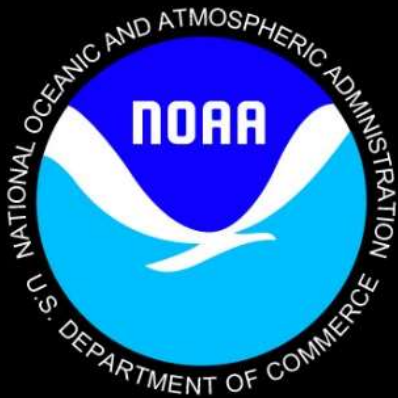


# Visualizing Destructive Tsunamis



**Nathan Becker**

NOAA/NWS/Pacific Tsunami Warning Center

**Leon Geschwind**

NOAA/NOS/Office for Coastal Management

# Animation Library Details

- 10 tsunamis (so far) covering 18<sup>th</sup> to 21<sup>st</sup> Centuries
- Mastered at 8k (8192 x 4096) at 60 FPS
- 48 hours of simulated time - waves wrap the sphere
- Consistent color scheme across all animations



Search datasets

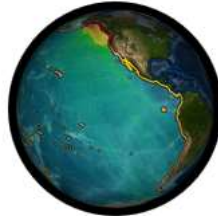
Submit

Categories ▾

Live Programs

## Search Results

Datasets found for "tsunami historical series": 9



### Tsunami Historical Series: Alaska - 1964 Mar. 22, 2016

**Duration:** Mar. 28, 1964 to Mar. 30, 1964

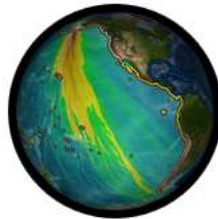
**Keywords:** Model, Oceans, Bathymetry, Vorticity, Waves, Tsunamis, Earthquakes

**Themes:** Major Events, Natural Disasters

**Dataset Contact:** Nathan Becker, NOAA Pacific Tsunami Warning Center, [Nathan.Becker@noaa.gov](mailto:Nathan.Becker@noaa.gov)

**Dataset Developer:** Dailin Wang, NOAA Pacific Tsunami Warning Center

**Visualization Developer:** Nathan Becker, NOAA Pacific Tsunami Warning Center, [Nathan.Becker@noaa.gov](mailto:Nathan.Becker@noaa.gov)



### Tsunami Historical Series: Aleutian Islands - 1946 Mar. 29, 2016

**Duration:** Apr. 01, 1946 to Apr. 03, 1946

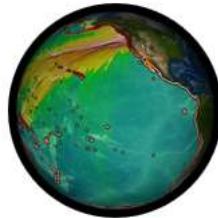
**Keywords:** Model, Oceans, Bathymetry, Alaska, Hawaii, Waves, Tsunamis, Earthquakes

**Themes:** Major Events, Natural Disasters

**Dataset Contact:** Nathan Becker, NOAA Pacific Tsunami Warning Center, [Nathan.Becker@noaa.gov](mailto:Nathan.Becker@noaa.gov)

**Dataset Developer:** Dailin Wang, NOAA Pacific Tsunami Warning Center

**Visualization Developer:** Nathan Becker, NOAA Pacific Tsunami Warning Center, [Nathan.Becker@noaa.gov](mailto:Nathan.Becker@noaa.gov)



### Tsunami Historical Series: Cascadia - 1700 Jan. 21, 2016

**Keywords:** Model, Oceans, Cascadia, Bathymetry, Waves, Tsunamis, Earthquakes

**Themes:** Natural Disasters, Major Events

**Dataset Contact:** Nathan Becker, NOAA Pacific Tsunami Warning Center, [Nathan.Becker@noaa.gov](mailto:Nathan.Becker@noaa.gov)

**Dataset Developer:** Dailin Wang, NOAA Pacific Tsunami Warning Center

**Visualization Developer:** Nathan Becker, NOAA Pacific Tsunami Warning Center, [Nathan.Becker@noaa.gov](mailto:Nathan.Becker@noaa.gov)



### Tsunami Historical Series: Chile - 1960 Jun. 01, 2016

**Duration:** May. 22, 1960 to May. 24, 1960

**Keywords:** Model, Oceans, Chile, Bathymetry, Waves, Tsunamis, Earthquakes

**Dataset Contact:** Nathan Becker, NOAA Pacific Tsunami Warning Center, [Nathan.Becker@noaa.gov](mailto:Nathan.Becker@noaa.gov)

