

# ROYAL METEOROLOGICAL SOCIETY: AUSTRALIAN BRANCH MEETING

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## Tropical Cyclone Tracy: Christmas Day 1974

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As a prelude to the talk by Mr Muffatti, Assistant Director Services of the Australian Bureau of Meteorology, a film illustrating the extent and severity of damage to Darwin by Cyclone Tracy was shown. Panoramic scenes of houses devastated to floor level in the northern suburbs made a dramatic impact on the audience. Hardly a building in Darwin was undamaged. In some suburbs 90 per cent of homes were wrecked beyond repair. The death toll was put at 49 with 16 missing.

The climatology of cyclones in the Australian region was then reviewed from the aspects of regional occurrence, frequency and paths taken by storms in the region extending from the Coral Sea through the Arafura Sea and Timor Sea to the Indian Ocean. Those particular storms that affected Darwin were recounted. On some five occasions major destruction to Darwin by tropical cyclones occurred during the period 1878 to 1937, while only minor effects occurred between 1937 and Tracy.

In summary it was pointed out that within a recent 30 year period only 4 storms have passed within 45 km of Darwin and Cyclone Tracy was an event of a very rare kind.

The broad physical-dynamical features and life cycle of a typical tropical cyclone were illustrated before passing on to the particular details of the structure of Tracy. These details were revealed by records from Darwin's weather radar, anemograph, barograph, synoptic charts and post-event surveys of damage.

The importance and value of satellite photographs from ESSA 8 in the early detection of the storm from 20 December, and the detailed accurate tracking of the storm's eye by Darwin radar when it came into range on 24 December, were stressed. Direct recording of winds by an automatic weather station on Bathurst Island gave valuable information on the destructive wind strength for the issue of warnings.

Mr Muffatti then gave a detailed description of the structure of Tracy and a synopsis of the associated meteorological situation. The eye of the storm was observed by radar to move on a sinusoidal track with a periodicity near 6 hours. The direction of movement from 23 December was south-southwest, then south, then southeast, then east-southeast at a steady 8 km/h with landfall 0330 am on Christmas Day.

The extreme measured wind was 140 km/h with gusts to 217 km/h at Darwin Airport when the centre of the storm was by radar 10 to 12 km away and the eye-wall radius was approximately 6.5 km. The anemometer structure then failed. The period of calm assessed by witnesses' comments lasted approximately 45 minutes. Destructive winds continued for about two hours after the storm and much of the major damage appeared to occur during these southwesterlies. Damage was severe 20 km either side of the

storm, with winds dropping below gale force about 40 km from the centre. The minimum pressure in the city was estimated as 955 mb at 0335 and at the airport 950 mb. Pressure gradients estimated from the barogram averaged 1 mb/km across the storm but near the centre almost 3 mb/km occurred.

The storm surge of 1.5 m occurred at Darwin but was of little significance as this height was exceeded by a natural high tide a day or so later. This tide excluded post-event surveys of debris from contributing to knowledge of the variation of surge away from the tide gauge at Darwin.

K.T.S.