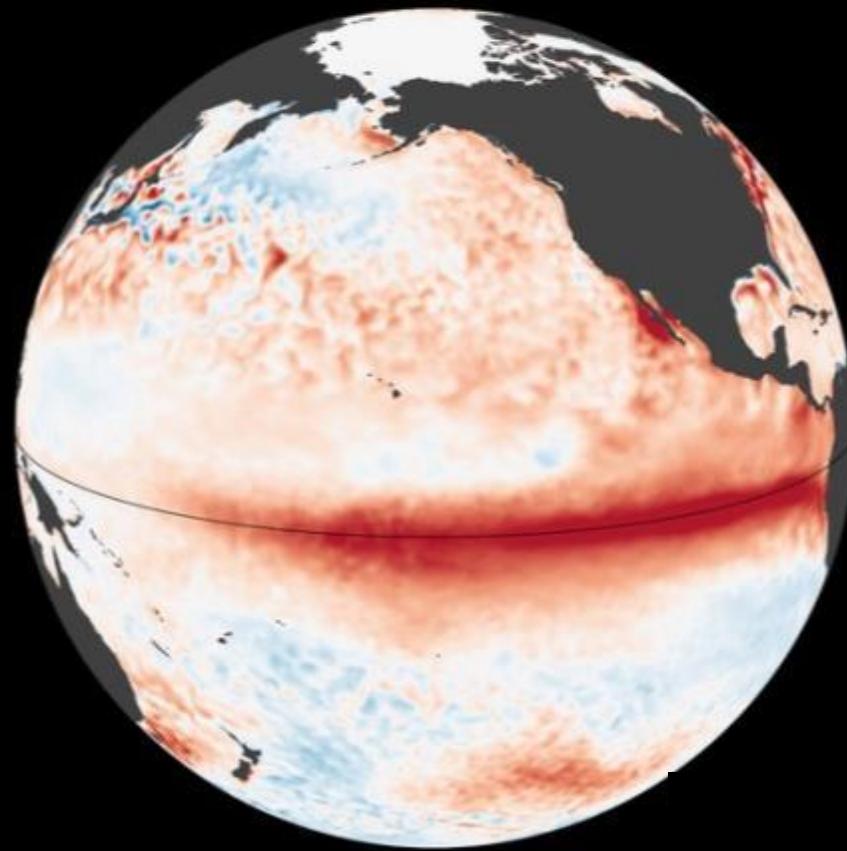


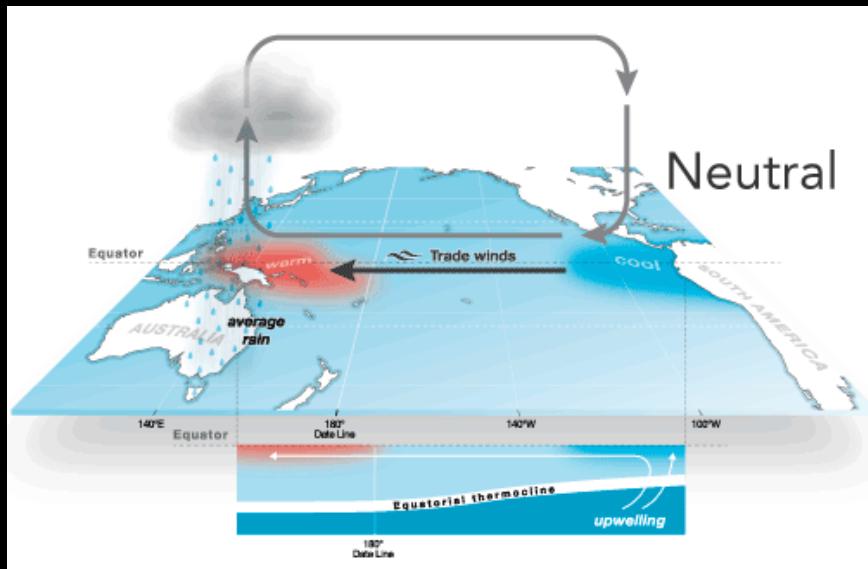
What scientists are learning from data collected during El Niño 2015/16

El Niño
December 2015



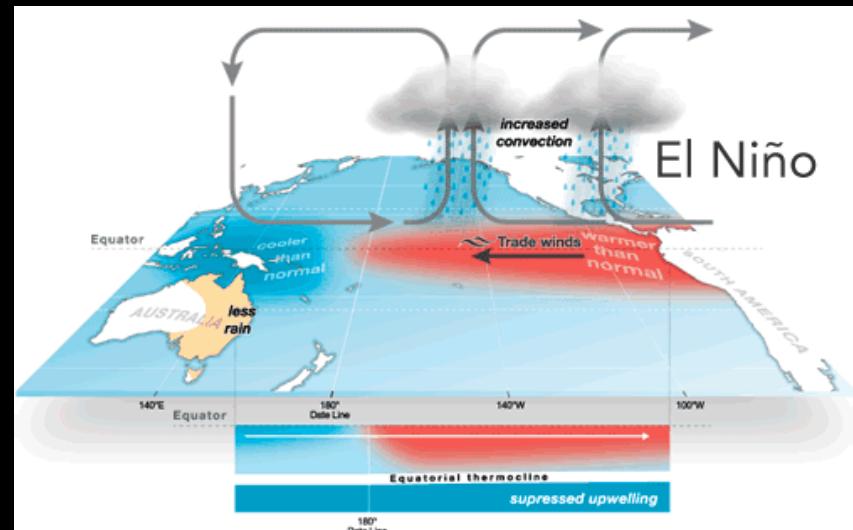
Stephanie Schollaert Uz, PhD
PACE Project, Earth Sciences Division
NASA GSFC (Global Science & Technology Inc.)

Equatorial Pacific: sea-surface temperatures, sea level, atmospheric circulation and precipitation patterns



Normally:

