MAE578, Spring 2019 HW3 solution

Prob 1

(a) RH = 43.7%, partial pressure of water vapor e = 16.1 mb

(b) At Level 2, T = 284.9 °K, p = 835.2 mb

(c) At Level 3, T = 274.4 °K, p = 654.2 mb, q = 6.3 g/kg

[The results are obtained with the approximation, $q \approx \varepsilon\, e/p$. For Part (c), in the formulas for equivalent potential temperature and moist static energy we also approximate the effective R and Cp by the constant values associated with dry air. Slightly more accurate results could be obtained without these approximations.]

Prob 2

The maximum height is H = 876.7 m

Plot of vertical velocity as a function of height: