Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

AAS01-P02 会場:コンベンションホール 時間:5 月 24 日 15:30-17:00

Indian Ocean observation for ocean and climate variability in JAMSTEC
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安藤 健太郎 [1*], 升本 順夫 [1], 堀井 孝憲 [1], 植木 巌 [1], 石原 靖久 [1]
ANDO, Kentaro[1*], MASUMOTO, Yukio[1], HORII, Takanori[1], Iwao Ueki[1], Yasuhisa Ishihara[1]

[1] 海洋研究開発機構
[1]JAMSTEC

In the eastern Indian Ocean, two TRITON buoys deployed in October 2001 were the initiation of the current RAMA (Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction) buoys at 1.5S-90E and 5S-95E, and added one smaller size m-TRITON buoy at 8S-95E in November 2009. The TRITON buoys at 1.5S-90E and 5S-95E were replaced by smaller size m-TRITON buoys in 2006. We also maintain ADCP mooring site at 0-90E since 2000. The mooring provides quite precious information for ocean and climate variability and change. As an example of recent achievements in JAMSTEC, the time series analysis of the mooring buoy in the eastern equatorial Indian Ocean observed details of subsurface ocean conditions associated with Indian Ocean Dipole (IOD) events in 2006, 2007, and 2008. IOD is one of the inter-annual climate variability in the Indian Ocean, associated with the negative (positive) SST (Sea Surface Temperature) anomaly in the eastern (western) equatorial region developing during boreal summer/autumn seasons. In the 2006 IOD event, large-scale sea surface signals in the tropical Indian Ocean associated with the positive IOD started in August 2006, and the anomalous conditions continued until December 2006. Data from the mooring buoys, indeed, captured the first appearance of the negative temperature anomaly at the thermocline depth with strong westward current anomalies in May 2006, about three months earlier than the development of the surface signatures. Similar appearance of negative temperature anomalies in the subsurface were also observed in 2007 and 2008, while the amplitude, the timing, and the relation to the surface layer were different among the events. These subsurface evolutions within the ocean would be a key factor for better understanding of IOD mechanisms and its predictability.

Engineering developments in JAMSTEC are also essential to contribute sustaining and developing ocean observations. TRITON buoy, which has been used since 2000, is tough to severe oceanic and atmospheric conditions, and its data recovery rate from whole array in 2000-2005 was high (average of data recovery is more than 90%). Because of several disadvantages such as difficulties to deploy and recover by a smaller vessel etc., we have developed a new smaller and lower cost surface buoy system with flexibility in modifying electric system, named m-TRITON buoy system. The new m-TRITON buoys were already installed in Indian Ocean TRITON buoy sites at 1.5S-90E and 5S-95E, which are component of RAMA array.

キーワード: Indian Ocean, IOD, upper ocean dynamics, air-sea interaction, m-TRITON, RAMA buoy array
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