PART II

SURVEYS OF THE INSHORE PELAGIC STOCKS

2-22 March 1991

TABLE OF CONTENTS
PART II

CHAPTER 1 INTRODUCTION

1.1 GENERAL OBJECTIVES. SEE PART I

1.2 SPECIFIC OBJECTIVES OF PART 2, SURVEY 1/91

1.2.1 To produce a biomass estimate for three of the commercially important pelagic fish species; pilchard *Sardinops ocellata*, anchovy *Engraulis capensis* and round herring *Etrumeus whiteheadi*.

1.2.2 To conduct target strength measurements on horse mackerel.

1.2.3 To determine the distribution of pelagic horse mackerel *Trachurus capensis* and to produce a biomass estimate of this stock.

1.2.4 To obtain environmental data to enable correlations between fish distribution and the environment.

1.2.5 To provide training for Namibian scientific and technical staff.

1.3 PARTICIPATION

The scientific staff from Namibia on the "DR. FRIDTJOF NANSEN" were: from 2nd to 8th March - Helen Boyer, Bernatitus Birisamub, Sielfried Gowaseb and Nghidipo Nghishongwa, and from 8th to 22nd March - David Boyer, Frikkie Botes, Malakia Shimhanda, Serubabel Kahiha, Nghidipo Nghishongwa and Richard Kharuchab.

The scientific staff from the Institute of Marine Research were: Johannes Hamre, Ingvald Svellingen, Diana Zaera and Tore Mørk.

CHAPTER 2 METHODS

From the general knowledge of pelagic fish distribution and from reports of commercial fishing vessels, the survey area was limited to the area from Dolphin Head (26°00') to the Cunene River (17°15') and from the shore to the 120 m bathymetric line. The southern limit was formed by the cold and oxygen deficient upwelling region centred around Lüderitz and the northern boundary by Namibia's border with Angola. The demersal survey of the "DR. FRIDTJOF NANSEN" undertaken immediately prior to this survey failed to detect significant concentrations of clupeids or anchovy in water depths greater than 120 m. It was therefore decided unnecessary to survey beyond this depth, although environmental lines were extended to a depth of approximately 500 m.

To allow comparison with the previous "DR. FRIDTJOF NANSEN" surveys, the region was divided into two areas;

1	26°00' to 21°00'	Dolphin Head to Ambrose Bay
2	21°00' to 17°15'	Ambrose Bay to Cunene River

The "DR FRIDTJOF NANSEN" left Walvis Bay at 11h00 on 2nd March and surveyed the area south of Walvis Bay returning to Walvis to exchange Namibian scientific staff at 11h00 on 8th March. She departed at 16h00 on the same day, surveyed the northern region and returned on 22nd March at 10h00. Four thousand nautical miles were steamed and 69 trawl stations worked. Nine hydrographic profiles were made.

The course tracks with the fishing and hydrographical stations from Dolphin Head (26°00') to Ambrose Bay (21°00') are shown in Figure 1a. The northward and southward coverage from Ambrose Bay to Cunene River (17°15') are shown in Figures 1b and 1c respectively. As suggested in previous cruise reports, the frequency of transects was increased in areas of high fish density, and special efforts were made to survey shallow inshore areas during darkness, when fish tend to move offshore and thus become more available for abundance estimates. Consistent with this approch, the large amount of pelagic fish found off of Walvyes Bay-Swakopmund during the northwards coverage of this area was later re-surveyed more intensively (Figure 1d).

The distribution and biomass of off-shore horse mackerel were broadly assessed from some few transects sailed to the outer edge of this species distribution and on hydrographic lines.

All catches were sampled for composition by weight and numbers of each species and the size distribution of commercially important species, using total length, was determined. The length frequencies of these species are given in ANNEX I. The complete records of fishing stations are shown in ANNEX II.

Hydrographical data were collected to standard depths at stations 2, 5, 10, 15, 25, 35, 50 and 75 nm from the coast on all full degree lines of latitude between 26°00' and 23°00', while the lines from 22°00' to 18°00' were sampled to 50 nm. In addition the 20°00' was extended to 125 nm to determine the position of the warm oceanic/cold Benguela current front.

