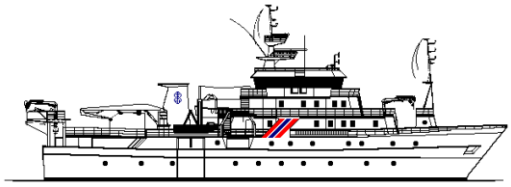
NANSEN PROJECT



Country: Myanmar shelf, Bay of Bengal

Research vessel: R/V DR. FRIDTJOF NANSEN

Survey number: 2015404

Number of days: 36

General objectives: Survey in the waters of Myanmar

	Port	Date	Coverage	Specific objectives
Departure	Yangon, Myanmar	27/04	Myanmar shelf, Bay of Bengal	• To carry out an ecosystem survey with focus on the demersal and pelagic fish resources. Hydrographical data, zooplankton and phytoplankton samples will be collected along standard monitoring sections and on additional sampling stations for horizontal mapping.
Arrival	NA	2/06		

Cruise leader: Jens-Otto Krakstad

Participants:
From IMR: Jens-Otto Krakstad, Tore Mørk, Kåre Tveit, Bjørn Krafft, Merete Kvalsund, Oddgeir Alvheim
From the Department of fisheries, Ministry of Livestock, Fisheries and Rural Development, Myanmar: Htun Thein, Win Ko Ko, Aung Win Sein, Zay Yar Min, Aung Hlaing Win, Min Khine, Maung Hla, Bhone Myint Aung,
From Mawlamyine University, Mon State: Myat Thu
From Yangon University: Kyaw Naing oo
From Myeik University: Zar Ni Ko Ko ,
From Navy, Myanmar: Kyaw Tay Za
From FAO: Peter N. Psomadakis

Summary of the results:
The survey followed the same design as the 2013 survey. Transects were made perpendicular to depth isobaths and spaced 20 nautical miles (NM) apart. They covered the depth-interval between 20 m depth near the coast to 500 m depth offshore. Bottom trawling was conducted within four different depth-strata on each of these transects between 20-50 m, 50-100 m, 100-200 m and between 200-500 m depth, with a maximum distance of 20 nm between trawl stations. When time and bottom conditions permitted, occasional trawls were conducted deeper than 500 m. Pelagic trawls were made to sample acoustic targets, but also on random along transects when time permitted. CTD's were taken at each bottom trawl station. The survey was carried out around the clock. As far as possible it was attempted to carry out shallow water station during the day to reduce the effect of diel migration on the estimate but due to the very long shelf in Myanmar this was not always practically possible.
Every third transect was termed an "Ecosystem transect" with a more elaborate sampling program. These transects extended to 1000 m depth. CTD's were taken at bottom-depths of 1000 m, 500 m, 200 m, 100 m, 50 m and 30 m at the coastal margin of the transect. Additionally, three stations for sampling of nutrients, chlorophyll, phyto- and zooplankton, were conducted at positions with bottom-depths of 500 m, 100 m, and 30 m. Trawling was undertaken within the same depth-regions as for all other transects.

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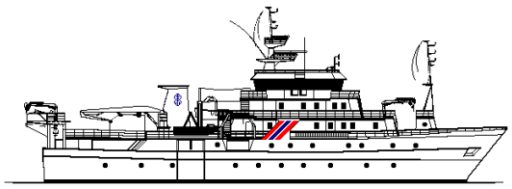

Acoustic data from the ER 60 echosounder (18 kHz, 38 kHz, 120 kHz and 200 kHz transducers), the multibeam bottom mapping echosounder SM710, and data from the thermosalinograph and a weather station were recording continuously during the survey.
For the purpose of acoustic and swept area abundance estimation the coast was divided into three regions. The first region (the Rakhine coastal zone) included the area from the border to Bangladesh to Mawtin Point. Region two, the Ayeyarwady delta, covered the central Myanmar delta region, while region three, the Tanintharyi coast, covered the area from Htarwe to the border with Thailand.
The cruise results demonstrate marked spatial patterns in near-surface temperature, salinity, oxygen-levels and relative fluorescence within the Myanmar coastal region. All four variables display clear spatial dynamics, and in some areas also strong horizontal gradients. Most notable are the comparatively warmer upper water-masses along the Rakhine coast, the more saline upper water masses in the southern part of Myanmar coastal area, as well as the high-fluorescence area in the Ayeyarwady Delta coastal region. Our results also show low-oxygen waters with especially (but not exclusively) in the northern region with concentrations as low as about 1 ml/l dissolved oxygen in many cases reaching shelf-depths as shallow as ca. 100 m.
Environment
Chlorophyll a levels were generally low to moderate, depending on location and depth. Chlorophyll concentrations in surface-near layers were generally highest at the stations near the coast.
Nutrient concentrations varied strongly with depth, and particularly nitrate and silicate concentrations spanned great ranges. Nitrate and silicate levels were typically very low in the surface, and increased with depth. Nutrient concentrations in the surface-near layers were mostly higher at near-shore stations. Mixing processes are important factors limiting primary production by nutrients. Nitrate, phosphate and silicate are necessary for phytoplankton to grow. Because of gravitation sinking of particulate material (such as plankton, dead or faecal material), the nutrients are removed from the euphotic zone, but can be replenished by mixing by e.g. river run off or upwelling of deeper water. During the season the survey was carried out, and as pointed out in the results section of this report, river run-off likely is an important contributor to supply primary growth during this season in addition to upwelling caused by internal waves and wind. Copepods dominate in the overall picture from the zooplankton biomass samples, contributing as a major food organism for small fish in the Myanmar waters.

Report: status: final References:
Report ready

Constraints/Comments: