

# GLASS SPONGES, HEXACTINELLIDA

## Identification and classification



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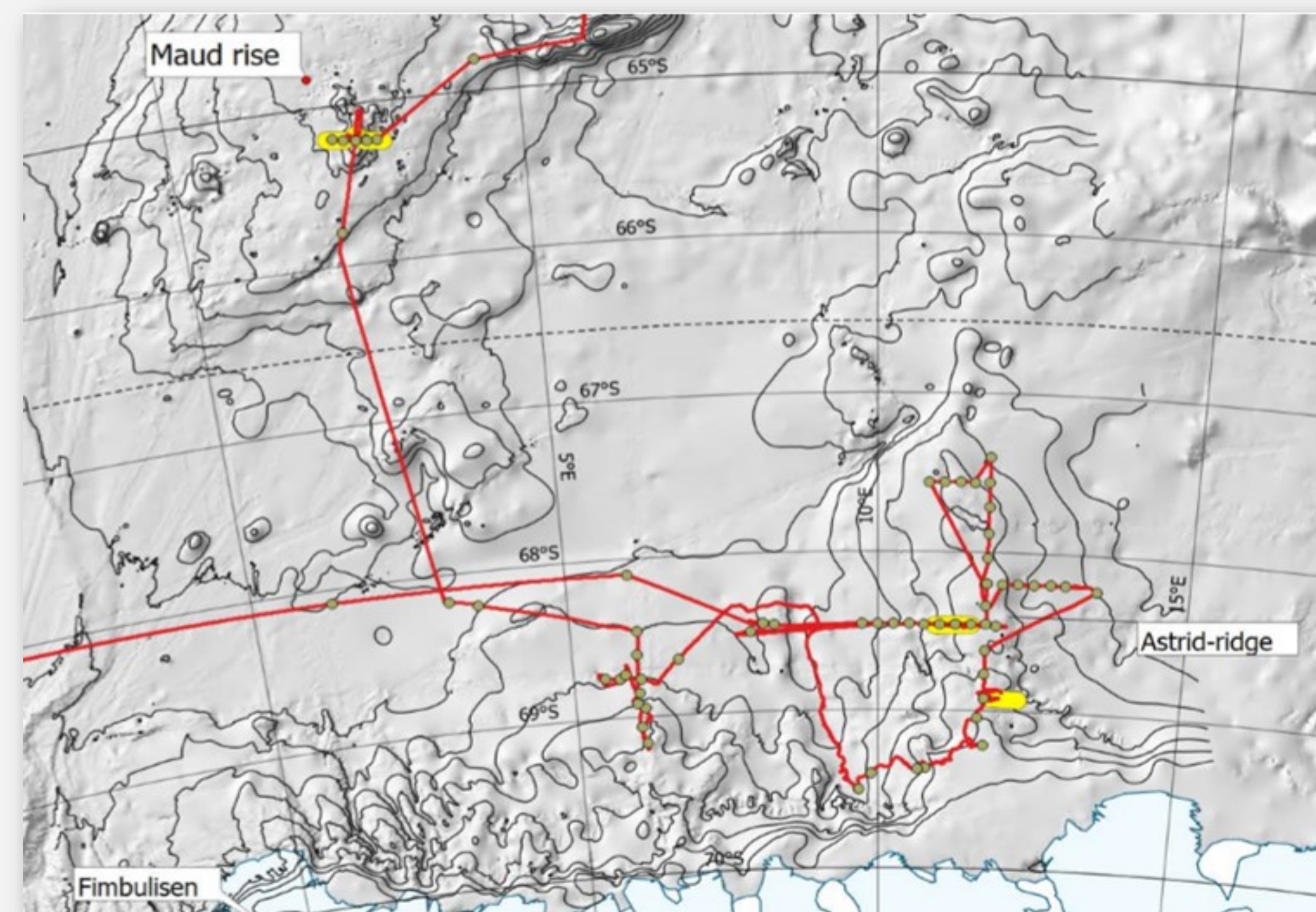
### Norwegian Cruise to Antarctica — mapping and describing the whole ecosystem

Norwegian Polar Institute led a cruise to the Kong Håkons VII Ocean 28th February—10 April 2019. The focus area was the Astrid ridge (Figure 1). **The aim of the cruise is to improve the knowledgebase for the management of the Kong Håkon VII Ocean north of the coast of the Dronning Maud Land which could provide a base for preservation of the area shown in Figure 1 in Antarctica.**

The work was divided into 7 work packages (WP) in Antarctic where **benthic mapping (WP3)** was focused on in this research.

ROV Ægir6000 and Campod Logger (footage logging) collected data that was used to identify and classify different sponge species later in the lab<sup>1</sup>

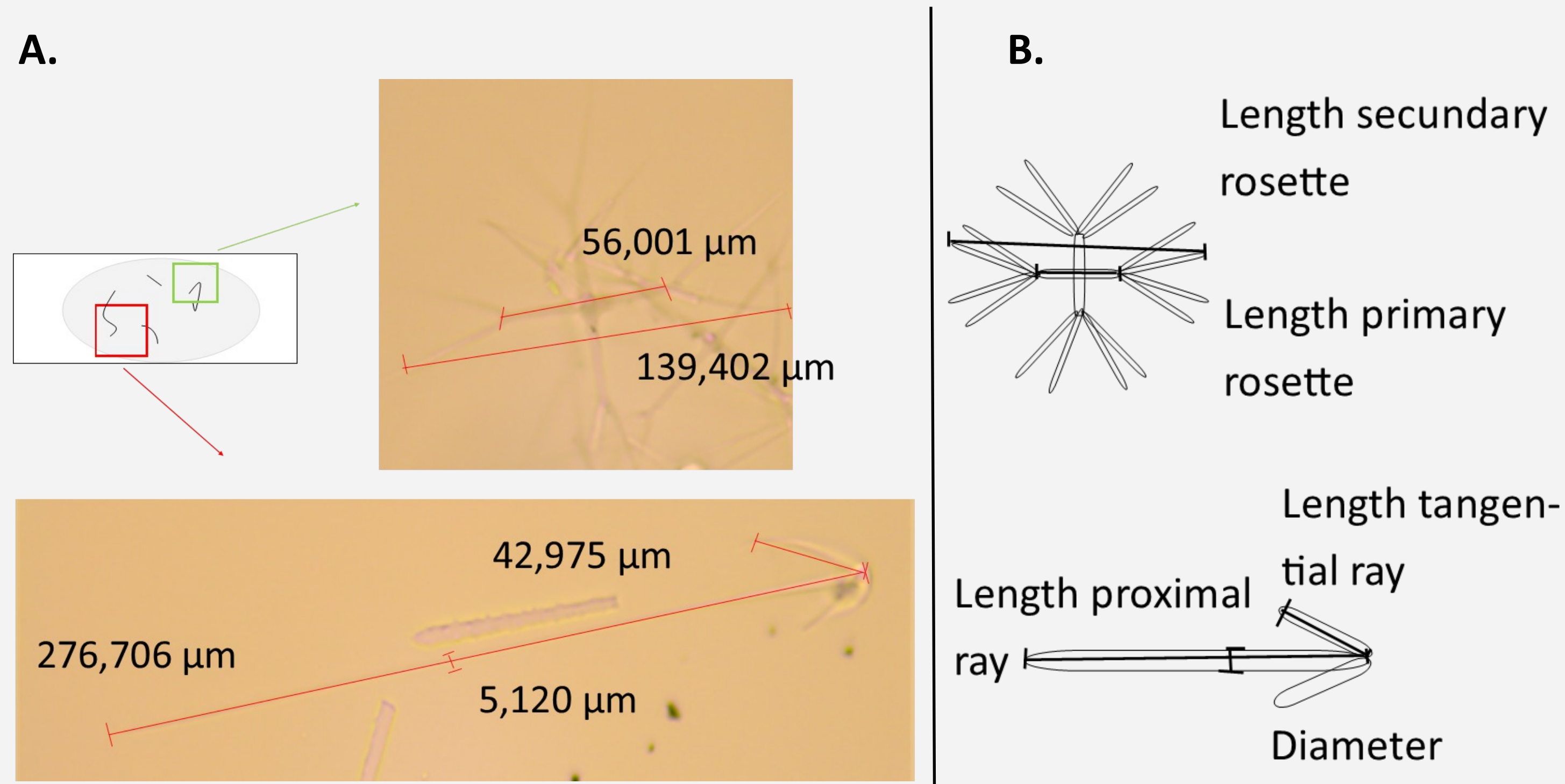
Sponges are multicellular aquatic animals that constitute to the phylum Porifera. Sponges associate with other organisms, have an impact on the substrate and play a role in benthic-pelagic coupling. The **Hexactinellida** is a group of marine sponges that inhabit the deep sea<sup>2</sup>



**Figure 1:** Map over the part of the Kong Håkon VII Ocean<sup>1</sup>. The yellow dots indicate the **sampling stations where the cruise ran benthic videos and sampling transects.**

### 1 Procedure - Identification of species

**How to measure sponges?** The external morphology of sponges is often ambiguous. Therefore, hexactinellid sponges are determined by examining spicule structure. Hexactinellid spicule structure includes megascleres and microscleres, with one axon and several equal axons, respectively. The collected spicules can be placed under and measured with a light microscope with a Leica camera (see Figure 2). There should be around 20 measurements of each spicule type for obtaining a reasonable identification of sponge species based on spicules<sup>2</sup>. In this poster, one specimen that has been handpicked on the cruise (see Figure 4) was identified.

