ID: W2991000874

TITLE: Fauna of the Kemp Caldera and its upper bathyal hydrothermal vents (South Sandwich Arc, Antarctica)

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ABSTRACT:

Faunal assemblages at hydrothermal vents associated with island-arc volcanism are less well known than those at vents on mid-ocean ridges and back-arc spreading centres. This study characterizes chemosynthetic biotopes at active hydrothermal vents discovered at the Kemp Caldera in the South Sandwich Arc. The caldera hosts sulfur and anhydrite vent chimneys in 1375-1487 m depth, which emit sulfide-rich fluids with temperatures up to 212°C, and the microbial community of water samples in the buoyant plume rising from the vents was dominated by sulfur-oxidizing Gammaproteobacteria. A total of 12 macro- and megafaunal taxa depending on hydrothermal activity were collected in these biotopes, of which seven species were known from the East Scotia Ridge (ESR) vents and three species from vents outside the Southern Ocean. Faunal assemblages were dominated by large vesicomyid clams, actinostolid anemones, Sericosura sea spiders and lepetodrilid and cocculinid limpets, but several taxa abundant at nearby ESR hydrothermal vents were rare such as the stalked barnacle Neolepas scotiaensis. Multivariate analysis of fauna at Kemp Caldera and vents in neighbouring areas indicated that the Kemp Caldera is most similar to vent fields in the previously established Southern Ocean vent biogeographic province, showing that the species composition at island-arc hydrothermal vents can be distinct from nearby seafloor-spreading systems. ?13C and ?15N isotope values of megafaunal species analysed from the Kemp Caldera were similar to those of the same or related species at other vent fields, but none of the fauna sampled at Kemp Caldera had ?13C values, indicating nutritional dependence on Epsilonproteobacteria, unlike fauna at other island-arc hydrothermal vents.

SOURCE: Royal Society open science

PDF URL: None

CITED BY COUNT: 15

PUBLICATION YEAR: 2019

TYPE: article

CONCEPTS: ['Hydrothermal vent', 'Caldera', 'Geology', 'Chemosynthesis', 'Seafloor spreading', 'Volcano', 'Oceanography', 'Submarine volcano', 'Geochemistry', 'Hydrothermal circulation', 'Paleontology']