Portfolio Papers

Geological Oceanography

Prof. Laura Wetzel

Eckerd College

Portfolio Overview

- Write a series of one-page papers describing topics related to class throughout the semester.
- Present one of these one-page papers as a 3 to 5 minute oral presentation in lab.
- Revise these one-page papers as a portfolio for submission at the end of the semester.

The Sognefjord: Better than the Rest

By: Drew Thimenti 12-5-14

An estuary is a semi-enclosed body of brackish water with an inflow of salt and fresh water. Estuaries act as nurseries and habitats for animals, natural harbors, or buffer zones between the ocean and the land. Estuaries could be categorized based on their origin and evolution. An example of a category of estuaries are fjords, a long, narrow, deep inlet typically formed by being surrounded by the steep walls of glacial valleys. Fjords could be found in places such as Norway and Iceland. The top three longest fjords in the world are Scoresby Sund, Greely Fjord, then Sognefjord (Sognefjorden). Located in Sogn og Fjordane county in Western Norway, the Sognefjord stretches 205 kilometers (127 miles) inland from the ocean to the small village of Skjolden, making it the largest fjord in Norway and the third longest in the world. However, the two before it are ice-covered, making the Sognefjorden the longest open (ice-free) fjord in the world. The name Sognefjord (Sognefjorden) originates from Sogn, a traditional district which covers the southern part of the county. There are many municipals that the fjord goes through: Solund, Aurland, Vik, and Luster among a few more. The fjord reaches a maximum depth of 1,308 meters (4,291 feet) below sea level in the inland part of the fjord and has a minimum depth of one hundred meters (330 feet) below sea level near its mouth. The average width of the main branch of the Sognefjord is about 4.5 kilometers (2.8 miles). The surrounding cliffs around the fjord rise to a height of at least one thousand meters (3,300 feet), the inner end surrounded by a mountain range rising about two thousand meters (6,600 feet) above sea level that is covered by the largest glacier in continental Europe. There are also many islands and smaller fjords that branch off the main fjord. Located in the municipal Luster, the inner most arm of the Sognefjorden is called Lustrafjord where there is an area that accesses the Jotunheimen National Park where transport between the Bergen and Scandinavian inland was accomplished by boat. Approximately thirty thousand people live along the fjords and in the valleys surrounding them. The fjord has become a tourist attraction in the summer. This tourism provides much of the local economy.

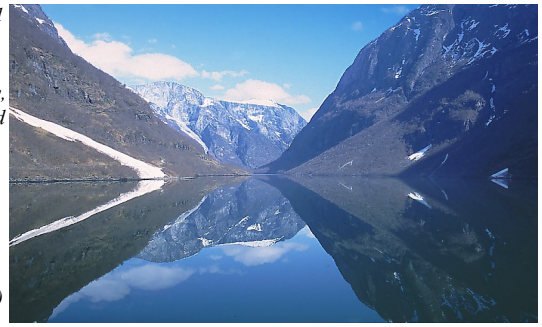


Illustration 1: View of the Sognefjord

Illustration 2: Skjolden by the Sognefjord

Works Cited

Key facts about the Sognefjord area. (July 7, 2013) *visitnorway.com.* Retrieved December 4, 2014, from http://www.visitnorway.com/us/where-to-go-us/fjord-norway/sognefjord/key-facts-about-the-sognefjord-area/

Sognefjord. (n.d.) *jostedal.com.* Retrieved December 4, 2014, from http://www.jostedal.com/img/Sognefjordguiden2014_Eng.pdf

Sognefjord, Norway – The Creek of Adventure. (n.d.) *1000lonelyplaces.com.* Retrieved December 4, 2014, from http://www.1000lonelyplaces.com/phot-blog/sognefjord-norway-the-creek-of-adventure/

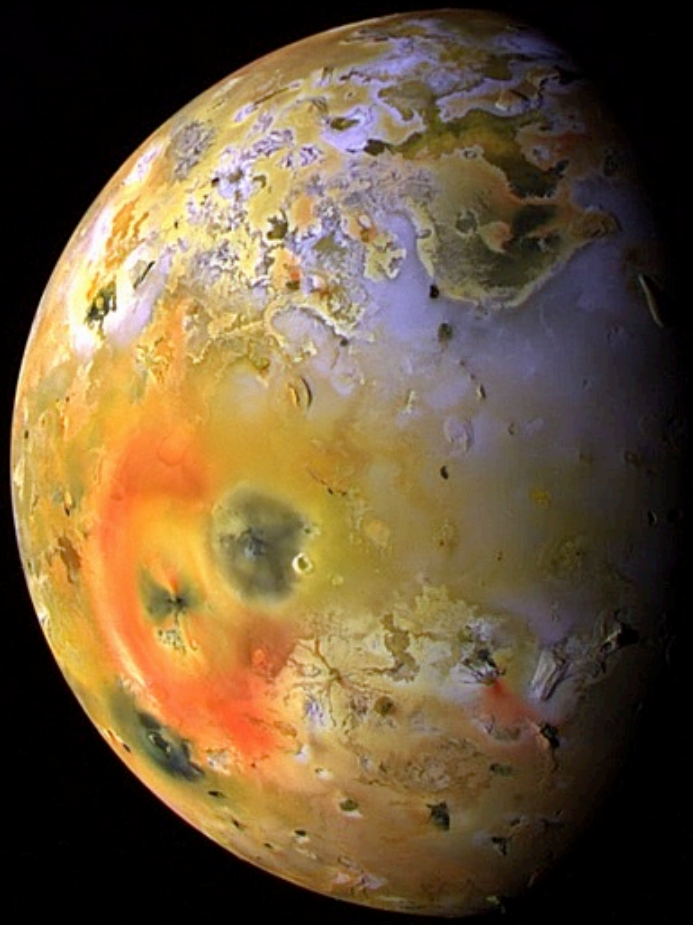
Images

Skjolden by the Sognefjord [Photograph]. Retrieved December 4, 2014, from http://www.1000lonelyplaces.com/phot-blog/sognefjord-norway-the-creek-of-adventure/

View of the Sognefjord [Photograph]. Retrieved December 4, 2014, from http://en.wikipedia.org/wiki/Sognefjord

Topics

- Solar System
- Minerals
- Rocks
- Hydrothermal Vents
- Volcanoes & Earthquakes
- Marine Sediments
- Hurricanes & Typhoons
- Tides



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solarsystem.nasa.gov/planets/

Topics

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- Rocks
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- Marine Sediments
- Hurricanes & Typhoons
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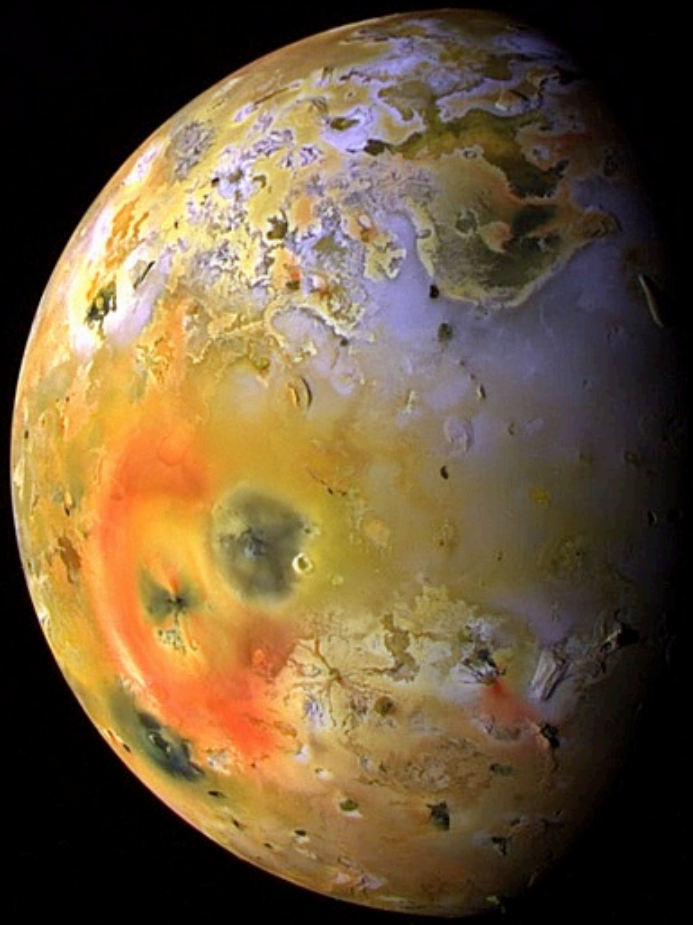


Io

solarsystem.nasa.gov/planets/

Paper #1: Solar System

http://solarsystem.nasa.gov/planets/

Paper #2: Minerals

- Chemical formula
- Physical properties
- Hand specimen identification
- Geologic occurrence
- Origin of the mineral name

Smithsonian Mineral Gallery:
geogallery.si.edu/index.php/en/minerals/all

Paper #3: Rocks

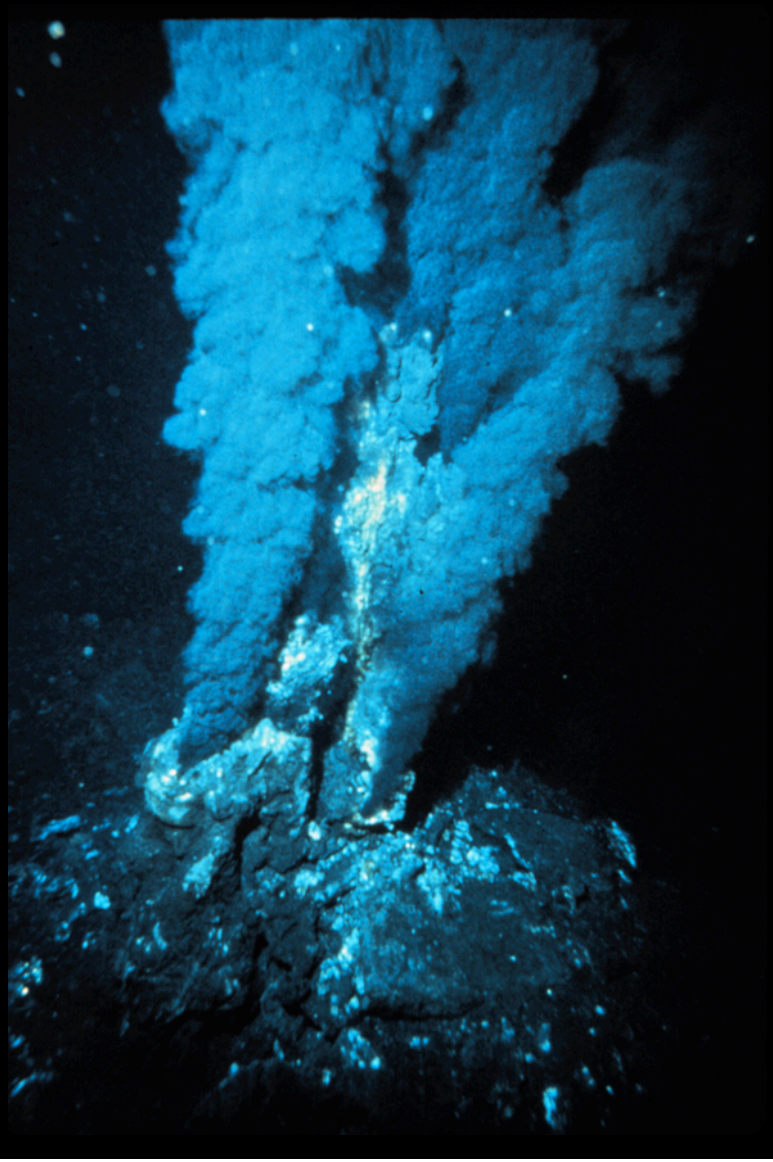
- Minerals
- Textures
- Hand specimen identification
- Geologic occurrence

