Virtual Temperature

From the user, an air temperature (T), a dewpoint temperature$\left(T_d\right)$, and a station pressure$\left(P_{sta}\right)$ are given.

To calculate the virtual temperature, the temperatures must be converted to units of degrees Celsius $(°C)$ and the station pressure $\left(P_{sta}\right)$ must be converted to millibars (mb) or hectoPascals (hPa).

To see how to convert these units see the links below:

Temperature Conversion

Pressure Conversion

Then, the virtual temperature can be calculated using the formula below:

$$T_v = \frac{T + 273.15}{1 - 0.379 \times \left(\frac{6.11 \times 10^{\left(\frac{7.5 \times T_d}{237.3 + T_d} \right)}}{P_{sta}} \right)}$$

The virtual temperature answer will be in units of Kelvin (K), but virtual temperatures can be converted to other units using the link above.