

Manual Relative Humidity

(Last rev. 17/08/2012)

Manual Relative Humidity is measured on Barro Colorado Island only. Precipitation is currently collected at the following locations:

- 1) The Laboratory Clearing
- 2) The Lutz Tower 1m
- 3) The Lutz Tower 20m
- 4) The Lutz Tower 42m
- 5) The Lutz Tower 48m

Manual Relative Humidity is recorded, usually between 12:00 and 1:00pm at all locations. Data are collected as wet and dry bulb temperatures using a Bacharach Sling Psychrometer (see Bacharach_Sling_Psychrometer.pdf and Figure 1). The wet bulb of the Psychrometer is wetted with distilled water. The Psychrometer is then vigorously rotated for 60-90 seconds following which wet and dry-bulb temperatures are recorded.

Wet/dry bulb temperatures are converted to relative humidity using the following equation:

$$P = 101.325 * e^{(-.0001184 * \text{Elevation})}$$

$$A = .00066 * (1 + .00115 * T_w)$$

$$ES_{wb} = e^{((16.78 * T_w - 116.9) / (T_w + 237.3))}$$

$$E_d = ES_{wb} - P * A * (T_d - T_w)$$

$$ES_{db} = e^{((16.78 * T_d - 116.9) / (T_d + 237.3))}$$

$$\text{Relative Humidity} = 100 * E_d / ES_{db}$$

Where: T_w = Wet-bulb temperature (in degrees Celsius)

T_d = Wet-bulb temperature (in degrees Celsius)

Figure 1



Bacharach Sling Psychrometer