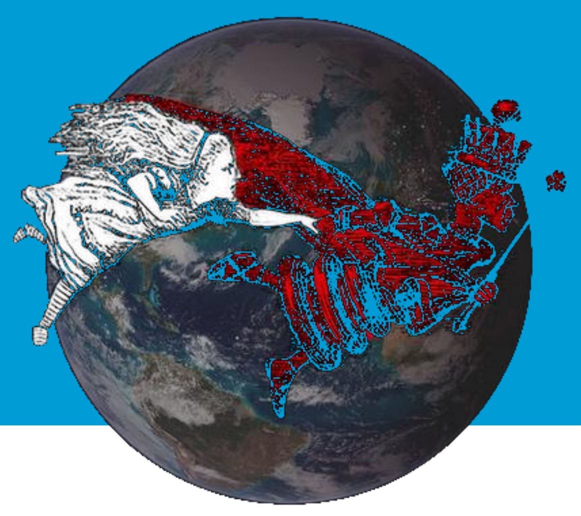

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The Red Queen‘s race

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Arctic Benthos and Climate Change

Introduction

"In a fast changing environment it takes all the running you can do to keep in the same place." **(Lewis Carroll)**

Analog to the red queen's race, Arctic ecosystems seem to change much faster than new research can be performed and evaluated. We intend to overcome this problem by combining all available biological and ecological data in one geo-referenced database to get a better view on the whole Arctic biosphere and its dynamics. We center on the benthic system, whose organisms are on average longer lived and more stationary and so effects of climate change may be seen earlier and clearer than in the pelagic system.

Our aim is

to understand benthic structures (community composition, biodiversity, food web) and processes (production, metabolism) on large scales and to model the impact of environmental drivers on the benthic system in order to predict future scenarios.

Methods

Data aquisition:
Field work
Data Mining:
- Abundance and Biomass Data (Literature, Databases, Cruise reports, Protocols, …)
- Environmental data (Literature, Online Platforms, Databases)
- Ecological Information / Functional Traits (Literature, Online Databases)

Data Standardization
- Sampling Gear
- Sample Treatment
- Scale Units
- Taxonomy (WoRMS, ITIS)

Modeling
- Somatic production was modeled using the empirical ANN model developed by Brey, T. (2012).

Results

Here we show how our approach is applied to an example macrobenthic dataset from Fram Strait to the Central Arctic, compiled from several cruises of RV Polarstern between 1991 and 2012 (Degen et al. in prep., Kröncke, I. 1994 & 1998; Vedenin et al. in prep.). Figures 1 and 2 indicate the spatial distribution of basic community parameters abundance and biomass, respectively. Figure 3 shows the spatial pattern of modelled benthic production. Further we show how these parameters are distributed between the major taxonomic groups (above Fig. 1 – 3).