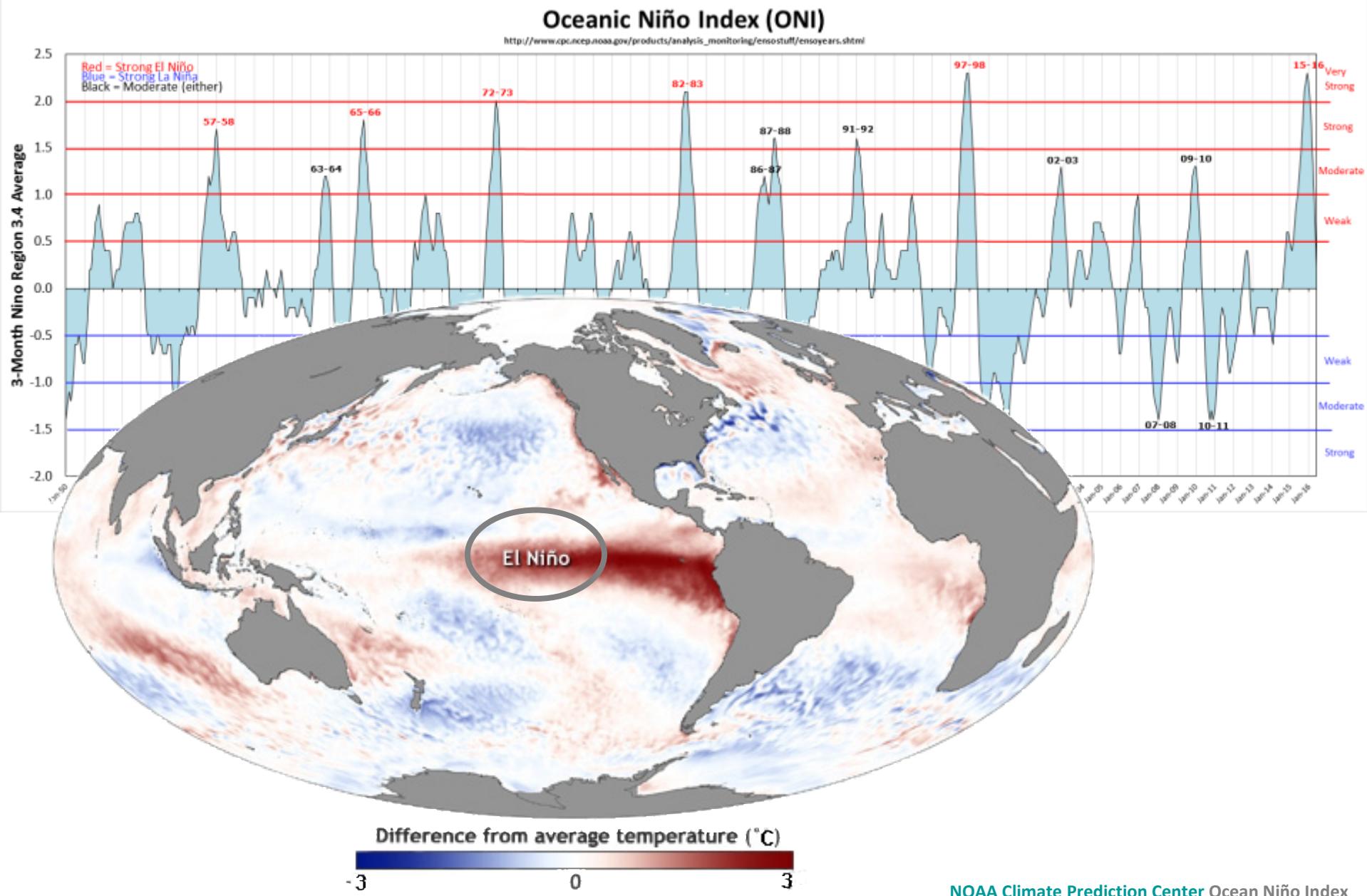
Trade winds blow east-to-west - push warm water westward cause warmer, fresher west Pacific warm pool. Upwelling in east.



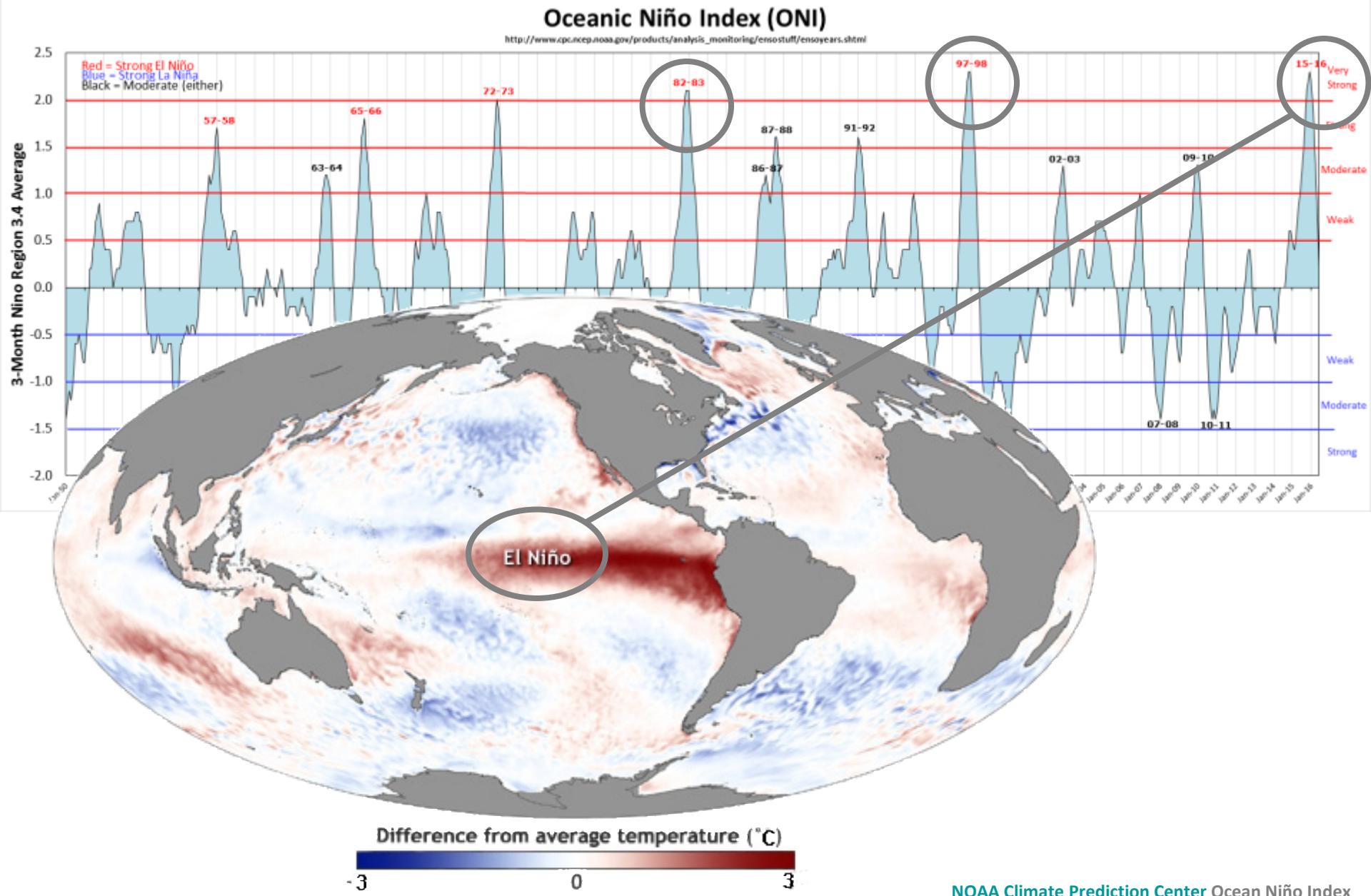
El Niño:

Trade winds weaken, warm pool moves eastward, thermocline deepens in the east and upwelling is suppressed.

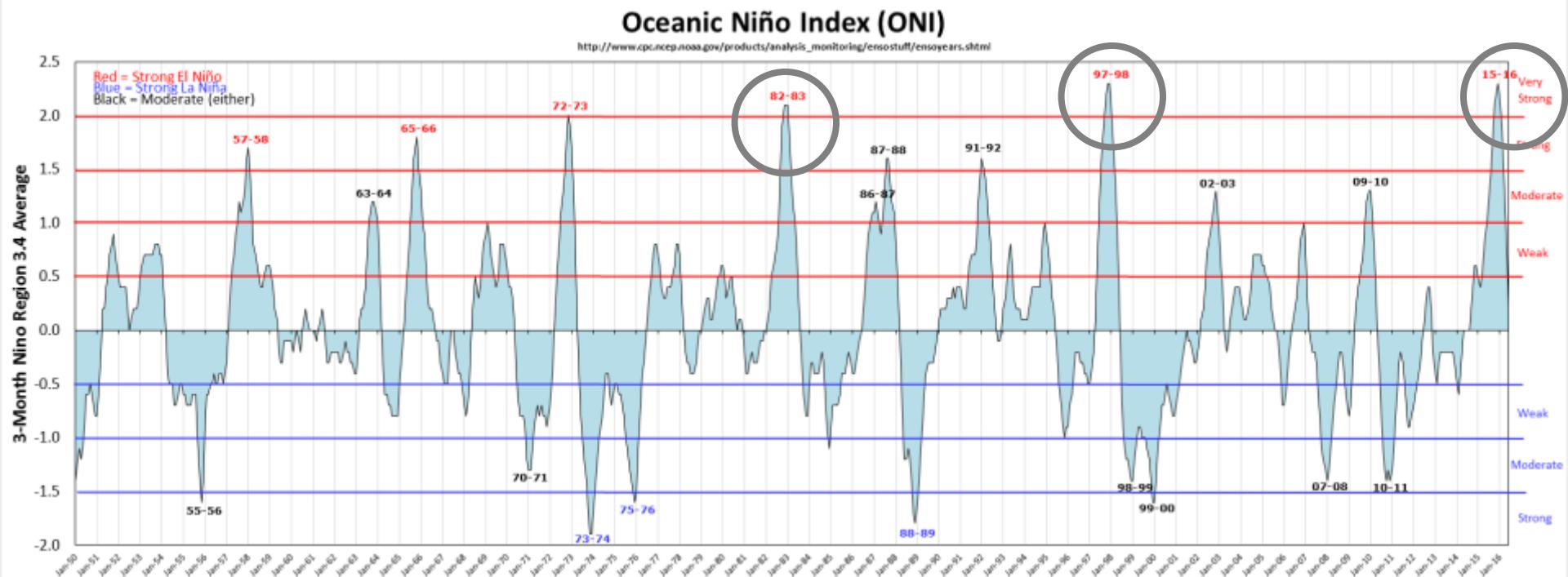
El Niño 2015/16 among 3 strongest on record



El Niño 2015/16 among 3 strongest on record



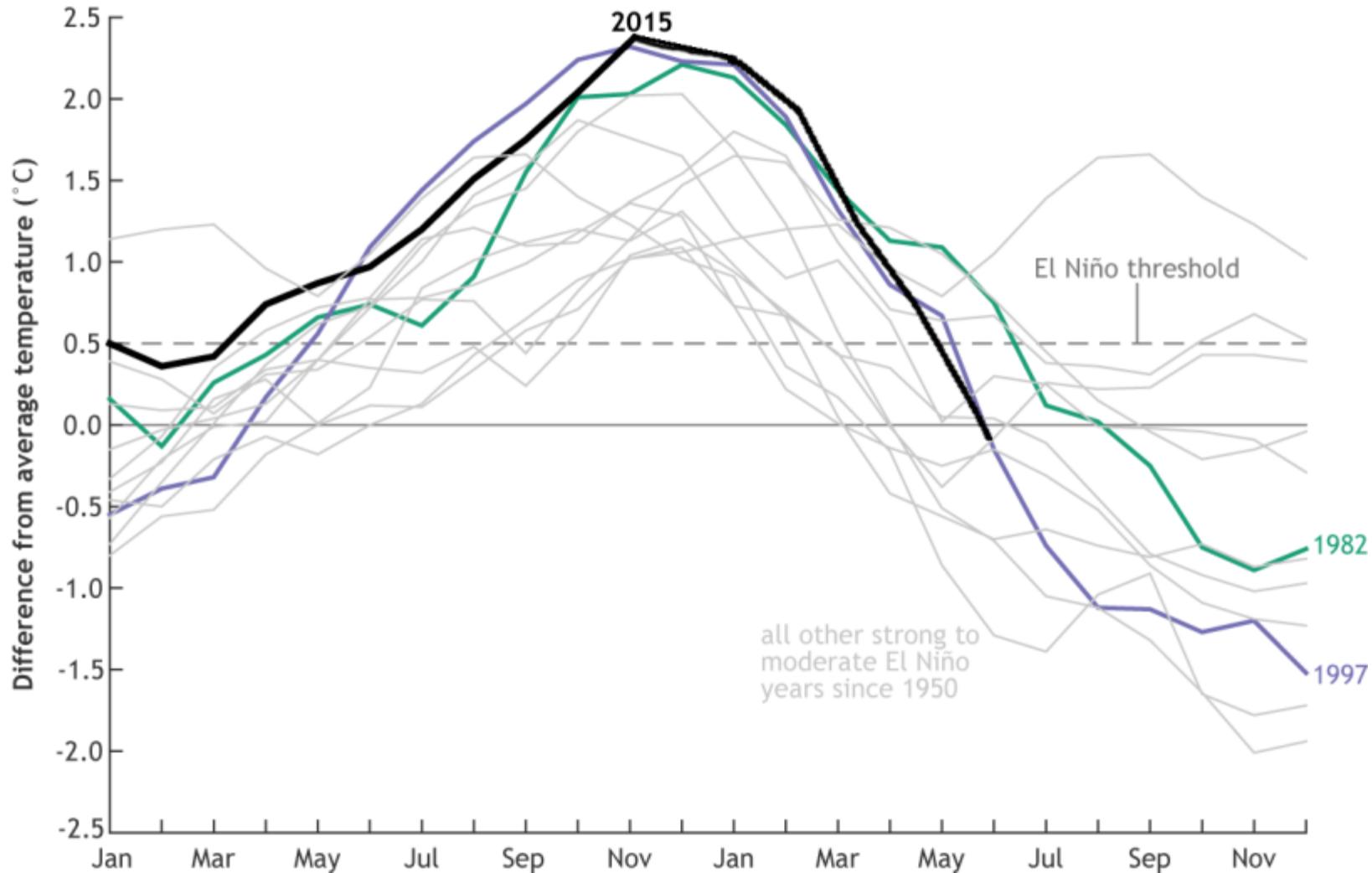
El Niño 2015/16 among 3 strongest on record



