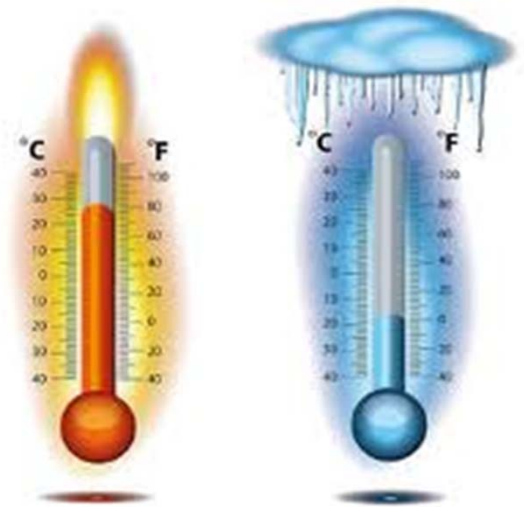


Temperature and Earth's Ocean

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NF-POGO COFE SCHOLAR
2013-2014

What is temperature?

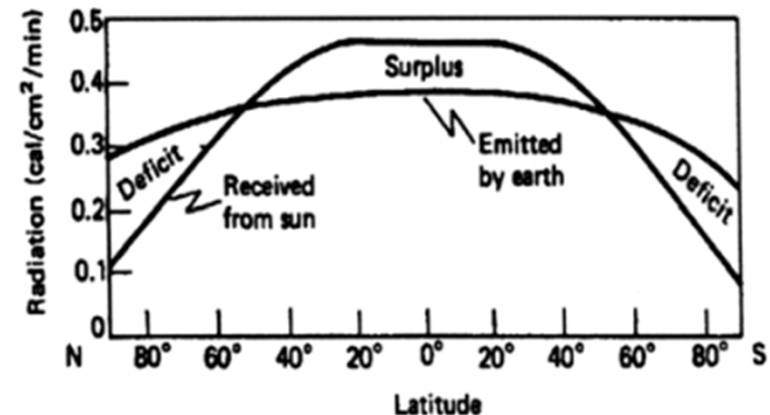
- It is a numerical measure of how hot
- Its measurement is by detection of heat radiation of a material.
- Can be calibrated in any of various temperature scale, Celsius, Fahrenheit, Kelvin.



<http://www.sophisticatededge.com/what-is-the-freezing-temperature-of-water.html>

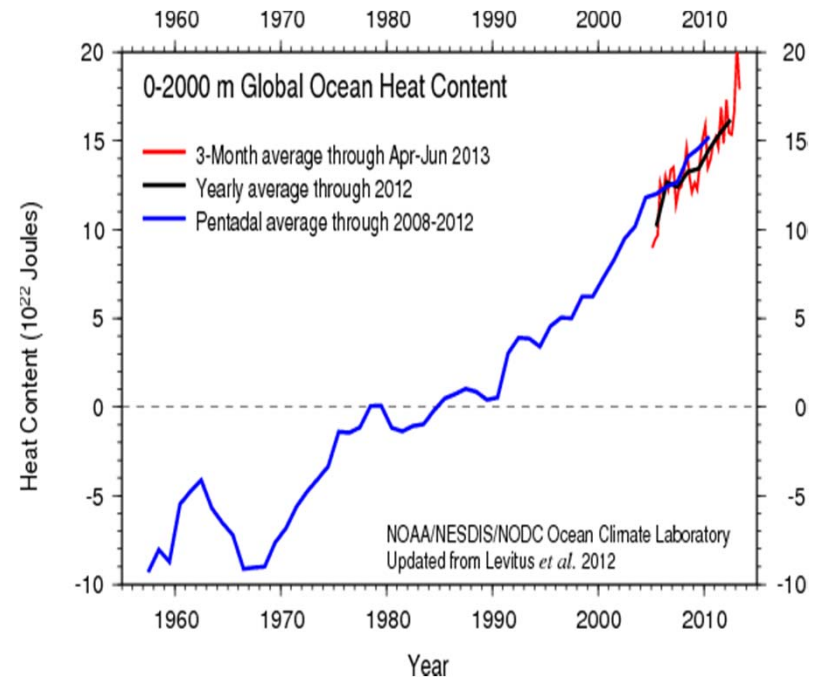
Temperature variations of the Earth's ocean

- Heat is transferred from low to high latitudes by winds and currents
- Most solar radiation is absorbed in the first few meters of the ocean surface
- Small amounts of heat is transferred to the bottom via convection
- Between 200-1000m the temperature declines rapidly – THERMOCLINE



The importance of measuring temperature of the Earth's ocean

- The heat content of the oceans is growing.
- The amount of heat stored in the oceans is one of the most important diagnostics for global warming.
- The increase in the amount of heat in the oceans amounts to 17×10^{22} Joules over the last 30 years.



