MISMO and the NEXT

Kunio Yoneyama
Institute of Observational Research for Global Change (IORGC),
Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Yokosuka, Japan

In October – December 2006, the field experiment MISMO (Mirai Indian Ocean cruise for the Study of the MJO-convection Onset) took place in the central equatorial Indian Ocean. As found from its project name, the aim of MISMO was to capture atmospheric and oceanic features in the equatorial Indian Ocean when convection in the Madden-Julian oscillation (MJO) is initiated. For this purpose, we constructed the observation network with the research vessel *Mirai*, a moored buoy array, and land-based sites at the Maldives Islands (Fig. 1).

Intensive observations using Doppler radar, radiosonde, and others instruments were conducted at (0°, 80.5°E), after deploying an array of surface and sub-surface moorings at (1.5°N, 80.5°E), (0°, 79°E), (1.5°S, 80.5°E), and (0°, 82°E). The *Mirai* stayed within this area from October 24 through November 25. After a period of stationary observations, underway meteorological measurements were continued from Maldives to the eastern Indian Ocean in early December.

Observations were collected during a positive Indian Ocean dipole event. While the convective activity was suppressed in early November, much deep convection developed over the central Indian Ocean in late November and then eastward moving of large-scale cloud systems were observed in early December. From satellite data analysis, these cloud systems were identified as convection associated with the MJO (Fig. 2), though it was weak comparing to September and December cases. One significant feature observed was the abrupt change in upper tropospheric winds from westerly to easterly in mid-November, corresponding to the development of large-scale cloud systems. In addition, it was observed that while divergence layer in the upper troposphere that corresponds to the development of convection over the intensive observation array gradually shifted upward from early to late November, moistening of middle and upper troposphere was primarily caused by several eastward-propagating meso-scale convective systems. At present, the relationship between these features and the onset of MJO-convection is extensively analyzed by the MISMO researchers.

Because we believe these in-situ data are invaluable for the study of the MJO-convection onset, we will open these data through the MISMO web site at http://www.jamstec.go.jp/iorgc/mismo/ from the coming January 2008.

In addition, based on the MISMO project as well as French project VASCO-CIRENE, we've just started to discuss the future field experiment in the Indian Ocean at the CLIVAR/GOOS Indian Ocean Panel with LOCEAN and LMD (France), NIO (India), and NOAA/PMEL (USA). At present, the most plausible year for JAMSTEC to execute this with R/V *Mirai* is year 2012. However, details are not decided yet. At the workshop, some basic ideas on the post-MISMO will be presented.

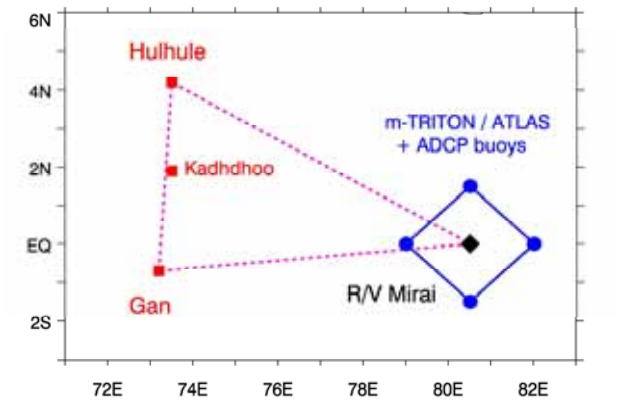

Fig. 1. Observation network with atmospheric sounding array (red, dashed line) and oceanic buoy-array (blue, solid line).

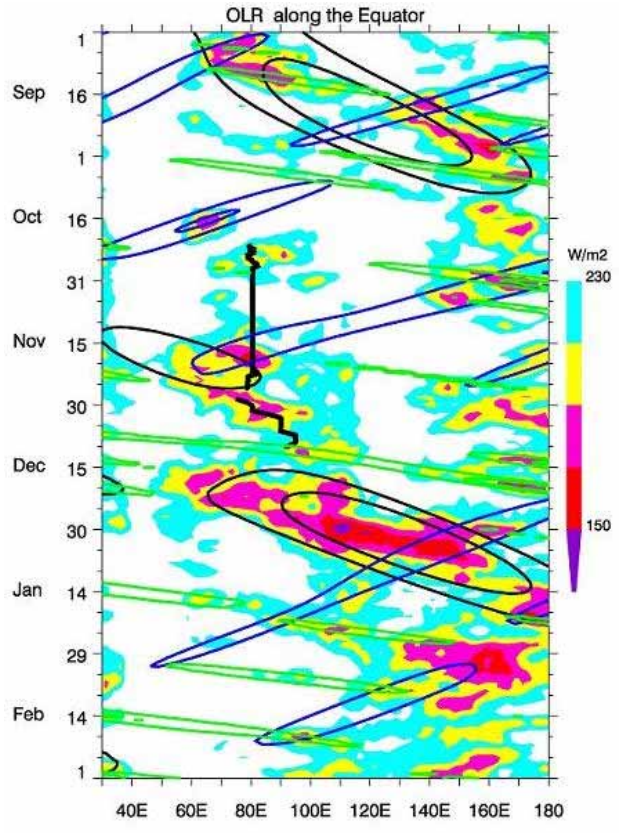

Fig. 2. Time-longitude cross section of outgoing longwave radiation (OLR) along the equator averaged over 7.5°S - 7.5°N. Contours indicate the signals identified as MJO (black), Kelvin wave (green), and n=1 Rossby wave (blue) by following the work of Wheeler and Kiladis (1999) and Wheeler and Weickmann (2001). Contour interval is 7.5 W m^{-2} and only negative area is plotted. The position of the *Mirai* is superimposed as black thick line.