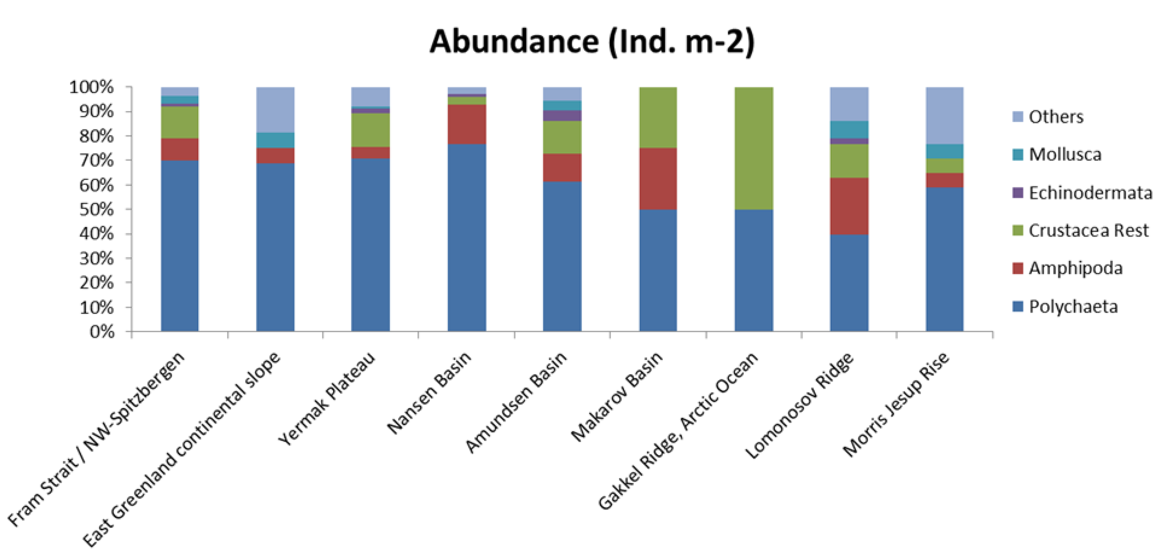


Fig. 1 Macrobenthic abundance (Ind. m-2)

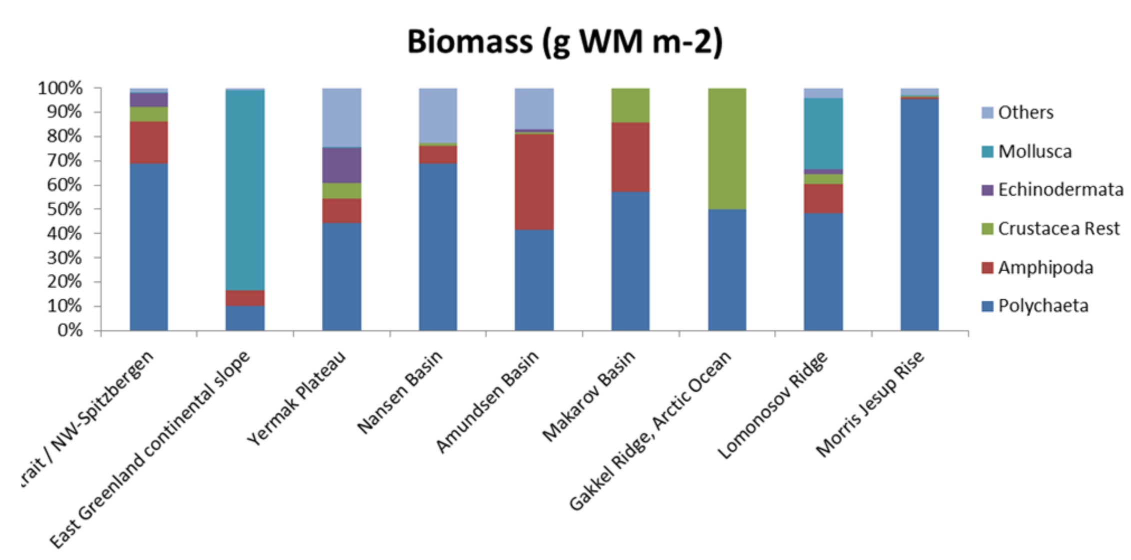


Fig. 2 Macrobenthic biomass (g WM m-2)