El Niño 2015/16 among longest on record



Monthly sea surface temperature Niño 3.4 Index Values

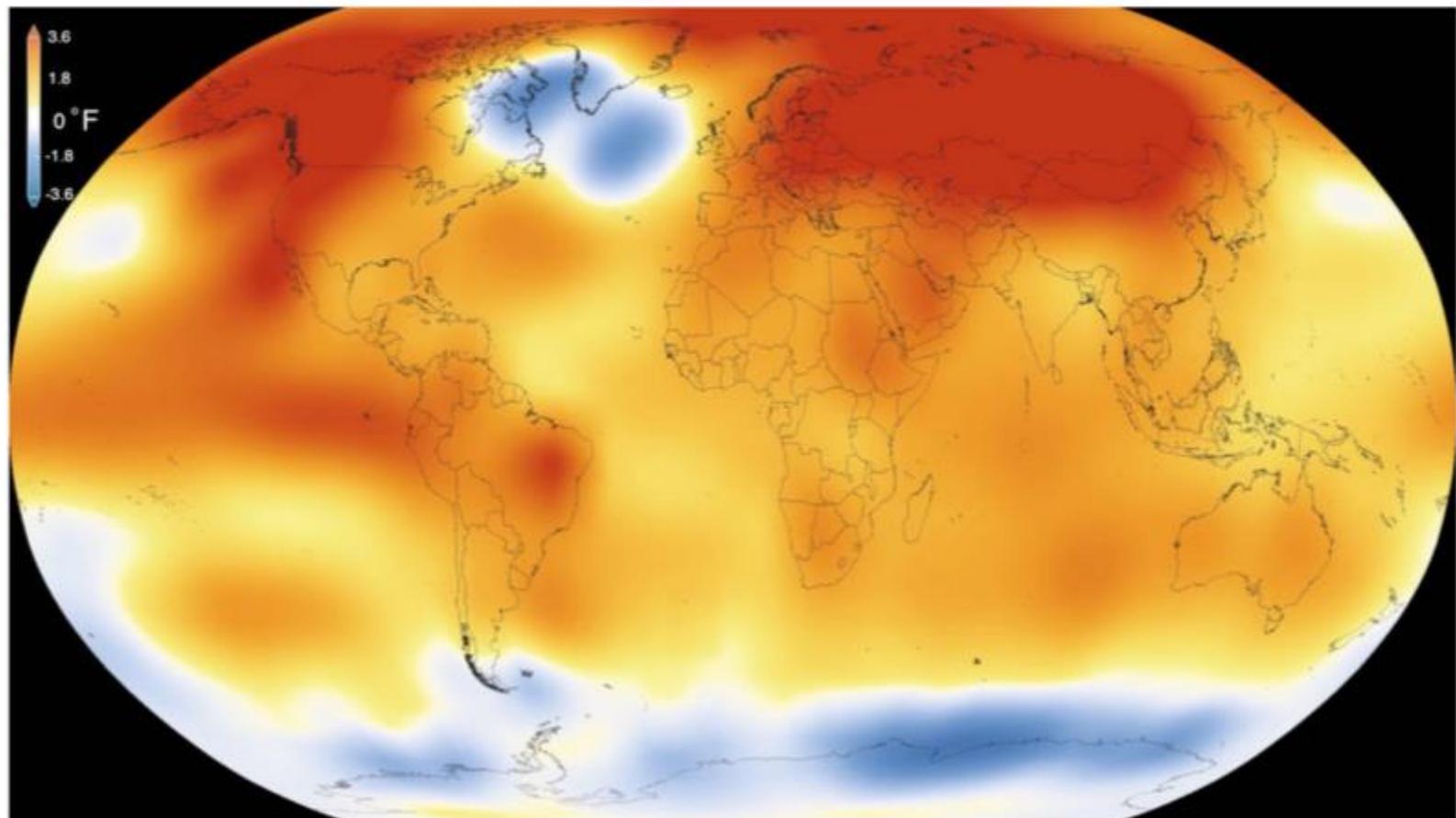


El Niño contributed to 2015 being warmest on record



Jan. 20, 2016
RELEASE 16-008

NASA, NOAA Analyses Reveal Record-Shattering Global Warm Temperatures in 2015



2015 was the warmest year since modern record-keeping began in 1880, according to a new analysis by NASA's Goddard Institute for Space Studies. The record-breaking year continues a long-term warming trend — 15 of the 16 warmest years on record have now occurred since 2001.

Credits: Scientific Visualization Studio/Goddard Space Flight Center

[NASA press release](#)

El Niño 2015/16 linked to massive fish die-offs

[El Niño is going to starve a lot of fish](#)

[Experts blame El Niño for dead sea creatures on Chile's beaches](#)

[El Niño brings sharks and other marine life to California](#)



Map Satellite



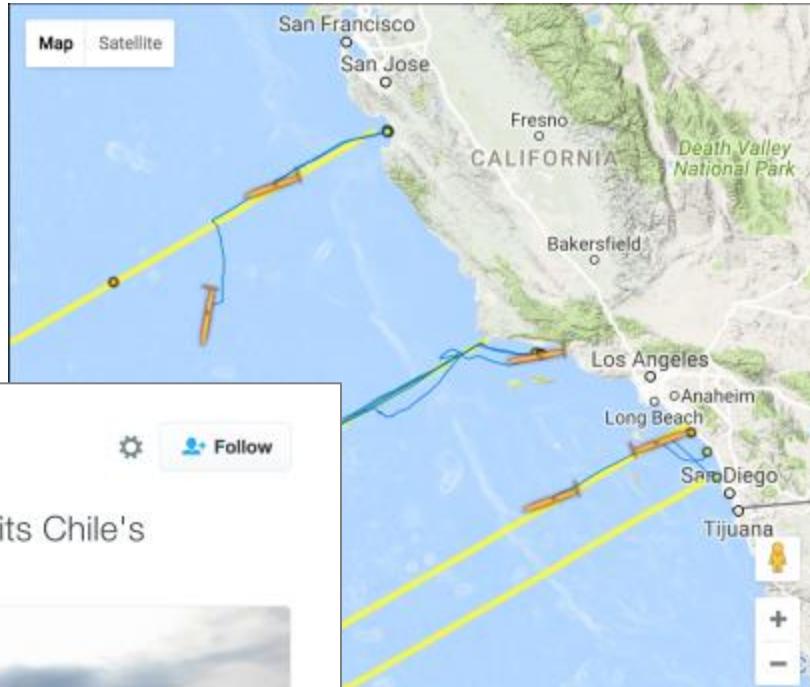
Wave of dead sea creatures hits Chile's beaches u.afp.com/ZuQQ

ALVARO VIDAL / AFP

RETWEETS LIKES
105 35

1:12 AM - 4 May 2016

105 35 ...



