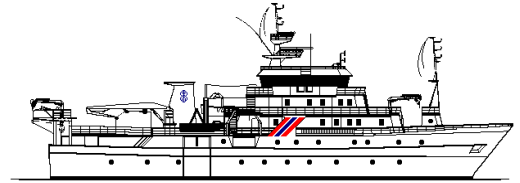


<b>Countries:</b> Ghana				
<b>Research vessel:</b> R/V DR. FRIDTJOF NANSEN				
<b>Survey number:</b> 2010403				
<b>Number of days:</b> 22				
<b>General objectives:</b> to provide increased knowledge about the baseline environmental status of the marine ecosystem in the Western Region of Ghana				
	<b>Port</b>	<b>Date</b>	<b>Coverage</b>	<b>Specific objectives</b>
<b>Departure</b>	Tema	6 April	Ghana	The survey aims to contribute with essential information especially on the benthic communities and levels of contamination by hydrocarbons and heavy metals in the sediments to establish a baseline.  The objective is to provide relevant environmental monitoring, provide elements towards an environmental monitoring plan covering the areas of concern. This will help to understand the local and remote forcing conditions in order to apply appropriate measure to deal with an eventual oil spill.
<b>Arrival</b>	Tema	27 April		
<b>Cruise leader:</b> Bjørn Serigstad				
<b>Participants:</b>				
<u>From EPA, Ghana:</u> Emmanuel APPOH, Abdalla IBIN, John Kofi NYANTE				
<u>From University of Ghana, Legon:</u> Lloyd Cyril ALLOTEY, Benjamin O. BOTWE				
<u>From Marine Fisheries &amp; Research Division Ghana:</u> Kwame N. DAMOAH, Reynolds OBENG				
<u>From University of Cape Coast, Dept. of Fisheries &amp; Aquatic Sciences, Ghana:</u> Joseph AGGREY-FYNN				
<u>From Survey Department, Ghana:</u> Edward A. AWUAH, Isaac LARBIE				
<u>From University of Bergen Norway:</u> Frøydis LYGRE Supervised by: Gisle Vassenden (Uni Research AS)				
<u>From IMR:</u> Bjørn Serigstad, Magne Olsen, Tore Mørk, Jarle Kristiansen, Marek Ostrowski				
<u>Seabed mapping with multibeam:</u> Alexey Andrew (Elcom/Marimeter), Atle Lagestrand (Norwegian Mapping Authority, Hydrographic Service)				
<b>Summary of the results:</b>				
The coastal zone of Ghana may be divided into three geomorphologic zones: West Coast, Central coast and East coast. The investigation in 2009 was concentrated in the West Coast. The offshore oil exploration and exploitation have just started in Ghana. The Jubilee Field, the first oilfield to be developed in Ghana, is located in the deepest part of the investigated area.				
The investigation included sediment sampling for analysis of grain size, chemical content and benthic fauna. The sampling stations were spread out on three transects at predefined depths (approx. 25 m, 50 m, 100 m, 250, 500 m and 1200 m depth). These sites may be used as a reference stations in future surveys. The sampling was executed according to the OSPAR guidelines for sediment monitoring in offshore oil production areas. The sediment sampling was carried out by the crew from Ghana under the supervision of the accredited laboratory Section of				





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CTD profiles were deployed at selected sediment sampling stations. The determined parameters include temperature, conductivity, dissolved oxygen and fluorescence. The investigation also include multibeam seabed mapping. The multibeam survey covered an area between the border of the Ivory Coast and the Jubilee field. During the survey, local scientists were trained in the sampling methodology and equipment operation.

The temperature distribution exhibits conditions characteristic to late spring, prior to the onset of the upwelling season. The thermocline was depressed to a 30 m depth. The data suggest a downwelling. At the offshore end, the vertical structure of the water column exhibits a salinity maximum,  $S > 36$  and a drop in oxygen concentration  $< 3 \text{ ml l}^{-1}$ , located just below the thermocline.

The sea bed was dominated by very fine grained sediment in the deepest part of the investigated area. Shallower site was dominated by more sandy sediment. The content of total organic matter (TOM) correspond to the content of pelite, with higher TOM content in the deepest part compared to the more shallow part of the investigated area.

Most of the metals show higher concentration in the fine grained sediment in the deepest part of the investigated area. This correspond to the particle size of the sediment, smaller particles have higher affinity to chemical compounds. The concentrations were generally low. The result will be a good reference for future monitoring survey to detect contamination.

The concentrations of hydrocarbons were low at all sites and indicate the background value in the area.

The benthic fauna was generally undisturbed and fairly heterogenic at all investigated sites. The factor having the greatest impact on the distribution of bottom fauna was depth.

Altogether, the results indicate a benthic environment of good quality and that this survey is well suited as background material for future comparison.

**Report: status: final References:**

**Preliminary report**

**NORAD – FAO PROJECT 2009405 CRUISE REPORTS "DR. FRIDTJOF NANSEN" MARINE ENVIRONMENTAL SURVEY OF BOTTOM SEDIMENTS IN GHANA, Survey of the bottom fauna and selected physical and chemical compounds in May 2009**

**Constraints/Comments:**