www.travelpod.com/travel-blog-entries/mcmactravels/2/1385499216/tpod.html

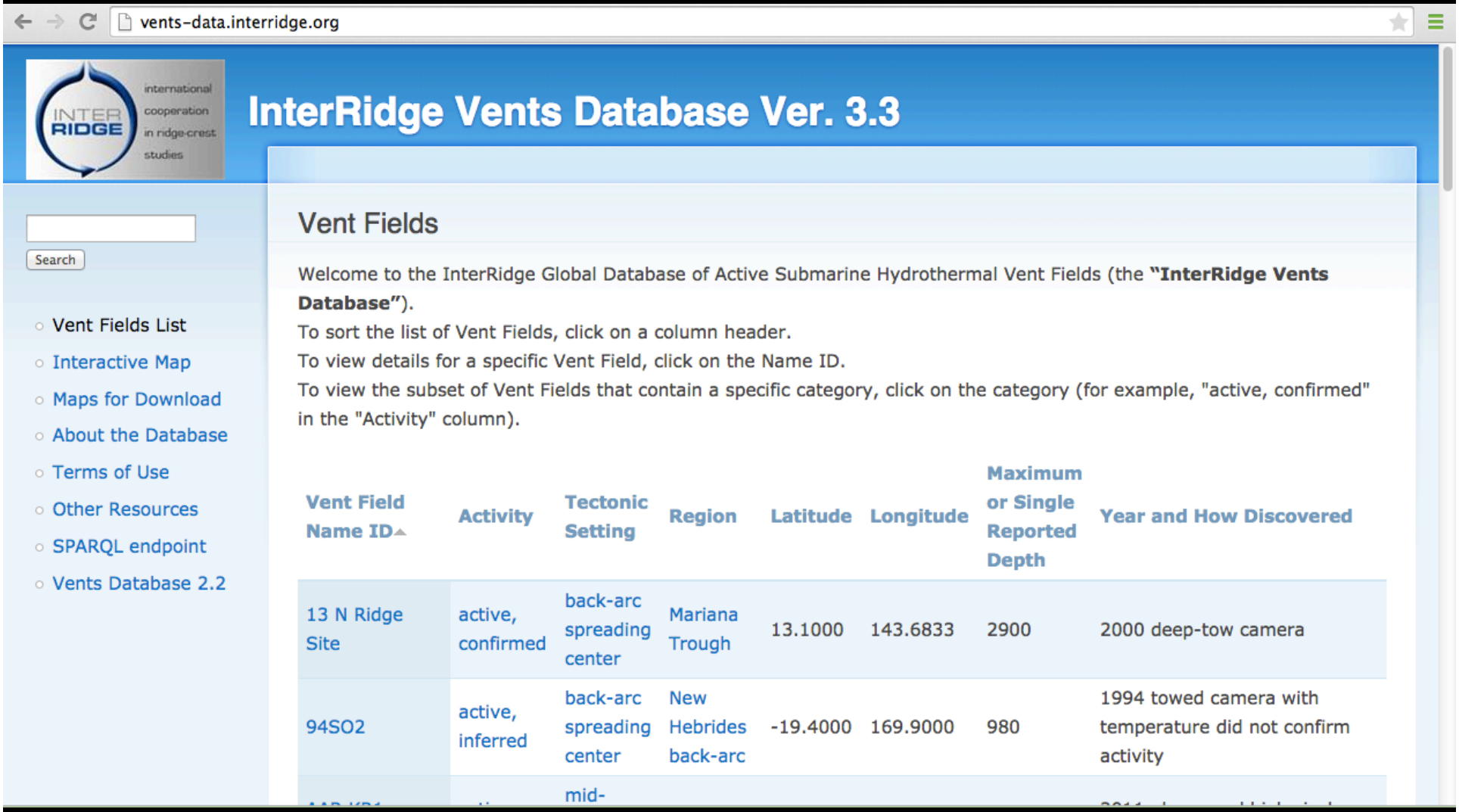
Paper #4: Hydrothermal Vents

- Photos

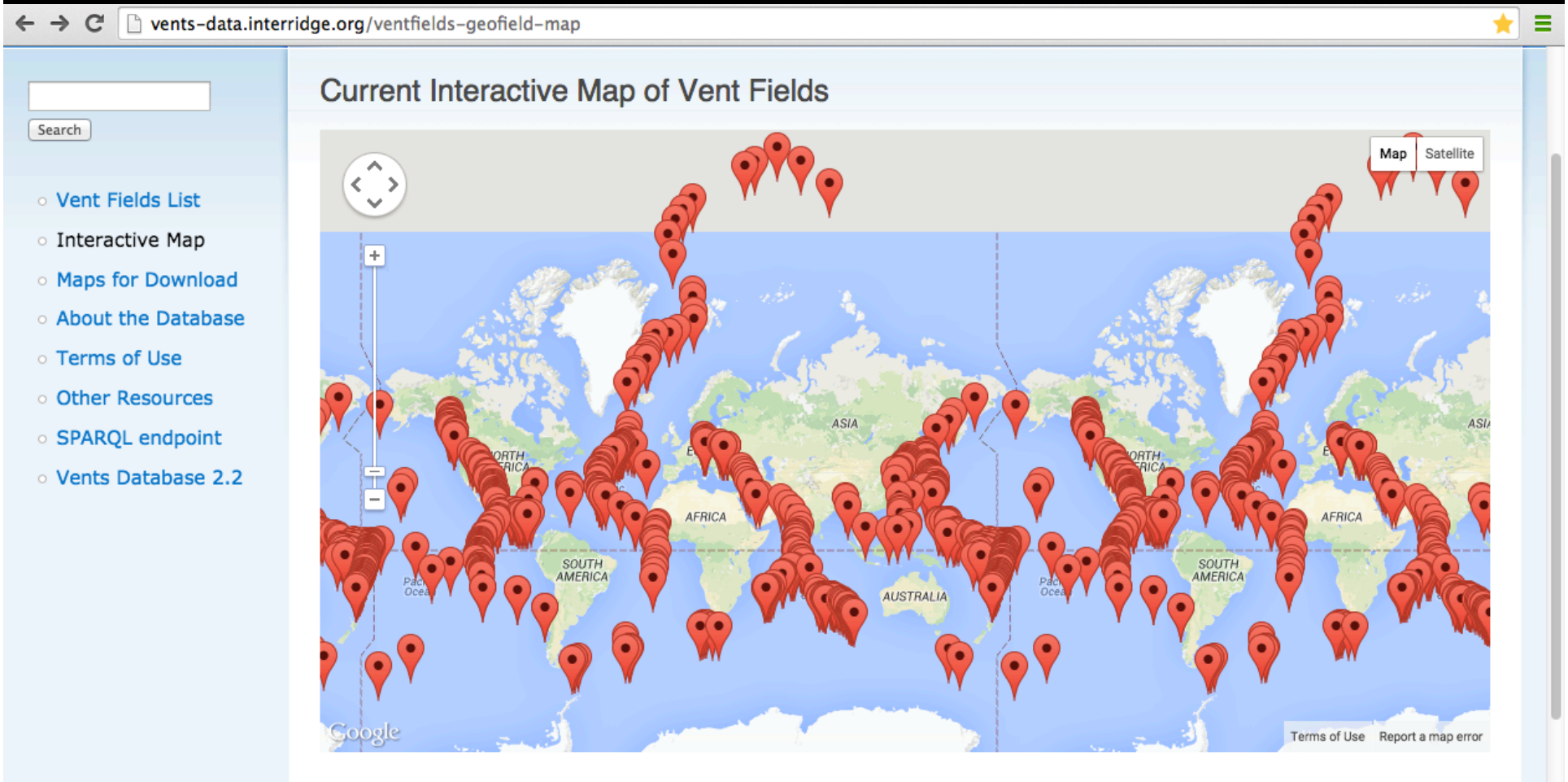
www.photolib.noaa.gov/bigs/nur04506.jpg



Hydrothermal Vents



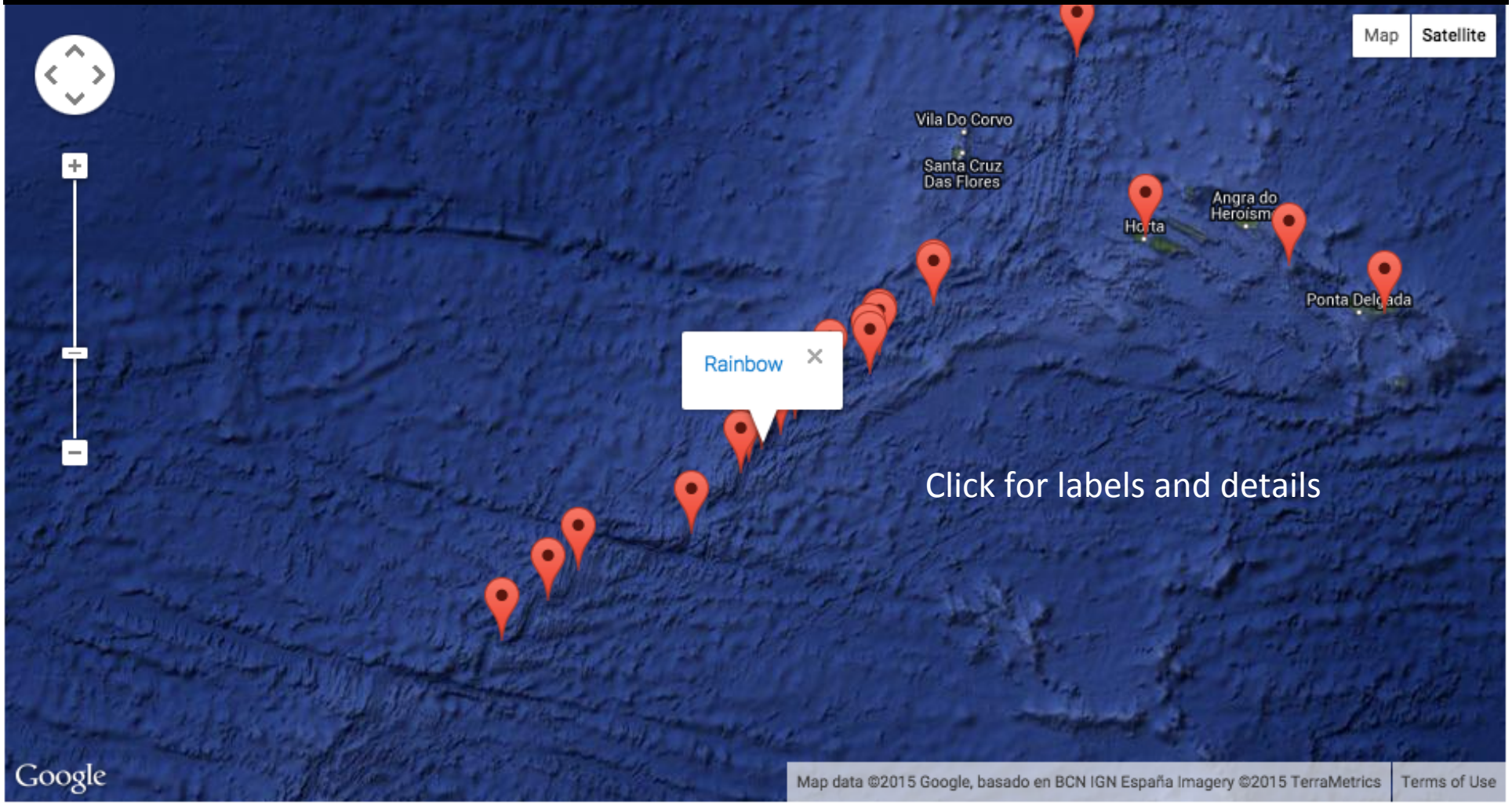
Interactive Map



Rainbow, MAR

vents-data.interridge.org/ventfields-geofield-map

Rainbow, MAR



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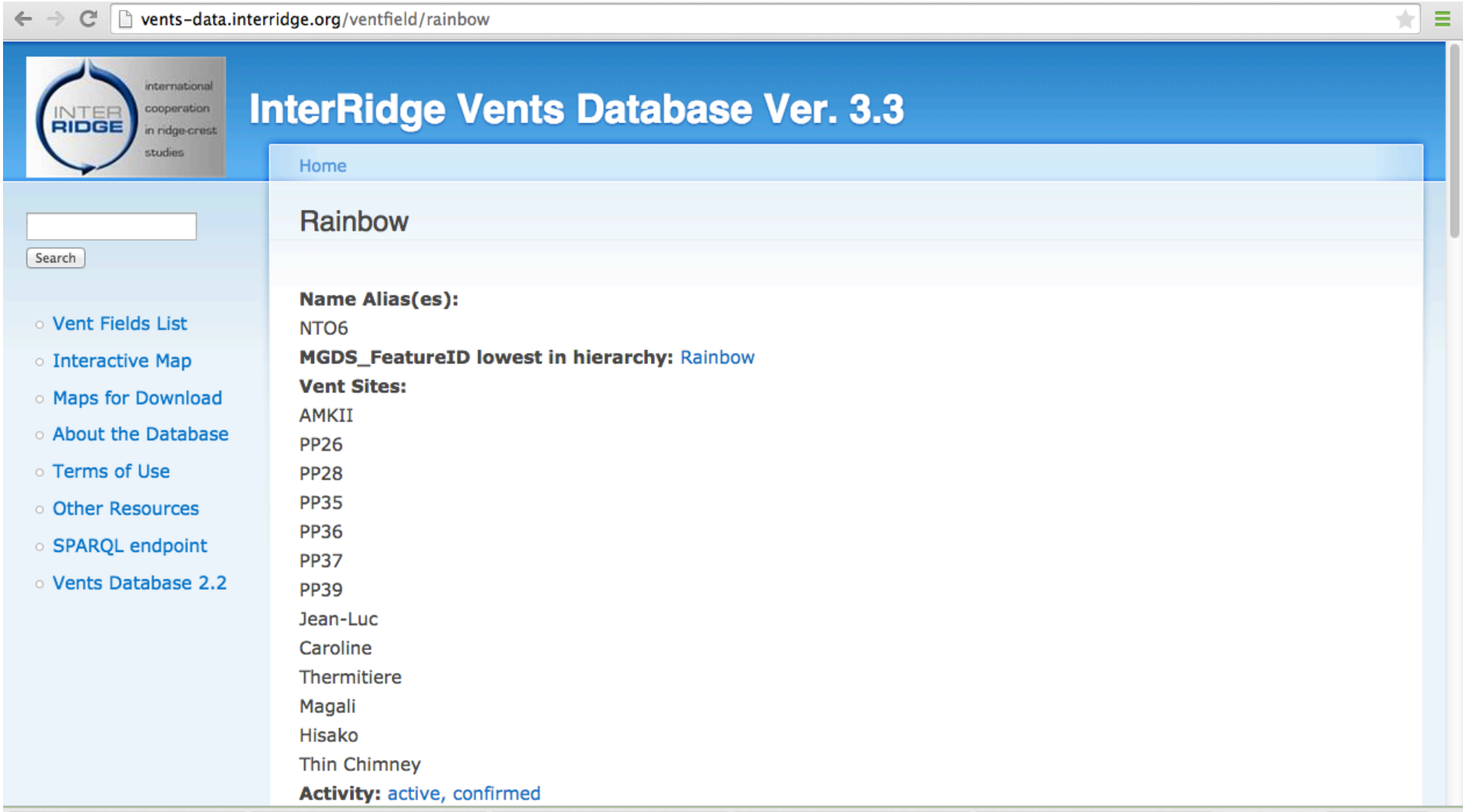
vents-data.interridge.org/ventfield/rainbow
international cooperation in ridge-crest studies
InterRidge Vents Database Ver. 3.3
Home
Search
Vent Fields List
Interactive Map
Maps for Download
About the Database
Terms of Use
Other Resources
SPARQL endpoint
Vents Database 2.2
Rainbow
Name Alias(es):
NTO6
MGDS_FeatureID lowest in hierarchy: Rainbow
Vent Sites:
AMKII
PP26
PP28
PP35
PP36
PP37
PP39
Jean-Luc
Caroline
Thermitiere
Magali
Hisako
Thin Chimney
Activity: active, confirmed

