



Expanding the Impact of Your Research

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NASA Winds website → nasawinds.org

- Hub for the NASA's *Ocean Vector Winds Science Team*
- 16 archived meetings
 - 978 presentations
- 864 publications
- News
- Research One-Pagers
- NASA Winds Stories

NASA Winds Stories

Space Truthing Ocean Wind?
A mystery arises while calibrating winds from our seas and space

Ocean Winds & Microplastics
Connected in surprising ways

Beyond the Blob
Marine heatwaves ... all around us

Salt & the Wind
Exploring ties between wind, ocean layers and dissolved salt in our seas

Marine Heatwaves
How wind - or lack thereof - compounds extreme events

Current Thinking
How does feedback from the upper ocean impact air-sea interactions?

Vexed by HEX
Driven by winds, our sea levels can hit high extremes

Turns Out that Ocean Motion Impacts Winds
Ocean currents can influence winds far above Earth's surface

Ocean Wind Links Motion in our Seas & Skies
Known as "air-sea coupling," it describes the transfer of various properties between Earth's key climate fluids: seawater and air

Climate Research
Why wind data are crucial for this important endeavor

Research One-Pagers

This database catalogues one-pagers of the OWSST and those that employ our products. Some one-pagers include links to stories about that publication (i.e., StoryMaps). Like StoryMaps? Check out the full [NASA Winds Stories collection](#).

Sort: Author Title Year

One-Pagers: 30
Click on any image to enable toggling between 2-pagers.

07-Jan-2025 | Investigation of a Calibration Change in the Ocean Surface Wind Measurements from the SIO Buoy Array
[DOI: 10.1029/2024JD041111] | [StoryMap](#)

05-Nov-2024 | May, J. and Bourassa, M.A. | Upper Ocean Thermodynamic Response to Coupled Ocean-atmosphere Simulations of the Northern California Current System (J22)
[DOI: 10.1029/2024JD041111] | [Journal Article](#) | [StoryMap](#)

28-Aug-2024 | Samelson, R.M., Davis, S.M., Chelton, D.B., McPherson, E.D., and Rienecker, P.L. | Surface Currents and Relative Wind Stress in Coupled Ocean-atmosphere Simulations of the Northern California Current System (J22)
[DOI: 10.1029/2024JD041111] | [Journal Article](#)

22-Apr-2024 | Kemp, W.H., Wu, W., Zhang, L., Kato, S., and McCreary, J. | Atmospheric Oscillations Leading to Sea Level Extremes
[DOI: 10.1029/2023JD041111] | [Journal Article](#) | [StoryMap](#)

28-Jul-2023 | May, J.C. and Bourassa, M.A. | Ocean Surface Currents Influence Winds Well Above the Surface
[DOI: 10.1029/2023JD041111] | [Journal Article](#) | [StoryMap](#)

28-Dec-2023 | Madec, G.F., and Long, D.C. | Calibration and Validation of the RapidScan Scatterometer Using Tropical Rainforests
[DOI: 10.1029/2023JD041111] | [Journal Article](#)

News

08-2025 International OWSST Meeting
[24-Jan-2025] The 2025 International Ocean Vector Winds Science Team meeting will be held at EUMETSAT Headquarters in Darmstadt, Germany May 5-8, 2025
[DOI: 10.1029/2025JD041111] | [MORE](#)

08-2024 OWSST Level 2 Ocean Wind Vectors Released
[08-Oct-2024] The PODAAC is pleased to announce the first public release of the OWSST Level 2 Ocean Wind Vectors (L2O) derived from the SeaWiFS Temperature and Salinity Data (TSR) and Environmental Data (ED) collected by the Jet Propulsion Laboratory.

08-2024 OWSST Level 3 Merged Science Data Record Near Real Time Version 3.2.1
[08-Sep-2024] The PODAAC is pleased to announce the public release of the OWSST Level 3 Merged Science Data Record (SDR) Version 3.2.1 dataset, and daily watermask v3.2 dataset from UC Berkeley.

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You are here

Ocean Vector Winds »

When wind blows across our ocean, it roughens its surface. Some instruments in Earth's orbit can retrieve energy pulses scattered off ocean waves. The resulting patterns reveal the speed and direction of winds.

Observing and interpreting winds over our ocean is one of NASA's oldest traditions.

