Tropical Moored Buoy Implementation Panel (TIP) Report

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PROGRESS SINCE SSG-11

TAO/TRITON data have been used widely for monitoring the evolution of the 2002-2003 El Niño event and for initialising ENSO forecast models at operational weather and climate centres around the world. TAO/TRITON data also underpin much of CLIVAR research on ENSO and related variability in the tropical Pacific. In calendar year 2002, 43 refereed publications used TAO/TRITON data to improve the description of tropical Pacific phenomena, to diagnose variability on seasonal to interannual timescales, and to validate and improve climate models, data assimilation methods, and satellite products (see http://www.pmel.noaa.gov/tao/proj_over/pubs/taopubsr.shtml). The value of TAO/TRITON mooring time series for CLIVAR research is enhanced by shipboard measurements of physical, chemical and biological parameters made on repeat routine buoy serving cruises. These cruises also afford opportunities to support other elements of the climate observing system by providing a convenient platform for buoy, drifter and weather balloon launches and other measurement activities.
The originally planned TRITON array of 18 sites in the Pacific and Indian Oceans was completed in August 2002.

PIRATA, begun in 1997, has not yet achieved the same level of scientific productivity as TAO/TRITON. Use of PIRATA data for research and forecasting is growing though. The 9th session of the PIRATA SSC was held in Angra dos Reis, Brazil from 3-5 February 2003 to review progress and plans. Problems with vandalism, data return, ship time, and shipping were discussed, as were possible array expansions.
As part of the CLIVAR/OOPC Time Series Reference Stations initiative, 5 TAO/TRITON sites and 3 PIRATA sites are recommended as future surface flux reference stations. Additional sites are recommended as multi-disciplinary observatories.

Process studies embedded in TAO/TRITON: 1) The EPIC experiment along 95°W is winding down this year after a successful 4 year field phase. 2) Discussions are underway in US CLIVAR for a possible study of equatorial upwelling in the Pacific, incorporating intensive field measurements in the framework of the TAO/TRITON array. The planned study, called PUMP (Pacific Upwelling and Mixing Physics), will hold a first organizational meeting in Boulder, CO during 19-21 May 2003. See http://www.pmel.noaa.gov/~kessler/clivar/pump.html.

The TIP was represented by M. McPhaden and M. Jury at the Indian Ocean GOOS meeting held during 4-8 November 2002 in Mauritius. Discussion concerning moored buoy measurements benefited from a multiple-author position paper developed prior to the meeting (Masumoto et al, 2002). The meeting made progress towards design of a large-scale open ocean moored buoy array, identifying near term priorities relevant to CLIVAR science. At the conclusion of the meeting, an ad hoc working group of the TIP was formed to further develop the array design and implementation strategies.

The ATLAS Buoy design continues to evolve. This year, field testing of sonic anemometers has begun in the hopes of reducing wind data loss from vandalism and increasing wind measurement accuracy. An intercomparison of IMET, TRITON, and ATLAS buoy meteorological measurements highlighting the general comparability of these measurements was published as Woods Hole technical report in December 2002. Barometric pressure and downwelling long wave radiation from ATLAS moorings along 95°-110°W have been added to the TAO data delivery web page, and barometric pressure from ATLAS moorings is now being transmitted via the GTS. A longer term development underway at PMEL and in the prototype phase at present is to develop a new generation of deep ocean surface mooring that can more easily be constructed, deployed and serviced and that will be less expensive than existing technologies.

The Report of the CLIVAR co-sponsored Tropical Moored Buoy Workshop, held in Seattle in September 2001, was published in June 2002. The report strongly endorsed the science being supported by the TAO/TRITON array, its continuation (with PIRATA), and an expansion of moored buoy measurements into the Indian Ocean.

TIP ISSUES

In the past year, the Administrator of NOAA recommended transfer of TAO and PIRATA operations from PMEL to NOAA's National Data Buoy Center (NDBC). A transition plan was submitted to the NOAA Administrator on 15 January 2003. The NOAA Executive Council met in March 2003 and recommended against the transfer at this time. Rather, NOAA has adopted a strategy to determine observational requirements in support of its climate forecasting and assessment missions, considering all components of the observing system as a coherent whole in making recommendations for transition from research to operations. Input from the CLIVAR SSG to the NOAA Administrator on this issue was both welcomed and beneficial in the decision making process.

IMPACTS OF ACTIVITIES OF OTHER PROGRAMS

TAO/TRITON data are used extensively in ENSO forecasting and in generating climate products. TAO/TRITON and PIRATA data are incorporated into GODAE data bases to support operational ocean data assimilation and data product development.

DECISIONS REQUIRED FROM SSG

Formal recognition by CLIVAR is requested for the TIP Ad Hoc Indian Ocean Working Group. The primary goal of the group would be to develop and coordinate implementation of a moored buoy array to address CLIVAR scientific objectives and to support operational analyses and forecasting. Individuals willing to serve on the working group are: M. McPhaden (USA), M. Jury (So. Africa), Y. Masumoto (Japan), R. Molcard (France), M. Ravichandran (India), C. Perigaud (USA), G. Vecchi (USA), G. Meyers (Australia), VSN Murty (India), and P. Hacker (USA). This working group may not be necessary however if CLIVAR establishes an Indian Ocean Panel (see below).

FUTURE DIRECTION OF CLIVAR

The CLIVAR SSG should consider establishing an Indian Ocean Panel given the importance of the region for understanding climate from intraseasonal to decadal time scales, the recent increase in resources deployed in the Indian Ocean, and the need for a more coordinated approach towards developing and implementing sustained multi-national ocean observational systems in the region.