

1. The streamlines method of analysis has been used extensively by several meteorological services in all parts of the tropics during the last three decades, and I believe its usefulness has been demonstrated. Recently, the National Hurricane Center in Miami has developed a computer program that yields a computer-prepared objective streamline analysis from a given field. It is nevertheless perhaps true that the acceptance of the streamline method for day-to-day operations by several weather services may not be too widespread.

2. Our choice of the word 'struck' may not have been a proper one for the effect of the cyclone on the Arabian coast. At the time we had no precise knowledge of the effects of the cyclone on the coastal land area of Arabia. As Dr. Desai points out the station Salalah was affected by the outer area and did not receive the full impact of the cyclone core. The choice of the term 'struck' was not meant to imply that the cyclone core had penetrated the coast.

3. The pressure reading of 945 mb by RAF aircraft on 27 May was not received at Bombay at the time, and was unknown to me. We did receive a 60 kt wind report on the east side of the circulation on 28 May. Evidently, the system retained its full intensity while in the southwestward track after recurvature.

4. I am not certain the comments on this point hold views in direct opposition to ours. Not having access to Dr. Desai's 1967 paper it is, unfortunately, difficult for me to visualize his arguments. There is no question that by May 26, with the cyclone near the Arabian coast, air of middle latitudes origin was entering the outer periphery of the cyclone. I have no comment at this time about Dr. Desai's ideas on the lower and upper level structure and the so-called 'reversal level'.

5. No comments.

6. Dr. Desai's comments on items under (6) and (7) as well as on others, seem to indicate a pre-occupation with continental and maritime air currents and frontal type discontinuities in the cyclone circulation; ideas that have not been held in high esteem during the last three decades. In view of the success of other approaches to the tropical cyclone problem which have led to considerable advancement in the understanding of cyclone dynamics and energetics, and even to somewhat successful attempts at their modification,

it is difficult to see the validity of Dr. Desai's arguments. There has been considerable evidence accumulated during the last 10-15 years about the highly convective nature of the tropical cyclone circulation. In such a system processes of dissipation and reformation of essentially convective entities frequently occur.

7. See above.

8. Tropical cyclones formation has indeed been observed equatorward of latitude 10° and even of 8° , particularly in the Pacific and Indian Oceans, but they are still a rare occurrence.

9. So called 'upper level steering' has also been advocated by some forecasters in the Atlantic area, and there have been some fine examples where the use of upper level circulations would lead to good forecasts. Some good arguments have also been presented against the indiscriminate use of the principle of upper level steering. Our statement in regard to 500-mb and 200-mb levels express what I consider to be a generally prevalent, but not infallible, ideas.

10. No comments.

11. Although balloons released in the eye, whether made from the surface up, or from an aircraft down, may indeed drift into the wall cloud and the soundings be not truly representative of eye conditions; all the eye soundings obtained to date show some frequently recurring characteristics. The interpretation for dry and moist layers on the basis of maritime and continental air, suggested by Dr. Desai, is difficult to accept. In a well developed cyclone, of central pressure in the order of 950 mb or below, it is difficult to visualize that maritime or continental air maintain their original characteristics into the outer periphery of the eye. There was a few years ago one reported case in an Atlantic hurricane, from reliable witnesses, but unfortunately not documented for publication, where a constant-level balloon released in the eye remained in the eye for nearly 24 hours. Therefore, it is not unrealistic to assume that a dropsonde released from 500 mb in such a deep cyclone remained essentially within the eye, although not necessarily in the centre of the eye.

12. The effect of topographic features in the behaviour, and even the motion, of tropical cyclones has been reported several times in the literature.

13. No comments.

14. See comment in item 6 above.

JOSE A. COLON

*National Weather Service Forecast Officer,
San Juan, Puerto Rico 00213
20 November 1970*