The acoustical instruments were calibrated in an experiment in Baia dos Tigres, Angola immediately prior to the survey on 25th February.

ANNEX III gives a description of the instruments and the fishing gear used.

Data on horse mackerel target strengths were collected during the normal course of the cruise when the fish distributions were suitably dispersed in the water column.

Assistance in searching for and determining the precise distribution of pelagic fish was requested from the Namibian Research Vessel BENGUELA and commercial purse seiners. This was not forthcoming, although full use was made of information received from purse seiners during their normal fishing activities.

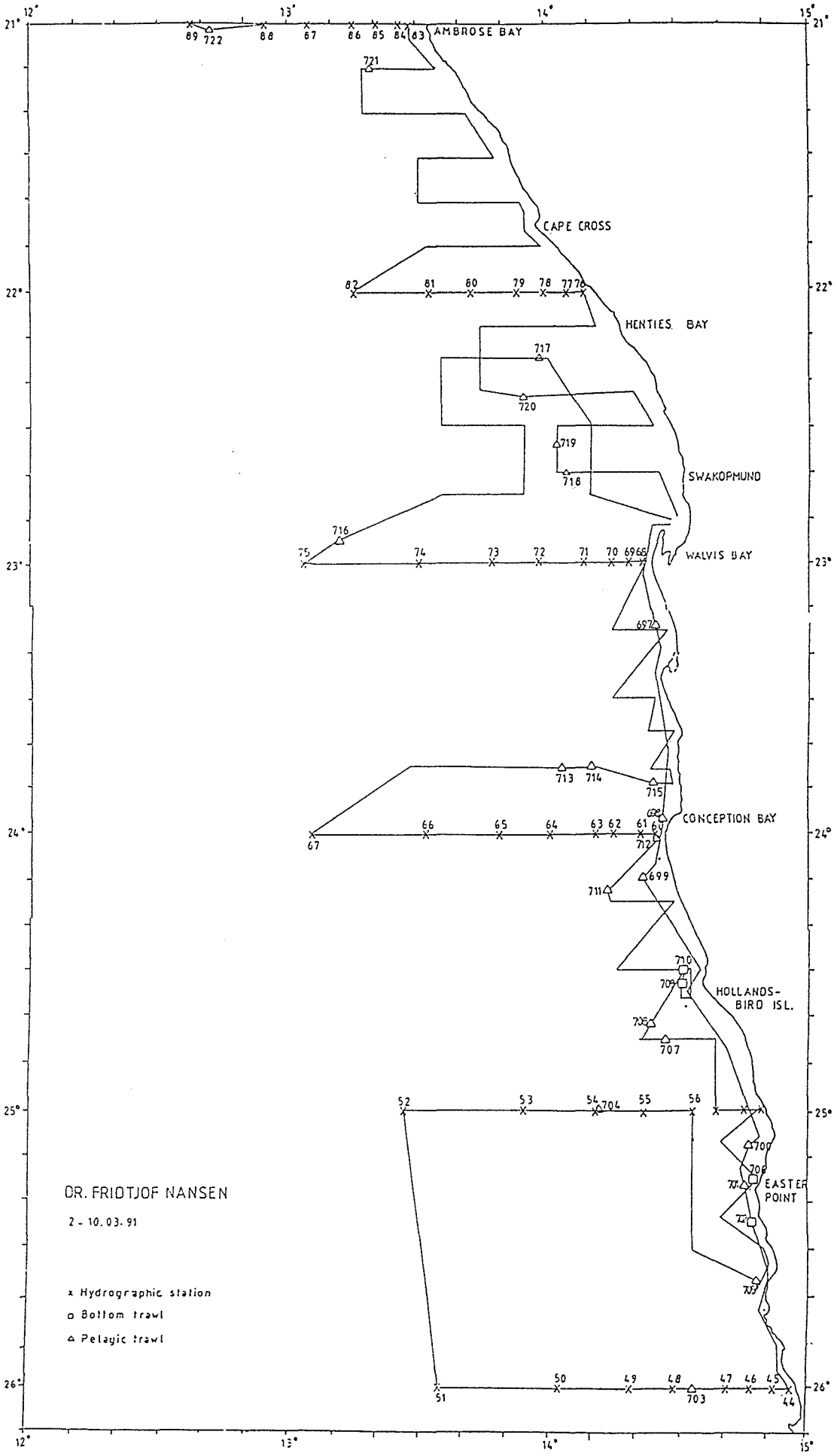

Figure 1a. Course track, fishing stations and hydrographic profiles. Dolphin Head to Ambrose Bay (northwards coverage).