Instruments used to measure temperature in the ocean

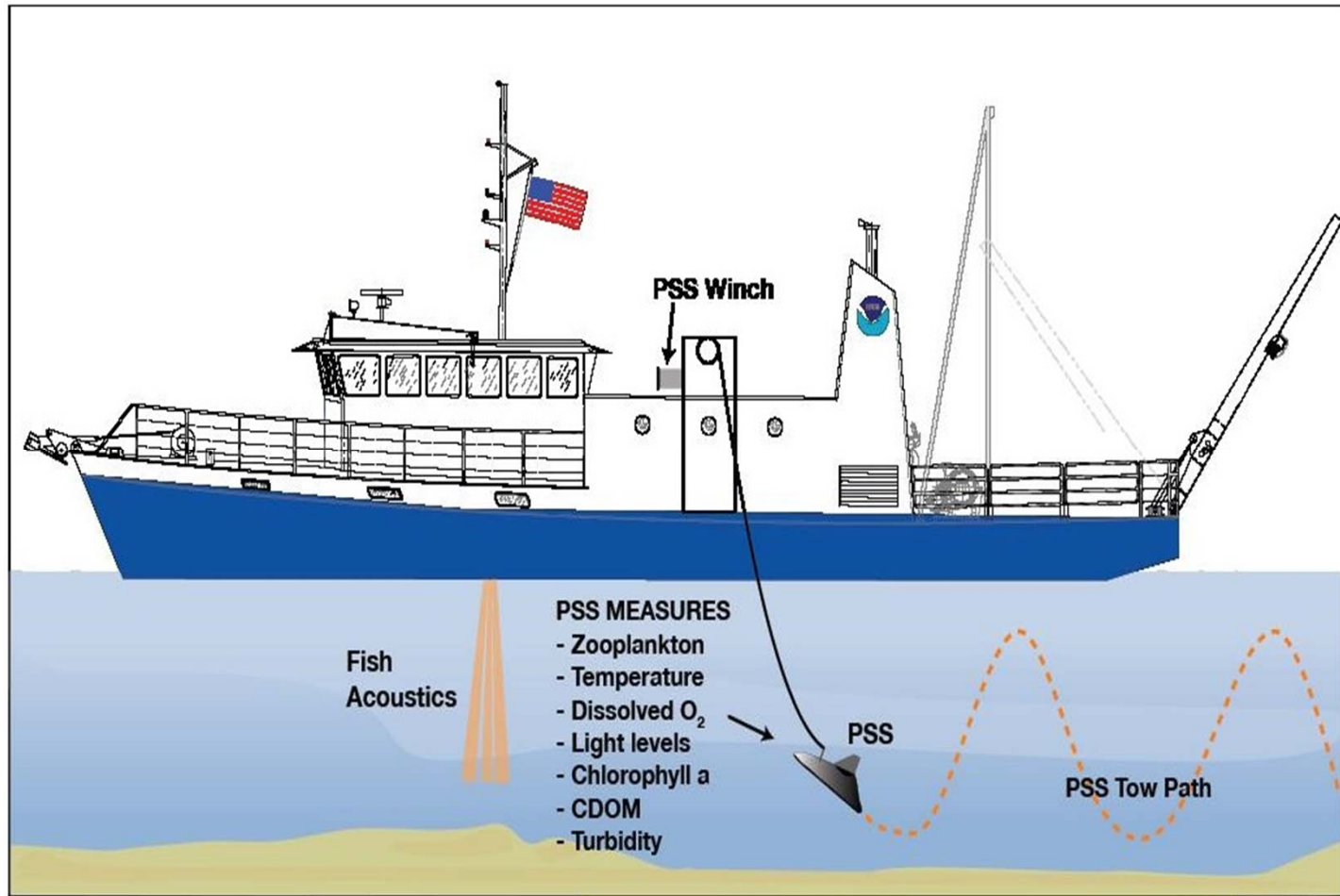
- Mercury thermometers



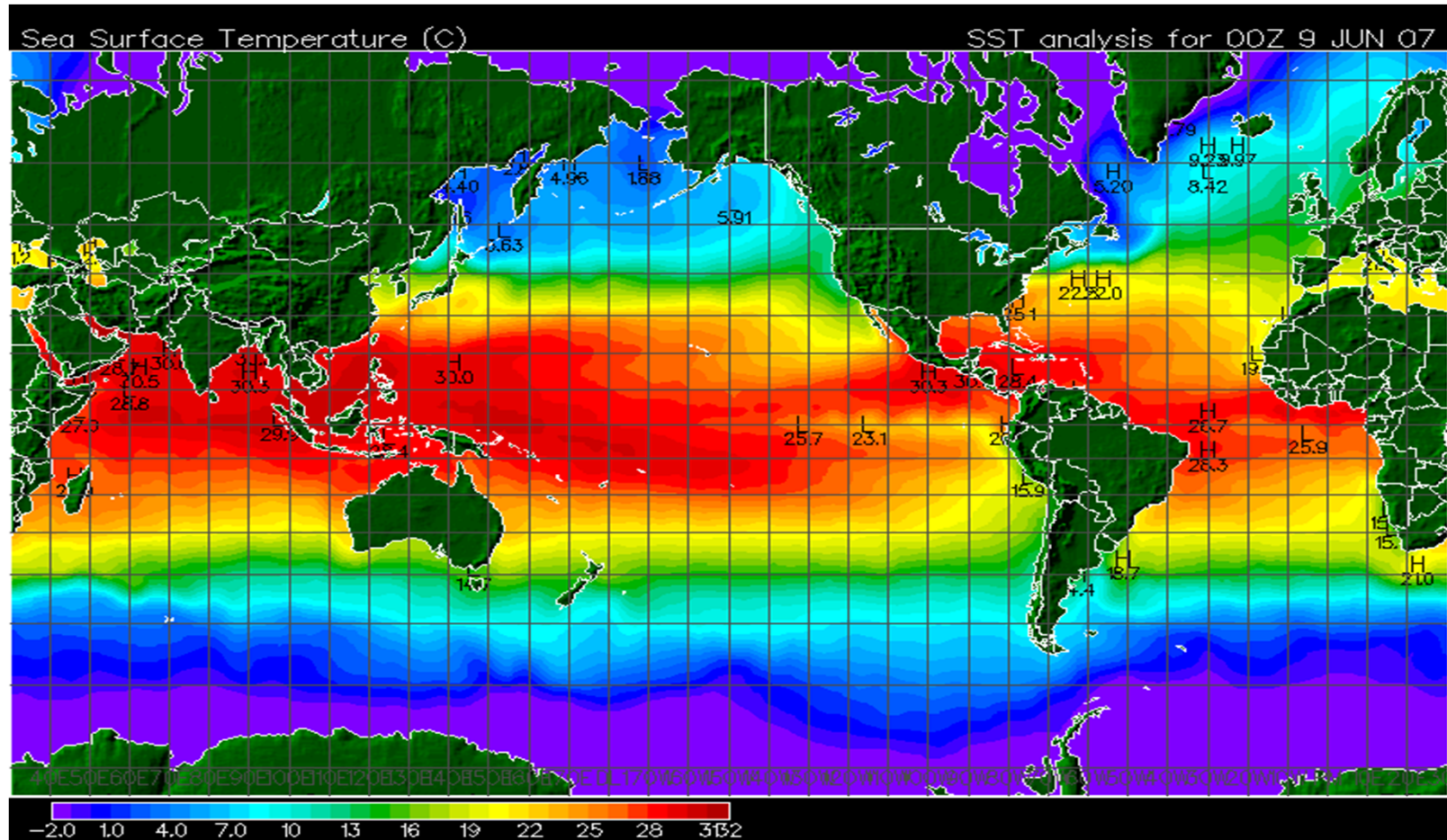
