

# SERVIR AMAZONIA

## Monitoring and Forecasting Fires in the Amazon

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AmazonTEC 2022



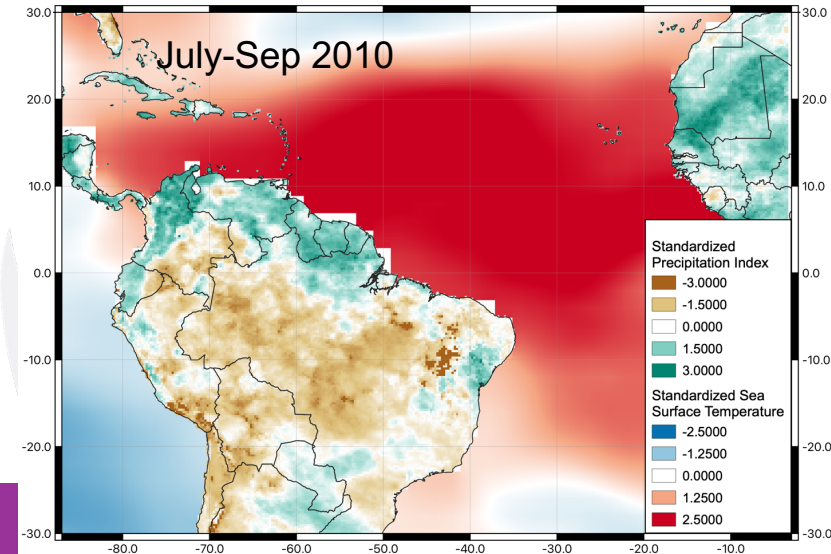
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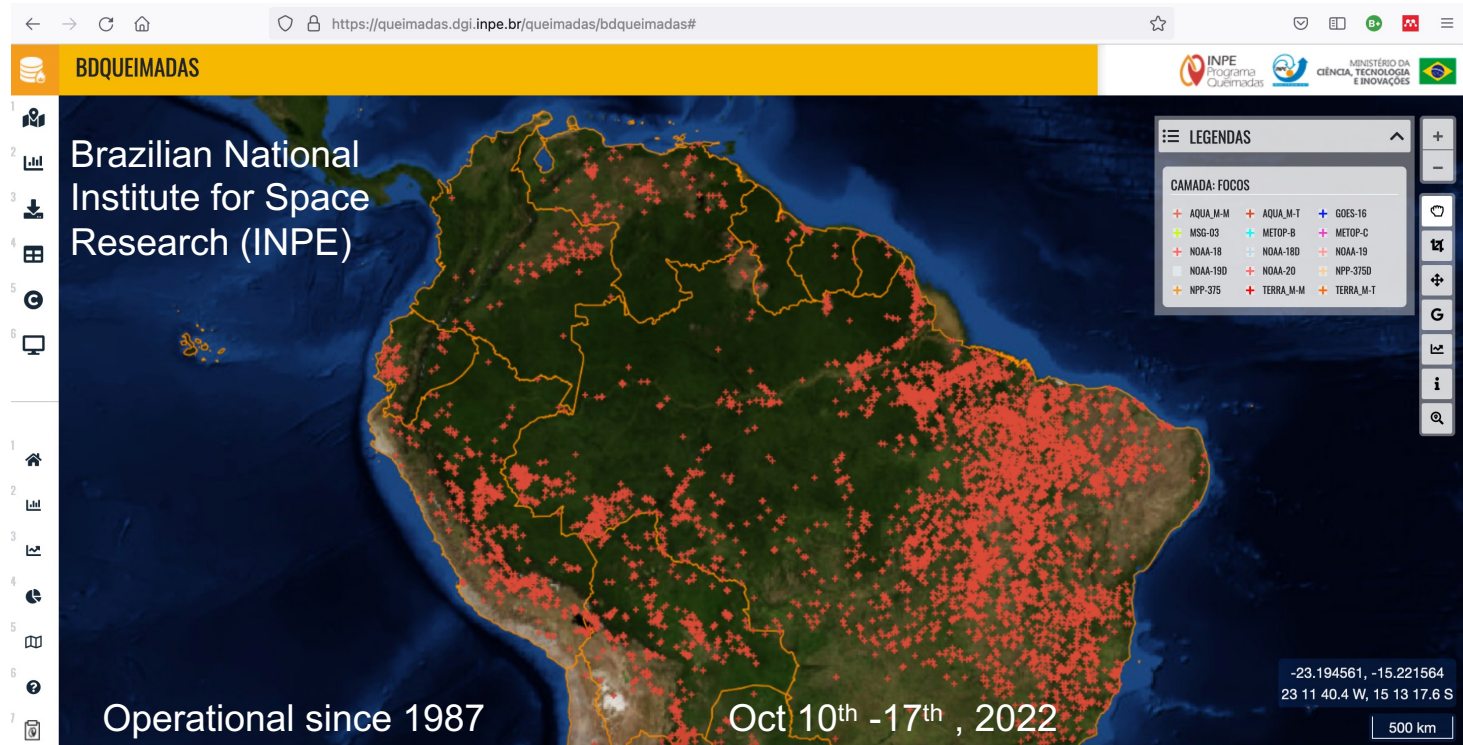
# The Nature of Fires in the Amazon

