Intertidal life

Hornsund (79°N), Svalbard

Now and 20 years ago

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Littoral 2008 Conference, Venice, ENCORA - EUCC

Introduction

- Climat is warming – very significant in Arctic
  - More energy in the enviroment

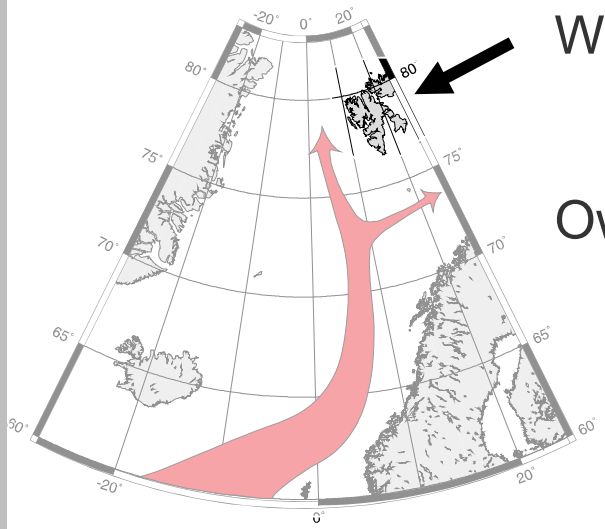
- Time frame : 2 decades – from 1988 to 2007

QUESTION

What is a littoral biota's **answer** to those changes?

Location

Svalbard 79ºN



Warm arctic

20º difference in mean temp. vs E Greenland

Owning to heat flux :

- WSC being part of Golfstrom
- Atlantic cyclones

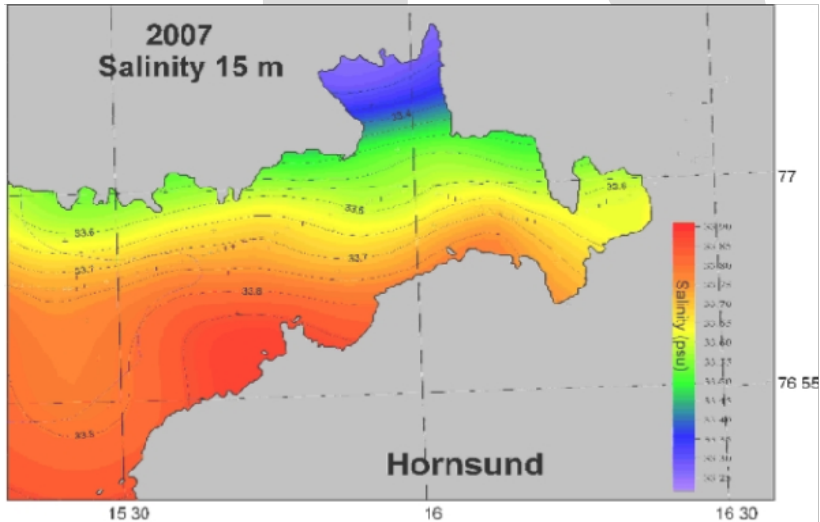
Hornsund

Small basin - 30 km long fjord

Glaciers runoff

Influence of warm current

Anticlockwise circulation



Tidal zone – why?

Why intertidal?

