Coherent propagation of a heton near a submerged cylinder in a two layer fluid

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Vortices are omnipresent in the ocean playing an important role in generating synoptic and mesoscale dynamics. Especially intense vortex dynamics is usually observed near bottom irregularities. Different approaches are exploited to get insights into vortex-topography interactions. The point vortex model presents possibly the simplest approach, allowing one to formulate closed ordinary differential equation systems that govern the point-vortex dynamics. These systems can vary in complexity given varied vortex interactions in question, often rendering them impossible to deal with analytically. However, one can manage relatively easily to solve these systems numerically. Another approach represents a vortex structure as a closed region with some constant distributed vorticity. Then, contours comprising different vorticities evolve according to the vorticity equation. During the evolution, the contours can merge or decompose creating new contours. The paper's goal is to analyze the dynamics of a heton, i.e. compensated two-layer vortex pair, interacting with a submerged cylindrical bottom feature. First, we emphasize a typical behavior of the system with the use of the contour dynamics technique. Then, where applicable, we demonstrate and analyze the similar behavior observed in the point vortex model.