

Abstract Submitted
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Application of fuzzy C-means clustering to geophysical transport

MICHAEL ALLSHOUSE, Northeastern University — Lagrangian techniques have been used to identify the underlying structures of time varying flows. The fuzzy C-means trajectory clustering is one such approach, which is based on the partitioning of trajectories into sets that remain close in Euclidean space throughout the interval of study. We apply this method first to an analytic geophysical system to determine a procedure that produces robust clusters and to determine characteristics of systems suitable for fuzzy C-means analysis. One challenge of the method is the initial seeding dependence of clustering results, which requires multiple implementations to confirm robustness. Direct comparison with the spectral clustering method demonstrates the limitations of applying the fuzzy C-means method to systems with a large number of coherent structures. We then apply our procedure to a geophysical fluid dynamics numerical simulation to visualize the dominant mechanism of transport.

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