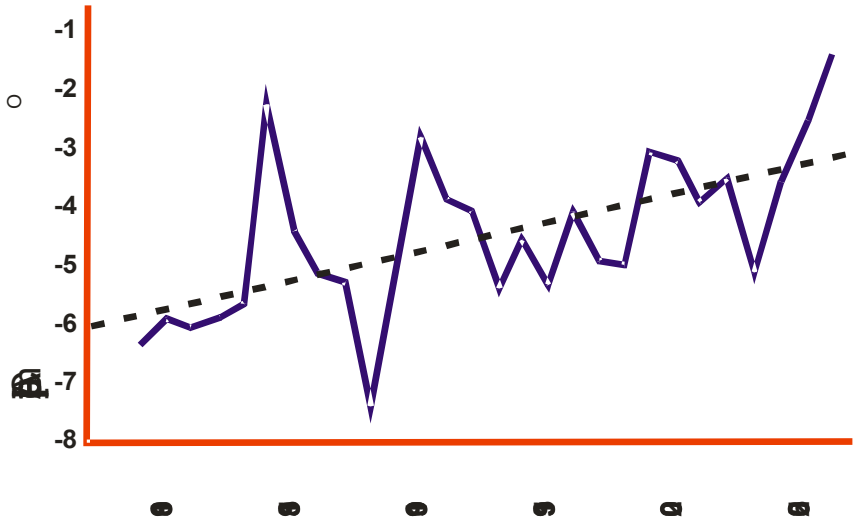
- Existence of **archival data** from 80s
- Exposed = **vulnerable** = rapid changes
- **Easy** sampling

Why Hornsund?

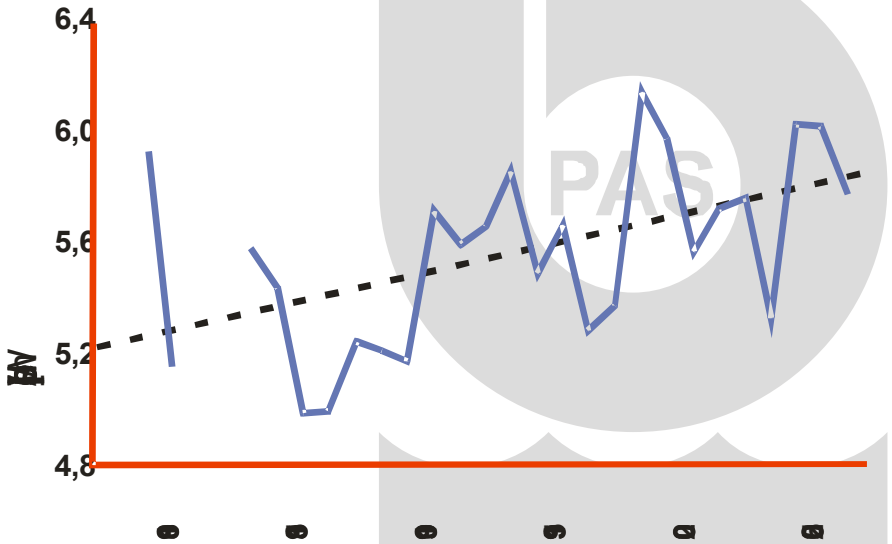
- Existence of **archival data**
- **All Taxa Biodiversity Inventory place**
- Logistics – Polish Polar Station
- ***Nice views***

Factors shaping littoral communities

- Temperature: both **air** and **water**
- Waving and storminess
- **Ice cover** duration
- Turbidity

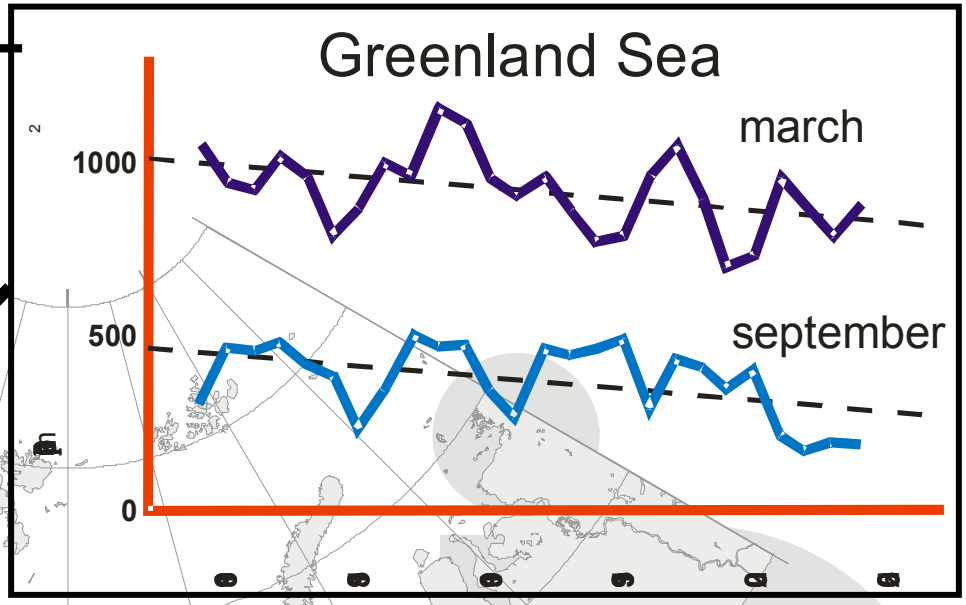


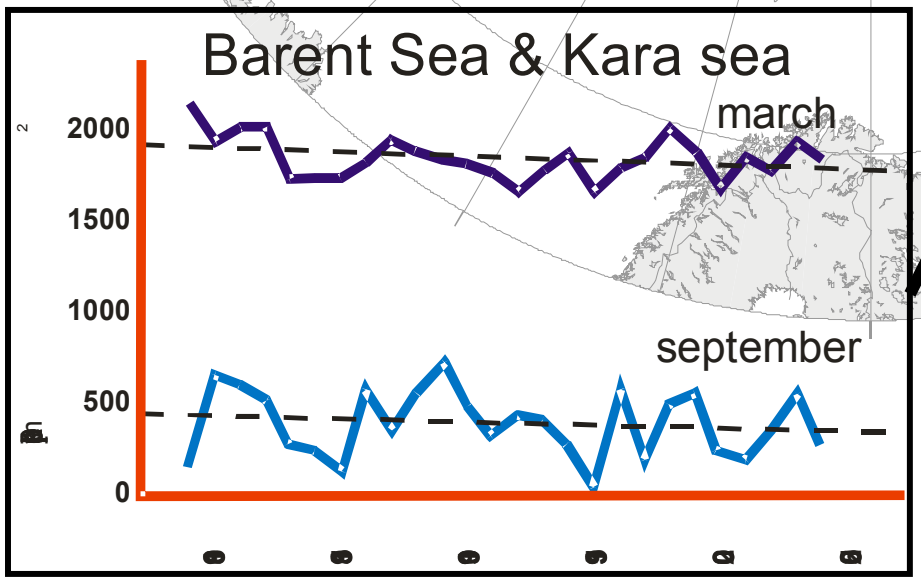
Air temperature rise



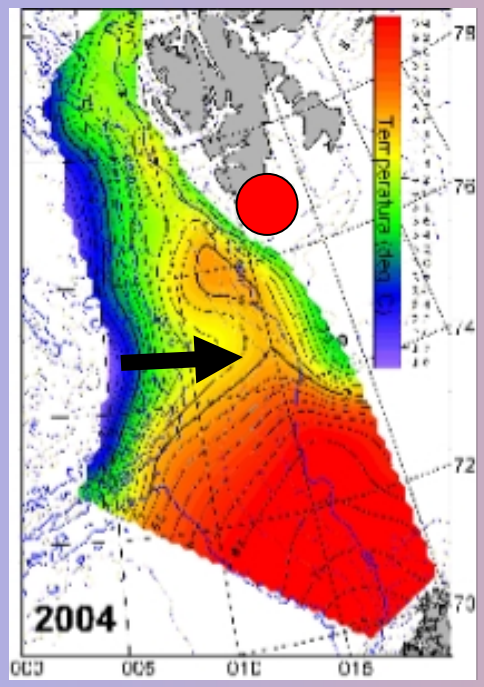
Wind speed

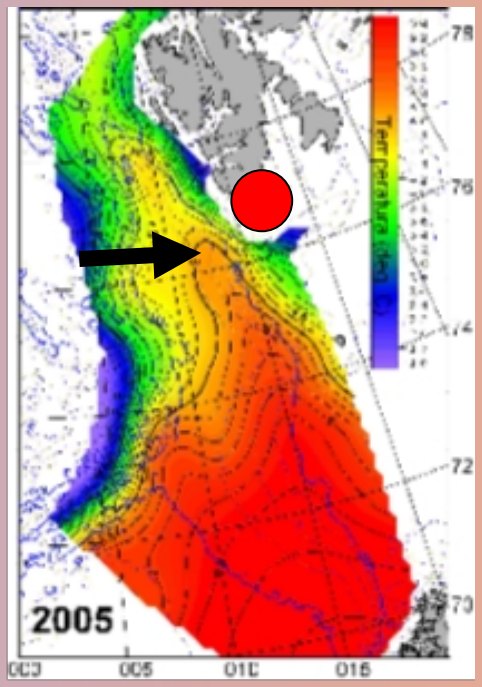
Ice coverage

