ATM 316 Examples for Chapter #2

Fall, 2020 – Fovell

(Example 2-1) Show that the Coriolis force cannot change the kinetic energy (KE) of an object. Take unit mass.

(Example 2-2) A missile is fired eastward at latitude $\phi_0 = 43°$N latitude. If it travels $L = 1000$ km at speed $u_0 = 1000$ m/s [2237 mph!] by how much is it deflected by the Coriolis force? You are in the NH (Northern Hemisphere). Consider only horizontal motion.

(Example 2-3) The 1000 mb geostrophic wind is southerly at 5 m/s. The 1000-500 mb vertical shear is northerly at 10 m/s. Layer mean temperature decreases to the west at 5 K per 1000 km. Compute the temperature advection, expressed in K per hour. Draw a picture.

(Example 2-4) Concisely explain why a westbound parcel is subject to northward and downward deflections by the Coriolis effect in the Northern Hemisphere. Draw a picture.