

LOW PRODUCTION AND SLOW TURNOVER OF HETEROTROPHIC MICROBES IN THE DEEP WATER OF THE CANADA BASIN, WESTERN ARCTIC

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Data on microbial metabolic activities and biomass in deep oceans have begun to provide new insights into regional variability in the extent of and patterns in vertical organic carbon delivery in the ocean's interior. However, such information is scarce in the polar region, especially in the major Arctic basins. Here we examined full-depth distributions of heterotrophic prokaryote production and biomass in the Canada Basin, western Arctic. Prokaryote production was high in the Pacific-origin water masses located in the upper-mesopelagic layer (100–200 m). In the deeper layer (300–3,000 m), the depth-integrated prokaryote production was low relative to other oceanic regions, with the estimated turnover time of 6 years in the bathypelagic layer. This turnover time was among the longest values reported in lower latitude oceans. Despite the low production and slow turnover, the estimated prokaryote carbon consumption far exceeded (38 fold) the reported sinking particulate organic carbon fluxes at depths of 120–200 m. This large apparent carbon imbalance may be partly explained by the shelf-basin exchange of organic carbon due to lateral intrusion of Pacific-origin water masses.