ASLO
Association for the Sciences of Limnology and Oceanography

Diel periodicity in both sei whale vocalization rates and the vertical migration of their copepod prey observed from ocean gliders

Baumgartner, Mark F., David M. Fratantoni

Limnol. Oceanogr., 53(5_part_2), 2008, 2197-2209 | DOI: 10.4319/lo.2008.53.5_part_2.2197

ABSTRACT: The daily activity cycles of marine predators may be dictated in large part by the timing of prey availability. For example, recent studies have observed diel periodicity in baleen whale vocalization rates that are thought to be governed by the diel vertical migration of their zooplanktonic prey. We addressed this hypothesis by studying associations between sei whale (*Balaenoptera borealis*) vocalization rates, oceanographic conditions, and the vertical distribution of the whales[] prey, the calanoid copepod *Calanus finmarchicus*, during May 2005 in the southwestern Gulf of Maine using an array of autonomous ocean gliders. Each of the four gliders was equipped with sensors to measure temperature, salinity, and chlorophyll fluorescence. Three of the four gliders carried a digital acoustic recorder and the fourth carried a 1-MHz acoustic Doppler current profiler. We observed strong diel periodicity in the acoustic backscatter measured by the current profiler that we attribute (based on a corroborating shipboard study) to the diel vertical migration of *C. finmarchicus*. Sei whale vocalization rates also exhibited diel periodicity, with more calls detected during the daytime when *C. finmarchicus* was observed at depth. We found no evidence to suggest that the observed patterns in sei whale calling rates were attributable to diel periodicity in background noise or acoustic propagation conditions. Sei whales are adept at foraging on nearsurface aggregations of *C. finmarchicus*; therefore we expect that the whales were feeding at night. We hypothesize that calling rates are reduced at night while the whales are feeding, but increase with social activity during the day when copepods are either more difficult or less efficient to capture at depth. The gliders[] persistence during adverse weather conditions experienced during the study allowed continuous collocated observations of whale vocalization behavior and oceanographic conditions that have not been previously possible with traditional shipboard techniques.

Article Links

Download Full-text PDF

Return to Table of Contents

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for $10 per article. All L&O articles are moved into Open Access after three years.

Association for the Sciences of Limnology and Oceanography © 2013