

# NATURAL ENVIRONMENT RESEARCH COUNCIL

## APPLICATION FOR CONSENT TO CONDUCT MARINE SCIENTIFIC RESEARCH ICELAND

Date: 7<sup>th</sup> October 2010

SHIP NAME	CRUISE NUMBER	DATES OF CRUISE	Country applied for	PORT CALLS	DATES
Discovery	D350	1 <sup>st</sup> – 10 <sup>th</sup> May 2010	Iceland	Reykjavik	28.04.10 – 01.05.10 And 10.05.10

List Scientific Work by Function e.g.: Magnetometry Gravity, Diving, Seismic, Bathymetry, Seabed Sampling, Trawling, Echo Sounding, Water Sampling U/W T.V.: Moored and Towed instrument	Water Column Incl. Sediment Sampling on the Seabed	Fisheries Research within Fishing Limits	Research Concerning the Natural Resources of the Continental Shelf or its Physical Characteristics	Distance from Coast	
				Between Within 12 NM	12 - 200 NM
Atmospheric aerosol samples	Yes	No	Yes	Yes	Yes
Water samples	Yes	No	Yes	Yes	Yes
Particulate matter in water	Yes	No	Yes	Yes	Yes

### 1. General information

1.1 Cruise name and/or number: RRS DISCOVERY D350

1.2 Sponsoring institution:

Name: **Natural Environment Research Council**

Address: Polaris House, North Star Avenue  
Swindon, SN2 1EU, UK

1.3 Scientist in charge of the project:

Name: Dr Mark Moore

Address: National Oceanography Centre, University of Southampton,  
European Way, Southampton SO14 3ZH, United Kingdom

Telephone: 44-2380594801

Telefax: 44-2380593059

1.4 Scientist(s) from Iceland informed of the planning of the project

Name(s): Jón Ólafsson (jon@hafro.is)

Address: Marine Research Institute, Skulagata 4, 121 Reykjavik, Iceland,

Tel: +354 575 2000, +354 575 2000; fax: +354 575 2001; email: [hafro@hafro.is](mailto:hafro@hafro.is)

#### **Submitting officer:**

Name: R. Plumley, NERC NMF SS, National  
Oceanography Centre, European Way, Empress Dock,  
Southampton, SO14 3ZH

Telephone: 02380 596800

Telex: 47121                      Telefax: 02380 635130

# NATURAL ENVIRONMENT RESEARCH COUNCIL

## **2. Description of project (Attach additional pages as necessary)**

### **2.1 Nature of objectives of the project:**

The cruise forms part of a study entitled 'Iron Biogeochemistry in the High Latitude North Atlantic'. The study is investigating the potential influence of iron availability on phytoplankton production in regions of the North Atlantic. The purpose of the cruise is to undertake measurements of dissolved and particulate iron availability, their spatial and temporal variations, and their impact on microbiology in the surface ocean.

Our specific cruise objectives are to:

1. Determine total dissolved Fe and Al (<0.2 micron) and macro-nutrient concentrations, in addition to Fe speciation, in areas of the high latitude North Atlantic Ocean.
2. Undertake on-board nutrient enrichment bioassay experiments with additions of Fe to determine the potential for Fe limitation in the Iceland and Irminger Basins.
3. Undertake phytoplankton photophysiological measurements, chlorophyll a, pigment analysis and counts of phytoplankton both within bioassays and the in situ population to determine the physiological basis and extent of Fe limitation.
4. Determine atmospheric inputs through aerosol sampling, combined with back trajectory analyses.
5. Determine Fe and nutrient fluxes (and their ratios) in particulate sedimenting material using Stand Alone Pumping Systems (SAPS) and <sup>234</sup>Th depletions at different water depths.
6. Determine Fe and nutrient supplies to high latitude N Atlantic surface waters through diapycnal transfer, convective fluxes, and wind induced vertical and lateral advection through Ekman transfer.
7. Determine the lateral transfer of Fe and nutrients from the geostrophic circulation and horizontal eddies using a general circulation model.
8. Provide a synthesis of Fe and nutrient inputs from the atmosphere and ocean circulation for the high latitude N Atlantic.

