

WFP. Ref. No.: AR07E  
Last Updated: August 18, 1991

Ship name: R/V TYRO  
Cruise No.: 91/1  
ExpoCode: 64TR91\_1

Dates: Dep Den Helder Apr 8, 1991  
Arr Reykjavik May 1, 1991  
Dep Reykjavik May 2, 1991  
Arr Den Helder May 16, 1991

Chief Scientist: Hendrik M. van Aken

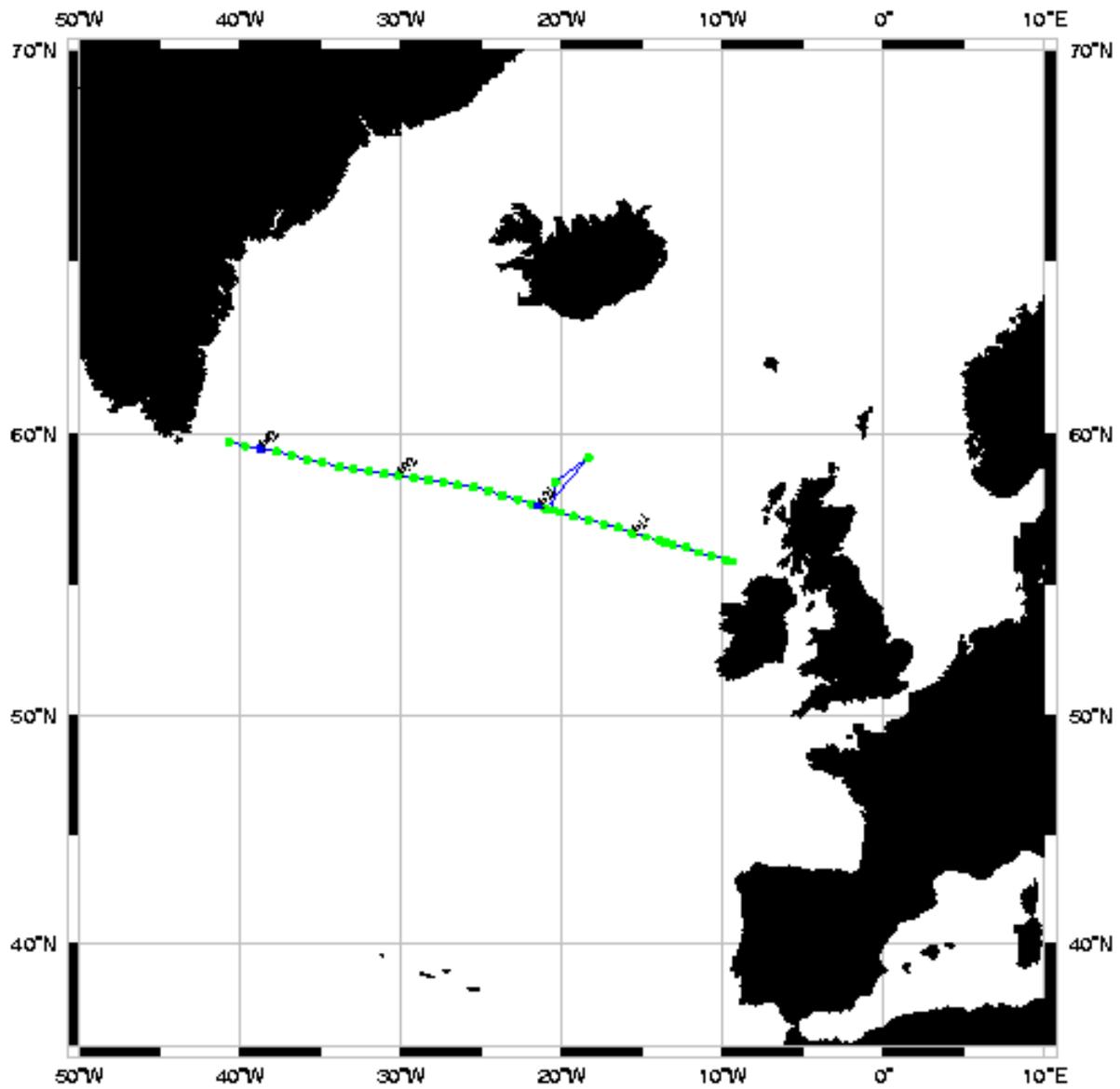
Via the North Sea, the Straits of Dover, the English Channel and the Irish Sea the ship sailed towards the shelf area northwest of the Irish Republic. In the Irish Sea a test station was carried out in order to shake down the CTD system and to obtain water for a test of the analytical instruments on board.

In the morning of 12 April, the first CTD-station was occupied near 55 45' N, 9 W, the first way point of section AR7E of the WOCE Hydrographic Programme. The CTD-programme was continued while R.V. TYRO crossed the Rockall Bank and the Rockall-Hatton Plateau. The normal station distance was 30 nautical miles, but in parts of the section with steep topography, this distance was reduced to 15 miles, in accordance with the recommendations in the WHP operational plans. While the first 4 stations the CTD-mounted oxygen sensor gave unreliable or no results, from station 9 onward, after the repairs the results seem to be more reliable. On the western side of the Hatton Bank the first of 4 ARGOS-drifters was launched.

