Ocean Layering: Density, Salinity, Temperature, and Circulation

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Fill in notes – sample answers

Vertical Circulation

Density in the ocean is primarily determined by: temperature and salinity

Colder water: has a higher density than warm water. Cold water will sink.

Saltier water: has a higher density than fresh water. Salty water will sink.

Deep currents in the ocean are caused by: changes in ocean density.

Water that sinks:

1) Is dense (cold or salty)

2) Is found in a few small places near the poles. The poles are where the water is coldest.

3) Moves quickly. It takes a few days or weeks to sink.

Water that rises:

1) Rises over the whole ocean

2) Rises very slowly. It takes about a thousand years for water to rise.

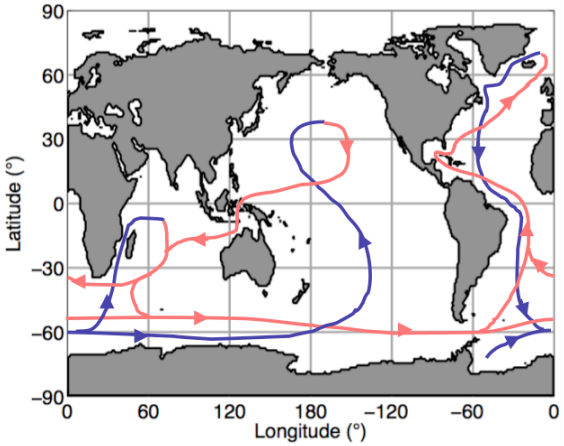
3) Slowly becomes less dense.

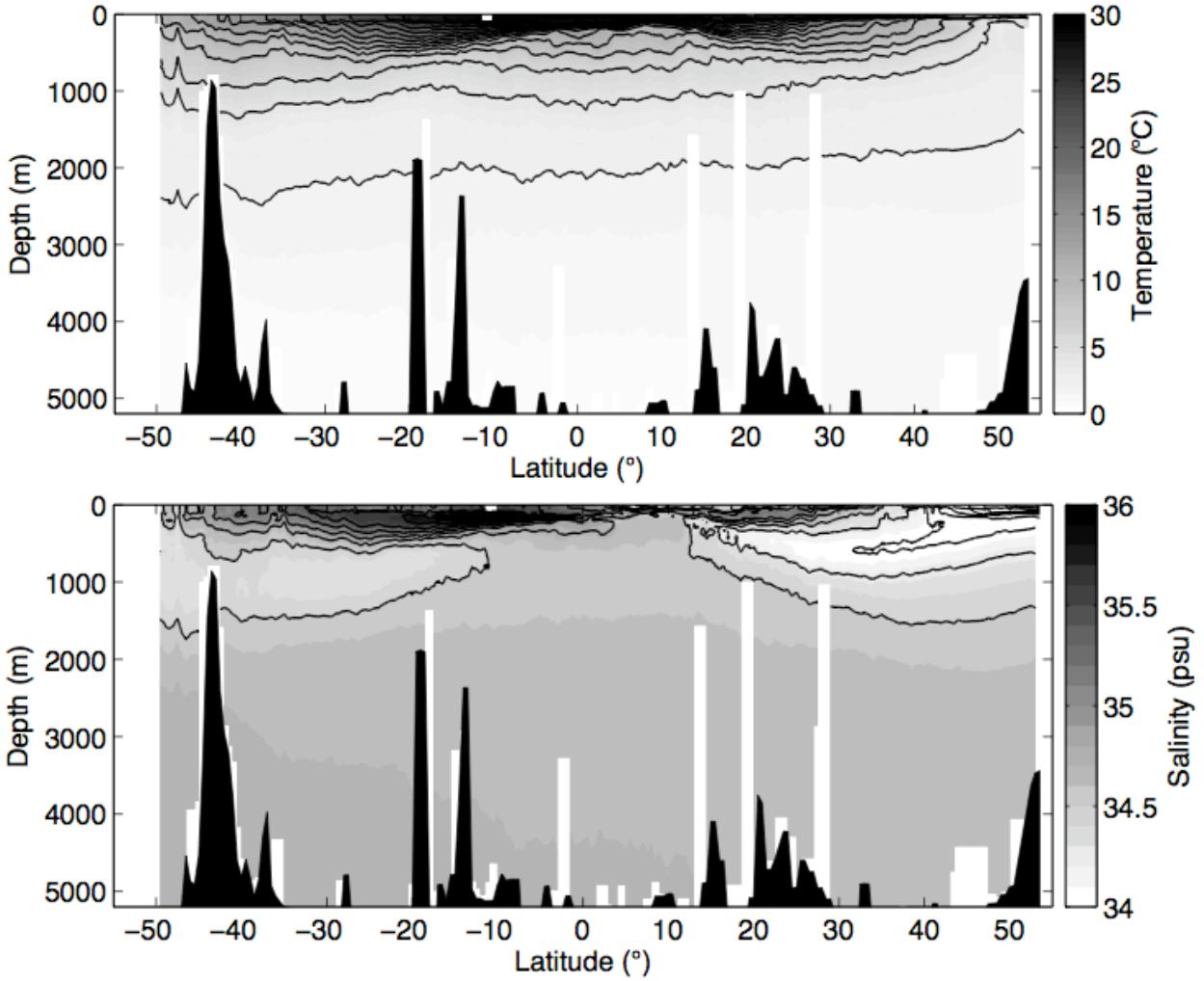
Deep water currents are important because:

1) they transport heat around the globe

2) they affect our climate

3) they bring nutrients from the bottom of the ocean to the surface.





Both pictures show the same vertical slice through the Pacific Ocean. The top picture shows temperature and the bottom picture shows salinity.

The vertical layers can show:

1) Where the water has come from.

2) The ocean currents. How fast the ocean moves.

3) How the ocean water is mixed. If it is mixed more, the fresh patches might disappear.

Water near the bottom of the ocean:

1) Is not all the same temperature or salinity.

2) Shows where the currents are.

Why do temperature and salinity change more near the surface than the bottom?
This is where the atmosphere can change the ocean. It only rains on the surface. The sun can't reach the bottom of the ocean to warm it up.