

A Comparison of Optical Rain Gauge and Radar Data from
TOGA/COARE

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A comparison between raingage data and radar data from TOGA/COARE was studied. The raingage data from an echo that passed over the Xiangyanghong #5 on December 24, 1992 was compared to what the MIT radar saw at this location from the R/V Vickers, 103.4 km to the east. The precipitation measured by the raingage peaked at 108 mm/hr 92 seconds into the period before tapering off 11 1/2 minutes later. This sharp gradient was evident in a PPI plot of the radar reflectivities and the percentage area-rainfall for the radar data statistics. The percentage area curve was converted to rainrates using a GATE Z-R ($Z=230R^{1.25}$) and compared to a percentage time curve of rainrates according to the raingage. A four minute running average applied to the raingage rates improved the comparison of peak rates between the raingage and radar. Differences in peaks between rainrates observed by the raingage and reflectivities observed by the radar could be due to variations in rainfall rates within a single radar data bin. For example, two measurements of reflectivity such as 37 and 47 dBZ within the same bin would result in a 44 dBZ average. This range in rates from 12 mm/hr to 74 mm/hr is observed in 30 seconds by the raingages within the first two minutes of the radar echo passage.

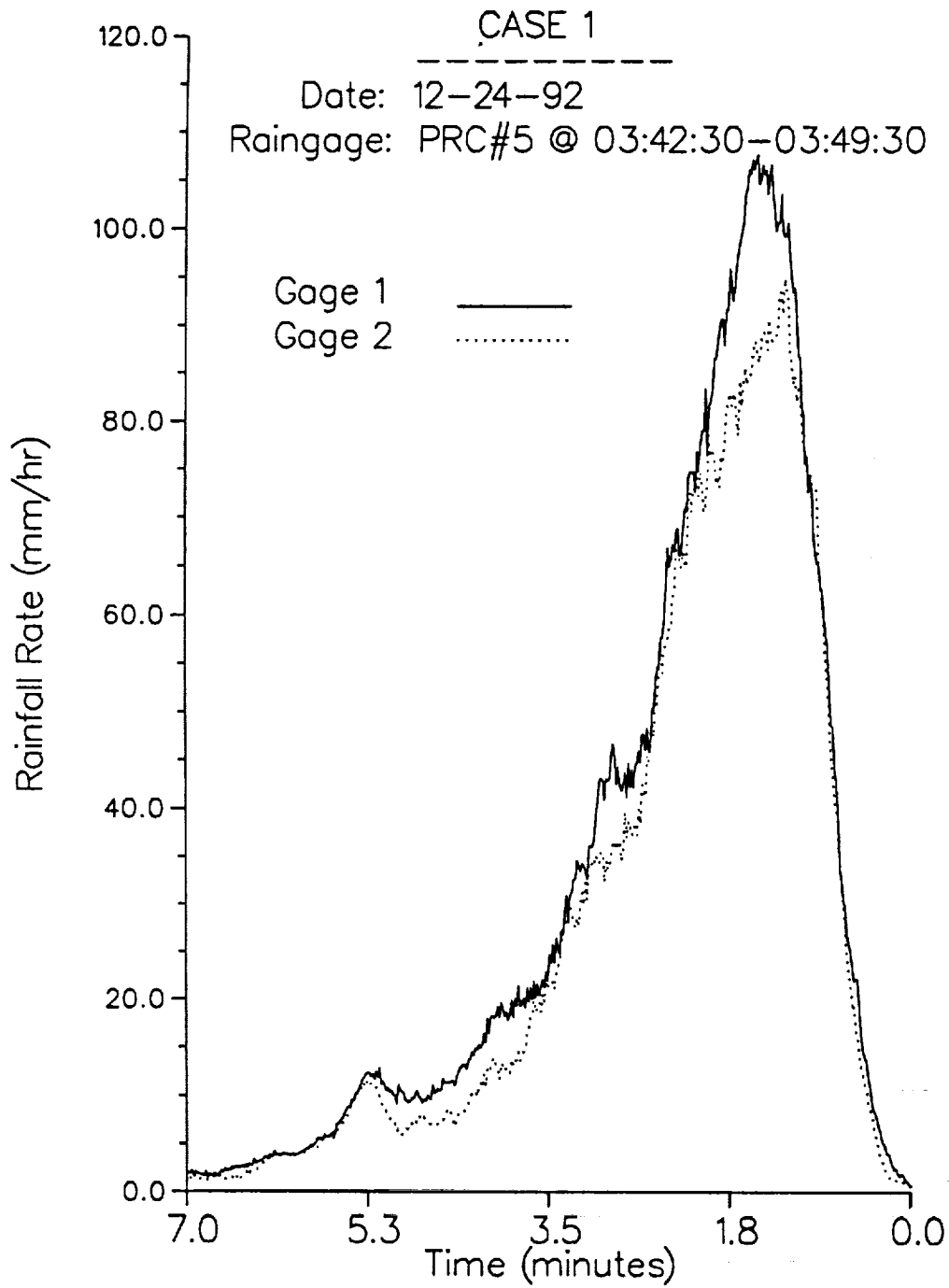


Figure 4.1. Case 1: Rainfall rate as a function of time from both PRC #5 raingages on 24 December 1992 from 03:42:30 to 03:49:30.

