Development of a Next Generation Platform and Instrumentation for Continuous Ocean Observations (PICO) for Reducing the Costs of Observations

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Project Summary

The purpose of developing a Platform and Instrumentation for Continuous Observations (PICO) is to advance the state of NOAA's open ocean observation systems with the development of an easy-to-deploy and low-cost mooring system that makes use of novel buoy technology and commercially available sensors and instrumentation (www.pmel.noaa.gov/pico). This Next Generation Climate Observation project is developing modular components of moored ocean sensor platforms to enhance and eventually replace the tropical moored arrays that are a cornerstone of the climate observing system. One module is the PRAWLER (Profiler + Crawler) mooring development, which will strengthen our moored sampling capability by producing well-resolved vertical profiles (not the present few discrete samples), and making a reliable time series of salinity. The sampling is also reconfigurable in real time, allowing adjustment for process studies, responses to storm situations or marine disasters, evaluating sampling strategies and power management. The PRAWLER uses no battery power for locomotion and has a heave energy conversion rate of ~80%; that is, for every 1 m of wave heave, the PRAWLER climbs 80 cm. All sampling is done during descent at user-defined intervals and all data is returned in real time. The value is significant cost reductions and improved data that can be made with a single profiling instrument, as opposed to ~12 individual sensors on a mooring line. As of late Oct '12 we have observed an average of 25 profiles to 450 m being made per day and a total of ~1300 profiles (and counting) made on each system. We are telemetering and storing eight profiles per day and the user can select higher sampling rates to suit the goals of the experiment or the event being observed.

After 4 years of engineering development and tests, two PRAWLER moorings were deployed in September 2012 in the subtropical Atlantic as part of the SPURS (Salinity Processes in the Upper Ocean Regional Study; http://SPURS.jpl.nasa.gov/SPURS/). Over the year-long experiment, we will gain real-world experience with a Prawler deployment comparable to their eventual operational mission. In FY'13 we will evaluate the two SPURS PRAWLER datasets and recover the moorings. Additionally, two other moorings of this type will be completed and made ready for deployment in a location to further the testing and evaluation of the PRAWLER and surface MET observations. Deployment location will depend on program goals and available resources. The SPURS PRAWLERs will be deployed for one year and return data in realtime, however, complete comparisons per 10 GCOS Climate Monitoring Principles are dependent on the WHOI subsurface data that will not be available until FY '14.

Users of this PICO- SPURS data are twofold: 1) ocean and atmospheric researchers and program managers studying the global water cycle as part of the SPURS project; and 2) engineers at NOAA-PMEL who are evaluating the quality and endurance of the PICO moorings for possible future inclusion in the tropical moored arrays according to the 10 GCOS Climate Monitoring

Principles. Secondary users are climate and coastal researchers, met services, warning and forecast managers, and industry.