

## Characterization of the lower Bengal Fan submarine channels

# Kyaw Thu Moe[1]

[1] Todai, Kaiyoken

<http://mc-net.jtbcom.co.jp/earth99/>

Swath bathymetry survey and 3.5 kHz sub-bottom profiling were conducted during Leg 4 of the KH-00-5 cruise to map the bathymetric feature of the submarine channels of the Bengal Fan, and to take cores. Echo character mapping was done and only one echo type has been identified. Several channel types are divided among the active and old channels. Active channels are characterized by V-shape, deep and narrow inside the channel, and channel levee peaks at the channel banks are higher bathymetry than local mean bathymetry. Old channels are characterized by U-shape, wide and shallow, deposits of infilling sediments at the channel bottom, and old channel bottom reflectors at some places. Channel levees at the channel banks are in strong and transparent reflectors, paralleling the subbottom.

The Bengal Fan is one of the world's largest elongate submarine fans and its channels up to 2500 km long act as conduits for turbidity currents flowing the full length of the fan from its apex in the northern Indian Ocean off the Ganges Delta until it merges with the central abyssal plain south of the equator. Previous studies in the area include many seismic and subbottom profiler data, numerous piston cores, and two DSDP and ODP drillings. However, both DSDP sites at the lower Fan and ODP sites at the termination zone of the Fan never reached the basement under thick fan deposits.

During Leg 4 of KH-00-5 (R/V Hakuho-maru, Hakuho-maru Indian Ocean Observation Cruise: HINDOO Cruise) we conducted swath bathymetry survey using the SeaBeam 2120 system together with 3.5 kHz sub-bottom profiler to map the bathymetric feature of the submarine channels of the Bengal Fan, and to calculate the inflow sediment volume from the Indian subcontinent to the Indian Ocean since last glacial maximum (LGM). Piston and multiple cores were taken to make various analyses to estimate the history of Himalaya- Karakoram mountain ranges under continent- continent collision and its consequence, climatic changes for the future ODP/IODP site survey.

Seafloor bathymetry in the area is smooth and has gradients varying a little more than 1m/km between 3500 m in the south and 2800 m in the north of the study area. Swath bathymetric mapping was rarely done in the Bay of Bengal and its profiles are not distinct due to the smooth slopes, however it is useful to trace submarine channels. Echo character mapping was done in the surveyed area using 3.5 kHz subbottom profiles, and only one echo type has been identified within the area of 86 to 89 degrees east and 10 to 15 degrees north. It is characterized in very prolonged echo with strong seafloor return and no sub-bottom, and interpreted as sediments of mainly turbidites which is supported by preliminary multiple core results.

In the surveyed area, many crossings of submarine channels are identified from 3.5 kHz subbottom profiles however there has been only 3 channels running north to south, one active and two old channels. Combination of swath bathymetry and sub-bottom profiles, several channel types are divided among these active and old channels. Active channels are characterized by V-shape, deep and narrow inside the channel, and channel levee peaks at the channel banks are higher bathymetry than local mean bathymetry. Few active channels are not V-shape and they are bigger in width with lower bathymetry than local mean bathymetry. Channel levees are thick, showing parallel strong subbottoms and has slumping down channel walls at some places. Differ from the active channels, old channels are characterized by U-shape, wide and shallow, deposits of infilling sediments at the channel bottom, and old channel bottom reflectors at some places. Channel levees at the channel banks are in strong and transparent reflectors, paralleling the subbottom.

Successful characterization and division of old and active channels through swath bathymetry and subbottom profiler provided the piston and multiple coring at the target locations with highest accuracy. Then high-resolution physical property, sedimentological, paleontological, mineralogical and geochemical analyses will enhance to achieve detailed history of the climatic changes in the area and mass transportation process in glacial and interglacial epochs in the Bay of Bengal.