

## Remotely forced decadal physical and biogeochemical variability of North Pacific Subtropical Mode Water over the last 40 years

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Half-century-long observations at the 137°E hydrographic section across the western North Pacific have been analyzed to demonstrate remotely forced decadal physical and biogeochemical variability of Subtropical Mode Water (STMW) over the last 40 years. During unstable periods of the Kuroshio Extension (KE) that lagged the warm phase of the Pacific Decadal Oscillation by 3–4 years, high regional eddy activity reduced the formation rate and salinity of STMW in its main formation region south of the KE. At the 137°E section south of Japan, decreasing advection of oxygen-rich STMW from the east resulted in decreases of dissolved oxygen and pH and increases of nutrients and dissolved inorganic carbon, accelerating acidification. Such changes reversed and acidification slowed down during stable-KE periods, especially in the current period since 2010 exhibiting a hiatus of acidification. These results indicate a new mechanism by which climate variability affects physical and biogeochemical structure in the ocean interior.

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