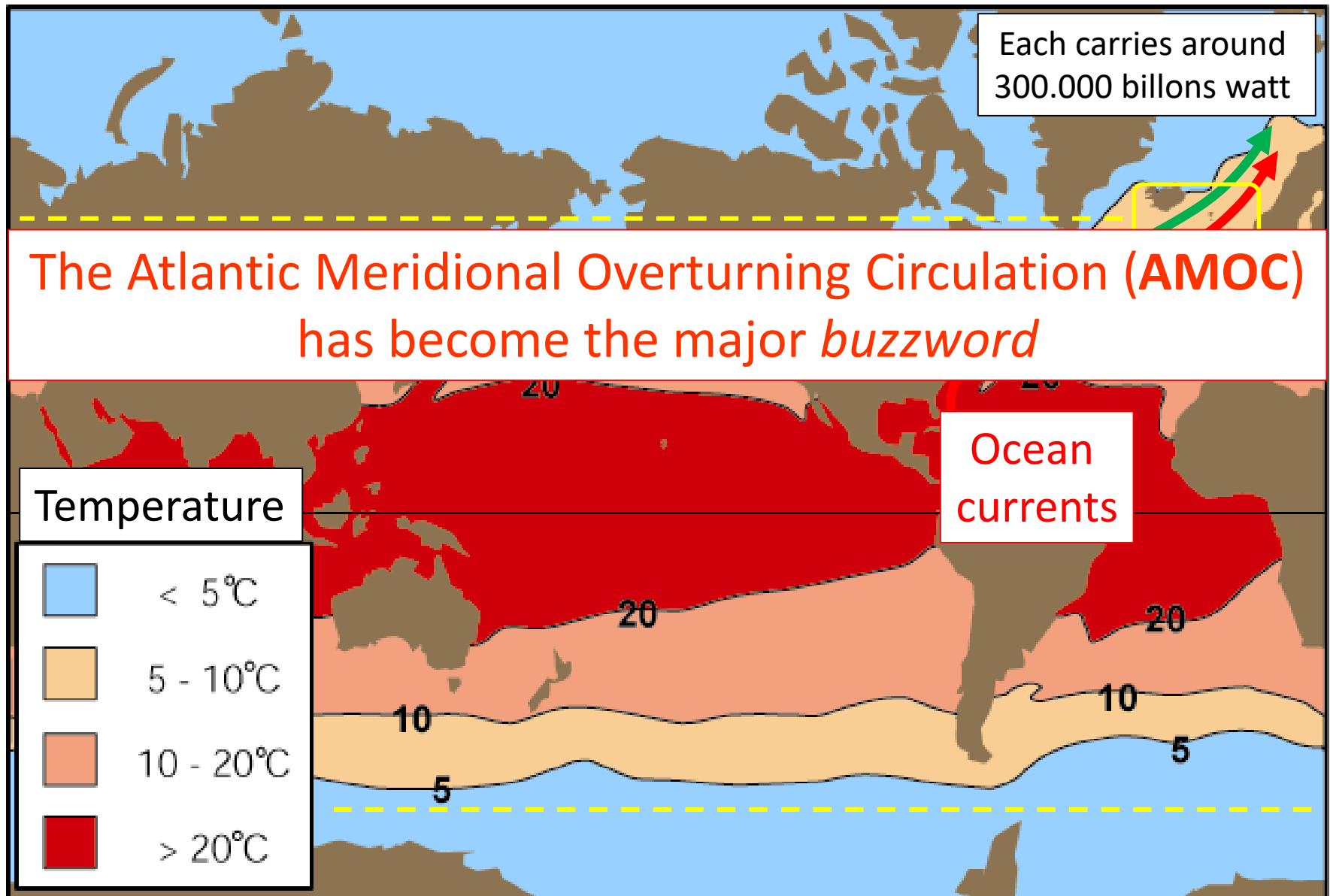


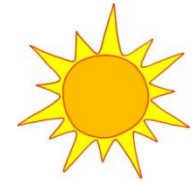
Climate variability and its Effects on Marine Resources in the Sub-Arctic

Hjálmar Hátún

A 'climate oasis' in the North Atlantic

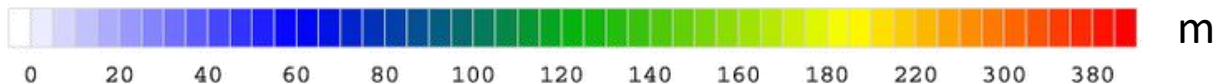
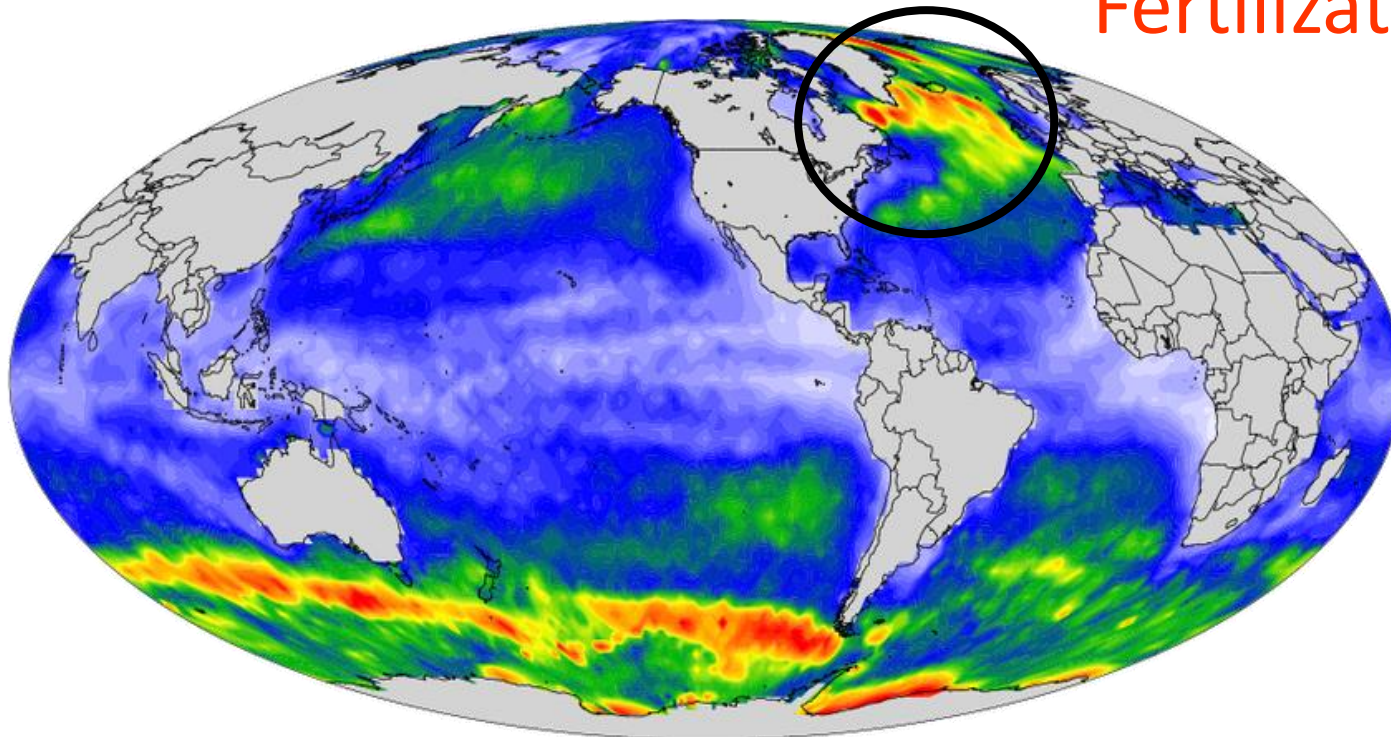


