**Suppl. Information “The La Meseta Formation, Seymour sland, Antarctic Peninsula”**

The fossiliferous Eocene-?earliest Oligocene La Meseta Formation is part of Paleogene back-arc sediments that were deposited approximately 100 km SE of the northern tip of the Antarctic Peninsula representing the sedimentary filling of a generally northwest-southeast incised-valey system [1,2]. The 720 m massive sediments of the La Meseta Fm. overly unconformably either Late Cretaceous or Palaeocene deposits and originally were subdivided into seven lithofacies units named Telms 1-7 (Table 1). These lithofacies later were assigned to six erosionally-based internal units, named from base to top Valle de Las Focas, Acantilados, Campamento, *Cucullaea* I, *Cucullaea* II and Submeseta Allomembers [2], which predominantly consists of poorly consolidated fine-grained sand- and mudstones interbedded with shell-rich conglomerates. These deposits were accumulated during the Eocene in deltaic, estuarine and shallow marine settings [2,3]. The coastal area was seemingly of low relief and comprises tidal channels and flats, an estuary mouth platform, as well as a mid-estuary [3,4]. Eocene terrestrial facies, however, still is unknown from the Antarctic Peninsula indicating that the fossiliferous sites were deposited well off the coast and all terrestrial fossils were transported into the marine environment.

Detailed taphonomic studies of the fossil vertebrates remains still are very rare and mainly have focused on fossil penguin elements up to now [5,6] (e.g., García et al. 2021; Irazoqui & Hospitaleche 2021). Nevertheless, the environmental settings of the fossiliferous sites (Tab. 1) and the corresponding dynamic systems might have had an influence on fossil preservation and probably also had some sorting effects. Teeth of *Straitolamia macrota* were recovered from all Telms in various quantities (Tab. 1) and preservational conditions. While most of older fossil collections only include larger, surface collected shark teeth, more recent collections also contain smaller shark and ray teeth that were obtained from bulk sediment samples that were sieved and subsequently sorted under a microscope. The high abundance of small-toothed taxa (e.g., batomorphs, carcharhiniforms) as well as small teeth of taxa that previously were represented almost exclusively by large teeth (e.g., lamniforms) in TELMs 3-5 imply that at least in these units a collecting bias can be ignored. The various preservational states ranging from complete conservation of small and large teeth to isolated tooth crowns of mainly large teeth indicate that different taphonomic events were at work. The high number of isolated tooth crowns of large teeth suggests that these teeth might have been exposed on the surface for longer times. The presence of small teeth most likely representing juveniles and larger teeth of subadults and adults, however, demonstrate that the collections used in this study most likely were not heavily plagued by collecting biases. Conversely, *Striatolamia macrota* is represented by rare large teeth in Telms 1, 2, 6 and 7 suggesting either collecting bias (targeting larger teeth during surface collecting) or sorting effects in these units. Detailed collection effort and taphonomic analyses will help to better understand the various biotic and abiotic effects on shark, ray, and skate tooth preservation modes throughout the Eocene La Meseta Fm. in the future.

1. del Valle RA, Elliot DH, Macdonald DIM 1992 Sedimentary basins on the east flank of the Antarctic Peninsula: proposed nomenclature. *Antarctic Science* **4**, 477–478

2. Marenssi SA, Santillana SN, Rinaldi CA. 1998a Paleoambientes sedimentarios de la Aloformación La Meseta (Eoceno), Isla Marambio (Seymour), Antártida, vol 464. Instituto Antártico Argentino, Contribución, 51 pp.

3. Marenssi SA, Santillana SN, Rinaldi CA. 1998b Stratigraphy of the La Meseta Formation (Eocene), Marambio (Seymour) Island, Antarctica. In: Casadio S (ed) Paleógeno de América del Sur y de la Península Antártica. Asociación Paleontológica Argentina, Publicación Especial, vol 5. pp 137–146. Buenos Aires

4. Marenssi SA. 1995 *Sedimentología y paleoambientes de sedimentación de la Formación La Meseta, isla Marambio, Antártida*. Tomo I, pp 330, Tomo II, pp 172. Ph.D. dissertation, Universidad de Buenos Aires (unpublished)

5. García, R, Acosta Hospitaleche, C, Márquez, G. 2021 Biodeterioration of Antarctic fossil penguin bones caused by lichens from the Eocene La Meseta Formation. *Polar Biology* **44,** 2243–2254.

6. Irazoqui, F. & Acosta Hospitaleche, C. 2021 Bioerosive traces in fossil penguin bones (Aves, Sphenisciformes) from the Eocene of Marambio/Seymour Island (West Antarctica), Historical Biology (online first).