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ZooKeys 1222 ♦ 2025

A FAUNAL INVENTORY OF METHANE SEEPS ON THE PACIFIC MARGIN OF COSTA RICA
By Charlotte A. Seid, Jorge Cortés, Greg W. Rouse, et al.

The methane seeps on the Pacific margin of Costa Rica support extensive animal diversity and offer insights into deep-sea biogeography. During five expeditions between 2009 and 2019, we conducted intensive faunal sampling via 63 submersible dives to 11 localities at depths of 300–3600 m. Based on these expeditions and published literature, we compiled voucher specimens, images, and 274 newly published DNA sequences to present a taxonomic inventory of macrofaunal and megafaunal diversity with a focus on invertebrates. In total 488 morphospecies were identified, of which 131 are described species, at least 58 are undescribed species, and the remainder include some degree of taxonomic uncertainty. Fifteen range extensions are reported, as well as 16 new depth records and three new seep records for species known to occur at vents or organic falls. No single evolutionary narrative explains the patterns of biodiversity at these seeps, as even morphologically indistinguishable species can show different biogeographic affinities, biogeographic ranges, or depth ranges. We emphasize the value of careful molecular taxonomy and comprehensive specimen-based regional inventories for biodiversity research and monitoring.

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zookeys.pensoft.net

ISSN 1313-2970 (online) ISSN 1313-2989 (print)



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