

Concurrent Measurements of Beaked Whale Clicks, Physical Oceanography and Prey Fields in the Tongue of the Ocean, Bahamas

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ABSTRACT: Assessments of the potential risks of noise exposure to beaked whales have historically occurred in the absence of information about the physical and biological environments in which these animals are distributed. Understanding the habitat utilization of these whales will increase our understanding of beaked whale behavior and the effectiveness of future risk assessments. Beaked whales, specifically Blainville's (*Mesoplodon densirostris*) and Cuvier's beaked whales (*Ziphius cavirostris*), are known to feed in the tongue of the ocean, Bahamas. These whales can be reliably detected and often localized within the Atlantic Undersea Test and Evaluation Center (AUTEK) acoustic sensor system. The AUTEK range is outfitted with regularly spaced bottom mounted hydrophones over 350 nm² providing a valuable network to record anthropogenic noise and marine mammal vocalizations. From 9/12-10/2 of 2008 we used a downward looking 38 kHz SIMRAD EK60 echosounder to measure prey scattering layers concurrent with fine scale turbulence measurements from an autonomous microstructure profiler (MP). Using an 8km, 4-leaf clover sampling pattern, we completed a total of 7.5 repeat surveys with 3 MP casts to concurrently measure the physical and biological oceanography so as to examine the spatiotemporal scale relationship in the microstructure and scattering layer. We found a strong correlation between increased prey density relative to increased click densities. These results open the door for future analyses examining the specific scale structure of prey patches and ultimately broad scale models of beaked whale foraging habitat.