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The Water Mass Transformation Framework for Ocean Physics and Biogeochemistry

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Abstract

The water mass transformation (WMT) framework weaves together circulation, thermodynamics, and biogeochemistry into a description of the ocean that complements traditional Eulerian and Lagrangian methods. In so doing, a WMT analysis renders novel insights and predictive capabilities for studies of ocean physics and biogeochemistry. In this review, we describe fundamentals of the WMT framework and illustrate its practical analysis capabilities. We show how it provides a robust methodology to characterize and quantify the impact of physical processes on buoyancy and other thermodynamic fields. We also detail how to extend WMT to insightful analysis of biogeochemical cycles.