The energetic and productive North Atlantic Ocean



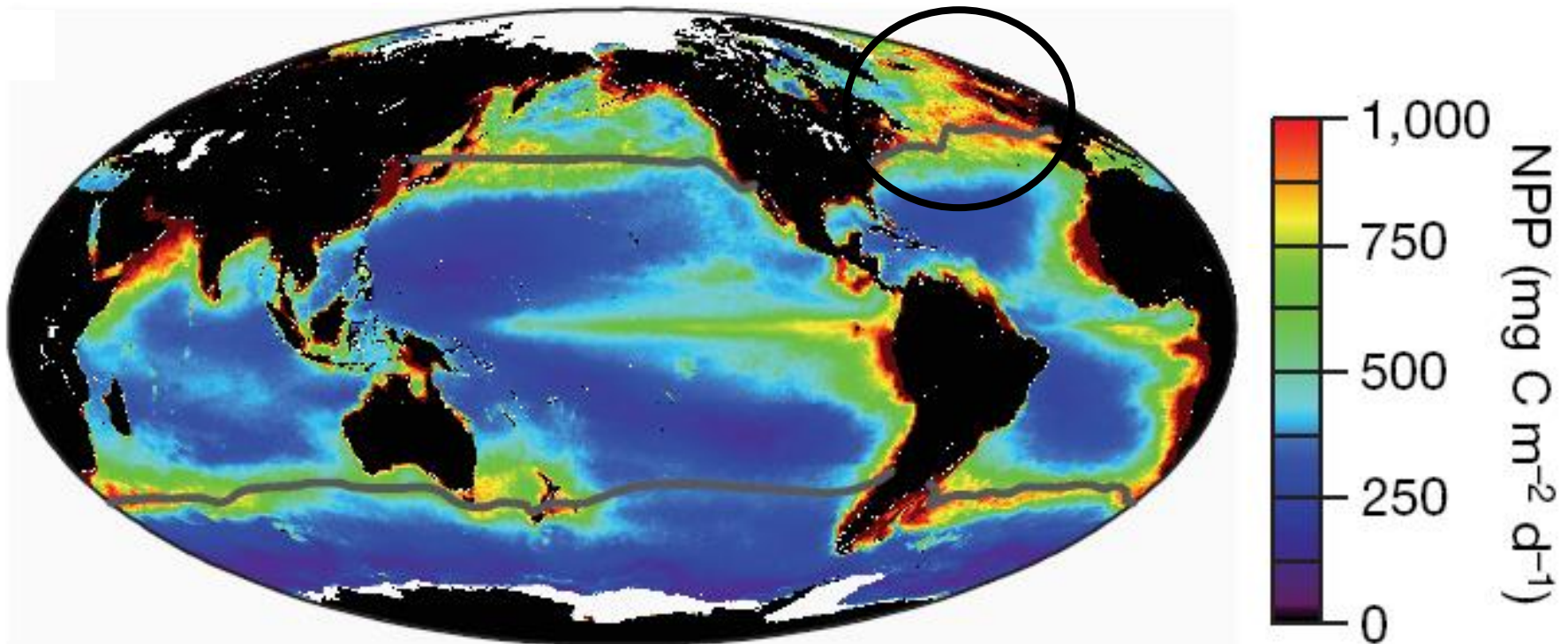
Deep mixing

Fertilization



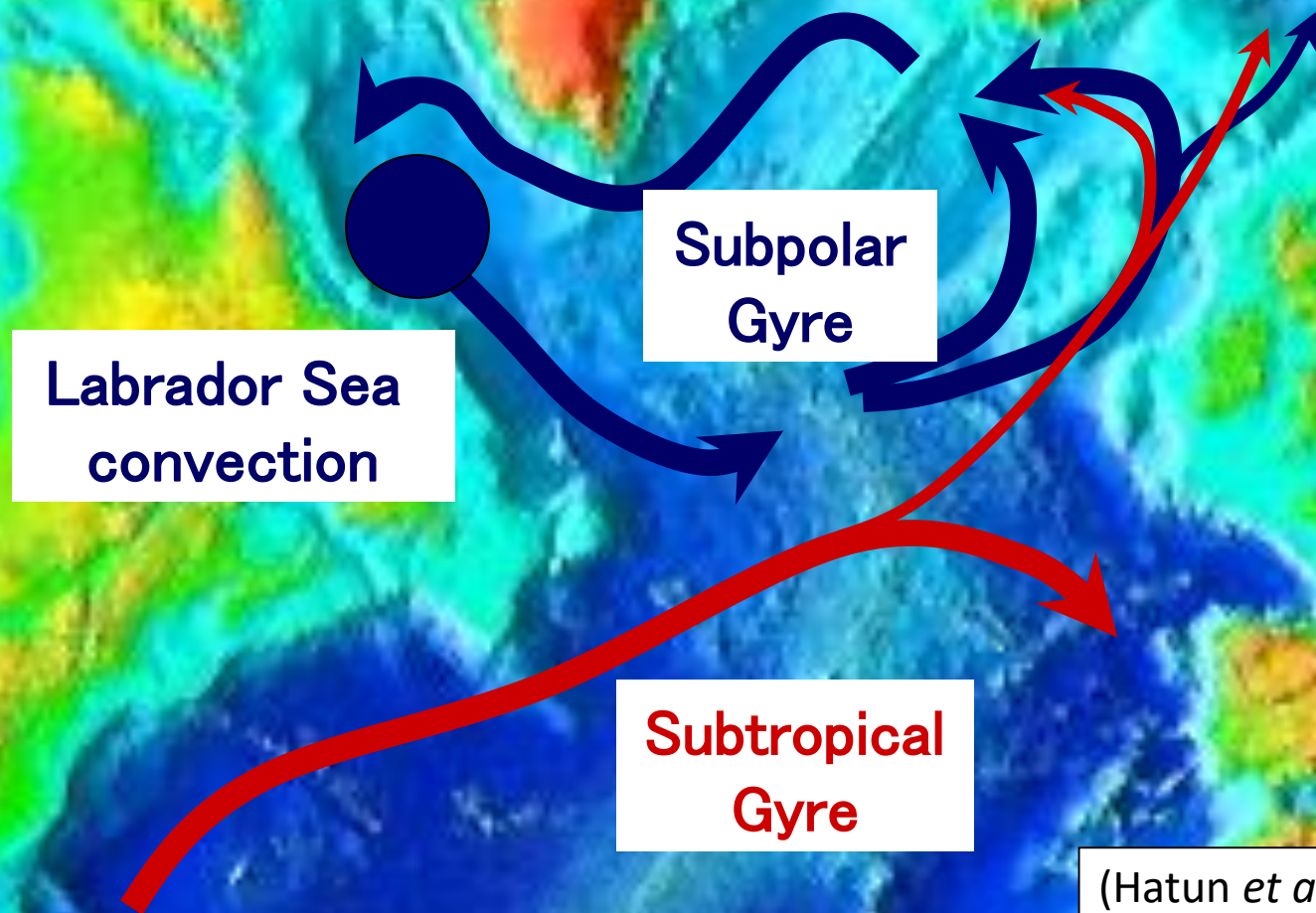
