Identification of a spurious jump in the TAO buoy winds using satellite observations

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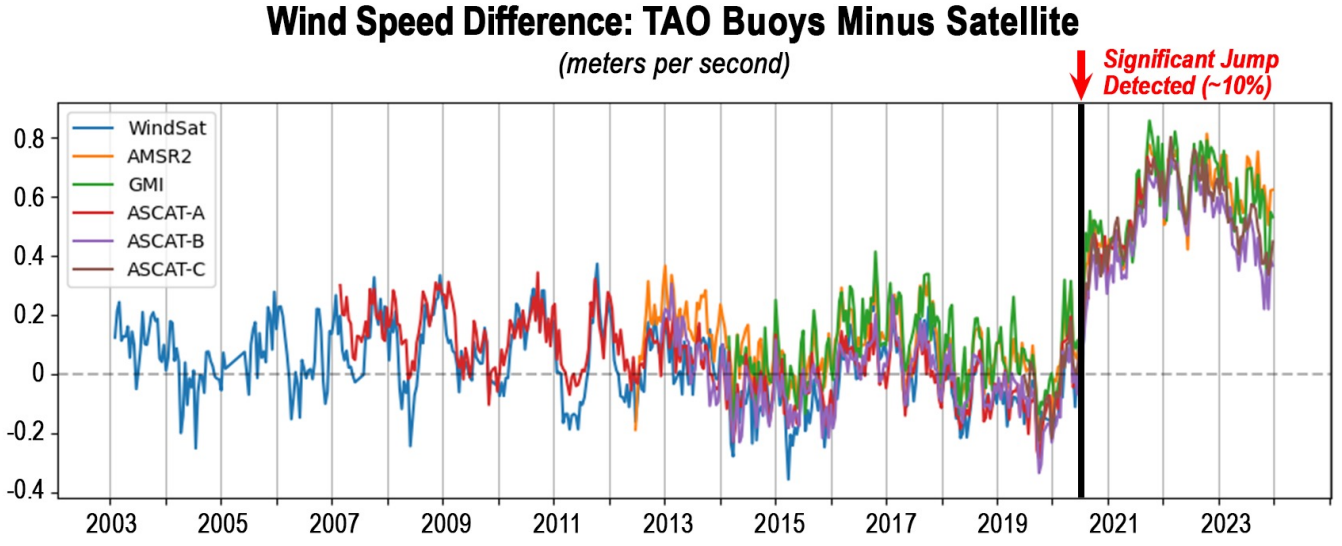

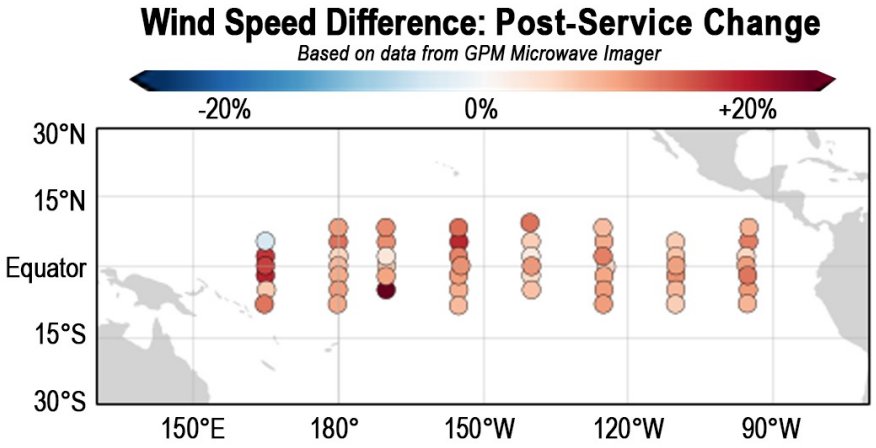

The jump was identified in all TAO buoys after they were serviced since mid-2020. The exact source of this change is still under investigation at National Data Buoy Center.

The Tropical Atmosphere Ocean (TAO) array is a system of 55 moored buoys in the tropical Pacific Ocean designed to monitor variability and investigate El Niño Southern Oscillation (ENSO) events.

Using wind retrievals from multiple cross-calibrated microwave satellites, we have identified a significant spurious change of 0.5-0.8 m/s (~10%) in the ocean surface wind from the TAO buoy array since mid-2020, impacting the global scientific community.

Other arrays (i.e., PIRATA, RAMA) are not affected. The resulting inconsistency between the calibration of the TAO versus the other buoy arrays undermines the use of global buoy data as ground truth, such as for satellite calibration.

These findings reinforce the value of global efforts from several groups in creating stable and accurate satellite ocean wind Climate Data Records able to detect changes as little as 0.1 m/s when averaged in space and time (Wentz et al. 2017).

Stability of the integrated satellite-buoy system is key for international ocean observation programs, climate variability studies, and data assimilation.

Ricciardulli, L., Manaster, A. and Lindsley, R.: Investigation of a calibration change in the ocean surface wind measurements from the TAO buoy array. *Bulletin of the American Meteorological Society*. Early Online Release, 7 January 2025, DOI 10.1175/BAMS-D-24-0072.1.

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