



# **PACIFIC REGION TECHNICAL NOTES**

82-002

Record Rainfalls at and near Vancouver?

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## INTRODUCTION

The years 1980 and 1981 have been two consecutive record-breaking years in terms of annual total precipitation. The object of this report is to determine if that occurrence was a singular event or a widespread tendency. A survey of reporting stations randomly chosen all over B.C. and the U.S. Coast will be made to find out how their '80 and '81 totals compared with previous records.

## RESULTS

In table 1.A we can see that while most stations reported higher than average precipitation totals, Vancouver Airport was the only one to break its previous record. Therefore a generalized climatic change or mean global circulation anomaly should probably be ruled out and a local study of the phenomena must be done to measure its extent. (Note also that a couple of stations were below their averages!)

This is what has been done in table 1.B. It is shown here again that '80 and '81 were "good" years for precipitation. But only three of those stations broke their records in 1981 and only one in 1980.

An attempt at an explanation can be made using Figure 1. It shows for three "local stations and Tofino (for a comparison with a station not too far away but in a "different" climatic regime), the annual variation of total precipitation compared with the mean total and the record before 1967.

A quite regular three year cycle seems to have prevailed in the last few years, with the exception occurring around 1977 where there is a "missing peak". During that cycle we see all stations approaching their record at peak years and going below average at "drought" years. Tofino broke its pre-'67 record three times during that period, including twice in a row. Vancouver Airport also broke its record twice in a row. The other stations approached their records at all peaks (especially UBC) but failed at the last moment. It would seem then that the record breaking of '80 and '81 were just another occurrence of peak years, associated with one or two good storms that made up the difference (about 40mm) between a good peak and a record.

Furthermore, that situation could have occurred (or so it seems) at any peak of the last 15 years, as in the case of Tofino for example. Now we will take a closer look at the records for Vancouver Airport, to try to find out what the apparent cycle is about.

In Figure 2, where the yearly totals have been plotted over the 10 year means, we can see some interesting features out of the seemingly random fluctuations. First the three year cycle of Figure 1 doesn't prevail in any significant way. Then the 10 year means show a slow but steady increase in the past 3 decades. When large amplitude yearly fluctuations are superimposed on that increase, it is natural to break a few records in the process. As for the regularity of the peaks, the shortness of record prohibits definite conclusions but it can be noted that the frequency is quite variable, with larger and slower oscillations embedded in the fluctuations. Such periods started in '38, '61, and possibly in '76. Finally, the frequency of occurrence of record breaking events diminishes with the length of record, as would be expected.

#### CONCLUSION

The combination of yearly fluctuations of large amplitude with a steady increase in mean totals has produced two consecutive record-breaking years for annual precipitation at Vancouver Airport.

As far as the future is concerned, assuming persistence of the pattern exhibited since 1938, another "wet" year is in store for '82 but it should be followed by a return to rapid (almost yearly) fluctuations between dry and wet years for the rest of the '80's.

TABLE I

TOTAL PRECIPITATION FOR '80 AND '81 VS PREVIOUS RECORDS  
(in millimetres)

## A. LARGE AREA SURVEY

STATION	PREV. REC./YR.	MEAN	1980	1981
Vancouver A	1367/'61	1113	1420*	1459*
Port Hardy A	2358/'68	1814	1845a	1930a
Tofino A	4128/'74	3345	3150b	3384a
Abbotsford A	2002/'72	1557	1756a	1776a
Prince Rupert A	3057/'74	2545	2669a	2623a
Prince George A	844/'64	618	722a	472a
Quillayute	---	2667	2660b	---
Seattle	---	906	1024a	---
Portland	---	955	1077a	---

## B. VANCOUVER AND VICINITY

Vancouver A	1367/'61	1113	1420*	1459*
Agassiz	2302/'32	1707	1854a	1443b
Alta Lake	1864/'68	1144	1396a	1379a
Burnaby Cap. Hill	2315/'68	1912	2090a	2130a
Burnaby Mtn.	2381/'61	1833	2086a	2015a
Vancouver Dunbar S.	1524/'68	1286	1478a	1530*
Vancouver Hrbr.	1857/'71	1597	1795a	1897*
Vancouver UBC	1528/'71	1264	1432a	1467a
Victoria A	1099/'48	868	1035a	989a

\* New Record

a Above the mean total

b Below the mean total

FIGURE 1.

