



Spiral arms and ‘dye walls’ in a compound vortex

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Shapes of water surface and transport of contaminants by compound vortex were studied experimentally. Vortex motion in a cylindrical container was produced by uniformly rotating disc placed near the bottom of container. Shapes and depth of surface trough for different values of experimental conditions that are depth of the fluid layer, diameter and angular velocity of rotating disc were measured and compared with calculated. Running large-scale inertial waves and short spiral waves are observed on the surface of the trough. Strong anisotropy of substance transport from a compact spot in compound vortex is observed. In a fluid at rest drop of dye placed on a free surface form cascade of circular vortices. Drop of the dye placed on a free surface inside the surface trough of compound vortex is transformed into fast changing vortex structures. On the free surface extended spiral arms are spinning from the spot. Dye from spiral arms is extracted into vortex and transported along vertical cylindrical surfaces. Comparison with a few previously published papers is given and extrapolation of data on environmental conditions is discussed.