Census of Antarctic Marine Life
SCAR-Marine Biodiversity Information Network

BIOGEOGRAPHIC ATLAS OF THE SOUTHERN OCEAN

CHAPTER 6.7. HALOCYPRID OSTRACODS OF THE SOUTHERN OCEAN.

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THE BIOGEOGRAPHIC ATLAS OF THE SOUTHERN OCEAN

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6.7. Halocyprid Ostracods of the Southern Ocean

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1. Introduction

The planktonic ostracods contribute a significant proportion of oceanic mesoplankton assemblages in the Southern Ocean. They have been reported from all depths, from the ocean's surface to the abyssal seafloor, both in open water and under pack ice. But they are generally most abundant at depths below the wind-mixed layer. They have featured in relatively few studies, partly because they are considered to be difficult to identify, and partly because of their small size (adults range in the Southern Ocean from 0.9 to 6 mm). Their systematics became confused when G.W. Müller (1906a) re-classified most of the halocyprid species into a single genus *Conchoecia.* Subsequent attempts by others to clarify their systematics have not always been successful. In an attempt to remedy this situation Blachowiak-Samolyk & Angel (2003) posted a web-based atlas, which includes a full species listing, taxonomic drawings, and zoogeographical distributions.

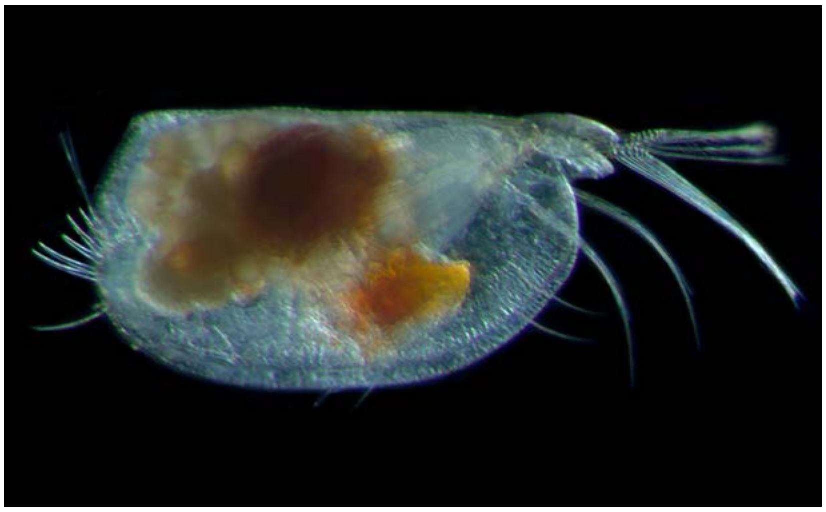


Photo 1 *Alacia hettacra* (G.W. Müller, 1906), female. Image: R. Hopcroft © UAF.

2. The role of halocyprids in the pelagic ecosystem

Most, if not all, the species are detritivores. Some species have been reported to be herbivores, not only are they small and but also several species have been found to have phytoplankton in their guts. However, they have no filter-feeding structures and observations on live animals have shown them to be particle feeders. The phytoplankton cells in their guts have been the result of them consuming snow aggregates and loose mucus sheets in which the phytoplankton cells have been entangled. They probably play an important role in modifying the fluxes of sedimenting carbon and nutrient regeneration within the water column.

3. Biogeography of halocyprids in the Southern Ocean

In the Northern Atlantic there is a clear latitudinal cline of increasing species richness towards the tropics; a cline that is expressed at all depths throughout the water column (Angel *et al.* 2007). There have been no comparable bathymetric studies in the Southern Ocean, but a similar cline can be expected to exist there as well. The mechanisms responsible for the cline are unknown. In the upper ocean species richness also increases with depth; the maximum species richness is generally found at a depth of about 1000 m (Angel *et al.* 2007). In the North Atlantic, there is a close relationship between the composition of the halocyprid assemblages and the distributions of water masses at both high and at low latitudes (e.g. Angel & Fasham 1975). Hence the halocyprids have a considerable potential as indicators of the impact of climatic variation (Angel & Fasham 1975, Castillo *et al.* 2007).

