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Uncertainty quantification of trajectory clustering in ocean ensemble forecasts GUILHERME SALVADOR-VIEIRA, MICHAEL ALLSHOUSE, Northeastern University, IRINA RYPINA, Woods Hole Oceanographic Institution — Identifying coherent structures in unsteady flows helps differentiate flow regions based on material transport. Partitioning flows into regions that minimally mix with their surroundings in the oceans, for instance, can assist search-and-rescue planning by reducing the search domain. One partitioning method is the spectral clustering of trajectories, which maximizes within-cluster similarities while minimizing between-cluster similarities. For ocean applications, however, in addition to the complex dynamics, there are several sources of uncertainty: model initialization and parameters, limited knowledge of the processes, boundary conditions, and forcing terms. Therefore, when applied to ocean forecasting, the clustering method should analyze multiple realizations, identify robust features, and quantify the uncertainty. We present an investigation of the sensitivity of the spectral clustering method to uncertain parametrization and noise through application to simulations of an analytic geostrophic flow model. We then apply this approach to an operational coastal ocean forecast and compare the results with observational drifter data from a field study.

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