Nearly four decades and several satellite missions later, global data records of ocean vector winds are an important backbone of scientific discovery. These records are key to understanding the interactions between huge, restless systems that drive our climate: the ocean and atmosphere.

The **Ocean Vector Wind Science Team (OWSST)** is an international community of scientists, government agencies, and users. Members of the OWSST have produced high-quality data streams from Earth-observing satellite missions. They have analyzed and interpreted wind-driven processes. They've improved operational modeling and forecasting applications for safer seas and coasts.

What's New
Space Truthing Ocean Wind?
2025 International OWSST Meeting
Current Thinking
COVWR Level 2 Ocean Wind Vectors Released

Why Winds?

Ocean Wind Links Motion in our Seas & Skies

Wind Compounds Ocean Extreme Events

Wind Data are Crucial for Climate Research

NASA Winds Stories

See all >>

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Ocean Winds from Space

COVWR
The Compact Ocean Wind Vector Radiometer (COVWR) measures wind speed and direction from the International Space Station.

CYGNSS
The mission is comprised of eight Low Earth Orbiting (LEO) satellites that measure Earth's ocean surface wind speed and direction from GPS satellites.

ISS-RAPIDSAT
The instrument was on board the International Space Station and measured Earth's ocean surface wind speed and direction.

SMAP
The Soil Moisture Active Passive (SMAP) mission retrieves soil moisture, salinity, and wind speed data.

[Learn More](#)

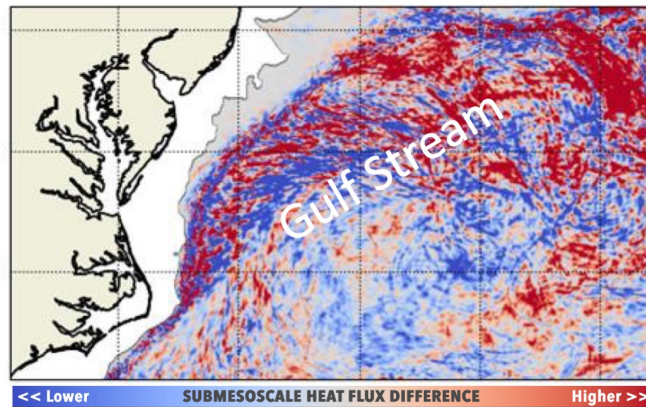
#1 We Can Help You Craft a One-pager Based on a Publication

Surface Currents Modify the Ocean's Vertical Structure

How do ocean surface currents change the vertical transport of energy in the ocean and into the atmosphere?

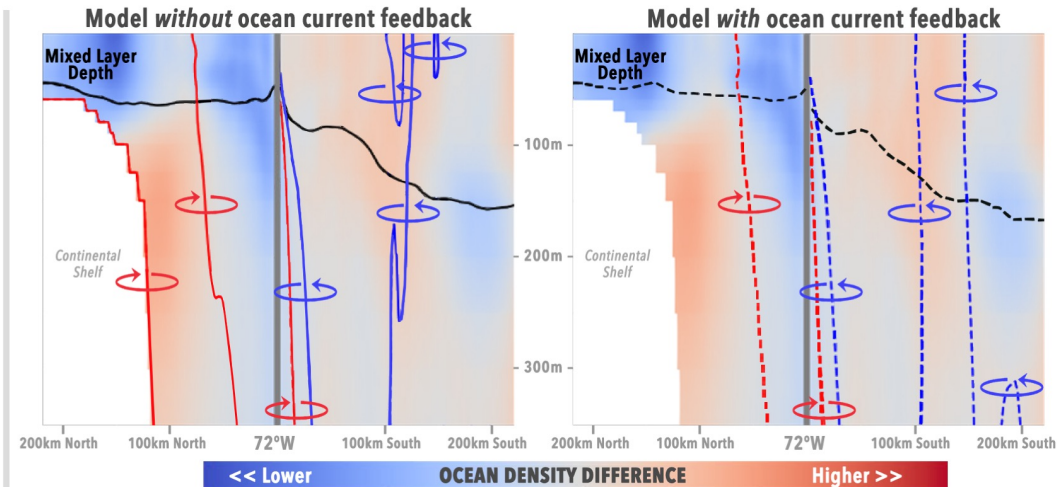
A high-resolution coupled ocean-atmosphere model is used to **examine the impacts of total surface currents on the ocean and atmosphere**. We find that physical processes such as current-induced changes in surface stress **modify vertical sub-mesoscale and mesoscale ocean motion**. This, in turn, **changes the vertical structure of temperature, salinity and density**.

