

Reply

JACK E. HUNTLEY

Fleet Numerical Oceanography Center, Monterey, CA

JOHN W. DIERCKS

30th Weather Squadron, Yongsan Army Installation, Korea

3 March 1982 and 12 May 1982

We are pleased to see that our recent paper has stimulated the interest of Khandekar. Our paper was based solely on observational evidence collected by aircraft and satellite reconnaissance. Little attempt was made to provide a theoretical discussion for the observed tilt, except to note that the tilt of these tropical cyclones was generally in the direction of the high-level wind shear and toward the convective cloud mass which often was displaced from a low-level exposed circulation center.

First, we apologize to Khandekar and Rao for overlooking their earlier papers which allowed for a tilted tropical vortex in a two-layer model. Second, their model is a plausible mechanism for the observed erratic motion in the early stages of many tropical cyclones. We believe, however, that this mechanism better explains the early surface trajectory of Typhoon Tip rather than the surface trajectory of Typhoon Abby. Although Khandekar's explanation is possible, the northward jogs in Typhoon Abby's sur-

face trajectory were closely correlated with passage of midlatitude troughs to Abby's north. Temporary northward displacements on a general west-northwestward trajectory are often observed as midlatitude troughs pass north of tropical cyclones.

Khandekar and Rao's model maintains a consistent separation distance of the upper-level vortex relative to the lower-level vortex while both vortex centers undergo similar oscillations. This is similar to observational evidence during the early stage of many tropical cyclones. As the cyclone intensifies to typhoon intensity, the lower-level and upper-level centers become vertically aligned often in close temporal proximity to eye formation. In the case of Typhoon Tip, the upper vortex during the period of trochoidal motion between 4 and 7 October 1979 was located to the south-southwest of the lower vortex. In the case of Tropical Depression 80-01, the upper vortex remained north of the lower vortex between its formation and landfall in the Philippines.