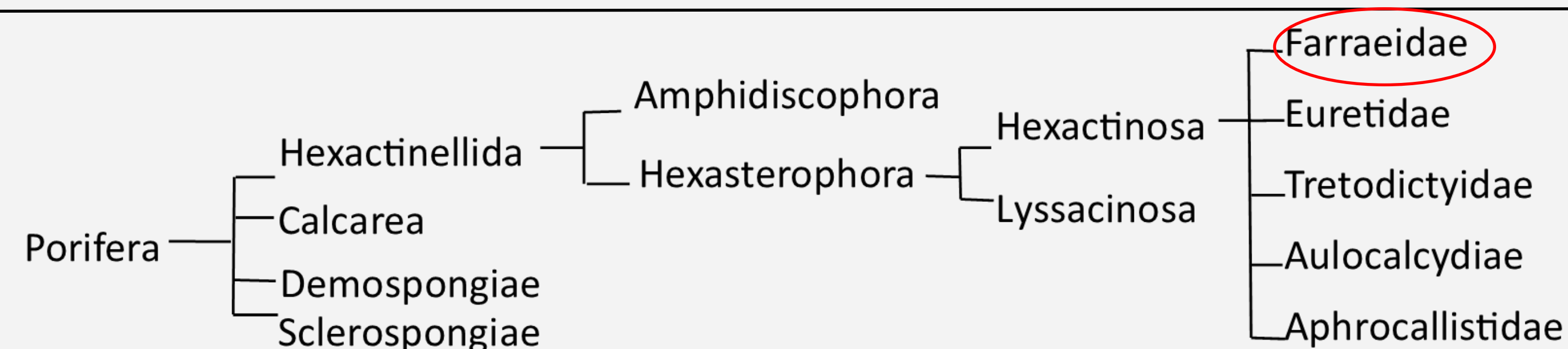


**Figure 2** A, Illustration of a microscope slide with types of spicules. B, The microsclere oxyhexaster (green area) is measured by its primary and secondary rosette. The megasclere hypodermal pentactin (the red area) is measured by its diameter and length of its proximal ray and by the length of its tangential ray.

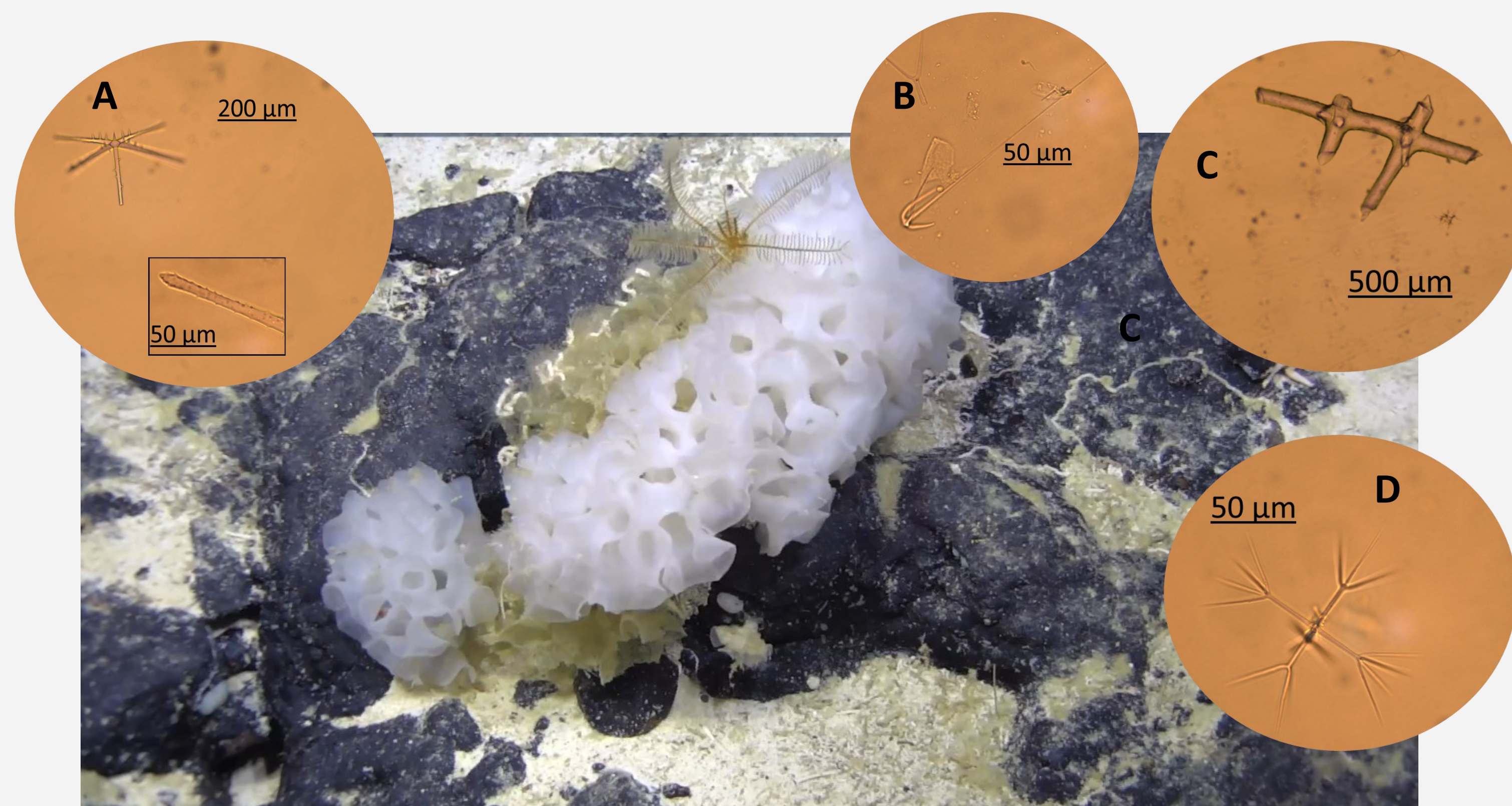
Comparison of identified and measured spicules and composition of spicules in other sponges gives an idea of which family this specimen (see Figure 4) could be a member of.