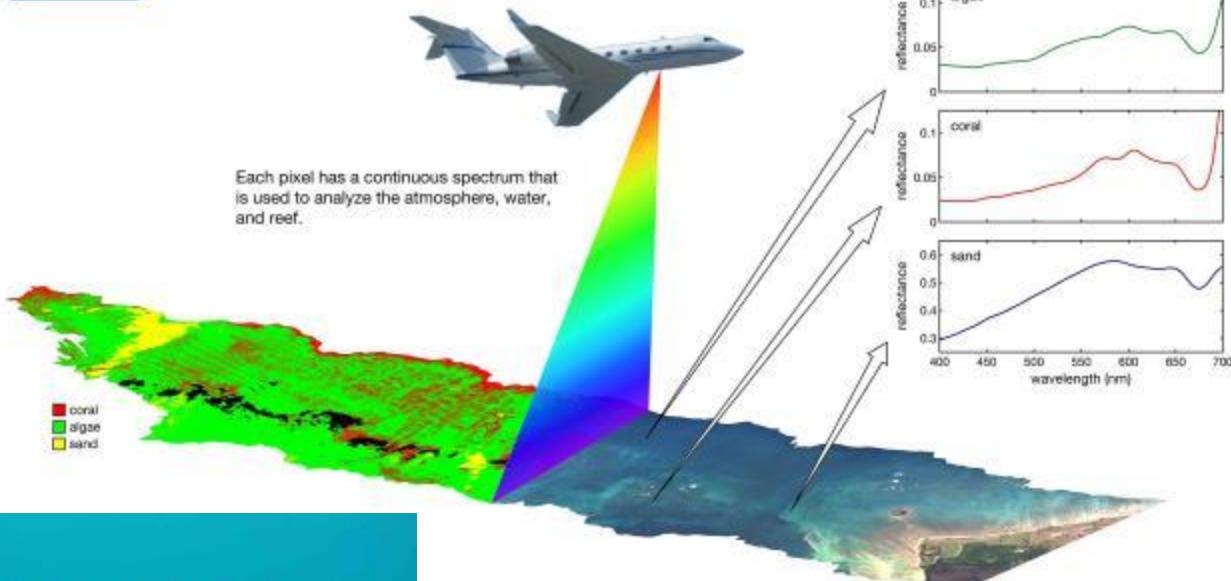
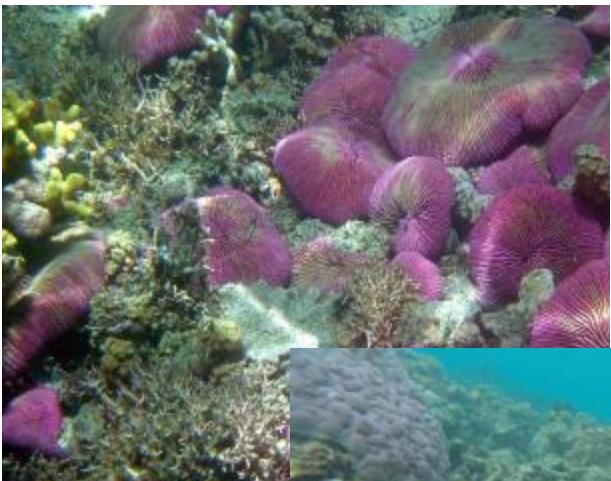
[Southern California Coastal Ocean Observing System](#)

El Niño 2015/16 prolongs longest coral bleaching event



[NASA scans Great Barrier Reef to find answers to coral's poor health](#)

[El Niño prolongs longest global coral bleaching event](#)



Images from NASA

Explore these effects in NASA Earth Observations (NEO)



<http://neo.sci.gsfc.nasa.gov/>

50 datasets routinely updated and easily accessible

The screenshot shows the homepage of the NASA Earth Observations (NEO) website. At the top, there's a navigation bar with links for ATMOSPHERE, ENERGY, LAND, LIFE, OCEAN, NEWS, ABOUT, 0 IMAGES, and ANALYZE. Below the navigation bar is a large image collage featuring four different views of Earth from space, each with a distinct color palette (blue, pink, yellow, and brown). To the right of the collage, a "WELCOME TO NEO!" section includes a "Our Mission" paragraph and a "Read more" link. Further down, there's a "BROWSE DATASETS BY CATEGORY" section with a "Atmosphere" heading and three thumbnail images labeled "Aerosol Optical Thickness", "Rainfall", and "Water Vapor", each with a "See All" link. On the right side, there's a "NEWS" section with a "Sep 14, 2016" date, a "Analysis Tool Development Update" title, and a "Read more" link. Below that is a "Java and NEO Analysis" section with a "Read more" link.

NEO NASA EARTH OBSERVATIONS

ATMOSPHERE ENERGY LAND LIFE OCEAN NEWS ABOUT 0 IMAGES ANALYZE >

WELCOME TO NEO!

Our Mission

Our mission is to help you picture climate and environmental changes as they occur on our home planet. Here you can browse and download imagery of satellite data from NASA's constellation of Earth Observing System satellites. [Read more](#)

BROWSE DATASETS BY CATEGORY

Atmosphere

[See All](#)

Aerosol Optical Thickness

Rainfall

Water Vapor

NEWS [See All](#)

Sep 14, 2016

Analysis Tool Development Update

A replacement is coming in 2017. [Read more](#)

Java and NEO Analysis

If you are a user of the analysis tool in NEO, you may have noticed that after you installed the latest Java update the analysis tool no longer

Explore these effects in NASA Earth Observations (NEO)



The screenshot shows the homepage of the NASA Earth Observations (NEO) website. At the top, there's a navigation bar with categories: ATMOSPHERE, ENERGY, LAND, LIFE, OCEAN, NEWS, ABOUT, D IMAGES, and ANALYZE. Below the navigation bar, there's a section titled "OUR MISSION" featuring five circular thumbnails representing different Earth observations: atmosphere, energy, land, life, and ocean. To the right, there's a "REACH US" section with a "Contact Us" button. The main content area has a heading "Welcome to NASA Earth Observations (NEO)" followed by a paragraph about the mission. Below this, there's a "Site Management" section listing team members: Kevin Ward, Paul Przyborski, Jesse Allen, Stephanie Schollaert Uz, and Vipool Rathod.

OUR MISSION

Welcome to NASA Earth Observations (NEO)

One of the best places to study Earth is from space. NASA satellites continually orbit the globe, collecting information about Earth's ocean, atmosphere, and land surfaces. Satellites can even monitor the activity of life forms, such as phytoplankton, from their remote vantage points. Satellite imagery provides the greatest benefit to the most people when it can be analyzed by anyone with an interest. NEO strives to make global satellite imagery as accessible as possible.

