ACTIVE EXPORT OF CARBON AND NITROGEN BY DIEL-MIGRANT ZOOPLANKTON AT STATION ALOHA

A THEISIS SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAII IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN

OCEANOGRAPHY

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ABSTRACT

The zooplankton community at Ocean Station ALOHA has been sampled at approximately monthly intervals during 1994-1996. Oblique tows were taken from mid-day and mid-night to a target depth of 150 m. Parameters measured include total and size fractionated dry, carbon and nitrogen weights and animal abundances. In addition one day and one night tow from each cruise were analyzed for community structure. Published empirical relationships as a function of animal body mass and environment temperature were employed to calculate active fluxes of respiratory carbon and ammonium excretion. Day biomass ranged from 114 to 1347 with an average value of 556 mg per m^2 whereas the night biomass values ranged from 389 to 2325 averaging 975 mg per m2. Strong diurnal cycles with regard to biomass were observed with night to day ratios ranging from 1.04 to 2.74 and averaging 1.81. Migratory biomass averaged 402 mg m^{-2} (range = 33-916). Downward fluxes due to migrators crossing below the euphotic zone ranged from 0.084 to 0.768 and averaged 0.304 mmol m^{-2} d^{-1} for carbon (range = 0.012 to 0.115) equivalent to 15% of passive flux (range = 6-25). mean active flux of NH_4 (DIN) was 0.045 and ranged from 0.012 to 0.115 mmol N m^{-2} d^{-1}. This was equal to 20% of gravitational flux of nitrogen measured at 150 m (range = 7-35). Both biomass and fluxes due to migrators exhibited seasonal variations with the greatest values in summer and the lowest in winter. The dominant migrator groups in terms of abundance and biomass were euphausiid species of the genus *Euphausia* and copepod species of the genus *Pleurommama* and Family Aetideidae.

Various metabolic equations and results of other studies of active flux are compared to those of this study. In addition assumptions used and active transport other than by inorganic metabolic release are discussed.