School of Ocean Sciences, University of Wales BANGOR, Menai Bridge, Gwynedd, LL59 5AB, United Kingdom

2004 RESEARCH VESSEL PROGRAMME

PROGRAMME: RV PRINCE MADOG: **FLADEN GROUND CRUISE**: Second Leg

Duration: 24/06-13/07/2004 **Locality**: Fladen Ground Northern North Sea

Staff involved:	**Length of Participation**	**Diet**
1. *Dr Chris Richardson (SIC) (SOS)	**Entire cruise**	all
2. *Dr Nicole Fraser (SOS)	**24.06 – 10.07**	all
3. *Paul Butler (SOS)	**Entire cruise**	all
4. *Ivor Rees (SOS)	**24.06 –05.07**	all
5. *Sara Richardson (LEEDS)	**24.06 – 05.07 (may stay until 10.07)**	all
6. *Aimee Oakham (SOS)	**24.06 –10.07**	all
7. *Pedro Freitas(SOS)	**24.06 – 05.07**	all
8. *Laura Foster (St Andrews)	**24.06 – 05.07**	nut allergy†
9. *Dr Jim Bennell (SOS)	**Entire cruise**	all
10. *Brian Long (SOS)	**05.07 – 13.07**	all
11. *Dr John Hartley (Hartley Anderson)	**05.07 –10.07**	all
12. *Ian Harris	**05.07 – 13.07**	vegetarian

*** Denotes confirmed personnel on the cruise.**

† Only sensitive to nuts in large quantities, trace amounts are fine.

Aims:

To collect live clams and dead clam *Arctica islandica* shells primarily using a newly designed and tested **"Arctica" dredge** from various sites in the Fladen Ground. Collection of clams will also be made with a **box corer** and/or **day grab**. A **2-m beam trawl** might be used on suitable ground to collect clams. Underwater video observations will be made of the seabed to assess the concentrations of shell material on the seabed and living clams.

John Hartley's cruise will return to three exploratory drills that used water-based mud (WBM), low toxicity oil-based mud (OBM) and diesel OBM. These sites were surveyed in 1987, 1995, 1996, 1997 and 1998. The 1998 survey was the first survey since the wells were decommissioned. Biological and physiochemical samples will be collected from each site.

CRUISE PLAN

14.06.2004	Mobilisation at Menai Bridge.
23.06.	Staff for 2nd leg of cruise transit to Peterhead to meet ship, overnight accommodation in Peterhead.
24.06	Chris Richardson and scientific staff board ship in preparation for departure either after lunch or after dinner. Transit to Fladen Ground overnight to Station A.
25.06 – 04.07	Commence trawling at Station A on 25.06 and subsequently daily for 12-13h at other stations.
04.07	Return to Peterhead in preparation for Crew change.
05.07	Crew change in Peterhead. Some scientific staff to leave ship. John Hartley, Ian Harris and Brian Long to join ship.
05.07	Depart either after lunch or after dinner. Transit to Fladen Ground overnight.
06.07 – 07.07	Commence trawling on 06.07 and then daily for 12-13h
08.07 – 10.07	24 h day grab sampling/multi-coring and trawling with the "*Arctica*" dredge.
10.07	Arrive in Inverness. Disembarkation of some scientific staff. Other staff remain on board for transit to Menai Bridge
11.07 – 13.07	Transit to Menai Bridge through Caledonian Canal.
14.07	**Demobilise in Menai Bridge**

Sampling design for Cruise Plan

An area of the sea bed with dense *Arctica islandica* populations has been identified (Station A; Figure 1) during a previous cruise. Prior to trawling a side-scan survey of the seabed will be undertaken (responsibility - Dr Jim Bennell). Using the "Arctica" dredge, replicate trawls of approximately 0.5 km length (about 15-30 minutes on the sea bed) will be taken within an area of 500m x 500m (0.25 km^2) to collect approximately 50 live and 200 dead shells. A further four sampling areas surrounding the station and within 1 km of each other will similarly be intensively sampled (see Figure 2). This sampling procedure will be further undertaken at other stations to collect clams at distances of 5, 50 and 100 km (2.699, 26.99, 53.99 nautical miles, respectively) away from Station A (see Figure 1 and Table 1).

