

## DEVELOP Colombia Disasters – MSFC – Video Script

Scene 1: \*No voice over\*

Scene 2: >> Katelyn: “Even though these students are in Huntsville, Alabama, they are studying data from another hemisphere. These students are part of the NASA DEVELOP internship and are studying wildfires in Colombia. From their studies, they will build a model to evaluate the risk of fire ignition for Valle Del Cauca, a department of Colombia, potentially saving lives and protecting valuable ecosystems.”

Scene 3: >> Katelyn: “In Colombia, monitoring fires is a major issue. Hundreds and possibly even thousands of wildfires occur every year during the dry season. In 2004 alone, there was an estimated 19,000 square kilometers of burned land. This puts Colombia’s rich biological diversity and its population of 1.4 million at risk. Currently, there is no remotely sensed system of fire risk evaluation, making the DEVELOP students’ studies that much more important.”

Scene 4: >> Tiffany: “NASA DEVELOP is helping to address this issue and other research based problems in the fields of Water, Weather, Disasters, Agriculture, Ecological Forecasting, Health and Air Quality, and Climate. The DEVELOP program provides interns an opportunity to lead an applied science research project that utilize NASA Earth observation data to address community concerns while building capacity in the interns and the project partners.”

Scene 5: \*No Voice Over\* [Music playing]

Scene 6: >> Julian: “Valle Del Cauca is a department of Colombia. It is on the Western side of the country and is one of the most important departments. The department is mainly divided into four zones. One is the Western mountain range, which is very humid with dense jungles, but is highly deforested due to the paper industry. Then, we have the Pacific shores, and also the river valley. Here, we can find the most fertile lands in the entire country. Finally, we have the Western ridge of central mountain range.”

>> Andres: “Agriculture is Valle Del Cauca’s main economic activity. Sugar cane is a main crop, and includes controlled burns in its harvesting process. This causes environmental impacts, but a stronger environmental impact is caused by wildfires started due to criminal activities near the mountains.”

Scene 7: >> Nathan: “The team’s scientific advisor from Marshall Space Flight Center for this term was Dr. Jeff Luvall. The team was project partners with SERVIR and the Wildlife Conservation Society, which allowed the students to meet with Dr. Max Moreno Madriñan and Mr. Victor Hugo Ramos as science advisors. All three of these advisors aided the students in developing methodologies, assisting in data processing, and provided advice for data analysis. The team also partnered with the Universidad Autónoma de Occidente of Colombia to recruit Andres Marmolejo and Julian Gonzalez-Otoya as team members. The partnership with the university will help to bring this end product to the end-users and the public, through the universities established relationship with local governing bodies and agencies.”

Scene 8: >> Kate: This project used data sets and products from the MODIS instruments on board the Aqua and Terra satellites and from the TRMM satellite systems. The MODIS products include the Fire Information for Resource Management System, or FIRMS, the Normalized Digital Vegetation Index, or NDVI, and the Enhanced Vegetation Index, or EVI. FIRMS was used for fire detection and NDVI was used to find fuel for fires by evaluating the health of plants. Between the Aqua and Terra satellites, the MODIS instruments can have data sets that span across the entire globe in just a day or two. The daily precipitation estimations from the TRMM system of satellites were used to determine how rainfall affect the ignition of fire.

>> Tiffany: The FIRMS datasets were used to identify fires during the study period. To reduce errors in our methodologies, fires with an 80% confidence or higher were selected for the study. These fires were joined to gridded cells that covered the area of Valle Del Cauca. TRMM daily estimated precipitation were used to calculate 8, 16, and 30 day accumulated rainfall. Accumulated rainfall data allowed us to study how the presence or absence of moisture due to precipitation affected the occurrence of fires. The TRMM data sets were spatially added to the gridded area of Valle Del Cauca so the number of fires within a cell could be compared to the precipitation values. Likewise, the 30 day mean values of NDVI and EVI data sets were spatially added to the grid of Valle Del Cauca to compare their

values to the number of fires within the cell.

>>Nathan: The number of fires, the accumulated rainfall, the NDVI, and the EVI were put into a table so that the statistical analysis of the data could be performed, such as linear regression and correlation. These values of linear regression and correlation showed that the 30 day accumulated rainfall and the 30 day mean NDVI were the best options in our fire risk evaluation model.

Scene 9: >>James: Our final product was to make a map using the raster calculator in ArcMap. The raster calculator took the current, 30 day accumulated environmental conditions as an input, applied them to the algorithm based on regressions between environmental factors and the occurrence of fires, and produced a map showing the fire risk evaluation. For this example, we used July 30th, 2012. The green cells are locations where fires are least likely to ignite, while the red cells are at the highest risk. Examining fires that occurred 1- days after July 30th reveals that there was some agreement between the map and the actual ignition of fires, such as the two forest fires occurring within the red cell. However, due to errors within the regressions caused by cloud cover, two other forest fires occurred in an area that was calculated to be low risk. Errors like these will be accounted for when the methodology and the product is shared with our Colombian endusers.

Scene 10:>>James: “The fire risk evaluation map will be made available to the public and decision makers through relations built by the Universidad Autónoma de Occidente and the DEVELOP students. This will provide a means to warn the people of Valle Del Cauca, and prepare regional fire fighters for possible fires.”

Scene 11: \*No Voice Over\*