**NASA DEVELOP National Program**

****Langley Research Center

**Fall 2014**

**Technology Team**

**Colombia Mi Pronostico Risk Assessment Application**

*Utilizing the NASA Earth Observation System to combine topography and near real-time precipitation data to support IDEAM’s hazardous weather notification system.*

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**Team Members:**

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**Applied Sciences National Applications Addressed:**

Cross-Cutting & Disasters

**Study Area:** La Mosca Watershed

**Study Period:** Real Time Application

**Partners/Collaborators**

National Oceanic and Atmospheric Administration (NOAA): Dr. Angelica Gutierrez

Institute of Hydrology, Meteorology, and Environmental Studies (IDEAM): Pilar Galindo

Institute of Hydrology, Meteorology, and Environmental Studies: Ricardo Quiroga

**80-100 Word Blurb**

Mi Pronostico is IDEAM’s current application that has been updated to include a flood risk assessment. This added capacity of the current application alerts local population of impending flood risks and where to seek refuge.

**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.
* 82% of Colombians affected by flooding, more than any other natural disaster

**Current Management Practices & Policies**

Currently IDEAM, the Institute of Hydrology, Meteorology, and Environmental Studies, has website called Mi Pronostico that provides alerts based on weather forecasts. However, the current system is not capable of categorizing the level of alert. It also does not have the function to direct the public to safe areas.

**Abstract**

Flooding presents a natural threat to public safety in Colombia. Therefore, the need to quickly disseminate flood warnings to the population is essential. Through the use of flow duration diagrams, elevation models, and precipitation data, easy to use tables and maps were created for the for the Information System of Water Resources Website (SIRH). This addition to the website provides an interface for users to determine if their current location is within a flood risk area, how severe the risk of flooding is, and where the nearest safe refuge is located and how to get there. By incorporating NASA Earth Observations data with the current IDEAM decision making process, the impacts of floods on the general public can be mitigated.

The application was created using layers on a map generated with data from the Advance Spaceborne Thermal Emission and Reflection Radiometer (ASTER) and near real-time precipitation data from the Tropical Rainfall Measuring Mission (TRMM) as well as precipitation data from IDEAM’s rain gauge stations. The risk assessment maps will use the La Mosca River Basin as its primary area of study in northwest Colombia.

**Decision Support Tools**

Mi Pronostico

1. An interactive web-accessible map showing near-real time precipitation information.
2. Flood Risk Assessment map with severity categories and warnings.

**Benefit to End-User:**

* Ability of local population in Colombia to view flood risk locations on web and mobile devices.
* Lead users to safe refuge in the event of a flash flood.

**Earth Observations & Parameters**

* Tropical Rainfall Measuring Mission (TRMM) – Near real-time precipitation data
* Global Precipitation Measurement (GPM) – Near real-time precipitation data
* Advance Spaceborne Thermal Emission and Reflection Radiometer (ASTER) – Digital Elevation Model (DEM)
* Shuttle Radar Topography Mission (SRTM) –Digital Elevation Model (DEM) 30 meter resolution

**Models Utilized**

Flow Duration Curves

Dominant river tracing-Routing Integrated with VIC Environment (DRIVE) model.

**Ancillary Datasets Utilized**

*In-Situ* 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

JDeveloper – Mi Pronostico requires the code be written using this program

Mapbox – Mapping application the team will experiment with