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Supporting Information for

Characteristics of Internal Tides Modulated inside a Mesoscale Warm Eddy based on Single Virtual-moored Slocum Glider observations

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Introduction

Supporting information in this file include 6 supplementary figures.

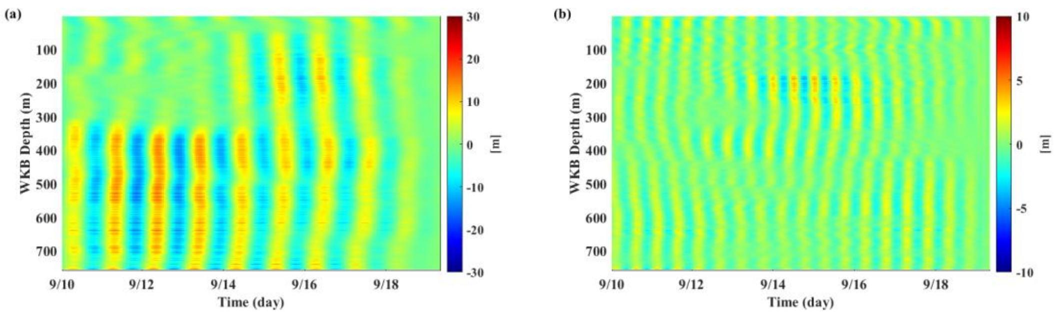

Figure S1. Depth-time map of WKB-scaled isothermal vertical displacements estimated from up-cast measurements of a glider. (a) DIT and (b) SIT. Compared to Figures 4c and d, no clear discrepancy occurs between them, meaning a high performance of the virtual-mooring mode of the Slocum glider. Note that the sampling time in up-casts is on average 2.8 h and data are gridded to a 1 h temporal resolution.

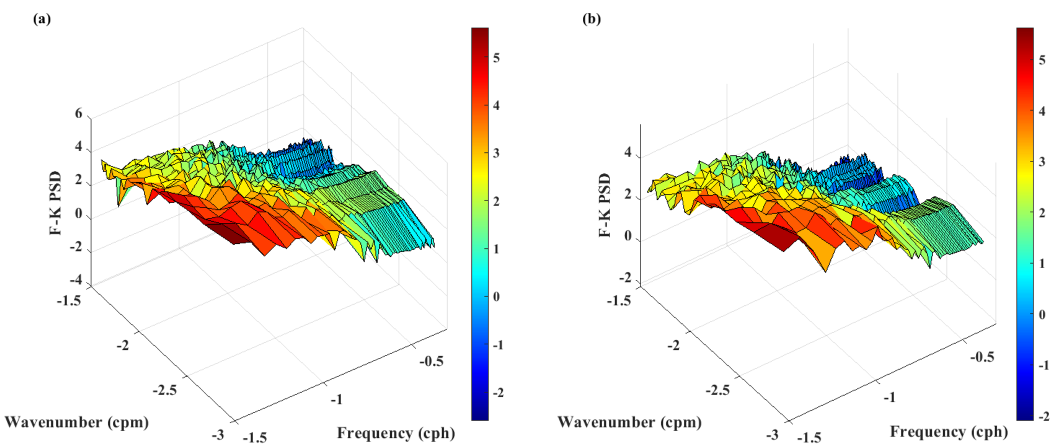

Figure S2. Surface plot of frequency-wavenumber (F-K) of depth-time isothermal vertical displacements. The spectral density is expressed in terms of Log10. (a) The eddy's inner center regime, and (b) the eddy's outer center regime.