**Dataset Developer:** Dailin Wang, NOAA Pacific Tsunami Warning Center

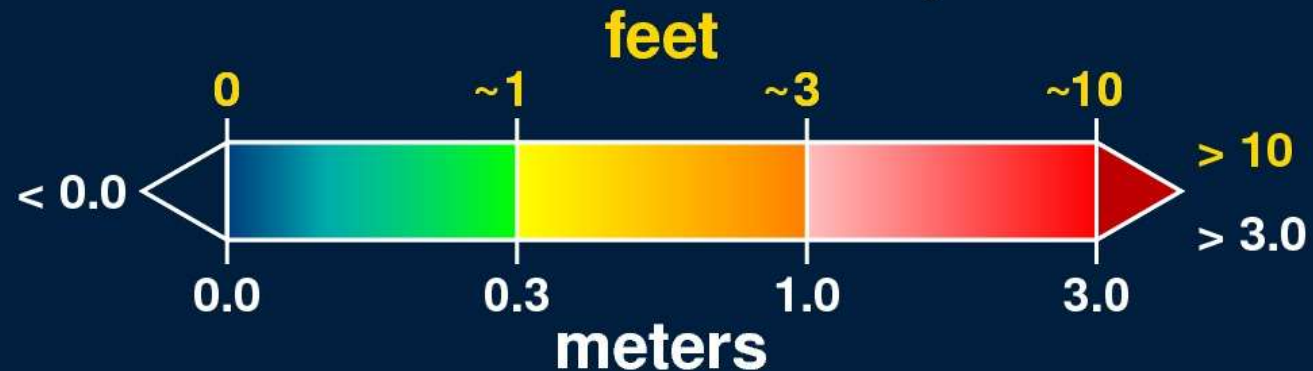
Search for  
tsunami  
historical  
series  
or  
PTWC

# Picture-in-Picture

Elapsed  
Time:  
00 hr  
00 min

UTC:  
2011  
11 Mar  
05:46 Z

Tsunami Wave Amplitude:

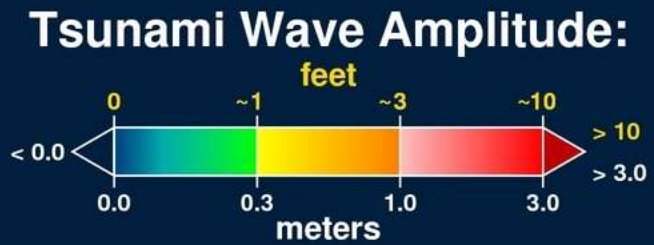




# Starting point

Elapsed  
Time:  
00 hr  
00 min

UTC:  
2011  
11 Mar  
05:46 Z

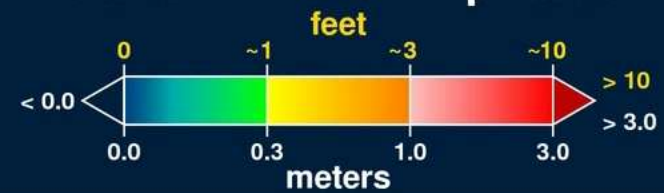


# Japan 2011

Elapsed  
Time:  
00 hr  
01 min

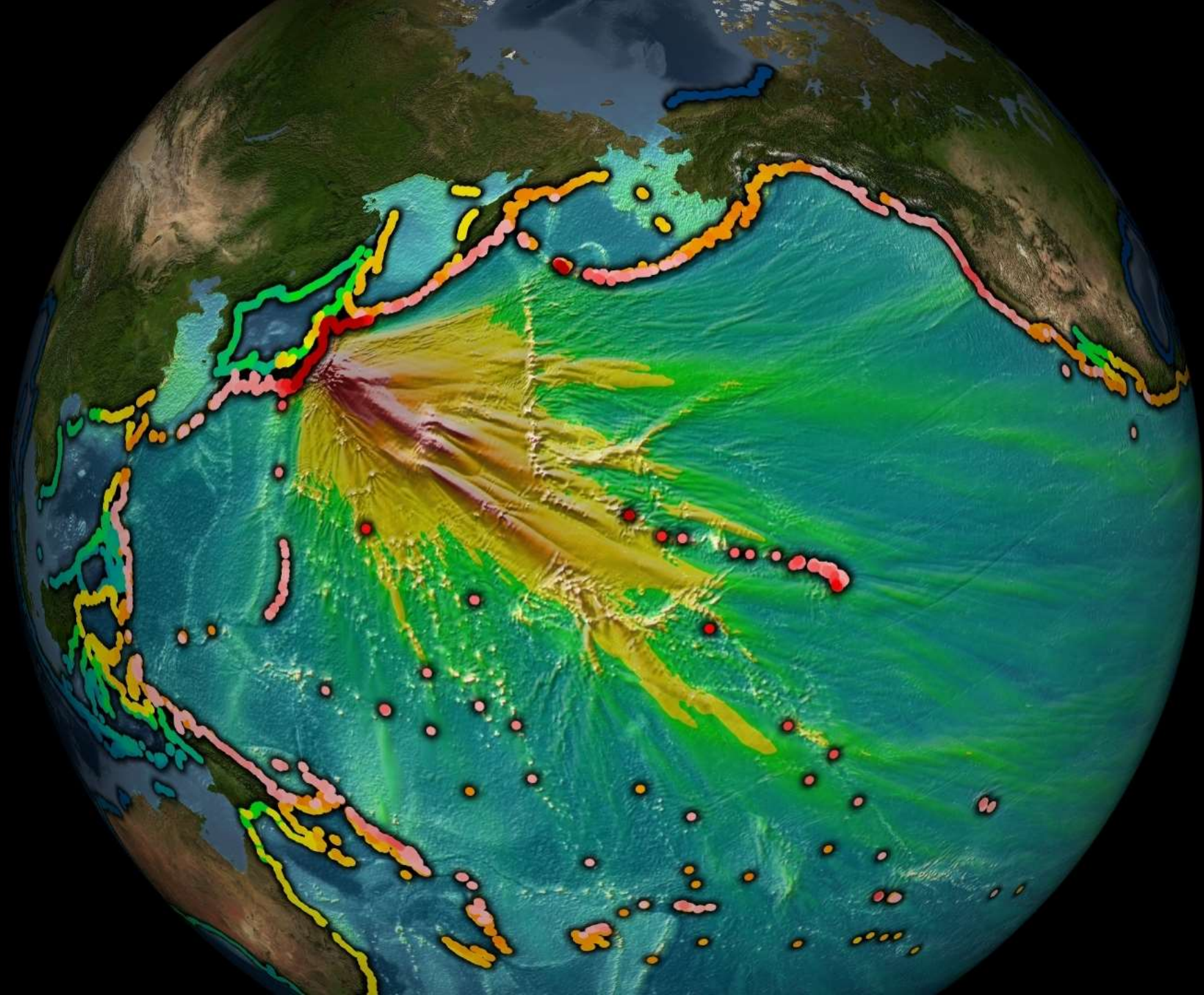
UTC:  
2011  
11 Mar  
05:47 Z

Tsunami Wave Amplitude:





# Energy Map



**Elapsed Time:**  
48 hr  
00 min

**UTC:**  
2011  
13 Mar  
05:46 Z

**Tsunami Wave Amplitude:**

feet

0    ~1    ~3    ~10    > 10

< 0.0    0.0    0.3    1.0    3.0    > 3.0

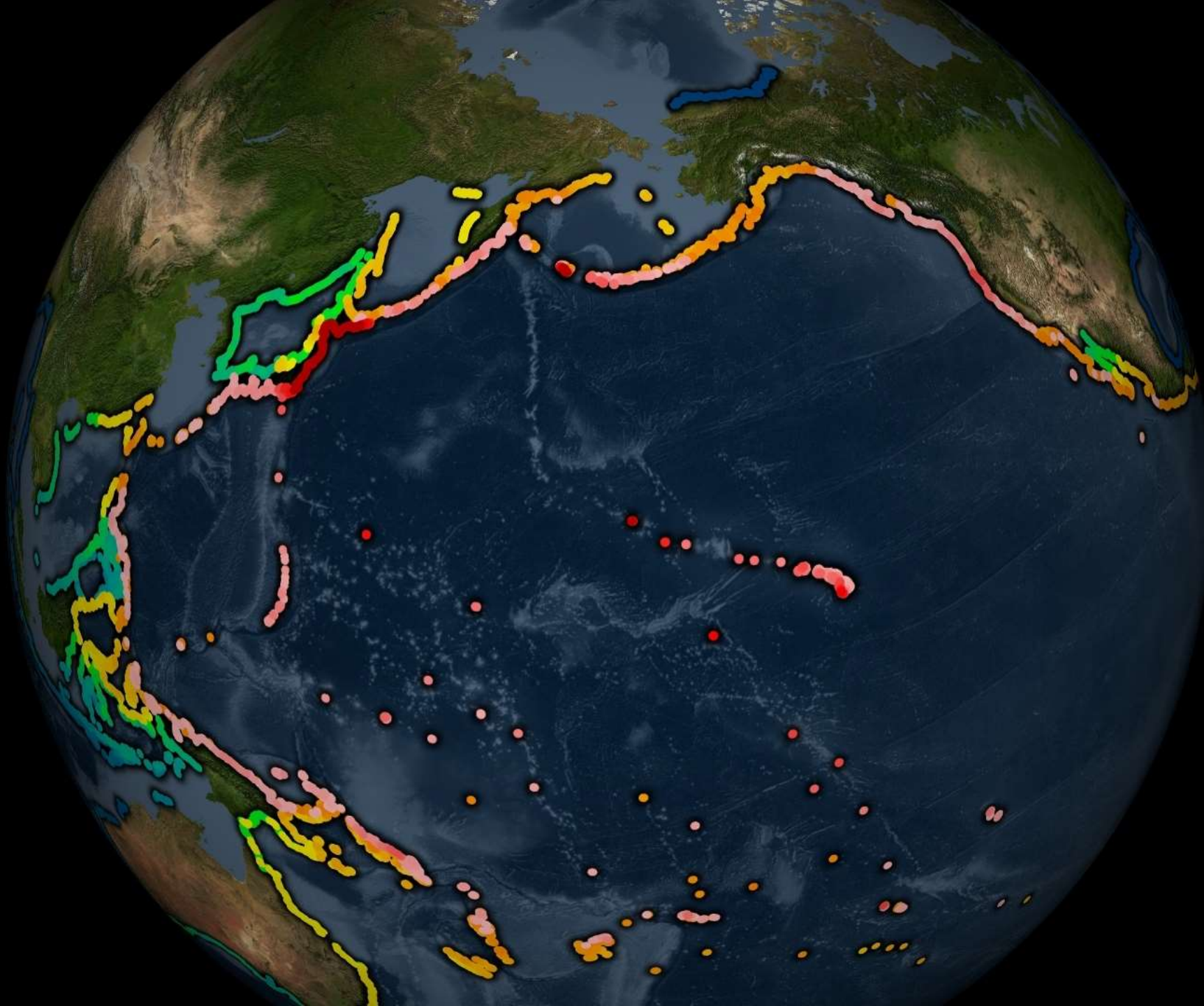
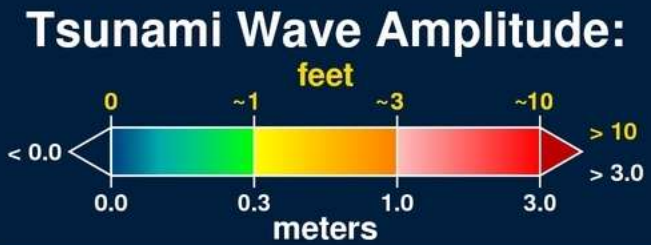
meters



