



## New species of *Leptohalysis* (Rhizaria, Foraminifera) from an extreme hadal site in the western Pacific Ocean

HIROSHI KITAZATO<sup>1</sup>, KATSUYUKI UEMATSUI<sup>2</sup>, YUKO TODO<sup>1</sup>, & ANDREW J. GOODAY<sup>3</sup>

<sup>1</sup>Institute for Research on Earth Evolution (IFREEE), Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 2-15 Natsushima-cho, Yokosuka 237-0061, Japan.

<sup>2</sup>Marine Technology Center, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 2-15 Natsushima-cho, Yokosuka 237-0061, Japan

<sup>3</sup>National Oceanography Centre, Southampton, Empress Dock, European Way, Southampton SO14 3ZH, UK

### Abstract

*Leptohalysis kaikoi* **sp. nov.**, a new hormosinacean foraminiferan, is described from a core sample collected using the Japan Agency for Marine-Earth Science and Technology's Remote Operated Vehicle, KAIKO, in the Challenger Deep (10,896 m water depth, Izu-Bonin-Mariana-Arc-trench system). The agglutinated test is <130 µm long and approximately 20 µm wide, and more or less confined to the 32-63 µm sieve fraction. It consists of a linear series of chambers with a simple terminal aperture. The new species differs from typical members of the genus *Leptohalysis* in the following features: 1) the chambers are rounded and abut closely with a distinct suture between them, rather than being flask-shaped with more or less flat, truncated bases; 2) the wall structure is less regular and consists mainly of grains with flat exposed faces that abut to create an outer surface resembling an uneven pavement, the edges of the grains being obscured by copious amounts of organic cement; 3) the proloculus is sometimes followed by a single "adventitious" chamber, located to one side of the axis of growth. A second species with similar characteristics is represented by a single individual in our material. These two species may represent a new genus. However, we prefer to retain them within *Leptohalysis* pending a detailed comparison of their wall structure with that of typical members of this genus. We also briefly describe a single specimen of a typical *Leptohalysis* morphotype. *Leptohalysis kaikoi* **sp. nov.** was the most common multilocular agglutinated foraminiferan in the 32-63 µm sieve fraction of the Challenger Deep sample. It has not been found in the same size fraction of samples from abyssal depths in the North and eastern equatorial Pacific Ocean.

**Key words:** Benthic foraminifera, agglutinated, Hormosinacea, deep-sea trench, West Pacific, Remote Operated Vehicle (ROV)

### Introduction

More than 100 species of foraminifera have been reported from hadal depths of > 6,000 m (Belyaev 1989; Gooday *et al.* 2008a). Nevertheless, this total is small compared to the estimated 2,140 species described from the oceans of the world (Murray 2007), reflecting the difficulties involved in sampling at extreme depths in deep-sea trenches. In particular, the faunas of the deepest trenches (>10,000 m) are very poorly known. The only studies of foraminifera from such depths are those of Saidova (1975) from the Kermadec Trench, Kamenskaya (1989) on komokiaceans in the Tonga Trench and of Akimoto *et al.* (1996, 2001) in the Challenger Deep (Mariana Trench). Recently, Todo *et al.* (2005) gave a brief account of an assemblage of small foraminifera, also from the Challenger Deep (10,896m). The four dominant species, all of them new, were subsequently described by Gooday *et al.* (2008a).

The species described by Gooday *et al.* (2008a) were all characterised by a mainly organic test wall. The Challenger Deep material also yielded a number of tiny agglutinated foraminiferal species, some of which