

Climate and the Oceans: Ocean's Role in Climate & Climate Variability

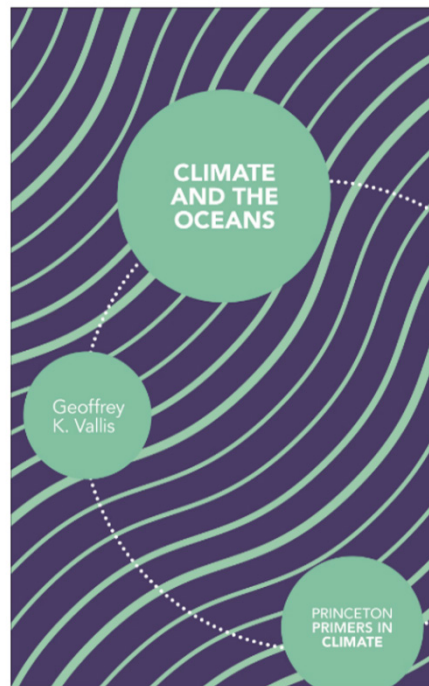
AOSC 680

Ross Salawitch

Class Web Sites:

<http://www2.atmos.umd.edu/~rjs/class/fall2024>

<https://umd.instructure.com/courses/1367293>



Lecture 16

<https://sealevel.jpl.nasa.gov/resources/1169/altimeter-mission-series>

29 October 2024

TOPEX/Poseidon

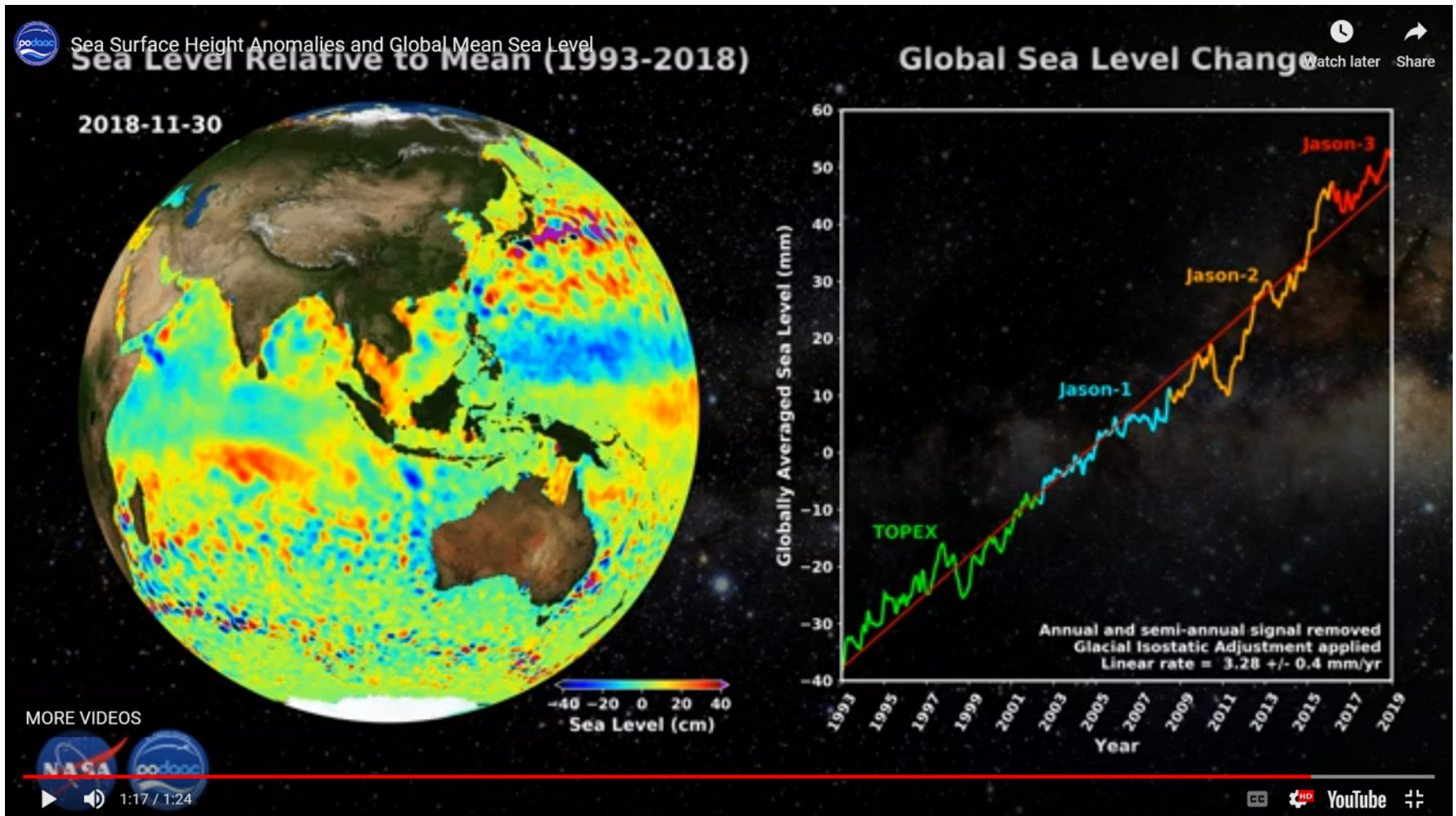
Launched in 1992, TOPEX/Poseidon was a joint venture between CNES and NASA that measured ocean surface topography to an accuracy of 4.2 cm, enabled scientists to forecast the 1997-1998 El Niño, and improved understanding of ocean circulation and its effect of global climate. While a 3-year prime mission was planned, with a 5-year store of expendables, TOPEX/Poseidon delivered an astonishing 13+ years of data from orbit. The mission ended in January 2006. In those 13 years, it:

- Measured sea levels with unprecedented accuracy to better than 5 cm
- Continuously observed global ocean topography
- Monitored effects of currents on global climate change and produced the first global views of seasonal changes of currents
- Monitored large-scale ocean features like Rossby and Kelvin waves and studied such phenomena as El Niño, La Niña, and the Pacific Decadal Oscillation
- Mapped basin-wide current variations and provided global data to validate models of ocean circulation
- Mapped year-to-year changes in heat stored in the upper ocean
- Produced the most accurate global maps of tides ever
- Improved our knowledge of Earth's gravity field



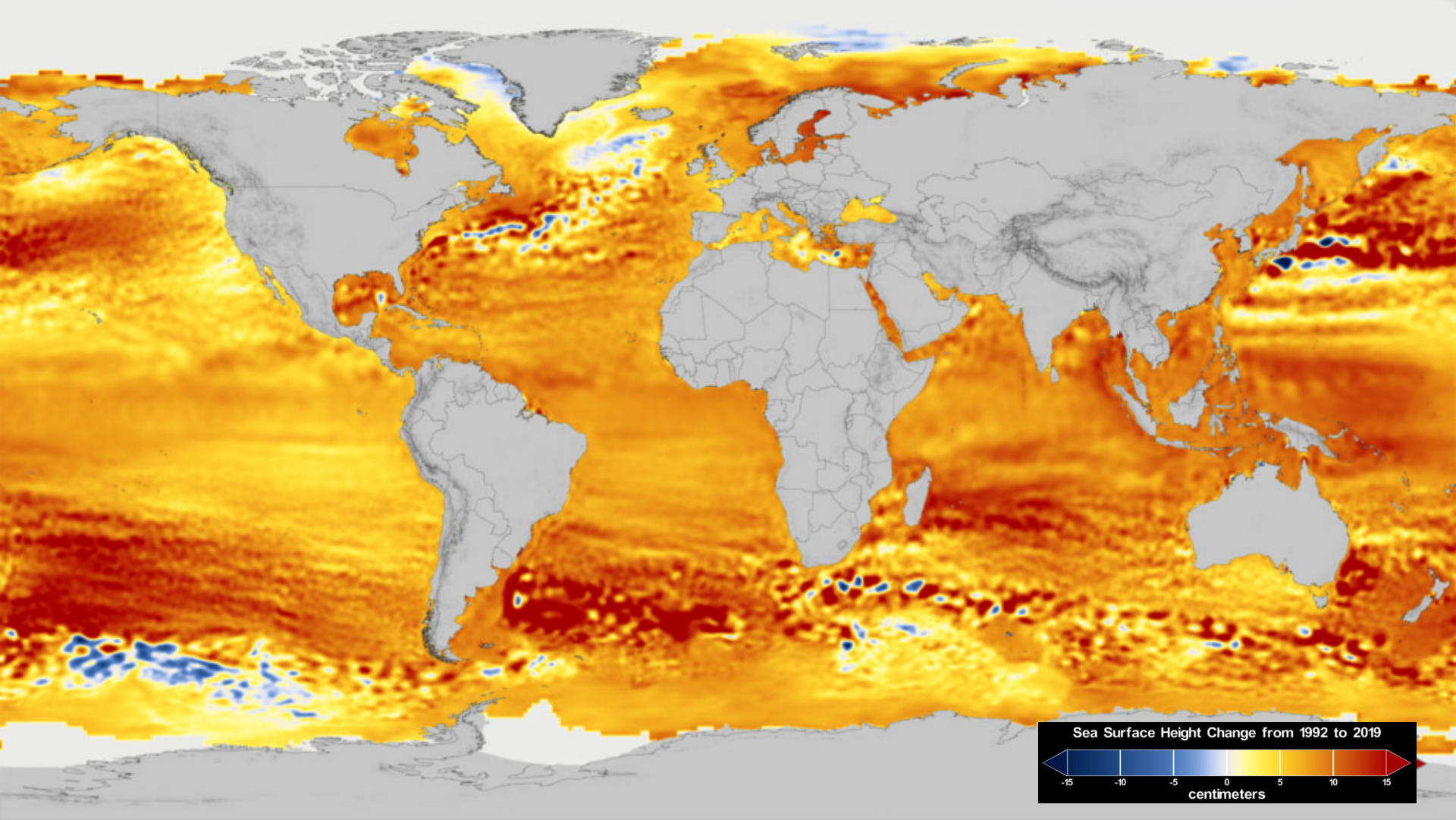
<https://sealevel.jpl.nasa.gov/missions/topex-poseidon/summary>
<https://www.marine.usf.edu/pjoc/packets/f98/f98u2le3.pdf>

