Temperature controlled size changes in marine crustaceans (benthic and hyperbenthic Malacostraca)

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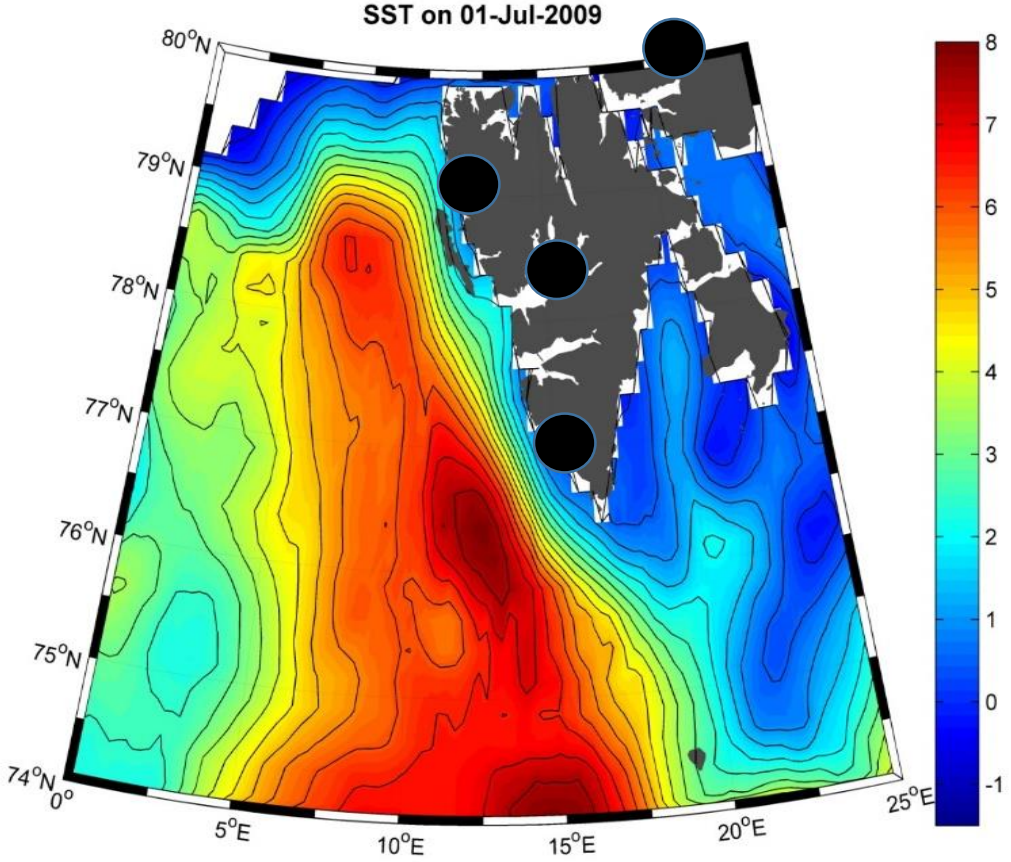
Crustaceans size distribution is a handy indicator of environmental changes

Molluscs – size and age does not match

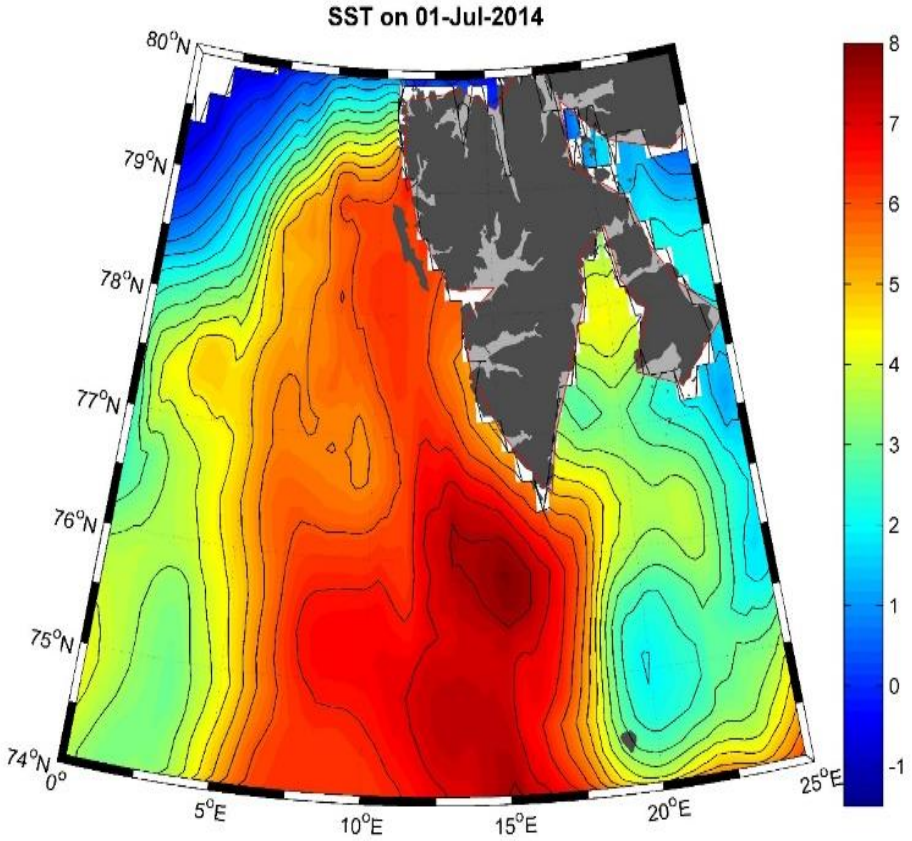
Polychaeta – size difficult to read

Crustacea – regular incremental size growth with age (moults)

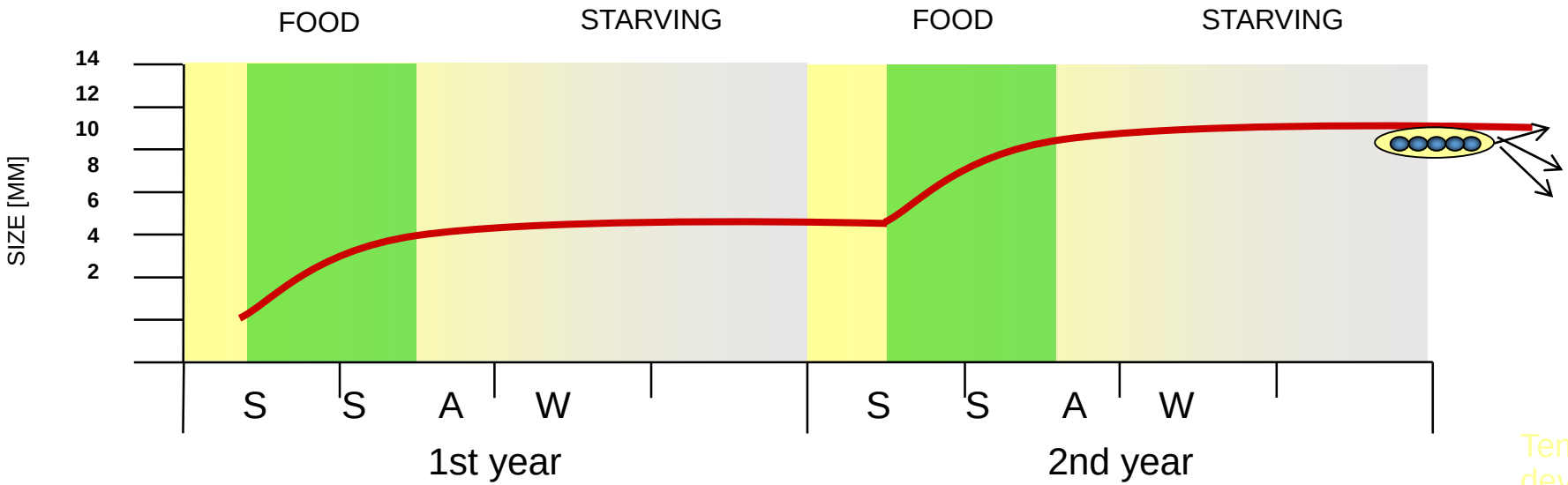


Fjords, from where data were collected

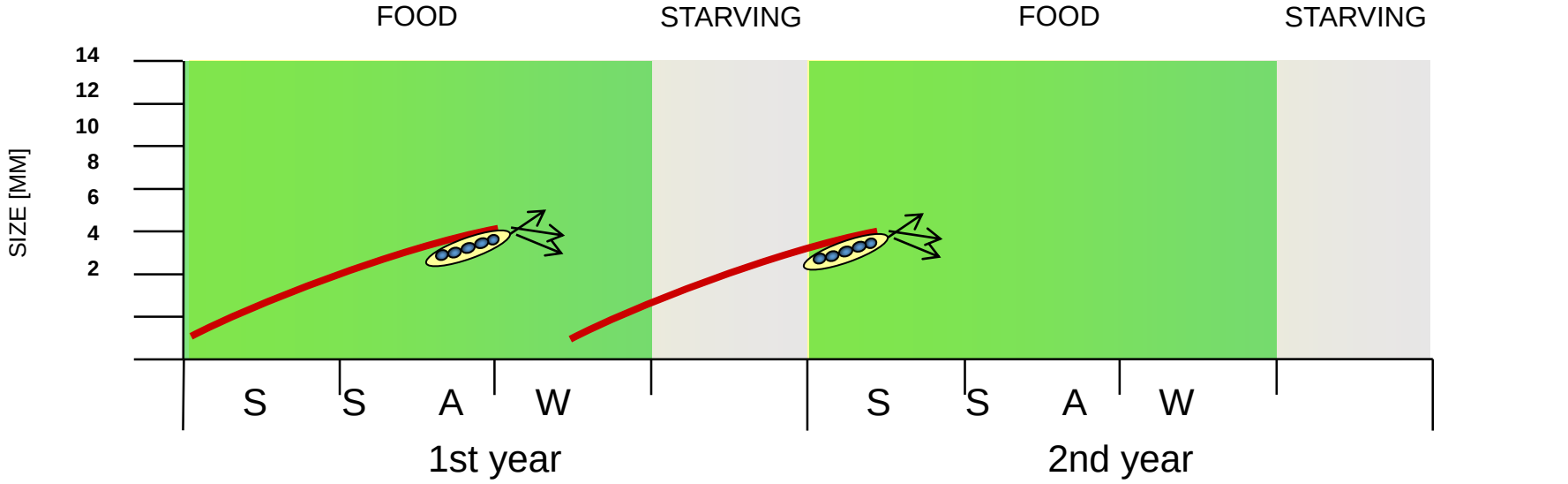
r/v Oceania, r/v Hellmer Hansen (UNIS cruise 2013)



Not only temperature, also oxygen and food availability and amount controls size in crustaceans



Temperature increase may speed up development but not allow two generations per year.



Crustaceans size groups (and surface to volume ratio)

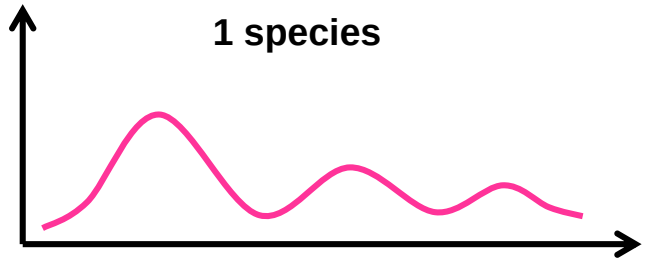
Small (0.5 to 10mm)

Large (11 to 30mm)

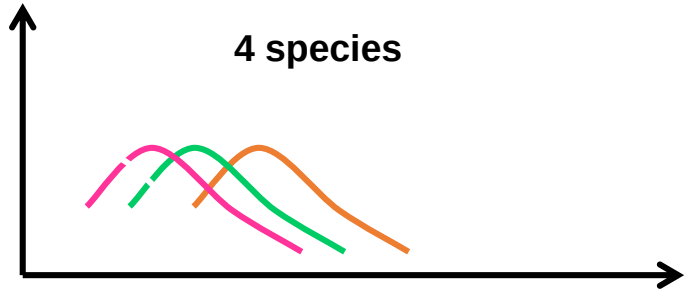
big (31 to 150mm)

