# **EOSC 112: THE FLUID EARTH**

# **OCEAN STRUCTURE**

Oc-1 Read: Kump et al. Chap.5, p. 83-85,93-94,101

# **Objectives:**

- 1. To describe the oceans' size and shape;
- 2. To describe the temperature structure of the oceans;
- 3. To describe the surface currents;
- 4. To describe the Oceans' role in global heat transport.

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# 1. Size & shape of the ocean

- Average depth ~ 4 km
- Continental shelf: average width ~70 km, average depth at shelf break ~130 m
- Further offshore => continental slope => abyssal plain (broad plain of deep ocean)
- trenches: deepest 11 km (Mt. Everest 9 km)



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- 2. Temperature: vertical
- Solar radiation absorbed within 100m of sea surface
- Wind => surface mixed layer of 50-200m, (T is nearly uniform).
- Thermocline occurs between 200-1000m depth T decr. rapidly with depth.
- Below thermocline, T decr. very slowly to 0-3°C at ocean bottom.



## **Vertical section of temperature in Atlantic**



### **3. Surface currents** • Gyres: Large horizontal circulation cells (related

#### to wind stress)

#### • Strong boundary currents: Gulf Stream, Kuroshio, 1-2 m/s (few cm/s elsewhere)



# 4. Global heat transport



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# Ocean transports almost as much heat poleward as atmosphere. Ocean dominates at low latitudes, atm. dominates at mid to high latitudes