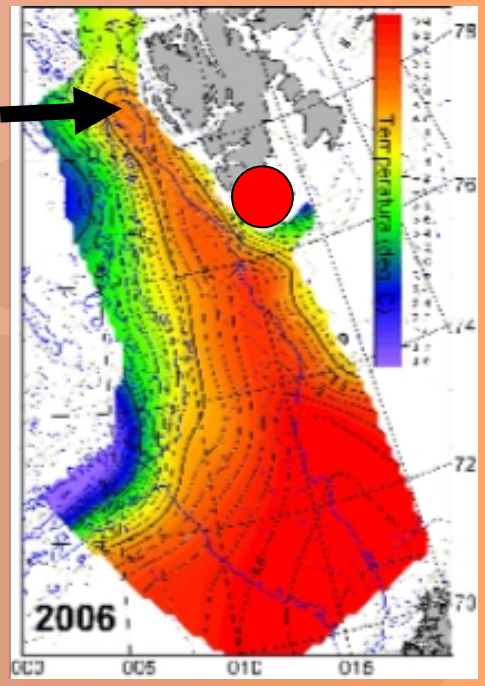




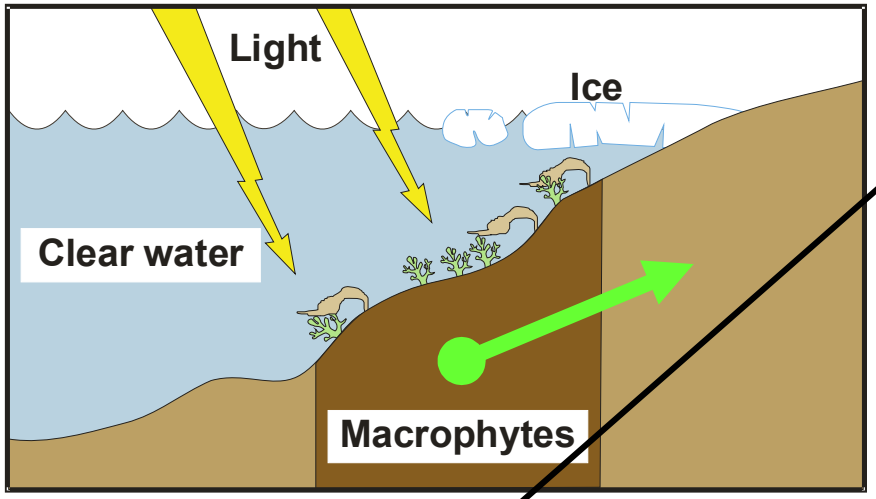
Heat flux via WSC

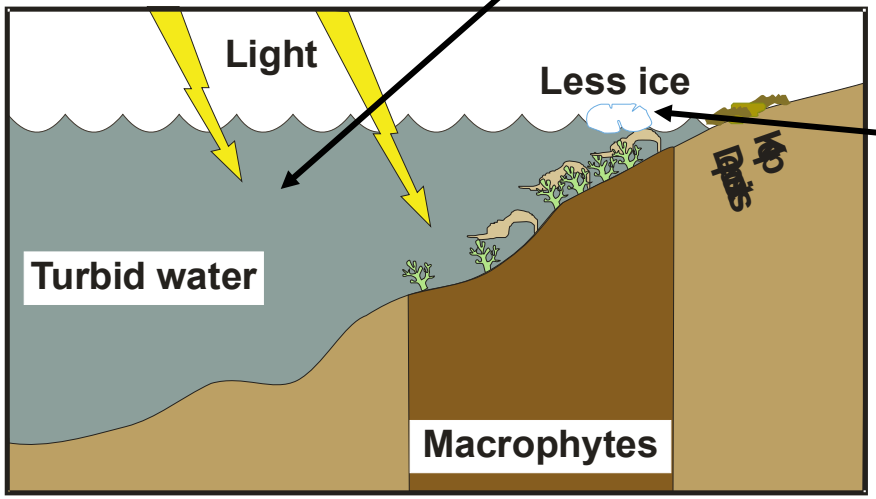






Model





Limited light at deepth due to increased amount of suspended matter

=

