Episodic and extreme events in the ocean: recent results and a view toward future studies

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Episodic and extreme oceanic events have great societal importance. For example a single typhoon that struck South Korea accounted for almost 10% of the worldwide financial losses attributed to disasters in 2003. Phenomena including hurricanes, typhoons, mesoscale eddies, and internal solitary waves have been vastly undersampled previously because of technological limitations. Consequently, their importance and contributions to oceanic variability have remained enigmatic. However, emerging cutting-edge technologies and new analyses are proving valuable for improving our knowledge and enabling development of new models of extreme and episodic ocean processes.

In this presentation, results from several recent interdisciplinary experiments that have effectively captured extreme and episodic events are described. For example, data collected during passages of hurricanes over autonomously sampling interdisciplinary moorings off Bermuda and the east coast of the United States are discussed. Analyses of observations collected during passages of mesoscale eddies and their roles in biogeochemical cycling and internal solitary waves and their effects on bottom resuspension are also presented. Finally, a view toward future observational and modelling capabilities for extreme and episodic events in the global context is provided.