Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Turbulence-Copepod Interactions: Response of *Acartia tonsa* to Burgers Vortex D.L. YOUNG, D.R. WEBSTER, J. YEN, Georgia Tech — Turbulence can affect the vertical position of copepods by altering their position, yet in situ studies suggest that, in many oceanic regimes, copepods alter their vertical position due to a behavioral response to turbulence. Numerous studies have examined copepod response to laminar flow fields, such as escaping from siphons and aggregating in thin layers. In contrast, little information exists on how they react to fine-scale turbulent fluid motions typically encountered in their natural marine environment. The hypothesis to be tested is that fine-scale turbulence alters copepod behavior, manifest as alterations in directed movement and changes in swimming kinematics. We present behavioral assays of the response of the coastal marine copepod, *Acartia tonsa*, to Burgers vortices. The rotation rate and axial strain rate of the Burgers vortices are specified to correspond to the vortices with the median dissipation rate in turbulent conditions typically encountered in coastal and near surface regions. The target conditions are defined by mean turbulent dissipation rates of 0.009 and 0.096 cm^2/s^3, respectively. The three dimensional flow field of each vortex treatment is quantified via tomographic-PIV, allowing for the analysis of copepod response to specific hydrodynamic cues such as deformation rate and vorticity. Copepod trajectories are analyzed in order to correlate the behavior responses (quantified as swimming kinematics) to the hydrodynamic sensory cue.

D.R. Webster
Georgia Tech

Date submitted: 30 Jul 2013 Electronic form version 1.4