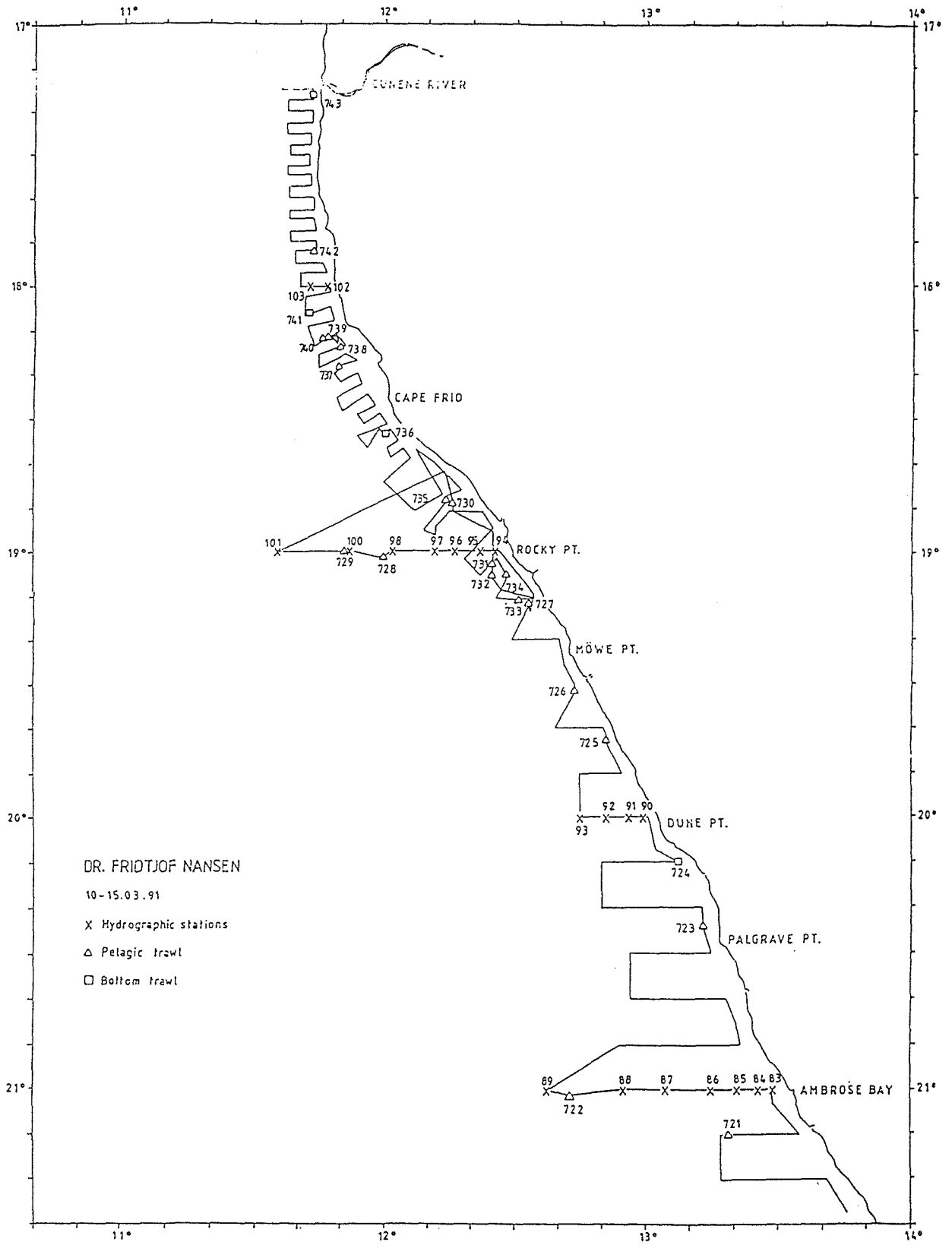

Figure 1b. Course track, fishing stations and hydrographic profiles. Ambrose Bay to Cunene River (northwards coverage).

