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Responses of *D. Majorinum* (Mollusca: Scaphopoda), in a changing environment.

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Polar oceans are projected to be highly affected by warming and ocean acidification (Shadwick et al. 2013), making the waters and the seabed around Antarctica an ideal test laboratory for comparing the effects of climate change. Marine organisms have different mechanisms to adapt to a change in environment. Therefore, it is important to understand their ecology (Peck 2015). Species living close to the Antarctic continent are more prone to be affected because they are native cold-adapted organisms which have been isolated from the rest of the World Ocean by the Antarctic Circumpolar Current for millions of years (Barnes & Peck 2008). Regional differences in temperature and carbonate chemistry due to different oceanographic properties make the Weddell and Amundsen seas suitable study areas for assessing biotic responses to different environmental conditions. Here we focus on an understudied benthic organism group, the Scaphopoda (specifically *Dentalium majorinum*). We find differences in morphometric parameters, such as ventral and dorsal diameters, length and rib number, volume and densities. On average, the Amundsen Sea specimens are smaller and have a lower volume than the Weddell Sea specimens. Length, ventral and dorsal diameter are higher at water depth below 1600m in the Weddell Sea. Density values are on average higher in Amundsen Sea specimens than in those from the Weddell Sea. Internal differences in shell morphology are analysed by microtomography (microCT) and synchrotron based x-ray tomographic microscopy (SXRTM). No distinct growth rings, indicating differences in growth rates between winter and summer, are visible in the specimens.