- Reverse thermometer



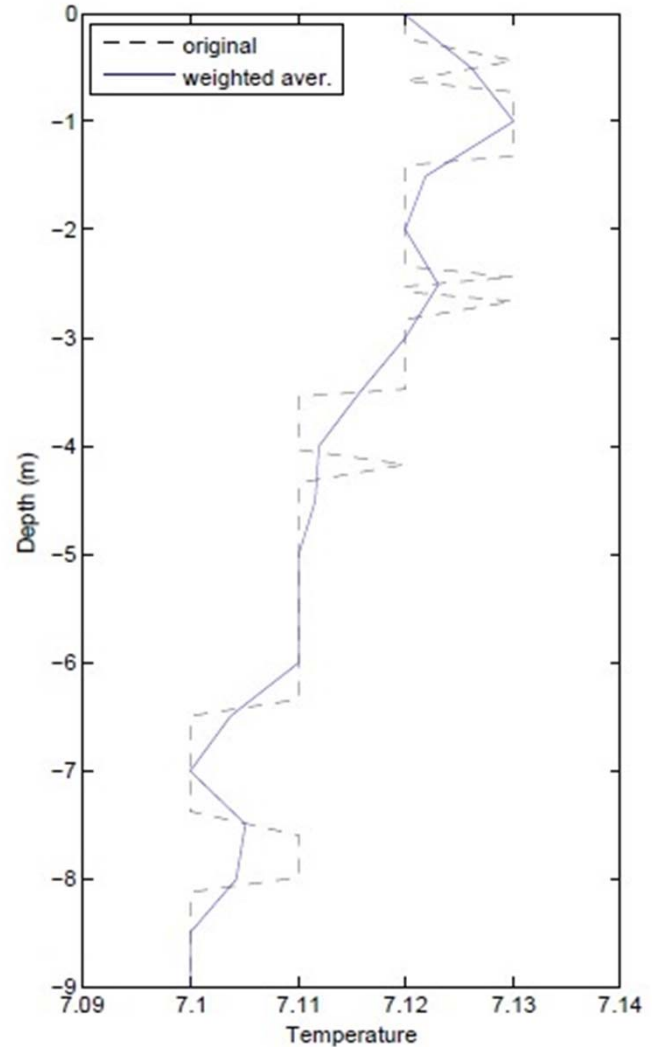
Thermistors



- Infrared radiometers



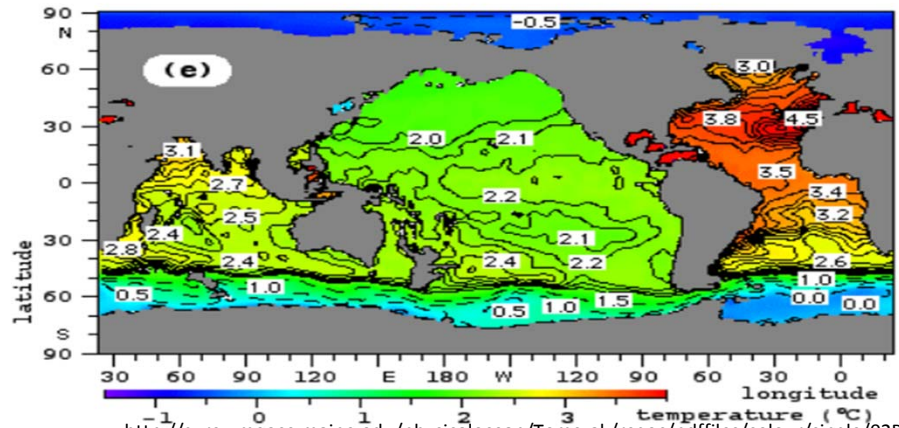
