The observation of a triangular vortex in a rotating fluid

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A dye visualization study of a triangular vortex in a rotating fluid is presented. The emergence and subsequent break-up of the vortex structure are described. Soon after the generation of the triangular vortex it becomes unstable: two satellite vortices merge and pair with the core vortex into an asymmetric dipole, while the third satellite vortex remains behind as a single monopole. A simple point-vortex model is used to simulate this break-up of the triangular vortex. The strengths and positions of the point vortices have been perturbed from an initial steady configuration, consisting of one core vortex surrounded by three oppositely signed satellite vortices, in order to gain insight in the disintegration process of the experimental triangular vortex. It is found that an asymmetry in the strengths of the satellite vortices provides a mechanism that results in an evolution of the vortex structure as observed in the experiment. Both the vortex trajectories and the advection of a passive tracer (dye) are quite well described by the point-vortex model. © 1998 The Japan Society of Fluid Mechanics Incorporated and Elsevier Science B.V. All rights reserved.

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