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Titel des Beitrags: Damping of Unwanted Turbulence in Wave-Current Experiments

Abstract: Laboratory testing of structures placed in combined wave–current flows is a valuable source of information for the fulfillment of offshore engineering related tasks and the development of ocean energy devices. In recirculating wave–current flumes, one of the problems encountered during such experimental studies is the occurrence of undesirable current induced velocity fluctuations. These fluctuations often result in significant disturbances of the generated wave profiles. In this paper, a physical flow filter is introduced that significantly reduces fluctuations in the current profile while permitting wave passage. This is achieved by passing the wave–current flow through a setup of perforated net tubes that allows for both horizontal and vertical flow motions. An in depth investigation of the properties of different filter configurations is presented, focusing on the reduction of turbulence intensities in the flow field as well as the influence of the setup on waves. The filter characteristics are quantified in terms of its deflection, absorption, and transmission properties. It is shown that the overall setup effectively reduces velocity fluctuations, resulting in stable wave–current conditions and allowing for high quality laboratory testing.

Stichworte: Filtering; Turbulence; Flow-smoothing; Waves; Wave–current interaction; Flume