vents-data.interridge.org/ventfield/rainbow

InterRidge Vents Database Ver. 3.3

Home

Search

- Vent Fields List
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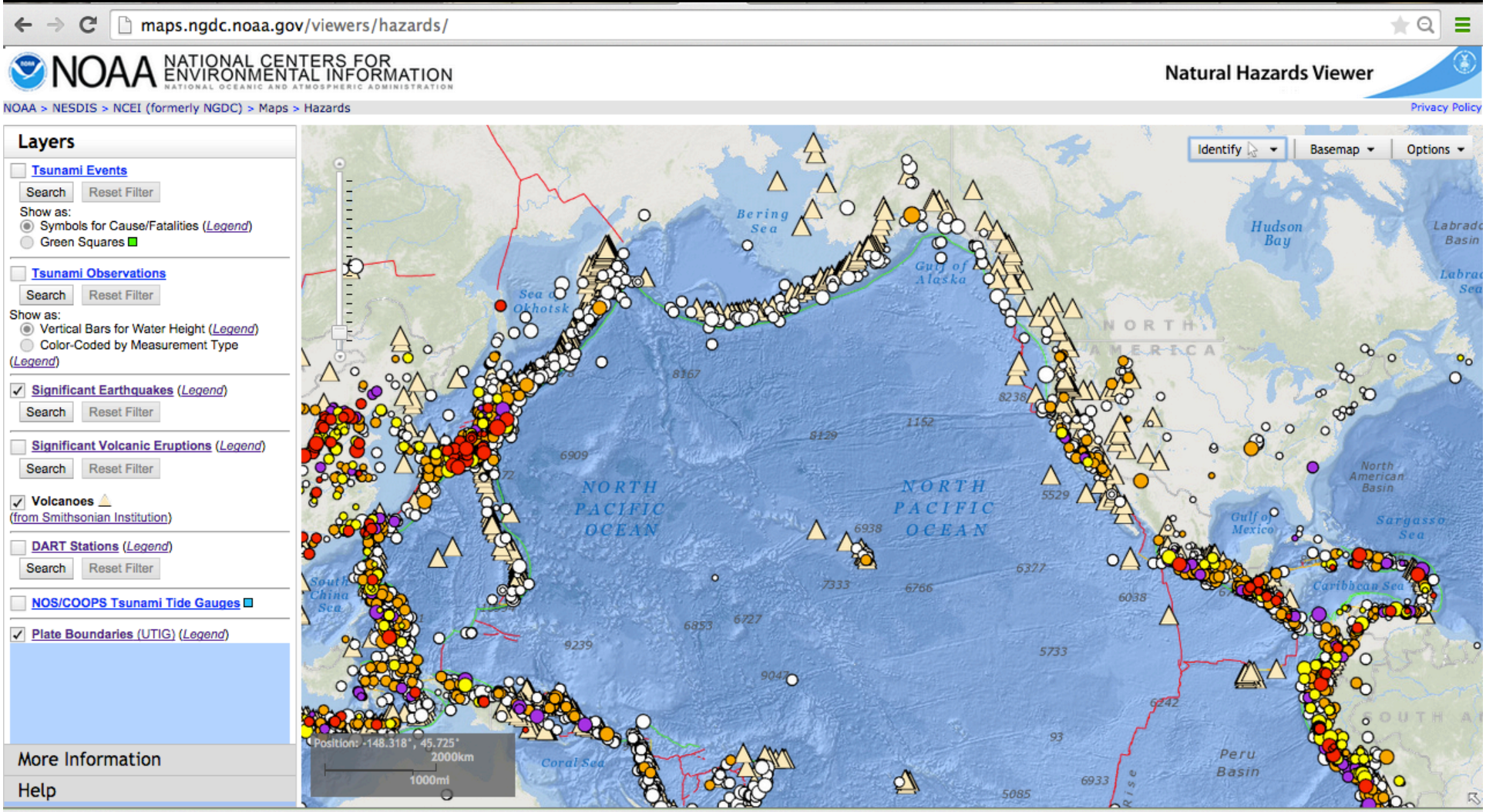
- SPARQL endpoint
- Vents Database 2.2

Rainbow

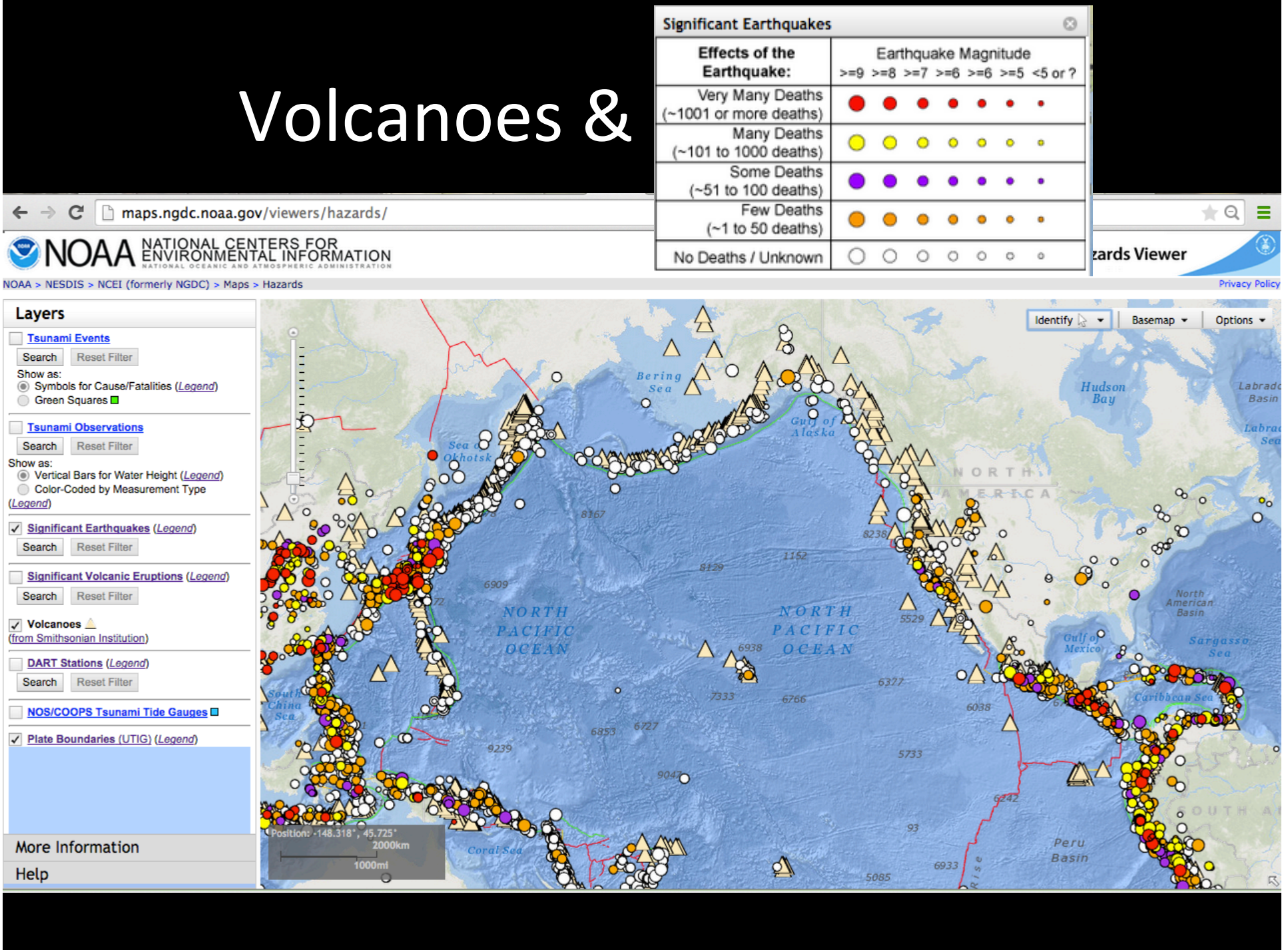
Activity: active, confirmed
Maximum Temperature: 362
Latitude: 36.2300
Longitude: -33.9020
Location on map:

Ocean: N. Atlantic
Region: N MAR
National Jurisdiction: high seas
Maximum or Single Reported Depth (mbsl): 2320
Minimum Depth (mbsl): 2270
Tectonic setting: mid-ocean ridge
Full Spreading Rate (mm/a): 20.6
Volcano Number (if applicable):
Host Rock: MORB, serpentinite, gabbro

Paper #5: Volcanoes & Earthquakes



Volcanoes &


Significant Earthquakes
Effects of the Earthquake:
Earthquake Magnitude
>=9 >=8 >=7 >=6 >=6 >=5 <5 or ?
Very Many Deaths (~1001 or more deaths)
Many Deaths (~101 to 1000 deaths)
Some Deaths (~51 to 100 deaths)
Few Deaths (~1 to 50 deaths)
No Deaths / Unknown
maps.ngdc.noaa.gov/viewers/hazards/
NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NOAA > NESDIS > NCEI (formerly NGDC) > Maps > Hazards
Privacy Policy
Layers
Tsunami Events
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Symbols for Cause/Fatalities (Legend)
Green Squares
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Vertical Bars for Water Height (Legend)
Color-Coded by Measurement Type
(Legend)
Significant Earthquakes (Legend)
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Significant Volcanic Eruptions (Legend)
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Reset Filter
Volcanoes
(from Smithsonian Institution)
DART Stations (Legend)
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NOS/COOPS Tsunami Tide Gauges
Plate Boundaries (UTIG) (Legend)
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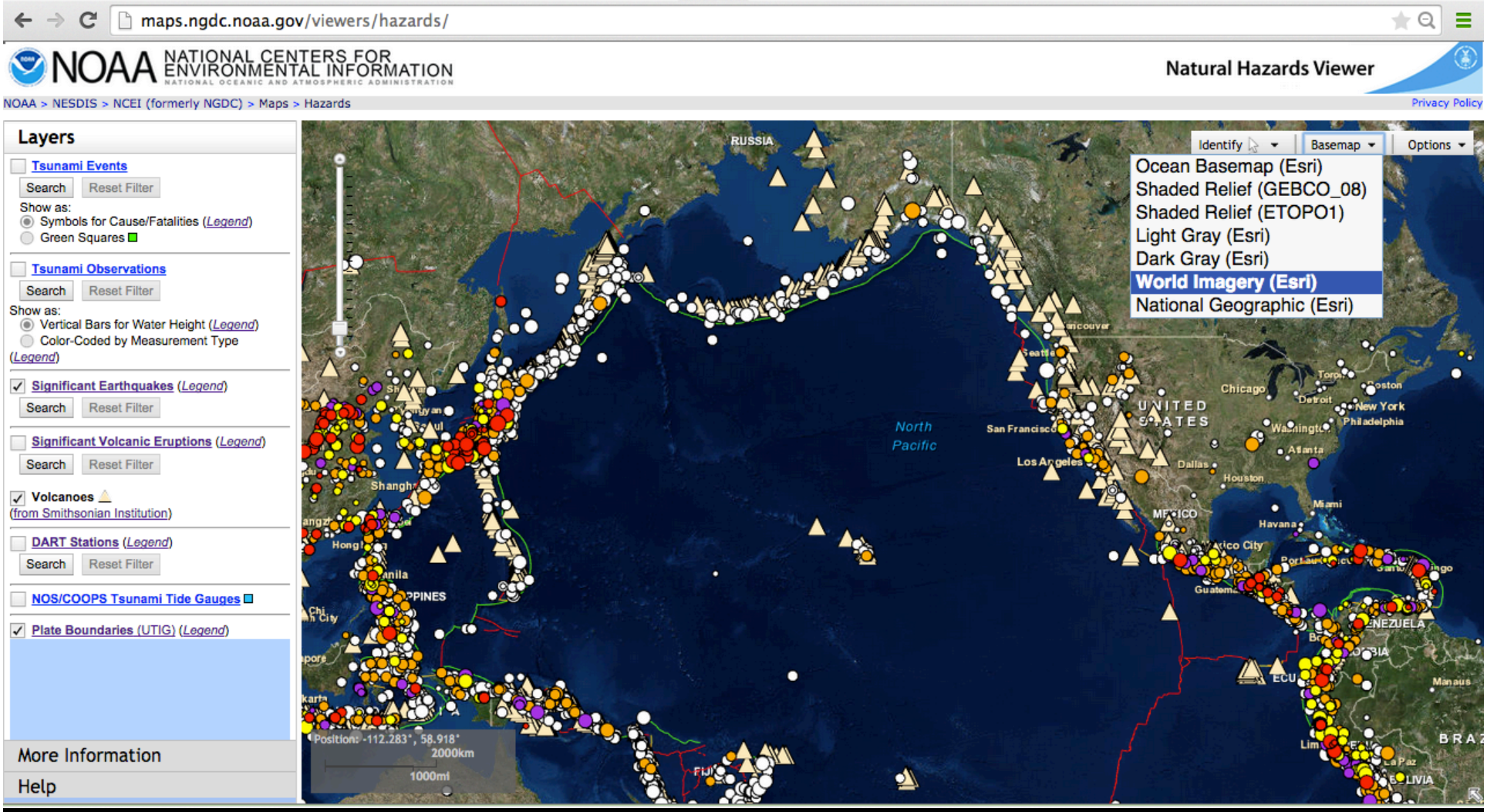
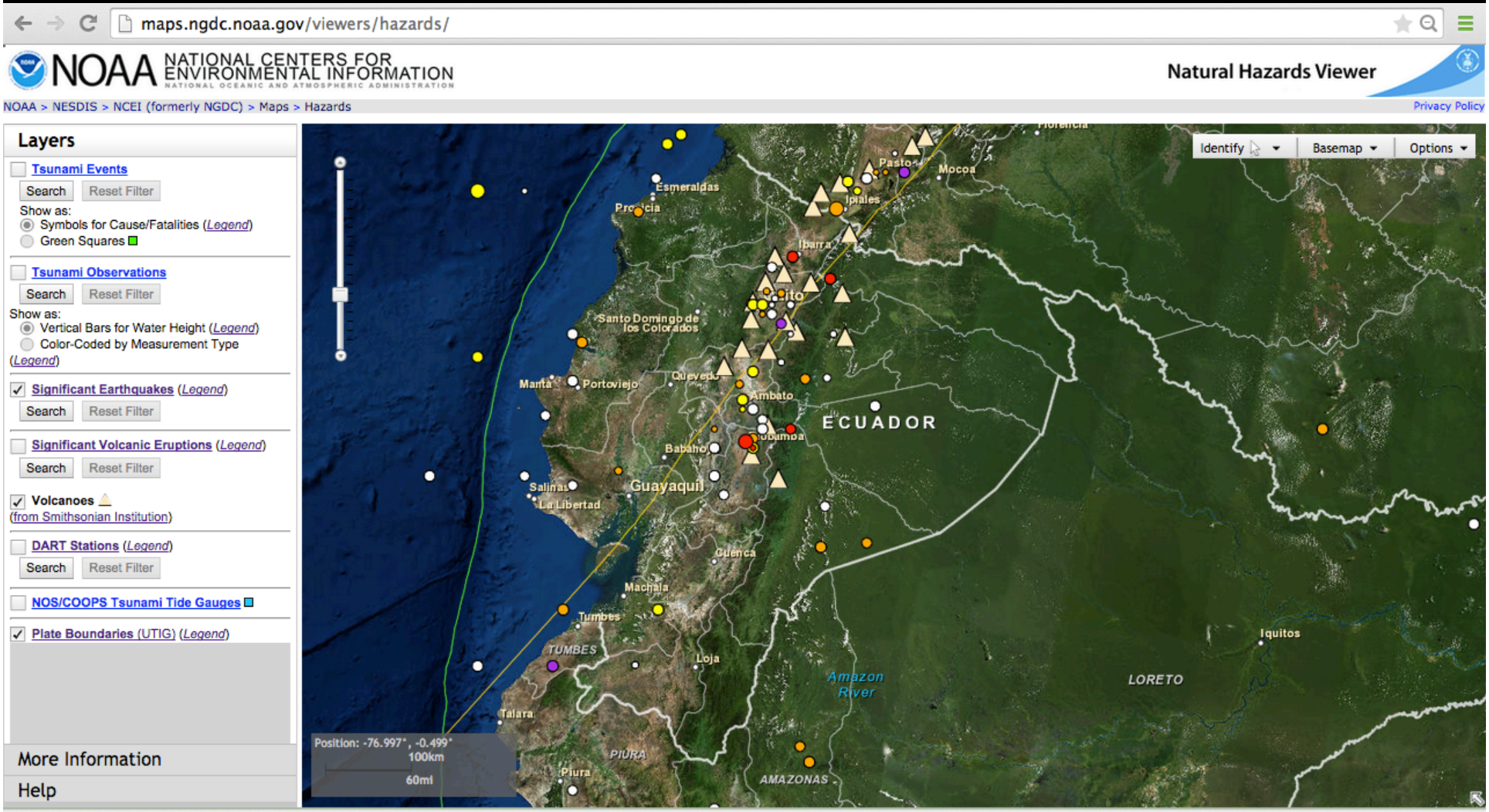
Options
Bering Sea
Gulf of Alaska
Hudson Bay
NORTH PACIFIC OCEAN
NORTH PACIFIC OCEAN
Gulf of Mexico
Caribbean Sea
Sargasso Sea
North American Basin
Coral Sea
Peru Basin
Position: -148.318°, 45.725°
2000km
1000mi

