Fires in the Pacific West Coast of Mexico (2015-2021)

The study area was conducted on the states of Sinaloa and Nayarit.

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Why are fires such a big deal?

Fires release greenhouse gases and other pollutants into the atmosphere, which attribute to global warming, and in severe cases, irreparably damage ecosystems.
How are fires recorded?

Fires are recorded by NASA using either VIIRS or MODIS

Types of Satellites: MODIS and VIIRS

MODIS

- uses multiple channels to detect thermal anomalies (gas flare, power plants, fires)

- fires can be picked out by contextual algorithm that exploits the strong emission of mid infrared radiation from fires
- snapshot is taken and observed

- classifies fire into missing data, cloud, water, non fire, fire, or unknown

- fires of a minimum size of 30mx30m are detected

- spatial resolution pixels is approx. 1km

**VIIRS**

- detects fires, separate land, water, and cloud pixels

- fires are detected by using threshold and contextual algorithm using radiometric signals

- spatial resolution pixels is approx. 375m

**Data Sets: Near Real Time and Standard Quality**

NRT: Generated within 3 hours of satellite observation

SQ: Data is sorted, processed, and delivered in an expedited manner

**Study Area: Sinaloa and Nayarit**

Why was this area chosen?
Why are these fires happening and is there a pattern?

Similarities of the states:

Both states are on the Pacific West Coast of Mexico and are mainly used for agriculture. They share similar vegetation, aqua-cultural, and natural resources.
agriculture: sugarcane, tobacco, corn, beans

aqua-cultural: shrimp, soft crab, chocolate clam, oysters

natural resources: gold, silver, zinc

vegetation: savana, tropical deciduous forest, thorn forest

Topography: consists of flat land and some mountain ranges
climate: subtropical

rainy period: June - February -> average 31 day rainfall >0.5 inches

rainless period: February - June -> average of 0.1 inches

dry season: September - June

windy season: January - July -> average wind speed = 5.7mph

hot season: May - July -> average 101 degree Farenheit and lowest temperature is 76 degrees Farenheit (considered sweltering)

cool season: November - February -> average temperature is 86 degrees farenheit and the lowest temperature is 56 degrees farenheit

precipitation: annual average of 26.9 inches or 683mm

wet season: June - October -> 42% chance of rain (accumulates >0.4 inches)
most wet month: August -> average 25.1 days of rain (>0.4 inches)

Conclusion: Areas burnt are due to season variation. There is a high chance of fires between the months of March - June.

Map creation-

Data collection (2015-2021 focus)

How did I make these maps?

How did I request the data?
How long did it take to receive the data?

**Comparative of data accumulated from Mexican Government**

In 2015 the maximum amount of fires was less than four thousand, but has only been increasing and fluctuating ever since.
Fires have migrated south since 2015 more landwards

The points guide to the middle of where all the fires would have been.
Overall: What are the causes of these fires?

Impact of this research

People can use this data to be informed, inform others, evacuate when needed, change agriculture scheduling, or rotate crops in a more efficient and speditate manner. People could also use this
data to know when it is dangerous to be around the area and how the air quality has been impacted.

Thank you.