

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.

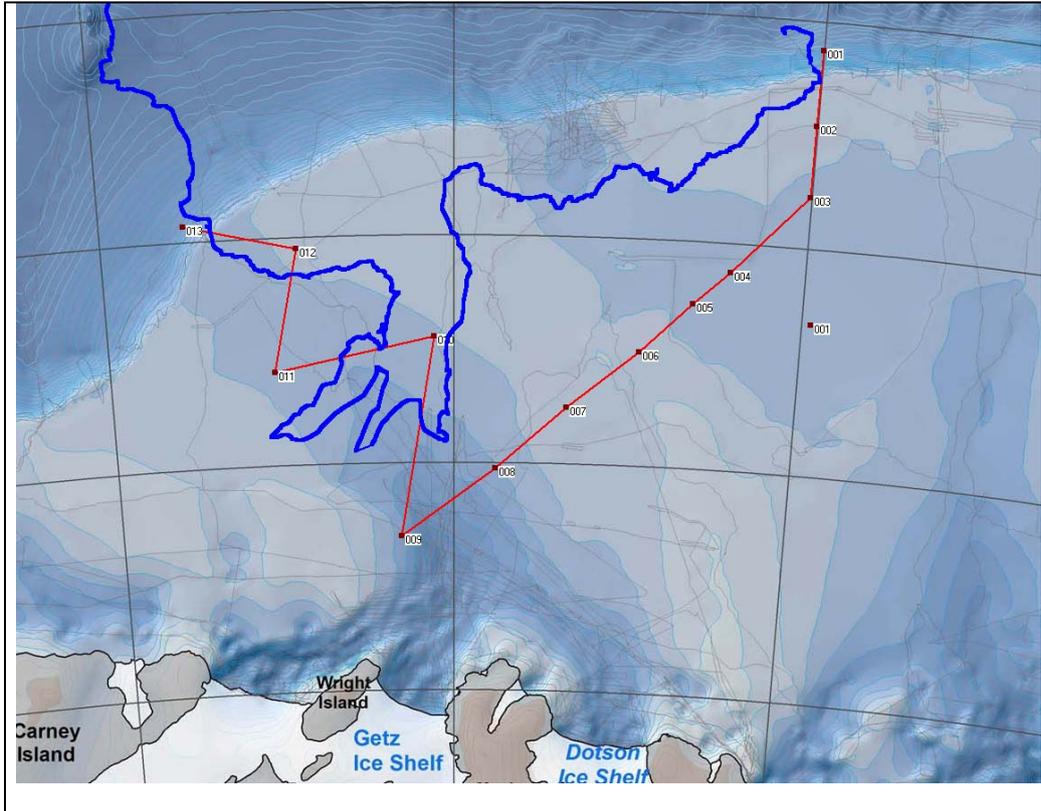
Principal Investigator: Katarina Abrahamsson
Project leader onboard NBP/ODEN (if other than P.I.):
Project title: Inter-Related Biogeochemical Cycles of Halocarbons and Mercury in the Southern Ocean
Participants onboard (tentative): Total: 5 persons Name and function: Katarina Abrahamsson, scientist, Anna Granfors, scientist, Maria Andersson scientist Two more, not identified yet

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

The project aims to determine the importance of some greenhouse gases (halocarbons), as well as mercury, for chemical and biological exchange processes in the cryosphere (snow and ice) and the marine environment with focus on Polar regions and their feedback mechanisms in the context of a changing climate. More specifically, the project aims to quantitatively investigate the mechanisms controlling the temporal and spatial variability in the processes driving the fluxes of halocarbons and mercury in the climatically sensitive polar ocean. The exchange of species (volatile halogenated organic compounds and mercury) between sea – atmosphere- sea ice – snow, as well as the control mechanisms, will be studied in field studies, with emphasis on the impact of changes in sea ice cover, precipitation, temperature, UV radiation, and a high carbon dioxide scenario

The major elements are:

- flux measurements in different ice regimes in the Antarctica These measurements include determination of chemical species in seawater, atmosphere, sea ice and snow during sea ice formation and melt.
- Chamber experiments will be performed in order to establish sea ice – atmosphere as well as snow – atmosphere fluxes These measurements will be combined with incubation experiments on board, where ice and snow samples will be placed in a controlled temperature environment in air tight canisters, and the release of biogenically produced gases will be measured (Theorin et al., 2007).
- controlled mesocosm experiments simulating ozone depletion events, ocean acidification and temperature increase.
- underway measurements of halocarbons and mercury in air and water



