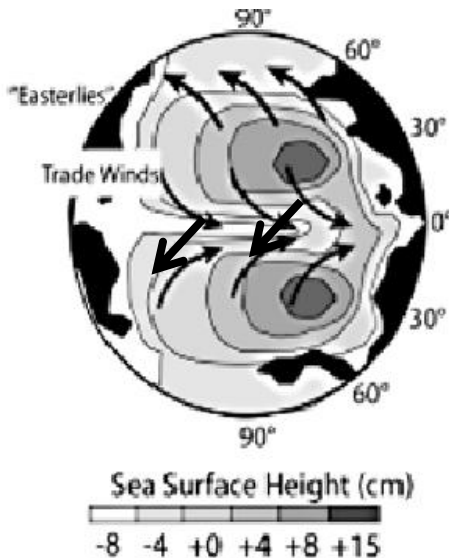


ANSWER

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Round: EXTRA B



A new planet has been discovered in the nearby star system of Alpha Centauri and the first radar altimetry map is plotted above.

1. Which direction does the planet spin? (a labeled arrow is sufficient)

The planet revolves counter-clockwise (right to left on the diagram above or clockwise when viewed from the north pole), the exact opposite direction from Earth. (4 pts)

2. Draw and label the wind fields between 0°-30°, 30°-60° in the Northern Hemisphere and Southern Hemisphere on Figure 1

4 pts total, 1 pt for each of the following)

Arrows to NW in Northern Hemisphere between 30°-60°

Arrows to SE in Northern Hemisphere between 0°-30°

Arrows to NE in Southern Hemisphere between 0°-30°

Arrows to SW in Southern Hemisphere between 30°-60°

3. Why is there a trough in sea surface height running along the Equator?

Transport of water is away from the equator (2 pts) since the water is always transported to the left in the northern hemisphere/to the right in the S. hemisphere of the dominant wind direction (2 pts). Water is moved away from the equator leaving a trough in surface height.

4. Would you expect the sea surface temperature to be warmer on the east side (right) of the ocean or the west side (left) of the ocean at the Equator, or would the temperature be the same? Explain why.

Water temperature should be warmer on the east side (2 pts) of the ocean along the trough of the equator. The warm water is pushed east by the winds leaving cool water to upwell to the surface on the west side of the basin (2 pts).

5. Explain how Ekman Transport contributes to the sea surface maximums.

In the Northern Hemisphere, Ekman transports water to the left of the wind (1 pt), toward the center of the gyre (1 pt), creating a bulge of water (1 pt) that is eventually balanced by pressure gradient forces (1 pt).