The energetic and productive North Atlantic Ocean

Net Primary Production (NPP)



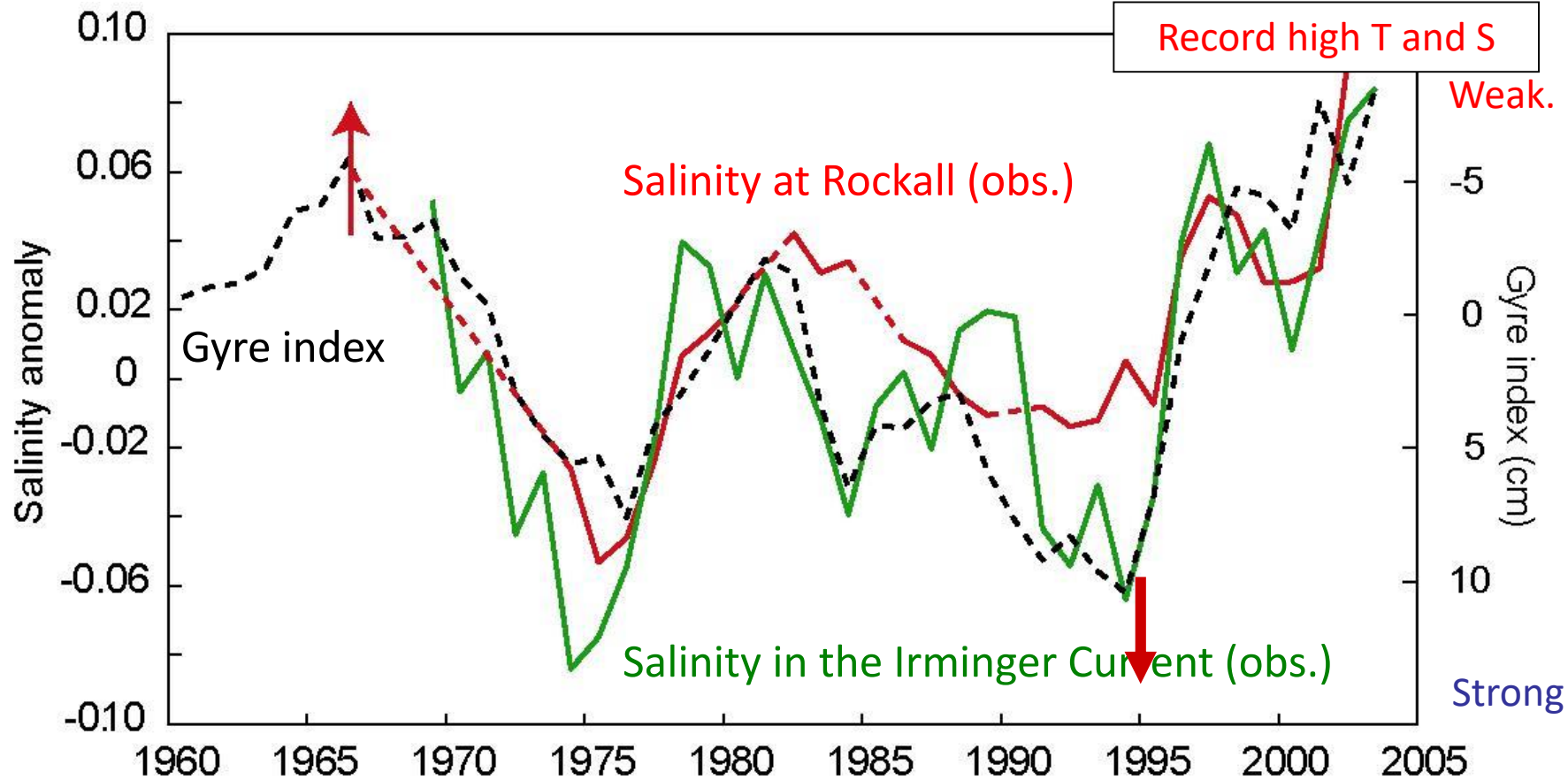
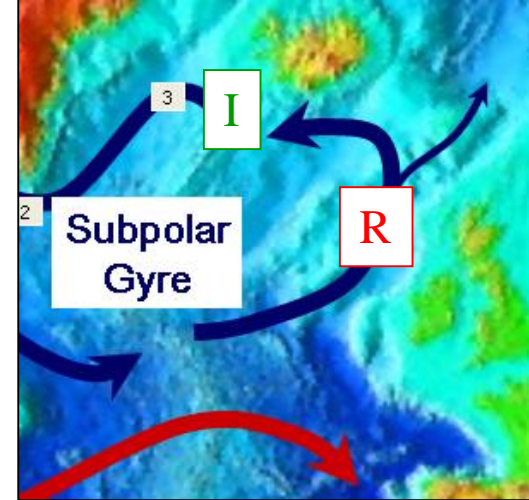
(Behrenfeld et al., 2006 Nature)

