MR03-K04 Leg3 Cruise Summary

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An area of the Chilean marginal area is characterized by high productivity due to coastal upwelling and cold sea surface water due to Humboldt Current, which is the largest eastern boundary current in the global oceans. At the subsurface water depth, low oxygen concentration zone presents along with Gunther Undercurrent from 20 to 45S, and Antarctic Intermediate Water, which has high oxygen, low nutrients and salinity presents at the depths 500-800m in the southern latitude from 35S. Thus, the Chilean marginal area has been recognized as a key area for biogeochemical cycle of carbon in the global oceans not only during the modern time but also over the past geological period. Despite its importance, there have been few systematic surveys to cover the temporal and spatial variation of biogeochemical processes in the area. Main goal of this cruise is to realize the historical change of the biological pump, sea surface water temperature and ventilation speed of the intermediate water during the past geological era, and to clarify the bio-optical dynamics in the surface water in the present time.

Based on the above-mentioned purpose, a cruise was planed to focus on the area along the Chilean marginal area and Magellan Strait.

R/V MIRAI left Valparaiso, Chile on Oct. 19, 2003 for the cruise and arrived at Santos, Brazil on Nov. 2. During its 15 days of the cruise, we have occupied 4stations for sediment core sampling and 12 stations for bio-optical observations. In the meantime, meteorological measurements, sea surface gravity measurement, surface three components magnetometer measurement, plankton sampling, underway measurement of chemical properties in sea water as well as temperature and salinity, satellite, and atmospheric observations such as aerosol and particulate carbon have been carried out continuously. Details of the observations are described in the following chapters.