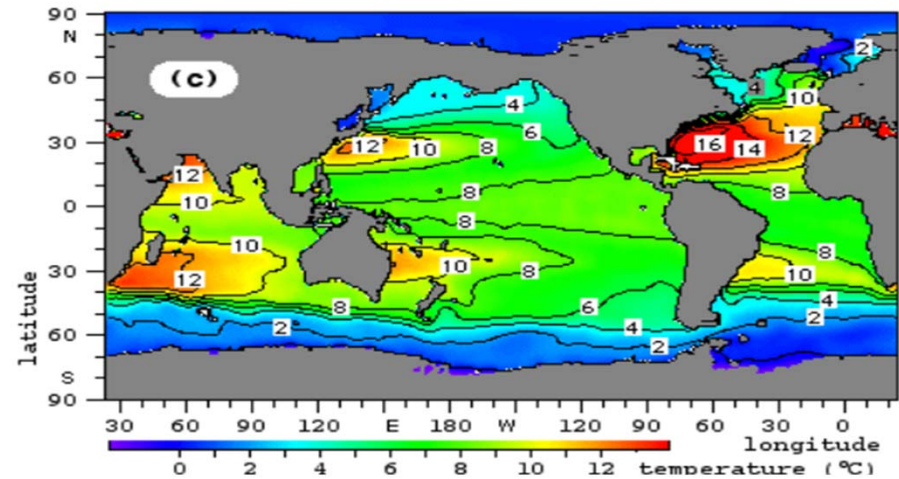
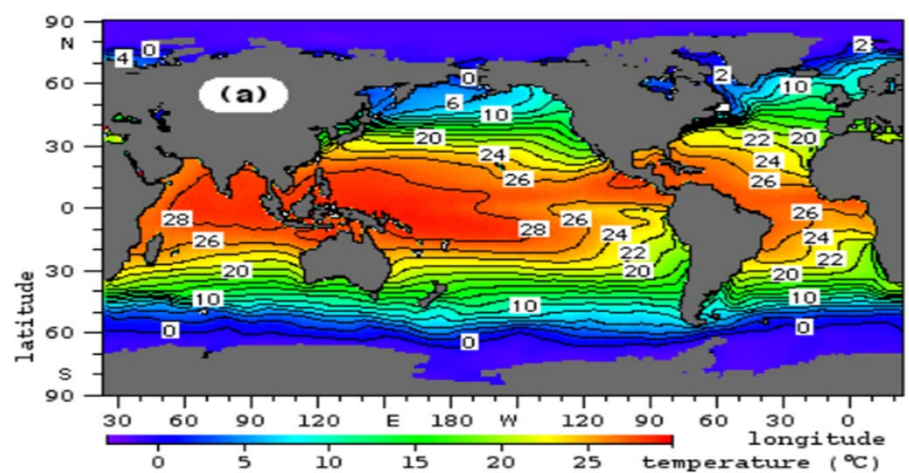
- CTD (Conductivity, Temperature, Depth)



