



Abstract View

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Abyssal Eddy Kinetic Energy Levels in the Western North Pacific

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ABSTRACT

An earlier observation of about $50 \text{ cm}^2 \text{ s}^{-2}$ for the maximum abyssal ($\sim 4000 \text{ m}$ depth) eddy kinetic energy (K_E) in the western North Pacific along 152°E , occurring in the vicinity of the Kuroshio Extension, is now supported by nearly two years of observation with moored instruments deployed from 28 to 41°N . The maximum occurred at the same site each year (nominal, from one array setting to the next), near 35°N , and the composite or two-year average is $45 \text{ cm}^2 \text{ s}^{-2}$. At analogous longitudes in the western North Atlantic, one finds abyssal kinetic energies as high as $100\text{--}150 \text{ cm}^2 \text{ s}^{-2}$ in the vicinity of the Gulf Stream. However, the abyssal western North Pacific could be more energetic at longitudes other than 152°E . Eddy intensities at abyssal depths near the Gulf Stream do drop off to smaller values approaching either Cape Hatteras or longitudes in the vicinity of the Grand Banks of Newfoundland.

Abyssal K_E values at specific sites along 152°E were observed to vary by as low as a few percent and as high as a factor of 2 from year to year. A prominent secondary maximum in K_E , primarily due to zonal variability, was observed to exist north of the Kuroshio Extension for one year, but not the next. However, the maximum K_E at 4000 m depth, its location, and the general shape of the latitudinal distribution of eddy intensity are relatively stable. Averages over all moorings where these data are available were 22.5 and $18 \text{ cm}^2 \text{ s}^{-2}$ for the two respective deployments. The mesoscale contribution (periods of 30 to 150 days) to abyssal K_E along 152°E was typically 50–60%.

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