### 2 Product - Classification of hexactinellida

Hexactinellida is divided into two subclasses, characterized by distinct types of microscleres: Amphidiscophora and Hexasterophora. Since the hexaster has been found in this sample (Figure 4), it can be classified as a member of the **Hexasterophora**<sup>6</sup>. After comparing spicule types, the family **Farraeidae** was found.



**Figure 3** Illustration of phylogenetic tree, showing the position of the sponge family Farraeidae (marked red) extending from the order Hexactinosa<sup>7</sup>.



**Figure 4** Picture of *Farrea* sp.<sup>8</sup> A, dermal pentactin. B, Scepterula with terminal anchor teeth. C, dictyonal framework of fused spicules. D, oxyhexaster.

Scepterules (one-rayed spicule with peculiar secondary developments at one end) are present only as clavules (one-rayed spicule with terminal anchor teeth, see Figure 2B) in this specimen<sup>4</sup>. This key leads to the genus **Farrea**<sup>5</sup>. Because of some uncertainties about the identities of a few spicules this specimen cannot be classified further than genus **Farrea sp.**

References: <sup>1</sup>Steen, H. (2019) Norwegian Cruise to Kong Håkons VII Hav 28<sup>th</sup> February–10<sup>th</sup> April 2019. <sup>2</sup>Torkildsen, M.M. (2013) Diversity of hexactinellid sponges (Porifera, Hexactinellida) on an arctic seamount, the Schulz Massiv. Masters degree thesis. Bergen: University of Bergen. <sup>3</sup>Skeleton (2019) in Encyclopedia Britannica. Available from: <https://www.britannica.com/science/megasclere> [18.11.2019]. <sup>4</sup>Boury-Esnault, N. and Rützler, K. (1997) The Sponges of the Antarctic Peninsula. <sup>5</sup>Reiswig, H.M. (1872) Family Farraeidae Grey. *Systema Porifera: A Guide to the Classification of Sponges*, Edited by John N.A. Hooper and Rob W.M. Van Soest. Kluwer/Plenum Publishers, New York, 2002. <sup>6</sup>Bergquist, P.R. (1978) Sponges. University of California, Berkeley and Los Angeles. <sup>7</sup>R.W.M. van Soest (2001) Porifera in European Register of Marine Species. Available from: [file:///C:/Users/sarah/AppData/Local/Packages/MicrosoftEdge\\_Bweky3d8bbwe/Tempstate/Downloads/Van\\_Soest\\_2001\\_ERMS\\_book%20\(1\).pdf](file:///C:/Users/sarah/AppData/Local/Packages/MicrosoftEdge_Bweky3d8bbwe/Tempstate/Downloads/Van_Soest_2001_ERMS_book%20(1).pdf) [18.11.2019]. <sup>8</sup>Photo: AGIR/UiB