One large, long living species – separated size/age groups

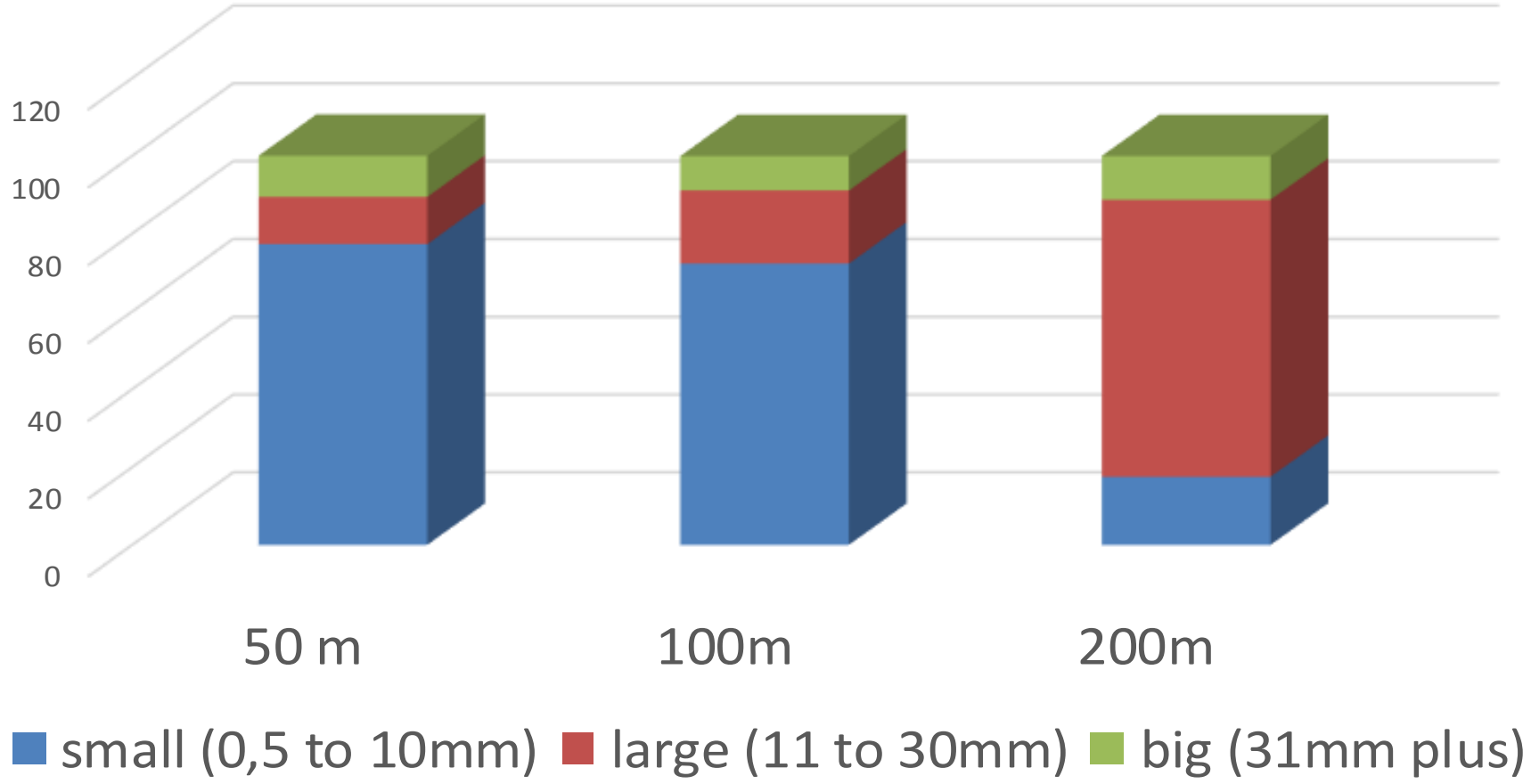
Arctic



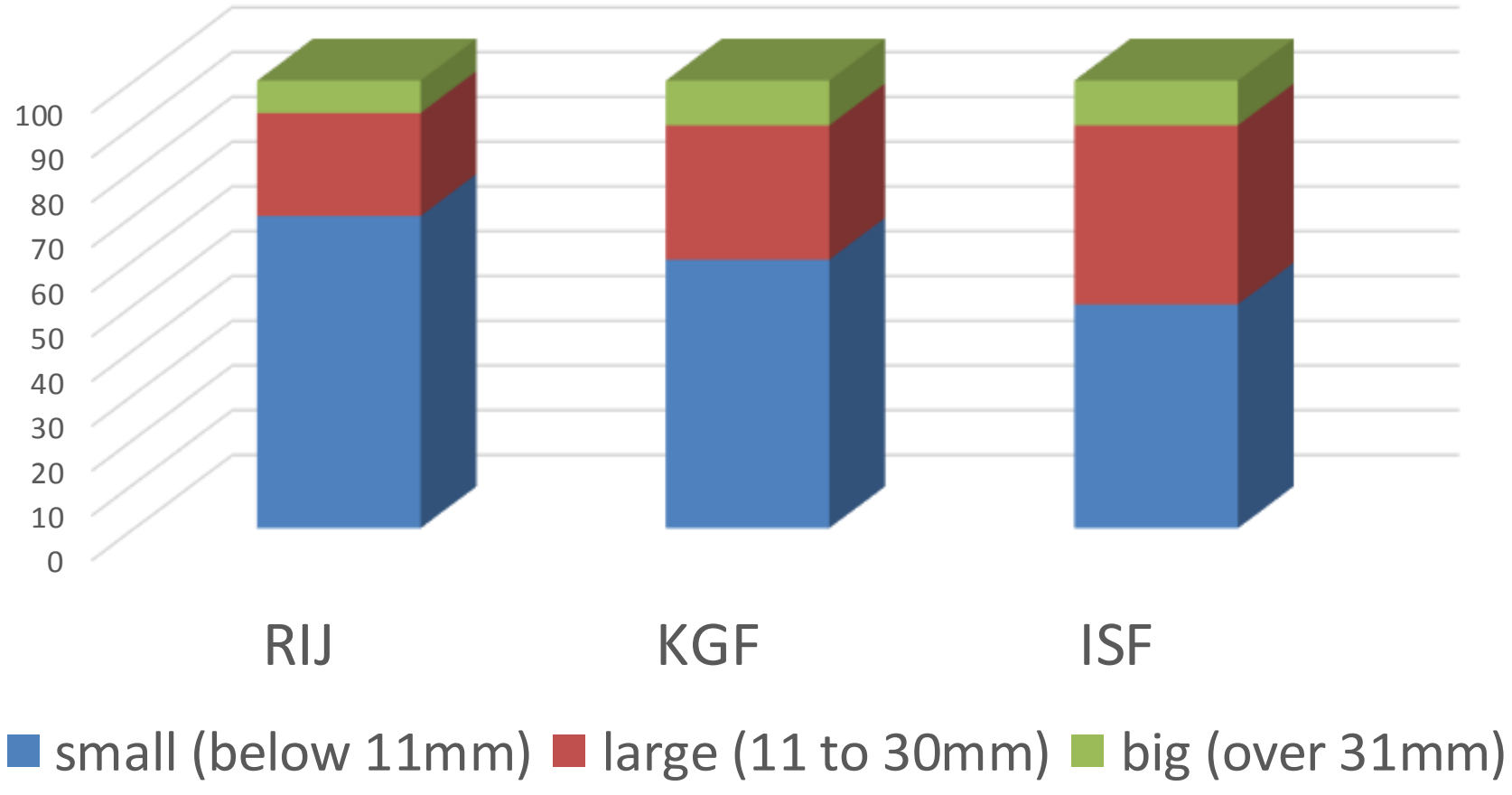
Atlantic

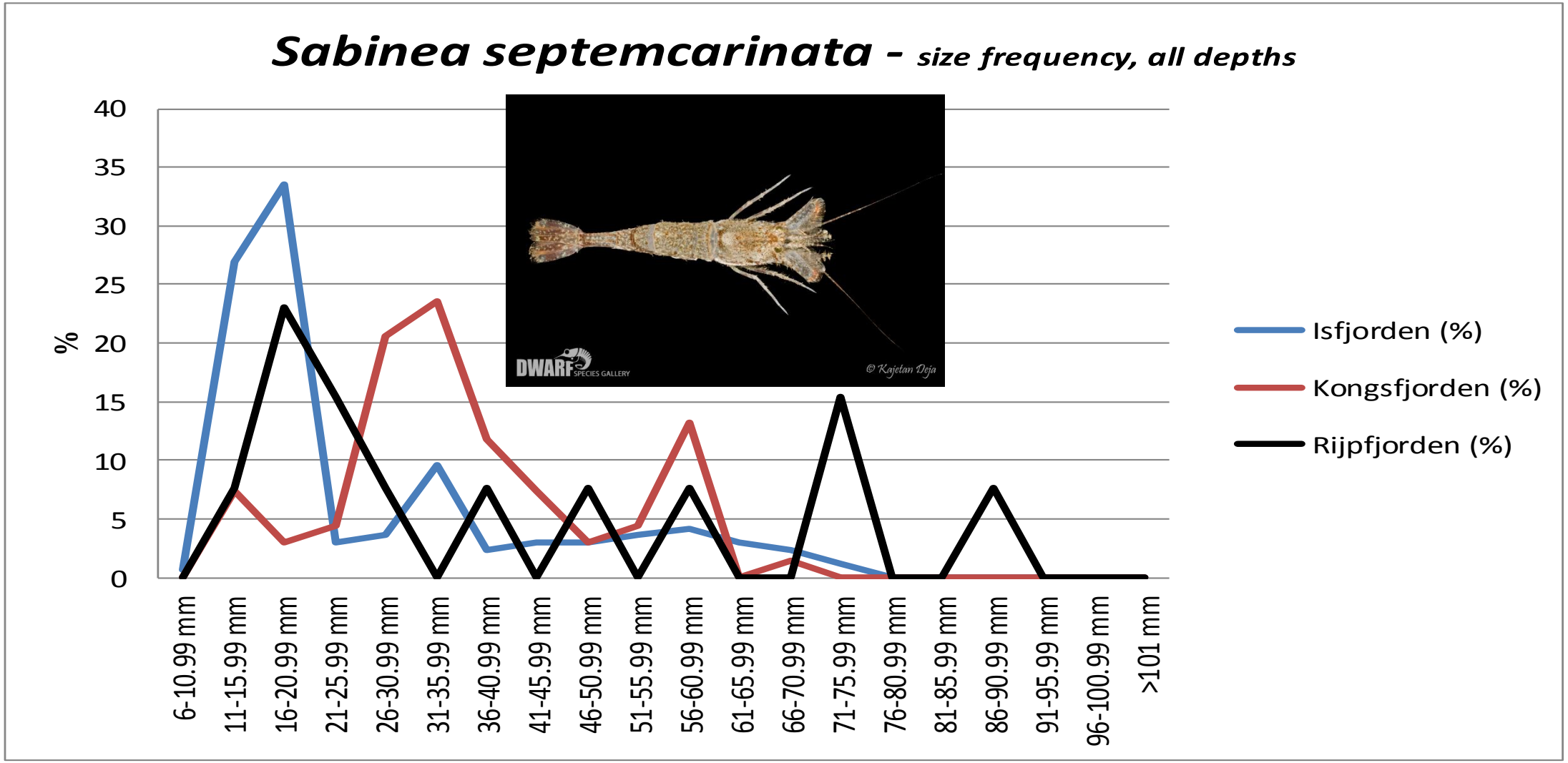


Crustacean size groups along depth in Spitsbergen fjords - temperature effect ?



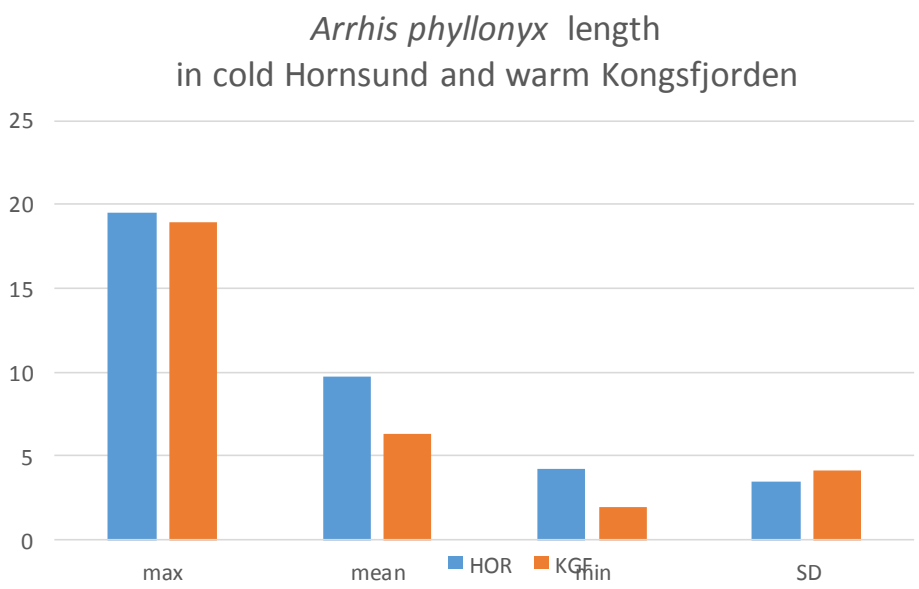
Crustacean size classes in Spitsbergen fjords- general occurrence - food availability effect ?





UNIS cruise 2013, size distribution of hyperbenthos

Arrhis phyllonyx – size differences in two contrasting fjords, all depths



Gammarus oceanicus

density [ind./sample]

40
35
30
25
20
15
10
5
1

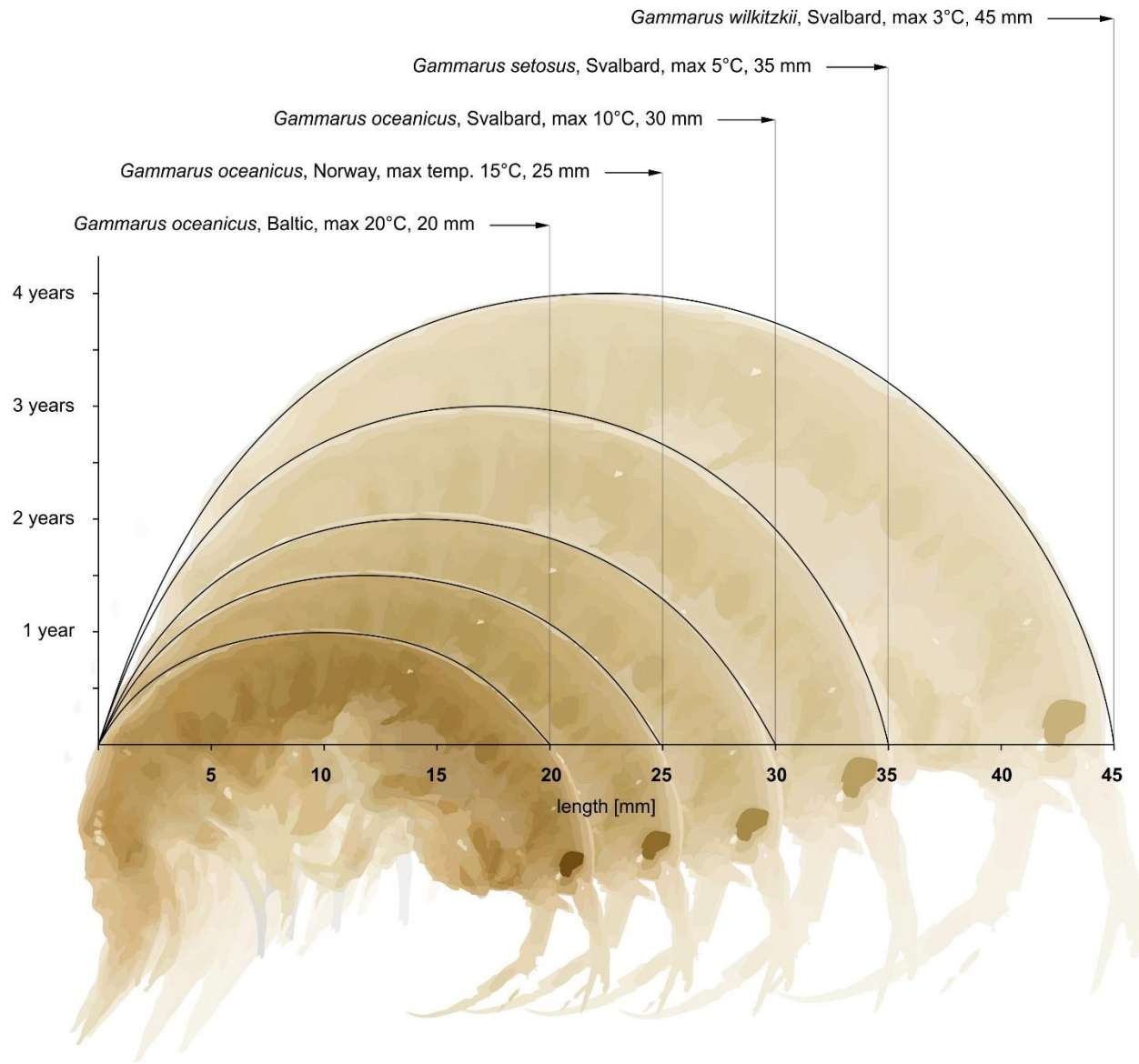
Gammarus oceanicus Gdynia-Kosakowo, 2016	Gammarus oceanicus Puck Bay, October 1981	Gammarus oceanicus Ballstad, October 2016	Gammarus oceanicus Isbjornhamna, October 1981	Gammarus setosus Sorkapp, 1988
18	19	20	31	36
13	15	14	11	16.5
5	5	5	5	5