The distributions of the majority of species in the Southern Ocean are circumpolar, although there is poor coverage of the Indian Ocean sector. There is one exception, *Proceroecia rivotella* McKenzie & Benassi, 1994, which is a species that has only been reported as a result of a single study within a limited sector between 64° and 71°S and 161° and 179°E (Benassi *et al.* 1994). Angel & Blachowiak-Samolyk (2008) when discussing the insights they gained through the development of their atlas of Southern Ocean planktonic ostracods (Blachowiak-Samolyk & Angel 2003), reported 12 species are endemic to the Southern Ocean. However, since then two of these species, *Vityazoecia (Metaconchoecia) lunata* (Deevey, 1978) and *Paramollicia major* (Deevey, 1974), have been reported from abyssopelagic depths in the sub-Tropical Atlantic (Angel 2010, Blachowiak-Samolyk *et al.* in preparation). These species, together with several others (e.g. *Metaconchoecia skogsbergi* (Iles, 1953)) may be advected northwards in Antarctic Intermediate Water (AAIW) and Antarctic Bottom Water (ABW) as they spread northwards. Two of the other endemics have not been reported since they were first described (i.e. *Bathyconchoecia lacunosa* (G.W. Müller, 1906a) and *Archiconchoecetta bidens* (Deevey, 1982)). Angel & Blachowiak-Samolyk (2008) included in their atlas 47 species that had been recorded from the Southern Ocean from south of 52°S. Twenty-three of these have been reported from south of the Polar Front, 26 between the Polar Front and the Sub-Antarctic Front, and 40 from between the Sub-Antarctic Front and the Sub-Tropical Front. The fronts are expected to be the main boundaries to the ranges of the species, but since the positions of sampling relative to the fronts have seldom been reported, this is yet to be proven. Blachowiak-Samolyk & Angel (2003) selected 52°S as the northern limit to their Southern Ocean atlas for pragmatic reasons. If 40°S had been selected as the northern boundary, the numbers of recorded species would have increased to >80 and would have included many sub-tropical species. Relating species richness to latitude is somewhat arbitrary, because species are intermittently advected beyond their usual distributional limits within mesoscale eddies. So some records from high latitudes in the Southern Ocean are undoubtedly 'aberrant', as species may persist within eddies for many weeks or even months beyond their normal latitudinal ranges.

Little is known about the vertical migrations (diel, seasonal; and ontogenetic) being undertaken by halocyprids in the Southern Ocean. The severity of sea states in the Southern Ocean inhibits the replicated sampling required firmly to establish these behaviours, and there are few opportunities to conduct year-round sampling at open ocean locations.

4. Biogeographical mapping

The maps presented here are based on compilations of all the published data for each of the species that can be geo-positioned using station listings. These data have been extensively supplemented with a considerable volume of unpublished records derived from our analyses of samples collected during the five Commissions of *Discovery Investigations*. All these data have been archived with OBIS and SCAR-MarBIN.

Using historical data for mapping has to be approached with caution for a number of reasons:

1. Some of the records are erroneous. For example, Poulsen (1973) reported *Boroecia antipoda* (G.W. Müller, 1906) as occurring in tropical seas around Indonesia and in the Eastern Tropical Pacific. Originally this species was considered to be a subspecies of *B. borealis* (Sars, 1865) and hence to have a bipolar distribution. Now it is considered to be a Southern Ocean endemic. Deevey (1978) expressed doubts about Poulsen's identifications and suggested that his records, particularly those from the tropics, should be referred to *B. borealis* sensu stricto. We have re-examined Poulsen's material and found it does include a single specimen of *B. antipoda* that was collected at 46°43'S 176°09'E; otherwise all his specimens from the tropics and subtropics in the Pacific belong to a new and, as yet, undescribed species.

2. After taxonomic revisions, it is not always possible to attribute early records to the correct taxon. For example, there are now three known species of *Halocypris*, which lack external characters that will unambiguously identify the species. So all early records of *Halocypris* species from latitudes south of 40°S have had to be omitted.

