WP4 – MARINE BENTHIC FAUNA

subtidal sedimentary habitats - infauna

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shallow hard-bottom habitats – encrusting colonial taxa- Bryozoa

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special focus on CRUSTACEA

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WP4 – MARINE BENTHIC FAUNA – Soft-bottom communities

GOAL: to determine how the size structure of populations and communities of benthic marine invertebrates dwelling at high latitudes will change in response to shifts in environmental conditions.

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GOAL: to determine how the size structure of populations and **communities** of benthic marine invertebrates dwelling at high latitudes will change in response to shifts in environmental conditions.

research questions :

- How does the community size structure change along a gradient of thermal regimes observed off the Norwegian coasts?
- Are changes in size structure documented at community level driven by shifts in species composition (e.g. a shift in dominants towards species of smaller size) or by changes in sizes of individuals of dominant species?
- What are the environmental controls of benthic species size structure?
- What are implications of change in size structure on the functioning of benthic communities (secondary production)?

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Task 4.3. Collection of samples from deeper subtidal soft bottom habitats. The material will be collected at three sites contrasting in terms of thermal regimes.
Task 4.5. Determination of Benthic Biomass Size Spectra (BBSS) in samples collected along the Norwegian and Spitsbergen coast. Assessment of signal of change in BBSS in response to environmental conditions.
Task 4.7. Assessment of benthic communities secondary production as a function of size structure in subtidal sedimentary habitats

D 4.1. Manuscript of a paper on change in BBSS in soft bottom communities and its functional consequences.
(submitted to a peer-reviewed journal M36)

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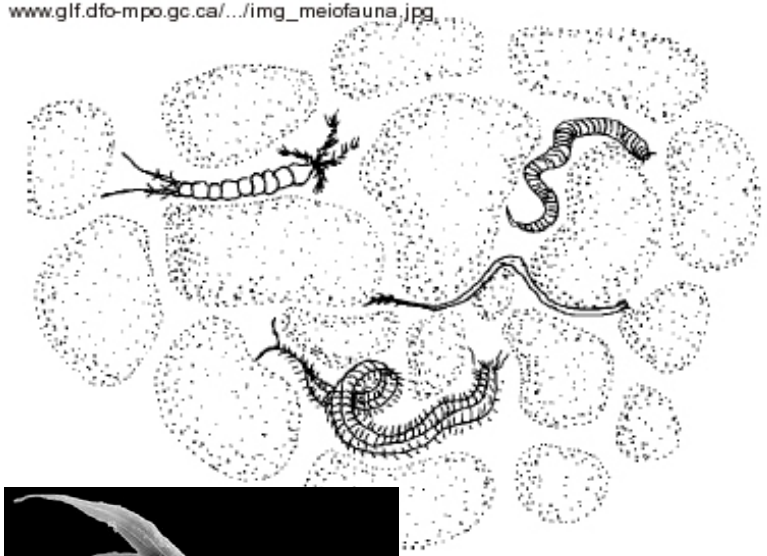
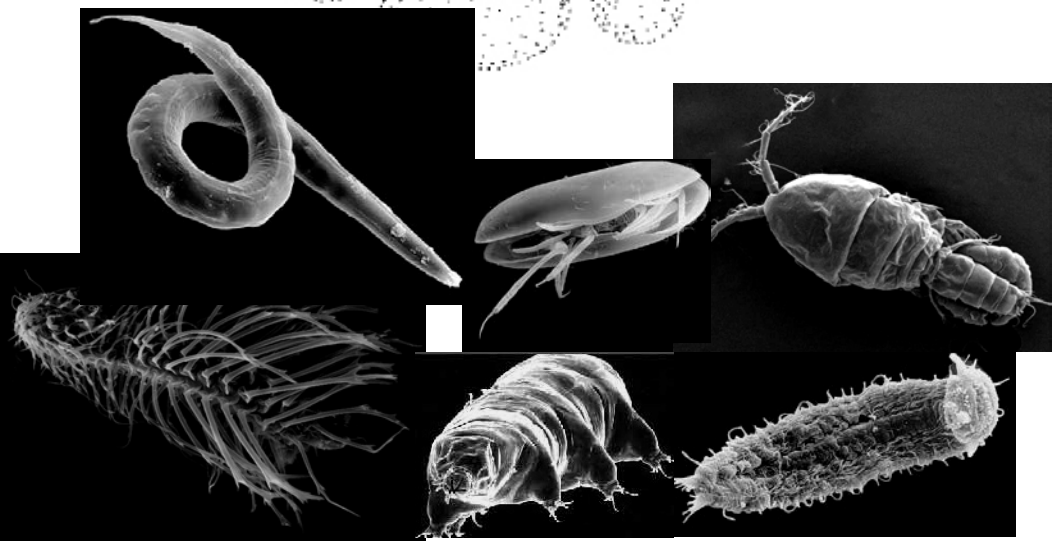
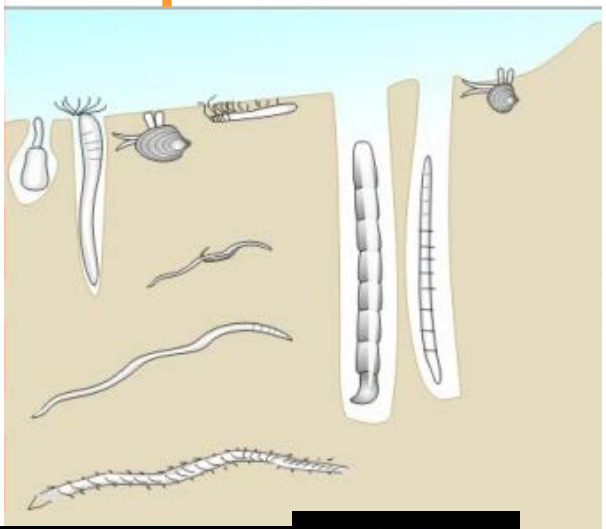
meiofauna 32-500 µm

www.glf.dfo-mpo.gc.ca/.../img_meiofauna.jpg





macrofauna 500 µm – few cm



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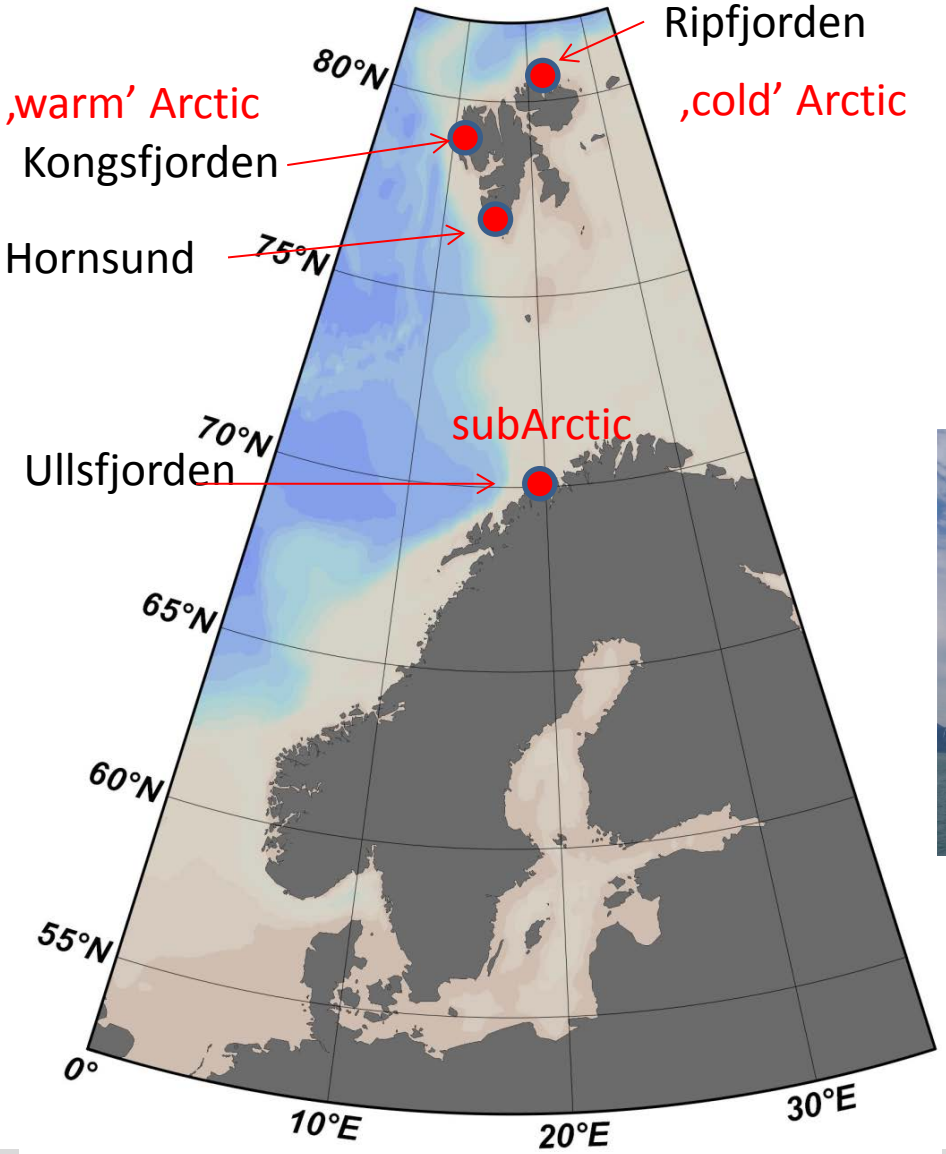