Site Management

Kevin Ward (Science Systems & Applications, Inc.), *lead architect*
Paul Przyborski (Science Systems & Applications, Inc.), *web developer*
Jesse Allen (Science Systems & Applications, Inc.), *data processing*
Stephanie Schollaert Uz (Global Science & Technology, Inc.), *science & strategy advisor*
Vipool Rathod (ADNET), *system administration*

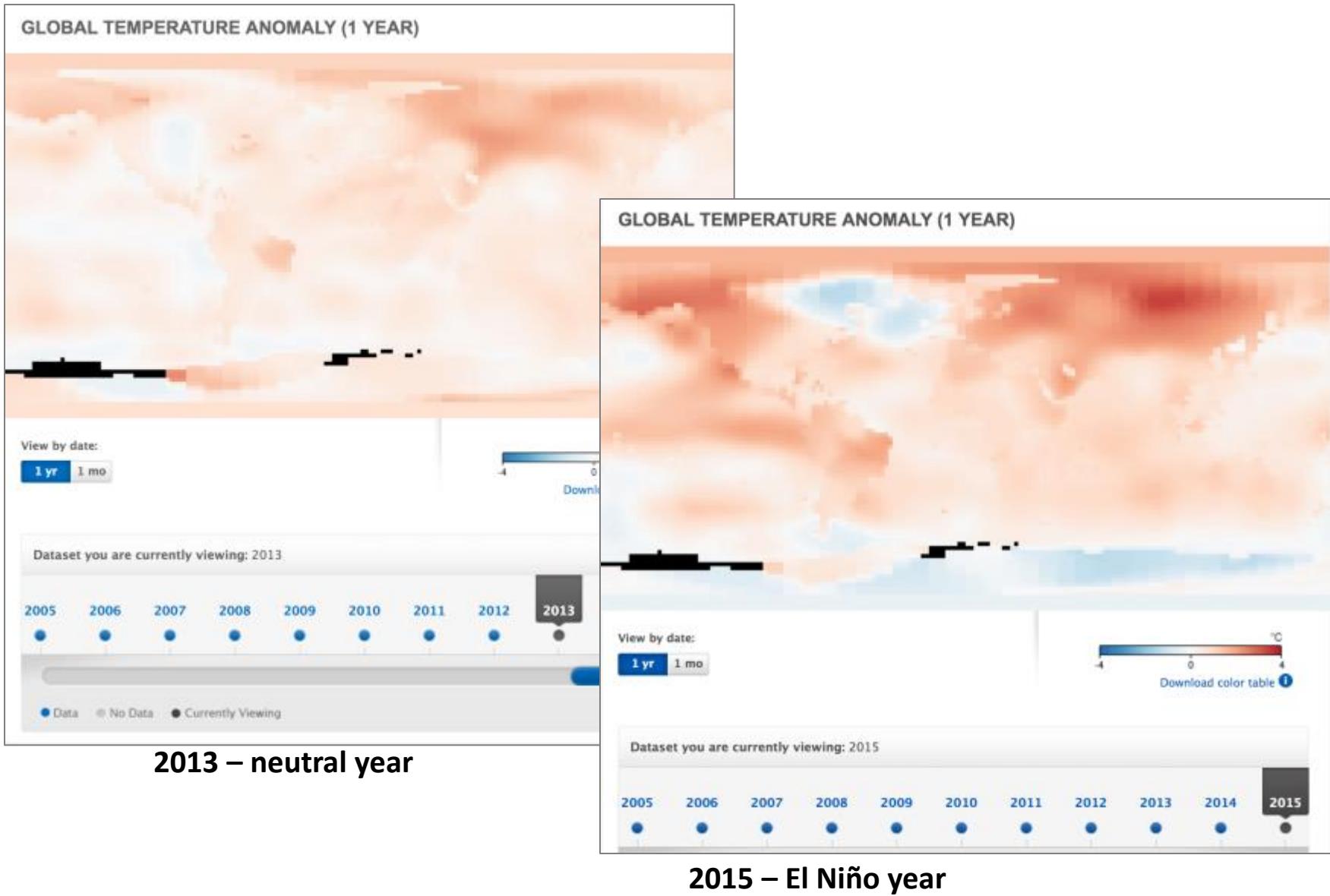
Current Java analysis tool will be replaced with a user-friendly HTML tool in 2017.

Feedback and suggestions welcome!

stephanie.uz@nasa.gov

<http://neo.sci.gsfc.nasa.gov/>

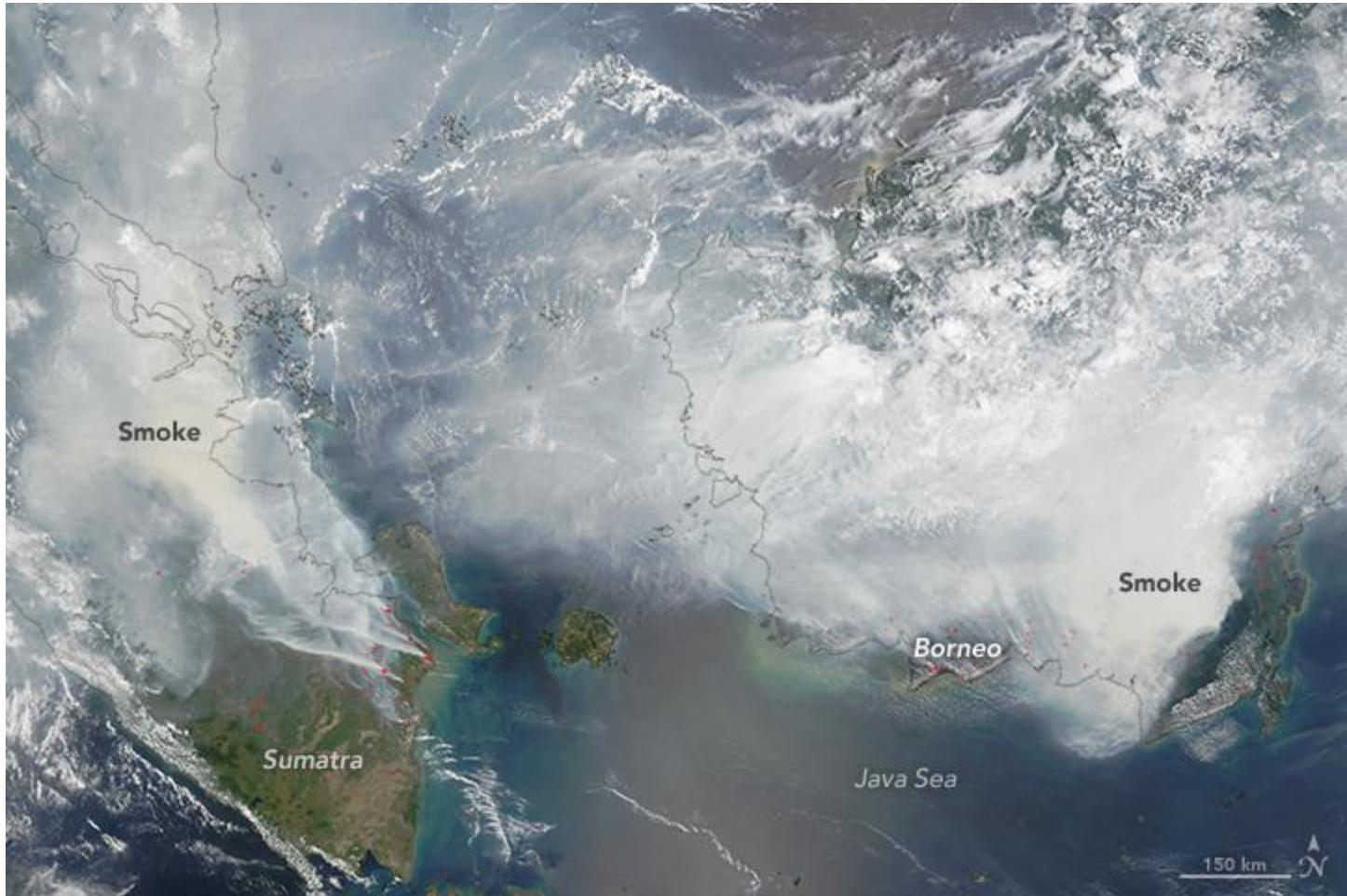
How did 2015 temperature anomaly compare?



