

Unit 19 ATM401, ATM601 and CHEM601**Application, analysis, and evaluation**

1. All students: Compare the vertical and horizontal pressure gradient force per unit mass for a pressure at sea level and 100m height of 1013.25hPa and 1000hPa, and an isobar of 1000hPa about 100km apart for a density of 1.29kg/m³.
2. Undergraduate students: Calculate the west-east scalar geostrophic velocity for $\phi = 25^\circ N$, a pressure gradient of 4hPa/150km in the south-north direction and $\rho = 0.8\text{kg/m}^3$.
3. Graduate students: At $\phi = 15^\circ N$, a hurricane has a pressure of 840hPa with density of 1.06kg/m³, and a pressure gradient of 45hPa/100km at a distance of 70km from the center. Calculate the horizontal wind components and comment on the centrifugal force and geostrophic wind.
4. All students: Determine the horizontal wind speed and direction (in degree) for a wind having a W-E-component of 10 m/s and a S-N-component of 5m/s.