Colors on this map show differences in **heat surface fluxes** averaged over one winter season. **These changes are large enough to impact weather.**



Submesoscale processes change ocean density structure – which depends on temperature and salinity – in a manner that is organized by mesoscale rotation:

- Current-induced patterns of temperature and salinity have **added submesoscale structure**
- These changes and the related vertical motions **are very likely to be important for ocean biology and biogeochemical processes**



Cross sections above show how coupling winds and currents:

- Change the ocean density structure (background colors)
- Align with modeled ocean current curl / vorticity (arrows)

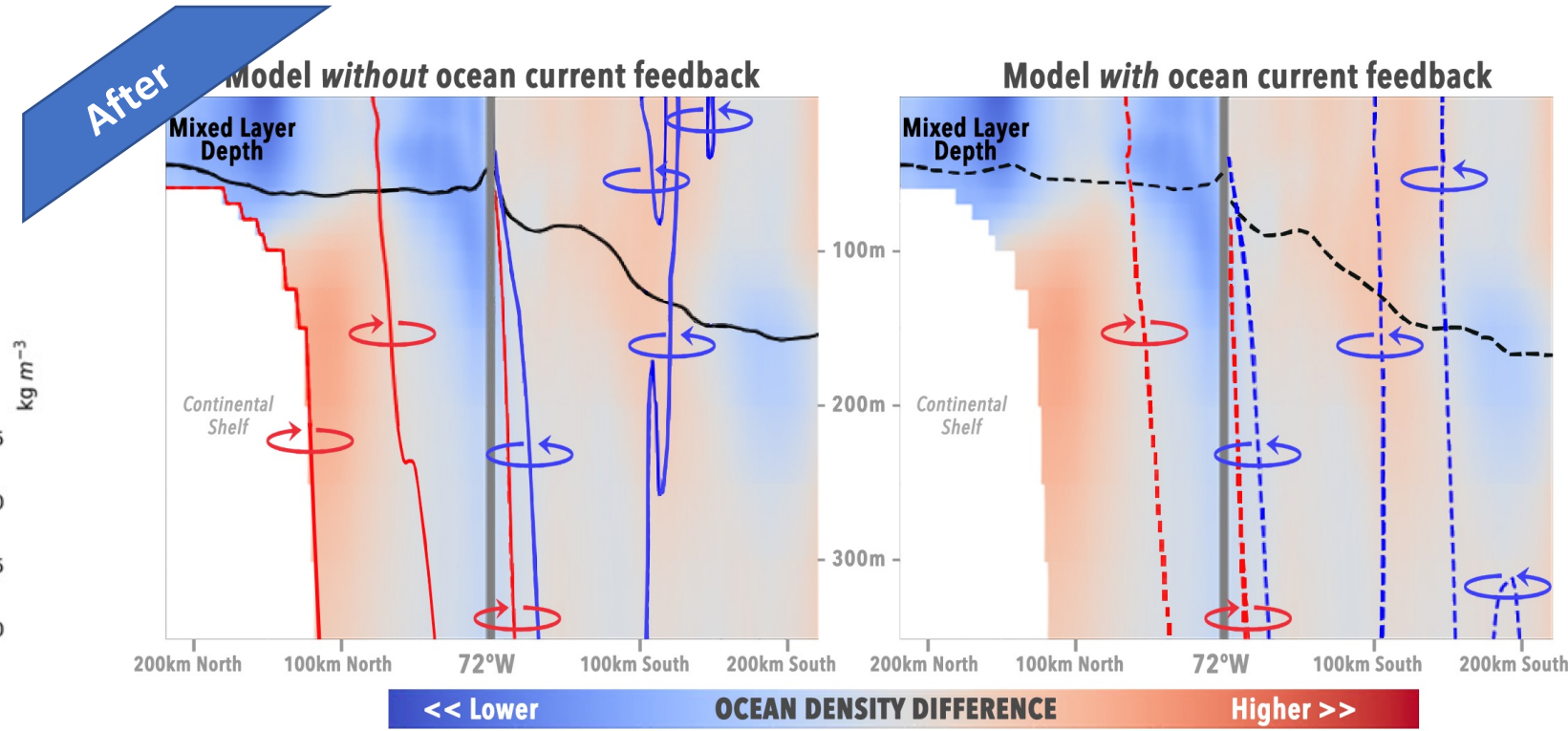
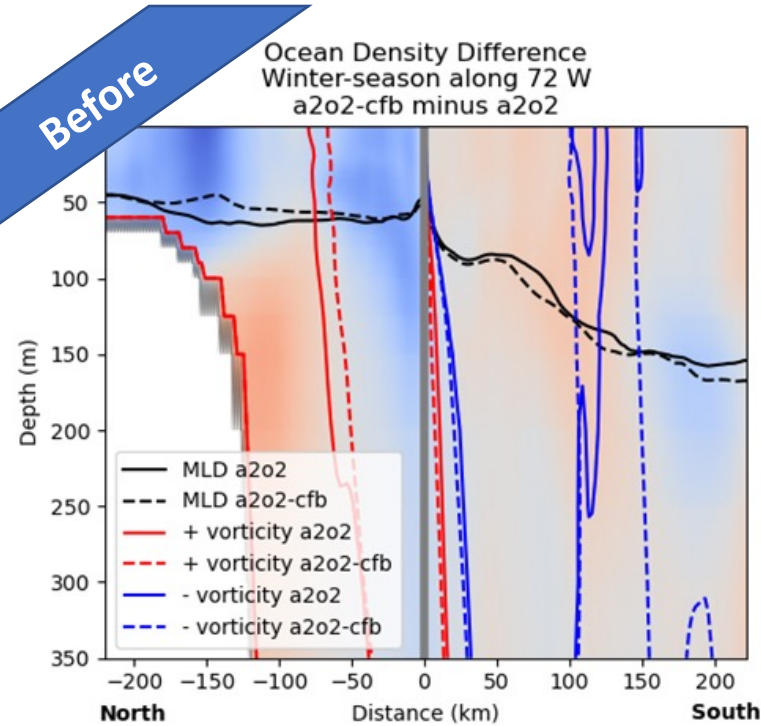
The density response is a **better match to the model with current and wind coupling**.