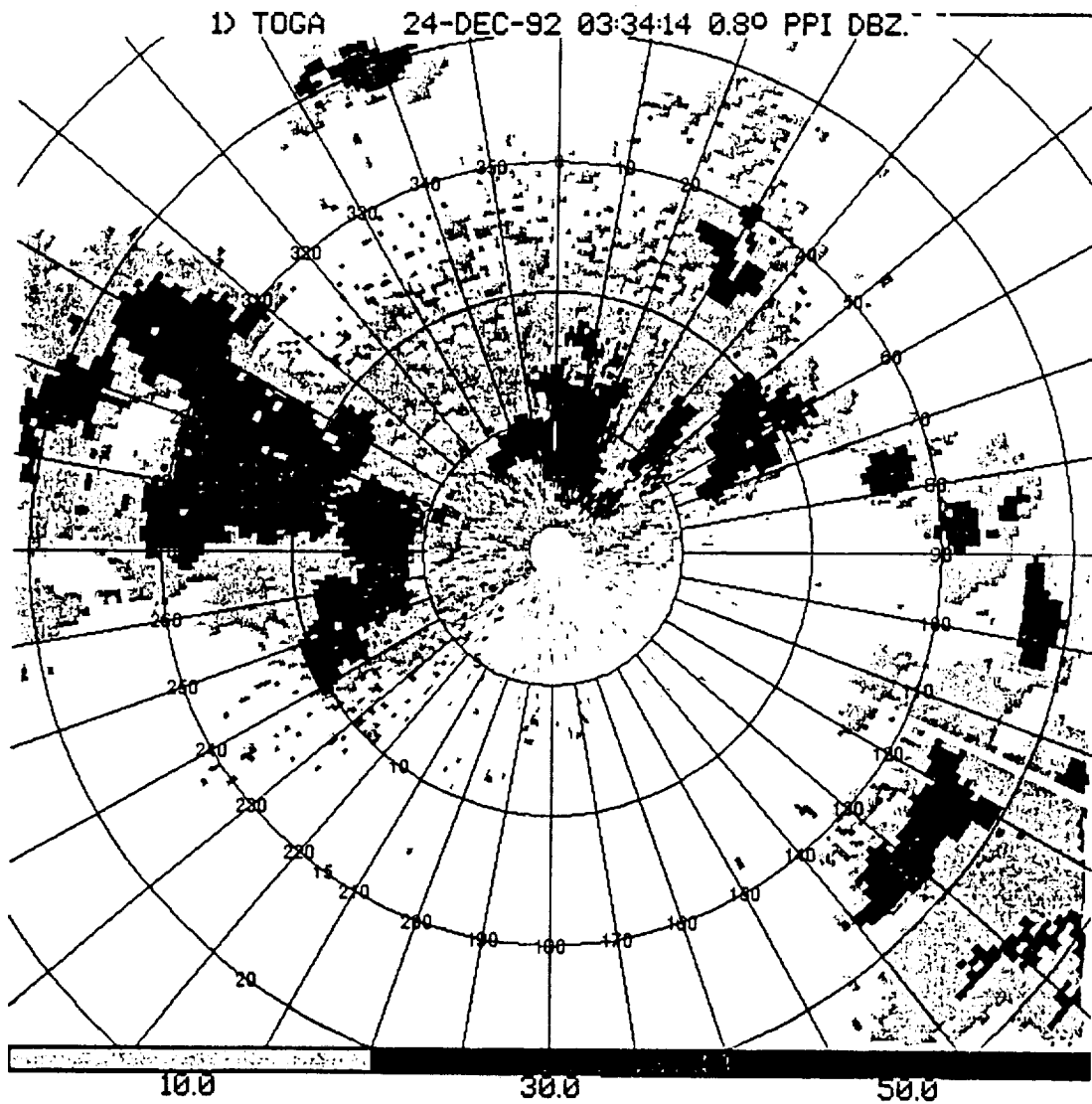


Figure 4.2. Case 1: PPI display of radar reflectivity from the TOGA radar for 0334 UTC 24 December 1992. The echo of interest lies along azimuth 258° with the most intense echo at a range of 7 km.

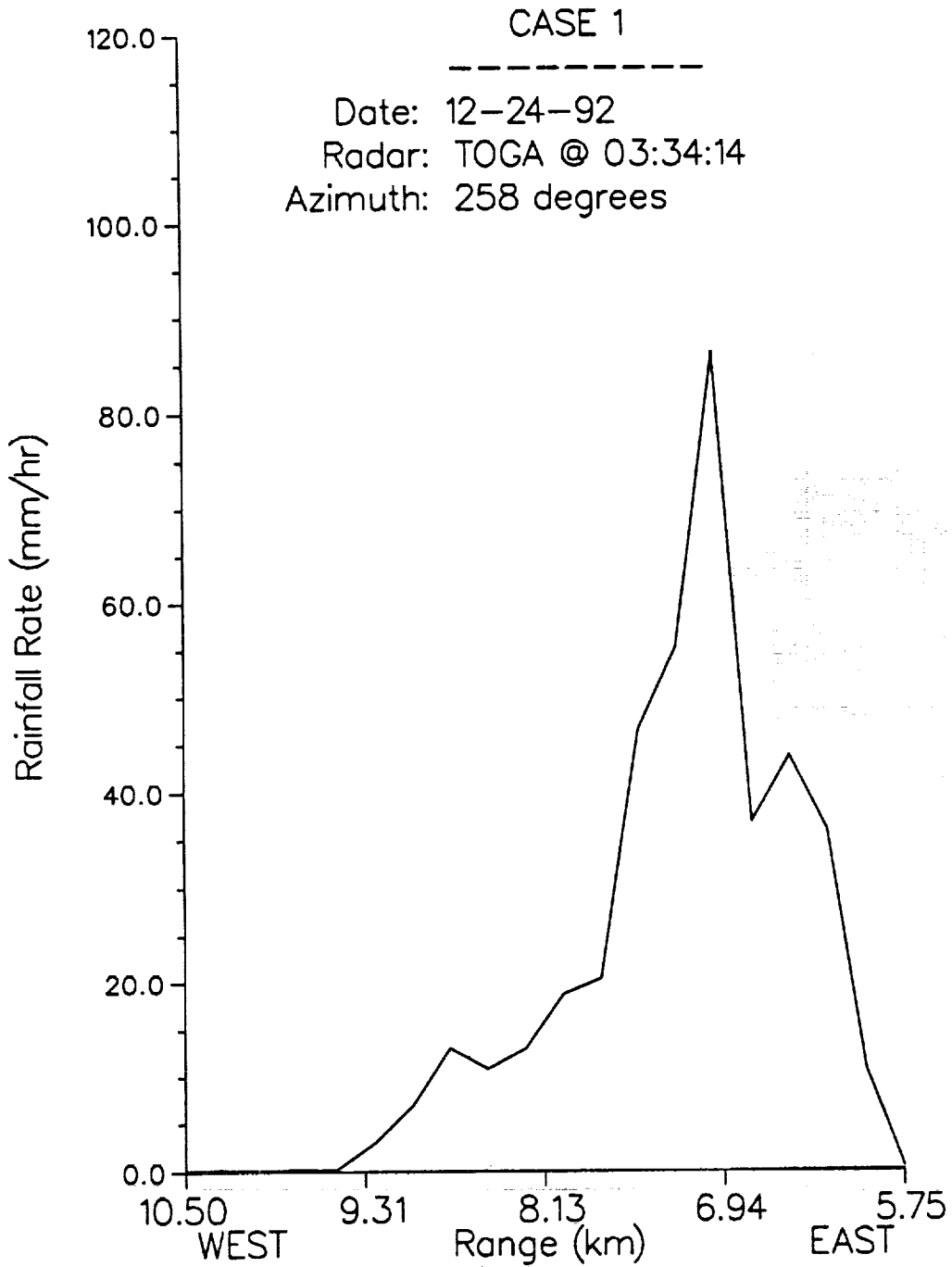


Figure 4.3. Case 1: Rainfall rate as a function of range from the TOGA radar for 0334 UTC 24 December 1992. The curve represents bin-by-bin radar data from azimuth 258°.