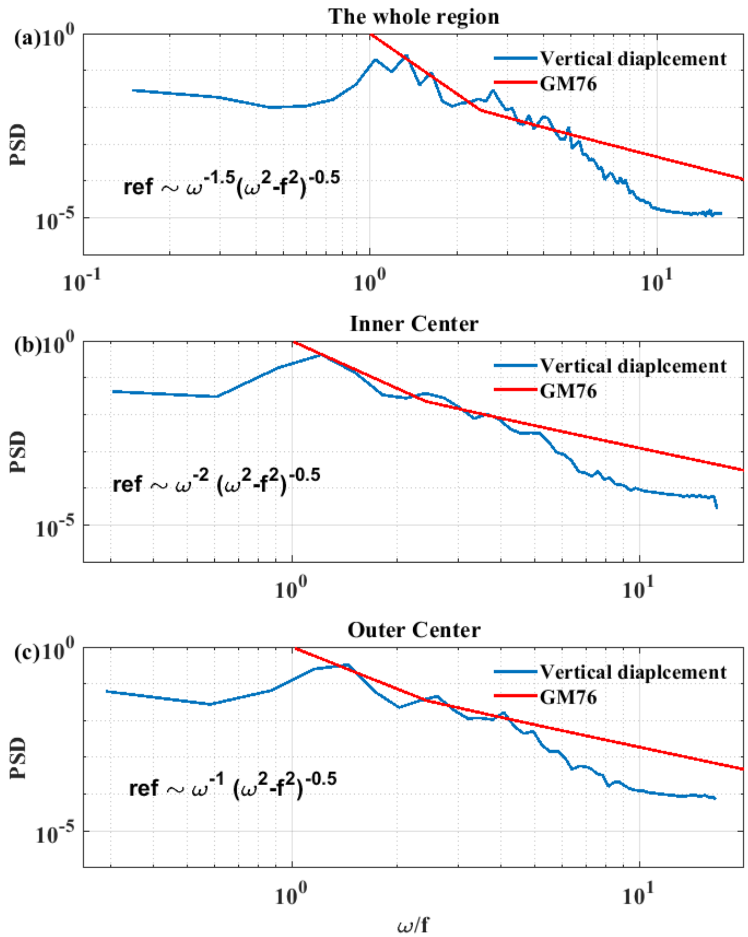

Figure S3. Frequency spectral density estimations obtained from frequency-wavenumber (F-K) of the depth-time isothermal vertical displacements. The slopes are estimated according to the GM76 model, for the entire observation (a), the inner center duration (b), and the outer center duration (c), respectively. A difference occurs in the slope estimated over the intermediate frequency bandwidths between inner and outer centers. Also, the abrupt decaying behavior in the high-frequency bands is presumably due to temporal smoothing effects when gridding the raw observations.

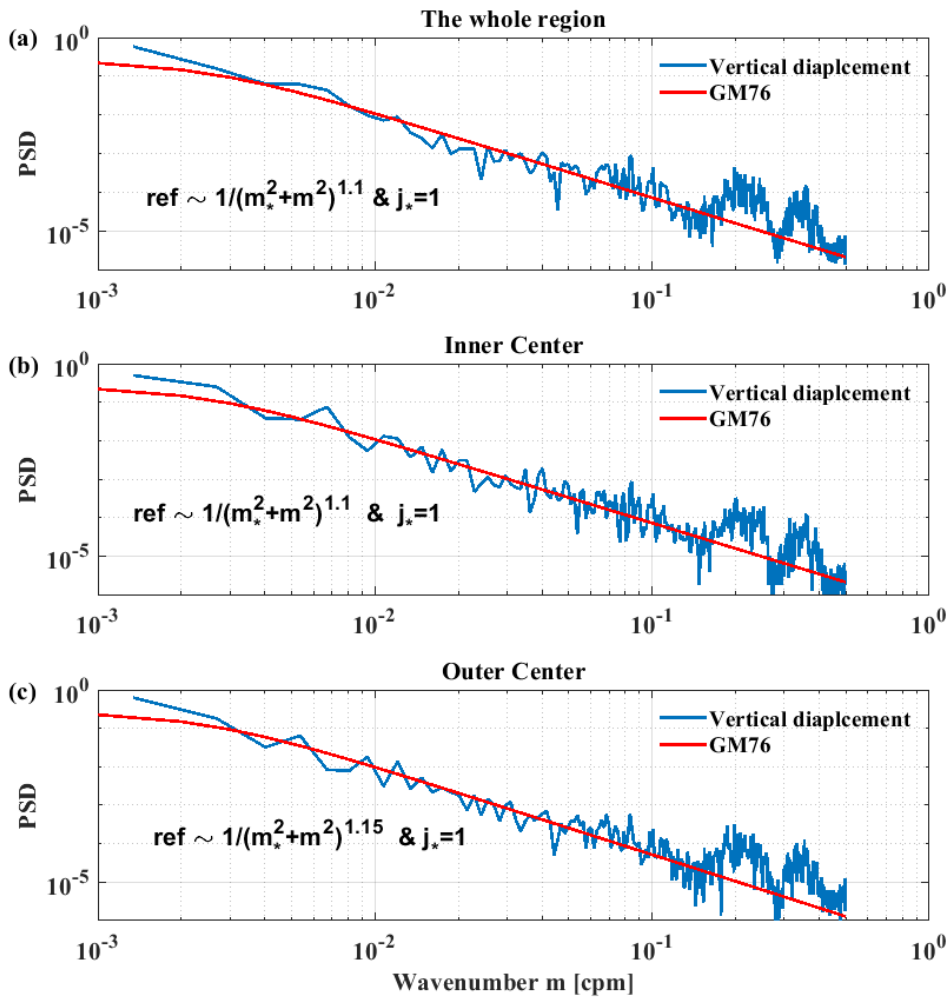

Figure S4. Vertical wavenumber spectral density estimations obtained from frequency-wavenumber (F-K) of the depth-time isothermal vertical displacements. The slopes are estimated according to the GM76 model for the entire observation (a), the inner center duration (b), and the outer center duration (c), respectively. There are no noticeable differences in the slopes above. The deviating behavior in the higher wavenumber bandwidths is due to measurement noises.

