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Untangling tracer trajectories and clarifying coherence in 2D flows using braid theory MARGAUX FILIPPI, SÉVERINE ATIS, Massachusetts Inst of Tech-MIT, JEAN-LUC THIFFEAULT, MARKO BUDIŠIĆ, University of Wisconsin-Madison, MICHAEL ALLSHOUSE, University of Texas-Austin, THOMAS PEACOCK, Massachusetts Inst of Tech-MIT — Interpreting ocean surface transport is crucial to many areas of oceanography, ranging from marine ecology to pollution management. To better understand surface mixing, we investigate a braid theory method to detect transport barriers bounding coherent structures in two-dimensional fluid flows. Whereas most existing techniques rely on an extensive spatiotemporal knowledge of the flow field, we seek to identify these structures from sparse data sets involving trajectories of a few tracer particles or floats. We present the results of model and laboratory experimental studies to test the robustness and applicability of the braid theory method, and discuss the potential applicability to oceanic data sets.

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