In an effort to better understand the physics of the eastern Bering Sea shelf current as it relates to flatfish advection to favorable near-shore areas, multiple satellite-tracked oceanic drifters were released in 2010, 2012 and 2013. The release sites and dates were chosen to coincide with known spawning locations for northern rock sole and known time of larval emergence. The drifters were dropped at 20 and 40 meters in 2010 and 2012 and deployed in a pattern where the five drifters at the same depth could be grouped into six triads (drifters 1, 2 and 3, or 1, 2 and 4, etc.). The drifter trials are used to make calculations of area (triangles) and divergence over a 90-day period that correspond to the larval duration of Bering Sea shelf flatfish. Results from the 2012 drifter deployments indicate that over the 90-day observation period, there are alternating periods of positive and negative divergence with an overall trend toward drift separation after 90 days. Examination of the drifter behavior at the hourly scale indicates that semidiurnal tidal forcing is the primary mechanism of drifter divergence and convergence. Field observations by the Alaska Fisheries Science Center EcoFOC program indicate larval behavior that includes diel vertical distributions that may interact with tidal cycles. It is hypothesized that larval use of diverging tidal cycles could be a mechanism in larval advection to favorable nursery grounds.

Ocean drifters reveal differential patterns of divergence forced by tidal periodicity: implications for larval flatfish advection and recruitment

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