Volcanoes & Earthquakes



Ecuador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Basemap
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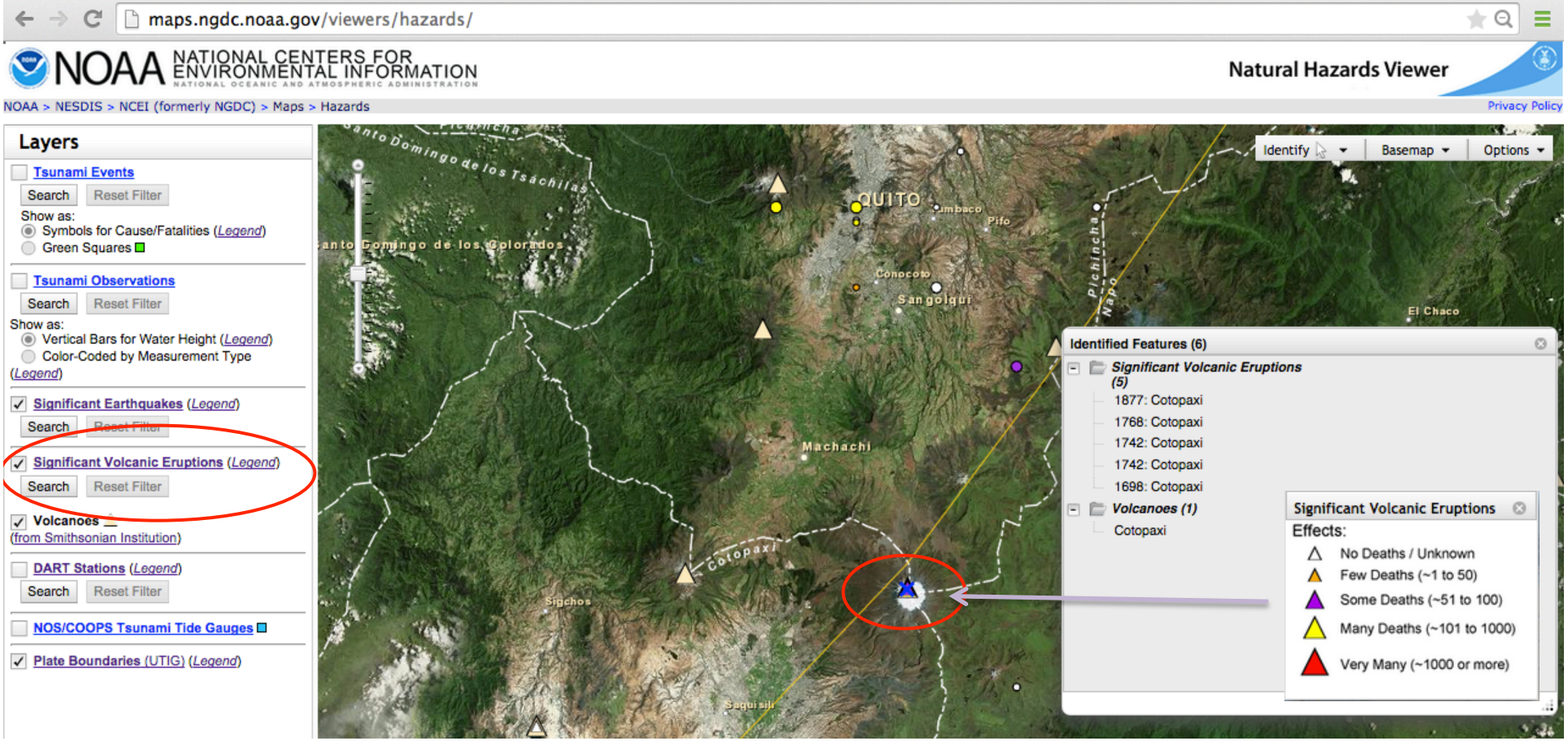
Santo Domingo de los Colorados
Manta
Portoviejo
Quevedo
Ambato
ECUADOR
Babahoyo
Guayaquil
Salinas
La Libertad
Cuenca
Machala
Tumbes
TUMBES
Loja
Talara
PIURA
Piura
Amazon River
LORETO
Iquitos
AMAZONAS
Position: -76.997°, -0.499°
100km
60mi

Cotopaxi

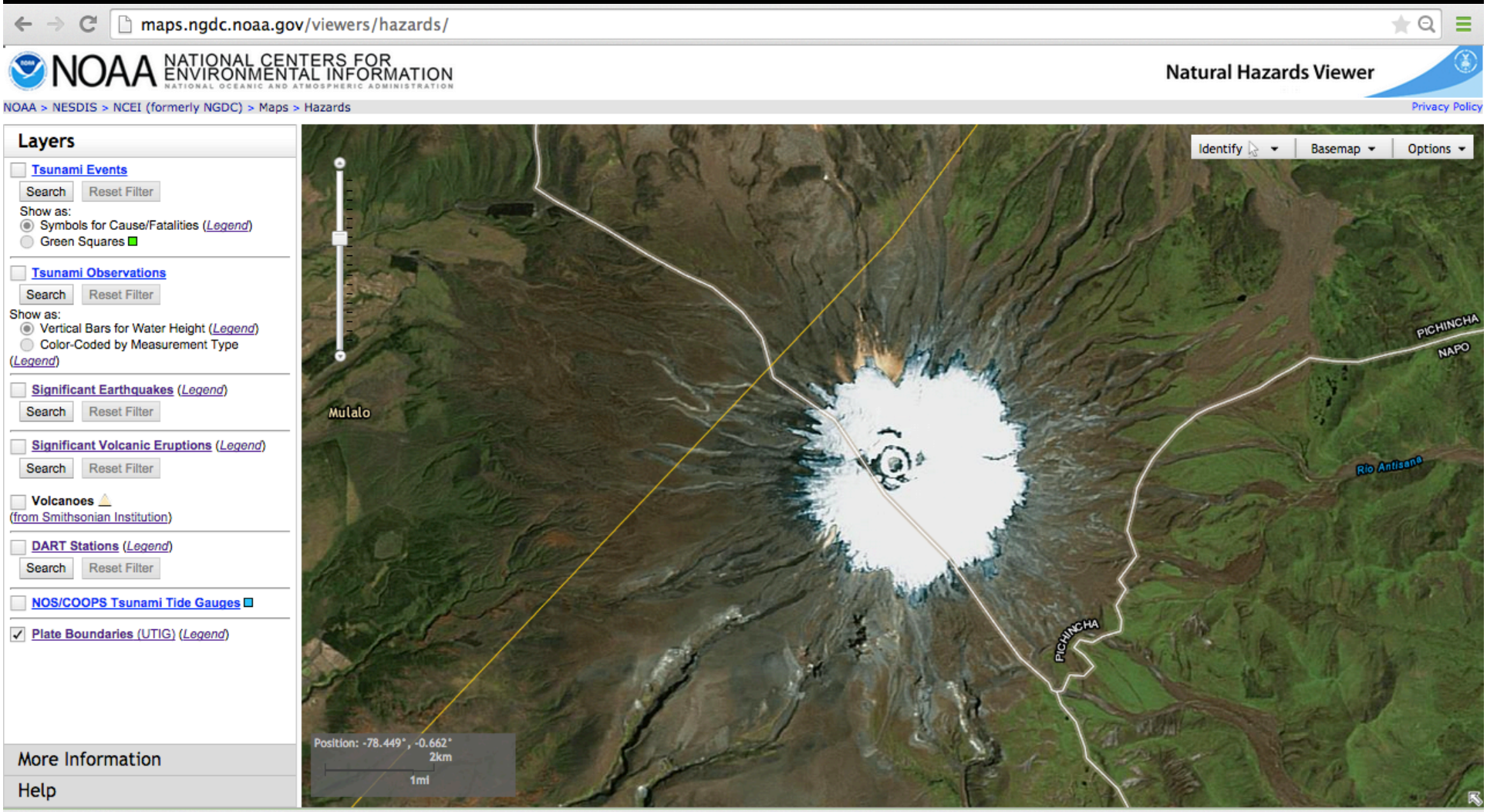


Volcano Locations

1 volcanoes where Name includes Cotopaxi

Number	Volcano Name	Country	Region	Latitude	Longitude	Elev	Type	Status	Last Known Eruption
1502-05=">	Cotopaxi	Ecuador	Ecuador	-.677	-78.436	5911	Stratovolcano	Historical	D2