May, J.C., and Bourassa, M. A. (2024) [Upper Ocean Thermodynamic Response to Coupling Currents to Wind Stress over the Gulf Stream](https://arxiv.org/abs/2405.11994), *J. Marine Science and Engineering*, 12 (11), 1994.

Visit the interactive story:
<https://arcg.is/1XCrX1>

Funded through NASA's Ocean Vector Winds Science Team & the Office of Naval Research

#1 We Can Help You Craft a One-pager Based on a Publication



- ✓ Made the plots' title more descriptive
- ✓ Separated into two plots showing *model without feedback* (—) and *model with feedback* (- - -)
- ✓ Added arrows to indicate the direction of vorticity
- ✓ Added measurement description to the color bar itself
- ✓ Simplified the color bar for faster comprehension
- ✓ Added 72°W to the horizontal axis
- ✓ De-emphasized the axes' labels
- ✓ Labeled the *Continental Shelf* & *Mixed Layer Depth*

Check out our poster for more information

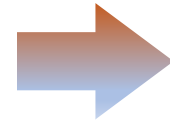
#2 We Can Create an Interactive Story Based on a Publication or Other Topic

Space Truthing Ocean Wind?

A mystery arises while calibrating wind
from our seas and space

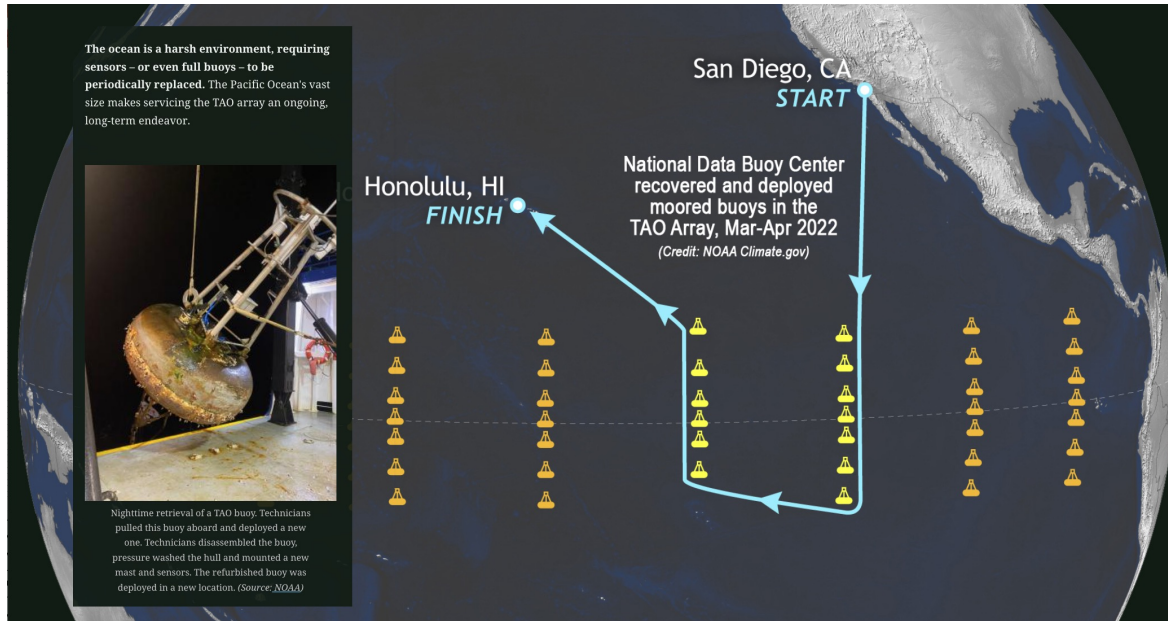
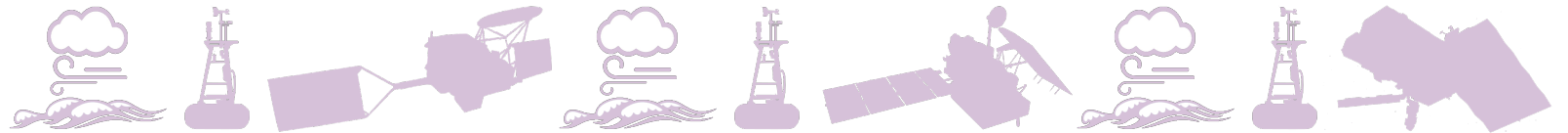
Based on Ricciardulli, L., Manaster, A. and Lindsley, R.
(2025) *Investigation of a calibration change in the ocean
surface wind measurements from the TAO buoy array*,
Bull. Amer. Meteor. Soc., doi: 10.1175/BAMS-D-24-0072.1

