

## Mathematical Physics

# Particle trajectories beneath small amplitude shallow water waves in constant vorticity flows

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We investigate the particle trajectories in a constant vorticity shallow water flow over a flat bed as periodic waves propagate on the water's free surface. Within the framework of small amplitude waves, we find the solutions of the nonlinear differential equations system which describes the particle motion in the considered case, and we describe the possible particle trajectories. Depending on the relation between the initial data and the constant vorticity, some particle trajectories are undulating curves to the right, or to the left, others are loops with forward drift, or with backward drift, others can follow some peculiar shapes.

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