Cotopaxi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Green Squares
Tsunami Observations
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Vertical Bars for Water Height (Legend)
Color-Coded by Measurement Type
(Legend)
Significant Earthquakes (Legend)
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Significant Volcanic Eruptions (Legend)
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Reset Filter
Volcanoes
(from Smithsonian Institution)
DART Stations (Legend)
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NOS/COOPS Tsunami Tide Gauges
Plate Boundaries (UTIG) (Legend)
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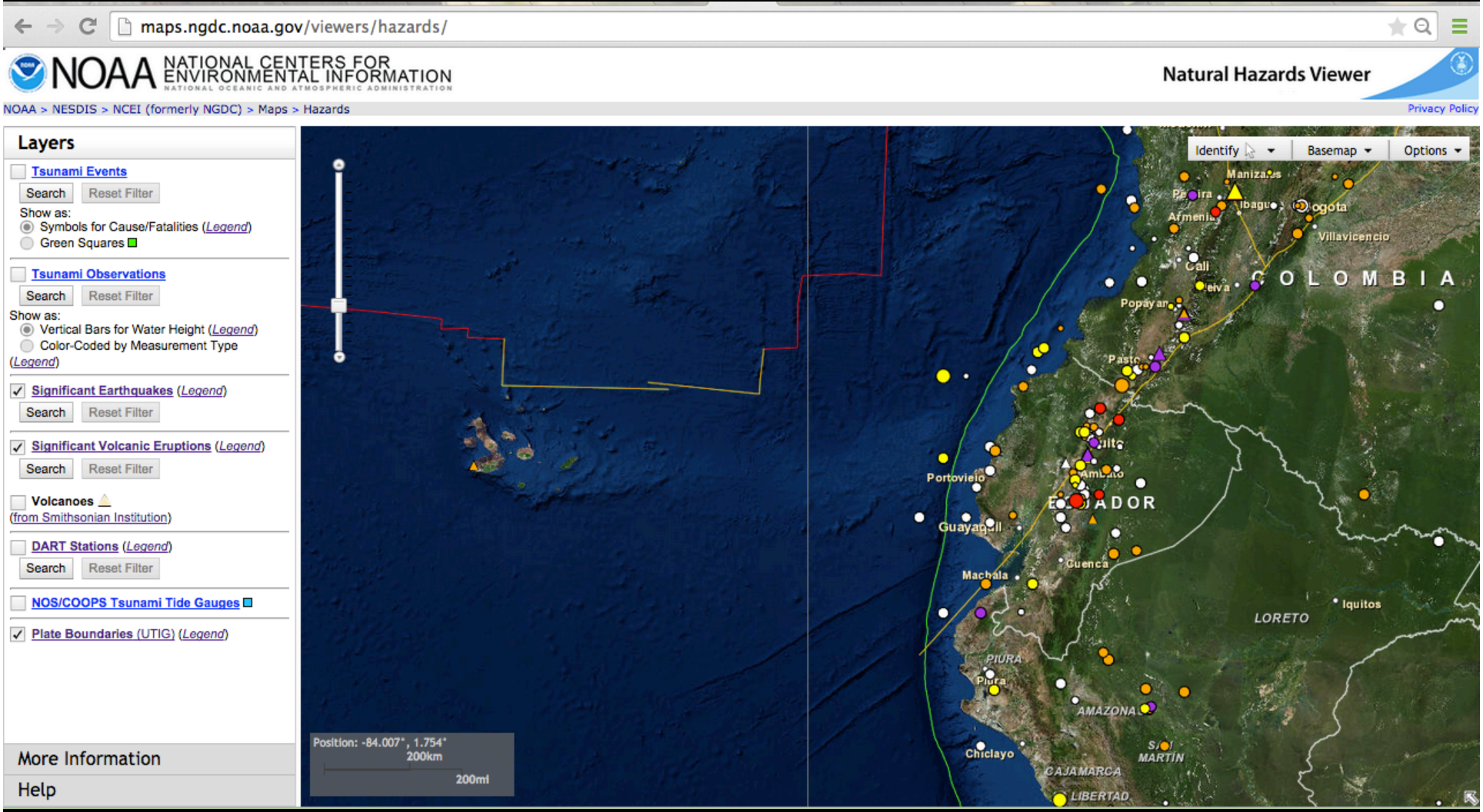
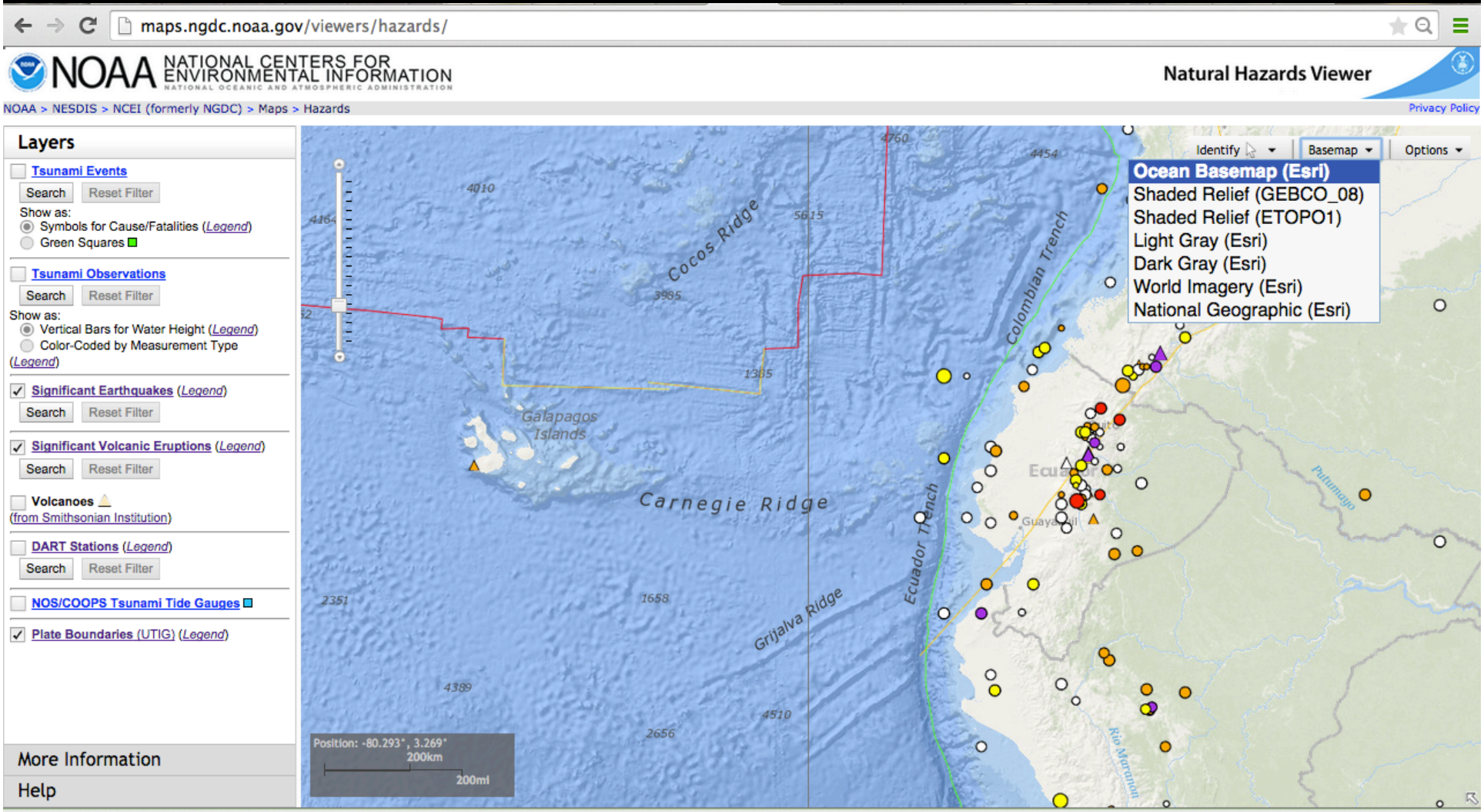
Mulalo
PICHINCHA
NAPO
Rio Antisana
PICHINCHA
Position: -78.449°, -0.662°
2km
1mi

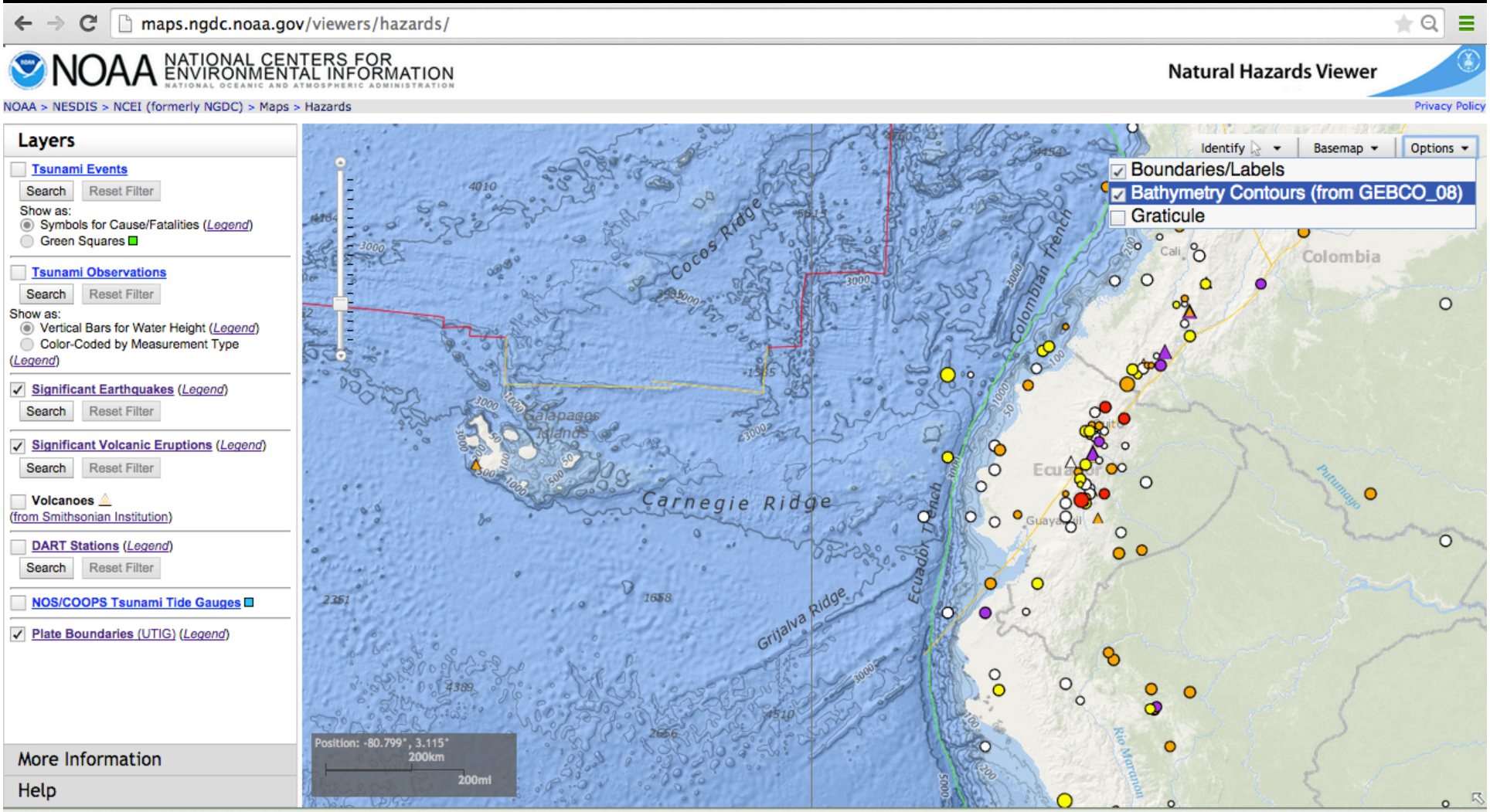
Ecuador & Galapagos Islands



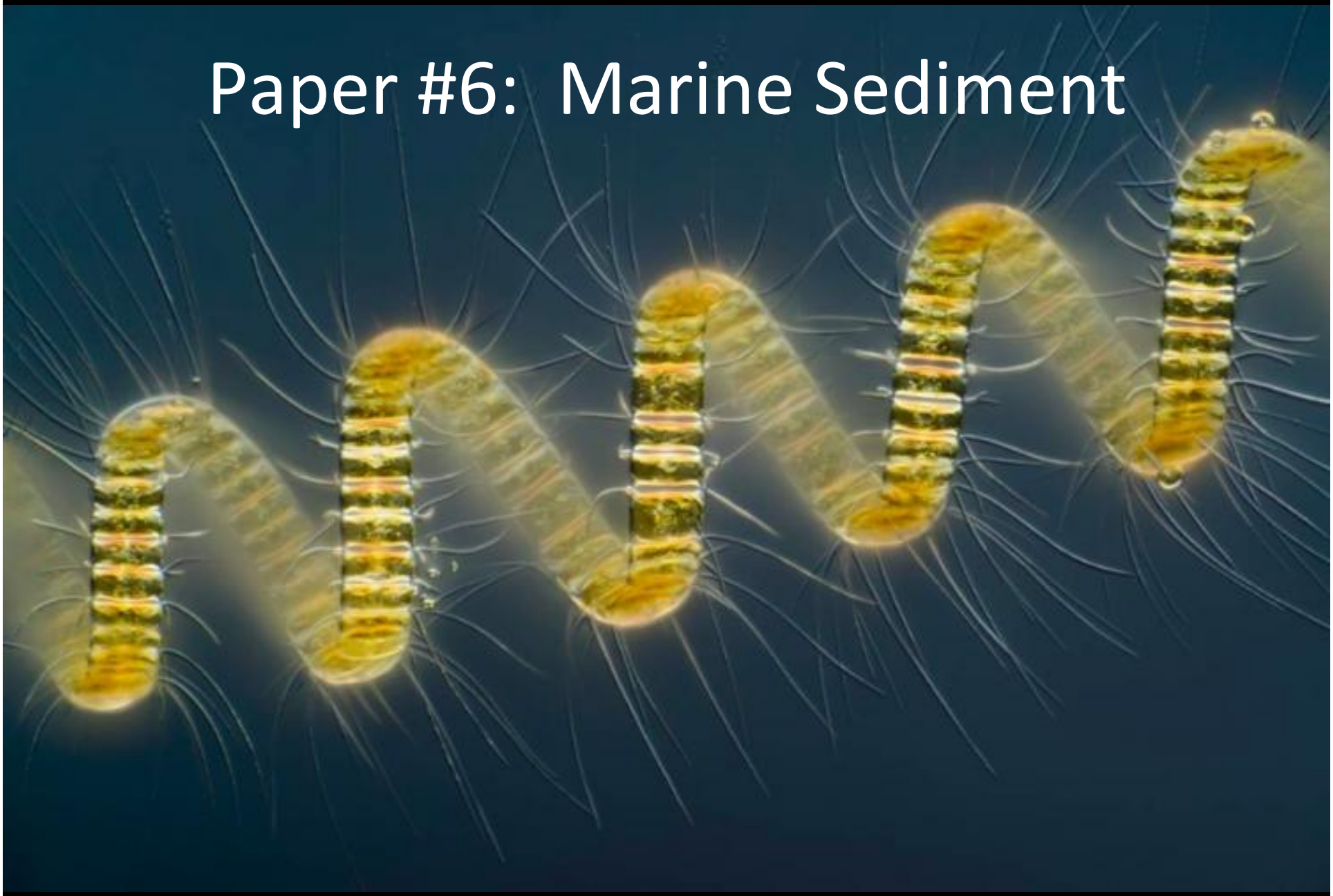
Ecuador & Galapagos Islands



Ecuador & Galapagos Islands



Paper #6: Marine Sediment



ocean.si.edu/ocean-photos/diatom-helix

Paper #7:
Hurricanes, Typhoons & Cyclones

- Will your name be used for a tropical storm?
- Which region and year?
- Check http://www.wmo.int/pages/prog/www/tcp/Storm-naming.html

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3. Tropical Cyclone Names Worldwide

Caribbean Sea, Gulf of Mexico and the North Atlantic Names

2015	2016	2017	2018	2019	2020
Ana	Alex	Arlene	Alberto	Andrea	Arthur
Bill	Bonnie	Bret	Beryl	Barry	Bertha
Claudette	Colin	Cindy	Chris	Chantal	Cristobal
Danny	Danielle	Don	Debby	Dorian	Dolly
Erika	Earl	Emily	Ernesto	Erin	Edouard
Fred	Fiona	Franklin	Florence	Fernand	Fay
Grace	Gaston	Gert	Gordon	Gabrielle	Gonzalo
Henri	Hermine	Harvey	Helene	Humberto	Hanna
Ida	Ian	Irma	Isaac	Imelda	Isaias
Joaquin	Julia	Jose	Joyce	Jerry	Josephine
Kate	Karl	Katia	Kirk	Karen	~~Kyle~~
Larry	Lisa	Lee	Leslie	Lorenzo	Laura
Mindy	Matthew	Maria	Michael	Melissa	~~Marco~~
Nicholas	Nicole	Nate	Nadine	Nestor	Nana
Odette	Otto	Ophelia	Oscar	Olga	Omar
Peter	Paula	Philippe	Patty	Pablo	Paulette
Rose	Richard	Rina	Rafael	Rebekah	Rene
Sam	Shary	Sean	Sara	Sebastien	Sally
Teresa	Tobias	Tammy	Tony	Tanya	Teddy
Victor	Virginie	Vince	Valerie	Van	Vicky
Wanda	Walter	Whitney	William	Wendy	Wilfred

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3. Tropical Cyclone Names Worldwide

Caribbean Sea, Gulf of Mexico and the North Atlantic Names

2015	2016	2017	2018	2019	2020
Ana	Alex	Arlene	Alberto	Andrea	Arthur

Northern Indian Ocean Names (as of 2014)