### **2.2 Relevant previous or future research cruises:**

Discovery cruise D321: This cruise departed UK (Govan) and ended Iceland (Reykjavik)

### **2.3 Previously published research data relating to the project:**

Nielsdóttir, M. C., C. M. Moore, R. Sanders, D. J. Hinz, and E. P. Achterberg (2009), Iron limitation of the postbloom phytoplankton communities in the Iceland Basin, *Global Biogeochem. Cycles*, 23, GB3001, doi:10.1029/2008GB003410

## **3. Methods and means to be used**

### **3.1 Particulars of vessel**

<b>Name:</b>	RRS Discovery		
<b>Nationality:</b>	British		
<b>Owner:</b>	NERC		
<b>Operator:</b>	NMF SS		
<b>Overall Length:</b>	90.25 metres		
<b>Maximum draught:</b>	5.446 metres		
<b>Net tonnage:</b>	902	<b>Gross tonnage:</b>	3008
<b>Propulsion:</b>	Diesel Electric		
<b>Cruising Speed:</b>	11 knots	<b>Maximum speed:</b>	N/A
<b>Call sign:</b>	GLNE		
<b>Method of capability of communication (including telex, frequencies):</b>			
<b>Inmarsat Voice:</b>	323388210	<b>Fax:</b>	23388212
		<b>Telex:</b>	323388214
<b>Name of Master:</b>	TBA		
<b>Number of Crew:</b>	22		
<b>Number of Scientists on board:</b>	28		
<b>MMSI:</b>	233882000		

# NATURAL ENVIRONMENT RESEARCH COUNCIL

**3.2 Aircraft or other craft to be used in the project:** None

**3.3 Particulars of methods and scientific instruments**

<b>Types of samples and data</b>	<b>Methods to be used</b>	<b>Instruments to be used</b>
Atmospheric aerosol samples	Collection using high volume pump and analyses in the lab in the UK using ICP-AES	High volume aerosol sampler with land-based analyses
Water samples	Collection using towed sampler, and using samplers on CTD frame. Samples for trace metal, nutrient analyses	Trace metal analyses on board using flow-injection analyses. Nutrient analyses on-board using autoanalyser.
Water samples	Phytoplankton analyses	Phytoplankton pigment analysis and preservation for microscopy on land. Nitrogen and carbon uptake experiments using radio-isotopes with analyses on board using liquid scintillation counting. Phytoplankton physiological measurements on board using fluorescence. Frozen samples collected for protein analyses
Particulate matter in water	Stand alone pumping systems will be used on a wire	Trace metal and nitrogen isotope analyses will be conducted on the samples
Particulate matter in water	Settling particles collected using 'marine snow catcher' on wire	Trace metal, carbon and nitrogen analyses will be conducted on the samples

**3.4 Indicate whether harmful substances will be used:** Yes

**3.5 Indicate whether drilling will be carried out:** No

**3.6 Indicate whether explosives will be used:** No

## **4. Installations and equipment**

**4.1 Details of installations and equipment (dates of laying, servicing, recovery; exact locations and depth):** None

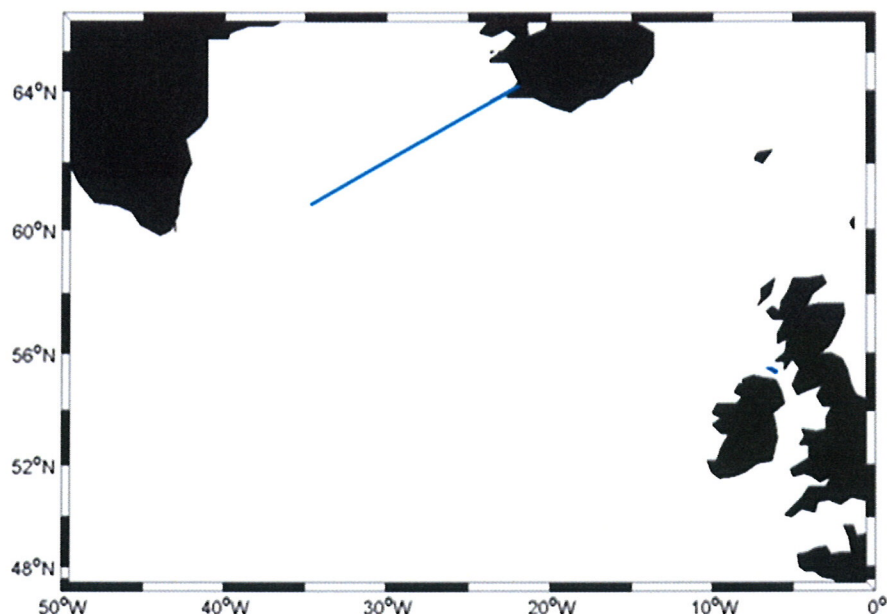
## **5. Geographical areas**

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

Latitude: 55-65°N

Longitude: 43-15°W

**5.2 Attach chart (s) at an appropriate scale 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**



Blue line indicates proposed cruise track.

Way points:	63.75°N	24°W
	62.8°N	27.66°W
	61.9°N	31.33°W
	61°N	35°W

Stations are provisionally planned for within ~50km of waypoints. No station will be occupied further west than final waypoint (61°N, 35°W).

## **6. Dates**

### **6.1 Expected dates of first entry into and final departure from research area of the research vessel:**

Expected first entry: 1<sup>st</sup> May 2010  
 Expected final departure: 9<sup>th</sup> May 2010

### **6.2 Indicate if multiple entry is expected: Yes**

## **7. Port calls**

### **7.1 Dates and names of intended ports of call in Iceland**

**Embark:** Reykjavik, Iceland 28<sup>th</sup> April – 1<sup>st</sup> May 2010  
**Disembark:** Reykjavik, Iceland 10<sup>th</sup> May 2010

### **7.2 Any special logistical requirements at ports of call: None**

### **7.2 Name/Address/Telephone of shipping agent (if available):**

Nesskip H.F.	Tel: 00354 5639900
Nesskip's House	Fax: 00354 5639919
Austrurstrond 1	Email: <a href="mailto:operations@nesskip.is">operations@nesskip.is</a>
172 Seltjarnarnes	Contact: Gudmundur Sigurgeirsson
Reykjavik PC101	
Iceland	

# NATURAL ENVIRONMENT RESEARCH COUNCIL

## **8. Participation**

### **8.1 Extent to which each coastal state will be enabled to participate or to be represented in the research project:**

One berth for an observer from each coastal state is offered in accordance with UNCLOS Art 249 (1a).

### **8.2 Proposed dates and ports for embarkation/disembarkation:**

**Embark:** Reykjavik, Iceland 28<sup>th</sup> April – 1<sup>st</sup> May 2010

**Disembark:** Reykjavik, Iceland 10<sup>th</sup> May 2010

## **9. Access to data, samples and research results**

### **9.1 Expected dates of submission of preliminary reports which should include the expected dates of submission of the final results:**

Six months after completion of Cruise

### **9.2 Proposed means for access to data and samples:**

All access will go through the Bidston Oceanographic Data Centre (BODC).  
Address: British Oceanographic Data Centre  
Joseph Proudman Building, 6 Brownlow Street, Liverpool, L3 5DA  
United Kingdom

### **9.3 Proposed means to provide Iceland assessment of data, samples and research results or provide assistance in their assessment or interpretation:**

Research articles and reports will be provided to coastal state.

### **9.4 Proposed means of making research results internationally available:**

Scientific articles. International Conference Presentations. BODC website for data dissemination

.....(On behalf of the Principal Scientist)

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