The Subpolar Gyre and the marine climate

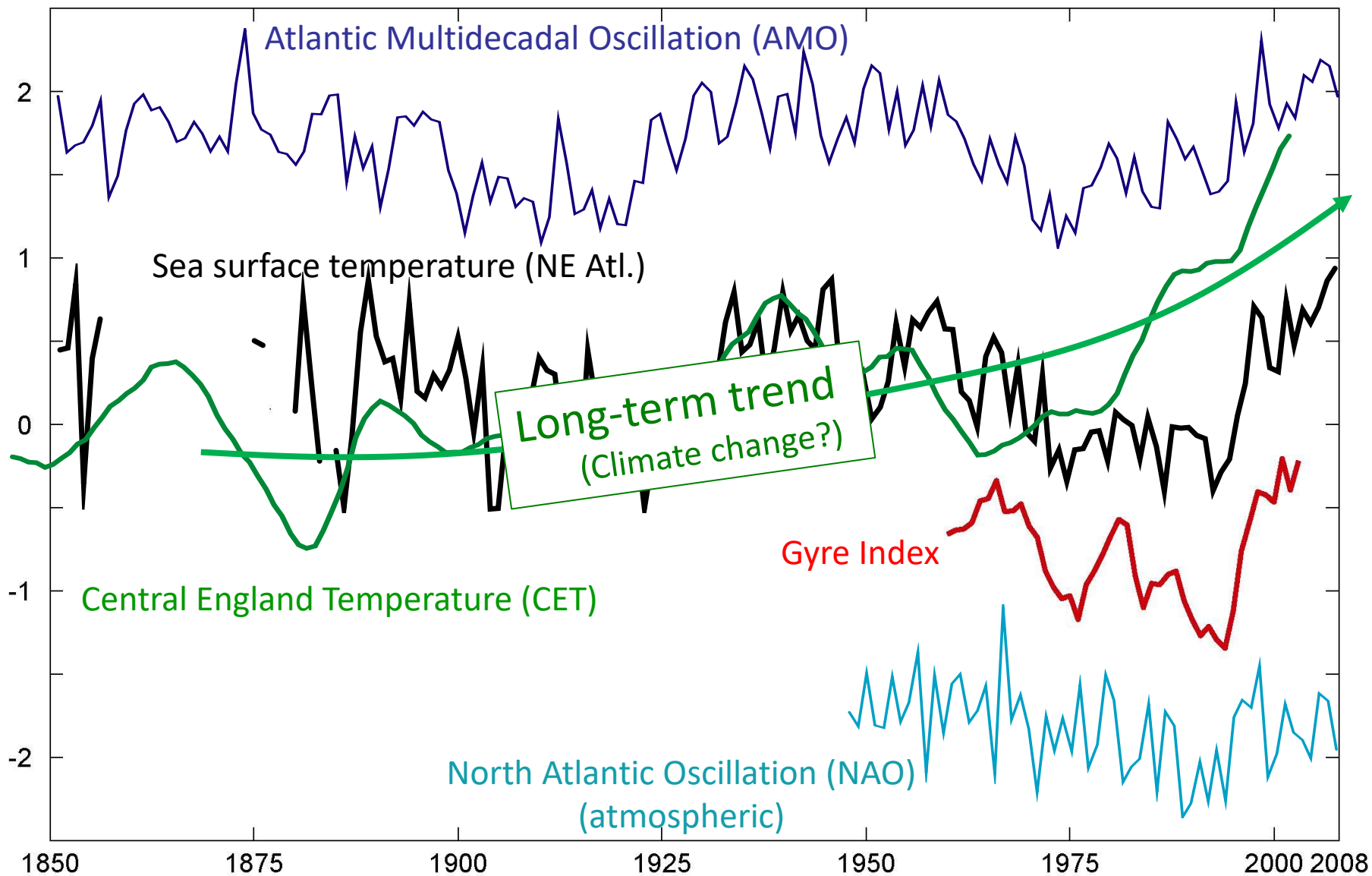


(Hatun *et al.*, Science 2005)

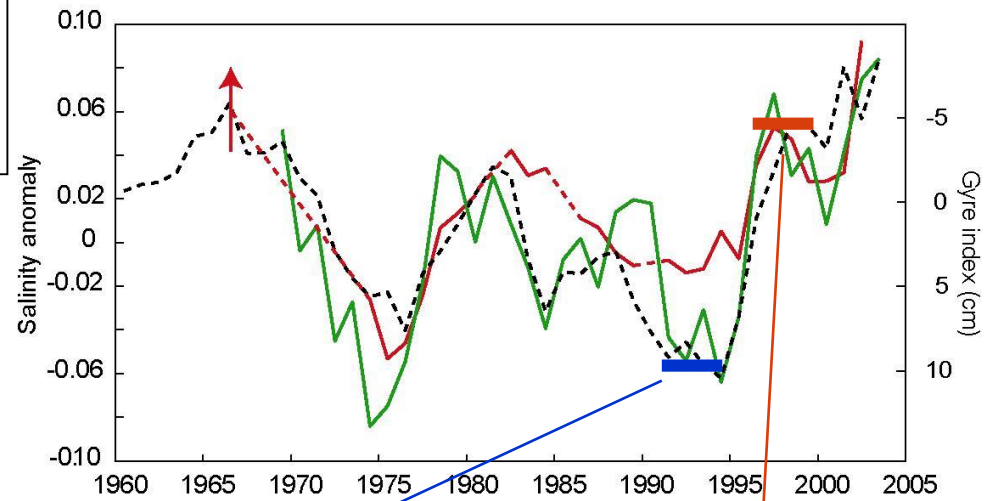
The Subpolar Gyre and the marine climate



Atlantic Climate Indices (and proxies)