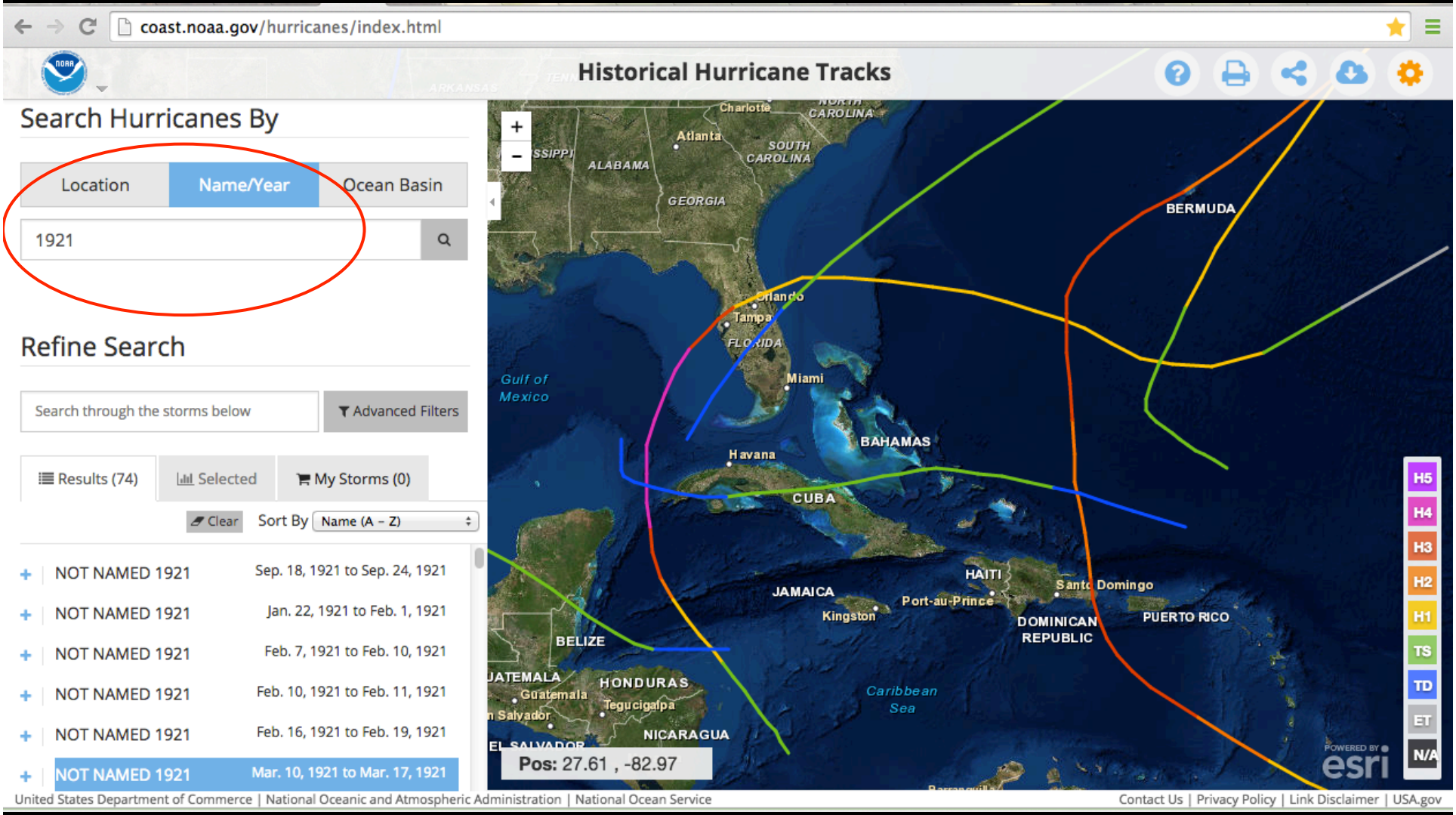
Contributors	List 1	List 2	List 3	List 4
Bangladesh	Onil	Ogni	Nisha	Giri
India	Agni	Akash	Bijli	Jal
Maldives	Hibaru	Gonu	Aila	Keila
Mayanmar	Pyarr	Yemyin	Phyan	Thane
Oman	Baaz	Sidr	Ward	Murjan
Pakistan	Fanoos	Nargis	Laila	Nilam
Sri Lanka	Mala	Rashmi	Bandu	Viyaru
Thailand	Mukda	Khai Muk	Phet	Phailin

Odette	Otto	Ophelia	Oscar	Olga	Omar
Peter	Paula	Philippe	Patty	Pablo	Paulette
Rose	Richard	Rina	Rafael	Rebekah	Rene
Sam	Shary	Sean	Sara	Sebastien	Sally
Teresa	Tobias	Tammy	Tony	Tanya	Teddy
Victor	Virginie	Vince	Valerie	Van	Vicky
Wanda	Walter	Whitney	William	Wendy	Wilfred

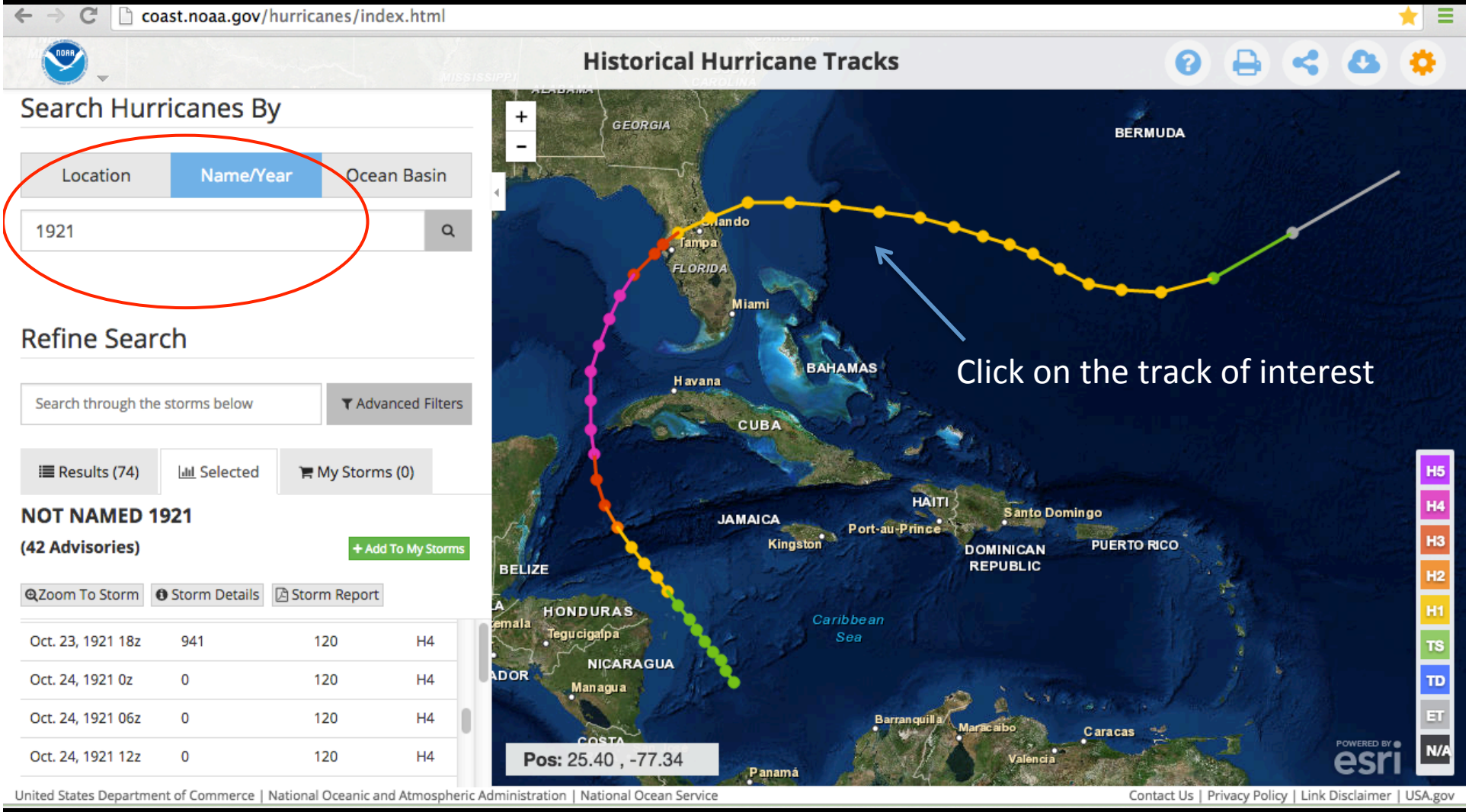
Hurricanes, Typhoons & Cyclones

- Use NOAA's Historical Hurricane Tracks site to plot the track of your storm: http://coast.noaa.gov/hurricanes/index.html.
- Include a legend or a description of the colors in a figure caption.
- Describe the development of the storm.

NOAA's Historical Hurricane Tracks

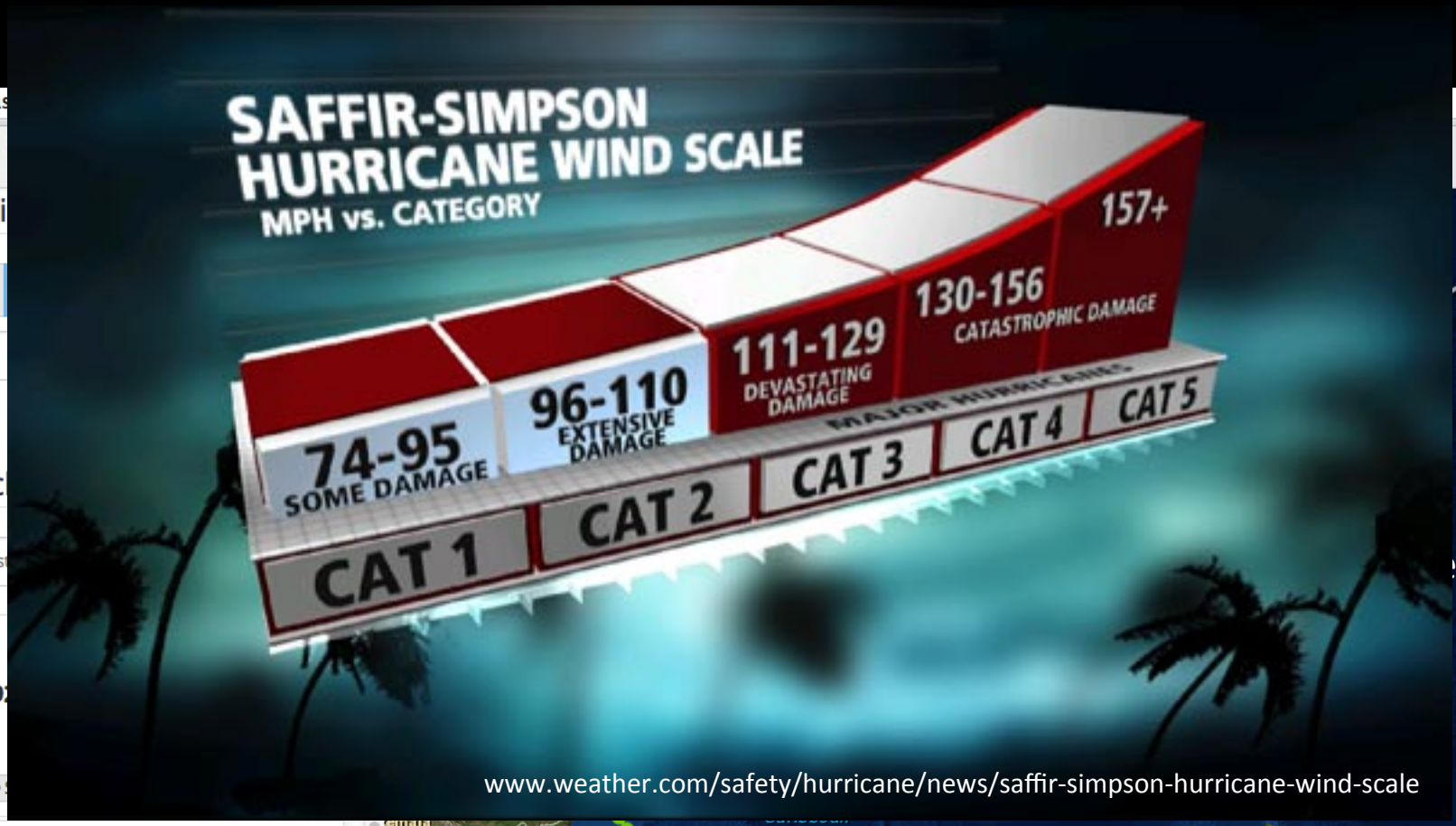


NOAA's Historical Hurricane Tracks



NOAA's Historical Hurricane Tracks

NOAA's Historical Hurricane Tracks



Search Hurri

Location

1921

Refine Searc

Search through the st

Results (74)

NOT NAMED 19

(42 Advisories)

Zoom To Storm

Oct. 23, 1921 18z	941	120	H4
Oct. 24, 1921 0z	0	120	H4
Oct. 24, 1921 06z	0	120	H4
Oct. 24, 1921 12z	0	120	H4

Tegucigalpa
NICARAGUA
Managua
Sea
Barranquilla
Maracaibo
Caracas
Valencia
Panamá
Pos: 25.40 , -77.34
POWERED BY esri

H5 H4 H3 H2 H1 TS TD ET N/A

United States Department of Commerce | National Oceanic and Atmospheric Administration | National Ocean Service