# Coastal Runup

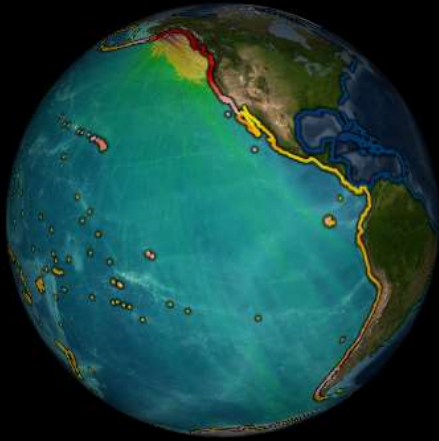
Elapsed  
Time:  
48 hr  
00 min

UTC:  
2011  
13 Mar  
05:46 Z

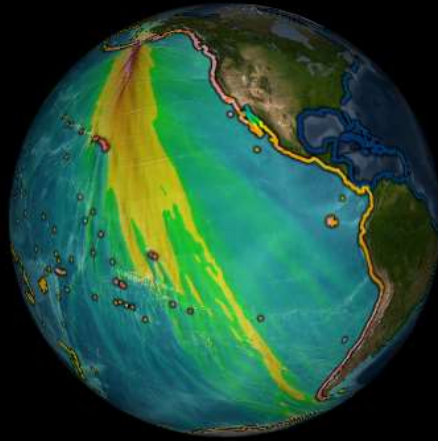




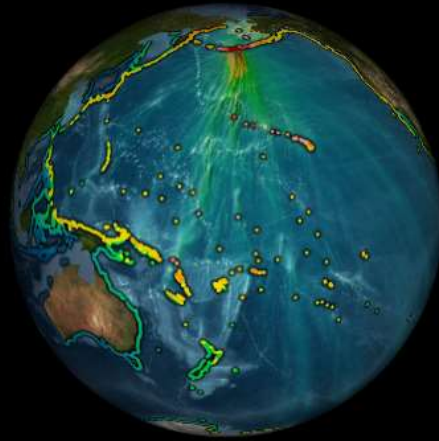
Alaska  
1964



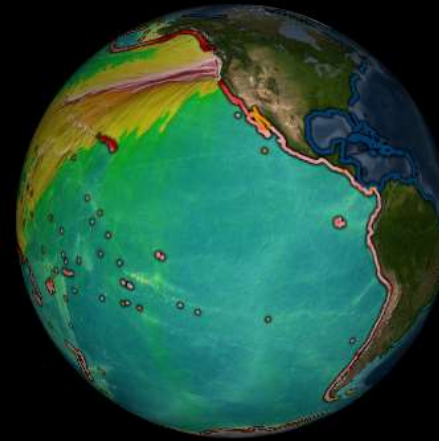
Aleutian Is.  
1946



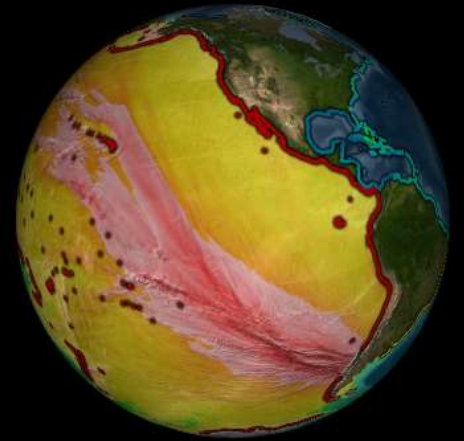
Aleutian Is.  
1957



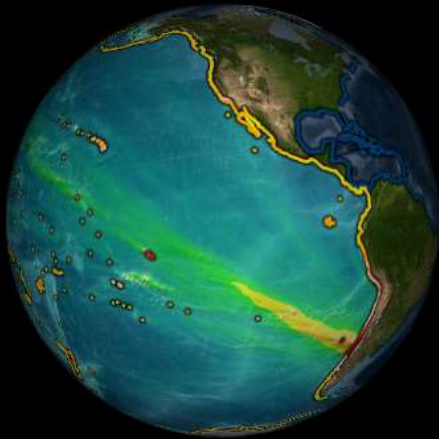
Cascadia  
1700



Chile  
1960



Chile  
2010



Japan  
2011



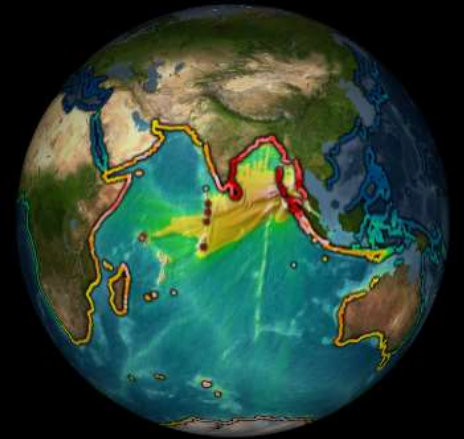
Lisbon  
1755



Samoa  
2009



Sumatra  
2004

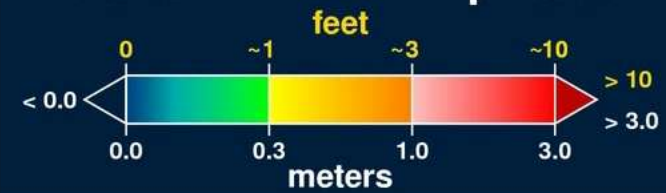


# Samoa 2009

Elapsed  
Time:  
00 hr  
01 min

UTC:  
2009  
29 Sep  
17:49 Z

Tsunami Wave Amplitude:

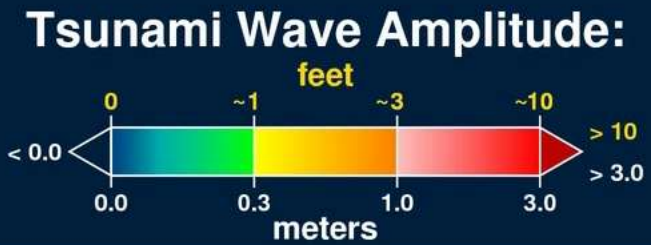




# Sumatra 2004

Elapsed  
Time:  
00 hr  
01 min

UTC:  
2004  
26 Dec  
00:59 Z

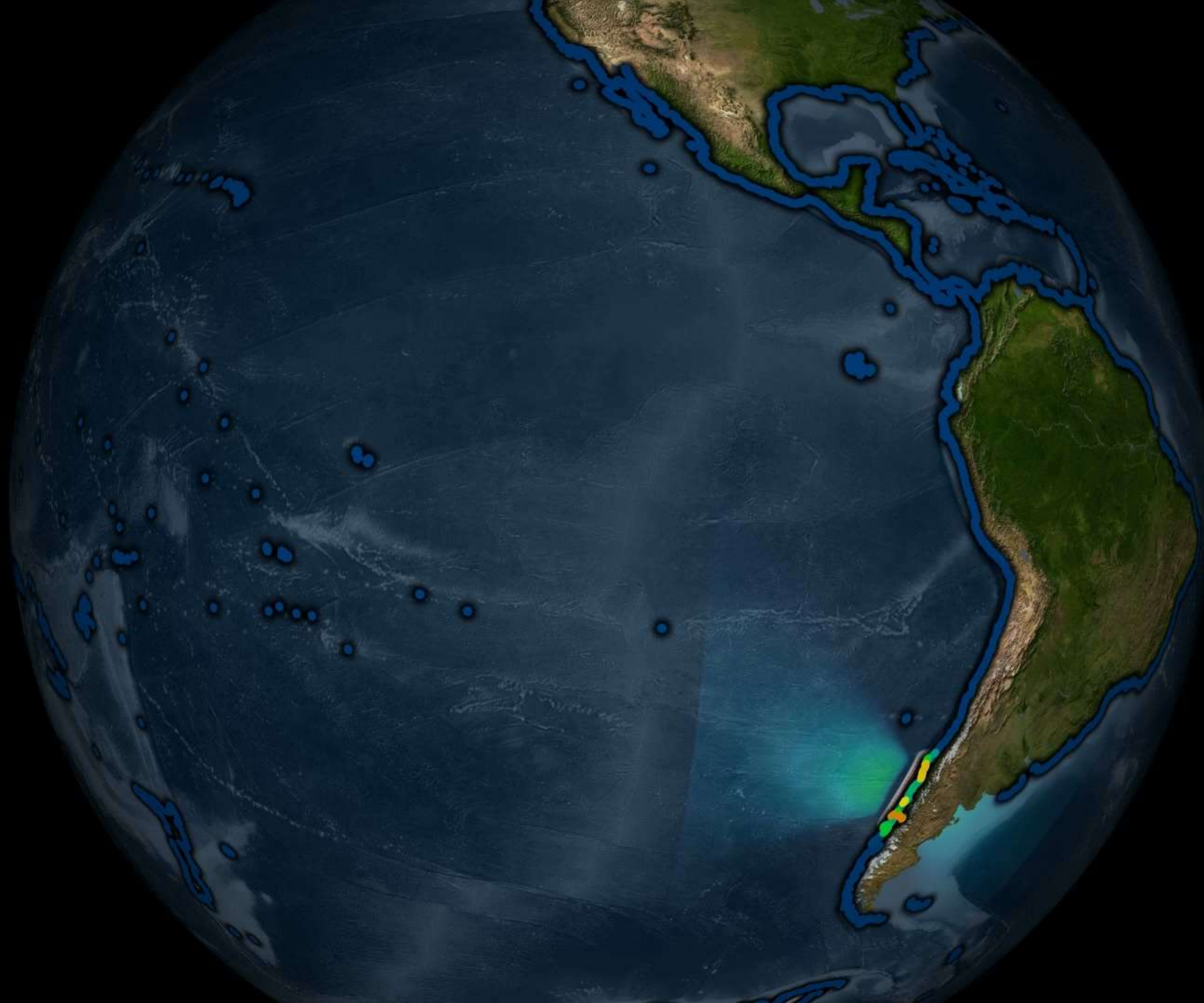
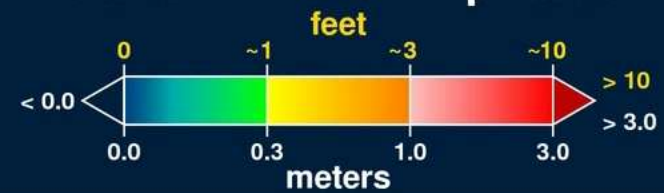


