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EDITED BY

Elva G. Escobar-Briones,
National Autonomous University of
Mexico, Mexico

REVIEWED BY

Olmo Miguez-Salas,
Senckenberg Nature Research Society,
Germany

*CORRESPONDENCE

Kenneth R. Hinga
kenhinga@mac.com

SPECIALTY SECTION

This article was submitted to
Deep-Sea Environments and Ecology,
a section of the journal
Frontiers in Marine Science

RECEIVED 15 September 2022

ACCEPTED 27 September 2022

PUBLISHED 12 October 2022

CITATION

Hinga KR (2022) Commentary:
Numerous sublinear sets of holes in
sediment on the northern Mid-Atlantic
Ridge point to knowledge gaps in
understanding mid-ocean
ridge ecosystems.
Front. Mar. Sci. 9:1045655.
doi: 10.3389/fmars.2022.1045655

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Commentary: Numerous sublinear sets of holes in sediment on the northern Mid-Atlantic Ridge point to knowledge gaps in understanding mid-ocean ridge ecosystems

Kenneth R. Hinga*

Retired, Bethesda, MD, United States

KEYWORDS

lebensspuren, Azores plateau, sublinear rows of holes, unknown maker, distribution

A Commentary on

[Numerous sublinear sets of holes in sediment on the northern Mid-Atlantic Ridge point to knowledge gaps in understanding mid-ocean ridge ecosystems](#)

by Vecchione M and Bergstad OA (2022) *Front. Mar. Sci.* 9:812915. doi: 10.3389/fmars.2022.812915

The description of a mysterious set of holes in the seafloor described by Vecchione and Bergstad (“Numerous Sublinear Sets of Holes in Sediment on the Northern Mid-Atlantic Ridge Point to Knowledge Gaps in Understanding Mid-Ocean Ridge Ecosystems” *Front. Mar. Sci.*, 31 January 2022 Sec. Deep-Sea Environments and Ecology) may be augmented by other previously published information. Recent interest in these features was stimulated by a NOAA web publication of images from an ROV study. The NOAA pages referred to the Vecchione and Bergstad (2022) observations in 2004 as the first observation of these features.

Photographs of lebensspuren with similar features appeared in a chapter by Laughton (1963), followed by Ewing and Davis (1967); Heezen and Hollister (1971); Ballard and Moore (1977), and Hinga (1981). Bell et al (2013) published a frame from video of the feature from a

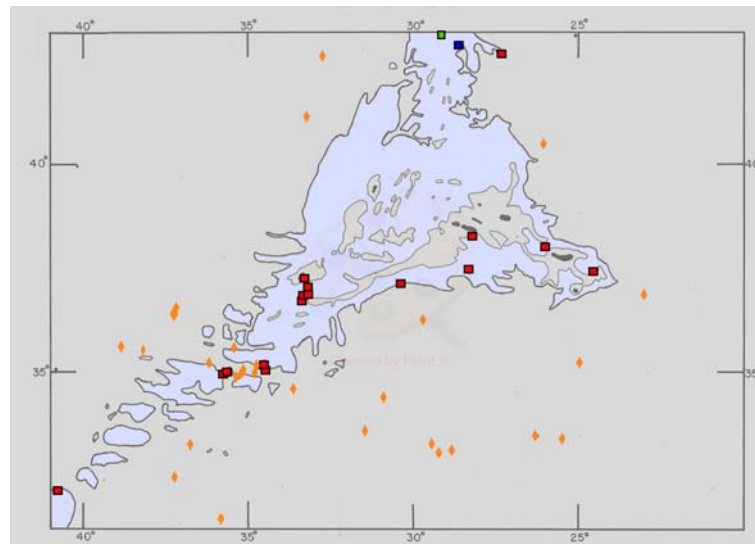


FIGURE 1

Location of stations finding the rows of holes. Tinted area is depths between 1,500 and 2,500 meters. Red squares are camera stations reported by Hinga, 1981. Blue square is location reported in Vecchoine and Bergstad (2022). Green square is location of Dive 4 of Voyage to the Ridge. The station reported by Bell et al (2013) is significantly further north at approx. 49°N and 28°47' W. Orange diamonds are camera stations where the rows of linear holes were not found in the region by Hinga (1981).

survey in 2010. There is some variability in the specific morphology of the individual sets, but all are distinguished by the linear, or arced linear, array of holes. Unfortunately, none of these studies identified the maker, though a variety of speculative makers were proposed.

All reported observations of this distinct set of holes come from limited depth and areal extents. Hinga (1981) used the photo libraries at Lamont-Doherty Geological Observatory, The Woods Hole Oceanographic Institution, and the University of Rhode Island Graduate School of Oceanography to map the stations where these enigmatic holes have been observed and where they were not found. The distinctive rows of holes were found exclusively in the depth range of 1,183 to 2,625 meters at 17 of the 21 camera stations around the Azores plateau (from approx. 23 to 42°N and 24 to 38° W: Figure 1). There were some 157 sets of holes observed in a total estimated area covered in pictures of an estimated 821 square meters. The rows of holes are a dominant feature of this area. The depths reported from the more recent video observations were within these depth limits: Vecchoine and Bergstad (2022), 2082 meters, Bell et al (2013), 2500 meters: and, NOAA dive 4, 2,528 to 2711 meters. The newer video observations are more northerly than the bulk of the earlier camera observations.

The Lamont library was searched for the flanks of the Madeira Islands and Corner Seamounts with similar depth range (Hinga, 1981), without observation of any similar sets of holes. Some anecdotal evidence also points to distribution of the features being limited to the region of the Azores. Dr. Dale Krause and Dr. Bob Ballard stated they can recall only seeing those holes in the Azores area (Personal communications.) Dr. Krause reported that

Russian scientists photographed the same array of holes, again, only in the region of the Azores.

The limited range of these holes would seem to point to an organism endemic to the flanks of the Azores and mid-ocean ridge in the North Atlantic. Perhaps some look at archival records of organisms found in dredge samples taken within the parameters of the limited distribution could provide clues to a couple of prospects. In the field, an ROV or submersible might use some sort of porous scoop to dig at the ends of a row of holes to see what may be hiding down there.

May the mystery eventually be solved.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Funding

Self-funded.

Acknowledgments

Dr. Dale Krause, formally of the University of Rhode Island, Graduate School of Oceanography is to be credited with the hypothesis that the enigmatic rows of holes are only found on the flanks of the Azores Plateau. He was responsible for a deep-towed

automatic camera that observed these holes on R/V Trident cruise 28 in November 1965.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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