

eddies from either the surface or the bottom. Based on the three-dimensional numerical product, we develop a method to extract information on the vertical structure of eddies, which shows that there are three types of eddies in terms of vertical shape: bowl-shaped, lens-shaped and cone-shaped. The dynamical analyses show that most submesoscale eddies in the SCB are in ageostrophic balance whereas most mesoscale eddies are in geostrophic balance.

[43] In a downscaling model, eddies remotely generated have been filtered along open boundaries. Though eddies tend to move westward and such filtering might have minor effects on the eddies in the SCB, we limit our studies to eddies which are generated and die inside the domain. Mesoscale and submesoscale eddy observational data are very scarce, especially sub-surface data, therefore the three-dimensional eddy characteristics presented in this study from a numerical product have yet to be verified by more observational investigations.

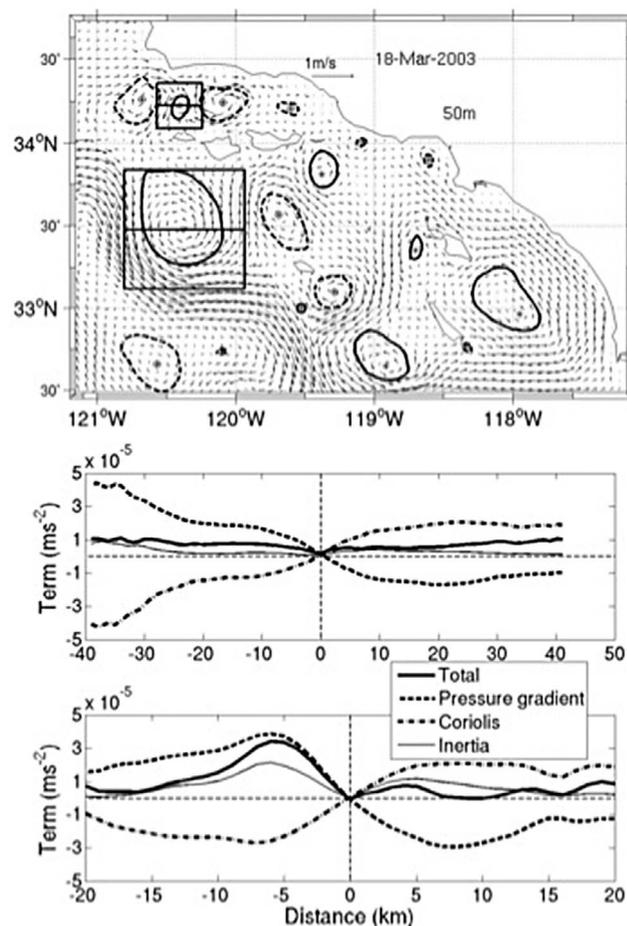


Figure 21. Two examples show geostrophic and ageostrophic balanced eddies at a level of 50 m. Top plot is a snapshot of currents at 50 m. The solid (dashed) circle-like lines are cyclonic (anticyclonic) eddies' boundaries. The stars are eddy centers. The two eddies are highlighted for dynamical balance analysis. Middle and bottom plots are dynamical balance analysis for the larger eddy and smaller eddy, respectively.

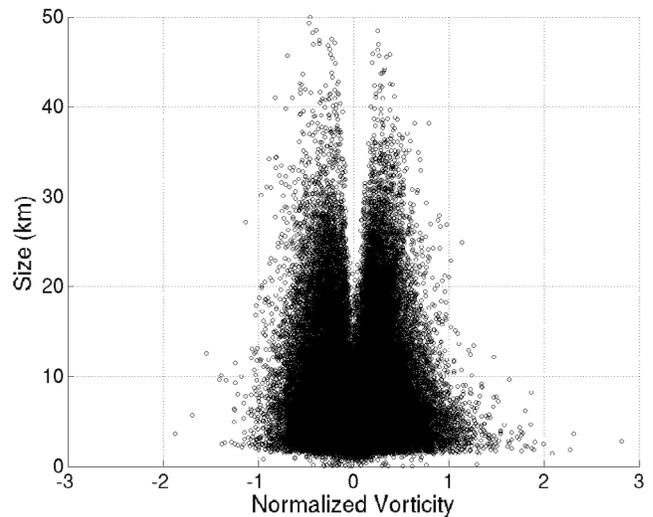


Figure 22. The normalized relative vorticity of eddies versus eddy sizes.

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