Sea Level Rise Versus Time



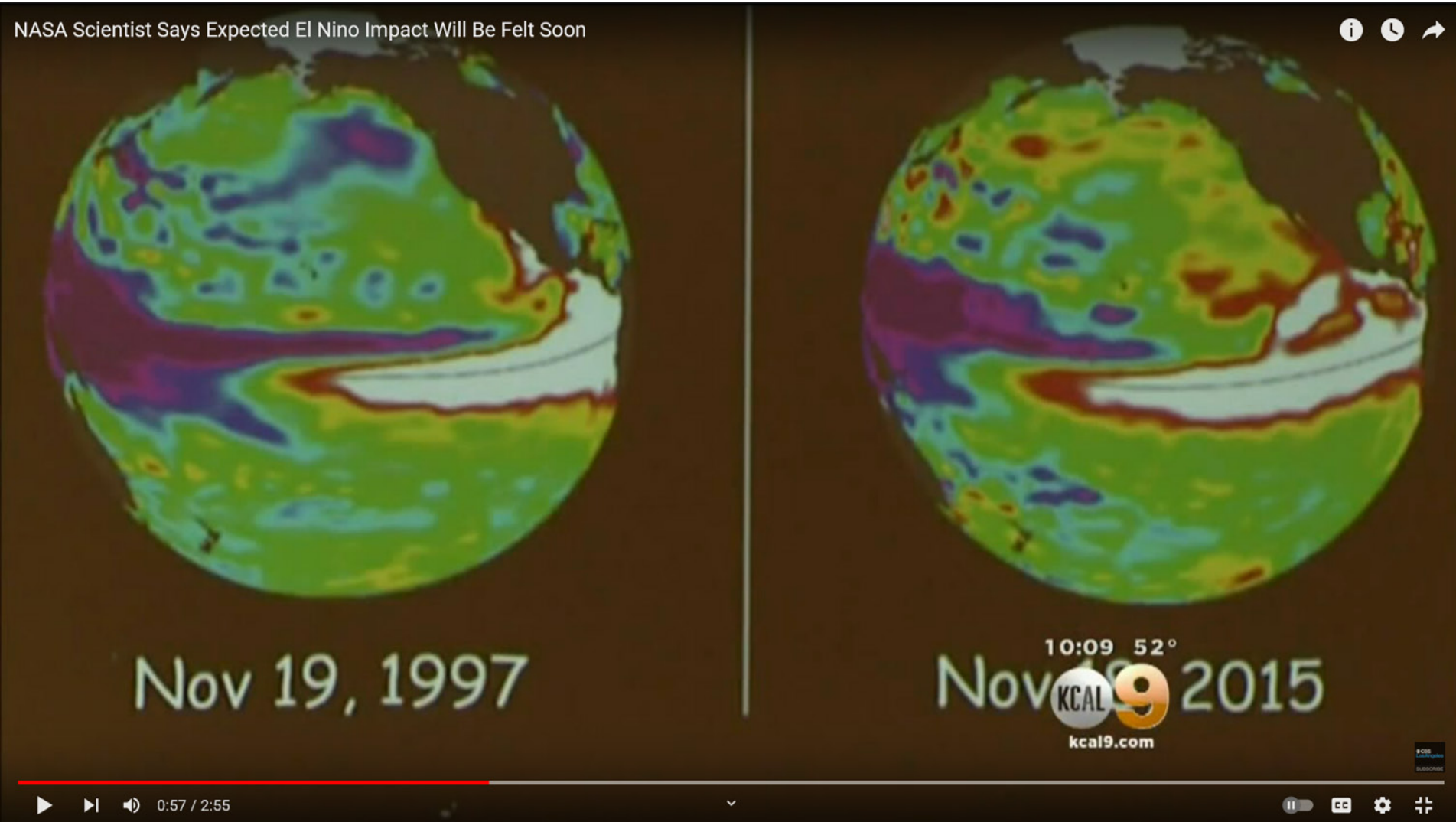
<https://sealevel.jpl.nasa.gov/resources/1216/sea-surface-height-anomalies-and-global-mean-sea-level/>

Sea Level Rise 1992 to 2019 versus Lat / Lon



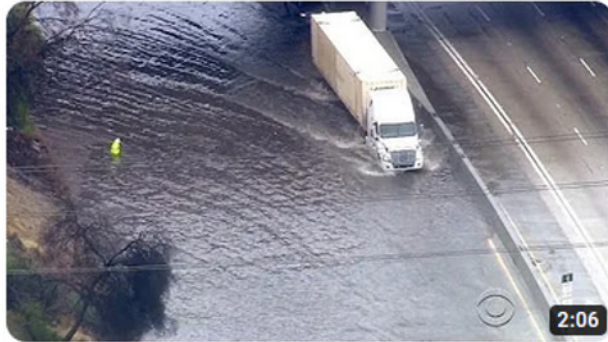
<https://sealevel.jpl.nasa.gov/resources/1258/27-year-sea-level-rise-topexjason/>

