

# ROYAL METEOROLOGICAL SOCIETY: AUSTRALIAN BRANCH MEETING

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## Stormfury Australia

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The tropical cyclone is an enigmatic phenomenon in meteorology. They are potentially one of the most dangerous storms that can cause substantial damage from high winds, floods and from the ensuing storm surge. While this point is generally recognised, crossings of the inhabited regions of the Australian coastline are relatively infrequent and often preparation and safeguards are relaxed as previous memories of cyclone damage are forgotten.

The problem seems to be not one of better forecasting, but of the detrimental financial impact of cyclone damage (e.g. it was estimated that cyclone Tracy caused approximately \$500 m damage). In view of the destructive capability of tropical cyclones, especially in the more densely populated cyclone-prone regions in America, ways were sought to modify the cyclone to reduce, in particular, the maximum wind speed. Even a relatively small wind speed reduction (N10 to 15 per cent) would be of immense economic benefit as damage and cost are proportional to  $v^3$ . Thus Project Stormfury was introduced.

The basis of Stormfury is to reduce the intensity of the damaging cyclone winds by enlarging the extent of the cyclone 'eye'. It is hypothesised that this may be achieved by enhancing convection (through cloud seeding) in the regions further out from the pronounced side wall. The difficulty is then to test this hypothesis.

It was suggested that the hypothesis may be tested in a numerical model. Such studies are generally inconclusive since most models are physically deficient. It appears that a statistical representation of evidence of wind speed modification is required. However, the need to carefully stratify the cyclones depends on (i) measured wind speed (greater than 75 kn), (ii) whether the storm is within aircraft range, and (iii) whether the storm is far enough out to sea (160 n mi) to remain unaffected by possibly crossing the coast during seeding. For example, in the US Caribbean, only one or two storms are suitable for seeding experiments during a cyclone season. Thus in 1976, NOAA - the US Government agency responsible for the project - approached Australia to see if Stormfury might be extended to Australia. While problems exist at the negotiating table between the two governments, the situation is encouraging and in February-March 1979 NOAA's specially instrumented Orion aircraft made the first penetration of a tropical cyclone in the Australian region (cyclone Kerry).

Discussion followed the presentation. Particular points made were that cyclone forecasting remains a significant problem during the formative stages as the initial position is difficult to determine. Also, statistical evidence of successful modification is indeed complex and it was felt that this point was underplayed in Stormfury. It was acknowledged that several case

studies are required to be statistically meaningful. Finally, doubt was cast on the employment of numerical models as a scheme of assessment or indeed in supporting the proposed hypothesis. The talk was well received and approximately 35 members attended.

G.L.S.