



## **Mesoscale eddies modulate multiscale motions and transport deep-sea sediments**

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Mesoscale eddies, which contribute to long-distance water mass transport and biogeochemical budget in the upper ocean, have recently been taken into assessment of the deep-sea hydrodynamic variability. Base on nearly 3-year measurements obtained by full-water column mooring systems located deeper than 2000 m in the northern South China Sea, we examine the influence of mesoscale eddies on the near-bottom currents and mixing as well as the cross-basin deepwater sediment transport process. Three southwestward-propagating mesoscale eddies with radius of  $\sim 150$  km passed by our mooring sites. According to our multiple measurements, it clarifies that these deep-reaching surface-generated eddies result in enhanced subinertial motions in the deep sea, and ultimately lead to energy transfer from mesoscale to small-scale motions. For the first time we observed the deep-sea sediment transport process driven by mesoscale eddies, resulting in a total net southwestward sediment transport up to one million tons. Our findings confirm that the mesoscale eddies have played a significant role on the deepwater dynamic process and further in general on ocean circulation and ecological environment at great depth.