SAMPLING CRUISES in 2014:

- June - r/v Oceania - Ullsfjorden
- July – r/v Oceania – west Spitsbergen
- September – r/v Helmer Hansen- Ripfjorden

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- at each locality – 3 sampling stations

- at each station:

- CTD
- 3 x macrofauna (van Veen grab) – sieved on 0.5 mm
- 3x meiofauna (subsamle from box-corer)
- sediments (subsample from box-corer) – grain size, pigments, POC, delta 13C analyses
- sediment cores – Pb-210 and Th-234 profiles of sediment cores

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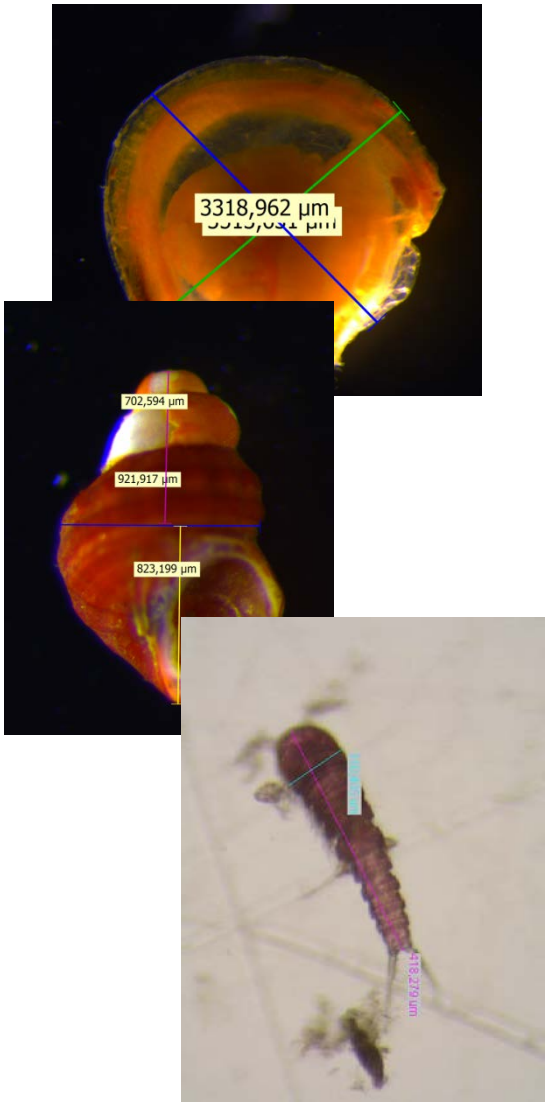
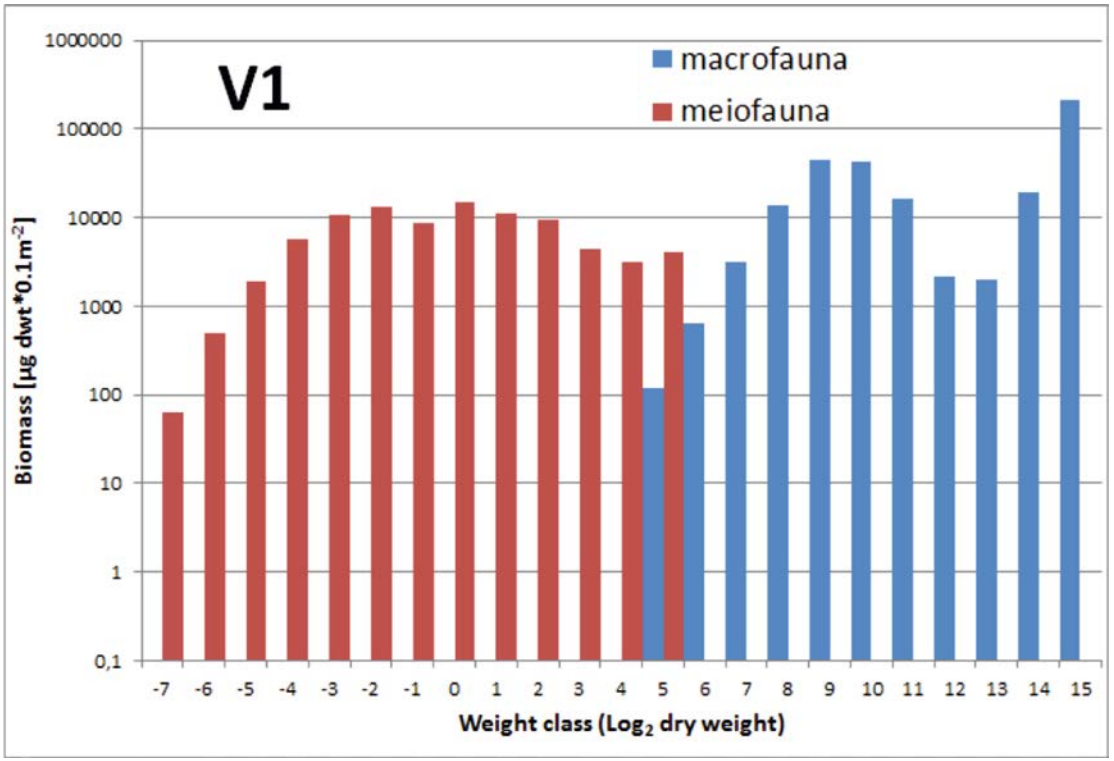


- measurements of individuals
