

## National Research Vessels

### SHIP-TIME PROGRAMME

### **RESEARCH SURVEY REPORT**

<b>Survey Code:</b>	<b>Survey Name:</b>	<b>Chief Scientist/ Institution</b>
CE13_003	Standard Oceanographic Sections in the Rockall Trough	Glenn Nolan

## Section A: Award Summary

<b>Title of Research Survey and Survey Code:</b>	CE13001: Standard oceanographic sections in the Rockall Trough <input type="checkbox"/>	
<b>Co-Ordinator/ Chief Scientist:</b>	Glenn Nolan	
<b>Vessel used for ship-time:</b>	<i>RV Celtic Voyager</i> <input type="checkbox"/>	<i>RV Celtic Explorer</i> <input type="checkbox"/>
<b>Total number of days at sea:</b>	16 days	
<b>Total number of grant-aided ship-time days awarded:</b>	16 days	
<b>Dates of survey:</b>	January 5 <sup>th</sup> to 20 <sup>th</sup> 2013 (2 legs)	
<b>Mobilisation/Demobilisation Ports</b>	Galway/Killybegs	
<b>Survey Personnel:</b>	<i>No. of Scientists</i> 13	<i>No. of Students</i> 3
<b>Final Report Completed by:</b>	Glenn Nolan	<b>Date:</b>

## Section B: Description of the Research Survey

### B1 Overview of survey personnel

<b>Names</b>	<b>Institute/ Department/ Course</b>	<b>Position (undergraduate/ post graduate etc)</b>	<b>Number of Days</b>	
<b>Scientists</b>				
Glenn Nolan	M.I.		16 days	
Xavi Monteys	G.S.I.			
Liam Curran	EI			
Gareth Lee	UEA			
Kieran Adlum	M.I.			
Tomasz Szumski	M.I.			
James Burris	NOC			
Sam Ward	NOC			6 days
Rosemarie Butler	MI			6 days
Rob McLachlan	NOC			16 days
Bastien Queste	UEA			6 days
Umberto Binetti	UEA			6 days
Richard Walsh	M.I.			6 days
				16 days
<b>Students</b>				
Conall O'Malley	NUIG	Undergraduate	<b>16 days</b>	
Edel O'Donnell	NUIM	Postgraduate	<b>6 days</b>	
Vincent Mouchi	UCD	Postgraduate	<b>16 days</b>	

### B2 Objectives

Briefly outline the overall objectives of the research survey.

Please state if objectives have changed from the original proposal. If survey included a training element please outline clearly.

#### Cruise objectives:

- Collect CTD profile data along the standard offshore sections to include:
  - Nutrient sampling
  - Salinity samples
  - DIC, TA, DOC, TOC ,DO samples
- Collect grab samples at key locations on the Irish shelf
- Deploy offshore weather buoy at Belmullet
- Deploy ADCP at WETS Belmullet site
- Recover existing Wavescan buoy at Belmullet
- Collect multi-beam bathy data in the vicinity of Inishturk and Inishboffin.

**No change to survey objectives from original proposal.**

### **B3 Overview of research survey**

*Provide a narrative overview of the research survey including survey timelines  
The information provided in this section should not exceed 5 pages (excluding tables and maps)*

Note: CE13001 was split into 2 legs, the first focused on the recovery of a met buoy and gliders from the PAP site for NOC and UEA, the second leg focused on oceanographic section and geological work for GSI and the servicing of the M6 weather buoy.

**January 5<sup>th</sup>:** Cleared Galway Port at 2130 and made way to the drifting UKMO met buoy at Porcupine Abyssal Plain site.

#### **Limited narrative for NOC, UEA work here (from bridge log)**

**January 11<sup>th</sup> :** After a 12 hour port call in Castletownbere the Celtic Explorer commenced leg 2 of the survey, clearing port at 1630. The ship proceeded south west to the locations of 12 sediment sampling sites for GSI.

**January 12<sup>th</sup>:** Commenced sediment sampling with day grab equipment at 0035 and proceeded on a “zig-zag” course through the remaining sampling sites. This activity was completed by 1000. Proceeded to steam to Aran Islands CTD station. Commenced CTD activities at 2130 south of Inisheer in favourable weather conditions.

**January 13<sup>th</sup>:** Proceeded along 53N line towards Porcupine Bank during the day, reaching the shelf break SW of Porcupine at 2318 (Stn 15).

**January 14<sup>th</sup>:** Proceeded along Porcupine shelf break stations until ca 1800. Broke off CTD operations to deploy M6 buoy (complete by 2100) and to recover existing M6.

**January 15<sup>th</sup>:** Old M6 buoy recovered at 0016. Proceeded to first CTD on south Rockall line (stn 22 commencing at 0214. Continued work in a NW direction towards Rockall Bank.

**January 16<sup>th</sup>:** Completed the south Rockall line (Station 29) at 0900 and proceeded to box core station on Rockall Bank in very fine weather conditions. Started first station on the North Rockall line.

**January 17<sup>th</sup>:** Continued in a SE direction off the Rockall shelf break in moderate sea conditions from the SE (winds 40kn, waves ca. 4m). Completed stations 30 to 37.

**January 18<sup>th</sup>:** 0130: Breaking off leg to drop Liam Curran to Ballyglass. Shore drop off completed by 1245 and headed back to innermost station on North Rockall section.

**January 19<sup>th</sup>:** Completed North Rockall CTD section at 0600 and proceeded to steam for Galway pilot station.

**January 20<sup>th</sup>:** Fully demob of gear AM to Marine Institute.

#### **B4 Benefits, impact and contribution of the outputs to marine research and the marine sector in general.**

*Outline clearly the specific outcomes and benefits of the research survey.*

*The information provided in this section should not exceed 1/2 page (excluding tables and maps)*

The generation of long-term time series to monitor ocean climate is at the heart of understanding the likely impact of future ocean climate scenarios on key marine sectors eg. Fishing, aquaculture, wave energy, environmental protection, coastal flood defense. Providing for sustainability in these sectors is a key element in the recently published Sea Change Marine research and innovation strategy. This work helps define the likely future ocean climate these marine sectors will have to contend with in terms of water temperatures, wave heights, tidal surges and nutrient and plankton concentrations.

While not glamorous in its own right, it is widely accepted that re-occupying hydrographic sections to examine year-to-year changes in ocean climate is one of the key elements required in climate change programmes. This is essential in preparing the marine sector as our ocean climate is modified.

This work has already enabled Ireland to be part of large EU programmes on collapse of the thermohaline circulation in the NE Atlantic and in the international ARGO programme.

#### **Capacity building**

The team involved have spent the past decade developing the capacity to acquire this standard section data and to ensure that the data is utilised as rapidly after collection as is feasible. Capacity was developed further by training upcoming undergraduate and postgraduate students on this cruise so that in time they will be in a position to lead such programmes and provide assessments of ocean climate on an ongoing basis.

#### **Dissemination**

Data from this cruise are disseminated using a variety of methods. In the first instance the data are provided to the ICES Working Group on Oceanic Hydrography of which Ireland is a member (and co-chair). This group produces the ICES Report on Ocean Climate which is widely disseminated among the ICES fisheries and environment communities. The report is available on the ICES website ([www.ices.dk](http://www.ices.dk))

Where new discoveries are made we endeavour to disseminate this information through MI and national seminars and in the production of peer reviewed scientific publications.

We also disseminate the information via the Marine Institute website where individuals request the survey data on completion of the cruise. There is ongoing work to make the data and plots available using an OpenDAP server coupled with applications such as Google Earth and NASA WorldWind.

#### **Improved understanding of ocean climate**

The proposed data collection on this cruise is designed to gather and establish baseline oceanic weather and oceanic conditions (eg. Malin Head station). It is in this overall context that we can establish the oceanic baseline from which future changes can be assessed.

We combine measured data with modelled data in an overall assessment of wave climate, tidal surges, sea level and temperature and salinity regimes. In some cases the data are used to validate models which can then be used to model future climate scenarios out to 2100 under varying Greenhouse Gas Emission scenarios.

### **Promoting multi-disciplinary and inter-institutional research collaboration**

This research brings together the two key oceanographic groups in Ireland from the university and government sectors. The university researchers are focussed on the pure research elements of the cruise while Marine Institute scientists are focussed on the long-term monitoring of Ireland's ocean.

These cruises have had a climate focus since 2006 and the Marine Geology team from the Geological Survey of Ireland will collect cores for climate purposes during this programme. This provides a link between palaeoceanography and modern measurements of ocean currents and water masses. The team also hopes to collect hydrographic data from the Irish shelf region filling gaps in the INFORMAR data coverage

Analysis of seabed samples collected during the cruise are publically disseminated through the INFOMAR program GIS web portal. Additionally, these results are key to feed into current major marine EU mapping projects such as EMODNET (<http://www.emodnet-geology.eu/>)

The cruise also enables baseline cetacean sightings to be made in the deep water west of Ireland.

The cruise incorporates physical, chemical and biological data gathering. In summary this cruise has active participation of a government agency (MI), a government department (DCENR-GSI), a 3<sup>rd</sup> level research group (NUIG) and a Non-governmental Organisation (IWDG) fulfilling a truly inter-institutional role and includes oceanographers, plankton ecologists, fisheries scientists (migratory and key commercial species) and marine technicians, thus fulfilling a truly multi-disciplinary role.

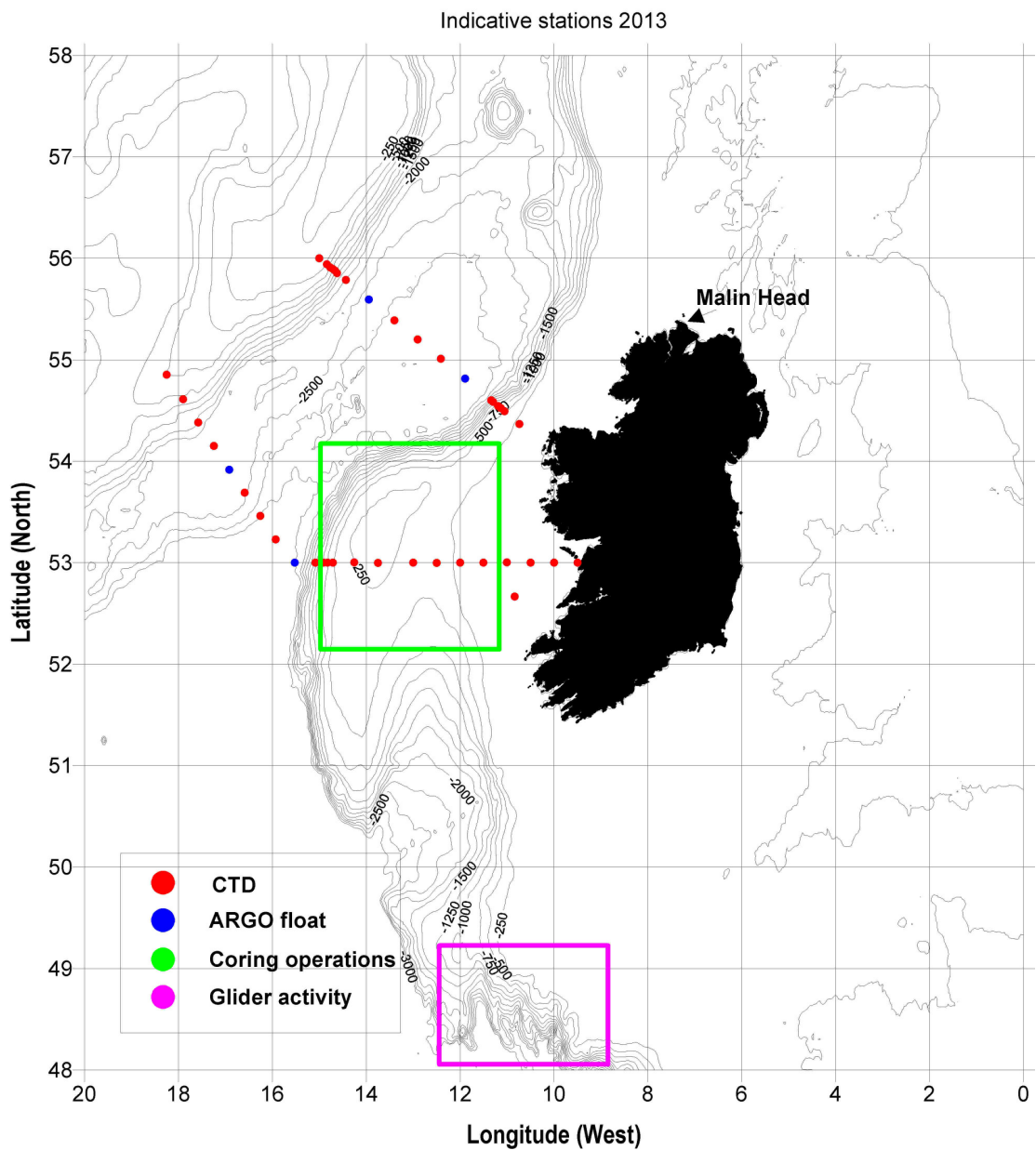
The initial leg of the cruise gave scientists from NOC, UEA and MI an opportunity to collaborate and to provide a basis for further international cooperation at the PAP site.

### **B5 Data**

*Provide a description of the data collected from the research survey, the usage of the data and how it will be stored.*

*The information provided in this section should not exceed 1/2 page (excluding tables and maps)*

A total of 36 CTD sampling stations were occupied for a variety of parameters including nutrients, salinity and carbon measurements. Grab sampling and rock dredging was conducted at a number of additional stations on behalf of the GSI.



**Figure 1: Stations occupied on Cruise CE13001**

**Preliminary CTD plots are included in appendix 1. All data freely available through Marine Institute data request service: [DataRequests@marine.ie](mailto:DataRequests@marine.ie)**

**B6 Contribution to marine research programmes**

*Outline specific National/EU/International research programmes this survey supported. Please include the funding sources for these programmes as well as the total amount of funding leveraged (Repeat the table below, if necessary).*

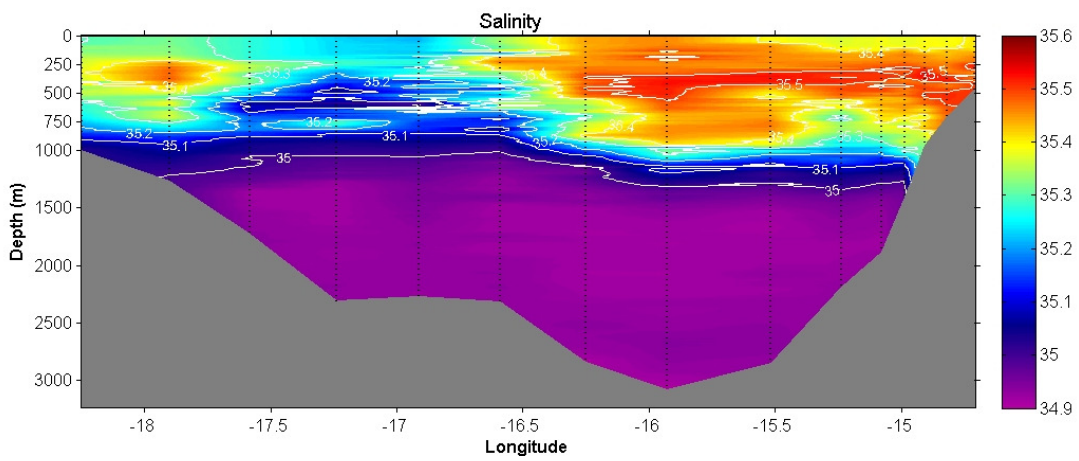
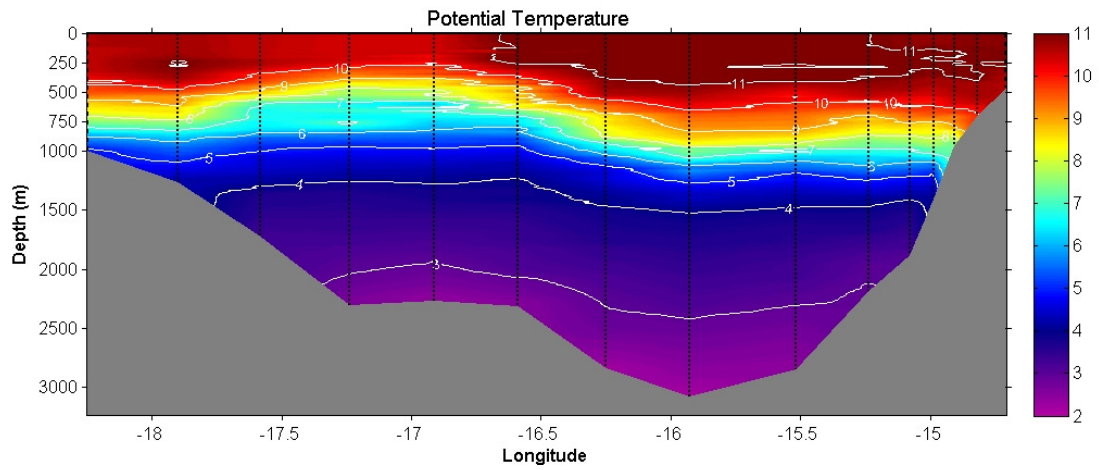
<b>National/EU/International Research programme(s):</b>	
<b>Total Programme cost:</b>	
<b>Value to Irish partners:</b>	
<b>Project duration:</b>	
<b>Contract no.:</b>	
<b>Project partners:</b>	
<b>Project web address:</b>	

## Appendices

Please number and attach any relevant Appendices here.

### Preliminary data plots from CE13001

South Rockall line:



North Rockall line:

