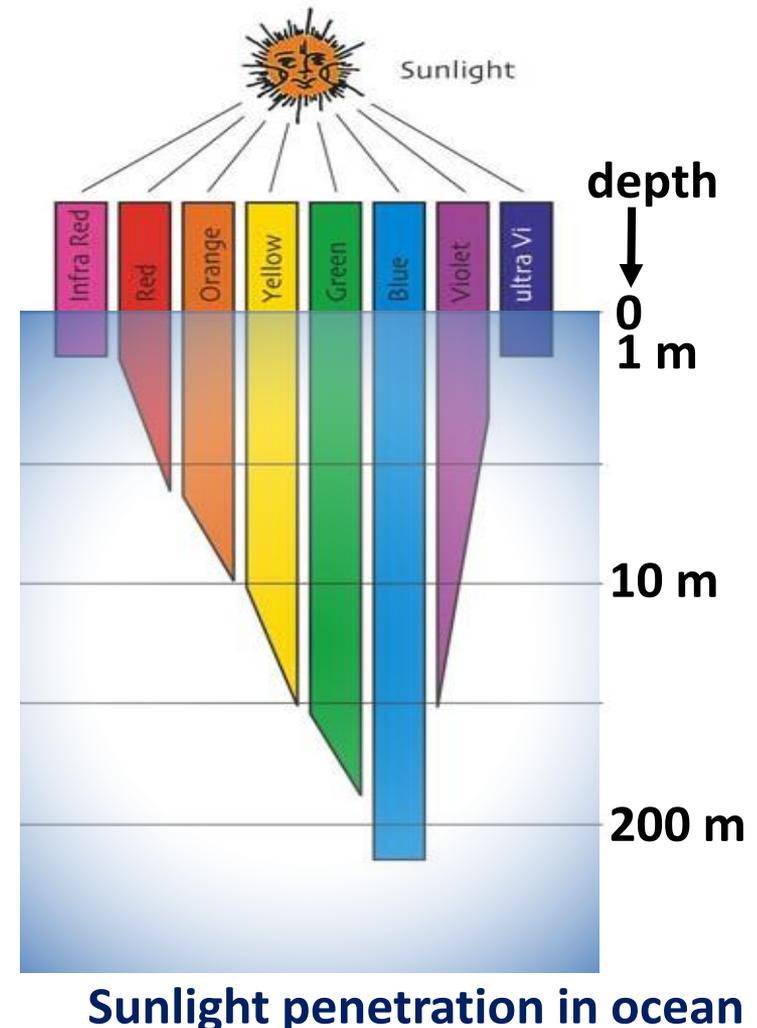


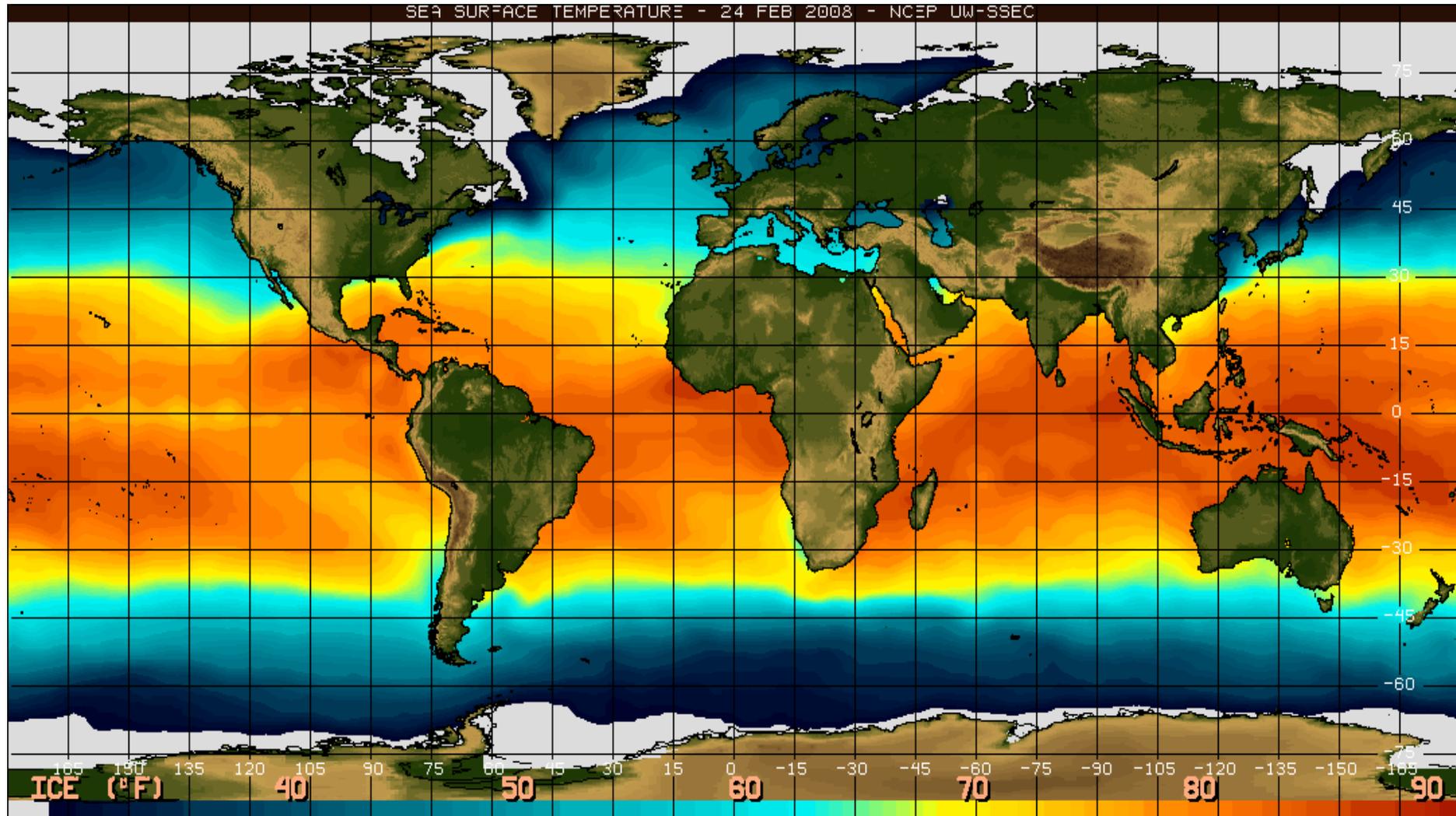
Ocean Temperature

Ocean temperature varies with depth, latitude, and season.

- **Ocean** is **heated by the Sun** from the surface downward.
- Most of sunlight energy is absorbed within the top layer of <200 meters.
- Ocean surface temperature can vary a lot, but **deep waters are very cold**, 75% of the ocean is between 30 to 43°F (-1 to +6°C).
- Both *seasonal* and *latitude* variation of ocean surface temperature are mostly due to the relative position of the Earth and the Sun.

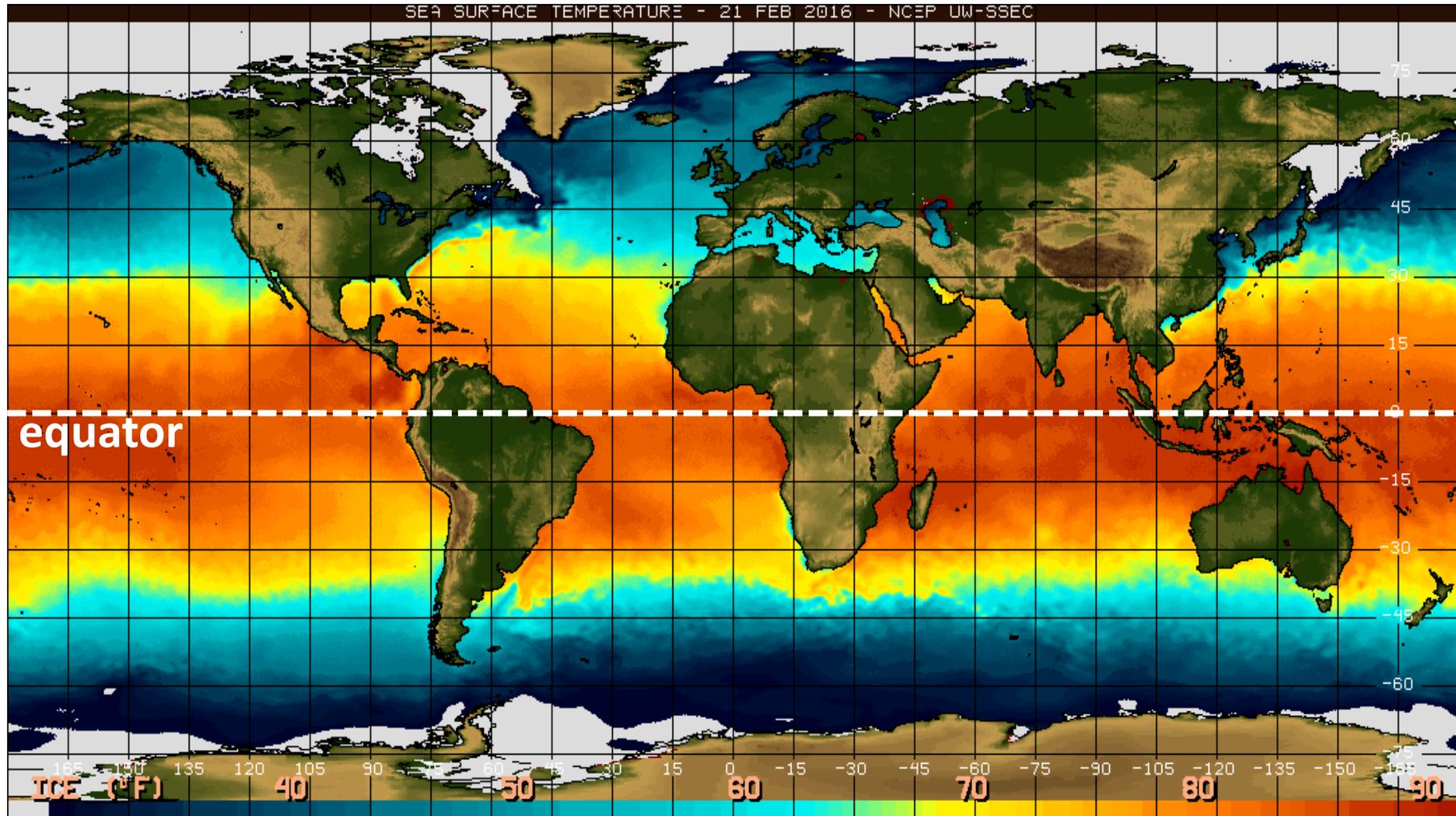


Temperature: Latitude Variation



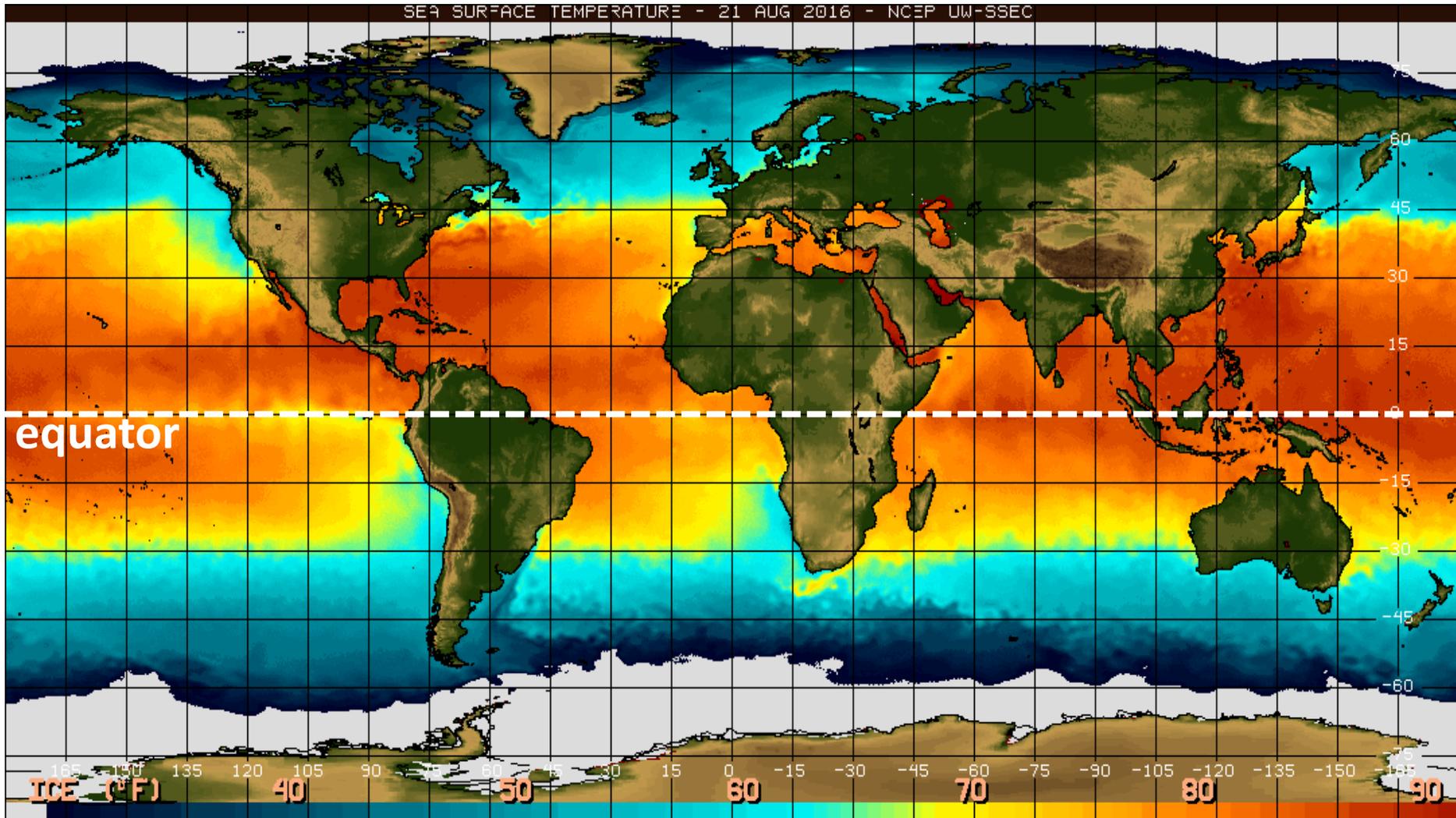
Ocean **surface temperature** varies greatly with latitude.

Temperature: Seasonal Variation

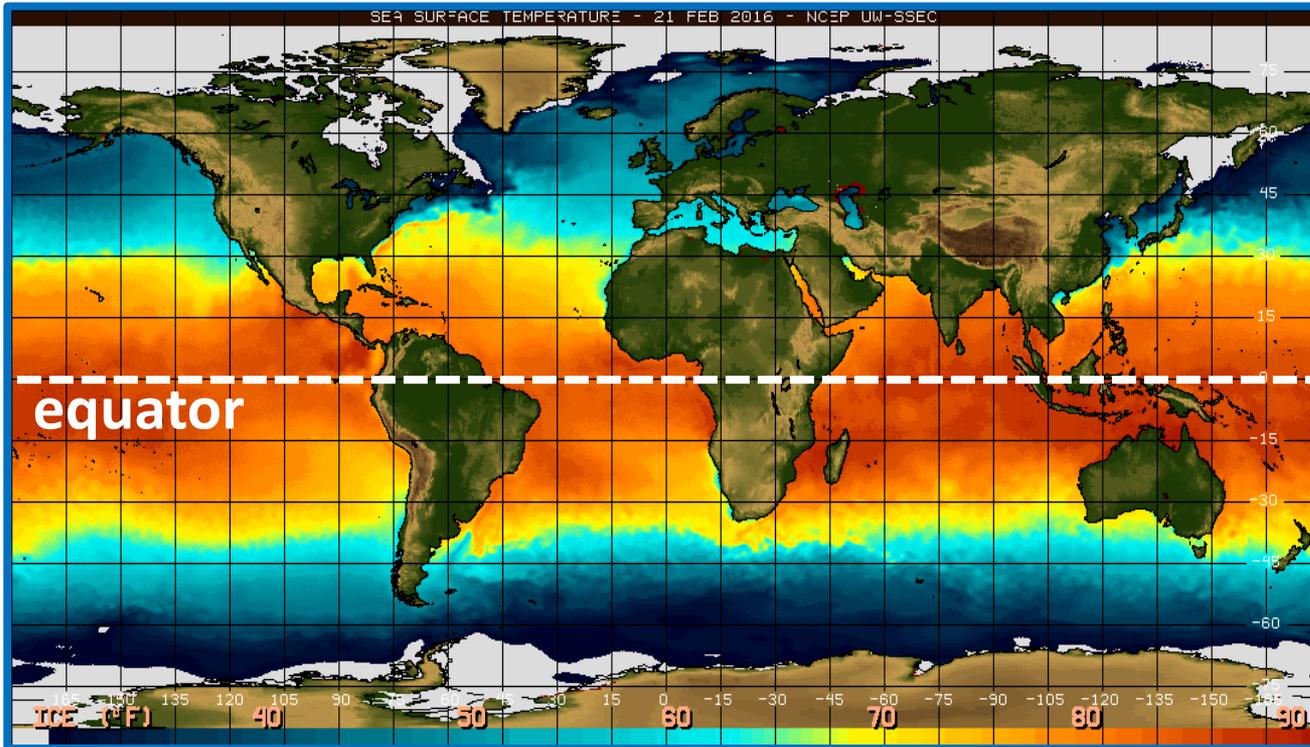


Ocean **surface temperature** on **February 21, 2016**.

Temperature: Seasonal Variation



Ocean **surface temperature** on **August 21, 2016**.

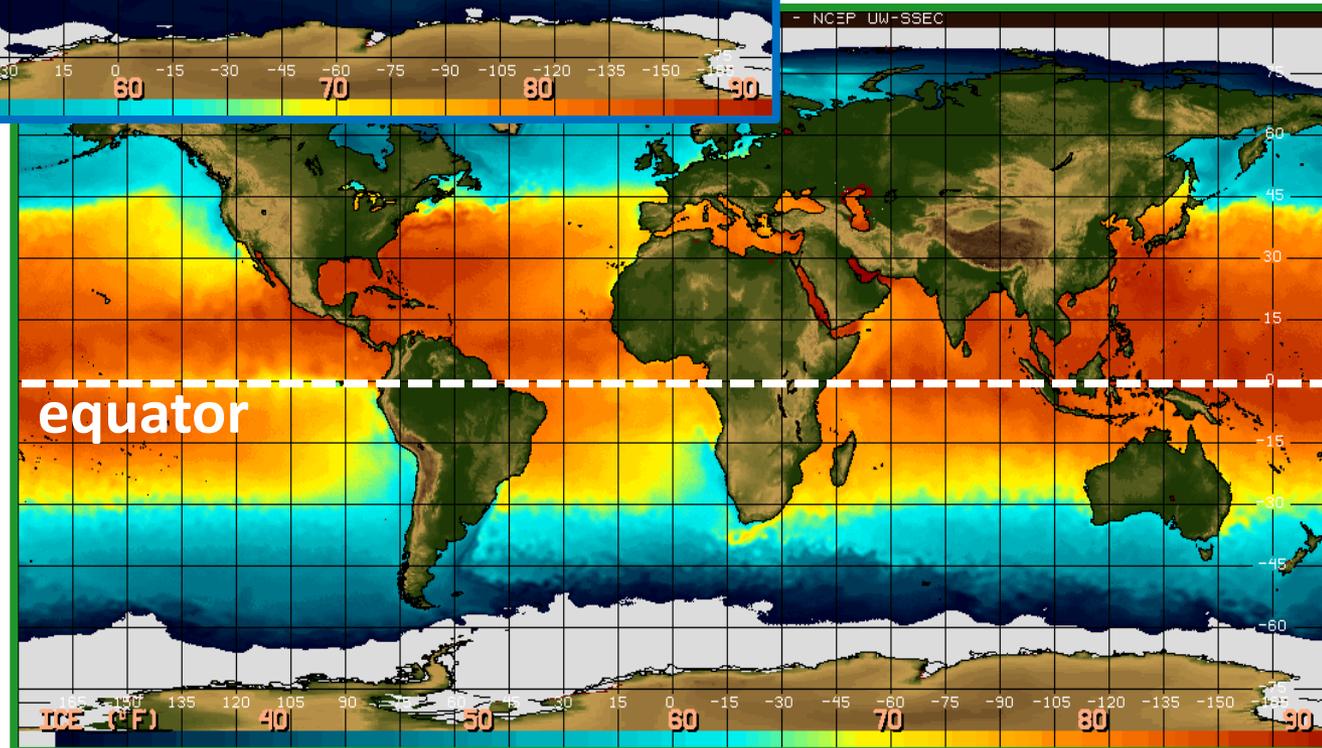


equator

Ocean Surface Temperature:

seasonal variation is slight since water loses or gains heat much more slowly than land.

↑
February 21, 2016

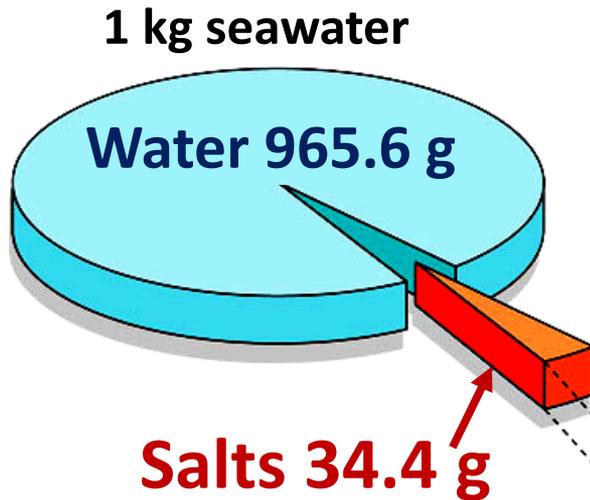


equator

August 21, 2016 →

Ocean Salinity

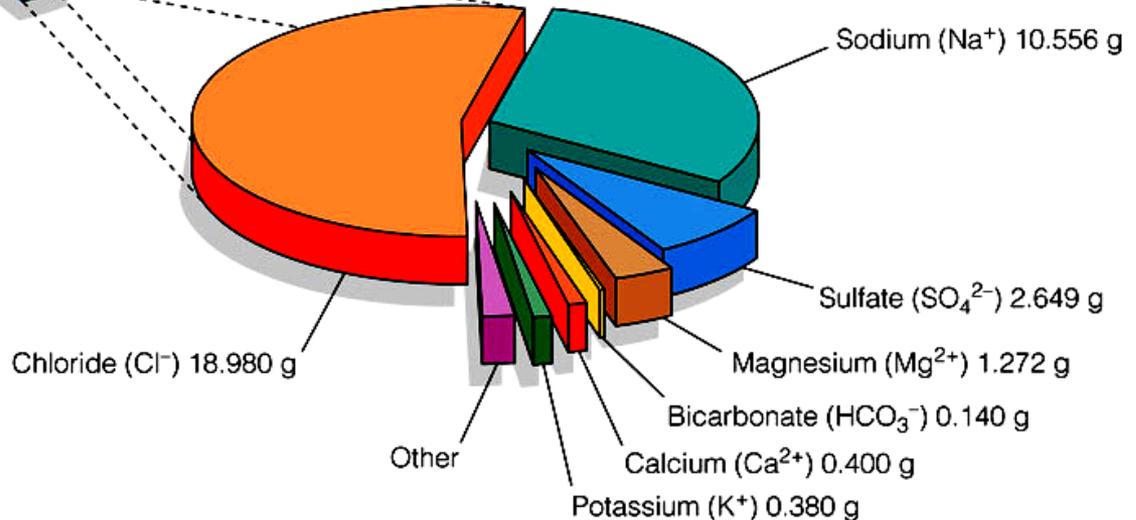
Salinity is a measure of the **amount of salt dissolved in a liquid** (measured in *percent*, % or *parts per thousand*, ppt or ‰).



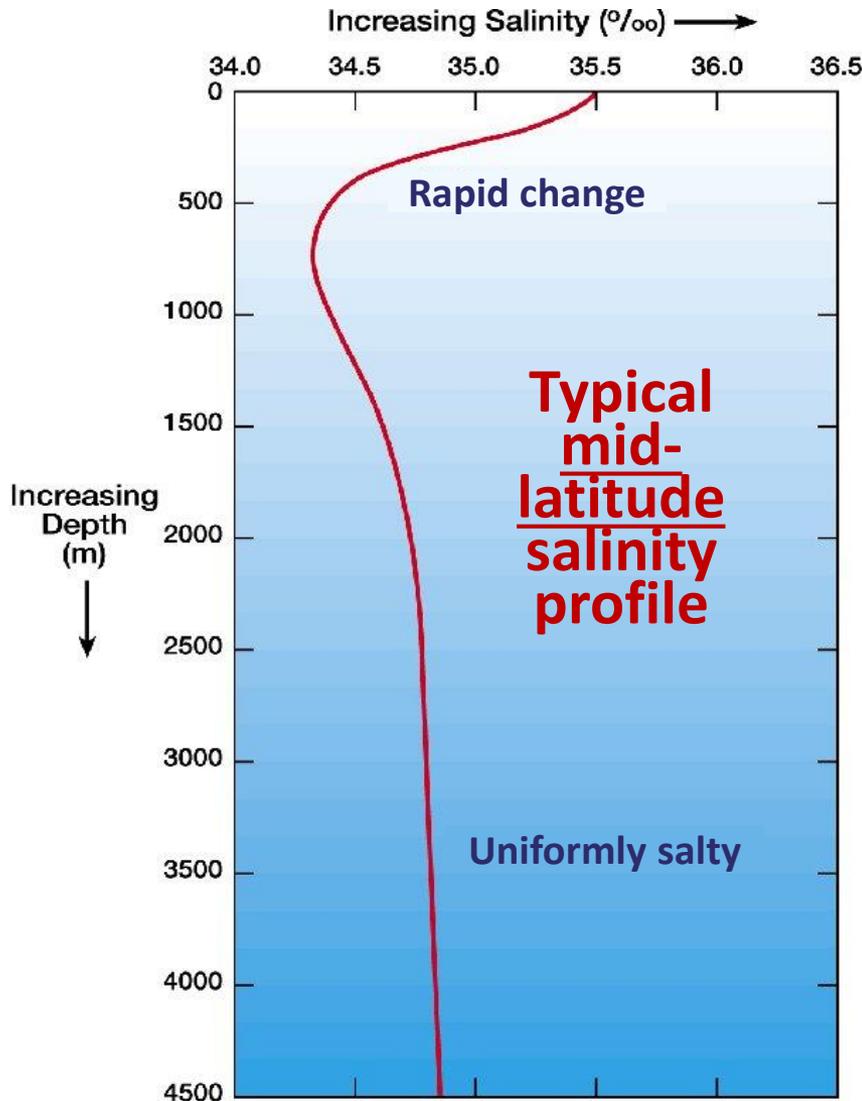
Salty **seawater** was created due to **salts** dissolved from the lithosphere:

- leached out of the ocean floor when the ocean formed
- brought by river flow over the ground and into the ocean

Ocean salinity has been **stable for billions of years**, most likely as a consequence of a **chemical/tectonic system** which removes as much salt as is deposited.



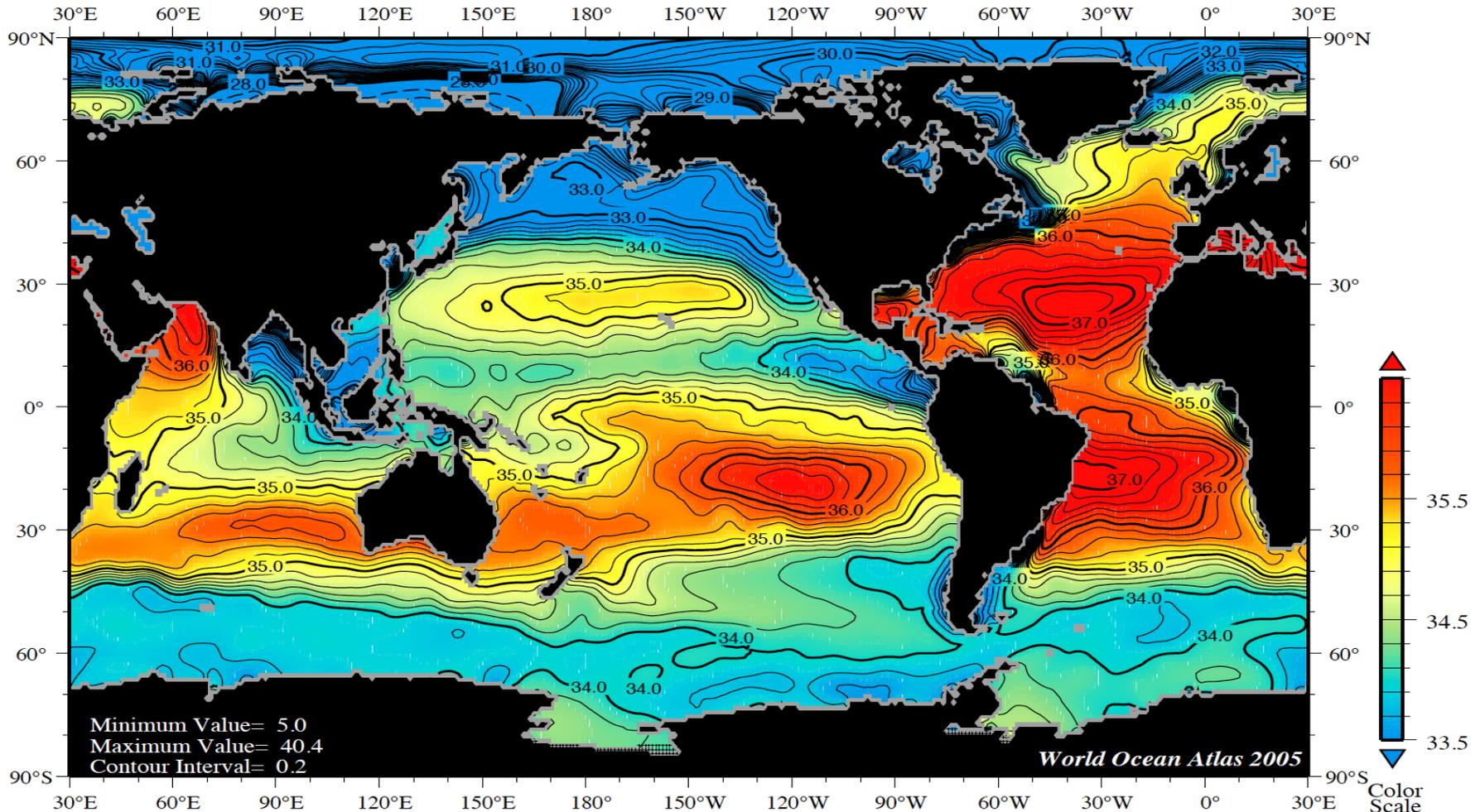
Salinity: Variation with Depth



Seawater is **not uniformly saline** throughout the world.

- Surface (mixed) layer salinity is influenced by:
 - evaporation of water (‰↑)
 - precipitation (‰↓)
 - ice formation (‰↑)
 - ice melting (‰↓)
- Saltier water is denser and consequently, it sinks down.
- Beyond ~1000 m, salt content changes very little.

Ocean Surface Salinity Pattern

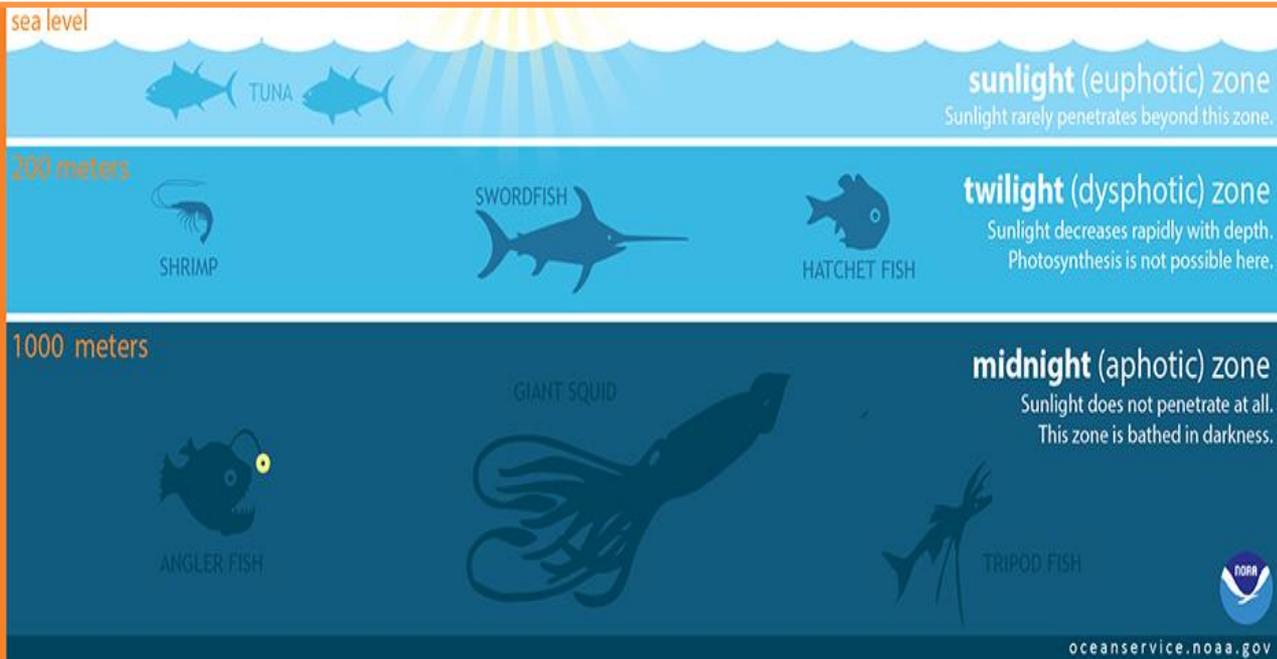


- Salinity is an **ecological factor** of great importance, influencing:
- the types of organisms that live in a body of water,
 - the kinds of plants that grow either in a water body, or on nearby land.

Ocean Layers

Based on sunlight penetration:

- Sunlight (photosynthesis is possible)
- Twilight
- Midnight



Based on water density:

- Mixed layer
- Pycnocline (rapid change of temperature/salinity)
- Deep ocean (cold and salty)

