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 gasess and other pollutants into the atmosphere, which attribute to global warming, and in severe cases, irreparably damage ecosystems.

Scott Stephens: Wildfires in California- Friend or Foe

How are fires recorded?

Fires are recorded by NASA using either VIIRS or MODIS

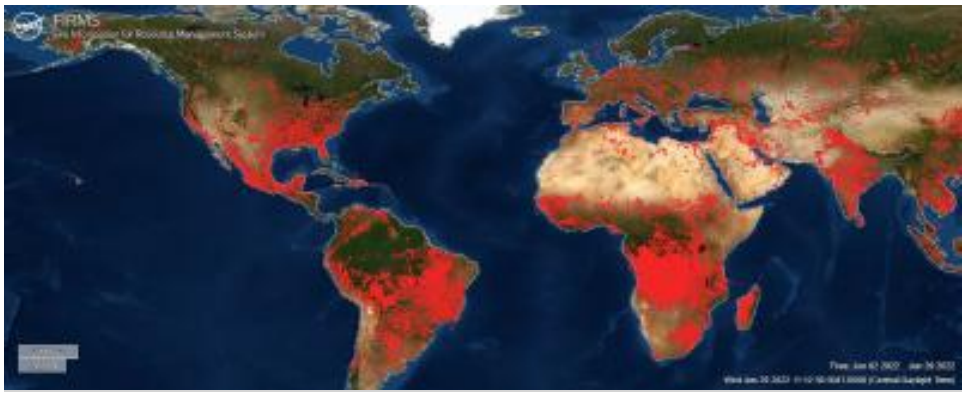


Image captured by NASA satellites

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 inframed radiation from fires

-snapshot is taken and observed

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

-fires of a minimum size of 30mx30m are detected

-spatial resolution pixels is approx. 1km

VIIRS

-detects fires, seperate 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.

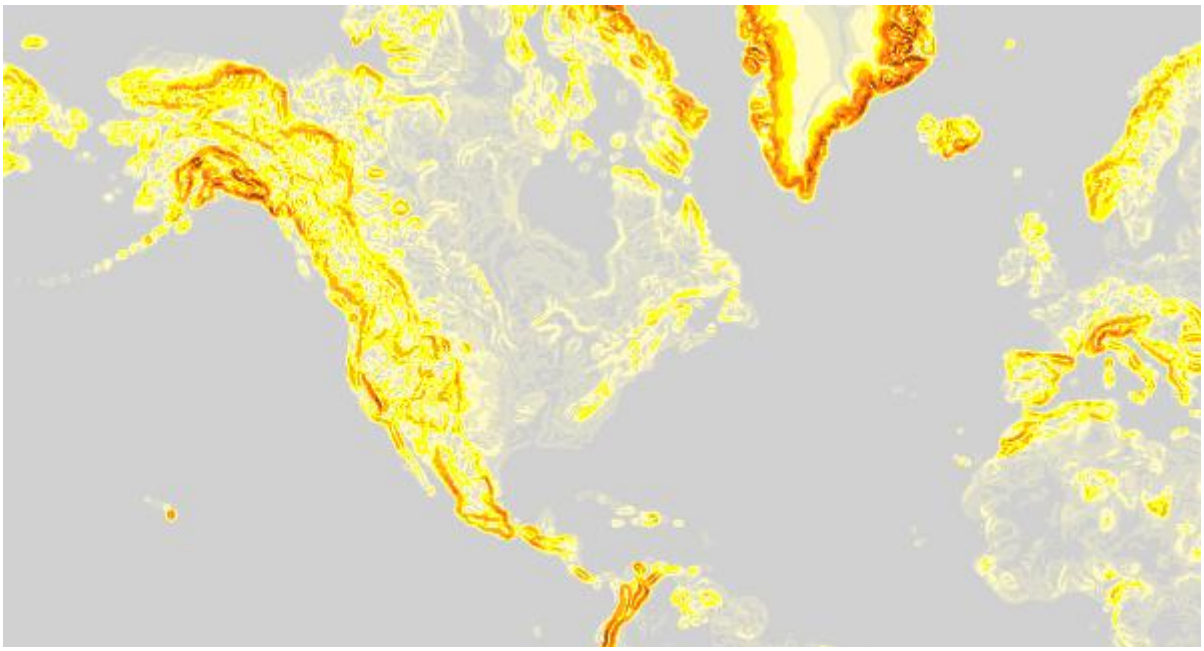
agriculture: sugarcane, tobacco, corn, beans

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

natural resources: gold, silver, zinc

vegetation: savana, tropical decidious forest, thorn forest

Topography: consists of flat land and some mountain ranges



Topography

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

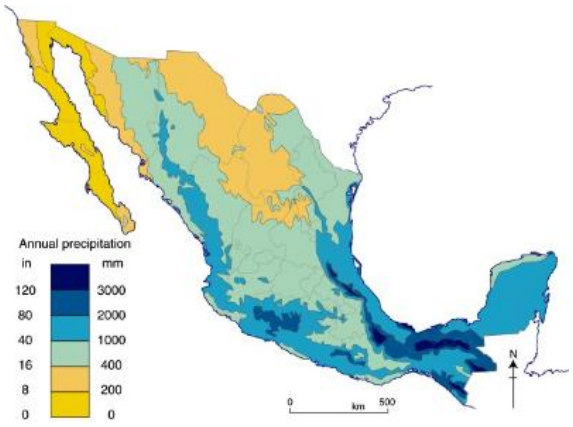
hot season: May - July -> average 101 degree Farneheit and lowest temperature is 76 degrees Farenheit (considered sweltering)

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

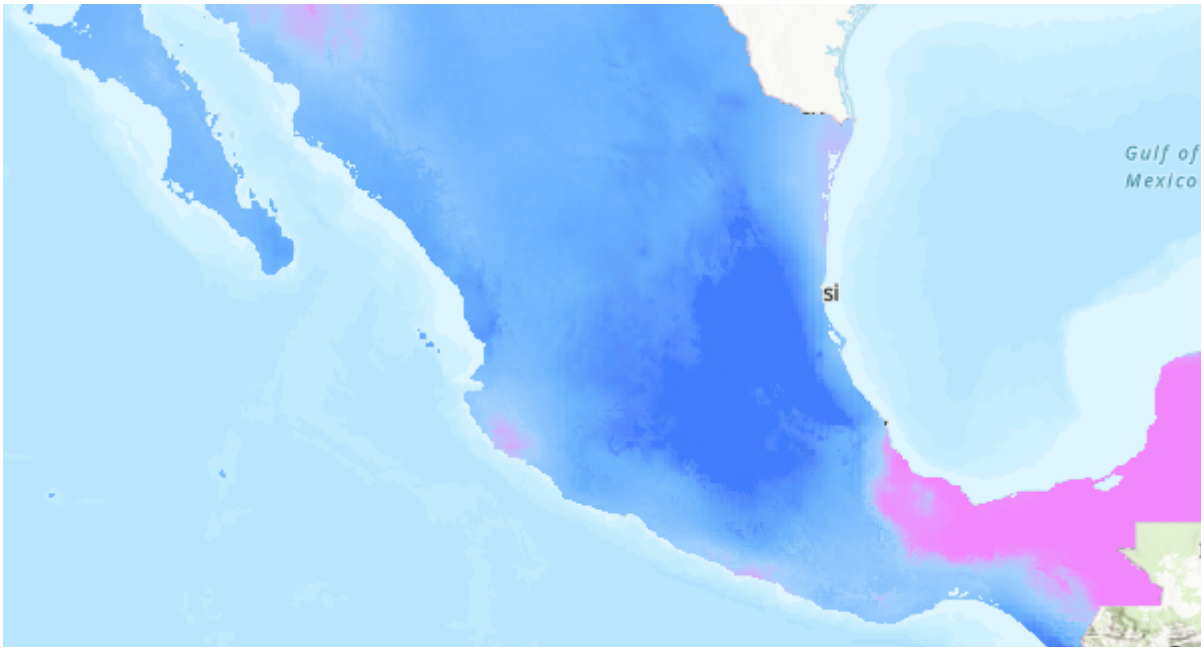
percipitation: annual average of 26.9 inches or 683mm

wet season: June - October -> 42% chance of rain (accumulates >0.4 inches)

most wet month: August -> average 25.1 days of rain (>0.4inches)



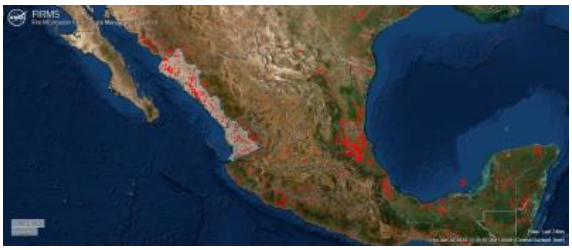
annual percipitation in Mexico



percipitation

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

Map creation-



Data collection (2015-2021 focus)

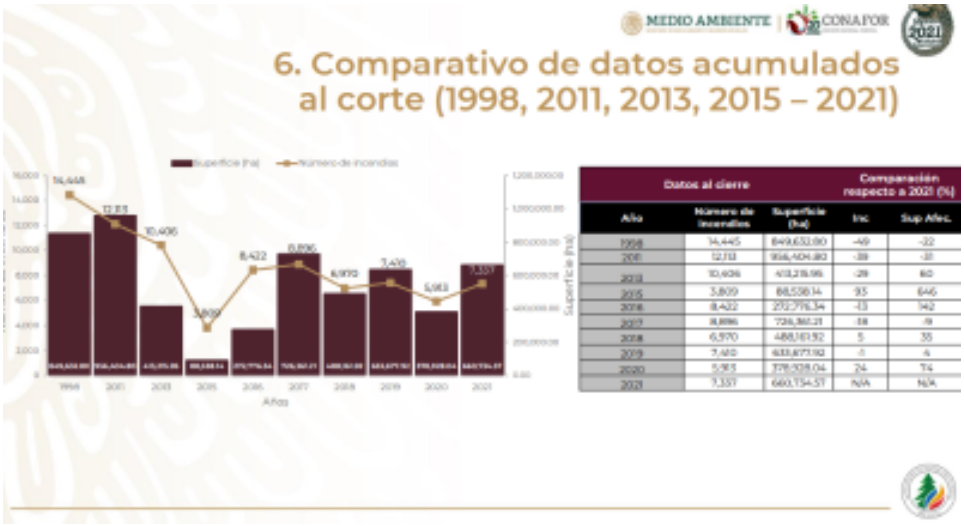
How did I make these maps?

How did I request the data?

points were plotted using my iPhone maps, dropping a pin by the border outline of state, then scrolling until I found the coordinates (map was not outlined when requesting data)

How long did it take to recieve the data?

Comaprative of data accumulated from Mexican Government-

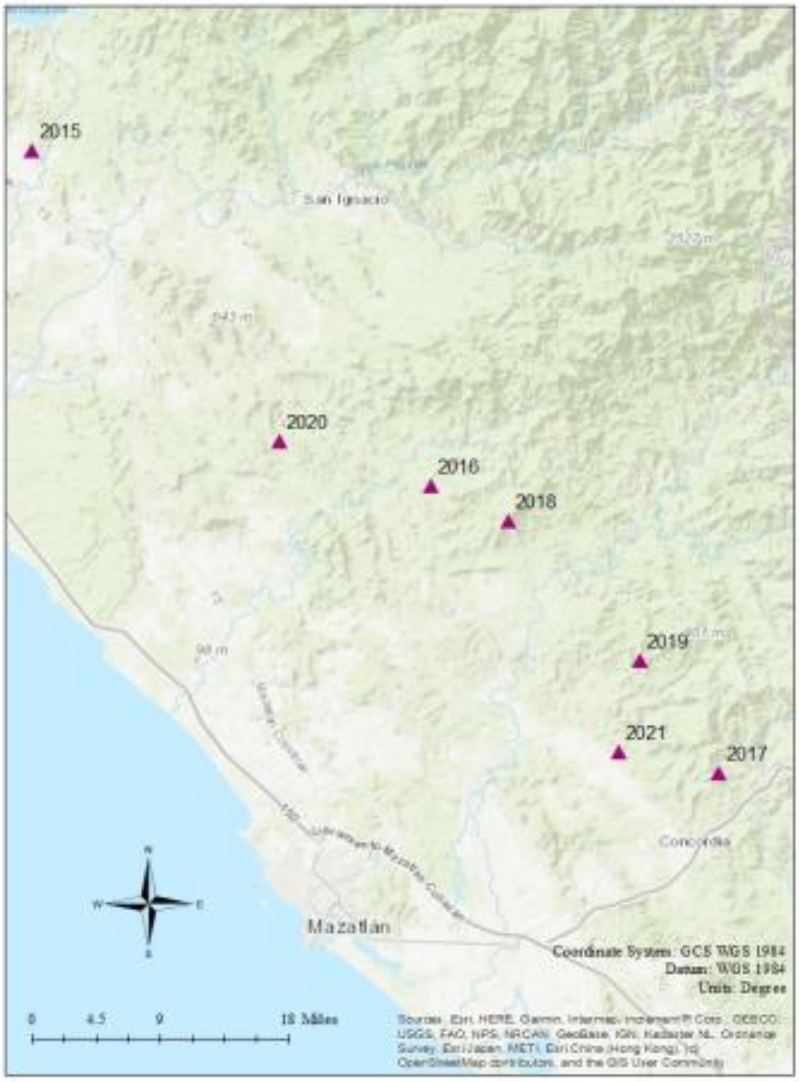


Año	Datos al cierre: Número de incendios	Superficie (ha)	Comparación respecto a 2021 (%): Inc.	Sup Afec.
1998	14,445	849,632.80	-49	-22
2011	12,113	916,404.80	-38	-27
2013	10,406	413,278.95	-28	60
2015	3,809	88,538.14	93	646
2016	8,422	272,779.34	-13	142
2017	8,896	726,361.21	-18	-9
2018	6,970	488,161.92	5	35
2019	7,410	633,677.92	-1	-6
2020	5,983	378,928.04	24	74
2021	7,357	660,734.57	N/A	N/A

In 2015 the maximum amount of fires was less than four thousand, but has only been increasing and flunctuating ever since.

Monthly Mean Wildfires in the Pacific West Coast of Mexico (2015-2021)

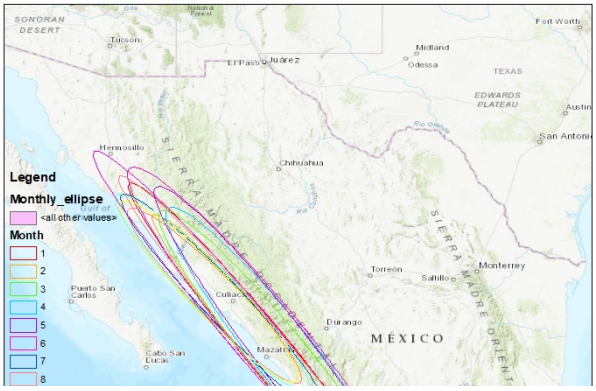
Yearly Mean Wildfires in the Pacific West Coast of Mexico (2015-2021)



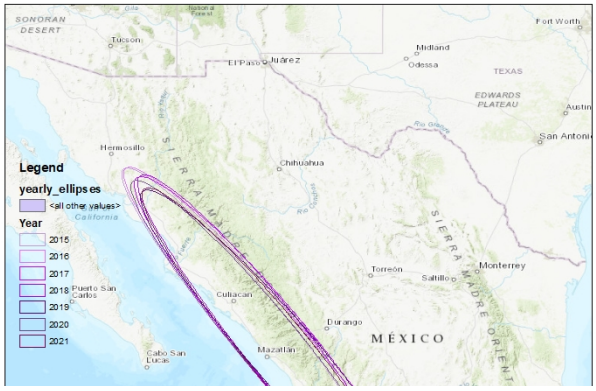
Fires have migrated south since 2015 more landwards

The points guide to the middle of where all the fires would have been.

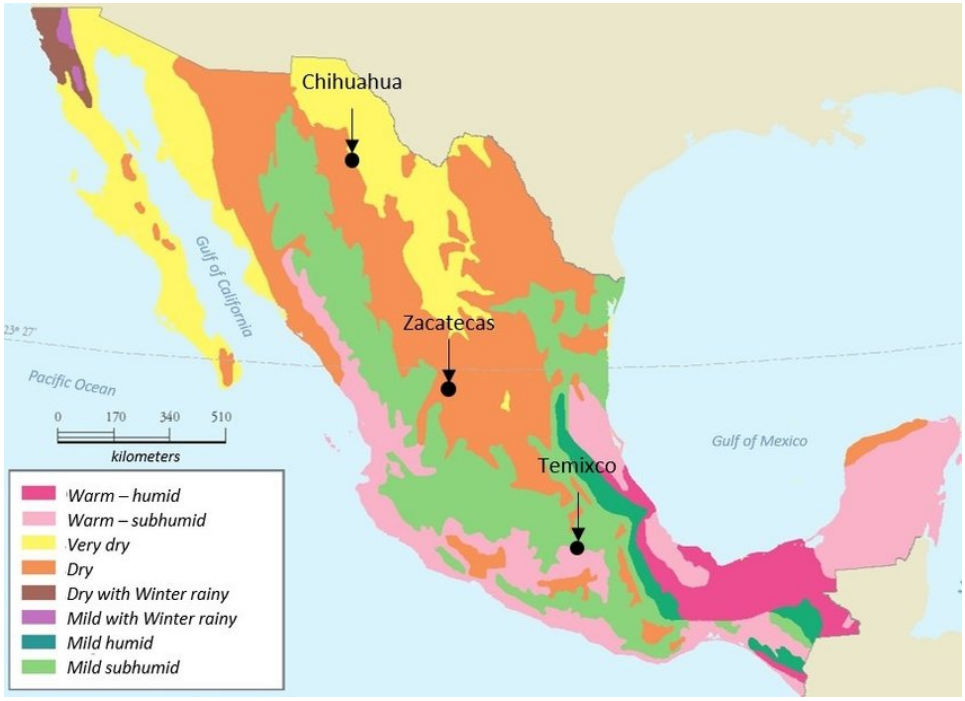
Monthly Ellipse of Wildfires in the Pacific West Coast of Mexico (2015-2021)



Monthly Ellipse of Wildfires in the Pacific West Coast of Mexico (2015-2021)



ellipse of fires throughout the months and years



Climate within the country of Mexico

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 agricultre scheduling, or rotate crops in a more efficient and spediate 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.