Using Ocean Glider Observations to Assess Upwelling and Hypoxia Along the Northern New Jersey Coast during September 2013

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Abstract (Oral Presentation)

Historical evidence shows that areas of hypoxia are co-located with upwelling events along the New Jersey (NJ) coast during summer. These events, which tend to occur near bathymetric highs within 30 km of the coast, are known to be forced by sustained northward winds that drive the Ekman transport coastal waters seaward. The observed hypoxia is a condition in which dissolved oxygen levels have dropped below 5.0 mg/L. Since 2011, Slocum glider AUVs (autonomous underwater vehicle) have been used to measure the dissolved oxygen (DO) and other water properties along the NJ coast during summer. Here we use the September 2013 glider RU28 data, buoy-winds, satellite sea surface temperatures (SST), and high frequency (HF) radar-derived surface currents to assess the potential for upwelling and hypoxia along the northern New Jersey coast. The sub-surface measurements from the glider, which zig-zagged along most of the NJ coast, measured the lowest temperature and dissolved oxygen in our northern study region. We find that a sustained northward wind during September is accompanied by ocean temperature decreases indicating upwelling. Water mass analysis indicates that the cooling was influenced by the so-called cold pool water mass in just offshore in deeper water. We will report on our analysis of the HF-radar currents on upwelling and hypoxia.