A Historical Analysis of Rip Current Rescues at Kill Devil Hills, NC

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A detailed historical analysis of rip current rescue data collected by Kill Devil Hills Ocean Rescue on the Outer Banks of North Carolina from 2001 to 2009 will be presented. The lifeguards at Kill Devil Hills occupy 19 stands over 8km of beachfront and record the time and location of every rip current rescue throughout each summer. This data provides a well resolved temporal and spatial indication of hazardous rip current occurrence. Throughout the same time period, directional wave data, tidal height and weather observations have been collected at the nearby Army Corps of Engineers Field Research Facility in Duck, NC. These concurrent observations enable a statistical analysis to determine which factors contribute to the likelihood of hazardous rip currents. As expected, the initial analysis suggests that tidal elevation, wave height and wave direction are contributing factors to strong rip currents. However, the analysis also suggests that rip currents are dependent on both alongshore location and prior wave conditions. The alongshore variability in rip current activity is persistent in time and is correlated with alongshore changes in the offshore bathymetry. This relationship coupled with survey data collected in 2008 and 2009 indicate that variations in the surf zone bathymetry contribute to alongshore variability in rip current activity. In addition, wave events exceeding 1 m significant wave height often preceded periods of hazardous rip current activity, with a majority of rip current rescues occurring within 72 hours following the peak of these events.