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Benthic foraminifera from the Atacama Trench: insight on distribution features and effect of bottom oxygenation and sedimentary organic matter

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The biology and ecology of benthic fauna from extreme environments, such as the hadal zone (> 6,000 m depth), is scarce due to the difficulties of access, exploration, and work logistics. The few exploration cruises of bottom settings have shown that benthic foraminifera, and meiofauna in general, display high abundances in the sediments, indicating that these organisms present unique adaptations and interactions to extreme conditions (e. g. high hydrostatic pressure, limitation of calcite and organic matter, etc.). As such, new species to science have also been reported. The Peru-Chile trench represents the deepest ecosystem in the South Pacific. It has been explored only on three occasions describing it as a eutrophic environment with high biomass of meiofauna. For foraminifera, only species reports have been published, being the ecology neglected. In this study, we aimed to determine the community structure (abundance, diversity, spatial and vertical distribution) of the foraminifera collected from 6 stations in the Atacama trench in the SONNE Cruise during 2018. We compared the taxa features to granulometry and proxies of food, organic matter source, and oxygenation. Dissolved oxygen at all trench stations penetrated 3-5 cm into the sediments and TOC was 0.5-1.3 %. The grain size was mainly silt-rich. The presence of 120 morphospecies, many of them soft-walled, is reported. The community was dominated by large specimens (>500 μm), and small specimens (63-150 μm) were rare. The bulk of the community concentrated in the first centimeter of sediment despite all the trench stations were fully oxygenated. However, different assemblages were found in the 6 analyzed stations. We argue if these community differences are generated by the gradient of organic matter nature or the presence/abundance of meiofaunal/macrofaunal predators. Our results contribute to the knowledge of ecology and diversity of foraminifera from the Atacama Trench and give insight to the role of this group in the benthic food webs in hadal settings.