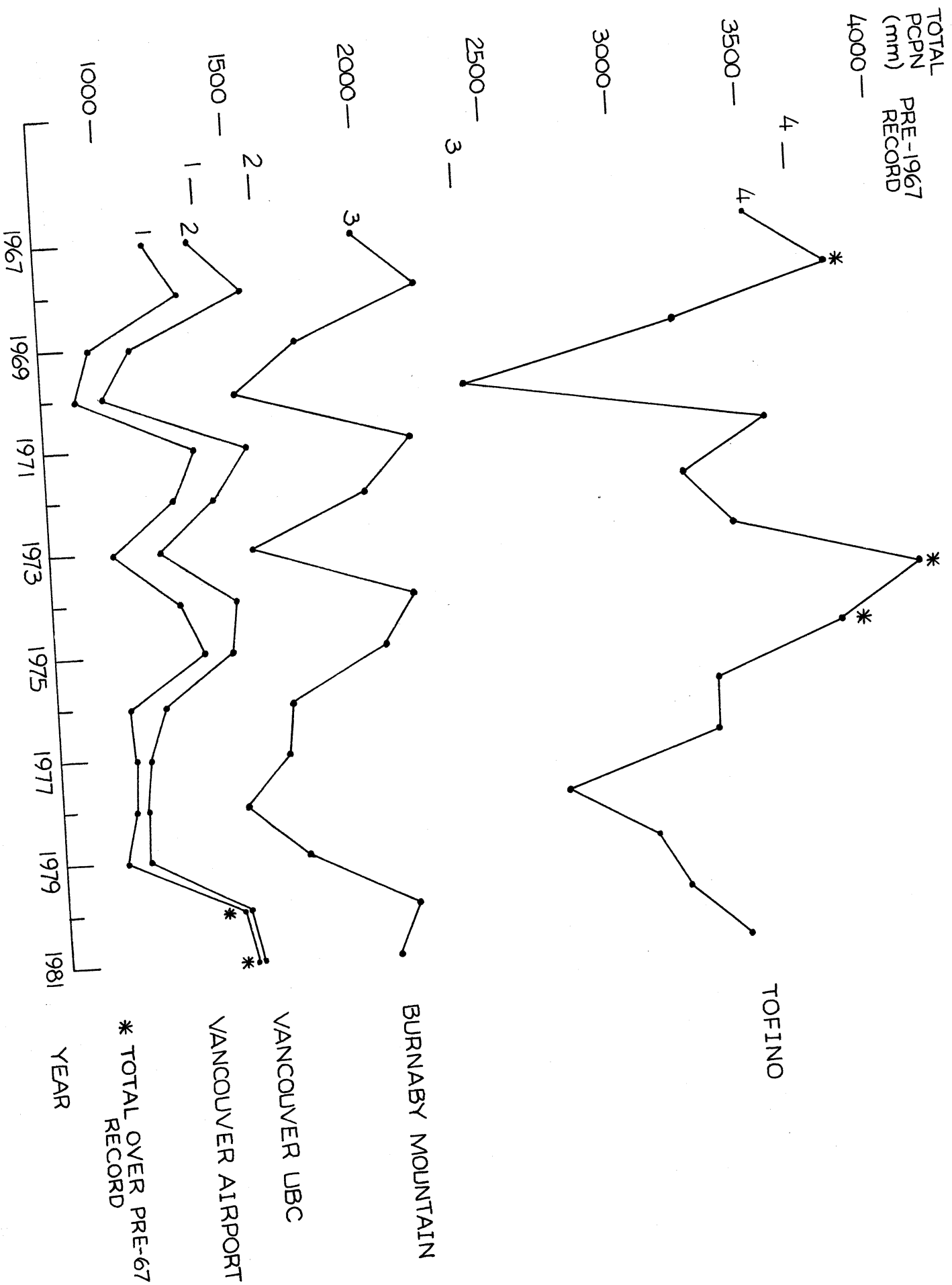


FIGURE 2.

