

**PROUDMAN OCEANOGRAPHIC LABORATORY**

**CRUISE REPORT NO. 30**

**VEINS:  
Inverted Echo Sounders in the Denmark Strait**

**As part of**

**FS POSEIDON CRUISE 222/1  
AUGUST 5, 1996 - AUGUST 12, 1996**

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**1999**

## DOCUMENT DATA SHEET

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<p>ABSTRACT</p> <p>The overflow of cold dense water from the Denmark Strait is one of the key elements of the north Atlantic thermohaline circulation and has important consequences for global climate change. It is important to measure the transport of this water and to understand its variability on seasonal and at longer time scales.</p> <p>The European funded project "Variability of Exchanges in Northern Seas" (VEINS MAS3CT960070) is an attempt to measure variations in the Arctic circulation using modern oceanographic instrumentation.</p> <p>An Inverted Echo Sounder and Bottom Pressure Recorder were successfully deployed to measure the thickness of this cold dense water and thus determine transport.</p>	
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<p>KEYWORDS</p> <p>Bottom Pressure Recorder Denmark Strait Inverted Echo Sounder  VEINS Sea Level Bottom Water North Atlantic</p>	<p>CONTRACT</p> <p>PROJECT 3310 MLL-12-5</p> <p>PRICE £6.00</p>

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## **POL PERSONNEL**

Scientific Officer

Geoff Hargreaves

## **ACKNOWLEDGEMENTS**

The author would like to thank the Captain, Officers and ship's company of FS Poseidon for their help in the deployment of sea level equipment in the Denmark Strait.

## **OVERVIEW**

The overflow of cold dense water from the Denmark Strait is one of the key elements of the north Atlantic thermohaline circulation and has important consequences for global climate change. It is important to measure the transport of this water and to understand its variability on seasonal and longer time scales.

The European funded project "Variability of Exchanges in Northern Seas" (VEINS) is an attempt to measure variations in the Arctic circulation using modern oceanographic instrumentation. Part of this work is in the Denmark Strait where an array of current meters is in place to measure the strength of the Overflow Water (DSOW). CTD surveys provide knowledge of the physical properties.

To measure the thickness of the DSOW, and hence get a value for transport, an Inverted Echo Sounder (IES) was deployed at the core of the current with a view to detecting the echo from the interface between the cold bottom water and the overlying intermediate layer.

## **POL CRUISE OBJECTIVES**

- 1) To deploy a combined Bottom Pressure Recorder and Inverted Echo Sounder in the Denmark Strait.

## **IES/BPR DEPLOYMENT**

### **Ship Preparation**

POL personnel joined FS Poseidon at Reykjavik, Iceland on August 5, 1996. The equipment was loaded aboard the ship, unpacked and stowed safely. The Bottom Pressure Recorder was assembled, tested and set running. The Inverted Echo Sounder was opened, configured and the re-sealed. The frame was prepared, the ballast weight assembled and then the BPR and IES installed.

## **DEPLOYMENT OF IES/BPR (ICE1) 9/8/1996**

### **EVENTS**

09.00 GMT            Arrive on station.

09.09 GMT            Released into the water.

09.50 GMT            On the seabed.

Total time on station: 50 minutes.

### **IES/BPR Deployment Summary**

Acoustic conditions were good, and the sea state calm. The IES/BPR was monitored to the seabed using both sets of acoustics and communication was excellent.

### **CONCLUSION**

With this deployment the POL cruise objective was achieved.

## APPENDIX 1 – IES/BPR TECHNICAL INFORMATION

### DEPLOYMENT OF IES (ICE1) INFORMATION

*Location details* - *Latitude* 63 °22.042' N  
*Longitude* 036 °04.369' W  
*Depth* 2180m

On station - 09.00 GMT on 9/8/1996  
Released into the water - 09.09 GMT  
On seabed - 09.50 GMT

The deployment went very smoothly with a calm sea. The IES was monitored to the seabed using both sets of acoustics and communication was excellent.

Acoustic Information - XT 6000 Acoustics  
S/N 46428  
Rx 14.5 kHz, Tx 12.0 kHz, Release D

- XT6000 Acoustics  
S/N 46457  
Rx 15.0 kHz, Tx 12.0 kHz, Release B

Radio Beacon - Novatek 154.585 MHz  
Channel A

The antenna screw thread on the radio beacon was damaged which meant that the antenna would not fully tighten. Self-amalgamating tape was wrapped around the thread to try and prevent the seawater from corroding the connection.

Logger - SSDL 5

Logger Information

Sensors - DQ 36573  
DQ 38175

Timebase Channels

1 - Temperature DQ 36573  
2 - Pressure  
3 - Temperature DQ 38175  
4 - Pressure

Sensor Frequencies

DQ 36573 - Temperature - 170.80 kHz

DQ 38175	-	Pressure	- 32.7 kHz
	-	Temperature	- 170.45 kHz
	-	Pressure	- 33.3 kHz

SSDL 5 timebase started at 14.30.00 GMT on 5/8/1996  
 First scan at 14.45.00 GMT on 5/8/1996

Battery Voltages

Logger	-	14.69 V
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Logger Current

-	38.7 mA - powered up
-	3.51 mA - sleep

IES Information

IES	-	Chirp IES with LDEO ADC Board
		Hard disk size 540Mb

The IES was powered up and the time set to 19.01.00 GMT on 5/8/1996

IES parameters

-	Chirp Interval	120 minutes
	Samples / Datafile	2
	Sampling Rate	Slow
	Lockout Time	0
	Start File	1
	Serial Number	10
	Deployment Number	2
	Comments	Greenland, August '96

First wakeup at 20.01.09 GMT  
 Second wakeup at 21.01.09 GMT  
 First Chirp at 21.01.28 GMT on 5/8/1996

## MAP OF IES/BPR DEPLOYMENT POSITION



## **GLOSSARY**

ADC	-	Analogue to Digital Converter
BPR	-	Bottom Pressure Recorder
CTD	-	Conductivity, Temperature and Depth Profiler
DSOW	-	Denmark Strait Overflow Water
IES	-	Inverted Echo Sounder
LDEO	-	Lamont Doherty Earth Observation Unit
VEINS	-	Variability of Exchanges in Northern Seas