

Supplementary Material B. Video Description

The four supplementary videos, for which captions are available below, correspond to the time evolution of the results presented in Figures 2, 7, 9 and 12.

★ video02.avi

Membership probabilities for vortices $k \in \{1, \dots, 6\}$, for different choices of the parameter σ . Values correspond to (a) $\sigma/l_x = 0.005$, (b) 0.015, (c) 0.030 and (d) 0.040. Corresponding colorbars presented in Figure 1.

★ video07.avi

Examples of membership probabilities for the six identified clusters, for different model parameters $\{A_n\}$ and $\{\phi_n\}$ drawn from normal distributions. Cases correspond to parameters $(A_1, A_2, A_3, \phi_1/l_x, \phi_2/l_x, \phi_3/l_x)$ equal to (a) (0.0087, 0.19, 0.20, 0.01, 0.06, -0.03), (b) (0.0069, 0.26, 0.25, 0.00, -0.08, 0.09), (c) (0.0102, 0.35, 0.25, 0.01, -0.01, 0.01), where the jet is identified and one of the vortices missed, and (d) (0.0077, 0.11, 0.32, 0.00, -0.01, 0.02), where the jet (grayscale) is identified and two vortices are merged. Corresponding colorbars presented in Figures 1 and 4.

★ video09.avi

Evolution of trajectories from the 1000 realizations with variable A_n and ϕ_n released from a low (orange, top) and high (red, bottom) uncertainty position. Orange particles are initialized at the core of vortex 1, while red particles are initialized at the perimeters of vortex 4. Transparency is used to highlight high or low concentration of particles. The vortex boundaries from the central realization are plotted in gray and enclose particles with membership probabilities greater than 0.5, for clusters 1 and 4.

★ video12.avi

Time evolution of the average clusters in a binned domain. The 18 drifters are marker-coded depending on the cluster in which they started. Crosses represent the 4 drifters initialized at locations of higher uncertainty, with $S_{i,\hat{k}} > 0.1$. Triangles are initialized on the purple cluster (3 drifters), squares on the blue cluster (5 drifters) and circles on the orange cluster (6 drifters). Corresponding colorbars presented in Figure 11(a).