El Nino



<https://www.youtube.com/watch?v=ydJ5E5YfqDI>

El Niño



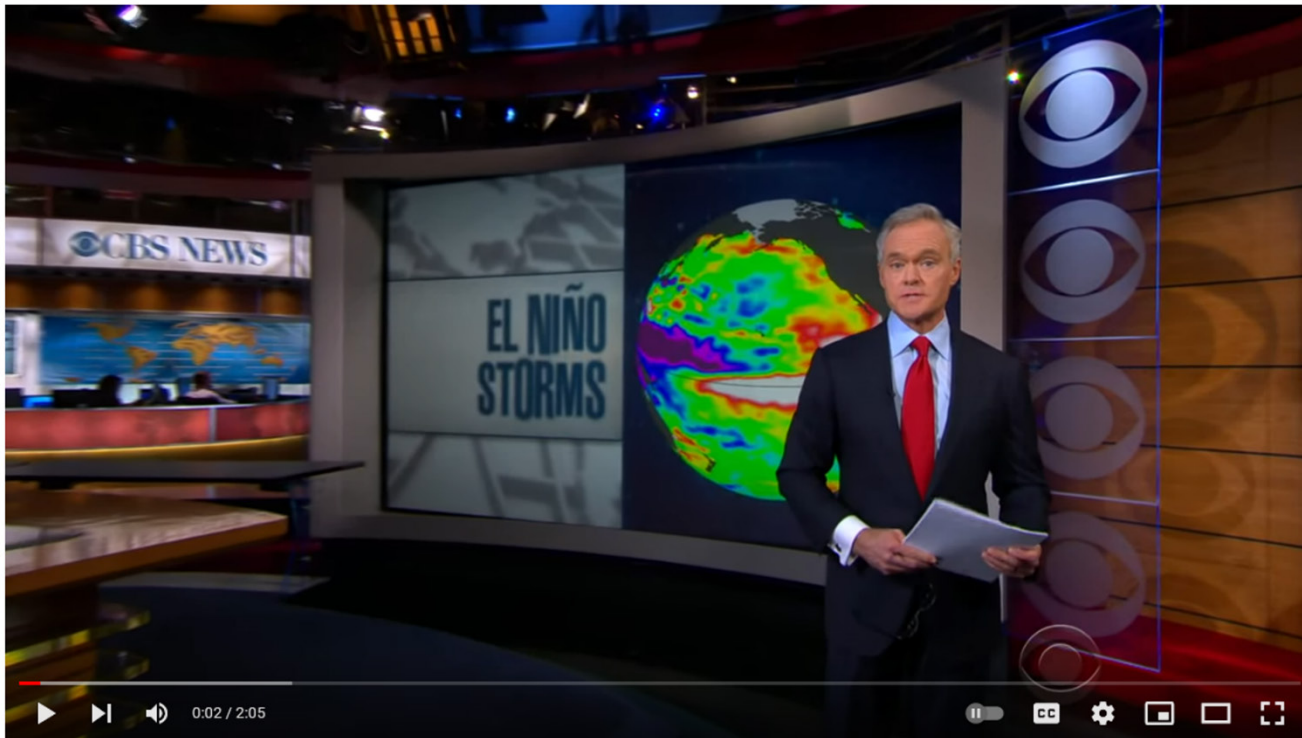
El Nino storms bring flooding, mudslides to Southern California

25K views • 6 years ago



CBS Evening News

A third day of heavy rains brought on by El Nino made kayaks the most practical mode of transportation on some of California's ...



El Nino storms bring flooding, mudslides to Southern California

<https://www.youtube.com/watch?v=tEkQkObqXSQ>

SWOT: Surface Water and Ocean Topography Mission



NASA Jet Propulsion Laboratory
California Institute of Technology

SWOT SURFACE WATER AND OCEAN TOPOGRAPHY

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International Satellite to Track Impacts of Small Ocean Currents

The Surface Water and Ocean Topography mission will explore how the ocean absorbs atmospheric heat and carbon, moderating global temperatures and climate change.

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<https://swot.jpl.nasa.gov/>

SWOT: Surface Water and Ocean Topography Mission



<https://youtu.be/UOdbwQE-0z4?t=29>