Macrophytes forced to abandom deepth previously occuped

Less ice = less scouring

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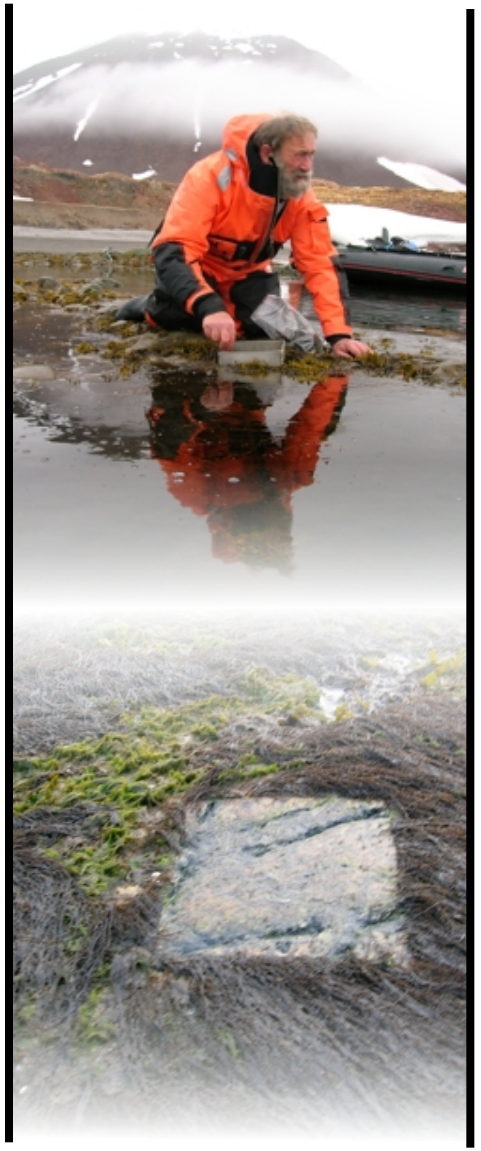
New, vegetation friendly, conditions in shellow, littoral waters.