- size → biovolume → biomass
- Benthic Biomass Size Spectra



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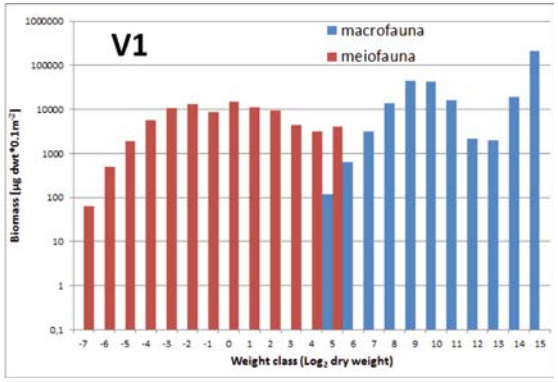

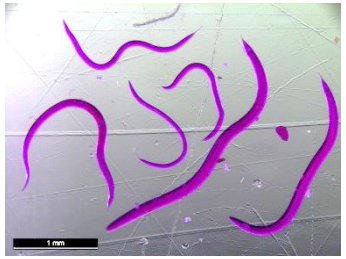

BBSS – methodological problems:

- meiofauna – aprox. 3-5 000 nematode individ. per sample (10 cm^2)– (how many need to be measured?)
- large (>500 um, macrofaunal nematodes) – overlooked in traditional analyses – missing link between meio-and macrofauna
- macrofauna – polychaete worms- most destroyed during sampling/sieving – impossible to measure length
- formulae for size/volume/weight calculations not available for all taxa
- no standard methods of statistical analyses