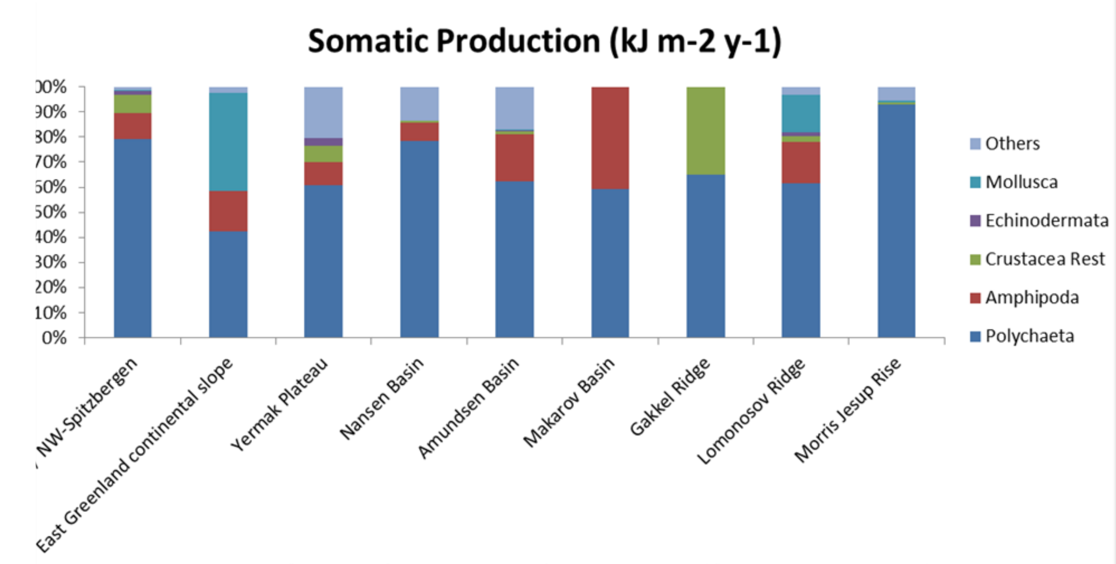
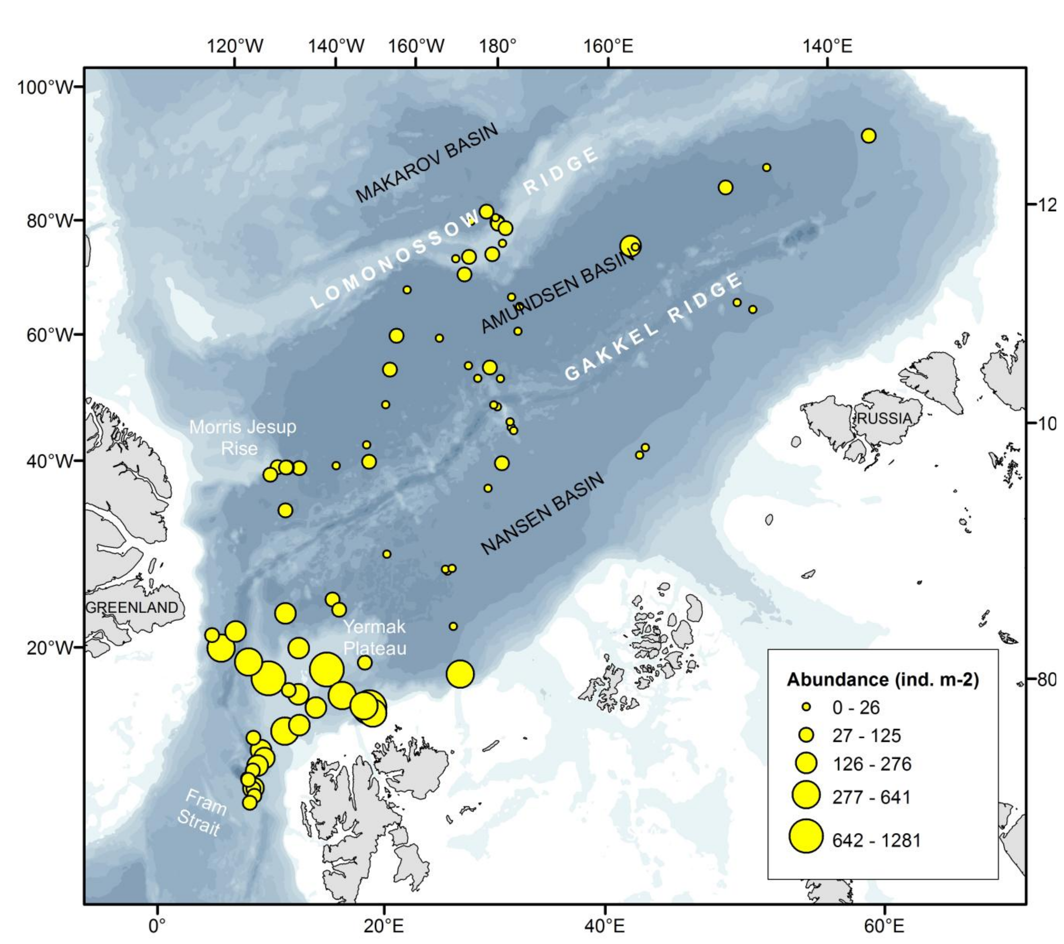
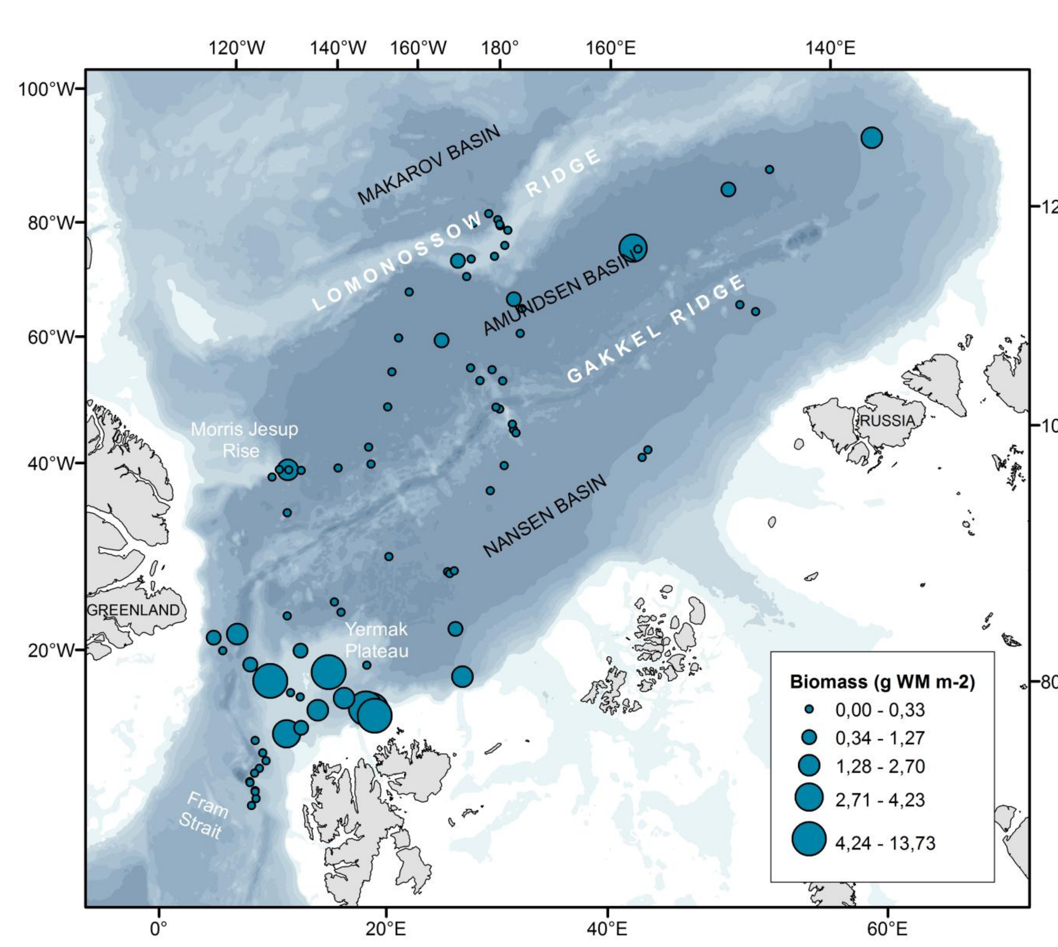
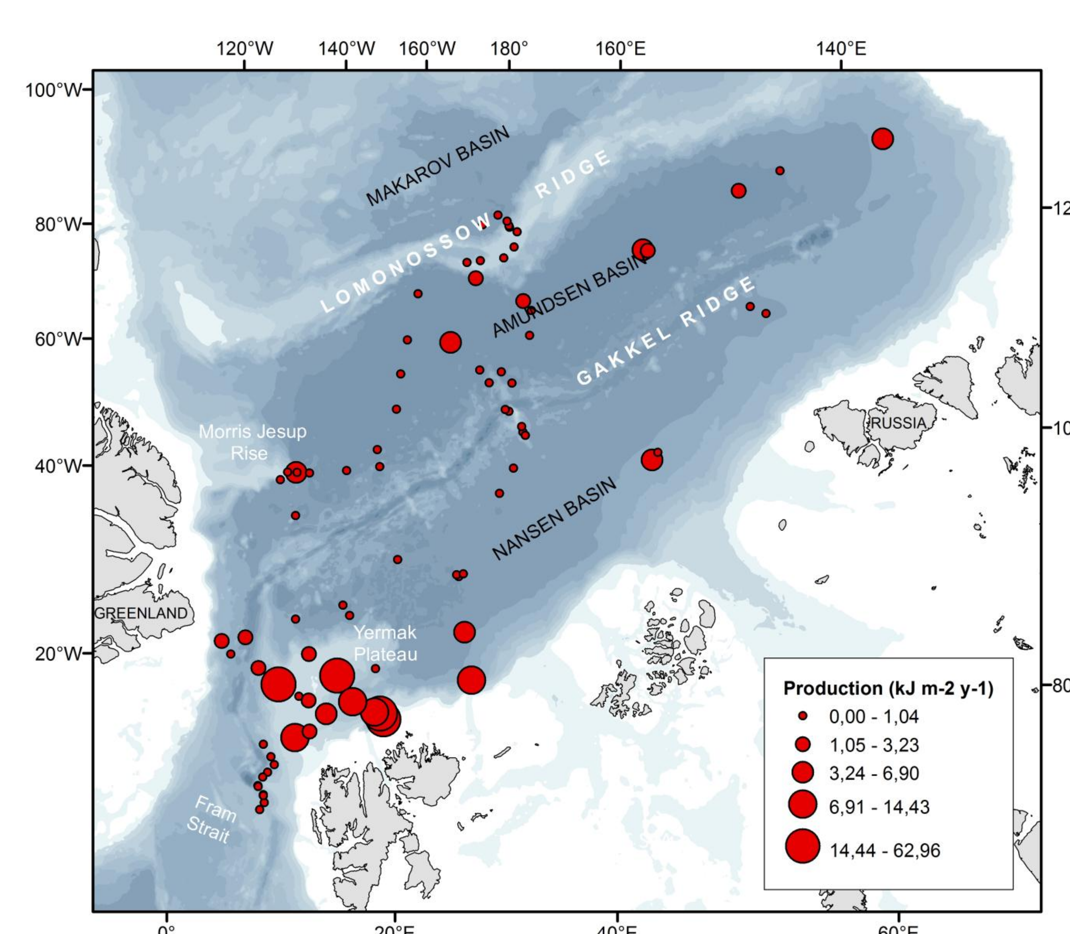
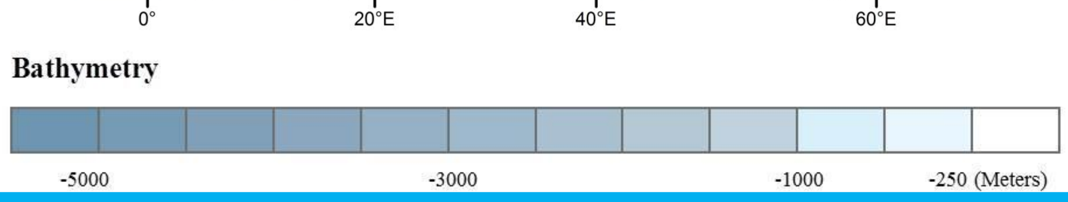


Fig. 3 Macrobenthic production (kJ m-2 y-1)









Outlook

The Arctic is a hotspot or climate change, but currently our knowledge of large-scale Arctic ecosystem structure and functioning is insufficient to predict forthcoming changes. The integration of existing biological and ecological data on an Arctic-wide scale will be a major step towards a better view on the whole Arctic biosphere and its dynamics.

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