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RAINFALL AT THE EL VERDE FIELD STATION, 1964-1986

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Rainfall has been measured at the El Verde Field Station of the Center for Energy and Environment Research (formerly Puerto Rico Nuclear Center) since

1966. In this report, we describe the collection procedures, present the raw data for the period of record, and present some summary statistics. We intend this report and the raw data to be periodically updated and generally available to researchers at the site. A computer file is maintained of the raw data, and is available from the Terrestrial Ecology division.

ACKNOWLEDGMENTS.

Throughout the period of record, funding was provided from the U.S. Department of Energy and its ancestors (U.S. Energy Research and Development Administration, U.S. Atomic Energy Commission). We gratefully acknowledge this support, and in particular that of DOE under contract DE-ACOS-76OR01839. We also thank Hloraa Ortoga, Cindy Gines, and Robert Hageny for technical support.

SITE

The study site was the FI Verde Field Station of the Center for Energy and

Environment Research, University of Puerto Rico. The station is located on the eastern end of Puerto Rico in the Liguillo Experimental Forest (Caribbean National Forest). A detailed description of the site is given in Odum and Pigeon (1970). Elevation of the laboratory buildings at the station is 350 m.

Rainfall was collected at various locations and at various sampling frequencies during the period of record. During 1964-1967, rainfall was collected continuously with a tipping bucket rain gage on a meteorological tower above the canopy; elevation above sea level for the gage was approximately 450 m. Although collected continuously, numerical data are only available on a weekly basis (in Kline 1968). Total daily rainfall is shown graphically for 1964-1966 in Odum et al. (1970). From June 1970 on, rainfall has been sampled at nearly daily intervals using a standard 8-inch diameter US Weather Service funnel connected to a ground-level reservoir. From 1974 to December 1980, the collection funnel was located on the roof of the field station Laboratory (approx 3 m above ground surface). From January 1981, the location was changed to a tower approximately 13 m above ground surface. In March 1982, the tower was moved to its present location adjacent to the dormitory building and extended to approx 20 m above ground surface. For a short period, tower height was 33 m, but this exposed the collector to strong winds and was deemed undesirable. Removal of the collector from the laboratory roof was necessitated by growth of canopy trees from 1964 to 1981.

Interception of rainfall by upward and lateral growth of canopy trees near the field laboratory may have gradually decreased the amount of rainfall reaching the Hoop gauge from 1976-1981. To test the extent of such interception, an intercalibration between the current collection site and the original roof site was conducted from June 1904 to May 1985. Results are shown in Figure 1.

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Slope of the regression of tower vs roof is 1.094 ($y \sim 1.094x - 0.004$, $r^2 = 0.992$) indicating that approximately 10% of incident precipitation was retained by the canopy over the rooftop collector. This probably represents a maximum estimate of differences between the two collection sites for 1974-1981, because canopy growth encroaching on the laboratory appears to have been continuous over the last 15 yrs. No correction has been made to any of the data sets.

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Figure 1. Daily rainfall (cm) recorded from the laboratory roof rain gage (collection site from 1974-1981) vs that recorded from the tower at its present location. Period of record for this comparison is June 1984 to May 1985.

RESULTS

Monthly rainfall for each of the months sampled from 1964-1986 is shown in Table 1, The average, average plus and minus standard deviation, and maximum

and minimum for each month are shown in Fig. 2, Precipitation shows some seasonality in monthly means, with a peak in May, but this is heavily influenced by a single year (1965) with exceedingly high precipitation in May

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Average daily precipitation (Fig. 3) for 1974-1986 shows similar patterns, with highest values in May, and no strong seasonality. Total annual precipitation for years with a complete record is shown in Fig. 4

table 1. Monthly rainfall for 1964-1986 at the EL Verde field station.

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Figure 2. Average monthly precipitation (ca) for 1964-1967 and 1974-1986 at the El Verde field station,

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Figure 3. Average daily precipitation (cm) at the B1 Verde field station,
1974-1986

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Figure 4. Total annual precipitation for the period of record at the El Verde Field Station.

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[APPENDIX T.

Daily rainfall values (mm) for the period of record. Date expressed as the day on which the measurement was made, at approximately 0900 throughout the Sauple period, ?This means that rainfall recorded for 15 June, for example, Consists primarily of rain which occurred from 0900-2400 on Th June, and that which £211 from 0000-0900 on 15 June, Note that for 1964-1967, rainfall ts fonly reported weekly. Data for 1964-1967 ware obtained from the 1968 Puerto Rico Nuclear Center Annual Report (Kline 1968). During 1974-1976, rainfall was sampled nearly datly (6 days/vk). hen more than one day vas sampled, average daily rainfall for the sample period was calculated.

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