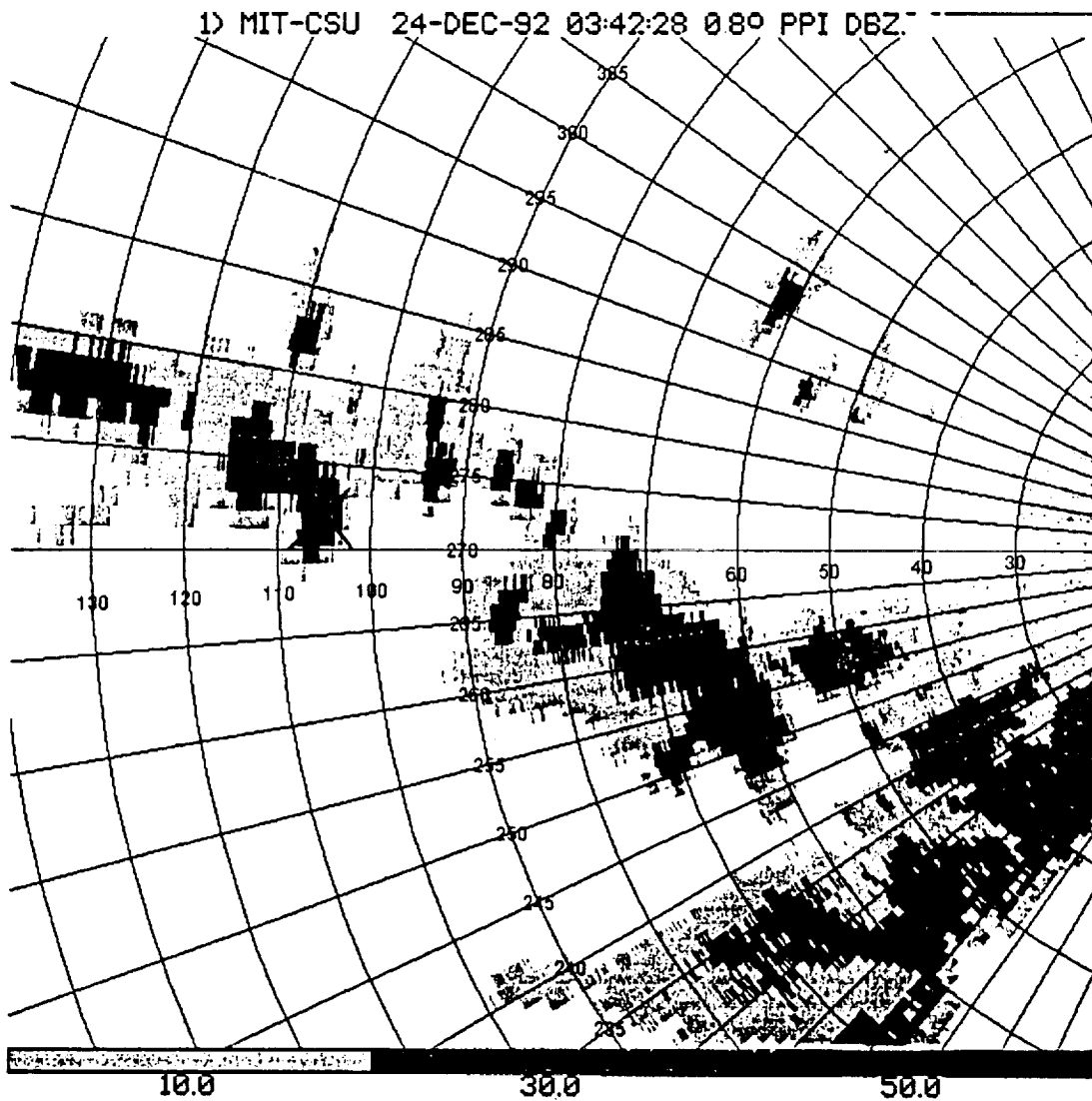


Figure 4.6. Case 1: PPI display of radar reflectivity from the MIT radar for 0342 UTC 24 December 1992. The "X" indicates the location of the PRC #5.