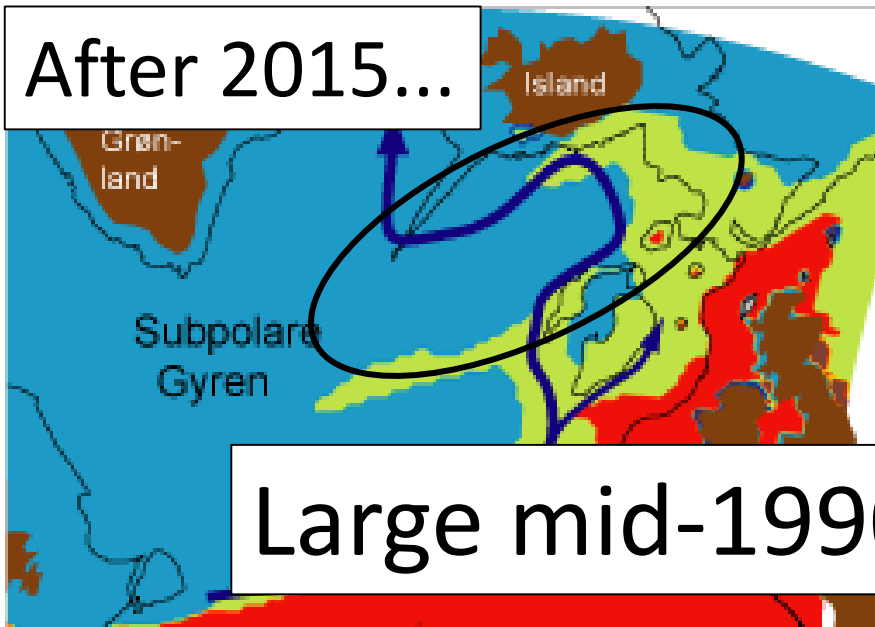


The Subpolar Gyre and the marine climate

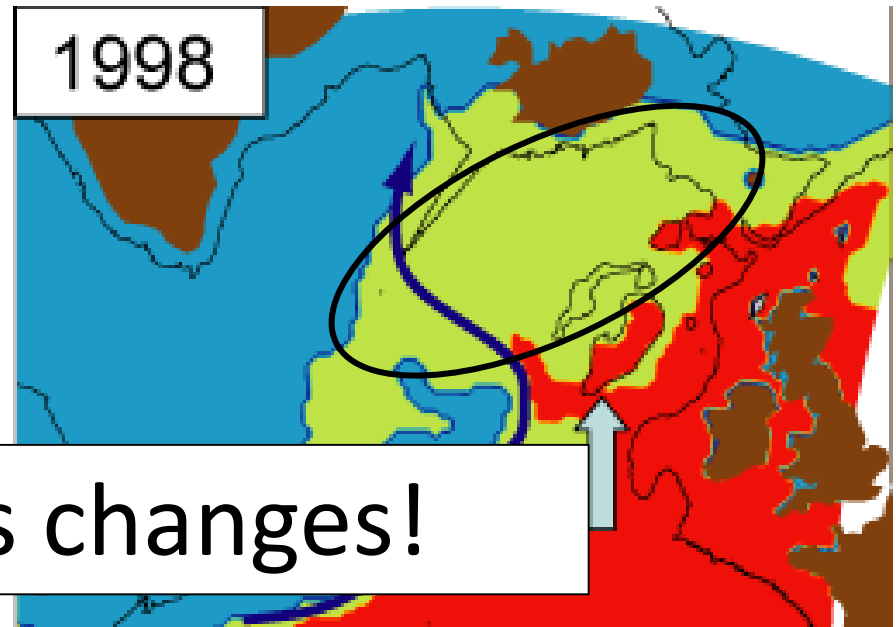


Simulated temperature

After 2015...



1998



Large mid-1990s changes!

The Subpolar Gyre and the marine ecosystem

Blue whiting



Sandeel



Seabirds



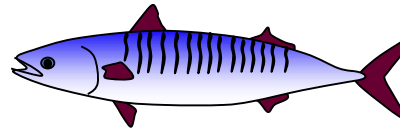
Pilot whales



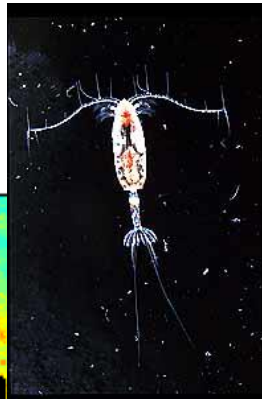
Cod



Mackerel

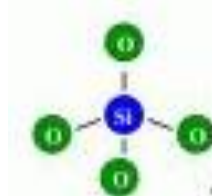
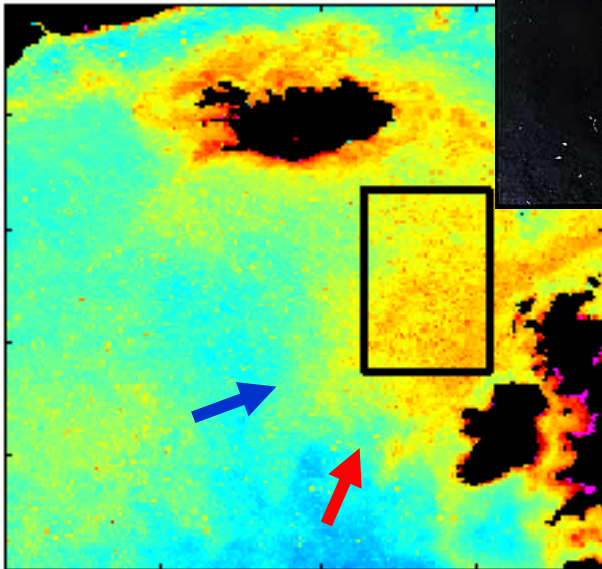


