

NAME \_\_\_\_\_

**89.582 - GEOLOGICAL OCEANOGRAPHY**  
**HOMEWORK III - SURFACE CURRENTS AND THERMOHALINE CIRCULATION**

1. What causes the principal open-ocean surface currents?
2. Contrast the eastern and western boundary currents.
3. Explain Ekman transport and its role in upwelling.
4. Why does the current continually change direction and decrease with depth in the Ekman spiral?

5. Describe geostrophic flow.

6. Explain the thermohaline circulation of the deep ocean.

7. Draw a generalized wind and surface current pattern for a rectangular Atlantic Ocean.

8. You are involved in an oceanographic cruise and are currently sailing at a latitude of  $40^{\circ}\text{N}$ . An anemometer mounted on your mast, at a height of 10 m above sealevel, records a wind velocity of  $14\text{ m s}^{-1}$ . The density of air is  $0.00129\text{ g cm}^{-3}$  and the drag coefficient is  $2.6 \times 10^{-3}$ . Calculate the following:

a. Wind stress.

b. Water speed.

c. Depth of the Ekman spiral.

d. The magnitude of the Coriolis force exerted on the moving water.

