

Tidal front affects prey-size use in a top marine predator

L. S. Vlietstra, K. O. Coyle, G. L. Hunt, Jr., and N. Kachel

ABSTRACT

This study examined how features that concentrate small prey organisms in the ocean affect spatial variation in the size of prey used by a top marine predator. We tested the hypothesis that short-tailed shearwaters (*Puffinus tenuirostris*) take large (>15 mm) euphausiids at a variety of depths, but restrict their consumption of small (<15 mm) euphausiids to times when small euphausiids are concentrated at the surface by physical processes, such as tidal fronts. We show that shearwaters feeding in Akutan Pass, Alaska (Aleutian Islands) fed upon small (11.5 ± 0.3 mm) euphausiids that were present in high density near the water's surface. We use CTDs, hydroacoustic surveys, and net tows to show that high densities of small euphausiids were associated with a convergent tidal front on the north side of the Pass. Elsewhere in the Bering Sea where tidal fronts were not observed, we found that shearwaters selected large (17.3 ± 0.1 mm) euphausiids when small euphausiids were present. This study provides evidence that, by promoting high prey densities, oceanographic features can broaden the range of prey sizes taken by predators and make profitable prey that is otherwise unprofitable to marine predators.