has substantially increased. Images from 1986, 1996, 2006 and 2011 will be analyzed and classified.

Project Status Update:

I was originally going to use Hydrosheds data derived from the Shuttle Radar Topography Mission in order to create a basemap of the Madre de Dios watershed and delineate the watershed. However, Hydrosheds data is 90 meter resolution, and I would like to use the highest resolution possible. I have since downloaded ASTER DEM data for my study site. I will use this DEM to delineate the Madre de Dios watershed and the watershed of the tributaries in which mining has taken place. I will follow the steps outlined in Exercise 4. One issue that I will need to figure out is how to define the streams based on flow accumulation in my study area. I

will likely try several iterations and check it against a base map or satellite imagery from the region.

Since I have no previous experience with remote sensing, to date much of my work for the second part of my project (analysis of satellite imagery) has been researching and reading about remote sensing, the differences between satellite instruments, and what type of images I should be obtaining. I have downloaded Landsat 4-5 Thematic Mapper satellite images from the USGS from the following years: 1986, 1996, 2006 and 2011 (path, row: 3, 69). These images are all from the dry season of the study site. I have also found 2.7 meter resolution panchromatic satellite imagery from the Brazilian INPE (National Institute of Space Research) from the past 5 years. I will first use ENVI for initial image processing. I will next explore possible classifications that I could use to distinguish water, sediments, and vegetation in the satellite images. Since the resolution of the satellite imagery is 30 meters, I am interested in learning more about how I can classify sediments such as middle channel bars, lateral bars, and islands with the 30 meter data.

The end goal of my project is to have a good base map of the upper watershed of the Madre de Dios and classified satellite imagery over a time span of the past 25 years. This project will shed light on how the landscape and river geomorphology have changed due to small-scale gold mining in Madre de Dios.