The wave plus current flow over vortex ripples at an arbitrary angle - DTU Orbit (09/11/2017)

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This work concerns the wave plus current flow over a sand bed covered by vortex ripples, with the current and the waves coming from different angles. Experiments were performed in a basin, where current and waves were perpendicular, in order to determine the conditions (current strength) leading to a regular ripple pattern formation. Numerical simulations were conducted changing the direction between the waves and the current from 0degrees to 90degrees and the ratio between the current strength and the wave orbital velocity from 0.2 to 1.5. Close to the bed, the current aligns parallel to the ripple crests, leading to a veering current profile with the vertical coordinate. The current-related friction coefficient was calculated. It was found that it decreases as the angle approaches 90degrees, while it increases for decreasing values of the current with a trend that can be described by a power law.

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