# Effects of mesoscale dynamics on the path of sinking particles to the deep ocean: A modelling study

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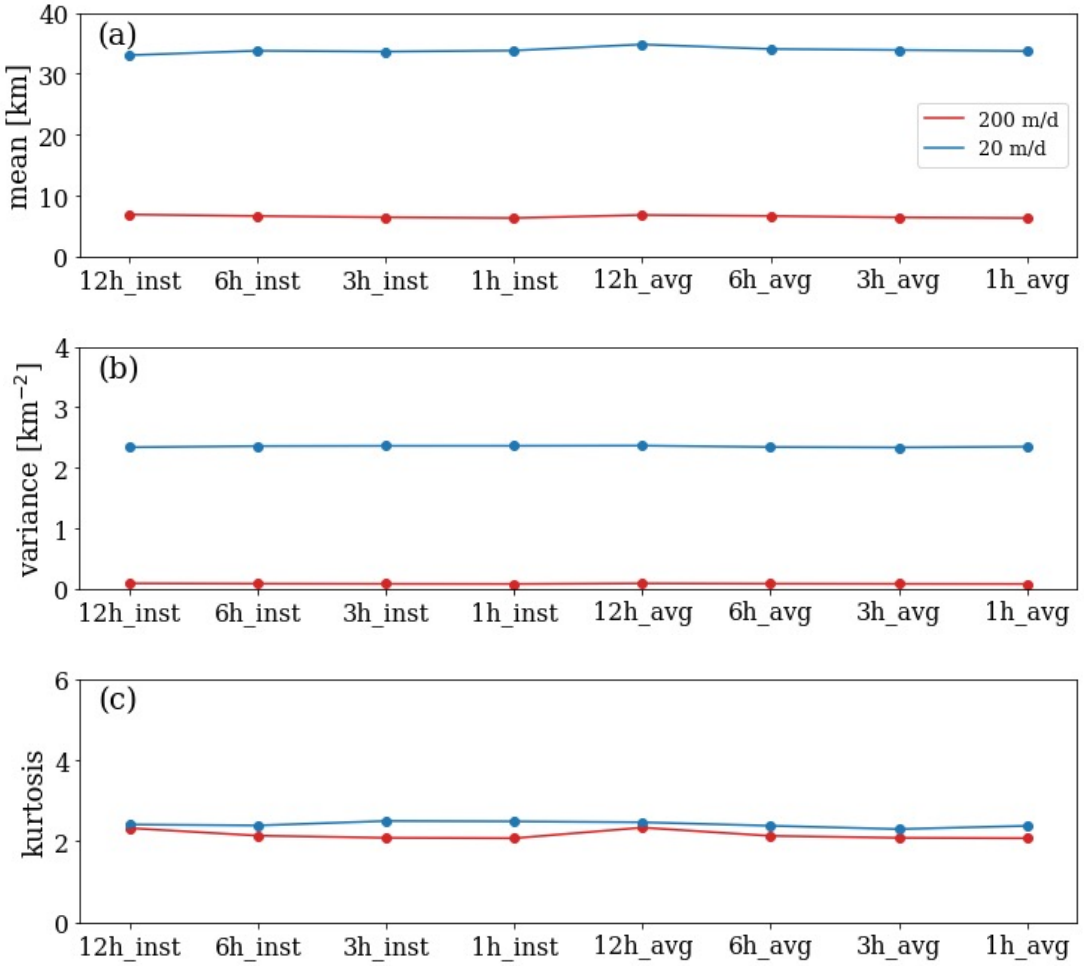


**Figure S1.** Horizontal dispersion in the sensitivity test runs, assessed by metrics derived from the PDF of horizontal displacements: (a) mean; (b) variance; (c) kurtosis. The x-axis is labeled by the types of outputs used for test runs: instantaneous ('inst') or average ('avg') at 12/6/3/1 hour intervals. All three metrics show minor changes with output types.