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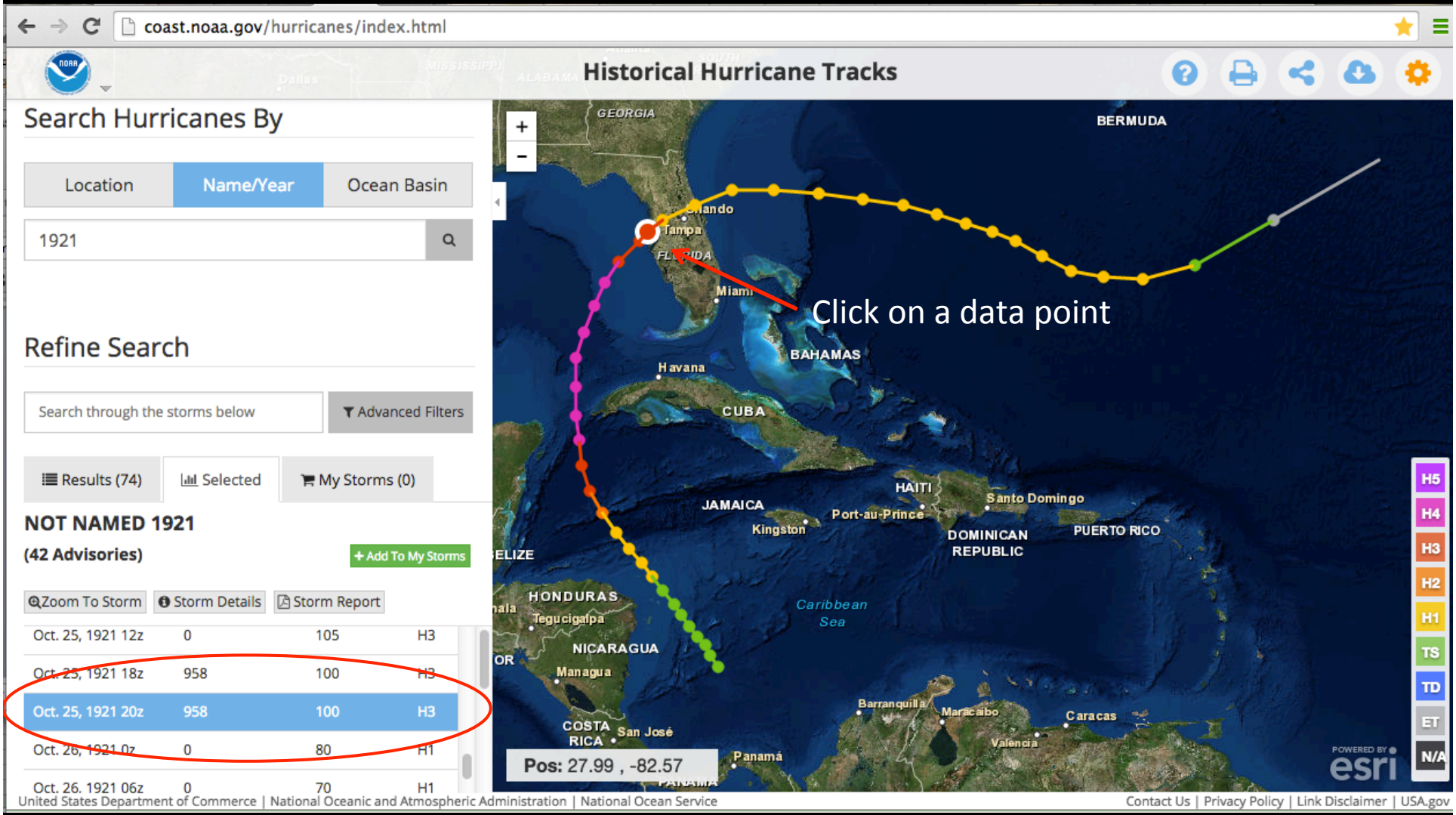
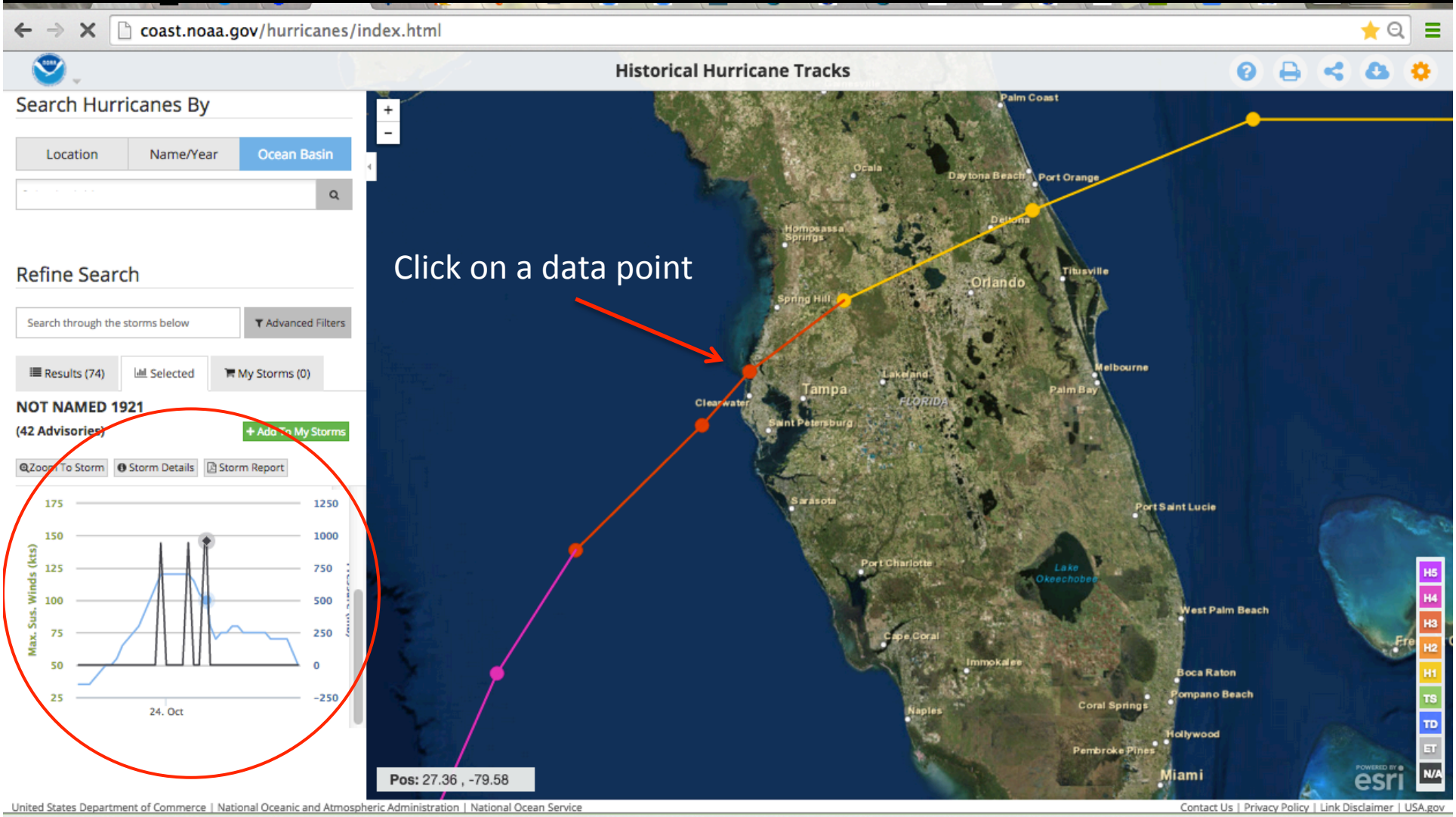
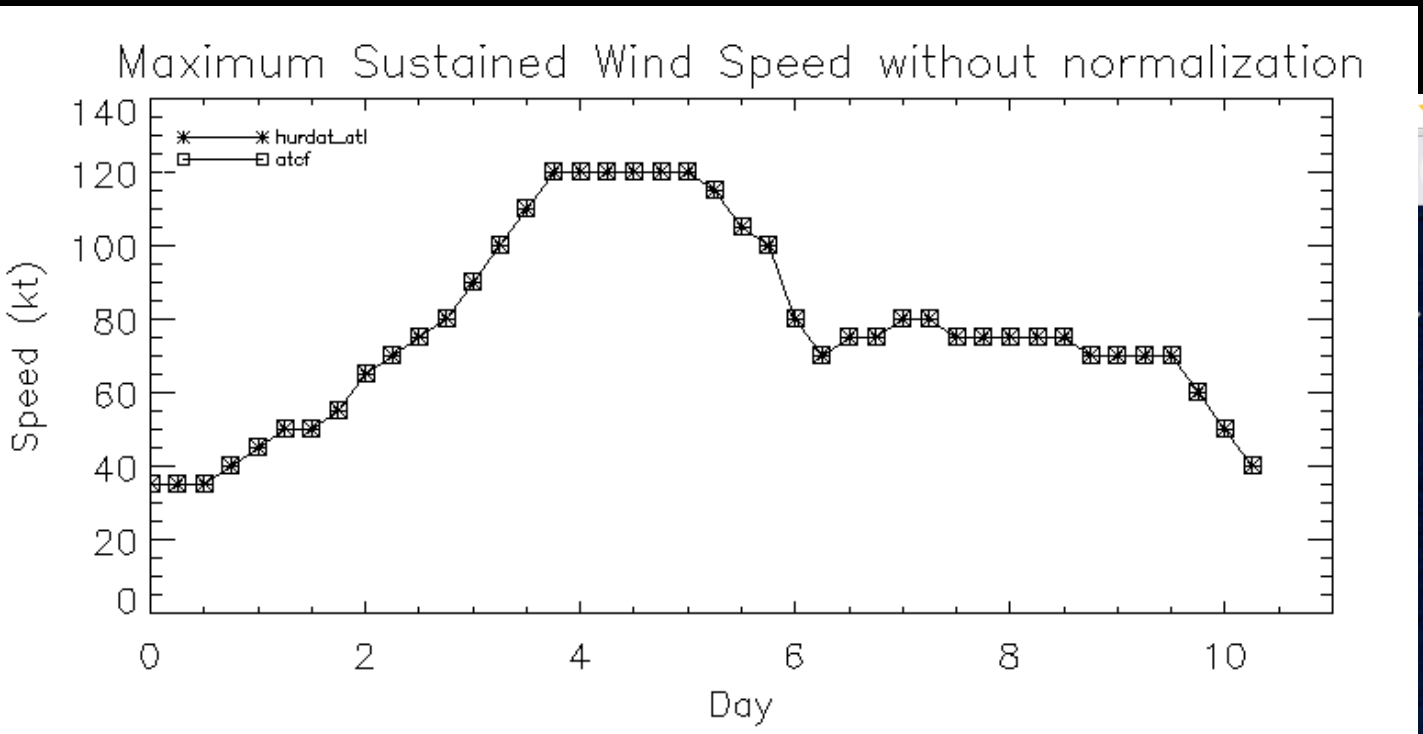
NOAA's Historical Hurricane Tracks



NOAA's Historical Hurricane Tracks



NOAA's Historical Hurricane Tracks



coast.noaa.gov/hu

Search Hurricanes By

Location | Name/Yea

1921

Refine Search

Search through the storms below

Results (74) | Selected

NOT NAMED 1921

(42 Advisories)

Add To My Storms

Zoom To Storm | Storm Details | Storm Report

Oct. 23, 1921 18z	941	120	H4
Oct. 24, 1921 0z	0	120	H4
Oct. 24, 1921 06z	0	120	H4
Oct. 24, 1921 12z	0	120	H4

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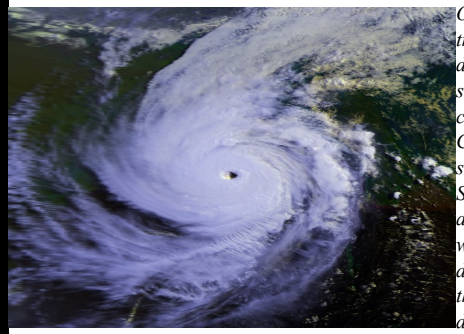
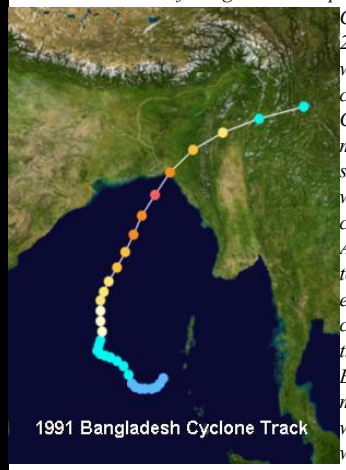
Marian: More than a Girl's Name

By: Trew Chimenti 11-6-14



On April 22, 1991 in the Bay of Bengal, persistent air activity and a monsoon trough had created a tropical depression. As time continued to pass, the tropical depression superseded the tropical storm phase, entering cyclone categories and finally becoming a Super Cyclonic Storm according to IMD scales (Category 4 on the Saffir-Simpson scale) with a wind speed of approximately 240 km/hr (150mph) in a week's time. This rapid formation was due to the favorable conditions of both the sea (which was at a consistent 26.6 degrees Celsius) and the weather conditions. It also had an overall diameter larger than the country of Bangladesh. This tropical cyclone, referred to as Cyclone Marian (or Cyclone 2b), was labeled one of the strongest in recent history for the country of Bangladesh (formerly East Pakistan) since the Great Bhola Cyclone of 1970. Cyclone Marian was tracked for a week before hitting the Southeastern coast of Bangladesh on April 29, 1991, causing devastating effects on the Chittagong region and the surrounding islands, including Kutubdia, who lost an approximate 20,000 people. The Chittagong region is known for a lot of flooding due to the river delta where the Ganges river flows into the Indian Ocean. Despite these dangers, and the 1970 cyclone Bhola, however, the people lived in the region for the fertile soil. As the Super Cyclonic Storm reached Bangladesh, warnings were put out to the people, but out of the 13.4 million people, only 100,000 stayed in the storm shelters. The rest had decided to wait out the storm in their mud and straw huts, either doubting the warning or not having an adequate warning for evacuation. The storm lasted nine hours. In the days that followed, weather conditions and rough seas hampered relief efforts for the survivors that were marooned. Approximately 135000 to 145000 people were recovered dead, some of which were washed out to sea during the storm. The processes to collect all the bodies had taken weeks. It was estimated that the most deaths during the storm were due to drowning, the values higher for children and the elderly, while some deaths were due to dehydration and lack of sanitation for the first three weeks following the storm. There was also extensive property damage for Bangladesh: eighty to ninety percent of edifices were destroyed in the storm (including 1.5 million homes); the surface water used for bathing and drinking were salinized; some islands were completely swamped and wiped out population wise; almost all industries on the port were destroyed. The agricultural industry of Bangladesh suffered significantly. 284,000 tons of crops, 224,000 head of cattle, 218,000 goats, and 2.4 million head of poultry were estimated to have perished in the cyclone. Surviving livestock were in poor health and lacked adequate feed. Losses in the fisheries sector were just as calamitous, with extensive damage to 31,000 hectares of shrimp farms as well as to fish processing plants, vessels, and stocks. There was worry of starvation in the following years. It was estimated that the property damage was the equivalent to 1.78 billion US dollars by a UN representative. The United States, through Operation Sea Angel on May 10, 1991, spent an average of 280000000 dollars for transport of troops and supplies. In Bangladesh, warning and elevated shelter systems have improved since 1991.

