

Size-Fractionated Bacterial Biomass and Production in the Antarctic Waters

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ABSTRACT. Attached bacteria are different from free-living bacteria in many aspects, e.g., physiology and cell size. Bacteria attach to various solids, such as suspended organic debris and particles, or mucilaginous secretion from phytoplankton, and thus phytoplankton blooming could support the attached mode. We examined the relative occurrence and importance of the two modes in a north-western Weddell Sea ice-margin zone during an austral summer. We compared free-living bacteria to attached bacteria for their biomass and productivity with respect to the blooming of *Phaeocystis* in this area. Water samples were collected at seven stations, from two depths (10 and 75 m). Bacterial cells in the fraction passing 3- μm pore-size Nuclepore filters were regarded as free-living, and those retained on the filters were attached. Bacterial cells were enumerated by DAPI direct count with a Zeiss Axiophot epifluorescence microscope. Bacterial productivity was measured by incorporating ^3H -methyl thymidine into DNA. In the study area, free-living bacteria were predominant (avg. 85% of the total cell count), and their production accounted for avg. 95% of the total thymidine incorporation. Free-living bacteria incorporated more thymidine on a per cell basis than attached bacteria did. Interestingly, it was unclear whether the *Phaeocystis* blooming influenced the frequency or the activity (thymidine incorporation) of the attached bacteria.

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