At each station, near bottom or bottom seawater temperature will be measured using a temperature logger either deployed on the grab or dredge and sediment samples collected either from material brought up in the "Arctica" dredge or from samples collected by the Day grab.

It is envisaged that all stations will be successfully sampled however in the case of bad weather and a truncated cruise, stations A, D, F and J will have priority for sampling.

Depending on the weather and sea conditions, a static video sledge will be deployed at Stations A, D and J in order to observe shell material and live *Arctica* on the sea bed. Depending on weather conditions the camera may be deployed before dredging for *Arctica* begins. Other organisms (e.g. bivalves, gastropods, brachiopods and burrowing starfish *Astropecten irregularis*) will be collected opportunistically during the cruise.

One or two scientists will assist the deck crew handling the gear whenever necessary.

John Hartley's cruise (8.07 to 10.07) will involve Day grabbing and multi coring in the Donan field at 3 single well sites. Samples will be collected by Day grabbing and coring around the single well sites. John Hartley will arrange for permission to sample around the 3 well sites within 50m and up to 6000m away from the well sites.

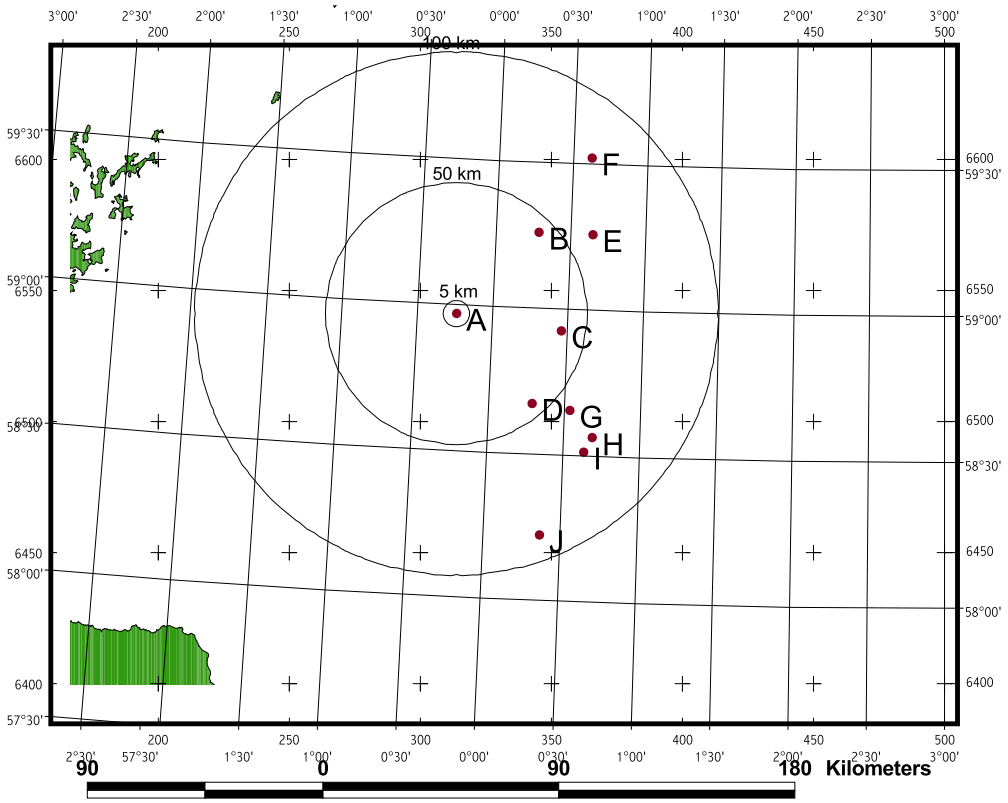

Figure 1. Map of the Fladen Ground stations with 5, 50 and 100 km zones.