# Chile 1960

Elapsed  
Time:  
00 hr  
01 min

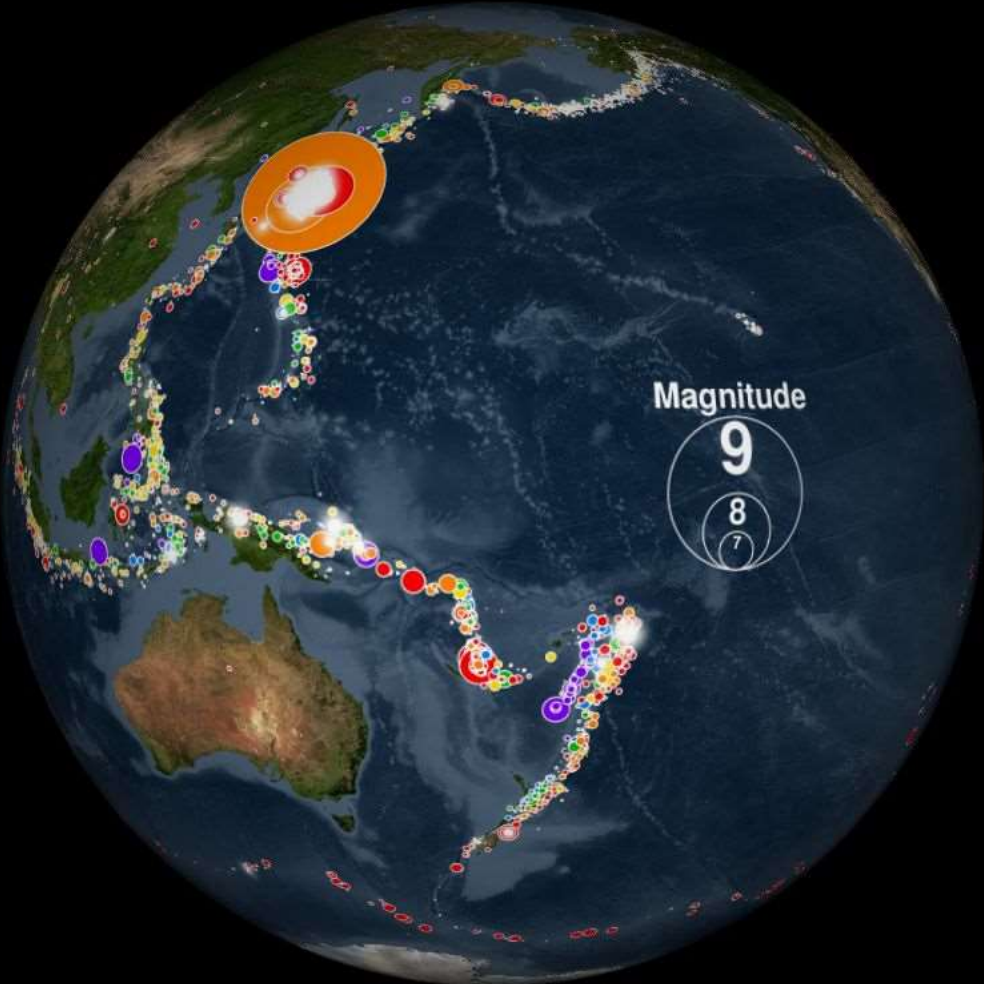
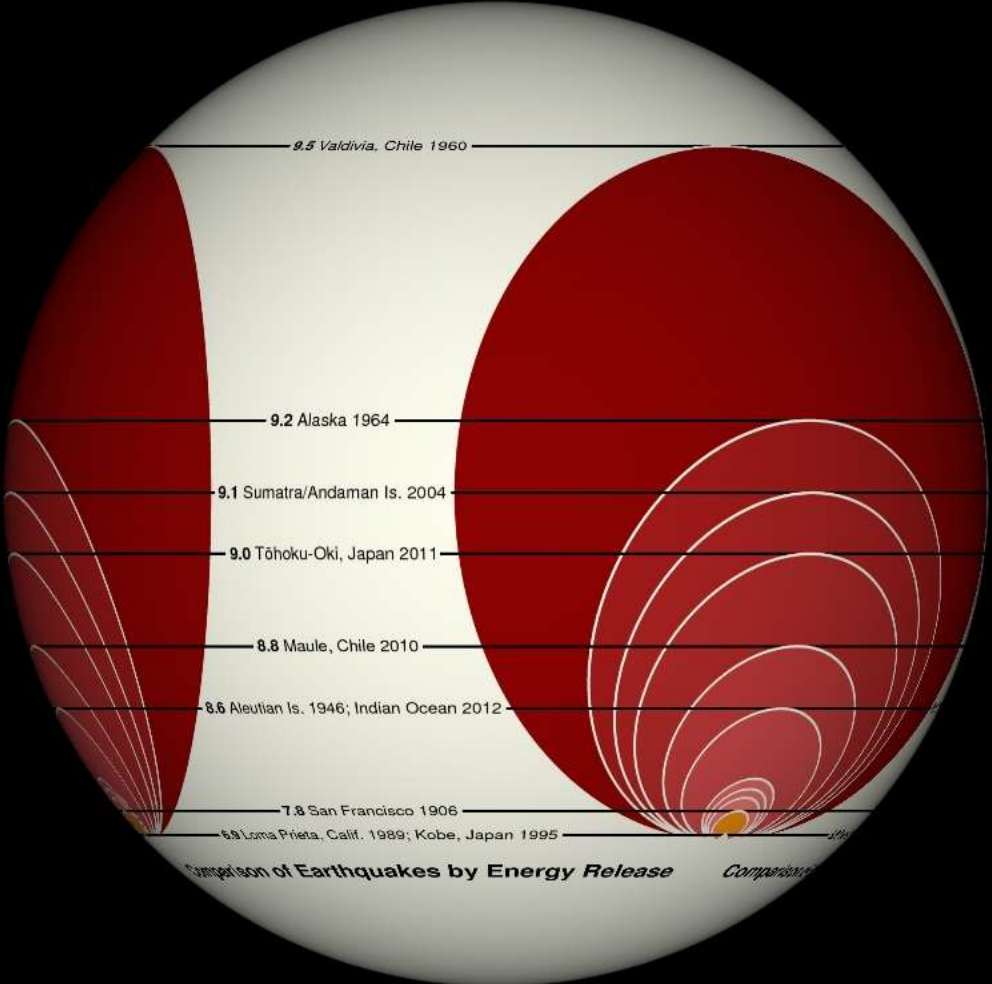
UTC:  
1960  
22 May  
19:12 Z

