

INTERACTIONS OF OCEAN CURRENTS AND DIEL MIGRATORS
AT A SEAMOUNT IN THE CENTRAL NORTH PACIFIC OCEAN

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ABSTRACT

Biological data from hydroacoustic and net samples, and information on current patterns from a vessel-mounted acoustic Doppler current profiler (ADCP), were collected during four research cruises at Southeast Hancock Seamount in 1987 and 1988. The seamount, located on the northern Hawaiian Ridge, has a circular, flat-topped summit of about 4.5 km² at a depth of 260 m. Over small time and space scales, currents affected the distributional patterns of the two dominant seamount-associated micronekton--the sternopthyichid fish, Maurolicus muelleri and the lophogastrid mysid, Gnathophausia longispina.

Current patterns over the summit varied within and among cruises. On the first and second cruises, currents were predominantly to the east at average speeds of 23 cm s⁻¹ and south at 17 cm s⁻¹, respectively. On the third and fourth cruises, mean currents were weaker (≤ 5 cm s⁻¹) and much of the current field could be described as rotary motions at tidal frequencies.

The distribution of G. longispina and M. muelleri over the summit was a result of behavioral and physical processes. Both species were present above the summit during each cruise, and vertically migrated into the water column nightly. Currents over the summit had the potential to advect animals an average of about 6 km per night on the first two cruises and about 2 km per night on the last two

cruises. Biological results indicated that G. longispina and M. muelleri were advected and/or moved to the downstream side of the summit by the end of the night. Vertical current shear occasionally complicated interpretation of the species' distribution patterns on the last cruise.

Distributional and population data suggest that G. longispina and M. muelleri resist advection from the area to maintain their populations at the seamount. Regardless of current patterns, few specimens were taken beyond 5 km of the summit. Reproductive information and analysis of population size classes for G. longispina argue against recruitment from other areas. Coherent movements of the dominant acoustic scatterers were detected above the summit at sunrise and may play an important role in the population maintenance of these seamount-associated species.