+20°C

+15°C

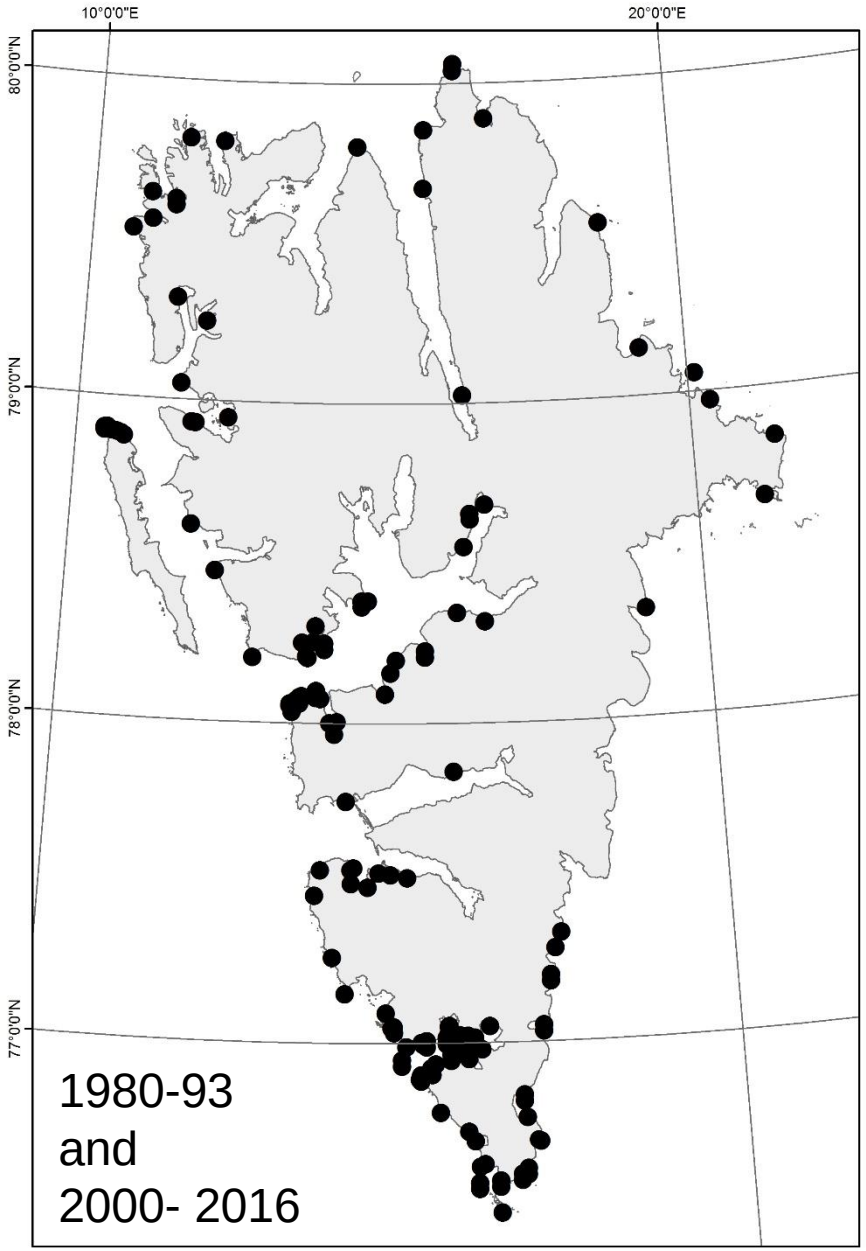
+10°C

Gammarus – twin species growth and maximal size in different regions related to temperaturę