Direct URL



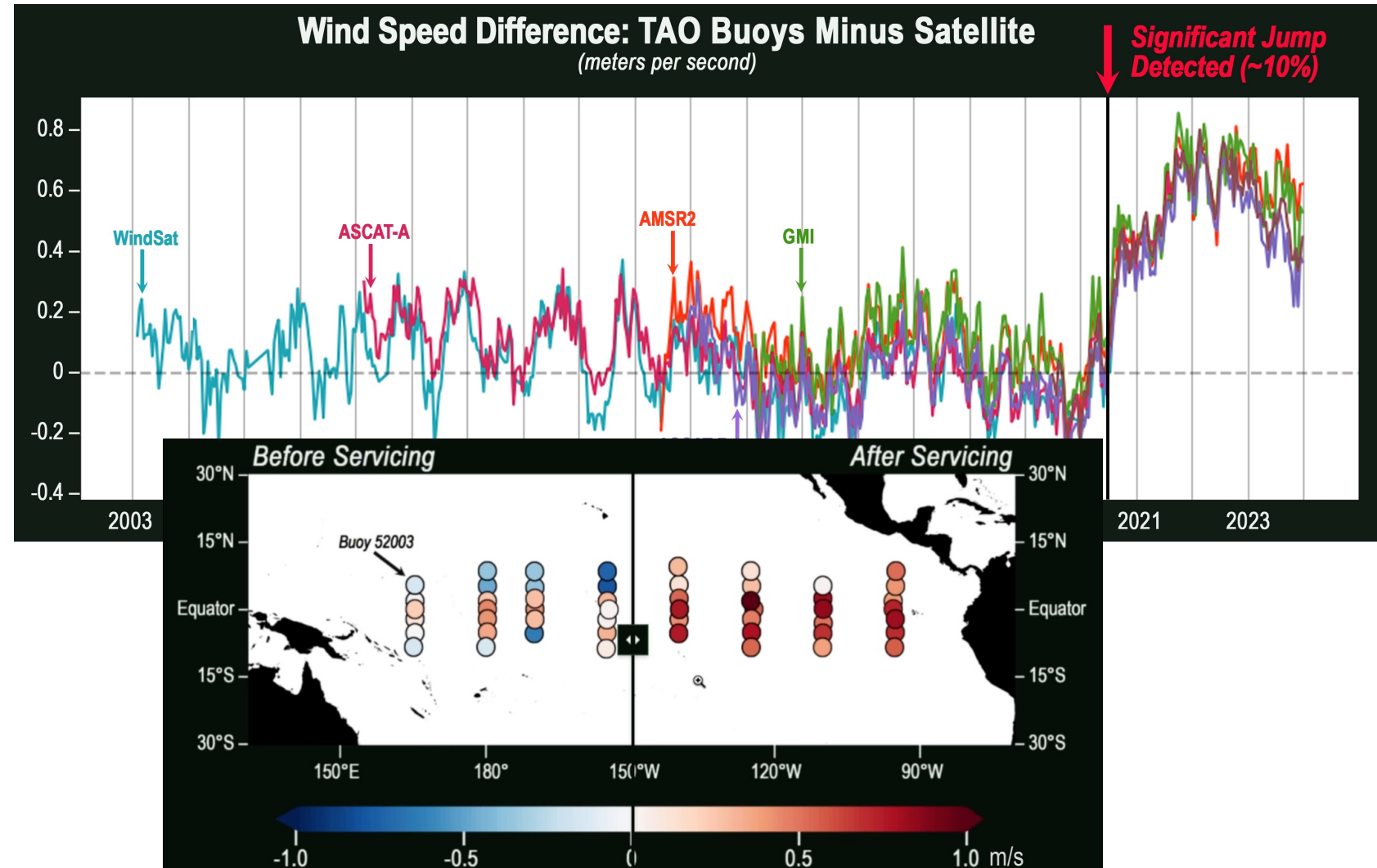
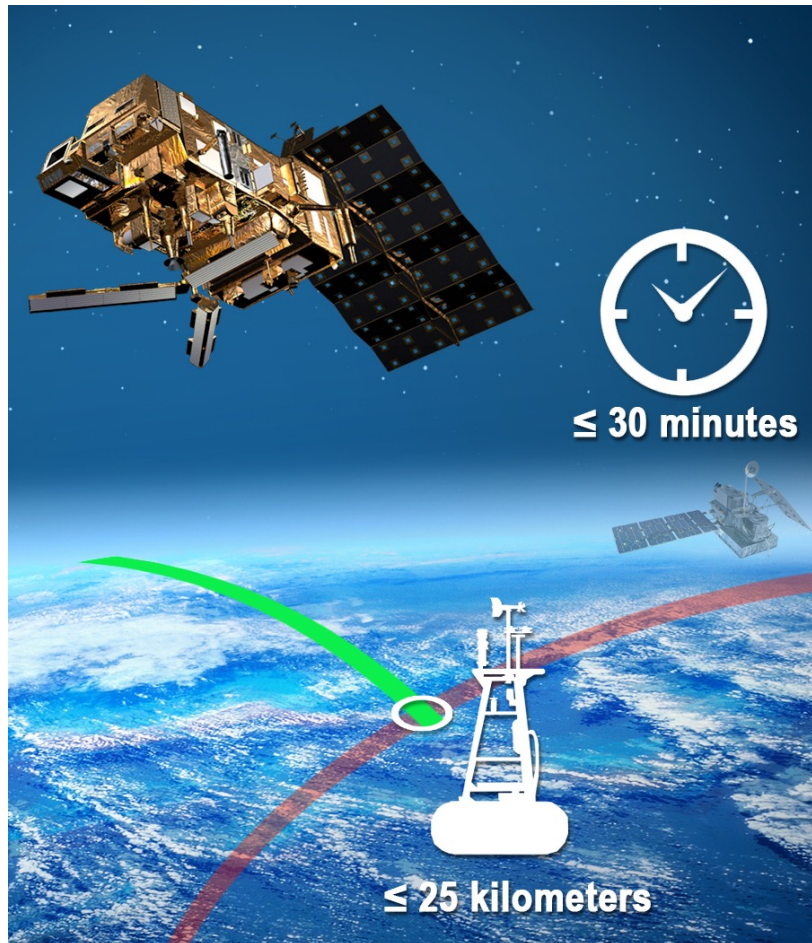
<https://arcg.is/1ub9zm>