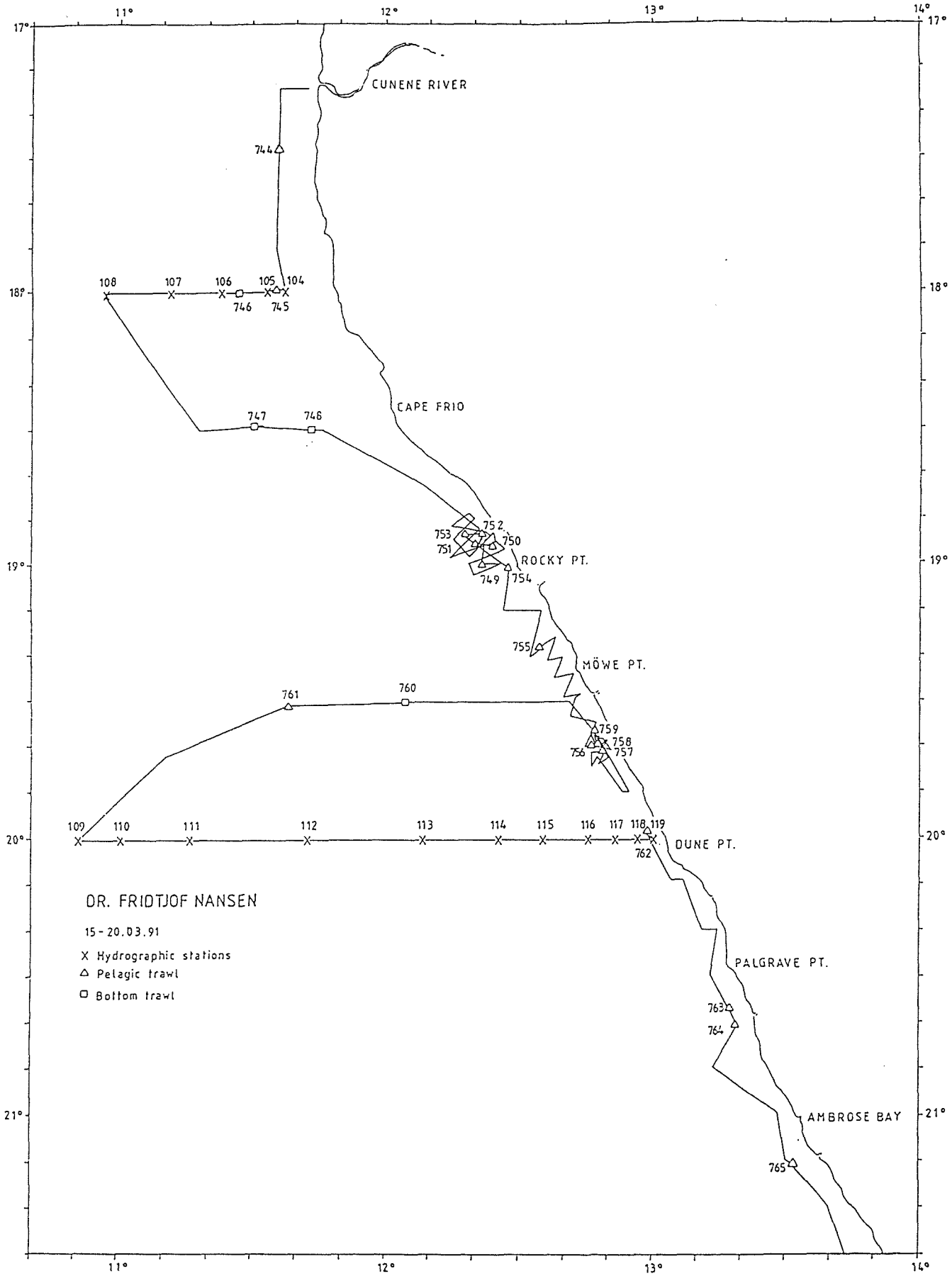

Figure 1c. Course track, fishing stations and hydrographic profiles. Ambrose Bay to Cunene River (southwards coverage).

