

Strong Cyclonic Vortices over Topography on a Beta-Plane

Hung-Cheng Chen, Chin-Chou Chu, Chien-Cheng Chang

Institute of Applied Mechanics, National Taiwan University, Taiwan

Strong cyclonic vortices over topography on a beta-plane were investigated by a joint analytical, experimental and numerical approach. Experimental parameters in the rotating tank with a gently sloping bottom were carefully determined according to the conservation of potential vorticity. A shallow water model was numerically integrated incorporating with a gradient-wind-balanced vortex model. The motion of the vortices showed complicated track deflections associated with meandering Rossby wave wakes. The track behaviours can be further explored by a dynamic model which predicts similar results to those observed from the experiments, numerical calculations and some historical typhoon trajectories encountering the Island of Taiwan.

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