Mesoscale Ocean Eddies from Satellite Altimetry: Methods, Data, and Applications

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Abstract

Mesoscale ocean eddies are ubiquitous rotating vortices of water that impact the global transport of heat, energy, and nutrients. With the advent of satellite altimetry, it is now possible to monitor these features on a global scale. We present a spatio-temporal data mining technique that extracts eddies globally from daily sea surface height data using both spatial and temporal information. This work is unique since most existing methods rely solely on spatial information. Furthermore, we demonstrate an application of such global ocean eddy dataset by studying the interactions between mesoscale ocean eddies and tropical cyclones. Interestingly, despite having virtually 1:1 ratio between cyclonic and anticyclonic eddies on a global scale, tropical cyclones interact nearly 2:1 with cyclonic than anticyclonic eddies.

Keywords: Mesoscale ocean eddies, tropical cyclones, data mining

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