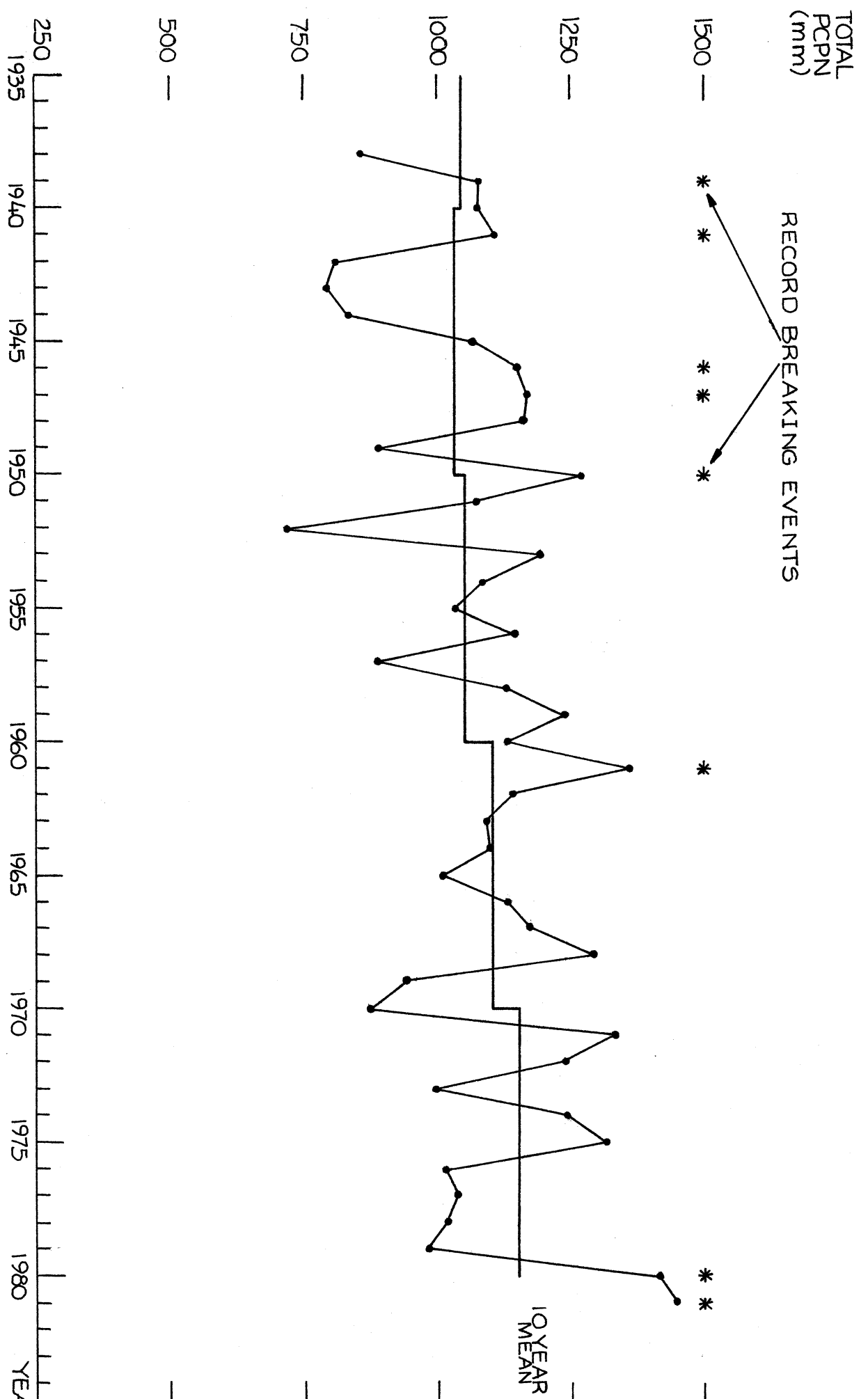


FIGURE 2.