- ✓ Introduce the El Niño connection
- ✓ Introduce key players: *Team Water* & *Team Space*
- ✓ Explain why marine equipment is periodically replaced
- ✓ Explain why cross-calibration of satellite data is crucial



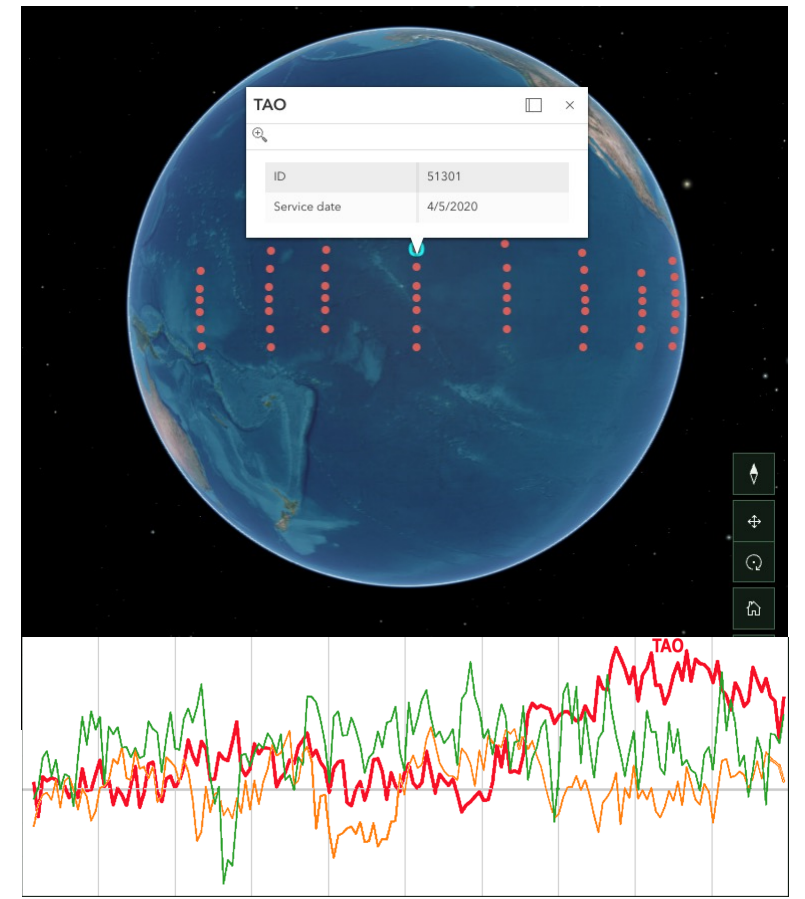
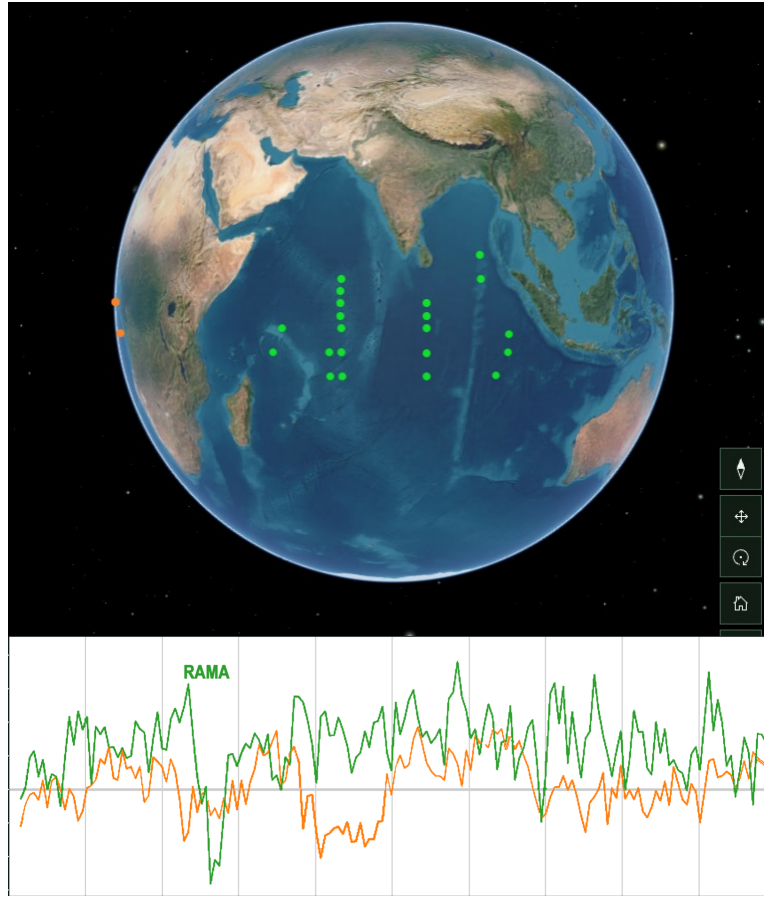
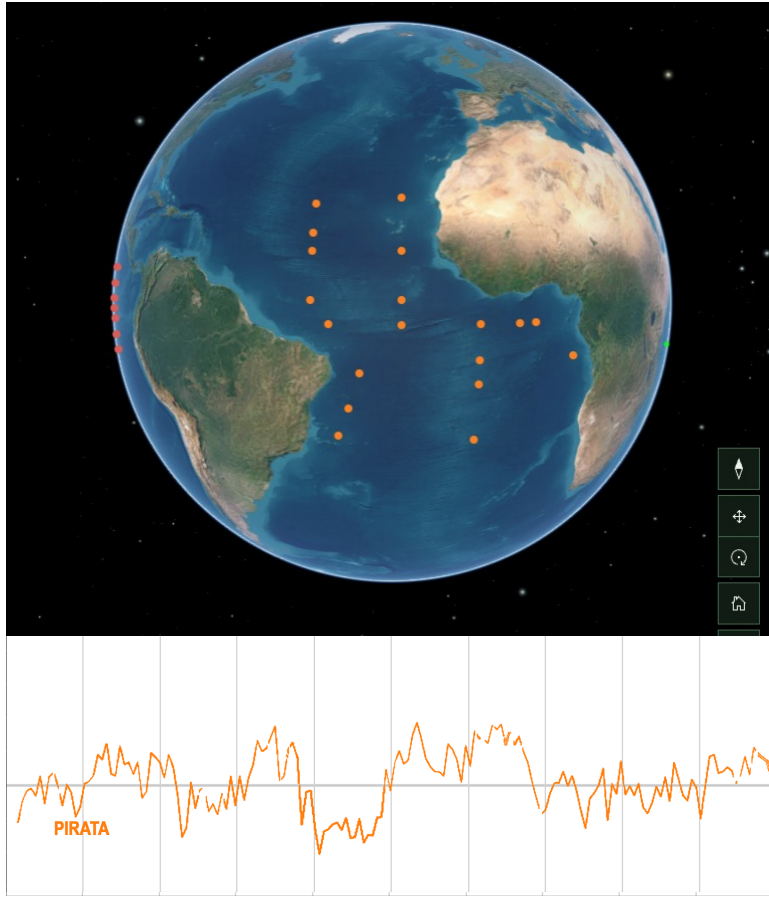
#2 We Can Create an Interactive Story Based on a Publication or Other Topic

- ✓ Describe satellite and buoy data matchups
- ✓ Present an annotated time series, highlighting the jump in wind speed first detected in 2020
- ✓ Include a slider so users can interactively compare wind speeds before & after buoy servicing



#2 We Can Create an Interactive Story Based on a Publication or Other Topic

- ✓ Provide a “tour” of global buoy arrays: PIRATA, RAMA and TAO
- ✓ Have clickable TAO buoy markers indicating service date
- ✓ End with a link to the original publication



Ricciardulli, L., Manaster, A. and Lindsley, R. (2025)
*Investigation of a calibration change in the ocean surface
wind measurements from the TAO buoy array*, Bull. Amer.
Meteor. Soc., doi: 10.1175/BAMS-D-24-0072.1.

Interested in Expanding the Impact of Your Research?

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Thanks for listening!