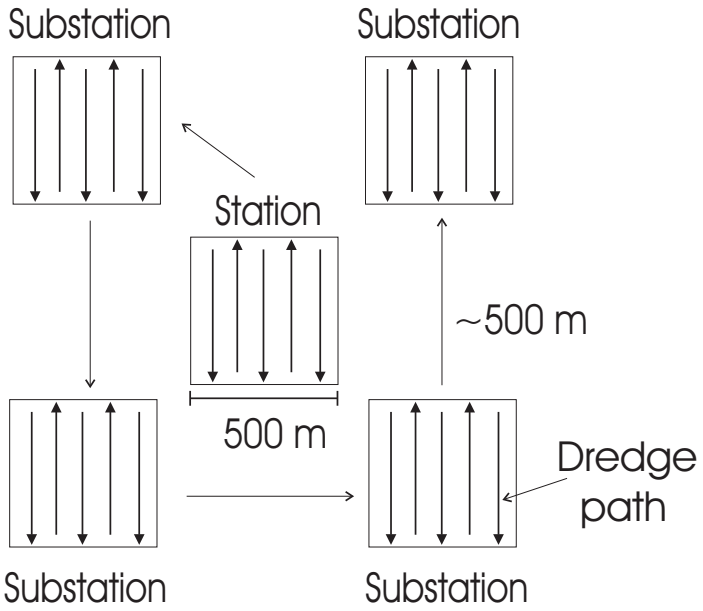

Figure 2. Sampling design. Five 500 m tow lengths will be taken with the "Arctica" dredge at each station, four substations surrounding the station and within 1 km of each other will be similarly sampled.

Table 1. Station positions in degrees and minutes. Stations A, D, F and J have priority and are highlighted in bold. (Sites in italics are rough coordinates only.)

Distance from Station A	Station	Latitude			Longitude			Former Site name	Source
0 -5 km	**A**	58°	49.86	N	0°	21.35	W	S01 197	Scotia June 2001
5-50 km	B	*59°*	*7.27*	*N*	*0°*	*10.00*	*E*	303	Scotia June 2001
	C	58°	47.24	N	0°	20.48	E	S01 189	Scotia June 2001
	D	58°	32.06	N	0°	10.04	E	S01 198	Scotia June 2001
50-100 km	E	59°	7.27	N	0°	31.50	E	256	Scotia June 2001
	F	*59°*	*23.00*	*N*	*0°*	*30.00*	*E*	Witbaard	Witbaard and Bergman, 2003
	G	*58°*	*31.00*	*N*	*0°*	*25.00*	*E*	248	Scotia June 2001
	H	58°	25.52	N	0°	34.20	E	Grab FL01 031	
	I	*58°*	*22.50*	*N*	*0°*	*31.00*	*E*	253	Scotia June 2001
	J	58°	5.13	N	0°	15.02	E	255	Scotia June 2001

Equipment list:

Heavy Gear:

- Day Grab and stand
- 2 x "Arctica" dredges
- Box Corer and cores
- 2 x 2-m Beam trawl
- Sieving table, 5 and 1mm sieves
- Benthic washing machine and sieves
- 1 x grey storage containers
- Yellow chemical storage container#
- Temperature logger
- Video sledge, cables and camera
- **Bowers and Connolley Muti corer. John Hartley to organise this equipment for loading at Peterhead**. **Gear will return to Menai Bridge and John to organise road transport back to Aberdeen.**

Light Gear:

- Side scan sonar
- Large grey trays
- Trays for day grab
- Buckets for sorting
- Vernier callipers
- 2 x Transmitted light microscopes
- 1 x Dissecting microscope
- Slides and cover slips
- Dissecting kits
- Disposable gloves (6 boxes, SMLx2)
- Stiff brushes (for dishes) and scrubbing brushes
- Balance + calibrations weights
- Trays for sorting
- Buckets for samples
- Formalin
- Water hose
- Helmets
- Oil skins/survival suits
- Boots
- Work gloves
- Waterproof paper
- Data entry forms
- Plastic bags
- Labels

- 1 x laptop
- Pencils (1 dozen)
- 2 A4 pads of lined paper
- Ream of A4 printer/photocopy paper
- Small hard books and large books
- Blue rolls (3 rolls; take away from lab stand)
- Pens (1 dozen)
- Calculators
- A Selection of small and large cable ties.
- 500 micron sieve (for Witbaard)
- Small thermometer