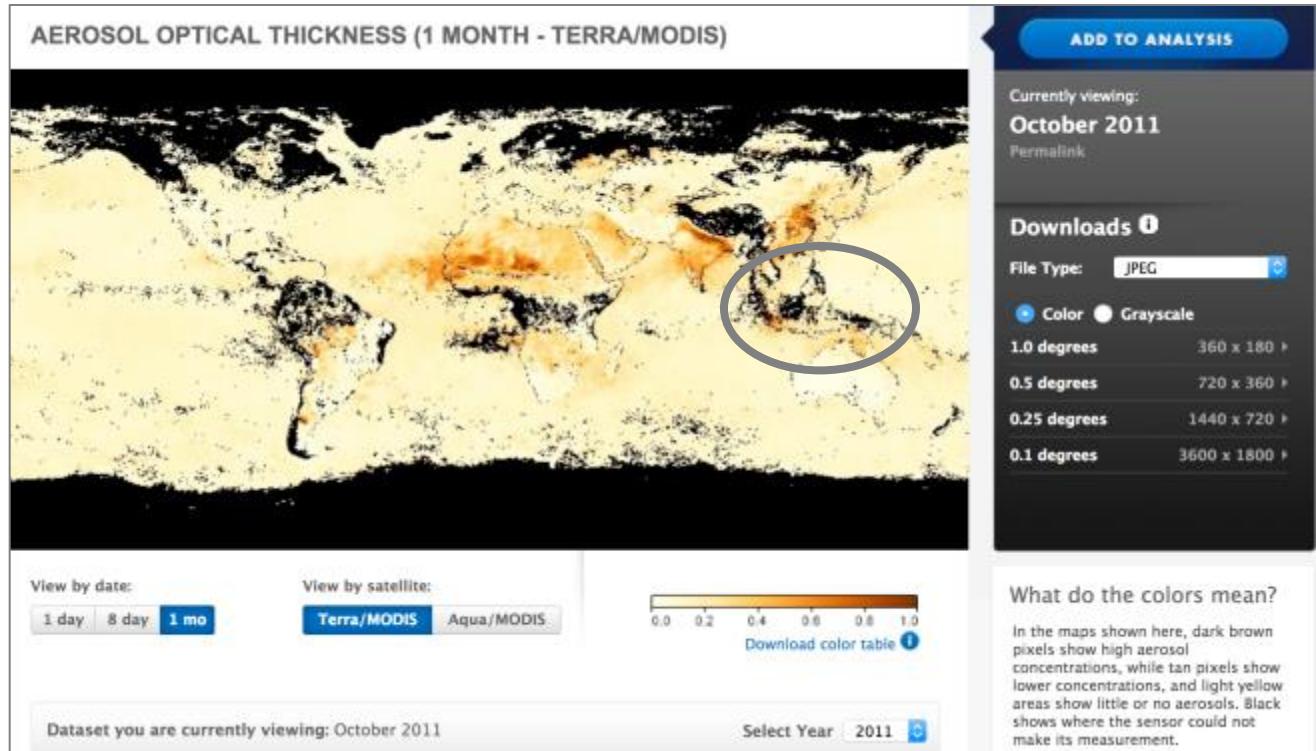
El Niño 2015/16 caused drought, fire in Indonesia

El Niño brought drought and fire to Indonesia

El Niño may have led to 100,000 deaths in Asia



How did 2015 fire effects in Indonesia compare?



How did 2015 fire effects in Indonesia compare?



