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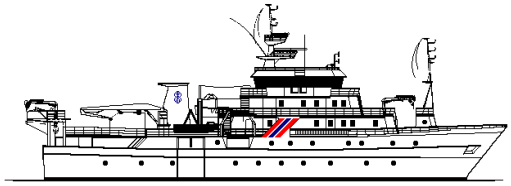


Countries: South Africa, Namibia

Research vessel: R/V DR. FRIDTJOF NANSEN

Survey number: 2010401 – BCC Survey No.1

Number of days: 53

General objectives: Transboundary survey between Namibia and South Africa with focus on the shared stocks of hakes providing a measure of the degree of sharing of the stocks at the time of the survey

	Port	Date	Coverage	Specific objectives
Departure	Cape Town	7 January	South Africa, Namibia	1. To plan and conduct a transboundary survey from Port Alfred to Orange River to produce distribution maps and abundance estimates of the two species of hake to be later merged with similar data from a co-occurring Namibian national demersal survey, to enable complete mapping and assessment of shared stocks, thus providing a measure of the degree of sharing of the stocks at the time of the survey. 2. To collect data on the maturity stages of the hakes to check for possible spawning activity. 3. To collect other relevant data to better understand the environment impact on the distribution of hakes, and the fish community structure in the distribution areas of the hake.
Arrival	Walvis Bay	20 February		

Cruise leader: Oddgeir Alvheim (cruise leader 2.02 – 12.02 and 12-28.02), Tore Strømme (cruise leader 2.02-12.02)

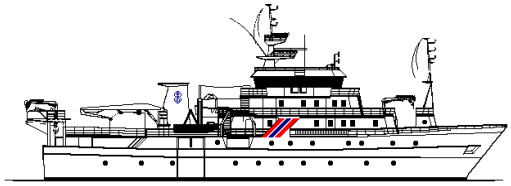
Participants:
From MCM, South Africa: Marek Lipinski, Sharon de Plessis, Mbongeni Tyesi, Pierre Joubert
Interns, South Africa: Jessica Escobar, Hazel Dickens and Sean Weltz, Melanie Smith, Danielle Boyd, Dale Wilson and Dylan Cooper, Kerry Hadfield, Bernadine Everett
From NatMIRC, Namibia: Claudia Kamdwombe
From Namibia: Joseph M. Lubanda and Oswald S. Mughongora
From IMR, Norway: Oddgeir Alvheim,Tore Strømme, Magne Olsen, Tore Mørk , Terje Svoren and Ole Sverre Fossheim

Summary of the results:

Considerations of the survey results, *M. paradoxus*

The findings from the survey January-26 February combined with similar findings from the Namibian survey in the period 14 January-19 February confirms some the general features as regards the distribution of *M. paradoxus*:

- Minimal spawning takes place at this time of the year, confirmed through few signs of maturing gonads.
- The early pelagic stage is mainly confined to the central-outer part of the shelf off Port Nolloth in a small area off the Cape Peninsula.
- Juveniles between 15 and 24cm are mainly concentrated on the shelf between Hondeklip Bay



and St. Helena Bay. In contrast to some earlier years there are no spill over of juvenile fish northwards over the Orange Banks into Namibia. The main interface between Namibia and South Africa seems to be along the slope. The same pattern occurred in the period 2007-2009 while in the preceding years there was a continuous channel of fish extending into Namibia over the Orange Banks during the January surveys. There might though be a seasonal pattern not revealed in the time series as all surveys are in January-February.

- The massive migration towards the slope starts in the 25-29cm group and when the fish is bigger than 30cm this movement is mainly completed.
- The adult fish is found from Cunene in the north and southwards beyond Cape Agulhas. The biggest fish, bigger than 70cm is, in consistency with previous surveys, only recorded in South Africa.
- The main part of the stock is at the time of the survey in 2010 located in South Africa which holds about 75% of the fishable biomass (fish bigger than 35cm) and 82% of the non-fishable biomass.
- The regional standing stock has been on a rising trend in the last four years. The regional estimate of fishable biomass has increased from 110 thousand tonnes in 2006 to roundly 230 thousand tonnes in 2010, representing a 109% increase.
- Generally for all years; for the size range 55 to 60cm fish length there is an increased share of the biomass in Namibian waters compared to smaller and bigger fish classes, perhaps indicating a periodic immigration from south in terms of the life cycle.
- From 2009 to 2010 there has been a major shift in the distribution of adult hake between the two countries. At the same time as the combined biomass has increased 15%, the increase has been 40% in South Africa, compensated by a 27% decline in Namibian waters. This breaks a linear trend that has been observed between the country biomasses in the period 2003-2009 and warrants further investigations and continued monitoring if this represents a regime shift or a temporal anomaly.
- The south coast of South Africa was in 2010 covered for the first time as part of the BCC surveys on transboundary stocks in order to have full synoptic survey and to investigate to what extent the southern stock component showed connectivity to the fish on the west coast. The deep water hake in this region is estimated to 100 thousand tonnes, which represents 15 % of the total paradoxus estimate and 18% of the South African estimate.
- The deep water hake in this region consists mainly of fish in the size range 35-70cm. The young fish less than 36cm (“non-fishable biomass”) on the south coast comprises less than 5% in terms of biomass of this fish in South African waters. This is a remarkable finding as it indicates that the southern component is mainly supplied by recruits from the west coast. The whole region from Port Alfred to the Cunene could therefore be understood as an integrated connected system as regards the stock of deep water hake.
- Blue Sea and “Dr. Fridtjof Nansen” use identical trawls and similar survey design and sampling protocol. The catchability coefficient in the biomass estimates applied is 0.8. Since the catchability coefficient of the trawl used on Dr. Fridtjof Nansen and Blue Sea has not been calibrated against absolute densities in the path of the trawl, the biomass estimates given here should not be considered as absolute biomass, but as indices of biomass. Thus the essential information is in relative comparisons and trends.

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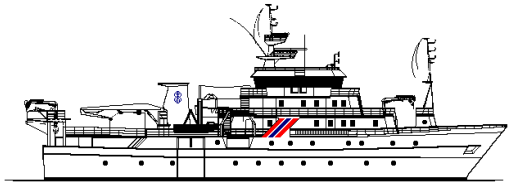

Report: status: final References:
FAO PROJECT: CCP/INT/003/NOR, Cruise reports "Dr. Fridtjof Nansen" EAF-N2010/1
T. Strømme, M. Lipinski and O. Alvheim. **Transboundary survey between Namibia and South Africa with focus on the shared stocks of deep water hake. Cruise report No 1/2010. 7 January – 28 February 2010.**Institute of Marine Research, Bergen, Norway and Marine and Coastal Management**,** Cape Town, South Africa. Bergen, September 2010.

Constraints/Comments: