

Logistics Planning Outline for the 2010/2011 NBP/ODEN 2-boat Operation

In an attempt to coordinate the science between the ODEN and the NBP for next year's 2-boat operation, the information below will be compiled and passed out during the planning meeting in November.

Principal Investigator: Richard Aronson, James McClintock
Project leader onboard NBP/ODEN (if other than P.I.): Dr Sven Thatje (NOCS, Southampton, UK)
Project title: Climate Change and predatory invasion of the Antarctic Marine Environment
Participants onboard (tentative): Total: 7 persons Name and function: Dr Sven Thatje (cruise project leader) Margaret Amsler (UAB) Graduate student (Florida Tech, TBD) Graduate student (Florida Tech, TBD) WHOI 1 – Hanumant Singh, (Engineer/Deck Ops/Data) WHOI 2 – John Bailey (Engineer/Deck Ops) WHOI 3 – Clay Kunz (Data person)

Please give a brief cruise synopsis. Include the following: research objectives and proposed cruise track.

The marine fauna of Antarctica currently lacks the durophagous predators that structure benthic food webs in nearshore habitats elsewhere. Sea temperatures are now rising rapidly and the physiological barriers to predatory reinvasion are coming down. Adult and juvenile anomuran king (lithodid) crabs have been discovered recently on the continental slope off the Antarctic Peninsula, where water temperatures are slightly warmer than on the shelf. In addition, larvae of brachyuran and anomuran crabs are entering Antarctic waters entrained in warm-core rings (mesoscale eddies) from the Antarctic Circumpolar Current. We will assess the extent and consequences of the ongoing invasion by: (1) sampling the water column for larvae; and (2) sampling bottom water for demersal larvae and surveying the benthos for juveniles and adults, and for localized changes in community structure.

Briefly describe sampling methods and major systems and equipment (collection method (i.e standard CTD, plankton nets, MOCness Nets, etc...))

The project will deploy a number of sampling techniques, which are explained below and in order of priority/deployment.

- WHOI SeaBED AUV – supplied by WHOI. The target depths for the AUV will be from the continental shelf break via the slope to the continental rise, from 450 to 1800 meters. The AUV will be towed on a sledge and will not actually be autonomous.
- Epibenthic sledge (EBS) and/or small dredge ('Rauschert dredge') – one meter wide equipped with an epibenthic, 500 um net and a suprabenthic µm net each bearing a cod

end of 300 µm mesh – this will be supplied by the grantee. The EBS will be trawled at the continental-shelf break and continental-slope depths with 1.5 times wire length to depth for 15 minutes at 1 knot. The Rauschert dredge will be used alternatively, if weather conditions prohibit use of EBS.

- Multinet – eight discrete depths set initially at 0, 50, 100, 200, 250, 300, 400, and 500 meters. The Multinet will allow sampling of plankton at discrete depths, whilst ship is stationary. If use of Multinet isn't feasible because of longer deployment time of logistics, a MOCness could be used alternatively, which would be towed over the entire sampling depth (ship in motion).
- CTD in addition to plankton sampling.

Sampling methods and sites when ship in motion

Site/area/transect	Type of sampling to be performed, volume of H ₂ O collected
AUV deployment both in Marguerite Bay (N=8), Bellingshausen coast west off Peninsula (N=4), Amundsen sea (N=4); AUV transects will be towed by the Oden; each deployment will last 12 hours.	Benthic survey (imaging) at 0.5 to 1m/second ship speed
Dredge/EBS deployment on continental shelf and slope, both in Marguerite Bay and Amundsen sea following AUV deployment. There will be N=8, 4 and 4 tows in Marguerite Bay, Bellingshausen west coast off Peninsula, and Amundsen sea, respectively.	15 minutes of trawling (gear on ground) at 1m/second ship speed

Sampling methods and sites from stationary ship

Sampling site	Type of sampling, weight/volume of samples and equipment, etc.	Time per station
Marguerite Bay, shelf break	N= 8 stations; Multinet haul (500m to surface)	2 hours each
Amundsen Sea, shelf break	N= 4 stations; Multinet haul (500m to surface)	2 hours each
Bellingshausen coast, west off Peninsula	N= 4 stations; Multinet haul (500m to surface)	2 hours each
Bellingshausen coast, west off Peninsula	CTD in addition to above plankton sampling (N=8; 500m to surface)	2 hours each
Marguerite Bay, shelf break	CTD in addition to above plankton sampling (N=4; 500m to surface)	2 hours each
Amundsen Sea, shelf break	CTD in addition to above plankton sampling (N=4; 500m to surface)	2 hours each

Sampling method and sites away from the ship, on ice

Sampling site	No. of persons	Type of sampling, weight/volume of samples and equipment, etc.	Time per station
n/a			

Deployment/retrieval of equipment

Site	Type of equipment, weight/ volume, procedure, etc.	Time per station
n/a		

Which are the most prioritized sampling areas/methods?

Site/area	Method/type of sample	Other info
Marguerite Bay	AUV	n/a
Marguerite Bay	Dredges	n/a
Bellingshausen coast, west off Peninsula	AUV	n/a
Bellingshausen coast, west off Peninsula	Dredges	n/a
Amundsen Sea	AUV	n/a
Amundsen Sea	Dredges	n/a

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The following equipment needs to be installed onboard
(describe in detail, also needed connections to electricity, water, gas etc):

Standard electricity supply to all lab benches.
CTD winch and data cable
AUV winch

Lab space	Wet lab	Dry lab	Other / specify
Meters of bench space	5m	5m	
Power needs (VA) 220/380 V	yes	yes	
Cold water (yes/no)	yes	yes	
Hot water (yes/no)	yes	no	
Sewage (yes/no)	yes	no	
Compressed air (yes/no)	no	no	
Gas (yes/no)	no	no	
Fume hood (yes/no)	yes	yes	
Sea water intake (yes/no)	yes	no	
Other (specify)	n/a	n/a	

Special lab areas needed:

Clean air room	n/a
Other (specify)	Sufficient extra lab/container space for AUV maintenance and data analyses

Storage of equipment and samples:

	Space needed (m ² /m ³)
Container	2 containers/lab units for AUV
Cold +2°C	n/a
Freezer -20°C	200-L
Other (specify)	-80°C (1 m ³)

The following chemicals, gases or other hazardous substances will be used, including radioisotopes or other substances which may constitute a threat of contamination for sensitive analyses:

Substance	Weight/vol.	To be used for:
Ethanol (70%)	50-L	Animal fixation
Formalin (40%)	20-L	Animal fixation

Hazardous waste:

Substance	Weight/vol.	Comments
n/a		

Disturbance to or sampling of organisms:

1. Species (scientific and English name)	All benthic invertebrates (and larvae) occurring in sample area (entire benthic community)
2. Handling/sampling method	Sampling by means of dredge/plankton net
3. Storage or handling onboard	Fixation in 4% formalin or 70% ethanol; freezing at -80 degrees C
4. Possible risks to health or environment	Limited if Risk Assessment in place for handling formalin (protective gloves, coat)
5. Consideration required from the ship/other researchers	Fume hood in labs

Cargo to be taken onboard the ship:

Type, handling/storage	Weight (kg)	Volume (m3)
AUV, 3 container units	2200kg	3
Lab equipment (microscopes, consumables, 4 Zarges)	100	1
Personal items (14 Zarges boxes)	280	1.5
Sample boxes	1700	2
Scientific gear (nets, dredges)	400	2

Cargo and samples to be taken off the ship:

Type, handling/storage	Weight (kg)	Volume (m3)
Frozen samples	1000	1
Fixed (ethanol) samples	850	1
Fixed (formalin) samples	850	1
Personal goods (14 Zarges boxes)	280	1.5
Scientific gear (nets, dredges)	400	2
Lab equipment (microscopes, consumables, 4 Zarges)	100	1

Other support needed onboard Oden, or in preparation phase:

Remarks: Multinet preferred but MOCness could be used alternatively.
CTD mentioned here but other programme partners/project will take care of this during cruise.