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SHIP OBSERVATIONS TEAM

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**SOOPIP-VII
ISSUES FOR THE SOOP**

Observing Other Ocean Variables

(Submitted by Dr Gustavo Goni, Oceanographer, NOAA/OAR)

Summary and purpose of document

This document provides information on observing systems other than XBTs promoted by Ships-of-Opportunity programme Implementation Panel (SOOPIP) for measuring ocean variables such as Sea Surface Temperature and Salinity, CTD profiles, and ocean current profiles. These observing systems include: ThermoSalinoGraphs (TSG), Expendable CTDs (XCTD), and Acoustic Doppler current Profilers (ADCP). This document explores how the use of such systems can be included in the SOOP activities, and evaluates their performances, cost-effectiveness, strengths and limitations.

ACTION PROPOSED

The SOOP Implementation Panel is invited to:

- (a) Review the information contained in this report, and make comments or suggestion as necessary and/or as appropriate;
 - (b) Consider opportunities to include other ocean variables within the SOOP;
 - (c) Discuss issues regarding sampling needs and strategies with the scientific community;
 - (d) Discuss other variables to sample.
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DISCUSSION

Introduction

1. TSG Report. The NOAA supports the collection of sea surface salinity (SSS) and sea surface temperature (SST) data from thermosalinographs (TSG) installed on ships of the NOAA fleet and ships of the Ship-of-Opportunity Program (SOOP). The NOAA/AOML currently maintains the TSGs in two cargo ships (SOOP). A TSG in the cruise ship *Explorer of the Seas* is maintained in collaboration with the University of Miami, Florida, USA. The University's data is currently being placed into the Global Telecommunications System (GTS). Additionally, the NOAA maintains thermosalinographs in fifteen ships of its research vessel fleet. It is anticipated that soon the NOAA/AOML will begin to quality control (QC) said data once their real-time transmission commences.
2. XCTD Report. Observations of large-scale T/S variability are crucial to investigate, for example, the variability of geostrophic flows used to determine heat advection, understanding the fresh water cycle. The Scripps Institute of Oceanography operates a high density XBT network in the Pacific and Indian Oceans. One of the scientific goals of this network is to measure the meridional transport of ocean properties by the large-scale circulation. To infer the circulation features from temperature observations, accompanying salinity information is necessary. Approaches to inferring the needed salinity information include relying on climatological salinity estimates or taking concurrent salinity samples while taking temperature samples. The Scripps Institution of Oceanography (SIO) has been using expendable CTD probes as a means of sampling salinity during high-density XBT cruises. The sampling strategy is much reduced relative to the spacing of the XBT measurements. Typically, on a cruise with 300 XBT samples, there would be approximately 15 XCTD observations. During 2006, SIO deployed forty-one XCTDs as part of the High-Resolution XBT Program (HRX). These deployments were distributed between two HRX lines, PX08 (New Zealand-Panama) and PX37-PX10-PX44 (San Francisco-Hawaii-Guam-Hong Kong) with approximately six XVTs per transect. Over the past three years, the Argo profiling float project has gradually supplanted the broad-scale requirements for the XCTDs on HRX lines. The final XCTD deployments were completed in late 2006, targeting oceanic regions, which were sampled by the Argo array or regions with small-scale salinity variability such as the equator and western boundary currents.
3. ADCP/Continuous Plankton Recorder/PCO2

The University of Rhode Island/Graduate School of Oceanography collaborated with several NOAA laboratories in a Ship-of-Opportunity Program that sampled the Gulf Stream in the Atlantic Ocean. This project, referred to as the Oleander Project (<http://www.po.gso.uri.edu/rafos/research/ole/index.html>), implements an Acoustic Doppler Current Profiler, which samples upper ocean currents on board the Oleander vessel. This project has been ongoing since 1992, and will be described in further detail in another document. In addition to the ADCP, the *M/V Oleander* has a Continuous Plankton Recorder operated by the NOAA National Marine Fisheries lab in Narragansett, Rhode Island, USA; a thermosalinograph and XBT system operated by the NOAA/AOML and a partial CO2 system operated jointly by the NOAA/AOML and the Bermuda Biological Station for Research.