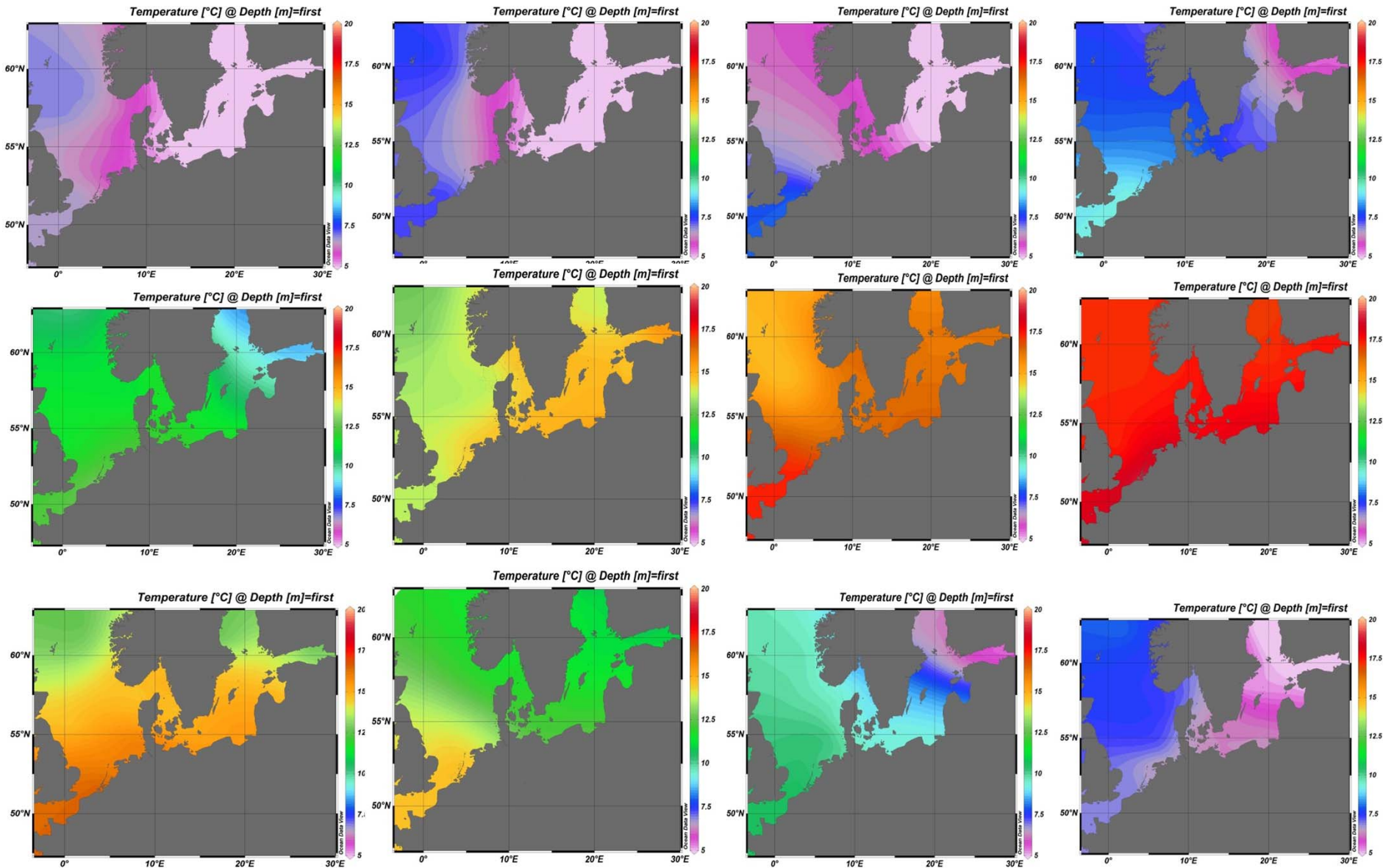
By: Natalia

CTD measurements taken from various stations