Method



3 Samples at water mark during low water

Square frame

0,25cm x 0,25 cm = **0,0625**cm^2

ALL organisms collected

ALL beings exceeding 0,5 mm are to be analized

Intertidal communities

3 types of communities found

Oligotrophic

Gammarus

Fucus - Balanus

Gammarus index

G.oceanicus/*G.setosus*

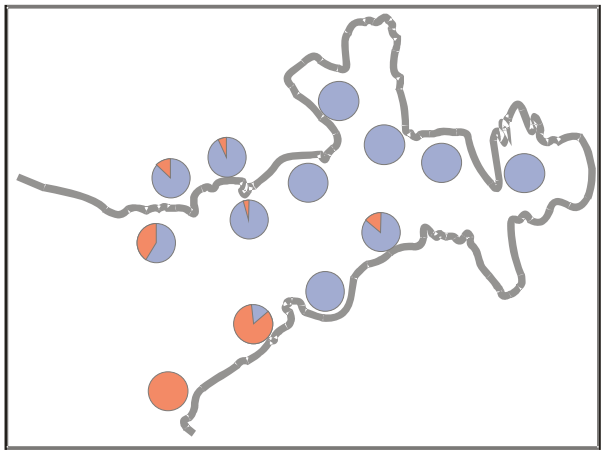
The same niche

- Shallow water
- Simillar toleration to salinity & temperature
- Carrion eaters

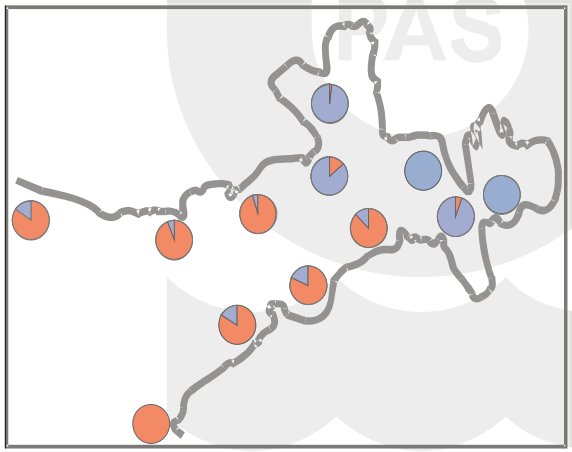
Temperature driven competition

- G. oceanicus – related to atlantic water
- G. setosus – preferes colder water

1988



2008



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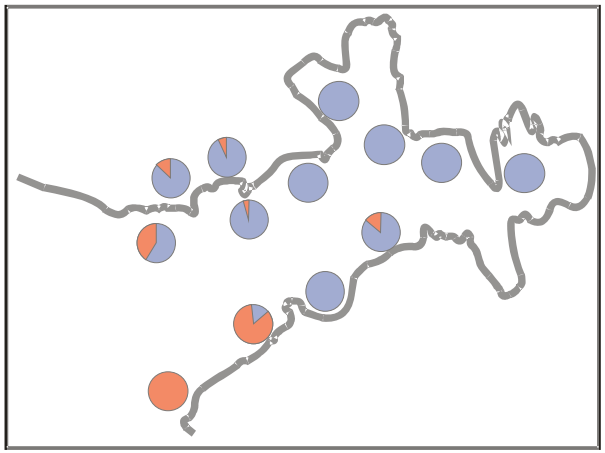

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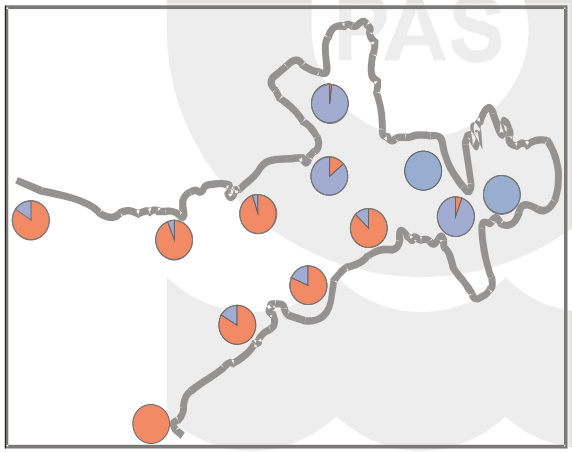