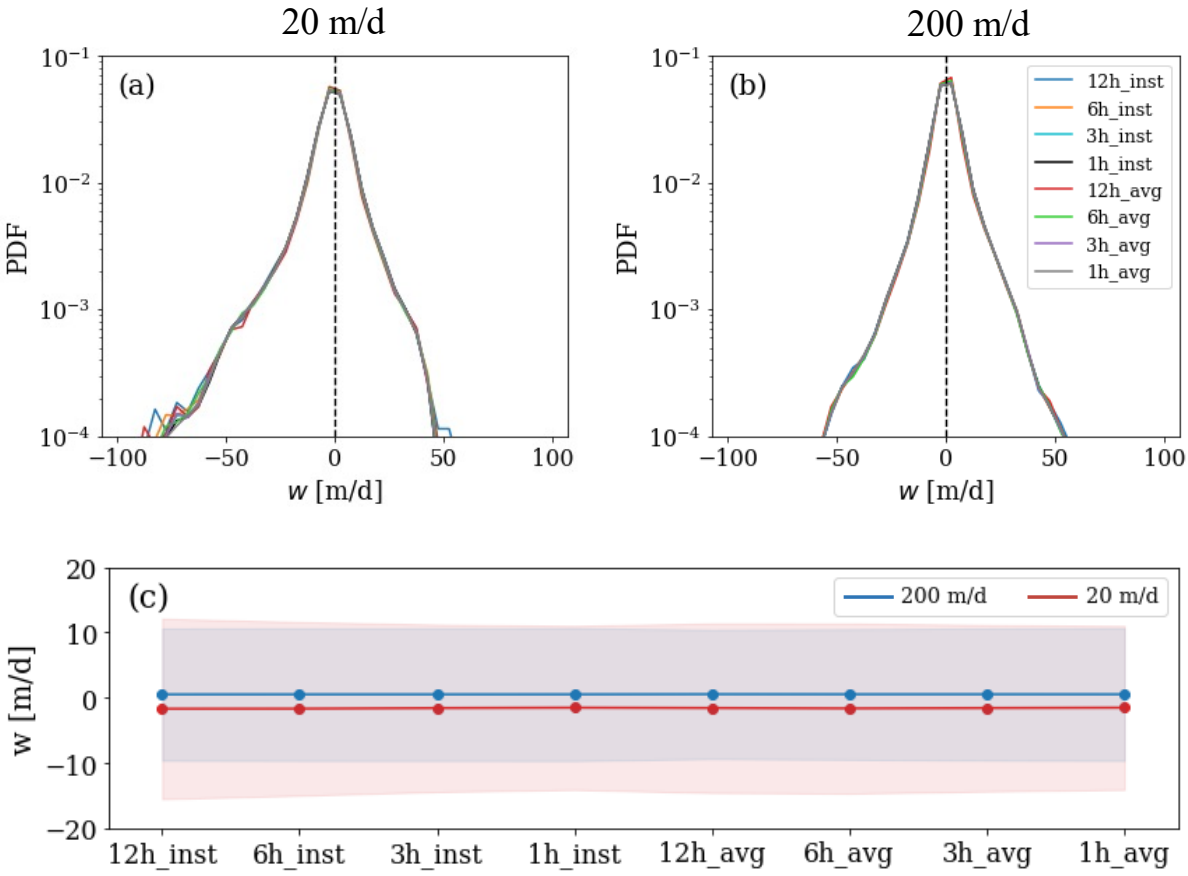


**Figure S2.** Vertical velocity $w$ recorded by particles in the sensitivity test runs: (a) PDF of $w$ for 20 m/d; (b) for 200 m/d; (c) mean $w$ with standard deviations. Again, similar to the horizontal dispersion, the types of outputs do not affect particle dynamics in the vertical.