- Fires result from human activities
- Interannual variability of fires are closely related to climate
  - Fire prediction models rely on both satellite active fires data and climate variables.
- Recent changes in the climate and forest edge degradation have increased the chances of fire occurrence



# Satellite Fire Detection in the Amazon

## Some History





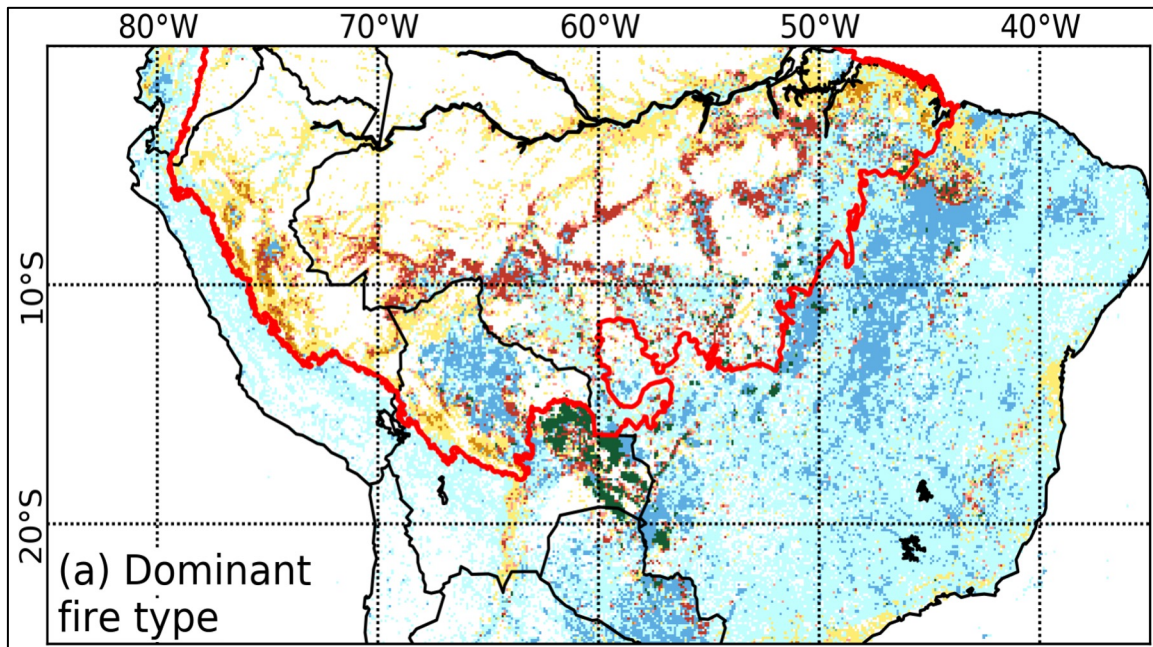
Drought and Fire Risk

# Satellite Fire Detection in the Amazon Innovation

## Legend

### Fire Atlas Fire Events

-  Savanna and Grassland
-  Small Clearing and Agriculture
-  Understory
-  Deforestation