Fucus case

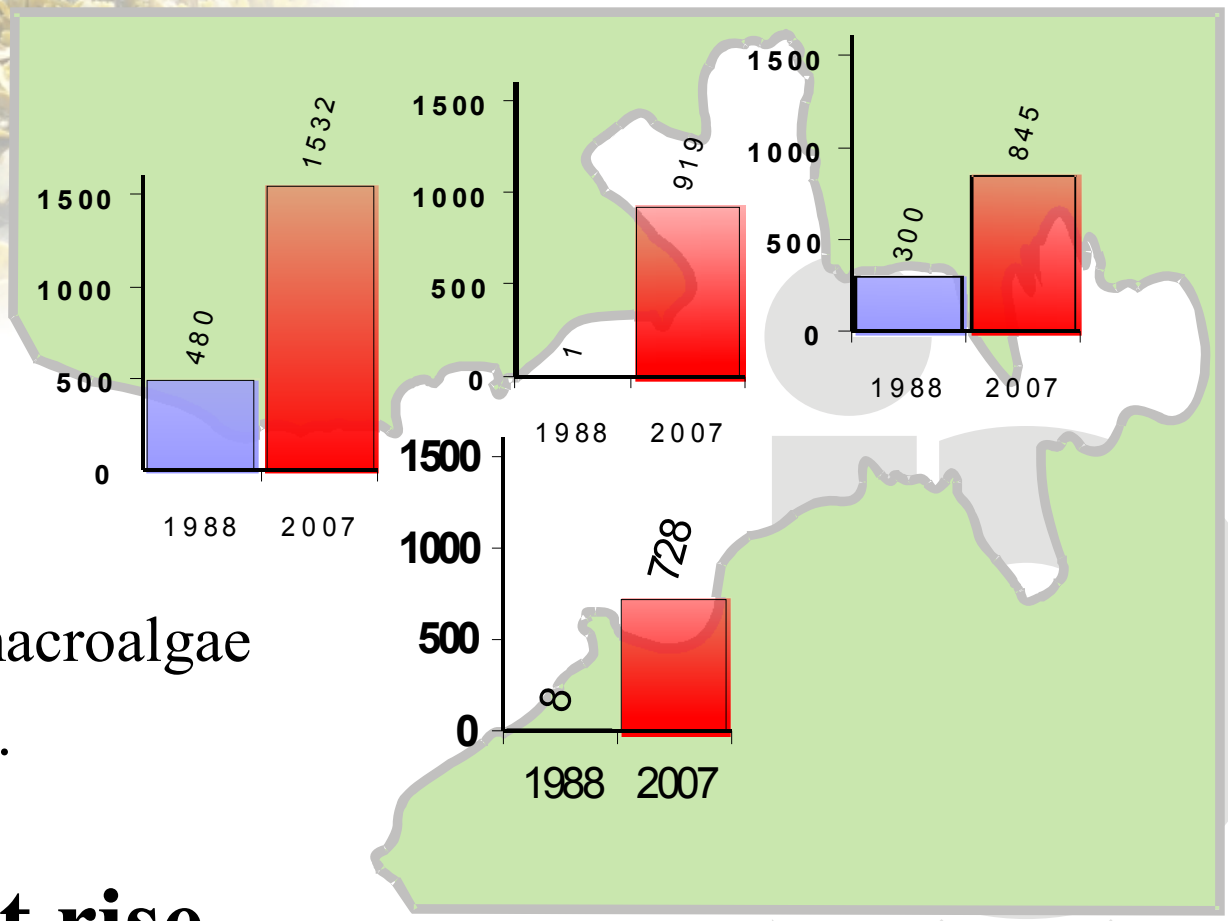
Fucus' length

Max. length 1988	6 cm -10 cm	Max in outer part
Max. length 2007	8 cm -15 cm	Max in middle part

Brepollen Fucus

No scouring = community change

Algae biomass



Wet weight of macroalgae [g*m^{-2}] at points.

Significant rise

CONCLUSION

Climat changes **have** impact on Horsund littoral zone

Increased amount of energy in enviroment leads to enrich intertidal communities