

Procedure for adjusting pressure to sea level

AOS 330

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1. Determine (a) the current station temperature and (b) the station temperature from 12 hours ago.
2. Compute the average of the above two temperatures.
3. Convert the average temperature to Kelvin by adding 273.1 to the Celsius value.
4. Compute the scale height $H = R_d T / g$, where $R_d = 287.1 \text{ J}/(\text{kg K})$ and $g = 9.807 \text{ m/s}^2$. Be sure to record H to at least 4 significant figures (unless you are using MathCad, in which case full precision is maintained automatically).
5. Compute the sea level pressure p_{sl} from

$$p_{sl} = p_0 \exp(z_0/H)$$

where p_0 is the observed pressure and z_0 is the altitude above sea level where you made your pressure observation (provided by the instructor).

6. The above procedure yields the standard sea level pressure that is used on weather maps. But pilots are interested in another form of sea level-corrected pressure, called the altimeter setting. It is computed in the same way as p_{sl} , but an assumed temperature profile corresponding the U.S. Standard Atmosphere is utilized instead of the actual temperature. The correction from observed pressure to altimeter setting is therefore always constant for a low-elevation station like ours. The correction for this exercise will be given in class by the instructor. Altimeter setting is always provided in inches of mercury rather than millibars, so the procedure is to convert your observed station pressure to inches of mercury (to the nearest 0.01") and then add the specified correction to obtain the altimeter setting.