

## Electronic Wind Speed and Direction (Last rev. 14/11/2024)

Wind speed and direction are measured at the top of the Lutz tower (Figure 1). Originally, the tower was 42m in height. When constructed in 1972, the top of the tower was 15-20m above the surrounding canopy (Figure 2). The surrounding forest is second growth forest that had been cut down sometime before 1910.

By the late 1990's, the canopy height had almost reached the top of the tower. In order to be able to measure conditions above the canopy, two new sections were added to the tower in October 2001, increasing the height to 48m (Figure 3). The 42m anemometer was operated until July 2007 in order to calculate a relationship between the two heights (Figure 4).

Wind speed and direction has been measured electronically with several models of the RM Young 05103 Wind Monitor family (See figure 5).

Wind speed and direction are sampled once every 10 seconds. The average, minimum and maximum values are recorded at the end of every 15 minute interval.

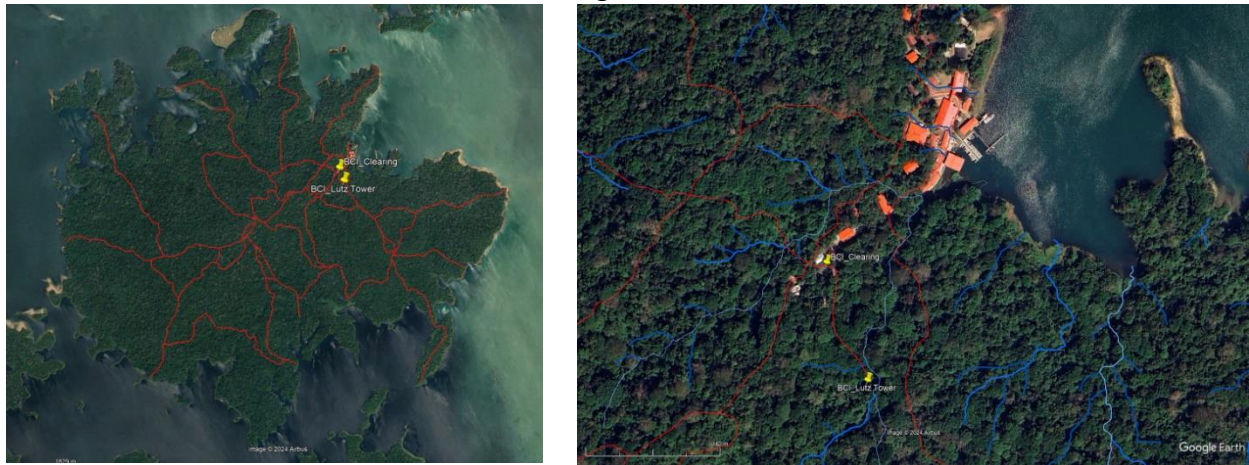
Sensor elements are replaced with newly recalibrated sensors every year according to the manufacture's recommendations.

Records are provided with two Quality Control flags. Flag one indicates the fitness-for-use of each record. Possible values are: good, bad, doubtful, missing. Records are marked as bad if they fail one or more QC tests. Likewise, records are marked as doubtful if they are potentially bad, but without sufficiently strong evidence to be marked as bad. The second QC variable provides that reason for marking a variable as bad or doubtful. Potential values are: range, step, persistence, drift. At this time only range tests have been applied.

### Note:

As a result of damage to the Lutz tower, wind data are no longer being measure on the Lutz tower beginning in March 2024. Caution should be used when using AVA tower as a surrogate because of the non-linear relationship in daily average wind speed during the rainy season, and the different relationships between wet and dry season (see Figure 6). This is very likely a function of the season-specific wind direction pattern differences between the towers (see Figure 7).

Figure 1



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

Figure 2



Aerial photo of Lutz Tower ca 1975 (left) and current tower from below (right)

Figure 3

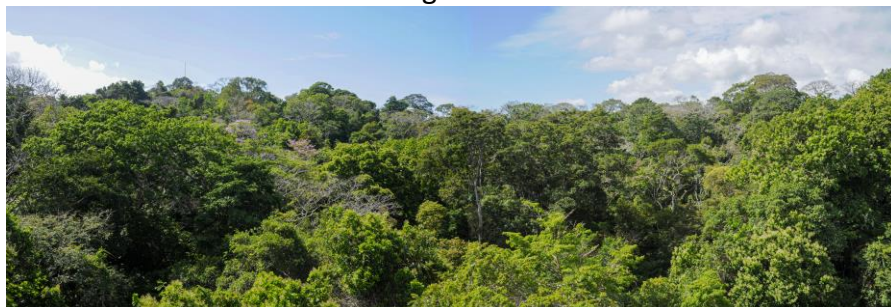
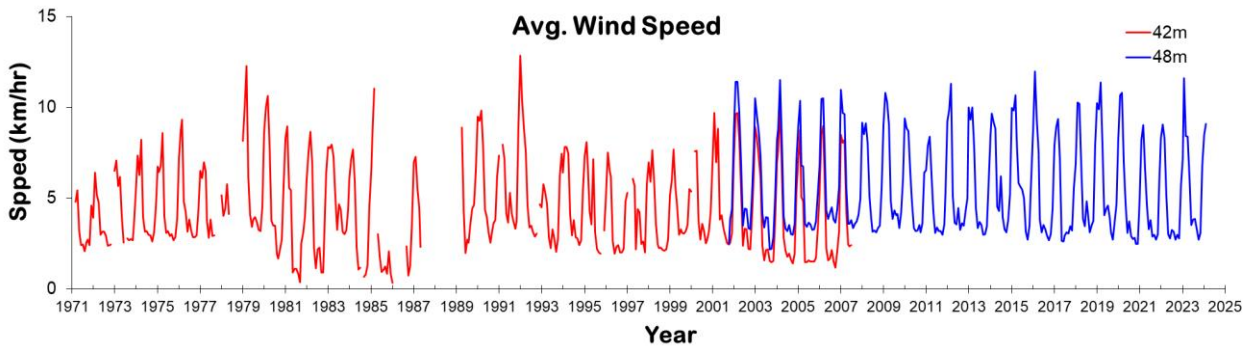


