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Elliptical motions of eddy-trapped floats

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We present preliminary results using a new mathematical method to extract physical properties of eddies from time-varying orbits of eddy-trapped floats. Our method, based on the continuous wavelet transform, permits several separate flow components to be distiguished from one another and bounded within confidence limits. We show that a high-frequency component, due to the float apparently traversing an elliptical orbit, accounts for a large portion of the scatter in traditional velocity and radius estimates. Such ellipticity has at least two main sources. The first is the deformation of Lagrangian trajectories by an external strain field, while the second is an artifact of anisotropic tracking error. After removing the high-frequency orbital motion, slower variations in ellipse properties are resolved, which reveal evidence for floats ''profiling" radially across the eddy. In some instances, quasi-periodic advection by an unseen partner eddy may also be inferred. The position of the eddy center is then found as a residual with minimal aliasing from the orbital motion. Examples from the POMME experiment in the subduction region of the eastern North Atlantic are shown.