



Early Cenozoic (Eocene) bryozoan biota as a biogenic and mineralogical indicators of the climatic changes in West Antarctica

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The changes in the biodiversity, taxonomic composition and the presence of the diverse growth-forms of the early-late Eocene bryozoan fauna of the La Meseta Formation (Telm1-7), Seymour Island are good indicators in the reconstruction of the climatic events (EECO, MECO and EOT). The 2-meters thick interval of the basal, initial marine transgressive facies of the la Meseta Formation (Telm1) in the early Eocene resulted in the greatest diversity and abundance of the bryozoans with a clear preponderance of cyclostomes, which form spectacular, massive, multilamellar colonies acquired mainly sub-spherical shape, along with the ascophoran cheilostomes, which either form the multilamellar, branched or encrusting colonies (Hara, 2001).

The occurrence of distinct, free-living lunulitiform bryozoans, which developed disc-shaped colonies, is characteristic of the middle part of the LMF (Telm4-5). This fauna is represented by Lunulites and Otionellina genera, which live on unstable loose, granular substrata, is overwhelmingly associated with sand fauna settings. Environmentally, lunulitids occur in shallow shelf conditions (2.5-190 m), with temperatures of 10-29°C on coarse, sandy to muddy bottoms, with low to moderate deposition, in quiet to agitated regimes. They are absent in rocky areas with high turbulence and high silt deposition, in coarse shell or pebble beds, in water with salinities >37‰ and/or bottom temperatures consistently lower than 10-12°C. For paleoenvironmental analysis the presence of free-living bryozoans (Lunulites and Otionellina) may be informative particularly for the temperate shelf environment, sandy often shifting substrate and diagenetic history that allows for preservation of aragonite. The average MgCO₃ content of calcite in the la Meseta bryozoans ranged from 4.0 to 5.0 mol% with a mean value of 4.5mol%. Their skeletons are formed of intermediate-Mg calcite (IMC) with 4.5mol% MgCO₃ content. The examination of free-living bryozoans using the X-ray diffraction (XRD) and the Laser Raman spectroscopy stressed their bimineralic skeletons showing the distribution of calcite, strontium apatite and aragonite. The presence of a mold of the basal wall in Otionellina may suggest that aragonite was added to the basal side of the colony and then leached showing the loss of this part of the skeleton (Hara et al., 2018).

Reported here for the first time in Antarctica, the free-living lunulitiforms such as Lunulites and Otionellina, are valuable climatic indicators, which inhabit circumtropical, tropical-subtropical to warm temperate waters at the present day.

The upper part of this formation (Telm6-7) contains a very scarce, single bryozoan colonies. A distinct decline of this fauna in the Telm7 marks the proximity of the Eocene-Oligocene boundary (EOT), when a severe decrease in temperature occurred in the Southern Ocean.

Hara, U., 2001. Bryozoans from the Eocene of Seymour Island, Antarctic Peninsula. *Palaeontologia Polonica*, 60: 33-155.

Hara, U., Mörs T., Hagström J., and Reguero M.A. 2018. Eocene bryozoan assemblages from the La Meseta Formation of Seymour Island, Antarctica. *Geological Quarterly*, 62: 705-728.