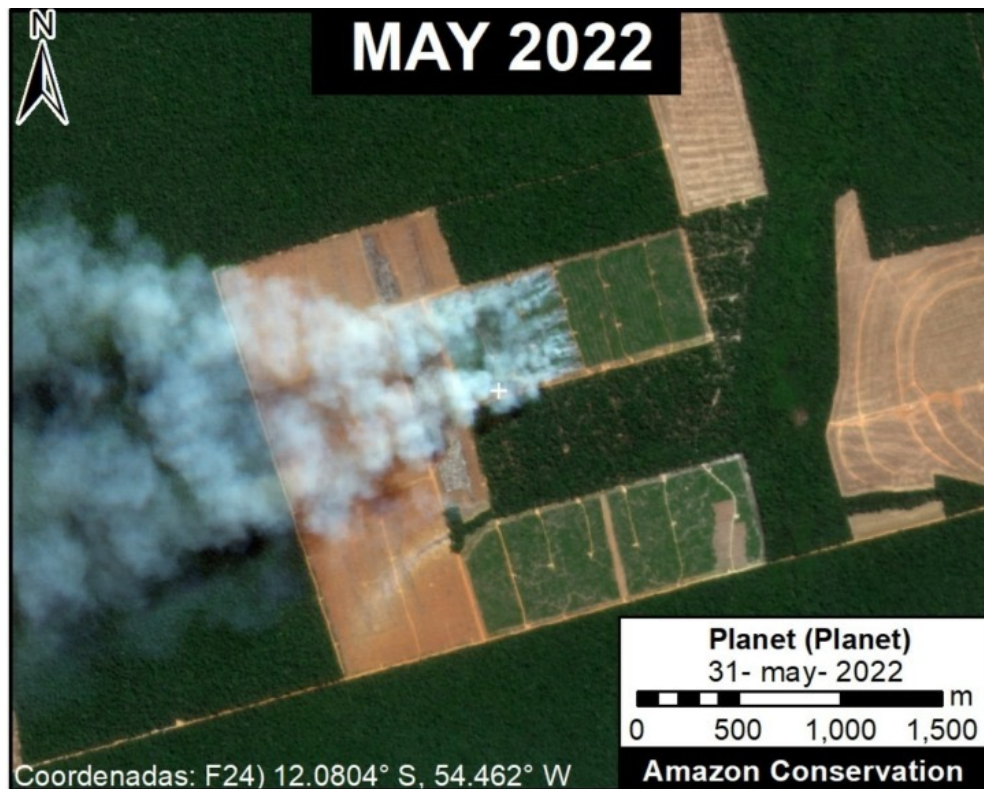


PI: Douglas Morton and Niels Andela  
NASA Goddard



Drought and Fire Risk

# Satellite Fire Detection in the Amazon Technological Advances

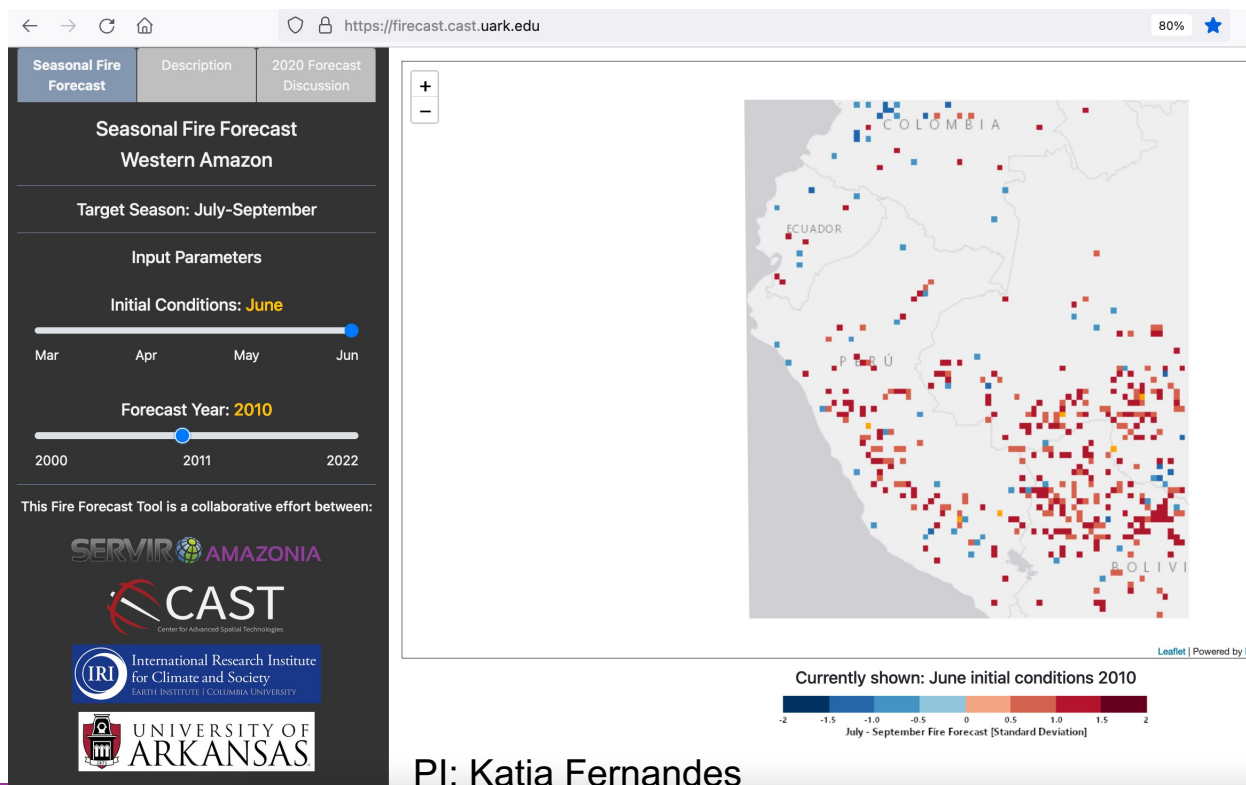


<https://www.planet.com/nicfi/>



Drought and Fire Risk

# Combining Satellite Fire Detection and Climate Indices to Predict Fires





Drought and Fire Risk

# Combining Satellite Fire Detection and Climate Indices to Predict Fires

https://ovideo-rivera.maps.arcgis.com/apps/dashboards/0f11d9146ff24276800633980dc53b4b

## Fire Season Severity: Outlook March of 2022

Select region: Acre Amazonas El Beni Maranhão Mato Grosso Pando Pará Perú Rondônia Santa Cruz



Map data © OpenStreetMap contributors, CC-BY-SA | This work is funded by the Gordon... Powered by Esri

... (0-100) for each area (0 states in Brazil: Acre, Amazonas, Maranhão, Mato Grosso, Pará, and Rondônia), 3 departments in Bolivia: (El Beni, Pando, and Santa Cruz), and one country: (Peru) using sea surface temperature information through the end of May. Green indicates below average predictions of fire activities whereas orange and red indicate above average activities.

**Fire Season Severity (FSS) predictions compared to observations:** This figure compares the FSS model with actual observations in each area. The colored lines are FSS derived from the empirical model. The dark blue solid lines correspond to observations of past years. Information on sea surface temperatures through **March of 2022** were evaluated for these predictions.

For more information on the methods, references and data, visit the official page:

<https://www.ess.uci.edu/~amazonfirerisk/ForecastWeb/SAMFSS2021.html>

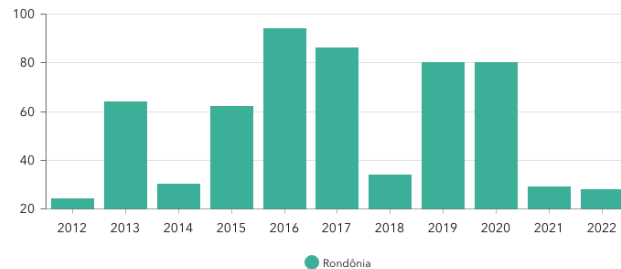
This dashboard was developed by the SERVIR-Amazonia Geospatial Information Team.

### Fire season severity index outlook



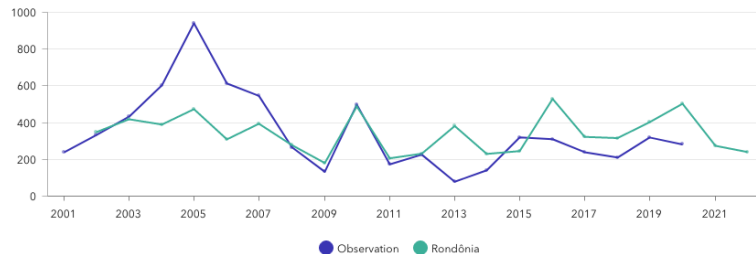
Rondônia

### Fire season severity index for other years



By Region All Regions

### Fire Season Severity (FSS) predictions compared to observations



By Region All Regions

2022

▲ 343

Mean prediction - 2022

▲ 240

Minimum prediction - 2022

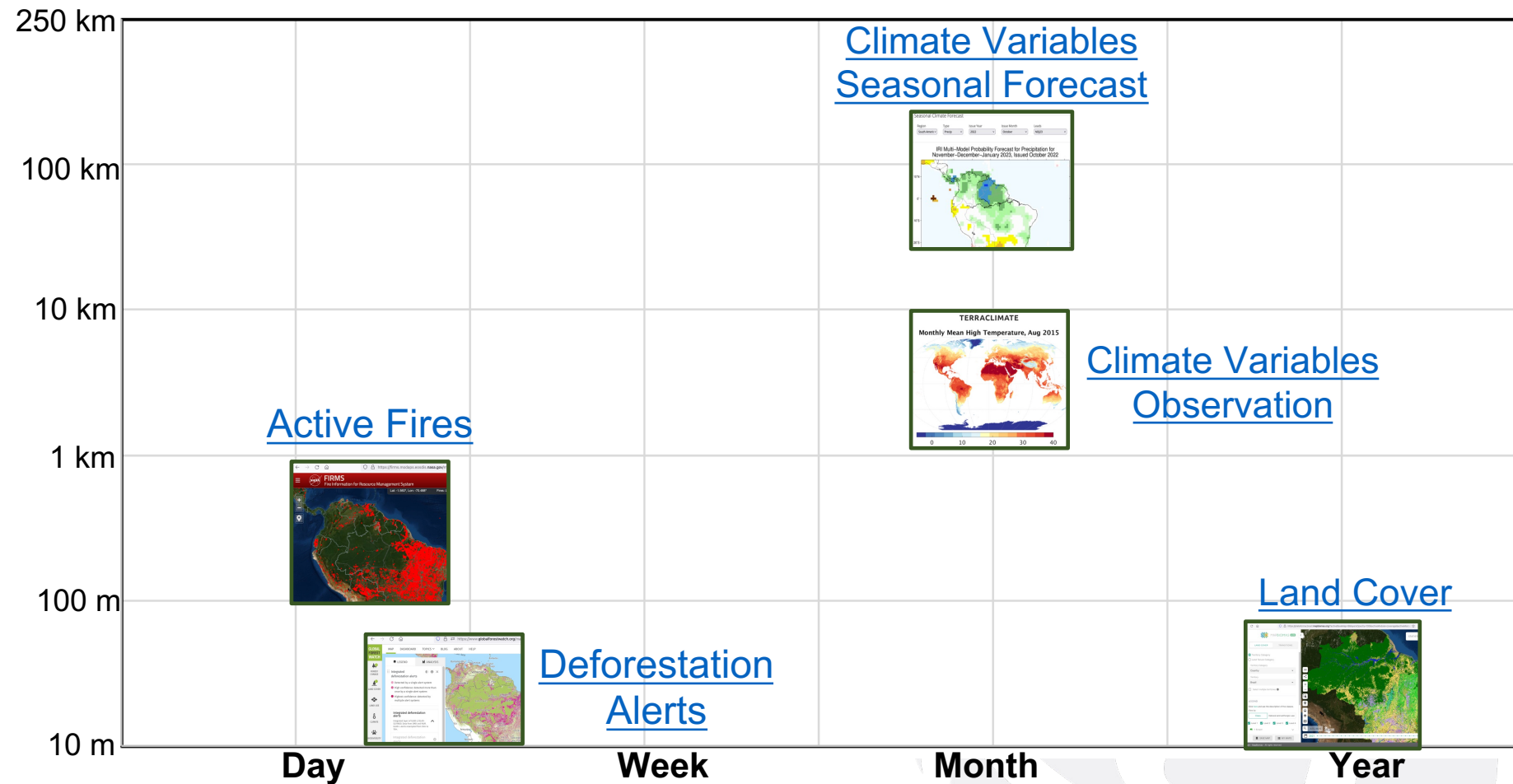
▼ 137

PI: Yang Chen, UC Irvine

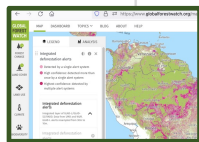
# Combining Satellite Fire Detection, Land Use Change and Climate to Predict Fires in a Collaborative Environment

## A Matter of Scale



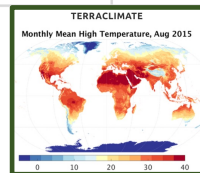
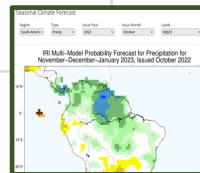


Active Fires



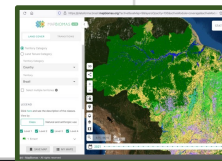
Deforestation Alerts

Climate Variables Seasonal Forecast



Climate Variables Observation

Land Cover



# Online Platforms

The screenshot displays the Google Earth Engine web interface. At the top, the Google Earth Engine logo and a search bar are visible. Below the search bar, there are tabs for 'Scripts', 'Docs', and 'Assets'. The 'Scripts' tab is active, showing a script editor with the following code:

```
1  
2 var GLAD = ee.Image('users/retsalp/TC_Predictors_OND2020_geotiffs/GLAD_Alert_Count  
3 var PDSI = ee.Image('users/retsalp/TC_Predictors_OND2020_geotiffs/PDSI_TC_avg_SCo  
4 var PR = ee.Image('users/retsalp/TC_Predictors_OND2020_geotiffs/PR_TC_avg_SCo  
5 var Protected = ee.Image('users/retsalp/TC_Predictors_OND2020_geotiffs/Percentage  
6 var SOIL = ee.Image('users/retsalp/TC_Predictors_OND2020_geotiffs/SOIL_TC_avg_SCo  
7 var VPD = ee.Image('users/retsalp/TC_Predictors_OND2020_geotiffs/VPD_TC_avg_SCo  
8  
9
```

To the right of the script editor is the 'Inspector' and 'Console' panel. The 'Console' tab is active, showing the output of the script: 'Use print (...) to write to this console.', 'Classifier.train' (JSON), and 'Object (12 properties)' (JSON).

The main map area shows a satellite view of South America. A large blue shaded region is overlaid on the map, covering a significant portion of Colombia and extending into Ecuador and Venezuela. The map includes labels for major cities like Bogotá, Medellín, Cali, and Quito, as well as geographical features like the Andes mountains and the Amazon basin. The bottom of the map shows a scale bar and keyboard shortcuts.

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