Zooplankton



Herring

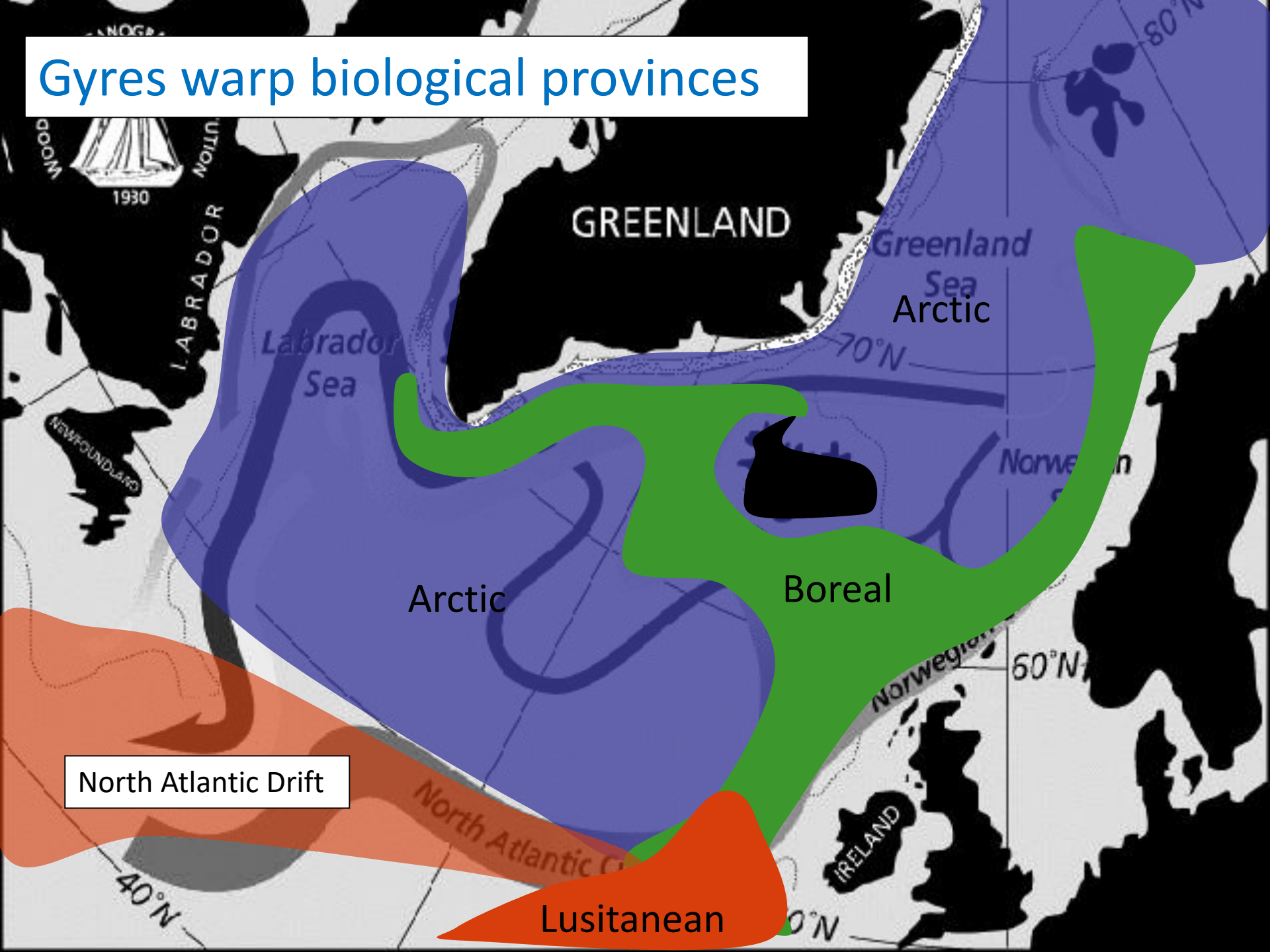
Phytoplankton



Nutrients

and more...

