**NASA DEVELOP National Program**

 NASA Langley Research Center

**Summer 2014**

**Colombia Mi Pronostico Application**

*Updating and Improving the Mi Pronostico Flood Web Application to Include an Assessment of Flood Risk*

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**Past or Other Contributors:**

N/A

**Applied Sciences National Applications Addressed:**

Technology, Water Resources

**Study Area:** La Mosca Watershed in Colombia

**Study Period:** Real time application

**Partners/Collaborators**

DEVELOP: Lauren Childs-Gleason

NOAA: Angelica Gutierrez

Instituto de Hidrologia, Meteorologia y Estudios Ambientales (IDEAM): Pilar Galindo and Ricardo Quiroga

**80-100 Word Blurb**

The DEVELOP Tech Team worked with the Instituto de Hidrologia, Meteorologia y Estudios Ambientales (Institute of Hydrology, Meteorology and Environmental Studies, IDEAM) in Colombia to update and improve the Mi Pronostico web application, which already notifies people when there is a flood warning. The watershed will be analyzed for indices of slope, basin shape, and drainage density to give it a risk level. In addition users are able to view the flow duration curve and index of variability for the watershed they are in.

**Community Concerns**

* The location of Colombia in the tropics, the presence of the Andes Mountains, the passage of the Intertropical Convergence Zone (ITCZ), and the influence of the El Niño-Southern Oscillation (ENSO) cause precipitation to be highly variable across Colombia. The spatially inconsistent and often heavy precipitation, together with complex topography, consisting of valleys, plateaus, and mountains, places Colombia at high risk for flooding.
* The spatial and temporal variability in precipitation amounts presents a concern for the efficiency of water use in local communities throughout Colombia.

**Current Management Practices & Policies**

IDEAM currently estimates daily precipitation using Geostationary Operational Environmental Satellites (GEOS) at a 4 km2 spatial resolution, which complements Colombia’s National Network of observation stations. Near-real-time data from Tropical Rainfall Measuring Mission (TRMM) can be used to improve the current observation network in Colombia by allowing for areas without precipitation stations to be viewed via satellite. Additionally, IDEAM currently has no method of measuring surface elevation. This data can be obtained from NASA EOS sensors such as ASTER.

**Abstract**

Colombia is a country with highly variable terrain, from the Andes Mountains to plains and coastal areas; due to the diverse topography, some areas are prone to flooding disasters. To identify these risk areas NASA’s Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) sensor was used to construct a digital elevation model (DEM) for the study region. The preliminary risk assessment has been applied to a pilot study area of the La Mosca River basin. Precipitation data from the National Aeronautics and Space Administration (NASA) Tropical Rainfall Measuring Mission (TRMM)’s near-real-time rainfall products as well as precipitation data from the Instituto de Hidrologia, Meteorologia y Estudios Ambientales (the Institute of Hydrology, Meteorology and Environmental Studies, IDEAM) and stations in the La Mosca River Basin were used to create rainfall distribution maps for the region. Using the precipitation data and the ASTER DEM, the web application, Mi Pronostico, that is run by IDEAM, was updated to include an interactive map which allows users to search for a location and view the vulnerability and current conditions in rainfall and flood warnings. The geospatial information was linked to an early warning system in Mi Pronostico that can alert the public of flood warnings and identify locations of nearby shelters.

**Decision Support Tools**

* An interactive web-accessible map showing near-real time precipitation information
* Flood risk map of Colombia using indices and slope

**Benefit to End-User:**

* Ability for the public in Colombia to view flood risk locations and seek shelter in the event of a flash flood
* Better use of water resources in Colombia, based on risk areas and certain indices set by the IDEAM

**Earth Observations & Parameters**

ASTER – Elevation data

TRMM – Near-Real-Time precipitation data

**Future Applicable NASA Missions**

Global Precipitation Measurement (GPM, recently launched)

**Models Utilized**

N/A

**Ancillary Datasets Utilized**

Stream and meteorological station data from IDEAM

**Software Utilized**

ArcGIS - Raster analysis and map creation for Mi Pronostico web application

Oracle - Web development

SQL - Web development