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

Standard CTD for water samples
 Ice coring, flux chambers/towers, require electricity from ship
 Surface water in lab
 Air sampling
 Incubations of samples at 0C, in specialized refrigerator (already on the Oden).
 Cool container for mesocosm experiments

Sampling methods and sites when ship in motion

Site/area/transect	Type of sampling to be performed, volume of H ₂ O collected
From port of departure to Ross Sea	
Surface water samples	continuous
Air sampling	continuous

Sampling methods and sites from stationary ship

Sampling site	Type of sampling, weight/volume of samples and equipment, etc.	Time per station
Amundsen Sea	Water from CTD, 1,5Ll	Time due to depth

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
8-10 stations distributed over sea covered area	3	Ice coring, water and brine sampling, ice cores and minor equipment around 30kg, volume 20-30L and 1-2 ice cores	6-8 hours
4 stations in ice covered area	3	Ice coring, water and brine sampling, deployment of flux chambers or towers 100kg, volume 40-50 L sea water and brine, 4 ice cores	24 hours

Deployment/retrieval of equipment

Site	Type of equipment, weight/ volume, procedure, etc.	Time per station
4 stations see above	Flux chambers or towers, sampling will be performed continuously and discrete samples will be taken every hour	24

Which are the most prioritized sampling areas/methods?

Site/area	Method/type of sample	Other info
Amundsen Sea	Ice coring	
Amundsen Sea	Flux chambers/towers	
From port of departure to Ross Sea	Continuous sampling of air and water	
Amundsen Sea	CTD	Ice covered areas

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

Gas chromatographs (4), need 220 V, and gas and surface water supplied
Sampling equipment for mercury species (4), 220V, gas and surface water supplied pressurized air supplied, air sampling on 4 th deck preferable. Clean bench
Air pump, 220 V
Filtration units
Fluorometer

Lab space	Wet lab	Dry lab	Other / specify
Meters of bench space	15	6	
Power needs (VA) 220/380 V	220V	220V	
Cold water (yes/no)	Yes, deionised	Yes, deionised	
Hot water (yes/no)	yes	yes	
Sewage (yes/no)	yes	yes	
Compressed air (yes/no)	yes	yes	
Gas (yes/no)	yes	yes	
Fume hood (yes/no)	yes	no	
Sea water intake (yes/no)	yes	no	
Other (specify)			

Special lab areas needed:

Clean air room	yes if possible
Other (specify)	

Storage of equipment and samples:

	Space needed (m ² /m ³)
Container	
Cold +2°C	1,2 m3
Freezer -20°C	1 m2
Freezer -80 C	0,3 m3

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:
nitrogen	10x50L 200atm	Halocarbon and Hg measurements
argon	5x50L 200atm	Hg measurements
helium	1x50L 200atm	Halocarbon measurements
Sulphuric acid	3L	Hg measurements
ethanol	10L	cleaning
methanol	2L	cleaning
acetone	20 L	Chlorophyll measurements
Elemental mercury	0.2 g	Gaseous standards, held in a closed container.
HCl	7 L	For sample preparation
Tinn(II)chloride	3 kg	For sample preparation
BrCl	0.25 L	For sample preparation
Hydroxylammonium chloride	0.25 L	For sample preparation
Divalent mercury standard	0.1 L	standard

Hazardous waste:

Substance	Weight/vol.	Comments
acetone	20 L	Bring back home
acid	25 L	Bring back home

Disturbance to or sampling of organisms:

1. Species (scientific and English name)	
2. Handling/sampling method	
3. Storage or handling onboard	
4. Possible risks to health or environment	
5. Consideration required from the ship/other researchers	

Cargo to be taken onboard the ship:

Type, handling/storage	Weight (kg)	Volume (m3)
4 gas chromatographs	100 kg	
4 purge-and trap systems	100 kg	
Mercury analysers	200 kg	
Ice corers, and related equipment	50 kg	
Water baths	200 kg	
fluorometer	75 kg	
Teflon bottles	80 kg	
Spare parts	250 kg	

Cargo and samples to be taken off the ship:

Type, handling/storage	Weight (kg)	Volume (m3)
filters	5 kg	0,3
All equipment described above		

Other support needed onboard Oden, or in preparation phase:

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