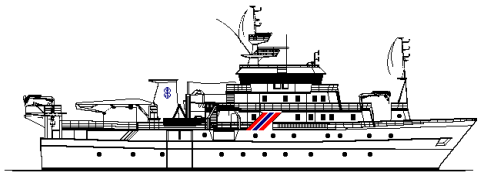
NANSEN PROJECT



**Country:** Angola

**Research vessel:** R/V DR. FRIDTJOF NANSEN

**Survey number:** 2009403

**Number of days:** 27

**General objectives**: Monitoring Survey

| | Port | Date | Coverage | Specific objectives |
|---|---|---|---|---|
| **Departure** | Walvis Bay, Namibia | 11 March 2009 | Namibia, Angola | The objectives of the cruise had been previously discussed and agreed upon by the responsible of the Demersal Programme of the Instituto Nacional de Investigação das Pescas (INIP), of Angola, and the responsible from the Institute of Marine Research (IMR), Norway, for the Angolan Demersal Programme, and were the following:<br>1. To survey, map and describe the distribution, composition and abundance of the main demersal species, with special emphasis on seabreams (Sparidae), croakers (Sciaenidae), grunts (Haemulidae), groupers (Serranidae), hakes (Merlucciidae) and shrimps (*Parapenaeus longirostris* and *Aristeus varidens*) on the Angolan shelf and slope (down to 800 m), from Cunene River (17°14'S) to Tombua* (15°40'S), and from Benguela (12°35'S) to Congo River (06°00'S) using bottom trawl and the swept-area method.<br>*2.* To collect biological data as length, weight, sex and maturity of *Dentex macrophthalmus*, *D. angolensis*, *Pagellus bellottii, Pseudotolithus senegalensis, Umbrina canariensis, Merluccius polli, Brachydeuterus auritus, A. varidens, P. longirostris, Chaceon maritae, Panulirus regius* and Cephalopods.<br>*3.* To collect the stomach contents and gonads for some species such as *D. angolensis*, *P. bellottii*, *P. senegalensis*, *U. canariensis* and *B. auritus,* for subsequent analyses in the INIP Lab.<br>4. To monitor the general hydrographical conditions using CTD-Sonde on each trawl station and map the temperature, salinity and oxygen.<br>5. To realize four monitoring lines (Namibe, Lobito, Palmerinhas and Congo River mouth) using new standard INIP hydrographical profiles for collection of temperature, salinity and oxygen, water nutrients, phytoplankton, zooplankton and sediments (Congo River only). |
| **Arrival** | Luanda, Angola | 7 April 2009 | | |

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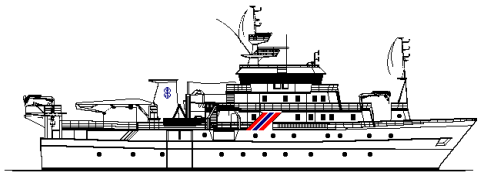


**Cruise leader:** Sigbjørn Mehl

**Participants:**

**From INIP**, Angola: Silvi Nsiangango (11.03-09.04, Local Cruise Leader), Virgílio Estévão (11.03-09.04), Pedro Tchipalanga (11.03-09.04), Fátima Delicado (11.03-09.04), Mário Fortunato (11.03-09.04), David Kisungo (11.03-09.04), Wsaso André (11.03-30.03), Manuel Domingos (11.03-30.03), Euzébio dos Santos (11.03-30.03), Catarina Ruby (11.03-30.03), Maria Margarida (31.03-09.04), Arsénio Cudivila (31.03-09.04), Domingos Pedro (31.03-09.04), Alberto Filomena (31.03-09.04).

**From IMR**, Norway: Sigbjørn Mehl, Cruise Leader (11.03-09.04), Diana Zaera (11.03-09.04), Ole Sverre Fossheim (11.03-09.04), Terje Svoren (11.03-09.04)

**Summary of the results:**

From 11 March to 09 April the 2009 demersal resource survey off Angola was successfully carried out using R/V "Dr. Fridtjof Nansen". Except from the area between Tombua and Benguela, which is unsuitable for trawling due to poor bottom conditions, the shelf and upper slope (20-800m) from Cunene River to Congo River was covered. In total, 194 trawl stations were carried out, of which 191 were valid and used in the biomass estimation of the demersal stocks. To map the oceanographic conditions 226 CTD stations were taken.

**Hydrographical conditions**

The demersal surveys in March are coincident with the late phase of the wet season, which causes low salinity in the surface waters on the shelf off northern and central Angola due to the freshwater coming for the coastal rivers. Clear signal of up welling was observed in the southern region, where the temperature was between 18 – 22ºC, salinity ranged between 35.06 and 35.92 and oxygen values were high (below 3.5 m/l).

Focus of cold water were also observed in the central and northern regions, in coastal areas close to the mouth rivers where the temperature varied between 23 to 24ºC and salinity between 35.00 – 35.90. The values of the oceanographic parameters were high offshore, around 27- 29 ºC for temperature and 35.60 – 36.60 for salinity. Inshore waters presented low salinity values, particularly around the Congo River's mouth (26.9) and its plume was observed down to 8.5ºS with a salinity of 34.5.