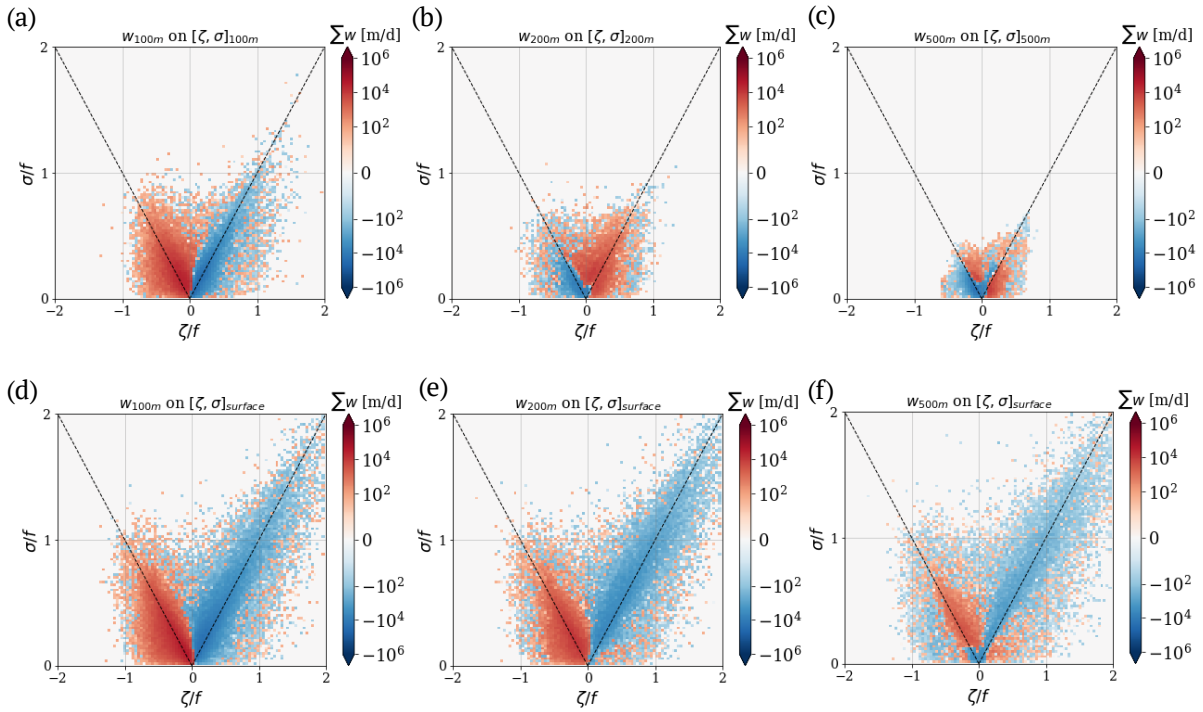


**Figure S3.** Vertical velocity at a specific depth (100 m, 200 m, and 500 m, from left to right), shown as the sum of $w$ in each bin: (a-c) conditioned on the vorticity-strain space at corresponding depth; (d-e) on the vorticity-strain space at the surface (10 m). The top and bottom panel comparison shows that the $w$ pattern changes dramatically when conditioned on different vorticity-strain spaces. Also, the comparison between the three columns indicates the patterns differ for depths within and below the mixed layer.

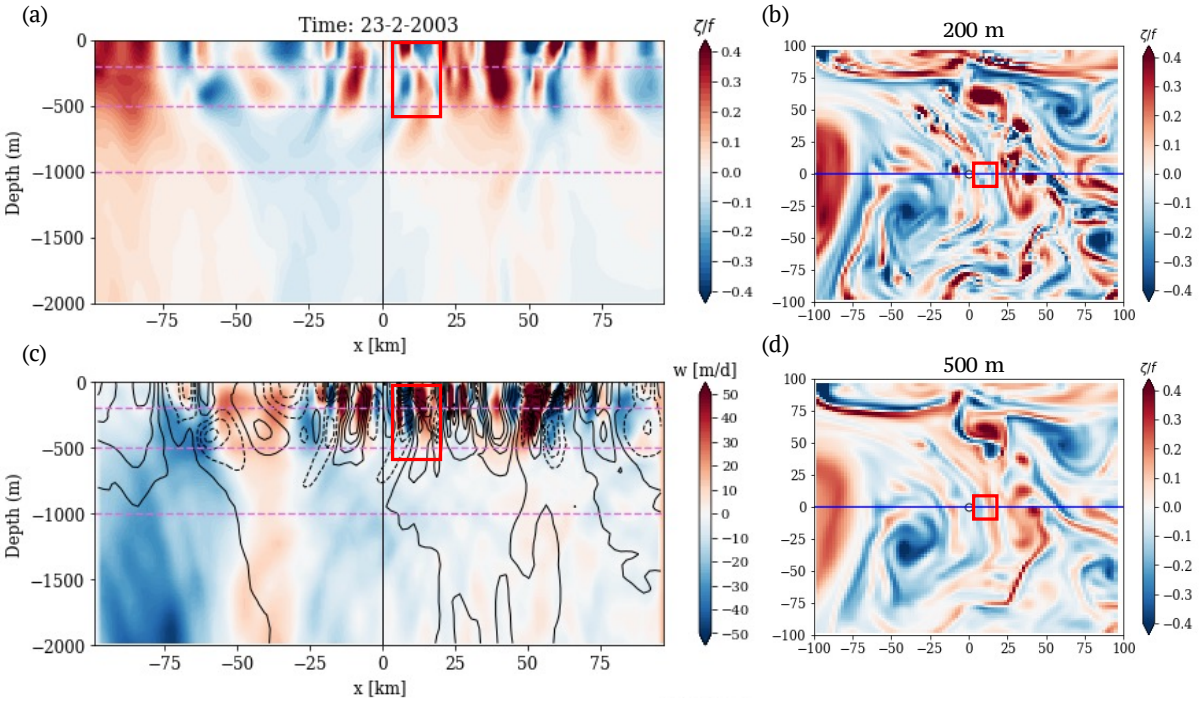


**Figure S4.** Snapshots of the flow field on 23 Feb 2003: (a) A section of relative vorticity; (c) A section of vertical velocity with relative vorticity contours (solid: cyclonic, dashed: anticyclonic). The location of the section is marked as the blue line in horizontal maps of relative vorticity at (b) 200 m and (d) 500 m. The example of structures showing changed signs of relative vorticity with depth is marked in the red box. Relative vorticity shows an opposite sign for the upper 200 m and below 200 m, associated with a homogeneous vertical velocity cell. Such structures are common in our time series.