

Variability of oceanic eddies from satellite altimeter in the Kuroshio region

Chung-Ru Ho¹ and Yu-Hsin Cheng²

¹Department of Marine Environmental Informatics, National Taiwan Ocean University

2 Pei-Ning Rd., Keelung 20224, Taiwan

Tel: +886-2-2462-2192; Fax. +886-2 -2462-0912

E-mail: b0211@mail.ntou.edu.tw

²Department of Marine Environmental Informatics, National Taiwan Ocean University

2 Pei-Ning Rd., Keelung 20224, Taiwan

Tel: +886(2)-2462-2192; Fax. +886(2) -2462-0912

E-mail: 29981002@mail.ntou.edu.tw

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Abstract

The absolute dynamical topography (ADT) data derived from satellite altimetry from 1993 to 2012 are analyzed to investigate oceanic mesoscale eddies in the Kuroshio region east of Taiwan. The number, lifespan, size, moving distance, moving velocity, and kinetic energy of identified eddies are determined by a free-threshold eddy identification algorithm. This identification algorithm is based on connected component labeling and the Okubo-Weiss parameter which can separate the flow field into deformation-dominated and vorticity-dominated regions. The results show that the kinematic properties of eddies are well approximated by a Rayleigh distribution. The kinetic energy of eddy has one order less than that of Kuroshio, but it still can affect the Kuroshio variability. The trajectories of eddies exhibit a strong westward propagating tendency, less beta effect is found here. Eddies are more active during late winter to spring. Anticyclonic eddies possess greater lifespans and size than do cyclonic eddies but the propagation speed of cyclonic and anticyclonic eddies are nearly the same. The kinetic energy of cyclonic eddy is greater than anticyclonic eddy. No matter cyclonic eddy or anticyclonic eddy, the propagation pathway is westward.

Keywords: eddy; Kuroshio; absolute dynamical topography; satellite