In the night of 14 to 15 April section AR7E was left temporarily in order to recover two moorings, deployed nearby in 1990. Sediment trap mooring STRAP II was recovered successfully on 15 April. The upper 2 traps had functioned faultless but, due to a rotation failure, the deepest trap collected only for 9 out of 20 programmed sampling periods. Current meter mooring IB90/3 was recovered successfully on 16 April. CTD survey along 20 W (section a) could start. Due to favorable weather conditions, this section was finished shortly before midnight 29 April at 60 N, 20 W.

May 2, course was set to station 62 on the Reykjanes Ridge. From station 71 on the Reykjanes Ridge course was set across the Iceland Basin (section b) towards the Hatton Bank (section e) where we arrived in the afternoon of 7 May (station 95). From the Hatton Bank course was set towards the Icelandic shelf along the 17 W meridian (section f). This CTD section was temporarily interrupted because of bad weather. Thereafter two zigzag CTD sections (g & h) were carried out from the Icelandic shelf towards the 500 m line on the Faroe-Iceland Ridge. Finally from the Faroe-Iceland Ridge towards Lousy Bank and from Lousy Bank towards the Hatton Bank. CTD programme was finished at station 144.  
Summary of observations

## Station locations for AR07EB : AKEN



During the cruise the following observations have been carried out:

- continuous underway recording of position, meteorological and sea surface parameters and echo sounder depths
- recordings of CTD-profiles as well as water sampling with a 24 bottle Rosette sampler
- 6 hourly meteorological observations, sent as OBS messages into the GTS network
- launch of 4 ARGOS buoys
- recovery of 4 current meter moorings and 1 mooring with sediment traps

#### ARGOS drifters

During the first leg of the cruise 4 ARGOS-drifter have been launched according to the following:

#### ARGOS drifters launched

<b>Date</b>	<b>time (UTC)</b>	<b>Latitude</b>	<b>Longitude</b>	<b>PTT Nr.</b>
14-04-91	21.08	57 30.3'N	20 07.9'W	8523
17-04-91	05.20	57 40.0'N	21 03.2 W	8521
17-04-91	16.43	57 56.7'N	22 46.2'W	8524
18-04-91	02.01	58 13.6'N	24 34.8'W	8522

#### CTD observations

During the cruise CTD observations have been carried out with a Neil Brown MkIII CTD. The data have been recorded with a frequency of 16 Hz. The temperature sensor consisted of an electronically combined high precision Pt 100 sensor and a fast thermistor.

During the cruise it turned out that for temperatures below 2 C the temperature calibration was slightly temperature dependent due to a temperature dependent effect in the power supply. This effect is of the order of a few mK. At this moment we assume that we can cope with this problem. During the first few stations the oxygen measurement with the CTD turned out to be faulty due to a loose contact. This could be repaired and we assume that from station #4 onward we can supply reliable CTD- oxygen data.

The positions of the CTD stations are given in the following table. The definitive positions of the stations may differ slightly from the positions given here.

AR7E

## List of CTD stations

<b>Stat. Samples #</b>	<b>C. #</b>	<b>Date</b>	<b>Time UTC</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Depth m</b>	<b>N</b>
1	1	12-Apr-91	10:01	55 44.4N	08 59.9W	120	4
44	1	22-Apr-91	22:22	59 40.0N	39.44.9W	2807	24

## Water samples

The CTD was mounted with a Rosette sampler with 24 Niskin bottles and 3 thermometer racks. The following analyses were carried out with samples taken:

In situ temperature was measured with SIS electronic reversing thermometers with a display resolution of 1 mK.

Salinity was determined by means of a Guideline Autosal salinometer. The standard water was from batches P112 and P114, supplied by the IAPSO Standard Water Service.

The Oxygen concentration was determined by means of a high precision photometric end point determination, developed at NIOZ. For the stations on section AR7E samples from all bottles were analyzed as well as two blanks and one duplicate sample per cast.

Nutrients were analyzed with a Technicon TRAACS 800 autoanalyser. The sample rate was set at 60 samples per hour. From all Niskin bottles Samples were taken for nutrient analysis so that over 2000 water samples were analyzed. For every sample Phosphate, Silicate, and Nitrite were determined.

The total carbon dioxide content TCO<sub>2</sub> was determined by means of a high precision coulometric instrument (Coulometrics Inc.). All samples from section AR7E were analyzed for TCO<sub>2</sub> but at the sections of the control volumes only samples from the even bottles were analyzed.

Alkalinity was determined by means of titration. Because of the limited analysis capacity only the even bottles of 2 stations per day were analyzed as well as all surface samples. Comparison of the data from the two titrators indicated that after the cruise new volume calibrations of the titrators have to be carried out before final data may become available.

XBT-observations Along the ship's track occasional XBT's have been launched in order to improve the horizontal resolution of the temperature structure in the upper ocean and to improve the extension of the information on the upper ocean temperature field.