

Sudden strong current generated by an eddy in the eastern part of Wakasa Bay, Japan

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A sudden strong coastal current called a“kyucho” occurred in August 2013 in the eastern coastal waters of Wakasa Bay, Japan. This study examined its characteristics based on both observational data collected by intensive field investigations and the simulation results of a numerical model. The field investigations comprised moored buoy observations near the coast and voyages by a research vessels and fishing boats. The mooring observations indicated that a current speed exceeding 50 cm s⁻¹ occurred abruptly near the eastern coast of the bay, in association with a synchronous change in the current direction. Data collected by acoustic Doppler current profilers (ACDPs) mounted on the vessels showed that a clockwise eddy existed in the bay and that the current on the east side of the eddy generated the kyucho near the coast. Based on the results of the numerical model and the analysis of the ADCP data, it was considered that the clockwise eddy was generated by a strong current at the tip of the Tango Peninsula, in the western part of the bay. As the eddy propagated from west to east across the bay, it induced the kyucho in the coastal waters in the east of the bay.

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