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STATISTICAL ANALYSIS OF MEASUREMENTS AT THE DEEP MOORING OFF THE NORTHWESTERN YAMATO RISE, THE SEA OF JAPAN

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Statistical analysis of unique data from deep mooring installed off the northwestern Yamato Rise, the Sea of Japan, from April 22, 2014, through April 13, 2015, is performed. Dynamic processes in the deep waters are studied from proxies, namely, depth and tilt of instruments rigidly fixed to the cable, as their variation was induced by currents. Dynamic processes in the thermocline are analyzed from satellite altimetry and infrared imagery. Timescales in the thermocline are estimated from temperature wavelet spectra and in the entire water column from the joint wavelet spectra of depth and temperature. The mooring behavior underwent a shift in late July 2014. At the beginning, fluctuations of the instrument depths were weak but they became intense afterwards, probably due to the intensified sensitivity to currents under the decrease of mooring buoyancy in the bottom layer. The shift evidently occurred on July 28, 2014 and was accompanied by abrupt depth jumps up to 80 m in few hours. After that, synchronized depth fluctuations of all instruments occurred within the range of 50 to 100 m and of 150 to 250 m in late March through early April 2015. Processes on 8-to-13 day's timescale evolved mostly independently in the thermocline and deep layer but they were coherent on April 4–7, 2015, when a large anticyclonic eddy moved near the mooring, affecting the entire water column. In January 2015 near-inertial oscillations were detected in the entire water column, probably forced by the strong wind and anticyclonic mesoscale features. An increasing trend of bottom temperature, equal to 0,002 °C per year, is revealed.

Keywords: deep mooring, depth, temperature, satellite altimetry, satellite infrared imagery, wavelet analysis, timescales, mesoscale eddies, near-inertial oscillations

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