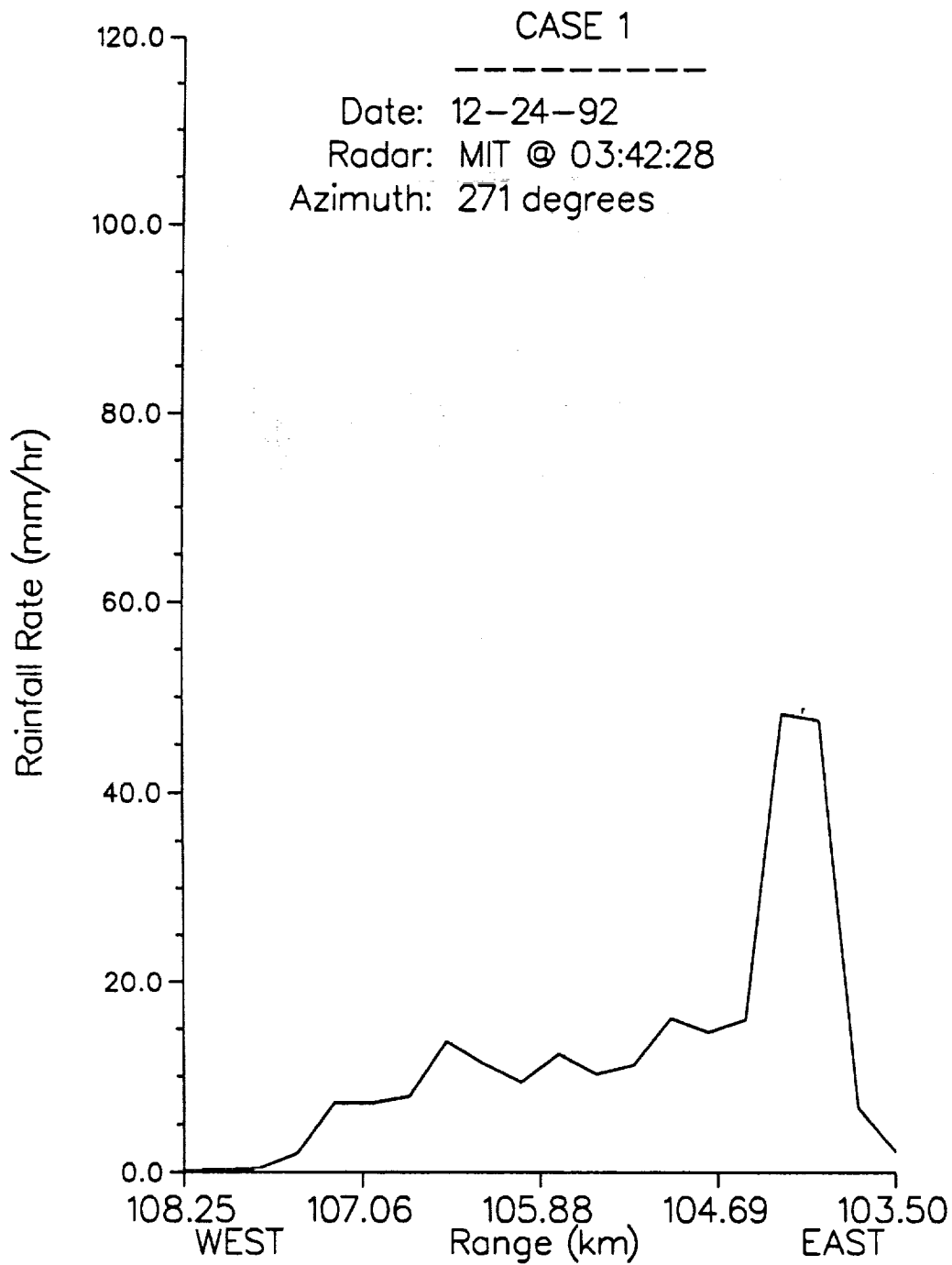


Figure 4.7. Case 1: Rainfall rate as a function of range from the MIT radar for 0342 UTC 24 December 1992. The curve represents bin-by-bin radar data from azimuth 271°.