

Application for Consent to Conduct Marine Scientific Research

1. General Information

1.1 Reference ID:

Application number: F2011-004
Project name: Denmark Strait

1.2 Sponsoring institution(s):

Institution	Contact Information	Director
Woods Hole Oceanographic Institution	Eric Benway Marine Operations Coordinator Woods Hole Oceanographic Institution 38 Water Street, MS #37 Woods Hole, MA 02543 Phone: (508) 289-3770 Fax: (508) 457-2185 Email: ebenway@whoi.edu	Susan Avery

1.3 Scientist in charge of the project:

Name: Pickart, Robert
Affiliation: Woods Hole Oceanographic Institution
Address:
Phone: 508-289-2858
Fax: 508-457-2181
Email: rpickart@whoi.edu

1.4 Scientists from coastal states involved in the planning of the project:

See Section 8 (*Participation*)

1.5 Submitting officer:

Name: Benway, Eric
Affiliation: Woods Hole Oceanographic Institution
Address:
Phone: 508-289-3770
Fax: 508-457-2185
Email: ebenway@whoi.edu

2. Description of Project

2.1 Nature and objectives of the project:

This project investigates the sources of water feeding the Denmark Strait Overflow Water. It is a collaborative field program between the Woods Hole Oceanographic Institution, the Marine Research Institute of Reykjavik, the University of Bergen, and the Netherlands Institute for Sea Research. Our approach is to deploy a year-long set of moorings from August 2011 to August 2012, and carry out a shipboard hydrographic/velocity survey of the region during the mooring deployment and recovery cruises. Moorings will be maintained upstream of the Denmark Strait sill in the major components of the circulation, as well as in the overflow water at the sill itself (see the attached figure showing the mooring locations and the tentative shipboard survey in 2011). The main scientific objective of the program is to quantify the different water mass components, transports, and pathways feeding the overflow water, and to understand the dynamics of the warm-to-cold conversion of water that forms the overflow.

2.2 Relevant previous or future research projects:

In autumn 2008 we carried out a month-long hydrographic/velocity survey in this region on the R/V Knorr to obtain preliminary information regarding the pathways of water entering Denmark Strait. This earlier field program motivated the present effort, and helped us determine the locations for the moorings. In 2012 we will submit another application to recover the moorings deployed in 2011, and carry out an additional hydrographic survey.

2.3 Previously published research data relating to project:

Vage, K., R.S. Pickart, M.A. Spall, H. Valdimarsson, S. Jonsson, D.J. Torres, S. Osterhus, and T. Eldevik, 2010. Formation and outflow of Denmark Strait Overflow Water via boundary currents and transformation in the Iceland Sea. Nature Geoscience, submitted.

3. Methods and Means to be Used**3.1 Platform:**

Name:	KNORR
Nationality (Flag State):	United States
Overall length:	281
Maximum draught (meters):	16.7
Displacement/gross tonnage:	2,518
Propulsion:	
Call sign:	KCEJ
Cruising speed:	
Maximum speed:	
Name of captain/master:	Kent D. Sheasley
Number of crew:	23
Number of scientists on board:	32

3.2 Other craft used in the project:

None

3.3 Methods and scientific instruments:

Types of Samples and Data	Methods to be Used	Instruments to be Used
Mooring timeseries measurements of pressure, temperature, salinity, and velocity.	Subsurface moorings.	Scientific instrumentation includes: conductivity/temperature/depth (CTD) moored profilers; acoustic Doppler current profilers; point pressure sensors, thermistors, conductivity sensors, and current meters.
Vertical profiles of temperature, salinity, oxygen, fluorescence, transmissivity.	Shipboard measurements.	CTD.
Vertical profiles of velocity and backscatter.	Shipboard measurements.	Two Vessel-mounted acoustic Doppler current profilers (ADCPs); a 300 kHz unit and a 75 kHz unit.
Bottom profile.	Shipboard measurements.	A 12 kHz and 3.5 kHz Knudsen echo sounder.

3.4 Will harmful substances be used?

No.

3.5 Will drilling be carried out?

No.

3.6 Will explosives be used?

No.

3.7 Will protected species be studied?

No.

4. Installations and Equipment

4.1 Will there be any installations?

Yes. We will deploy and/or turnaround 16 subsurface moorings. The deployment will take place in August/September 2011 and the recovery in August 2012. There is no surface expression on any of the moorings (the shallowest top float resides at 100m below the surface). The moorings will not be serviced at any point during the year-long deployment.

5. Geographical Area(s)

5.1 Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude):

The geographical area is the vicinity of Denmark Strait, north and east of Iceland, and the region north of the Faeroe Islands: 60N-73N, 35W-0W.