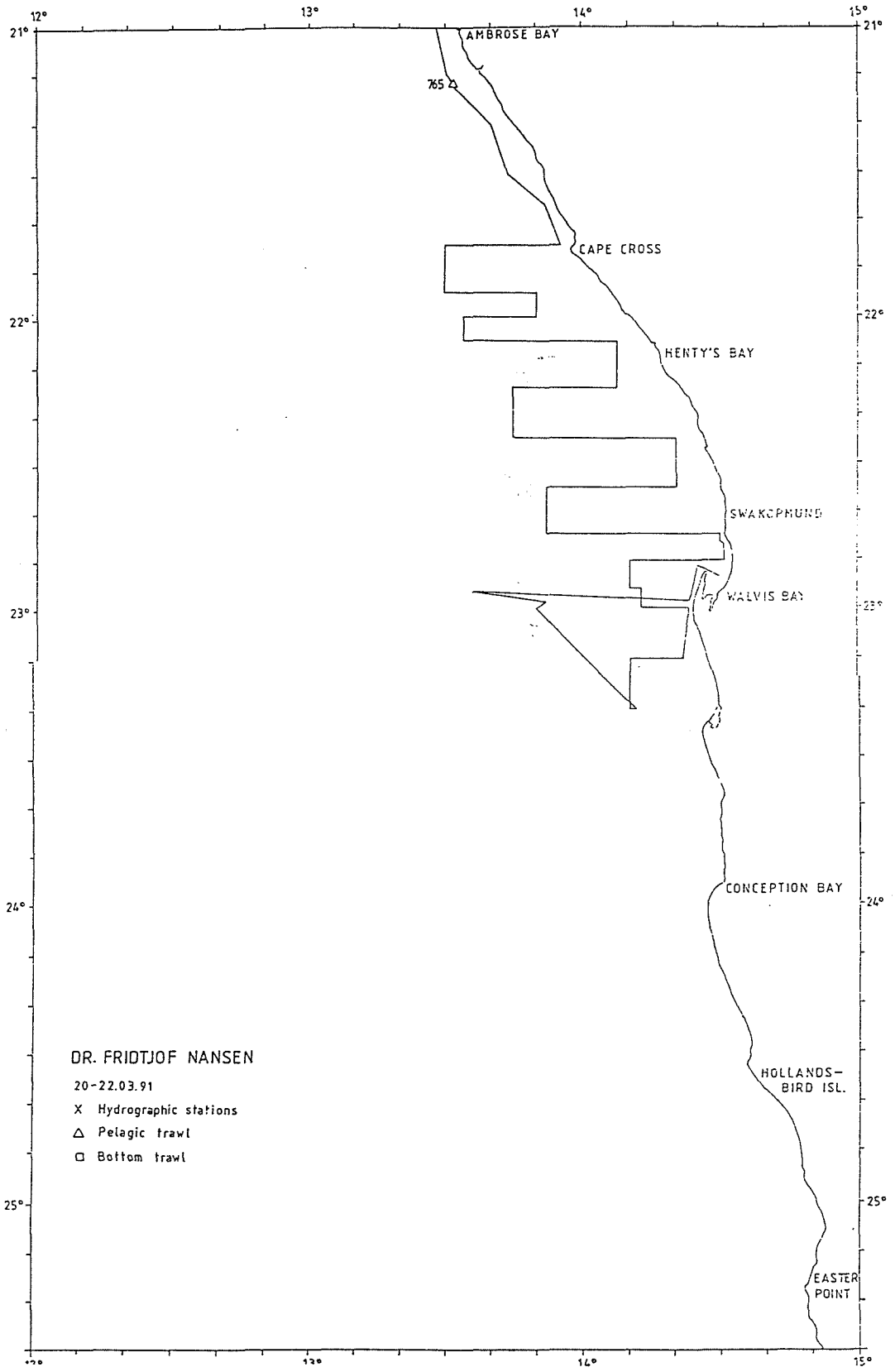

Figure 1d. Course track, fishing stations and hydrographic profiles. Dolphin Head to Ambrose Bay (southwards coverage).