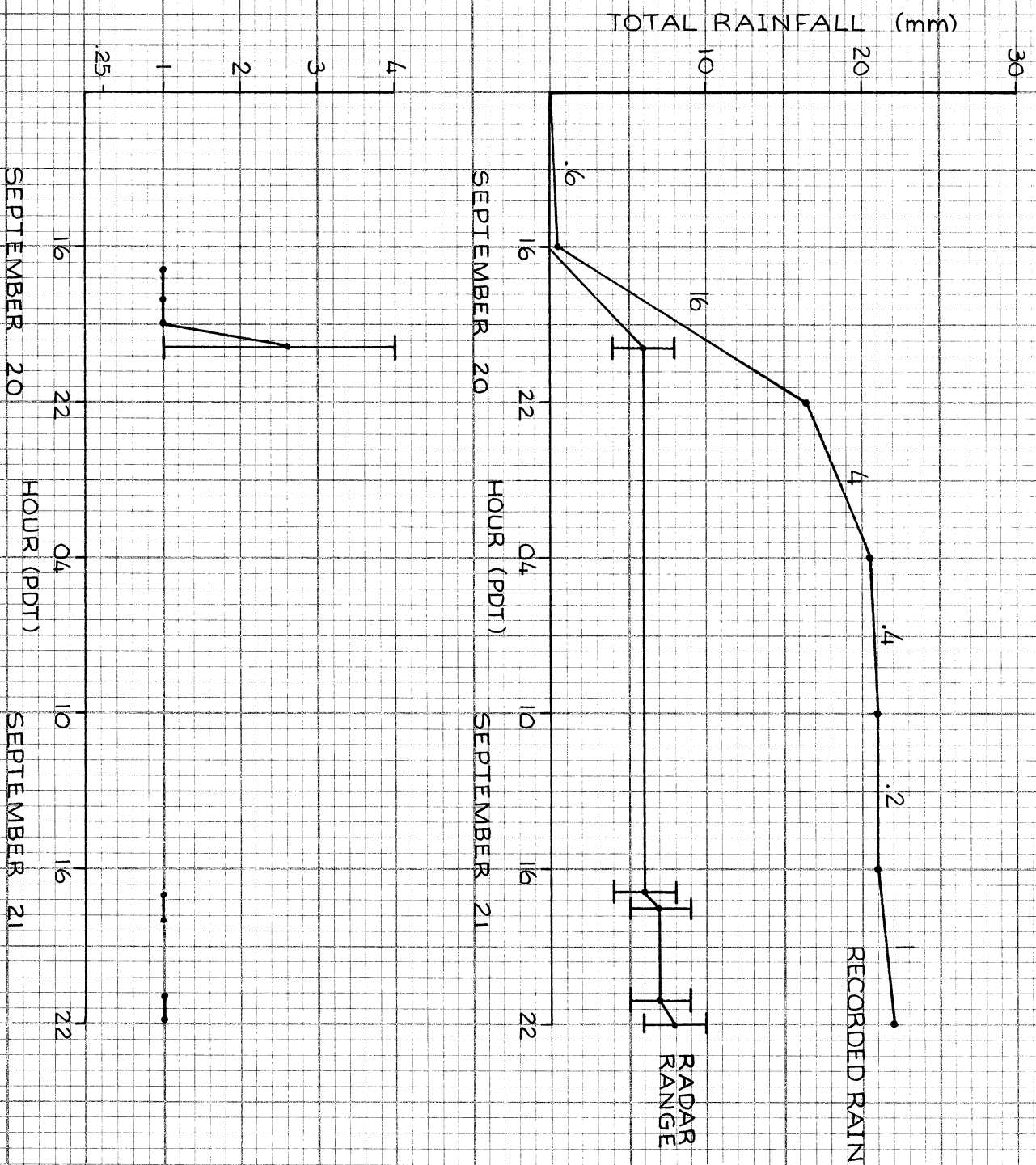


FIGURE 3.

