PSET 8

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A. On the northern side of the equator (northern hemisphere),

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A. The air rotated clockwise in Cyclone Yasi.

B. From the first graph, we can see that Cyclone Yasi hit Australia at around 20°S. We are given that $\rho = 1$ kg m^{-3}, and that a degree of latitude measures 111 km. From the second graph, we see that a degree of latitude measures a $\Delta p = 1004 - 1000 = 4$ hPa, thus, assuming geostrophic balance, the wind speed is:

$$\Delta p = V \rho f \Delta x$$
$$4 \text{ hPa} = V \times 1 \text{ kg m}^{-3} \times 2 \times 7.3 \times 10^{-5} \text{ s}^{-1} \times \sin(20^\circ) \times 111 \text{ km}$$
$$4 \text{ hPa} = V \times 5.54 \text{ kg m}^{-2} \text{ s}^{-1}$$
$$V = \frac{4 \text{ hPa}}{5.54 \text{ kg m}^{-2} \text{ s}^{-1}}$$
$$4 \text{ hPa} = 4\frac{N}{m^2} = 4\frac{kg}{m^3 s^2}$$