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(JCOMM)

SHIP OBSERVATIONS TEAM (SOT)

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SOUTHERN OCEAN DATA

(Submitted by Katherine Hutchinson (South Africa))

Summary and purpose of the document

This document provides information on current and planned data and ocean observation strategies for the region of the Southern Ocean south of Africa.

ACTION PROPOSED

The Team will review the information contained in this report, and comment and make decisions or recommendations as appropriate. See part A for the details of recommended actions.

- A - DRAFT TEXT FOR INCLUSION IN THE FINAL REPORT**9.5.2 Southern Ocean Data**

9.5.2.1 Katherine Hutchinson (South Africa) reported on the availability of SOOP data from the Southern Ocean. She recalled that the southeast Atlantic sector of the Southern Ocean connects the Atlantic with the Indian Ocean and the Antarctic Circumpolar Current, thereby acting as a major conduit within global ocean circulation. Thermohaline transports in this region are widely thought to have a critical influence on global climate. Yet magnitudes of the associated heat and salt content variations are poorly understood due restricted hydrographic observations and model limitations. The GoodHope (GH) repeat sampling track, which spans the ocean domain between Africa and Antarctica, was established in 2004 with the aim of addressing an identified deficiency in hydrographic data. The location of the GH line was carefully chosen to follow the Topex/Poseidon (T/P)-Jason1 altimeter flight path exactly in the northern domain, and then run directly along the Greenwich Meridian south of 51°S. The Atlantic Oceanographic and Meteorological Laboratory (AOML) of NOAA have established a high density XBT transect that overlays the GH line, named AX25. In addition, the layout of the GoodHope line is also designed so that it is a convenient route for the “logistic ferry services” that re-supply the South African Antarctic base to follow from Cape Town South Africa, to the Antarctic ice shelf. Since establishment of this ocean monitoring line, there have been 27 XBT transects undertaken along AX25, and 6 CTD occupations on or within very close proximity to the GH track. This data has proven invaluable in improving our understanding regarding the heat and salt changes taking place in the African choke point of the Southern Ocean, however, some challenges still remain. The Panel focused on the following issues:

Summertime seasonal bias of data acquisition

9.5.2.2 The Panel noted that data for the Southern Ocean is largely seasonally biased, as most cruises are restricted to the austral spring-summer months due to the constraints of harsh sampling conditions during winter. Knowledge of the seasonal cycle therefore remains poorly understood. One occupation of the GH line during winter has been undertaken, and another is planned for July 2015.

XBT temperature bias

9.5.2.3 Results found in a study comparing XBT profiles with collocated CTD casts support the hypothesis of the regional dependence of the XBT fall rate on water temperature, and thus water viscosity. In addition, results obtained highlight the need to develop an XBT bias correction scheme specifically appropriate to the Southern Ocean. Furthermore only type Deep Blue is used which has a maximum sampling depth of 800m – alternative model could be used to obtain a deeper cast i.e. T5.

Need for full depth profiles

9.5.2.4 While XBT data is extraordinarily valuable in obtaining a better understanding of upper ocean temperature and heat content, full depth profiles are needed in order to fully understand the thermohaline alterations taking place in all water masses.

Synthesis of all data and coordination of ocean sampling efforts

9.5.2.5 A variety of ocean projects exist which aim to collect and further monitor ocean parameters in the domain south of Africa. Monitoring of the Agulhas current, the Agulhas Return Current and the variability within the Cape Cauldron and South Atlantic is underway; however there has been limited collaboration, communication and data sharing. Better coordination of these

efforts would provide an improved “big picture” view of variability in an area that is hypothesized to play a major role in global ocean circulation and water mass alteration.

Appendices: none