5.2 Attach chart(s) showing the geographical areas of the intended work and, as far as practicable, the positions of intended stations, the tracks of survey lines, and the locations of installations and equipment:

See Section 10 (*Attachments*)

6. Dates

6.1 Expected dates:

Project start date: Aug 19, 2011

Project end date: Sep 24, 2011

Coastal Area	Entry Date	Final Departure Date	Multiple Entries Expected?
Iceland	Aug 19, 2011 12:00:00 AM	Sep 24, 2011 12:00:00 AM	No
Explanation of multiple entries:			
Extent to which Iceland will be enabled to participate or to be represented in the research project: This is a collaborative project with researchers from the Marine Research Institute of Reykjavik (Hedinn Valdimarsson) and the University of Akureyri (Steingrimur Jonsson). They are supplying moorings and may sail on the cruise (and/or send technicians on the cruise).			
Greenland	Aug 19, 2011 12:00:00 AM	Sep 24, 2011 12:00:00 AM	No
Explanation of multiple entries:			
Extent to which Greenland will be enabled to participate or to be represented in the research project: We have an available berth on the ship for a member of the coastal state.			
Faeroe Islands	Aug 19, 2011 12:00:00 AM	Sep 24, 2011 12:00:00 AM	No
Explanation of multiple entries:			
Extent to which Faeroe Islands will be enabled to participate or to be represented in the research project: We have an available berth on the ship for a member of the coastal state.			
Denmark	Aug 19, 2011 12:00:00 AM	Sep 24, 2011 12:00:00 AM	No
Explanation of multiple entries:			
Extent to which Denmark will be enabled to participate or to be represented in the research project: We have an available berth on the ship for a member of the coastal state.			
Jan Mayen	Aug 19, 2011 12:00:00 AM	Sep 24, 2011 12:00:00 AM	No
Explanation of multiple entries:			
Extent to which Jan Mayen will be enabled to participate or to be represented in the research project: We have an available berth on the ship for a member of the coastal state.			

Norway	Aug 19, 2011 12:00:00 AM	Sep 24, 2011 12:00:00 AM	No
Explanation of multiple entries:			
Extent to which Norway will be enabled to participate or to be represented in the research project: This is a collaborative project with researchers from the University of Bergen (Svein Osterhus and Kjetil Vage). They are supplying a mooring, and K. Vage will sail on the cruise.			

7. Port Call(s)

Port	Arrival Date	Departure Date	Special Logistical Requirements	Shipping Agent
Reykjavik	Aug 19, 2011 12:00:00 AM	Aug 22, 2011 12:00:00 AM	Forklift and space to accommodate 20-foot vans.	TVG-Zimsen ehf Korngardar 2 104 Reykjavik Iceland Phone: 011 354 5600 700 Fax: 011 354 5600 780 Email: eca@tvg.is 24 Hour Mobile Service: 011 354 856 0701 Primary Contact: Johann Bogason Direct line: 011 354 856 0701 Email: johann@tvg.is Contact: Helgi Bjarnason Direct liine: 011 354 856 0740 Email: helgi@tvg.is
Isafjordur - hofn	Sep 21, 2011 12:00:00 AM	Sep 24, 2011 12:00:00 AM	Forklift and space to accommodate 20-foot vans.	TVG-Zimsen ehf Korngardar 2 104 Reykjavik Iceland Phone: 011 354 5600 700 Fax: 011 354 5600 780 Email: eca@tvg.is 24 Hour Mobile Service: 011 354 856 0701 Primary Contact: Johann Bogason Direct line: 011 354 856 0701 Email: johann@tvg.is Contact: Helgi Bjarnason Direct liine: 011 354 856 0740 Email: helgi@tvg.is

8. Participation

8.1 Extent to which coastal state(s) will be able to participate or to be represented in the research project:

See Section 6 (*Dates*)

8.2 Proposal dates and ports for embarkation/disembarkation:

See Section 7 (*Port Call(s)*)

9. Access to Data, Samples and Research Results

9.1 Expected dates of submission to coastal State of preliminary reports, which should include the expected dates of submission of the final results:

No more than 30 days from the end date of the research.

9.2 Propose means for access by coastal state to data and samples:

Data will be provided through official channels at no cost to the coastal State(s). Samples will be provided upon request.

9.3 Propose means to provide coastal State with assessment of data, samples and research results or provide assistance in their assessment or interpretation:

Assessment of data, samples, and research results will be provided at no cost to the coastal State(s). Assistance in further assessment or interpretation will be provided upon request.

9.4 Propose means of making results internationally available:

Results of the study will be published in peer-reviewed scientific journals and presented at international conferences and meetings. After the processing is complete, all data will be posted on a web site.

10. Attachment(s)

Final Report	
Attachment	Estimated Delivery Date
No Final Report Currently Available	

Additional Attachments		
Attachment Type	Attachment	Submission Date
Proposed Cruise Track	1293568768380_clearance_knxxx.jpg	
Supplemental Material	1293568808458_pickart_photo.jpg	
Supplemental Material	1293568883380_Pickart-CV-Dec10.pdf	
Supplemental Material	1293715769318_Greenland-Denmark-Notification-of-proposed-research-cruise.pdf	