**Biomass estimates**

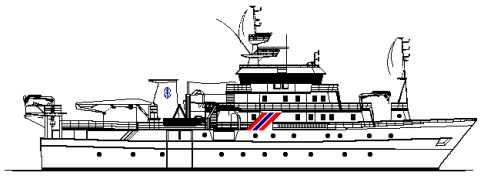
Time series from 1985 to 2009 of the biomass estimates for the most important species on the shelf and slope in the central and northern regions of Angola are shown on the report. The southern region is not included, as the surveys in this region have not been properly standardized throughout the years. However, the effort, *i.e.* the number of stations by stratum on the southern shelf, is relatively similar from 2000 to 2009 and the estimates in this period are comparable. The estimates on the southern slope are very unreliable as the number of tows is very low due to difficult trawling conditions. The biomass estimates of the important species on the southern shelf and slope respectively are shown.

**Seabreams**

The seabreams biomass estimate in the southern region was about 9 800 tonnes and consisted almost entirely of *D. macrophthalmus*. This was lower than the 2008 estimate, and was a marked decrease from 2007 and the lowest in the time series. In the central and northern regions, the biomass estimate of seabreams in 2009 was about 18 000 tonnes, which is a 14% reduction from 2008. *D. macrophthalmus* and *D. angolensis* comprised 5% and 37% of the 2009 estimate, respectively. Other abundant seabreams were *P. bellottii*, *D. canariensis* and *D. barnardi*. The biomass estimates of seabreams have fluctuated in most of the time series, and there was no clear long-term trend.

**Hakes**

*M. capensis* is generally the dominating hake species in the south, and Angola shares this stock with Namibia. However, whilst no Benguela hake (*M. polli*) was caught on the southern shelf during the 2006 survey the species contributed to about 65% of the biomass in 2008. In 2009 *M. capensis* dominated, while *M. polli* was only caught in two stations on the southern shelf and in one station on the slope. The total biomass estimates of hake (*M. capensis and M. polli*) on the southern shelf and slope in 2009 were 31 000 and 2 750 tonnes, respectively. Only two valid stations were carried out on the slope between 200 and 600 meters, which makes the estimate for the slope unreliable. On the shelf the hake abundance has annually



declined between 2003 and 2008, while the 2009 estimate is the highest in the time series, almost twenty times higher than in 2008. In the central and northern regions, *M. polli* is the only hake species found. Here, the estimated biomass of hake (*M. polli*) was 8 100 tonnes, which is a 40% decrease from the 2008 estimate (12 000 tonnes), and one of the lowest in the time series. The 2008 estimate was about 27% lower than the 2004 estimate.

**Shrimps**

The two commercially important shrimp species *P. longirostris* and *A. varidens* are never found in high densities south of Tombua, and they were not caught neither in 2006 nor 2007. Hovewer, in 2008 both *P. longirostris* and *A. varidens* were caught in small quantities in the southern region. In 2009 no *P. longirostris* was caught, while the 600 tonnes estimated of *A. varidens* is the highest in the time series. The biomass estimate of *P. longirostris* for the central and northern regions in 2009 was 1 400 tonnes, which is a 12% decrease from the 2008 estimate (1 600 tonnes). The high CV value indicates that the estimate is relatively uncertain. The 2009 estimate for *A. varidens* was 2 200 tonnes, representing a 46% increase from 2008 (1 500 tonnes) and the second highest in the time series.

**Grunts**

Commercially important grunt species are *P. incisus* and *P. rogeri*, but no grunts were caught in the southern region. The biomass estimate of grunts in the central and northern regions in 2009 was 8 200 tonnes, a 10% increase compared to last year but much lower than the 2007 estimate (17 000 tonnes), which is the highest biomass estimate registered since 1985.

**Croakers**

South of Tombua, the biomasses of the croakers have varied considerably between surveys during the last years, therefore, no clear trend in the time series can be seen. However, the 2009 and 2008 estimates (700 and 400 tonnes respectively) represent a large decrease from the 2007 estimate of 4 200 tonnes and are the two lowest in the time series. The biomass estimate of croakers, mainly *U. canariensis*, *A. aequidens, P .senegalensis* and *P. typus*, in the central and northern regions was about 6 000 tonnes in 2009, which is less than half of the 2008 estimate (12 600 tonnes). Generally, the biomass of *U. canariensis* has contributed to about 30% of the total biomass of croakers and has fluctuated in a similar way as the total biomass of croakers.

**Groupers and snappers**

Groupers and snappers were not caught in the region south of Tombua. In the central and northern regions the biomass estimates for these groups are relatively imprecise as shown by the high CVs values. The biomass estimate of groupers decreased from 1 200 in 2008 to 800 tonnes in 2009, while the biomass estimate of snappers increased from 90 tonnes in 2008 to 290 tonnes in 2009. The estimates in the time series show large fluctuations, making it difficult to identify any trend and conclude on the current state of these stocks.

**Pelagic species**

For the pelagic species, the estimates of the biomass are characterized by the high variability throughout the years, particularly for horse mackerel, hairtail and barracuda. The bottom trawl is not an adequate sampling gear for the pelagic fish species; therefore no certain conclusion may be drawn for these resources. However, the increasing and high biomass estimates of horse mackerel in 2008 (215 000 tonnes) and 2009 (322 000 tonnes) show increased presence in later years. More adequate results are achieved from the acoustic surveys conducted later in the year.

**Report: status: final References**:

Title not available

**Constraints/Comments:**