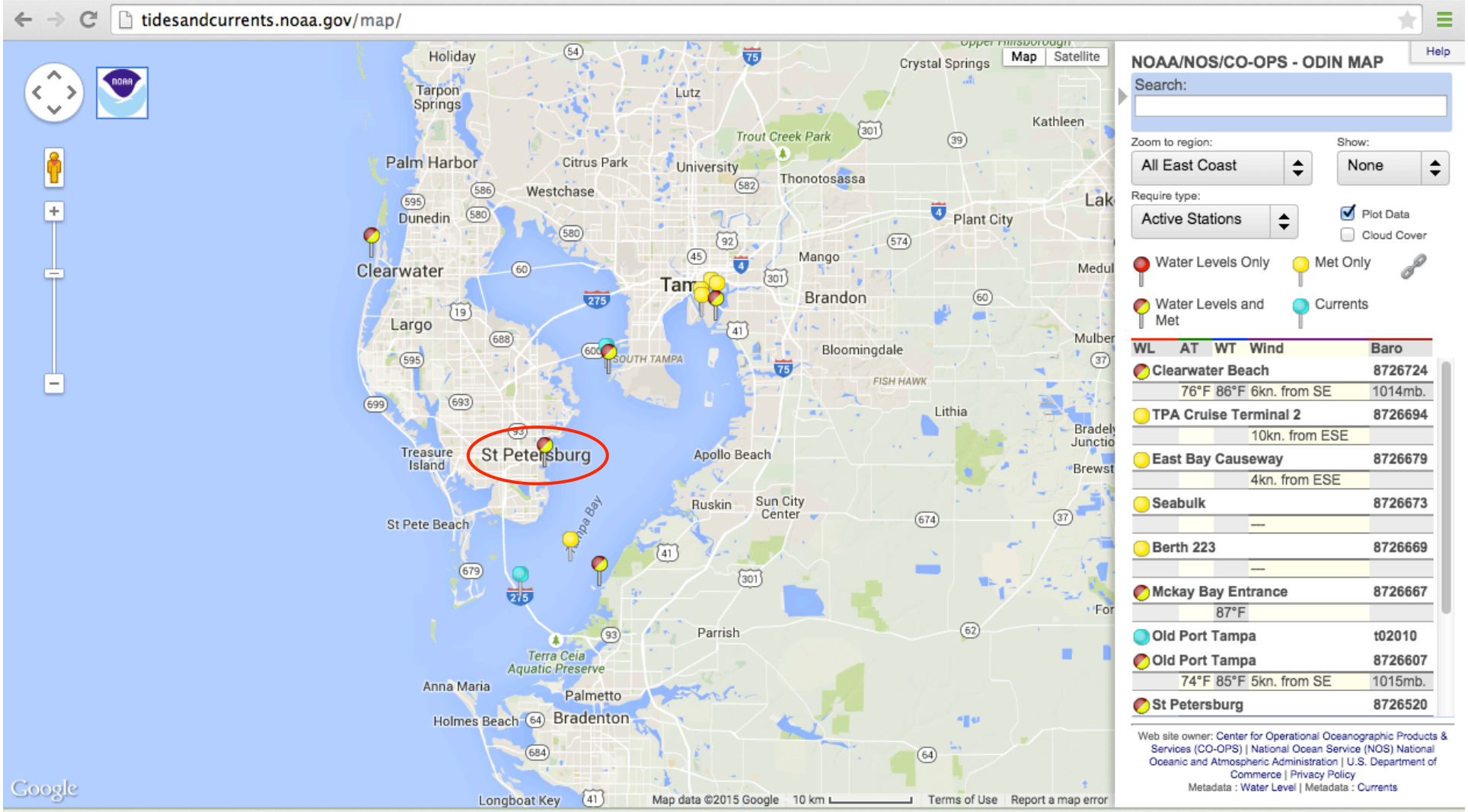
Saffir-Simpson Hurricane Scale		
Category	Wind Speed	
	mph	knots
5	≥156	≥135
4	131-155	114-134
3	111-130	96-113
2	96-110	84-95
1	74-95	65-83
Non-Hurricane Classifications		
Tropical Storm	39-73	34-64
Tropical Depression	0-38	0-33



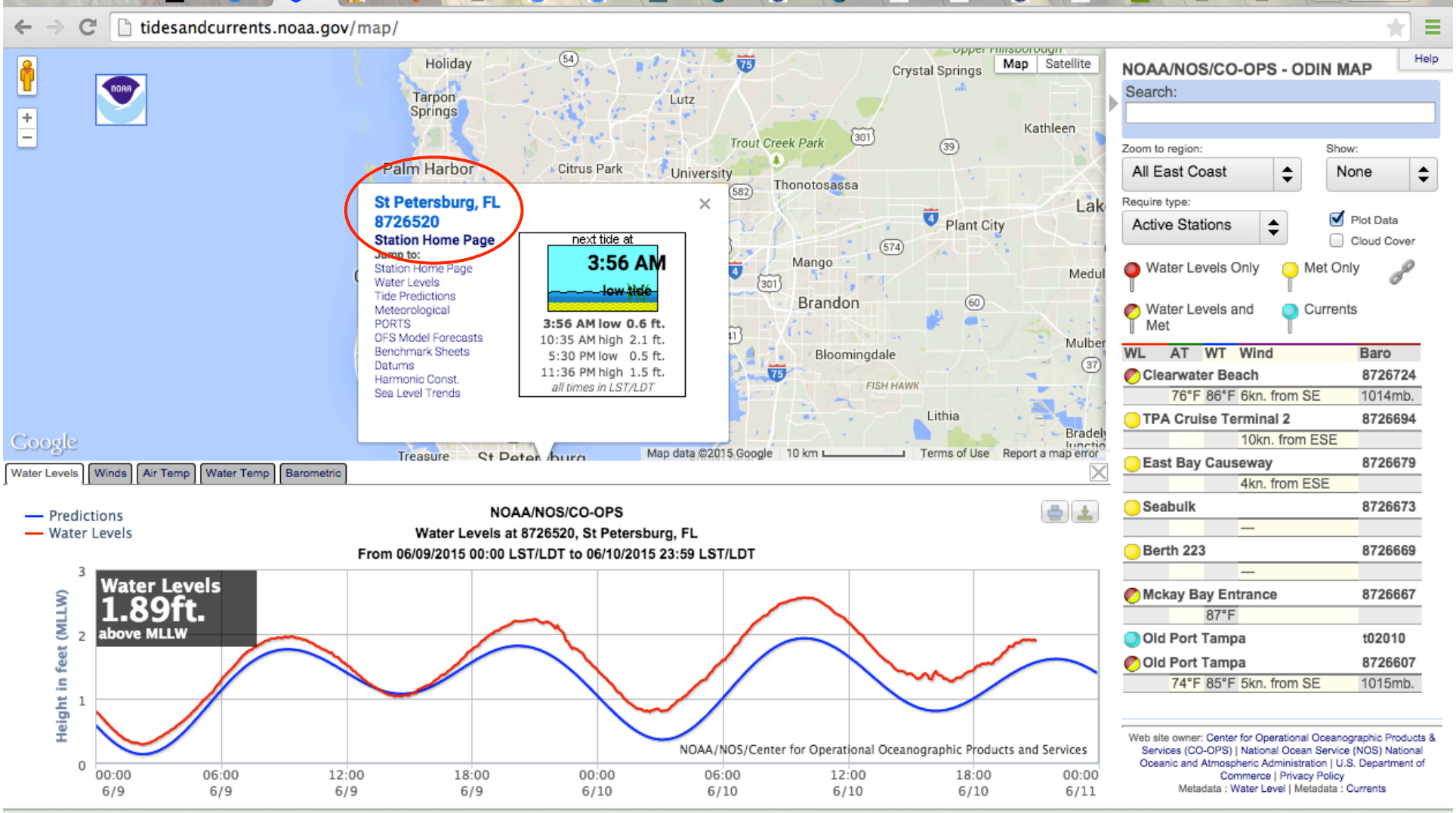
Paper #8: Tides

- Describe the tidal patterns for the coasts of the two specified states
- Provide a graph from at least one tide station for each state from the NOAA Tides & Currents website: http://tidesandcurrents.noaa.gov/map/
- Include details regarding the tide station, a map showing its location and, if available, a picture of the tide station

Tides


tidesandcurrents.noaa.gov/map/
Map
Satellite
Help
NOAA/NOS/CO-OPS - ODIN MAP
Search:
Zoom to region:
All East Coast
Show:
None
Require type:
Active Stations
Plot Data
Cloud Cover
Water Levels Only
Met Only
Water Levels and Met
Currents
WL AT WT Wind Baro
Clearwater Beach 8726724
76°F 86°F 6kn. from SE 1014mb.
TPA Cruise Terminal 2 8726694
10kn. from ESE
East Bay Causeway 8726679
4kn. from ESE
Seabulk 8726673
—
Berth 223 8726669
—
Mckay Bay Entrance 8726667
87°F
Old Port Tampa t02010
Old Port Tampa 8726607
74°F 85°F 5kn. from SE 1015mb.
St Petersburg 8726520
Web site owner: Center for Operational Oceanographic Products & Services (CO-OPS) | National Ocean Service (NOS) National Oceanic and Atmospheric Administration | U.S. Department of Commerce | Privacy Policy
Metadata : Water Level | Metadata : Currents
Holiday
Tarpon Springs
Palm Harbor
Dunedin
Clearwater
Largo
Treasure Island
St Petersburg
St Pete Beach
Crystal Springs
Lutz
Trout Creek Park
Kathleen
Citrus Park
University
Thonotosassa
Westchase
Plant City
Mango
Brandon
Bloomingdale
SOUTH TAMPA
FISH HAWK
Lithia
Apollo Beach
Ruskin
Sun City Center
Tampa Bay
Parrish
Terra Ceia Aquatic Preserve
Anna Maria
Palmetto
Holmes Beach
Bradenton
Longboat Key
Google
Map data ©2015 Google
10 km
Terms of Use
Report a map error

Tides


tidesandcurrents.noaa.gov/map/
Holiday
Tarpon Springs
Lutz
Crystal Springs
Kathleen
Trout Creek Park
Palm Harbor
Citrus Park
University
Thonotosassa
Plant City
Mango
Brandon
Bloomingdale
FISH HAWK
Lithia
Map
Satellite
St Petersburg, FL
8726520
Station Home Page
Jump to:
Station Home Page
Water Levels
Tide Predictions
Meteorological
PORTS
OFS Model Forecasts
Benchmark Sheets
Datums
Harmonic Const.
Sea Level Trends
next tide at
3:56 AM
low tide
3:56 AM low 0.6 ft.
10:35 AM high 2.1 ft.
5:30 PM low 0.5 ft.
11:36 PM high 1.5 ft.
all times in LST/LDT
Google
Map data ©2015 Google
10 km
Terms of Use
Report a map error
NOAA/NOS/CO-OPS - ODIN MAP
Help
Search:
Zoom to region:
All East Coast
Show:
None
Require type:
Active Stations
Plot Data
Cloud Cover
Water Levels Only
Met Only
Water Levels and Met
Currents
WL AT WT Wind Baro
Clearwater Beach 8726724
76°F 86°F 6kn. from SE 1014mb.
TPA Cruise Terminal 2 8726694
10kn. from ESE
East Bay Causeway 8726679
4kn. from ESE
Seabulk 8726673
—
Berth 223 8726669
—
Mckay Bay Entrance 8726667
87°F
Old Port Tampa t02010
Old Port Tampa 8726607
74°F 85°F 5kn. from SE 1015mb.
Water Levels
Winds
Air Temp
Water Temp
Barometric
Predictions
Water Levels
NOAA/NOS/CO-OPS
Water Levels at 8726520, St Petersburg, FL
From 06/09/2015 00:00 LST/LDT to 06/10/2015 23:59 LST/LDT
Water Levels
1.89ft.
above MLLW
Height in feet (MLLW)
3
2
1
0
00:00 6/9
06:00 6/9
12:00 6/9
18:00 6/9
00:00 6/10
06:00 6/10
12:00 6/10
18:00 6/10
00:00 6/11
NOAA/NOS/Center for Operational Oceanographic Products and Services
Web site owner: Center for Operational Oceanographic Products & Services (CO-OPS) | National Ocean Service (NOS) National Oceanic and Atmospheric Administration | U.S. Department of Commerce | Privacy Policy
Metadata : Water Level | Metadata : Currents

Tides

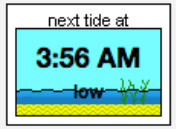
tidesandcurrents.noaa.gov/stationhome.html?id=8726520

St Petersburg, FL - Station ID: 8726520

Station Info | Today's Tides | Photos | Sensor Information | Observations | Directions and Map | Available Products

Established:	Dec 14, 1946
Time Meridian:	75° W
Present Installation:	Mar 21, 1991
Date Removed:	N/A
Water Level Max (ref MHHW):	3.999 Aug 31, 1985
Water Level Min (ref MLLW):	-2.471 Jan 16, 1972
Mean Range:	1.59 ft.
Diurnal Range:	2.26 ft.
Latitude	27° 45.6' N
Longitude	82° 37.6' W
NOAA Chart#:	11413
Met Site Elevation:	4.8 ft. above MSL

Today's Tides (LST/LDT)



3:56 AM	**low**	**0.6** ft.
10:35 AM	high	2.1 ft.
5:30 PM	low	0.5 ft.
11:36 PM	high	1.5 ft.

St Petersburg, FL

6 more station photos available, click to view.

Sensor Information

Sensor	Sensor ID	DCP#	Sensor Height	Status
	A1	1	N/A	✔ Enabled
Wind	C1	1	23.7 ft. above site elevation	✔ Enabled
Air Temperature	D1	1	21.8 ft. above site elevation	✔ Enabled
Water Temperature	E1	1	4.7 ft. below MLLW	✔ Enabled