Effect of Near-Bottom Flow Fields on the Ecology of Dinoflagellates Responsible for Harmful Algal Blooms

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The ability to predict harmful algal blooms and thereby minimize costs, protect seafood safety, and public health, depends upon research of how HABs develop, persist and are transported. The harmful dinoflagellate, *Karenia brevis,* has been intensively studied due to the socio-economic impacts that blooms have, almost annually, on the west coast of Florida. The new sensing technologies being developed by NOAA programs ECOHAB and MERHAB that contribute to early warning systems rely on surface expressions of HABs. While high cell densities ($> 1 \times 10^5$ cells l^{-1}) that discolor the water near-shore are responsible for the above outcomes, *K. brevis* populations appear to originate offshore in oligotrophic water columns. Field observations of *K. brevis* populations aggregating near the sediment at night and dispersing into an oligotrophic water column during the day suggest that cells may be using the sediments as a nutrient source. The persistence of these near-bottom populations depend on how vertically migrating cells interact with increasing turbulence that cells encounter toward the sediment boundary. Predicting where these near-bottom populations occur, and their subsequent connection to cross-shelf transport vectors, requires associating their distribution with the turbulent environment on different temporal and spatial scales. Nortek's 2 MHz Aquadopp Profiler measures current velocities within the inertial subrange (1-100 cm) and is able quantify the turbulent environment on scales relevant to the near-bottom ecology of *K. brevis*.