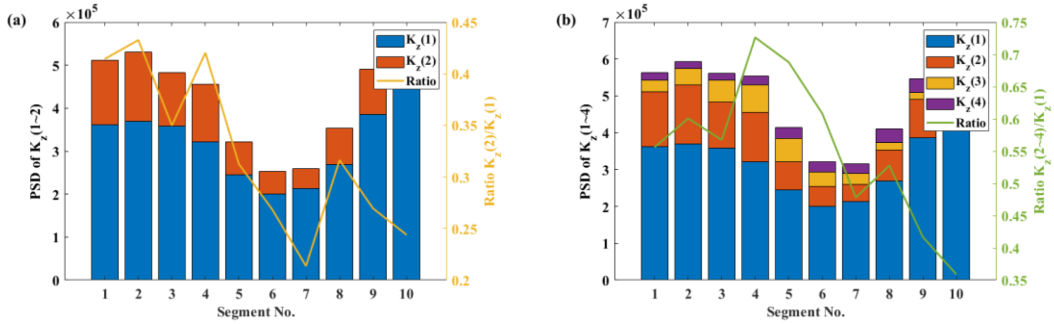

Figure S5. PSDs of vertical wavenumbers of DIT is presented using a moving window of 128 datapoints in an overlapping manner. (a) PSDs of the two lowest vertical wavenumbers and ratio are plotted (right *y*-axis). (b) PSDs of the four lowest vertical wavenumbers and ratio are plotted.

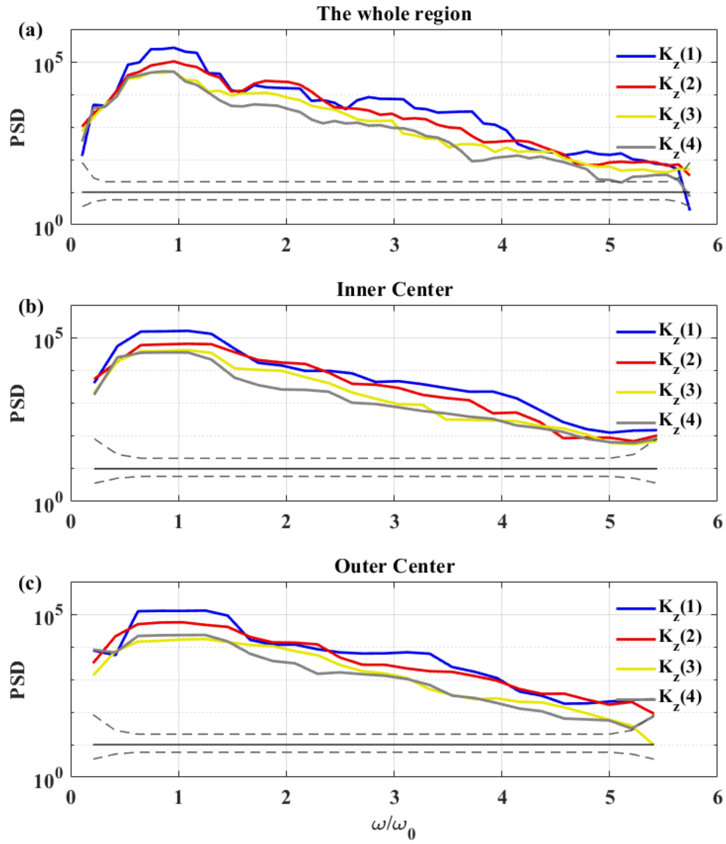

Figure S6. Frequency spectral estimations of DIT corresponding to the four lowest vertical wavenumbers, along with two-sided 95% confidence intervals in the bottom (gray dotted lines based on the black base line). Here, ω_0 is the diurnal frequency, K1. During the entire observation, the lowest wavenumber (Mode1) could be the first and second contributor to the total DIT and SIT variance, respectively (a). When separately decomposed into inner and outer eddy centers, the DIT power spectra distribution over the low wavenumbers is be wider in the inner center (b) rather than in the outer center (c), although subtle. This different pattern indicates that nonlinear interactions among internal waves and the eddy become stronger in the inner center than in the outer center.