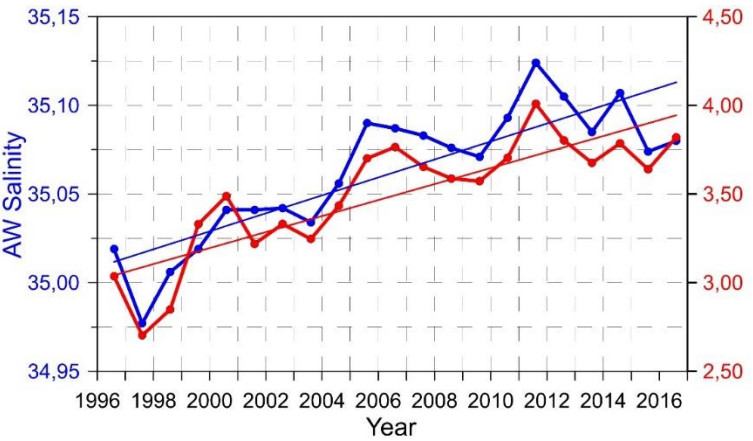


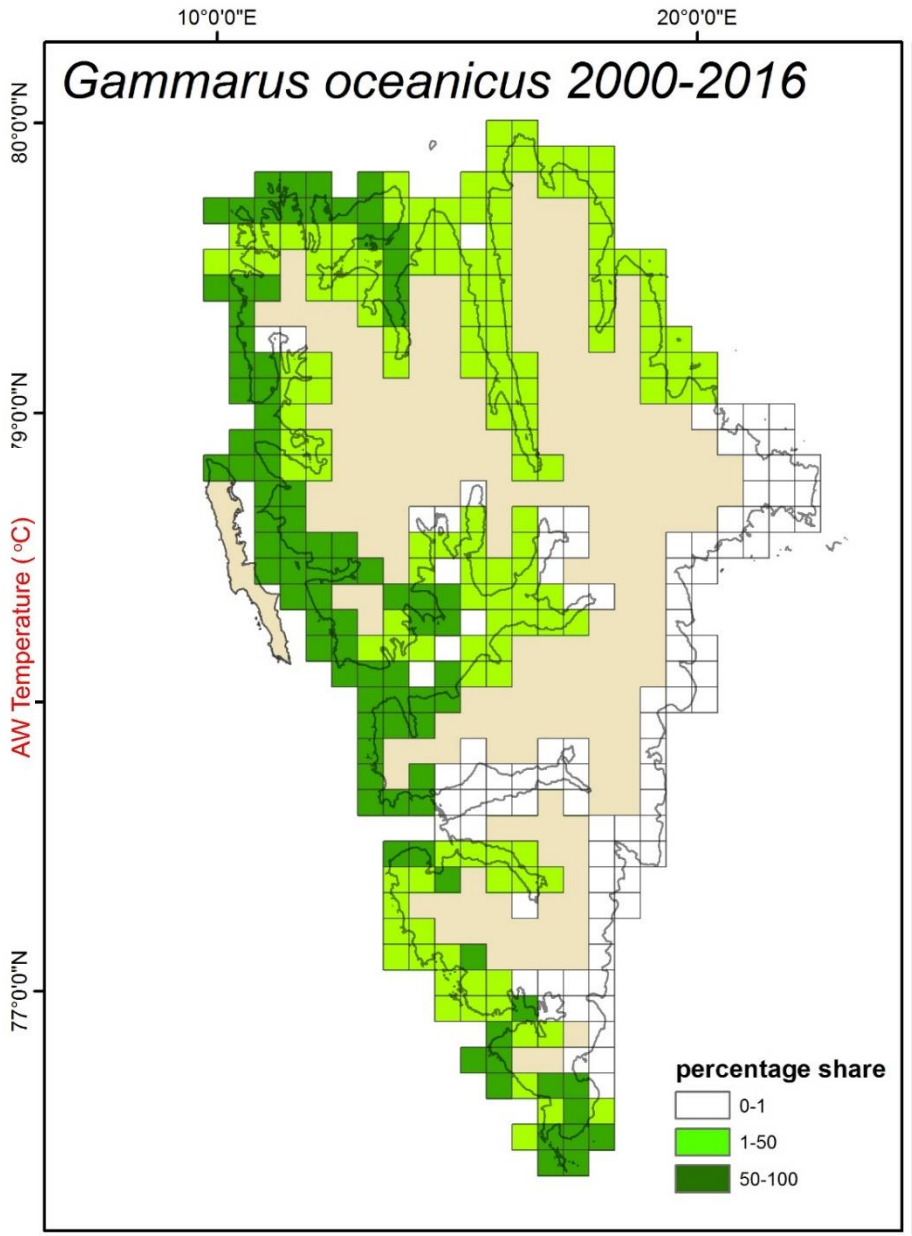
Competition between sibling species

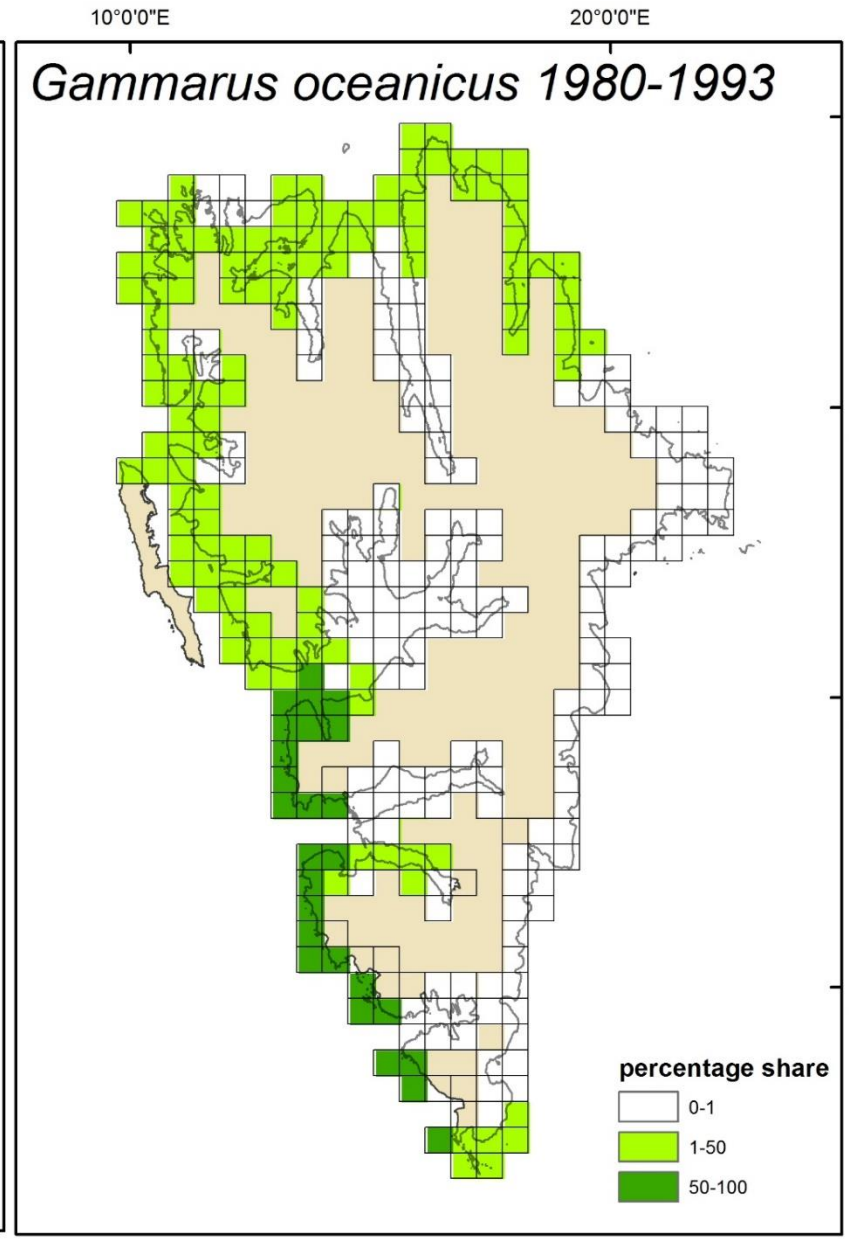
Gammarus oceanicus vs G. setosus in changing environment



Expansion of
atlantic species,
against
equally good local







Thank you