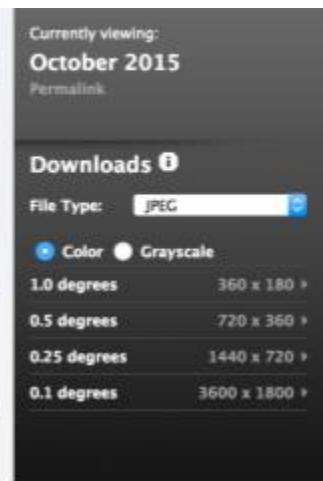
October, 2011
neutral



October, 2013
neutral

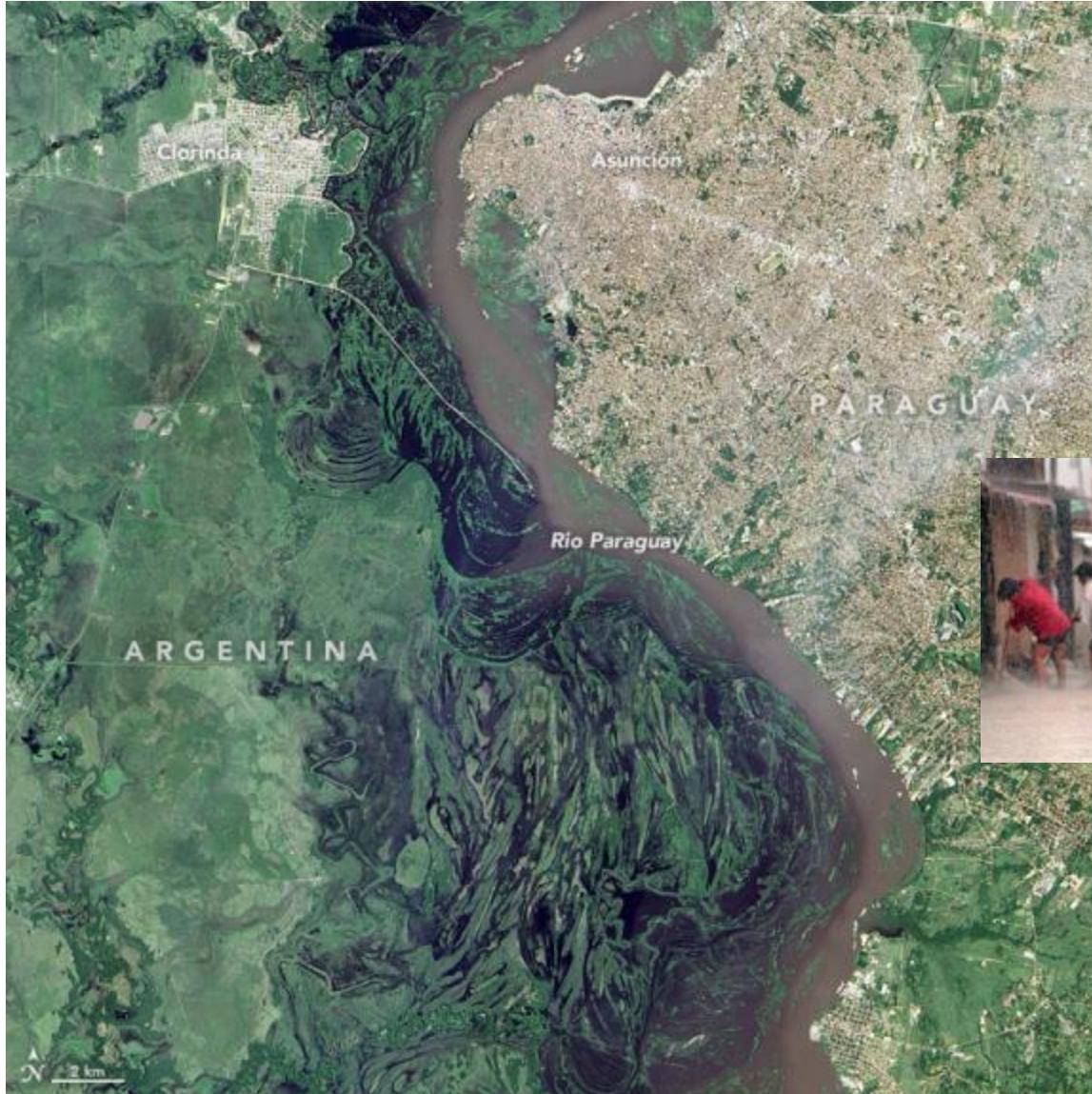


October, 2015
El Niño



How did 2015 flooding in South America compare?

Flooding in Paraguay & spread of mosquito-borne virus

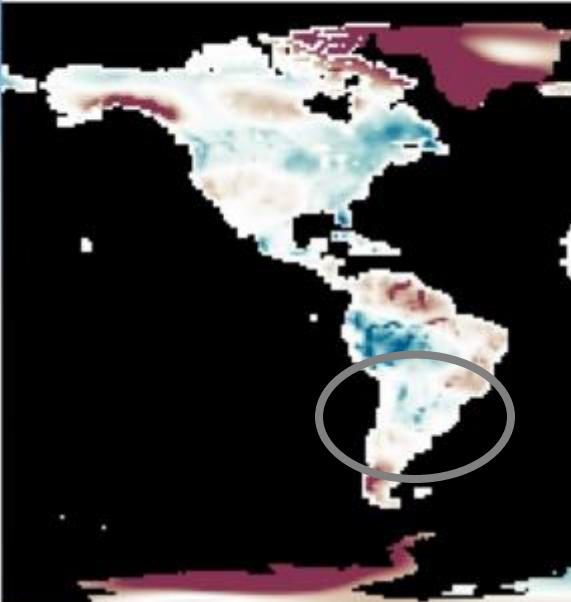


How did 2015 flooding in South America compare?

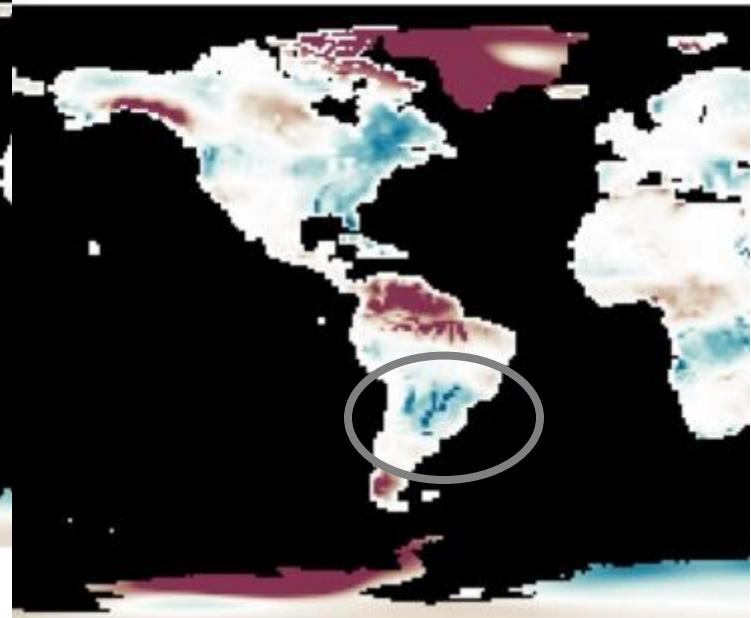
WATER EQUIVALENT ANOMALY (1 MONTH)



WATER EQUIVALENT ANOMALY (1 MONTH)

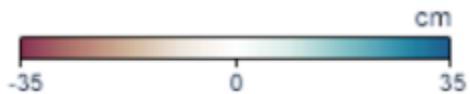


WATER EQUIVALENT ANOMALY (1 MONTH)



Dataset you are currently viewing: January 2015

Dataset you are currently viewing: February 2015



Dataset you are currently viewing: February 2016



Summary

- El Niño 2015/16 was one of the best-sampled El Niño events: satellites, in situ sensors on ships, buoys, gliders, aircraft
- Early data analyses indicate El Niño 2015/16 was one of the strongest and longest on record
- Impacted weather around the world: warmer, reorganized rain and drought patterns, growing season, fires and smoke
- Blamed for prolonged coral bleaching, fish die-offs, deaths in Asia due to smoke, millions hungry in Africa, spread of mosquito-borne disease (e.g. dengue, Zika) in South America
- Satellite imagery reveals some of these impacts and can be easily accessed through NASA Earth Observations (NEO)



References:

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Jacox, M. G., et al., Impacts of the 2015–2016 El Niño on the California Current System: Early assessment and comparison to past events, *Geophys. Res. Lett.*, 2016; 43, 7072–7080, doi:[10.1002/2016GL069716](https://doi.org/10.1002/2016GL069716).

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Koplitz, S.N. et al., Public health impacts of the severe haze in Equatorial Asia in September–October 2015: demonstration of a new framework for informing fire management strategies to reduce downwind smoke exposure. *Environ. Res. Lett.* 11, 2016; 094023 DOI:[10.1088/1748-9326/11/9/094023](https://doi.org/10.1088/1748-9326/11/9/094023)

Wendel, J., Dengue fever epidemics linked with El Niño, study says, *Eos*, 96, 2015, doi:[10.1029/2015EO037169](https://doi.org/10.1029/2015EO037169)