Gyres warp biological provinces



North Atlantic Drift

North Atlantic Gyre

Lusitanian

Labrador Sea

GREENLAND

Greenland Sea
Arctic

Arctic

Boreal

Norwegian Sea

IRELAND

Norwegian Sea

40°N

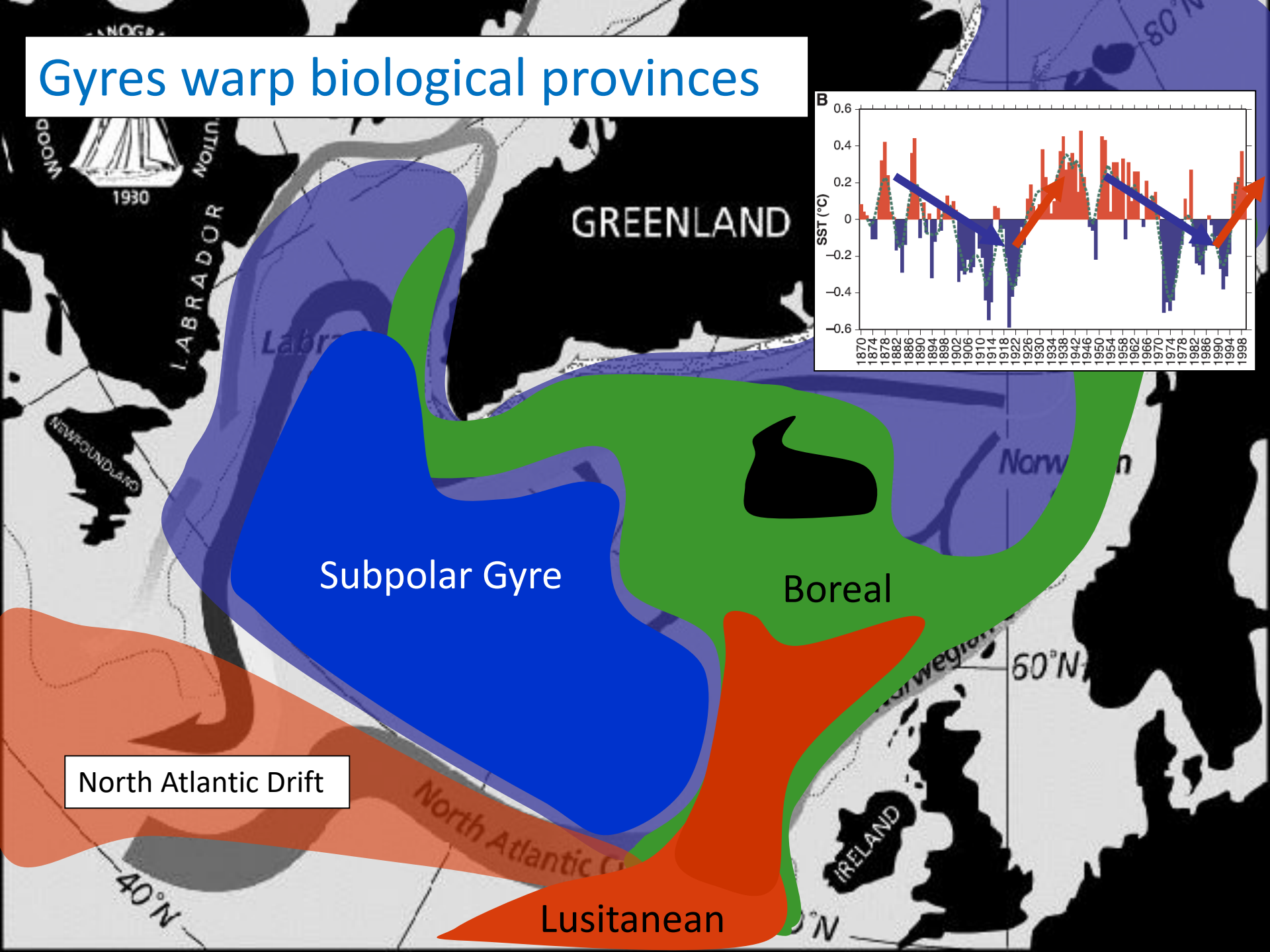
50°N

60°N

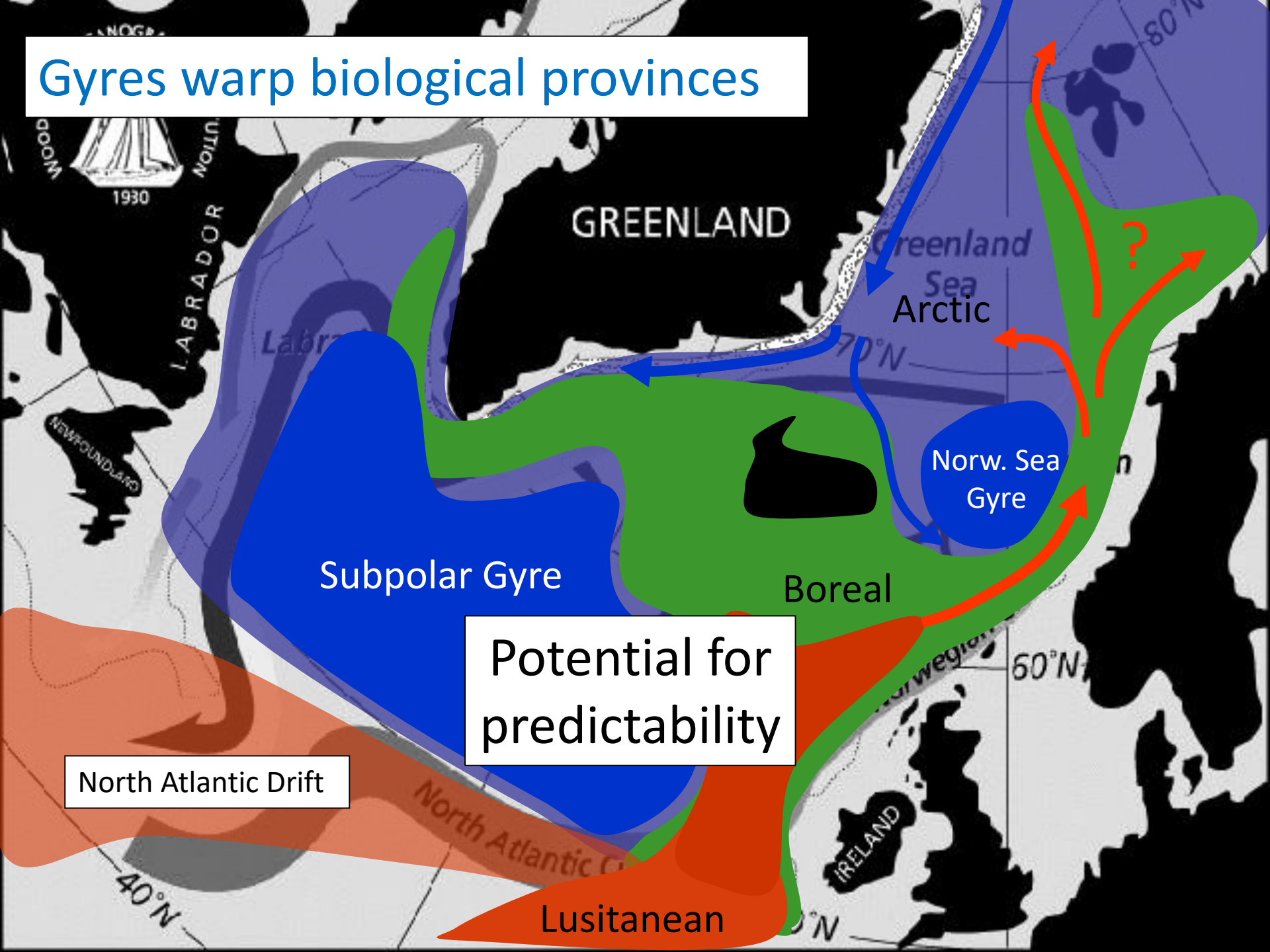
70°N

80°N

Gyres warp biological provinces



Gyres warp biological provinces



Potential for predictability

North Atlantic Drift

Lusitanian

Subpolar Gyre

Boreal

Norw. Sea Gyre

GREENLAND

Greenland Sea
Arctic

LABRADOR