Photo from 48m height of Lutz Tower in 2014

Figure 4



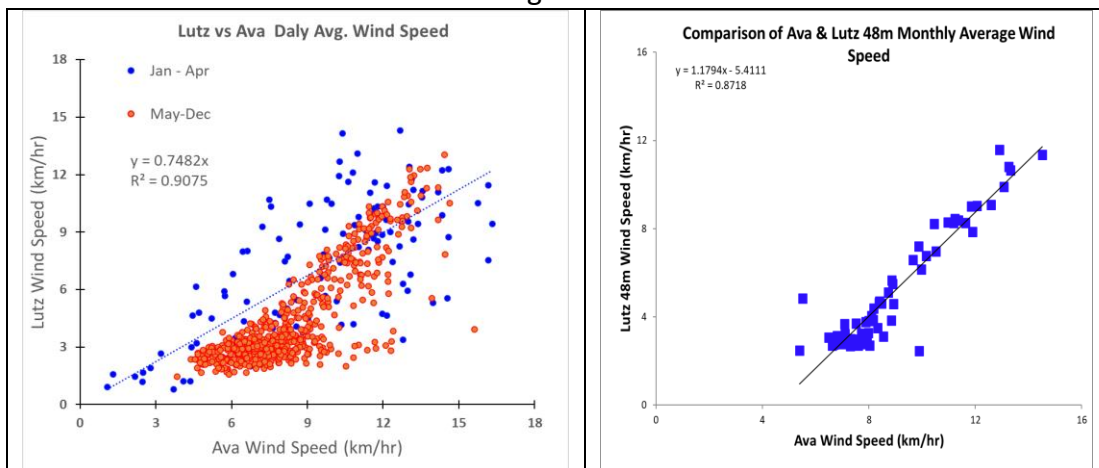
Monthly average Lutz Tower wind speed

Figure 5



RM Young Wind Monitor on top of Lutz Tower

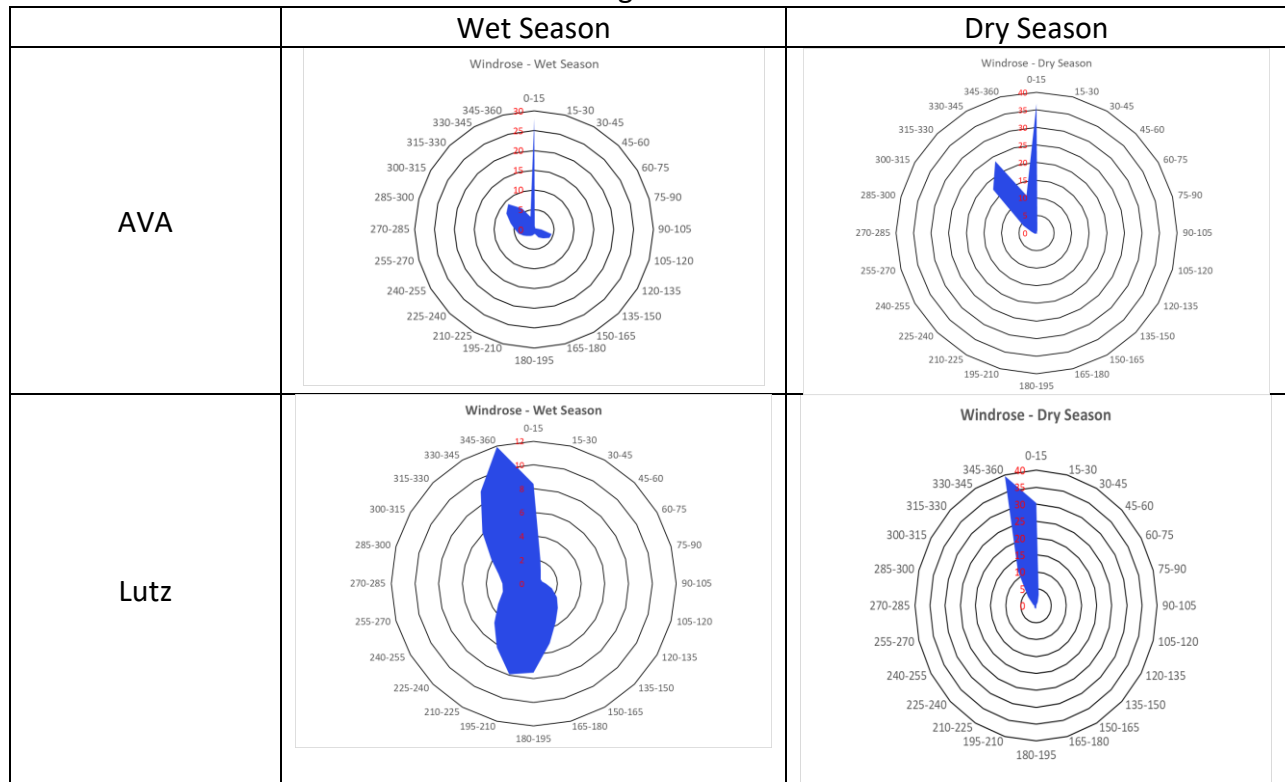
Figure 6



Comparison of AVA and Lutz daily average (left) and Monthly (right) average wind speed



Figure 7



Comparison of AVA and Lutz daily average wind vector