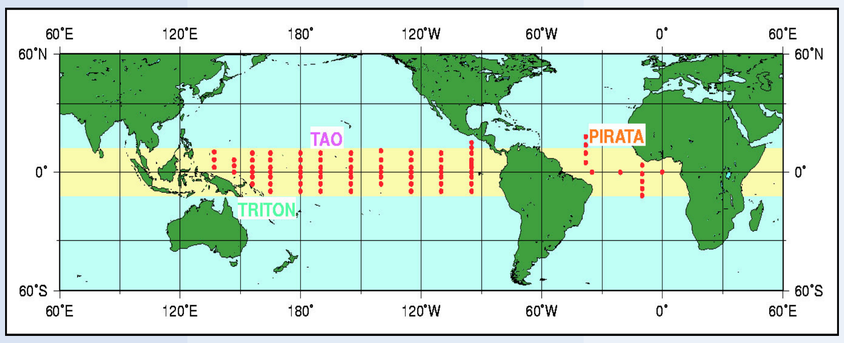
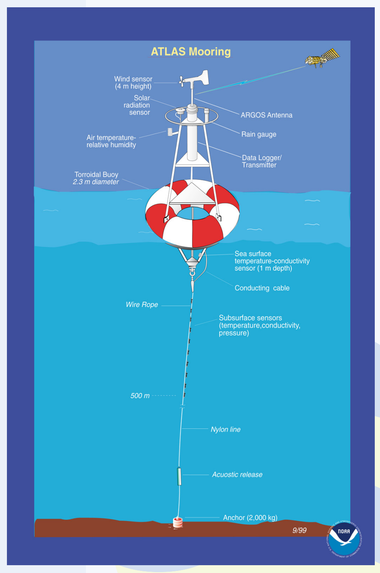
Effects of Fishing Activity on Tropical Moored Buoy Arrays

By their nature as fish aggregation devices (FADs) the impact of fishing activity around the moored ATLAS buoys can result in losses of mooring and fishing equipment

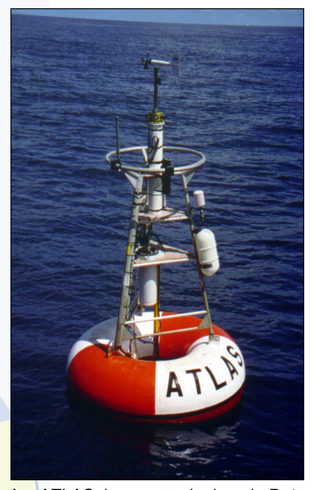


Distribution of TAO moorings in the topical Pacific and PIRATA moorings in the tropical Atlantic. The western portion (137ºE to 156ºE) of TAO is transitioning to be maintained by the Japan Marine Science and Technology Center (JAMSTEC) as part of their Triangle Trans-Ocean Buoy Network (TRITON)

El Niño events involve disruptions in the ocean surface winds and the upper ocean temperature pattern. These disruptions lead to seasonal climate variations and changes in fish migration patterns in many areas of the world ocean, including the tropics. The ability to predict future El Niño events and to estimate the degree to which they will disturb the ocean can help fishermen plan their operations



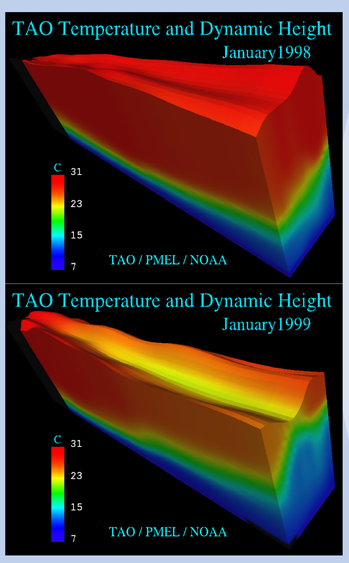
Schematic drawing of ATLAS mooring



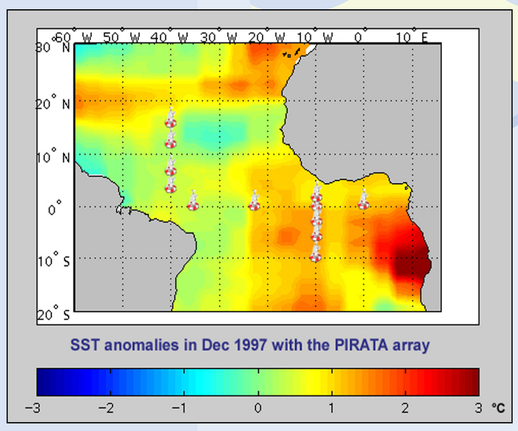
An ATLAS buoy, as deployed. Data are telemetered in real-time via Service Argos, and placed on the Global Telecommunications System (GTS) for assimilation into weather and climate forecast models

TAO and PIRATA buoys are deployed to improve our understanding and ability to predict the ENSO and Atlantic variability

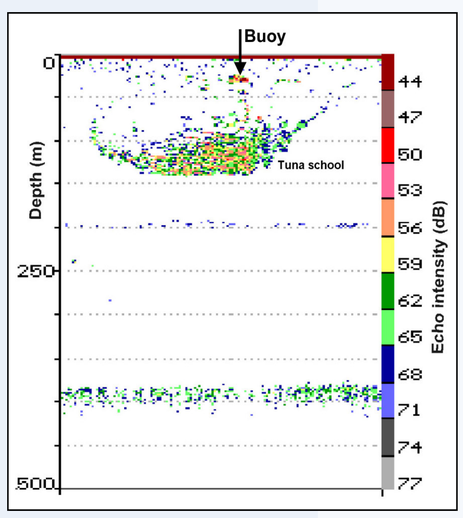
In addition to climate research, TAO and PIRATA data are made available to weather forecasters around the world. Measurements of the observed weather conditions that these buoys record and transmit regularly are an essential ingredient in weather predictions, which are of obvious benefit to fisherman



Three-dimensional plots of temperature and surface height from TAO data. These two figures contrast the very different ocean conditions between El Niño (Jan 98) and La Niña (Jan 99)

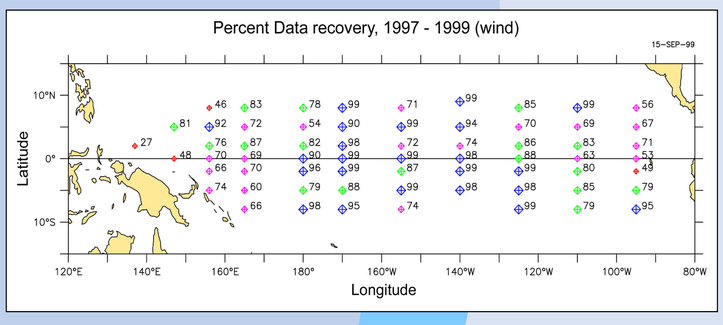


PIRATA, supported by Brazil, France, and the USA, is an array of 12 ATLAS moorings across the tropical Atlantic. The objective of PIRATA is to better understand and forecast ocean-atmosphere interactions that affect North and South America, and Africa

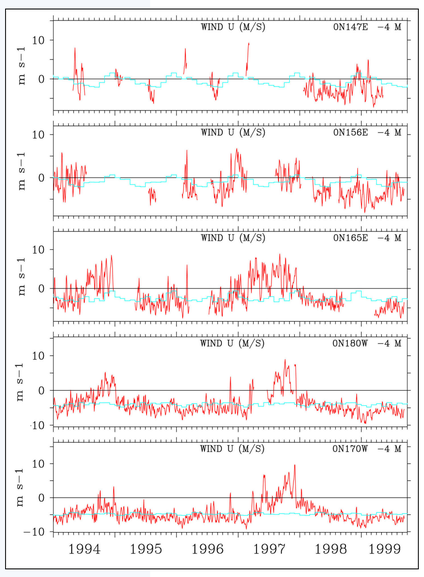


School of bigeye tuna (about 40 tons) observed by echo-sounder around a TOA Buoy (5°S - 140°W) in Jan 1996

Picture of a TAO mooring that has been severely vandalized



Percent good wind data returned for the period January 1997 to the present as a function of TAO mooring site. Data return for the central Pacific is generally much better than in the far western or far eastern regions of the basin. Data return from all TAO sensors (surface and subsurface) was 79% between 137º E and 165º E, 90% between 180º and 125º W, and 80% between 110ºW and 95º W



Wind speed from TAO moorings along the equator from 137º E to 170º W from January 1994 to the present. Gaps in the data are primarily due to sensor or mooring damage. There is a strong correlation between data gaps and mooring location, with the lowest data return occurring in the western Pacific, where fishing activity is higher

Conclusion: There is roughly an overall 10% data loss in regions of increased fishing activity, but losses can be much higher at specific sites. Entire mooring systems are often lost at some of the more frequently vandalized sites. Three TAO sites in the western Pacific, not included in these figures and statistics, have been abandoned due to repeated vandalism. The fishing community needs to know that data from these mooring are of great benefit to them, and that care should be exercised when operating near them

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