Tsunami Wave Amplitude:

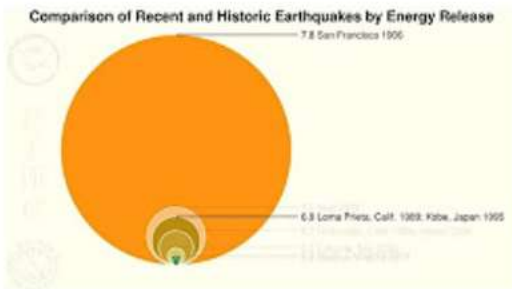




# Earthquake Animations Too!



[www.youtube.com/user/PacificTWC](http://www.youtube.com/user/PacificTWC)



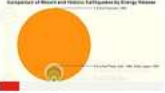
## NOAA Science-on-a-Sphere Companion Videos

PacificTWC • 12 videos • 149 views • Last updated on Mar 25, 2017

Companion "flat earth" animations for PTWC's contributions to NOAA Science-on-a-Sphere exhibits

<http://sos.noaa.gov/Datasets/search.php?q=ptwc>

- 1




**Perspective: a graphical comparison of earthquake energy release**

by PacificTWC

1:53

---

- 2




**Earthquakes of the First 15 Years of the 21st Century**

by PacificTWC

3:50

---

- 3




**Tsunami Forecast Model Animation: Alaska 1964**

by PacificTWC

1:27

---

- 4




**Tsunami Forecast Model Animation: Aleutian Islands 1946**

by PacificTWC

1:50

---

- 

**Tsunami Forecast Model Animation: Aleutian Islands 1957**

1:50



# Final Thoughts

- A comprehensive, consistent library of tsunami animations allows for side-by-side comparison of these complex global phenomena
- Such a library also helps prepare audiences and docents for future tsunami presentations, including those given in real-time