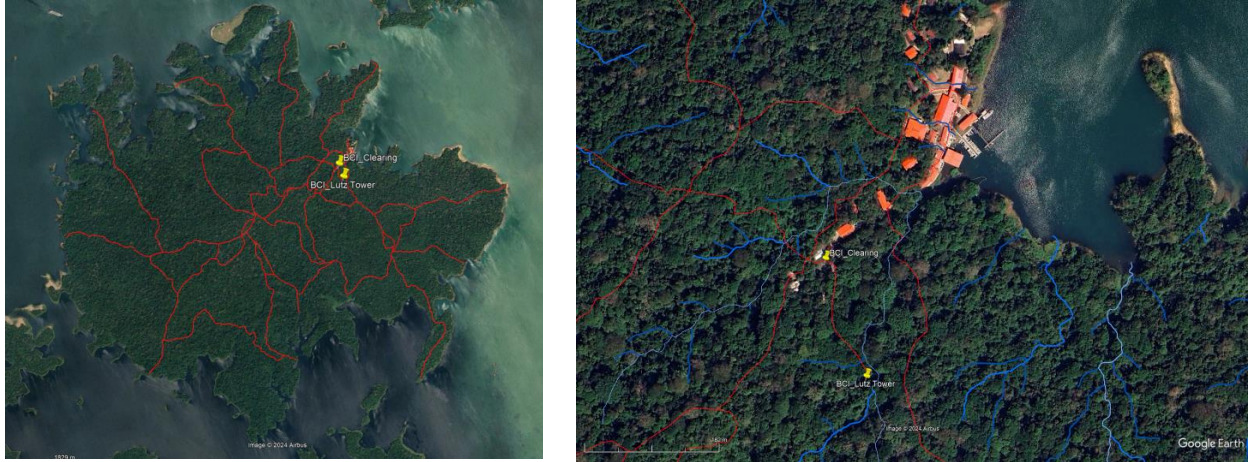


## Manual Potential Evapotranspiration

(Last rev. 18/08/2014)

Barro Colorado Island – BCI (Figure 1) evapotranspiration is measured electronically at the Laboratory Clearing ('El Claro') and the Lutz Tower (Figures 2 & 3) using combination sensors housed in naturally aspirated radiation shields (Figure 4)\*.

Figure 1



Location of Laboratory Clearing and Lutz Tower (red lines are trails, blue lines are streams)

Figure 2



Laboratory Clearing

Figure 3



Lutz Tower from below (left) and view of surrounding canopy from the top (right)

Potential Evapotranspiration (PEt) is estimated using ceramic plate atmometers known as ETgages. ETgages estimate evapotranspiration by allowing water to be drawn up through a ceramic disk and out through a GorTex cover. A recent study by Fontain and Todd (Measuring Evaporation with Ceramic Bellani Plate Atmometers, 1993, Water Resources Bulletin, Vol. 29, No. 5, p. 785-795) found that such devices perform very well compared with more traditional methods of measuring evaporation.

There are three ETgages currently being used on BCI: two in the Clearing located at a height of 1.5m and a second on the top of the 40m tower near the Lutz weir. ETgages are read at approximately the same time of day and with the same frequency and the rain gauges on BCI: usually between 8:30 and 9:30am. PEt is recorded first as height of the water column on the ETGage. The difference between this reading and the previous is the PEt for the intervening period. The data series for these data have the following pattern: station\_site\_evap\_man.

Since gauges are usually only read during workdays, PEt is also available prorated evenly over the recording period. The PEt on the next recorded date (Monday, for example) is divided evenly among that day and the missing days (e.g. Saturday, Sunday and Monday). The data series for these data have the following pattern: station\_site\_evap\_man\_pr.

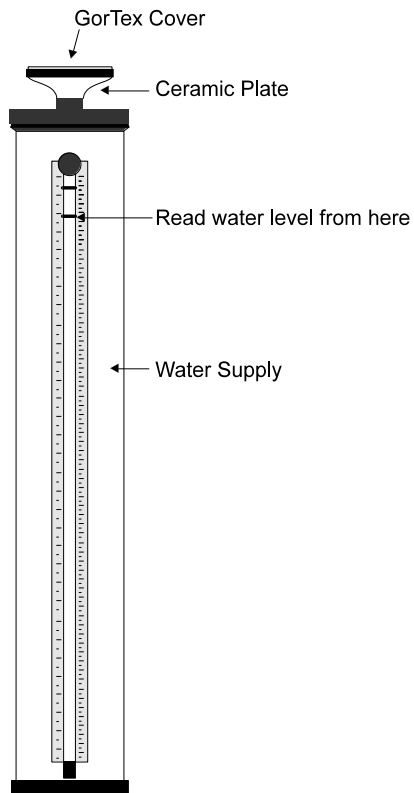
As an example, the following table:

Day	PEt	Prorated PEt
1	missing	5
2	missing	5
3	15	5



Figure 4

## ETguage

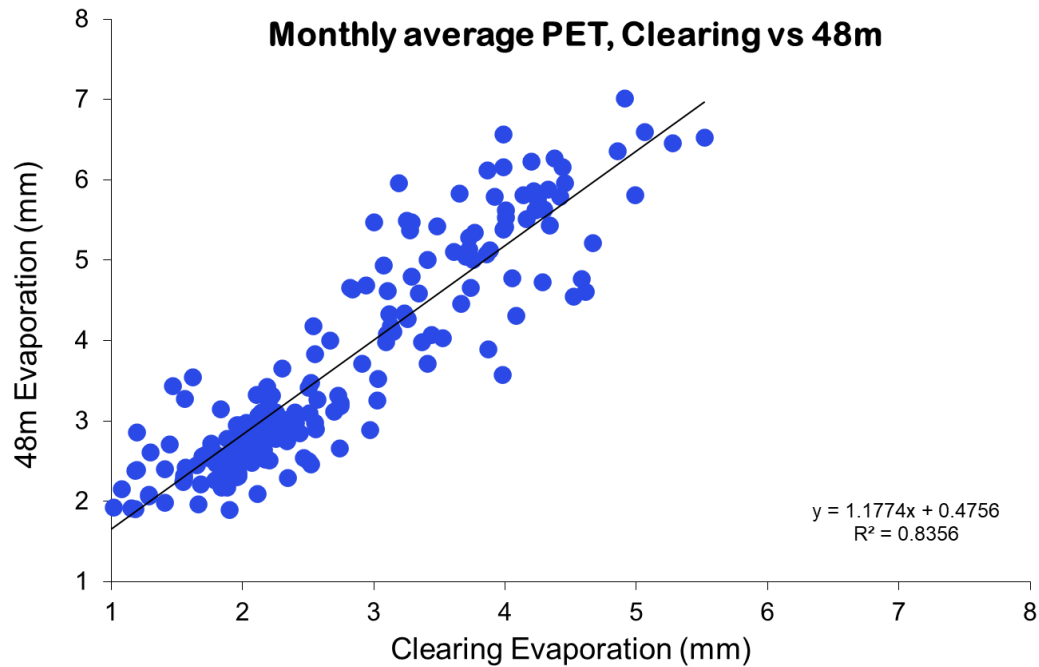


ET Gage schematic (left) and ET Gage on top of Lutz Tower (right)

**Note:**

As a result of damage to the Lutz tower, evapotranspiration is no longer being measured on the Lutz tower beginning in April 2018. A comparison of monthly PET between the Clearing and 48m stations show that a linear relation exists between the two sites (Figure 5).

Figure 5



Monthly PET Relationship between Clearing and 48m stations

**Comparison between ETGage and Class A Evaporation Pan:**

Between 1997 and 2001, 1.2-meter diameter, insulated uninsulated, type-A evaporation pans were operated at the Clearing to compare 'true' evaporation with that estimated by the ETGages (Figure 6).

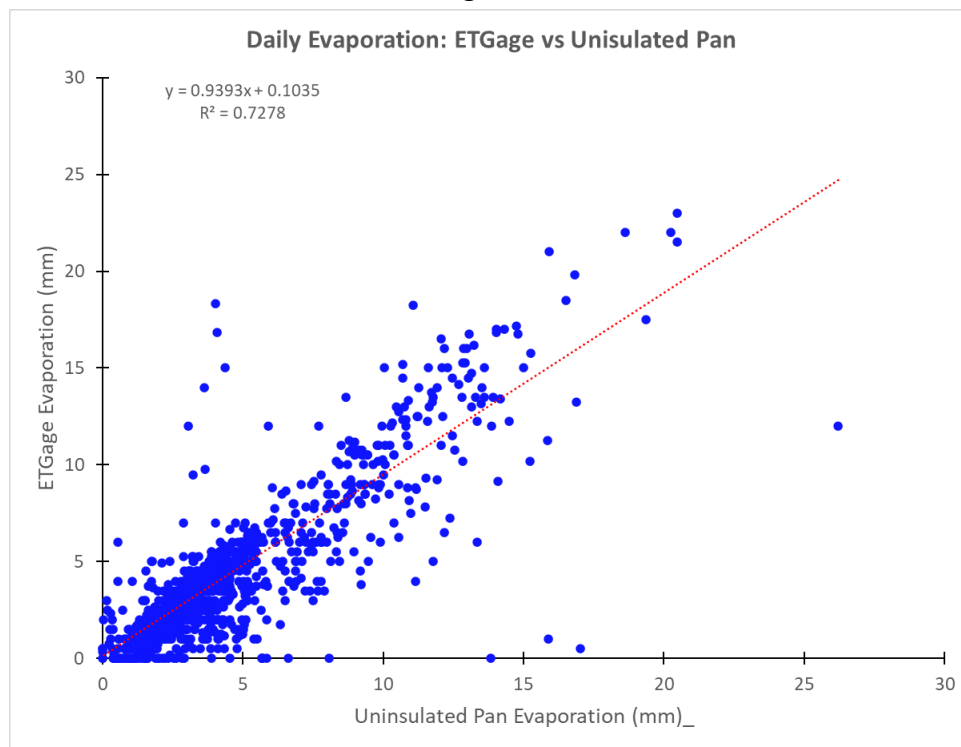
After approximately 1200 daily observations, the results show a nearly 1:1 relationship between the ETGages and the uninsulated evaporation pan over the long-term, with a moderate amount of day-to-day variability (Figure 7). At the end of the experiment, the pan recorded a total of 5339.6mm of evaporation, while the ETGage recorded 5140.0mm.

Figure 6



Uninsulated class 'A' Evaporation Pan

Figure 7



ETGage vs Evaporation pan