First results from the ARAMIS project

S. Arnault¹, P. Lattes¹, D. Diverres², S. Jacquin³, M. Ceder⁴

(1) LCE/IFREMER, Université Pierre et Marie Curie, Tour 45-5me étage, Case 100, 4 place Jussieu, 75230 Paris Cedex 05, France
(2) Centre IRD de Brest, BP 70, 29280 Plouzané Cedex, France
(3) Milieu France, quai des Abeilles, 76600 Le Havre, France

The ARAMIS Project

The ARAMIS project (Atollites et un Gulf Atlantic et Musée In Situ) has been developed by the French CNES (Centre National d’Etudes Spatiales) and IRD (Institut de Recherche pour le Développement) organizations in order to get a long term survey of thermo-haline structures in the Tropical Atlantic. Constrained with satellite data such as TOPEX/Posidonia and Jason one, this experiment will offer the opportunity to approach scientific questions such as the characteristics of the surface circulation long term variability in the tropical Atlantic, the role of specific oceanic processes in that variability or the connection to other parameters, other oceanic basins and climatic indices.

ARAMIS began in July 2002 for a 5 year-duration. The merchant ship AX11 line crosses the major equatorial currents (westward North Equatorial Current –NEC–, eastward North Equatorial Counter-Current –NECC–, the InterTropical Convergence Zone and the Atlantic regions of Maximum Salinity Water around 20°N and 90°W which are important features in a climatic context. The line is also superimposed to Jason track n°1.

For a year, in both spring then fall, when the tropical Atlantic oceanic circulation reaches its maximum/minimum intensity in the surface layer, 90 XBTs/Expendable Bathymthermograph (XBT) and 90 Expendable Conductivity-Temperature-Depth (XCTD) are launched alternatively along the ship route between 20°N and 90°W, together with in-situ information collected (Sea Surface Salinity –SSS–, Sea Surface Temperature –SST–, meteorological conditions).

In 2004, a collaboration with NOAA Miami was developed to deploy ARGOS float along the ARAMIS ship route. Starting with ARAMIS 1, 4 to 8 floats per cruise have been launched, simultaneously with an expendable probe (usually an XBT).

Comparison between ARAMIS T-S profiles and the neighboring XBT/XCTDs data can be done within a time lag between the profiles not exceeding a few hours. The total number of deployed ARGOS floats is presently 28, but only 16 of them can be used for such a study: the first 8 ones were not suited to give T-S profiles within launching period (cycle 5), one was definitely lost, and 3 others were flagged.

In this study we did intensive comparisons with the concomittent data sets that exist in that area: ARGO floats and altimetry. The aim of the ARAMIS project is to perform a survey of the tropical Atlantic Ocean between 2002-2007 to give, in association with altimetric missions, a realistic picture of the ocean time-space variability. The general good agreement between all the data sets has good prospects for the purposes of the project.

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Conclusion and Perspectives

The aim of the ARAMIS project is to perform a survey of the tropical Atlantic Ocean between 2002-2007 to give, in association with altimetric missions, a realistic picture of the ocean time-space variability. In this study we did intensive comparisons with the concomitant data sets that exist in that area: ARGO floats and altimetry. The large scale structures and the seasonality described with the ARAMIS sections clearly appear on both ARGO products even if the objective analysis smoothing is evident. The impact of the number of floats available in the domain is important. For instance, the agreement between ARAMIS and the linear interpolation of the ARGO floats in October 2006 (more than 30 profiles collected along the ship route versus 15 for the first cruise) is impressive even considering small scale variability compared to the first sections.

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