

7.12 Sea Level Pressure Computation

1. Find two surrounding σ levels 100 hPa above the surface, compute T at this level

$$T = \frac{T_{\sigma_A} \ln \frac{P_{\sigma_B}}{P} + T_{\sigma_B} \ln \frac{P}{P_{\sigma_A}}}{\ln \frac{P_{\sigma_B}}{P_{\sigma_A}}} \quad (7.20)$$

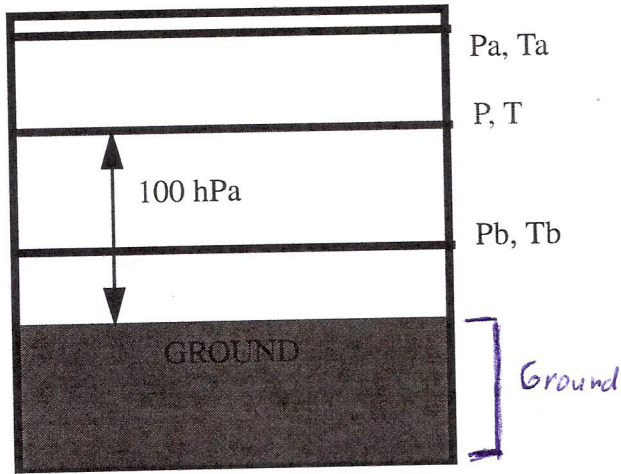


Fig. 7.7 To minimize the diurnal effects on the sea-level pressure computation, a pressure and temperature 100 hPa above the surface is used to compute a “surface” pressure and “surface” temperature.

2. Find T_s (surface temperature), T_m (mean temperature in layer above ground), Z at level 100 hPa above surface, and T_{slv} (sea level temperature)

$$T_s = T \left(\frac{P_{SFC}}{P} \right)^{\frac{\gamma_s}{g}} \quad (7.21)$$

$$T_m = \frac{T_s + T}{2} \quad (7.22)$$

$$Z = \text{TER} - \frac{R}{g} \ln \frac{P}{P_{SFC}} \times T_m \quad (7.23)$$

$$T_{SLV} = T + \gamma_s Z \quad (7.24)$$

3. Then sea level pressure is calculated as

$$P_{SLV} = P_{SFC} \exp \left[\frac{g \times TER}{R \frac{(T_S + T_{SLV})}{2}} \right] \quad (7.25)$$