around the world

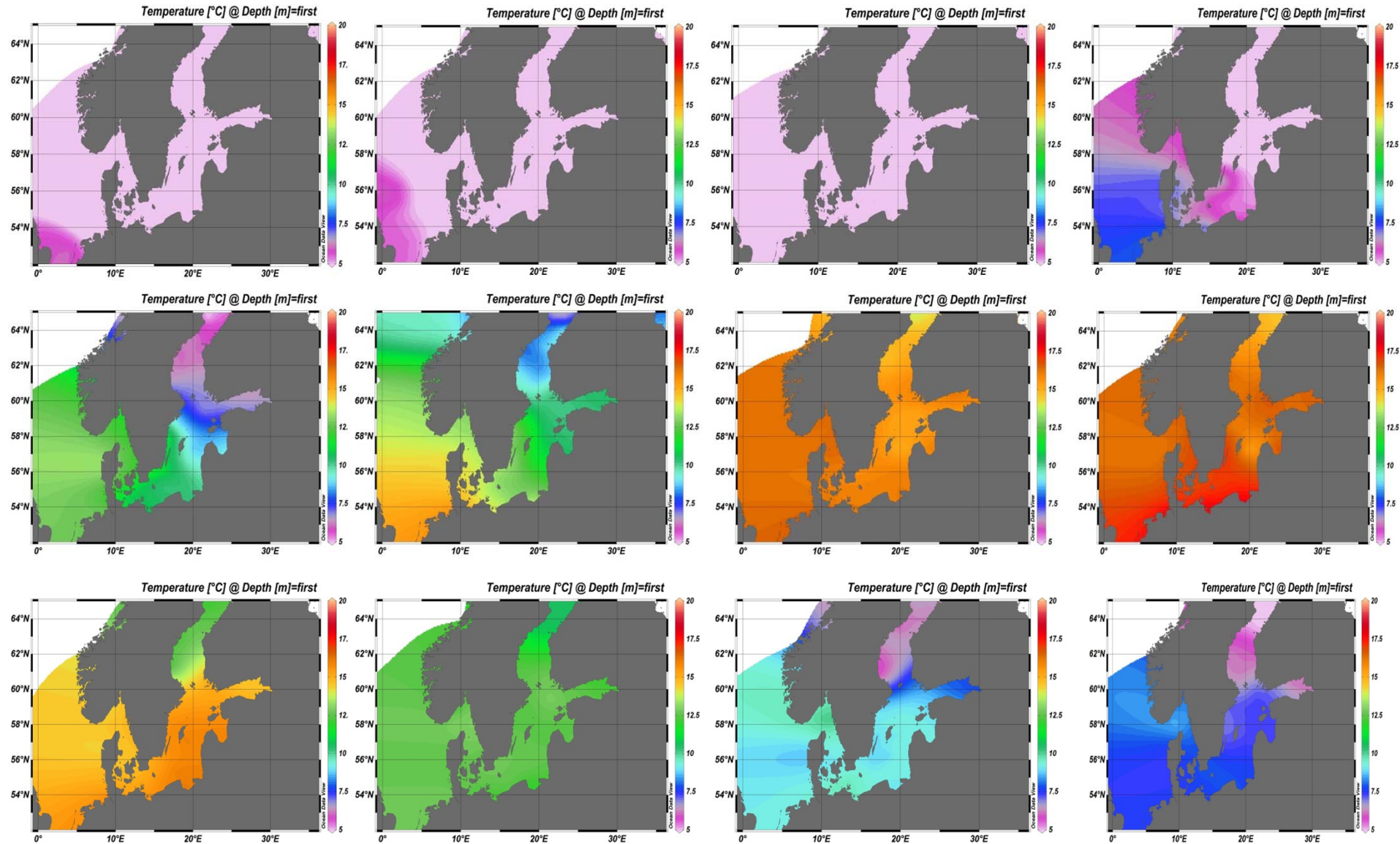
(Matthias and
Godfrey, 2001)



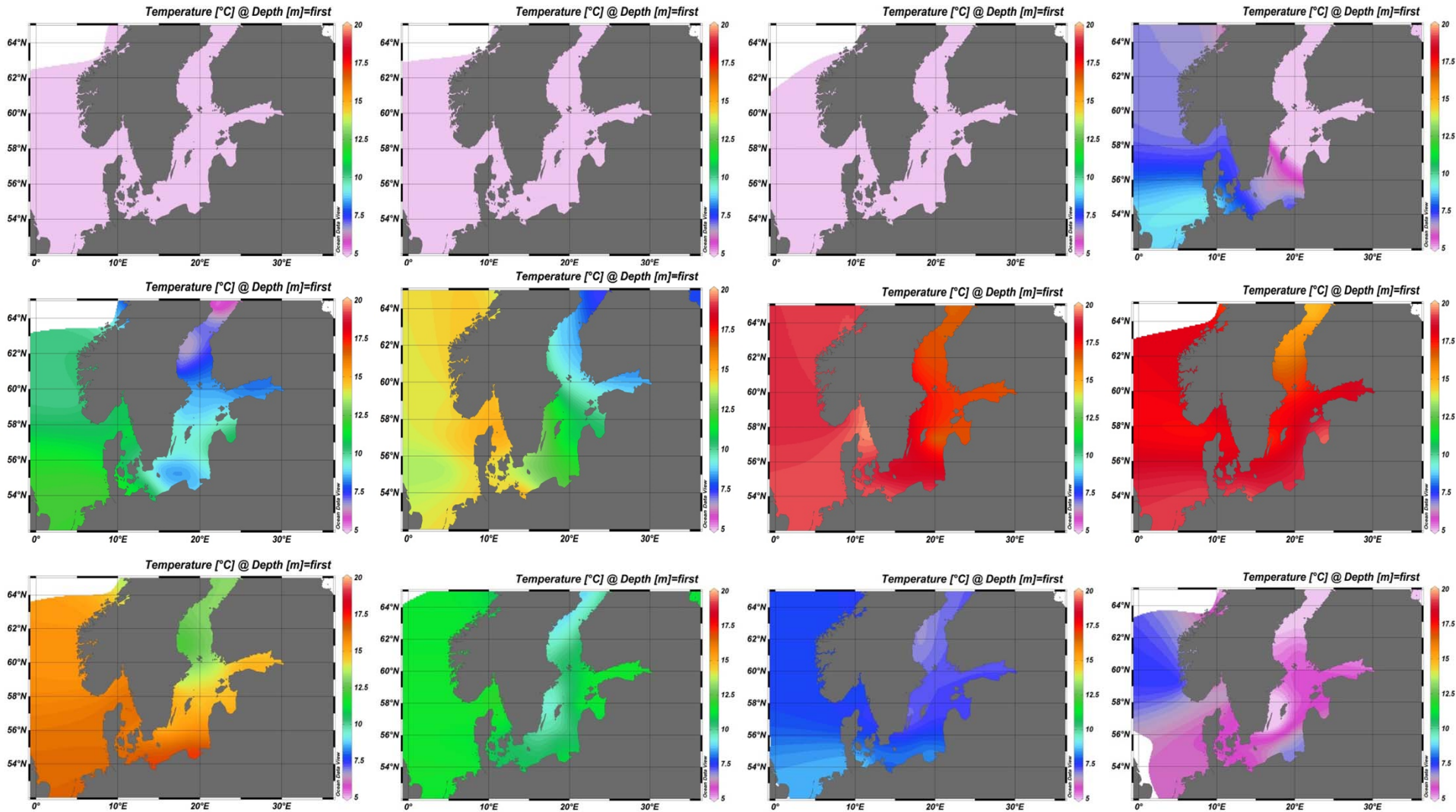
Sea Surface Temperature 1990 January – 1990 December in the North Sea



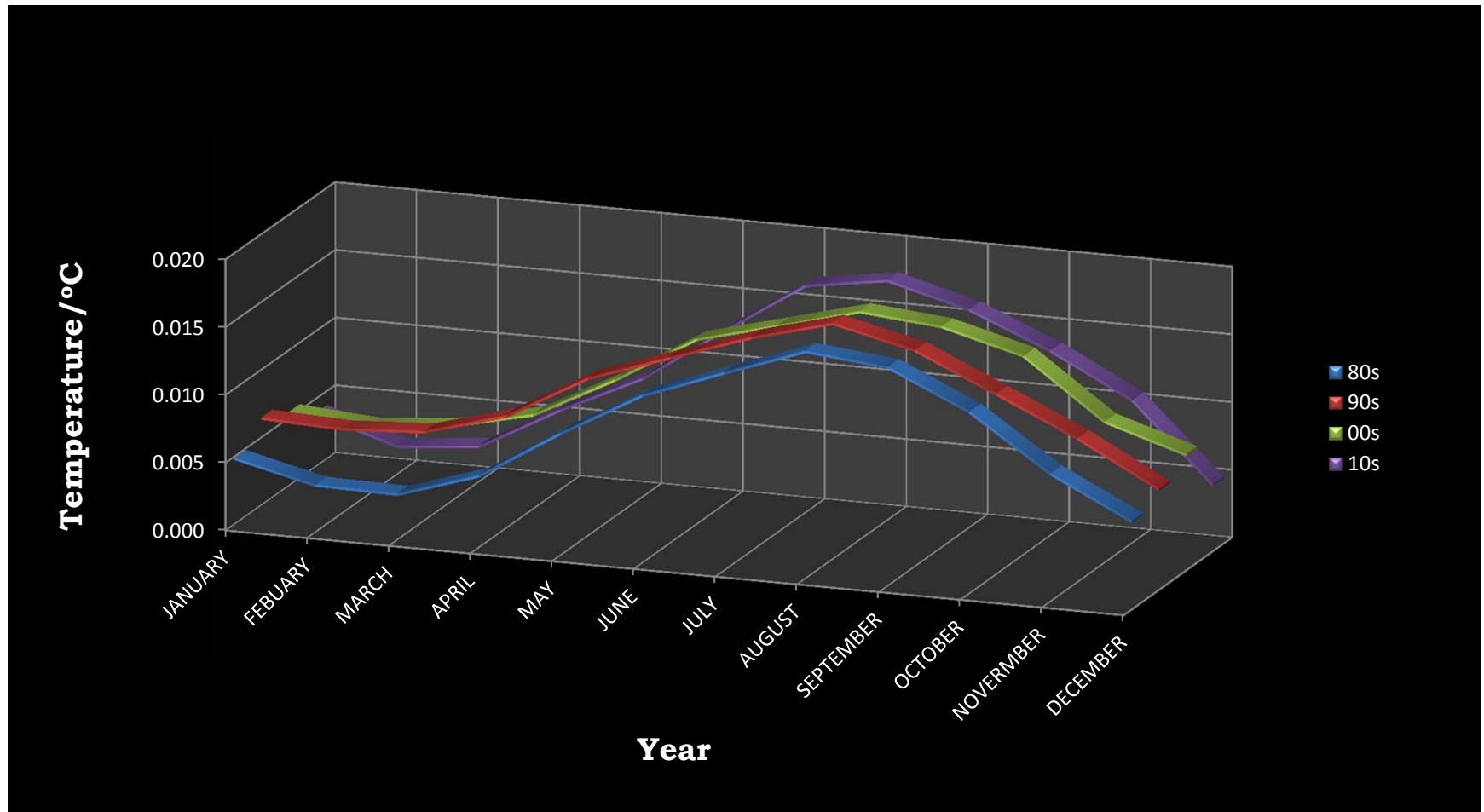
Sea Surface Temperature 2000 January – 2000 December in the North Sea



Sea Surface Temperature 2009 January – 2009 December in the North Sea



Helgoland time series for 1980, 1990, 2000, 2010



(Taken from: Helgoland time series Wiltshire et al., 2010)

The power of all activity in the ocean relies on temperature

Temperature controls the rate of fundamental biochemical processes in organisms, and consequently, changes in the environmental temperature can influence population, species and community-level processes.

Thank You!

