"You'll find that the only thing you can do easily is be wrong,
and that's hardly worth the effort"

Norton Juster
The Phantom Tollbooth

OCNG 251: Oceanography
Tuesday, Oct. 21st, 2008

i. **Surface Ocean Circulation**
ii. **Deep Ocean Circulation**

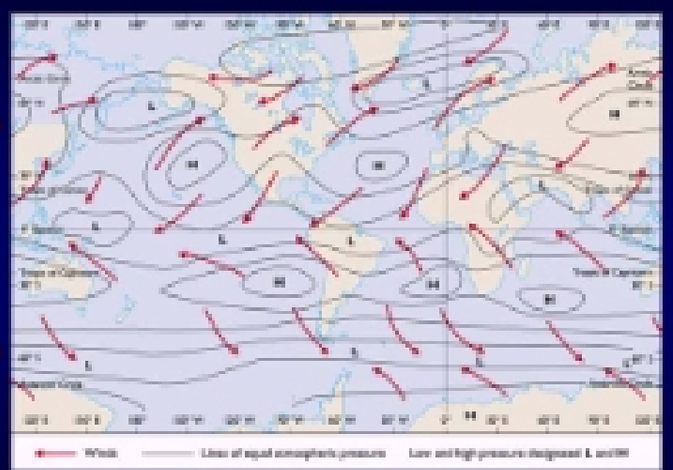
Zonal Wind Flow

Westerlies

Easterlies

Easterlies

Westerlies

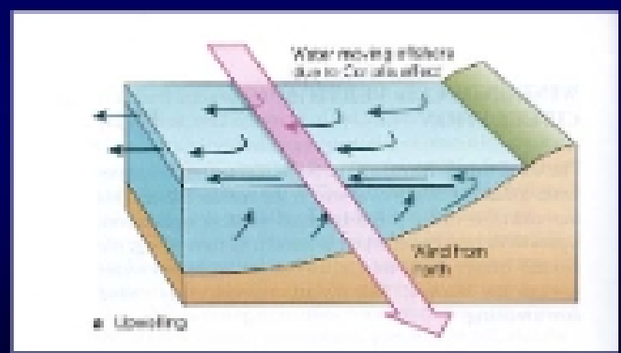


High/Low Pressure systems: Wind generation by flow from High to Low pressure systems (+ Coriolis effect)

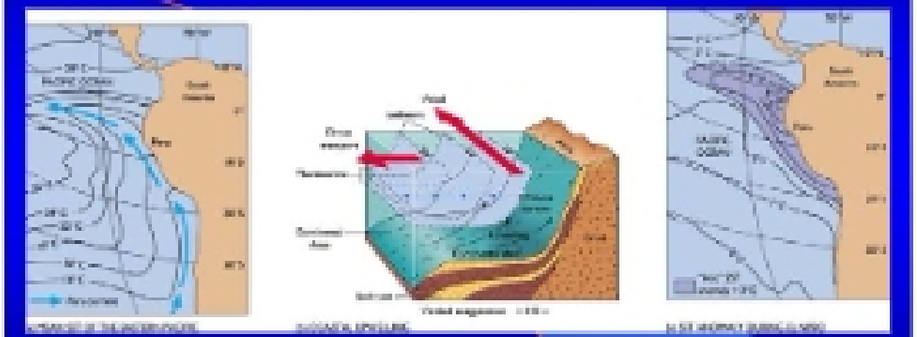
Ekman Transport

2) Upwelling:

If wind blows parallel to a shore in the proper direction → Ekman transport moves near-surface water offshore. Water must then rise from below to compensate for seaward surface flow.

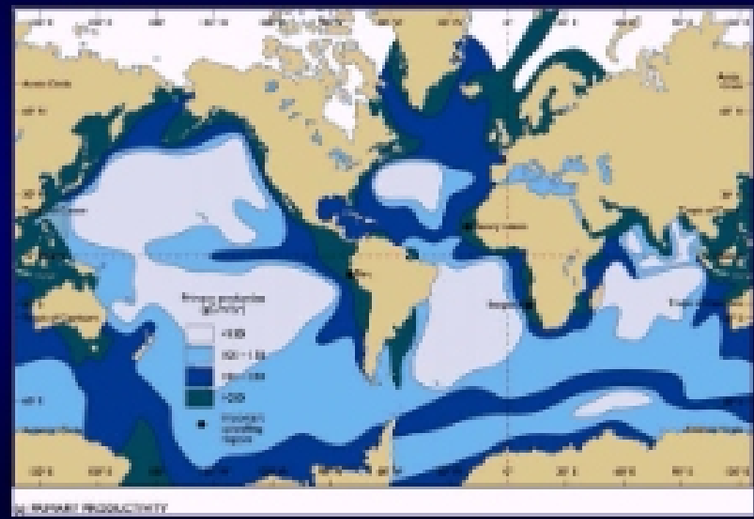


Upwelling: Biogeochemistry



1) Ekman Transport

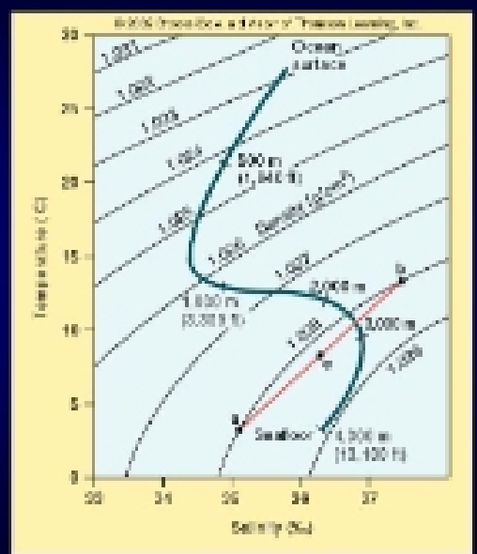
Upwelling: Peru; California; Africa; Australia



Deep water circulation: A model

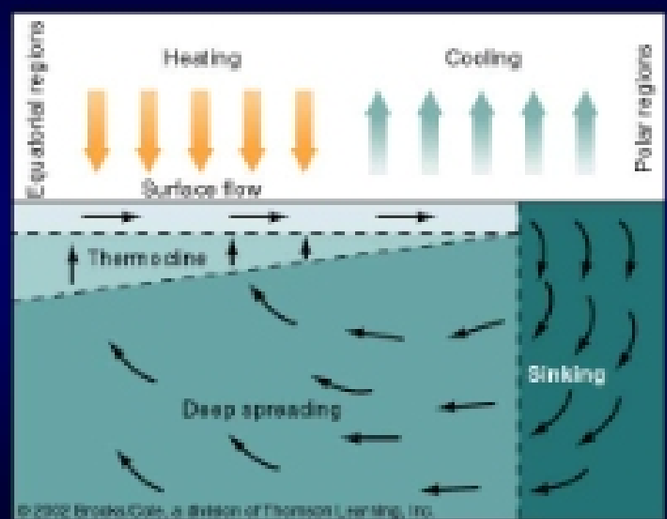
Caballing:

When two water masses merge, the combination of their temperatures and salinities results in densification ➔ vertical advection of water

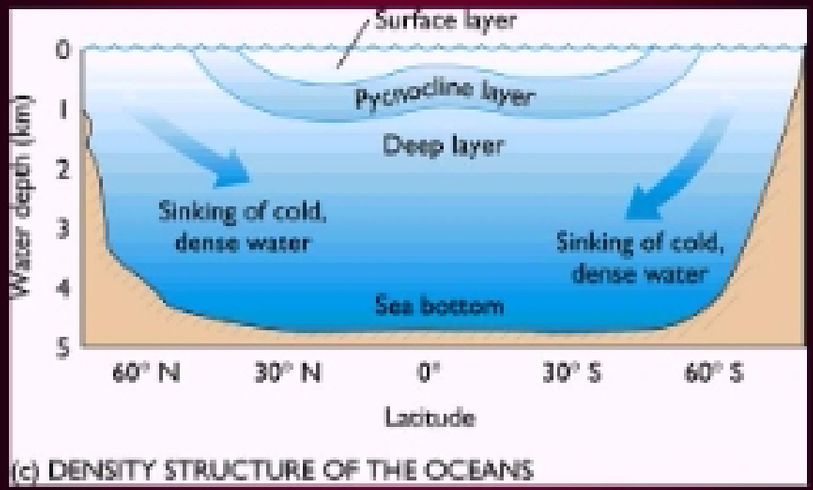


High latitudes (>60°N and S)

➔ Deep water circulation: A model



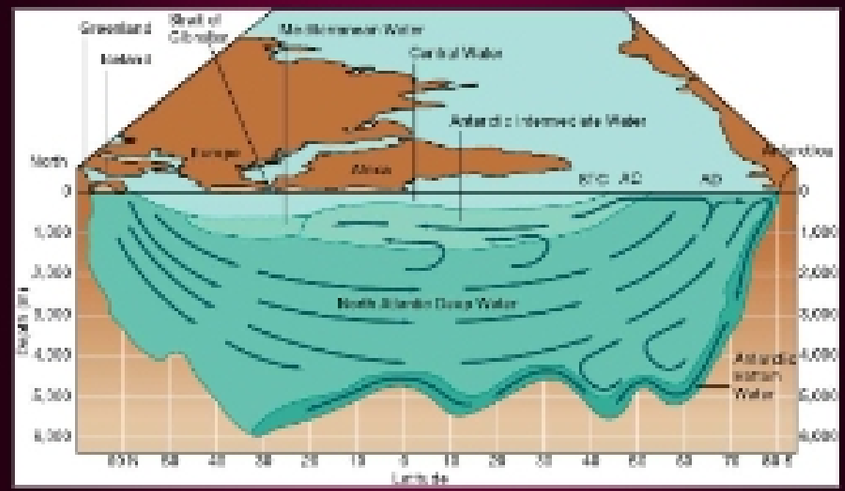
Density Structure of the Oceans' Depth

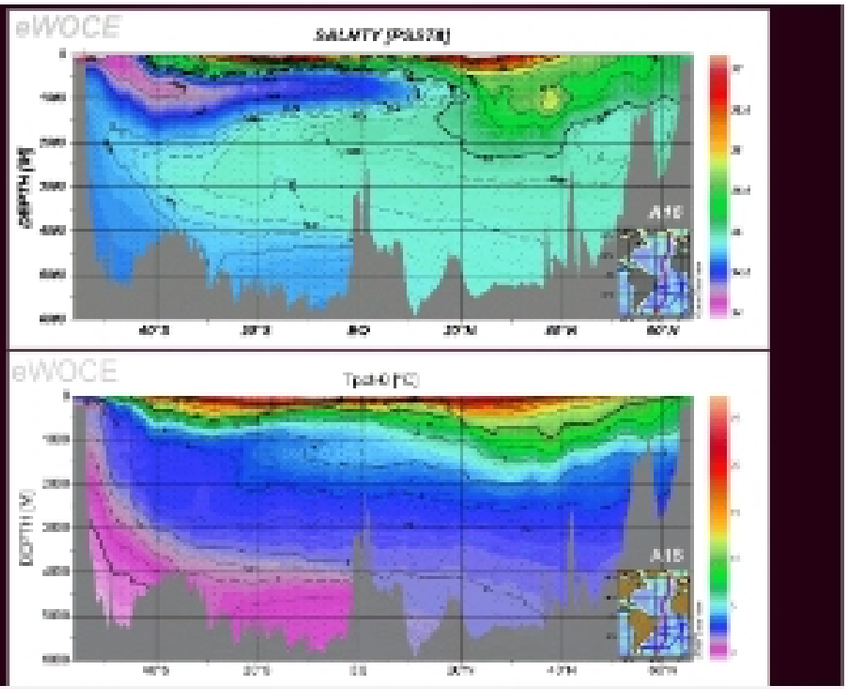


(c) DENSITY STRUCTURE OF THE OCEANS

The Ocean can be divided into three structures: Surface layer; Pycnocline; Deep-layer.

Density Structure of the Atlantic Ocean' A model





Density Structure of the Pacific Ocean