



The physicochemical habitat of *Sclerolinum* sp. at Hook Ridge hydrothermal vent, Bransfield Strait, Antarctica

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ABSTRACT: At Hook Ridge hydrothermal vent, a new species of *Sclerolinum* (Monilifera, Siboglinidae) was found at a water depth of 1,045 m. On the basis of investigations of multicores and gravity cores, the species habitat is characterized. *Sclerolinum* does not occur in sediments that are most strongly influenced by hydrothermal fluids, probably because of high temperature (up to 49° C) and precipitation of siliceous crusts. About 800 individuals m⁻² occur in sediments that are only weakly exposed to hydrothermal flow and have the following characteristics: 20° C (15 cm sediment depth) to 21.5° C (bottom water), 18-40 cm yr⁻¹ advection rates, pH 5.5, <25 μmol L⁻¹ methane, <170 μmol L⁻¹ sulfide, and <0.0054 mol m⁻² yr⁻¹ sulfide flux. Comparison with geochemical data from other reducing sediments indicates that the two groups of Siboglinidae, Monilifera and Frenulata, occur in sediments with low sulfide concentration and flux. In contrast, sulfurbased chemosynthetic organisms that typically occur at hydrothermal vents and cold seeps (e.g., Vestimentifera, vesicomid clams, and bacterial mats) occur in sediments with higher sulfide availability; threshold values are around 500 μmol L⁻¹ sulfide and 0.1 mol m⁻² yr⁻¹ sulfide fluxes. We did not find typical hydrothermal vent species at Hook Ridge hydrothermal vent, which might be explained by the unfavorable physicochemical habitat: At sites inhabited by *Sclerolinum*, sulfide availability appears to be too low, whereas at sites with higher sulfide availability, the temperatures might be too high, siliceous crust precipitation could preclude their occurrence, or both.

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