IRELAND

1930

40°N

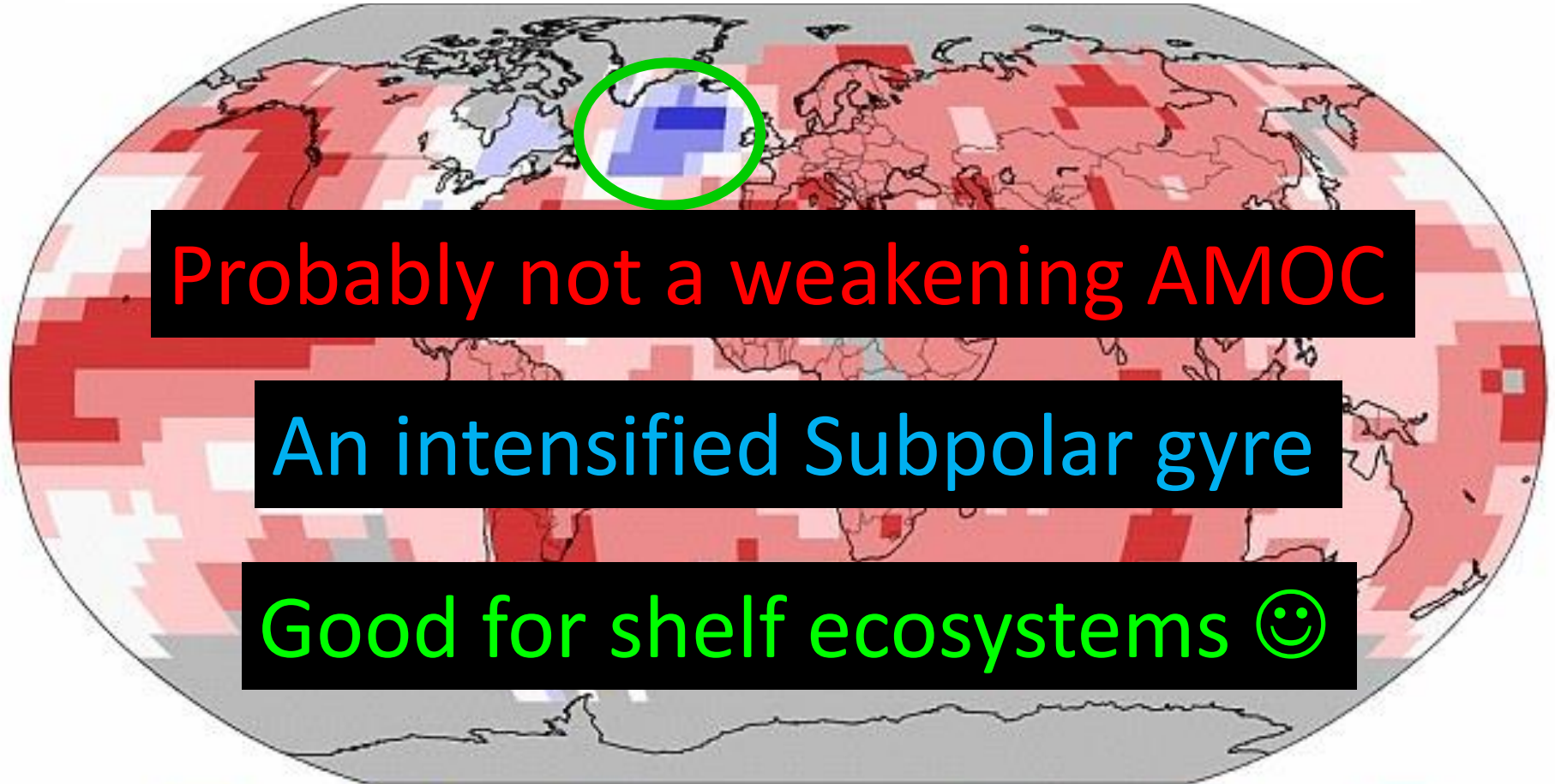
50°N

60°N

70°N

80°N

The 2015 'Cold blob'



Probably not a weakening AMOC


An intensified Subpolar gyre

Good for shelf ecosystems 😊


Record
Coldest


Much
Cooler than
Average


Cooler than
Average


Near
Average


Warmer than
Average


Much
Warmer than
Average


Record
Warmest

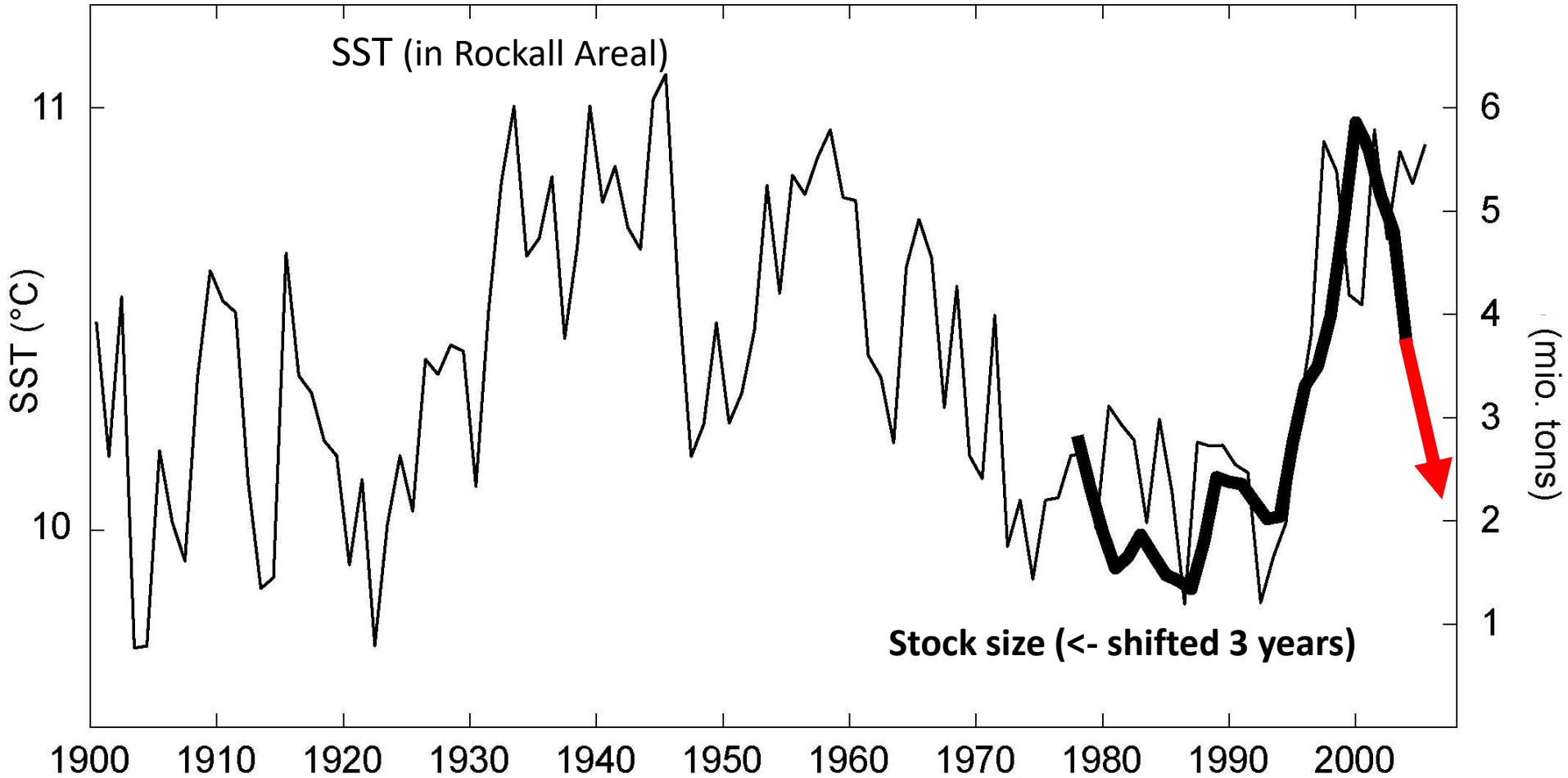


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Example: Blue whiting



Example: Blue whiting

(Catches – all nations)