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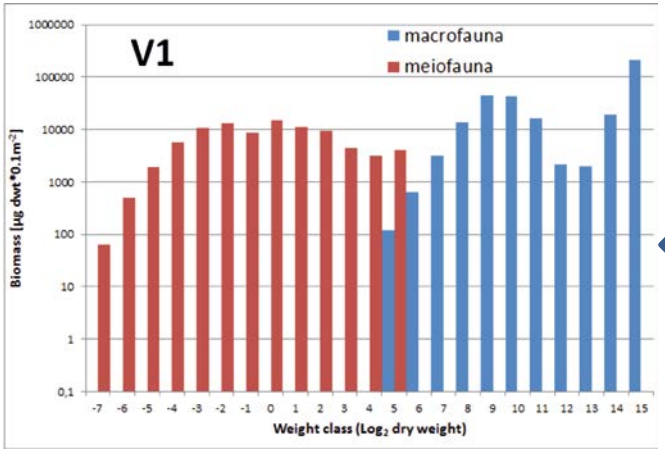

FUNCTIONING of benthic communities:

- production & respiration (estimated from B)

PRODUCTION
$\log(P)=0.240+0.960*\log(B)-0.210*\log(M)+0.030*T-0.160*\log(D+1)$

Where:
B – biomass (g DM m^2)
M – Max. individual body mass (g DM)
T – surface water temperature (°C)
D – water depth

RESPIRATION $\log(R) = 0.691 + 0.892 * \log(P)$
(Brey, 1999)

- bioturbation (biological mixing analysed with use of Pb-210 and Th-234 profiles of sediment cores)

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Task 4.1. Assessment of size structure in populations of selected macrobenthic species across gradients of thermal regimes. The task will be based on samples archived in Akvaplan-niva and new collected materials.

D 4.2. Manuscript of a paper on change in size in selected macrobenthic species. (*submitted to a peer-reviewed journal) M34*

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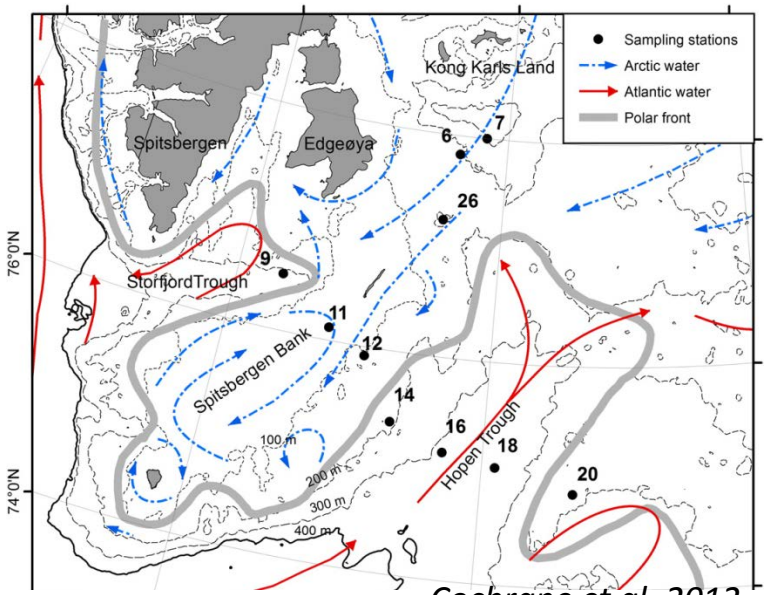
<u>select species</u>
(wide distribution/thermal range,
easily sampled or well represented in archived materials)
Crustacea:
Gammarus spp.?, crangonid and hipolitid shrimps?
Ampeliscidae (*Ampelisca*, *Haploops*)

other taxa?

<u>identify/collect materials:</u>
- archival samples (IOPAN – west Spitsbergen fjords, Akvaplan Niva- Barents Sea)
- additional sampling (2014 and 2015)



Cochrane et al. 2012

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Possible links to other WPs:

- WP2 – marine vs freshwater benthic crustaceans?
- WP 6 - cell, genome level analyses on selected marine benthic species?