

## **Climatic changes in the Antarctic Eocene: - palaeontological, mineralogical and geochemical fossil proxies from bryozoans**

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The earliest Antarctic Cenozoic (late early Eocene) bryozoan fossil records, recognized in the La Meseta Fm. on Seymour Island (Antarctic Peninsula) are connected with the major K/T phase of the cheilostome evolution, clear preponderance of cerioporoidean cyclostomes along with abundant occurrence of microporoideans, umbonulomorphs and lepraliomorphs. The presence of the loose, small zooecia of the cheilostome bryozoans in the lowermost part of this formation, systematically includes the buguloids and catenicelloideans such as e.g. Beanidae, Catenicellidae, Savignyellidae and Calwelliidae families, which in the present day are widely distributed in the tropical-warm latitudes mostly in the shallow-marine settings (Hara 2015). Undoubtedly, the occurrence of over 90% of the warm-loving multilamellar cyclostomes with the relatively slow growing rate is connected with a short-term episode in the lower part of the La Meseta Formation (Telm1), during their long in situ evolution.

The recently recognized biota in the middle part of the La Meseta Formation (Telm4 and Telm5) on the NE side of the Seymour Island, reveal a presence of the microporoideans of the Micropora as well as free-living lunulitiforms belonging to the Lunulites and Otionellina genera, which developed disc-shaped colonies (Hara et al. 2015, in review). They are dominated in the Telm5, along with the new umbonulomorph of the family Brydonellidae *Uharella seymourensis*, found as an epilithoic, encrusting bryozoan occurring in a loose residuum of the siliciclastic sediments. Environmentally, Recent, free-living lunulitids are known to occur in warm, shallow-shelf conditions, at temperatures of 10-29°C, on coarse, sandy to muddy bottom with low to moderate deposition in fairly high velocity current regime and they are overwhelmingly associated with sand fauna environments. The dominance of the lunulitiform colonies in the Telm4-5 may suggest the shallow-water setting in this middle part of the formation (Bartonian in age). Contrary to that, the bryozoan fauna recognized in the upper part of the LMF (Telm7) is composed of the impoverished biota of the scarce lepraliomorphs, poorly preserved cyclostome of Iridmonoidea and Reticrescis, which are abundantly accompanied by the gadiform fish remains, penguin bones and whales.

A sharp decrease in the bryozoan diversity near the contact between the Telm5 and Telm6 was connected with the climatic cooling event, which culminated at the time of deposition of the upper part of the LMF. The skeletal mineralogy along with the geochemical stable isotope studies of the bryozoans (Seymour Island, Antarctic Peninsula) help to elucidate the environmental and climatic changes connected with the Early Eocene Climatic Optimum (EECO), Middle Eocene Climatic Optimum (MECO) as well as the EOT in the stratigraphical profile of the La Meseta Formation.

### References

- Hara U. 2015. Bryozoan internal moulds from the La Meseta Formation (Eocene) of Seymour Island, Antarctic Peninsula. Polish Polar Research, vol. 36, 25-49.
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