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Copepod Behavioral Response to Simulated Frontal Flows D.R. WEBSTER, A.C. TRUE, M.J. WEISSBURG, J. YEN, Georgia Tech, A. GENIN, The Hebrew University of Jerusalem and The Interuniversity Institute for Marine Sciences of Eilat — When presented with a fine-scale upwelling or downwelling shear flow in a laboratory flume, two tropical copepods from the Red Sea, *Acartia negligens* and *Clausocalanus furcatus*, performed a set of behaviors that resulted in apparent depth-keeping and the potential for producing patchiness. Analyses of free-swimming trajectories revealed a behavioral threshold shear deformation rate value of 0.05 s^{-1} for both species. This threshold triggered statistically significant changes in path kinematics (i.e., relative swimming speed and turn frequency) in the shear layer versus out-of-layer. Gross path characteristics (i.e., net-to-gross displacement ratio, NGDR, and proportional vicinity time, PVT) were also significantly different in the shear layer treatments compared to controls. The vertical net-to-gross displacement ratio (VNGDR) was introduced here to explain a spectrum of depth-keeping behaviors. The mean value of VNGDR significantly increased in the shear layer treatments and, coupled with excited relative swimming speeds, suggested the potential to induce large vertical transport (at the 10 cm scale of the observation). However, histograms of VNGDR revealed a bimodality, which indicated a sizable portion of the population was also displaying depth-keeping behavior. Those copepod trajectories displaying large VNGDR predominately consisted of copepods swimming against the flow, thereby resisting vertical advection, which is another potential depth-keeping mechanism.

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