3. There are species, such as *Metaconchoecia skogsbergi,* for which taxonomic uncertainties persist. There are several examples of similar-looking halocyprid populations having significantly different lengths; these populations are usually spatially segregated either geographically or bathymetrically. During the Census of Marine Zooplankton (CMarZ) cruises the sequences of the COI mitochondrial genes of several of these putative species were examined, and without exception the sequences showed that the differently sized populations are separate species (Nigro, pers. com.). In other oceans there are several examples of similar-looking halocyprid species with mean carapace lengths that differ by a factor of $\sqrt[3]{2}$, which, when critically examined morphologically and ecologically, have been shown to be distinct species (e.g. *Orthoconchoecia bispinosa* (Claus, 1890) and *O. secernenda* (Vavra, 1906) (Angel 1970) and *Paramollicia major* and *P. plactolycos* (G.W. Müller, 1906a)). In the Southern Ocean there are two, or possibly three sizes classes of *Metaconchoecia skogsbergi*. These size differences are yet to be investigated. *Proceroecia brachyaskos* (G.W. Müller, 1906a) is another species that occurs in the Southern Ocean that globally has populations of two sizes. Its large-sized population occur both mesopelagically and bathypelagically in the Southern Ocean, and appears to extend northwards at depths of >1500 m into the tropical Atlantic. The small-sized population occurs at mesopelagic depths in the tropical and sub-tropical Atlantic. Whether it is a classical example of submergence and bipolarity, or the results of cryptic speciation is yet to be resolved. *Discoconchoecia elegans* presents an even more complex scenario. This was one of the first halocyprids species to be described (Sars 1865), the specimens being collected from near the Lofoten Islands, Northern Norway. It has since been recorded as being cosmopolitan ranging continuously at all

latitudes from 83°N to 68°S, in both the Atlantic and in the Pacific. However, in the high Arctic (85°N) its adult length is 2.25 mm; at the type locality off Norway it is 1.9–2 mm; at temperate latitudes in the North Atlantic it has an unusually broad length range of 1.3–1.9 mm, which decreases to 1.0–1.3 mm in the tropics and sub-tropics. In the Southern Hemisphere there appears to be a step-wise increase in length to 1.6–1.8 mm at about 40°S. These changes in carapace length are also accompanied by subtle changes in length: height ratios and in the relative lengths of males and females. It is probable that some if not all of these size changes reflect specific changes, and the present species concept is a complex of cryptic species. However, all the reports of *D. elegans* from latitudes >40°S are likely to be of a single circumpolar species, that extends northwards both up the coast of Chile and into the upwelling zone of the Benguela Current off south-west Africa. In spite of these reservations, records of 40 of the 47 species recorded from the Southern Ocean (Blachowiak-Samolyk & Angel 2003) can be accepted without concern. The species selected for the mapping include all the common Southern Ocean endemics and the other very common and characteristic species. These maps greatly extend the earlier mapping exercise undertaken by Hillman (1969) whose results were predominantly based on the samples collected by the *Eltanin.* Hillman mapped the distributions of just eleven species, only five of which were restricted to latitudes south of the Antarctic Convergence.

During the recent ANDEEP cruises carried out on the *Polarstern* at least ten novel species of the benthopelagic genus *Bathyconchoecia* were collected. These deep living species are yet to be described and their geographical ranges are unknown. Their discovery poses the question of how diverse are the benthopelagic halocyprid assemblages? The planktonic benthopelagic assemblages remain almost totally unexplored.

5. Individual species distributions

Alacia spp. (Maps 1–2)

The two species of *Alacia* presented on Maps 1–2 are endemic to the Southern Ocean. However, neither of them resembles the type species *Alacia alata* (G.W. Müller, 1906a) and so will probably be re-classified in a new genus. *Alacia belgicae* (G.W. Müller, 1906b) is associated with ice, and the first specimens were collected by sampling through holes drilled in the pack ice (G.W. Müller 1906b, Brady 1907). Records for this species are concentrated around the Antarctic Peninsula and the Ross Sea and south of the Polar Front where the sampling has been most intensive. Records from north of the Polar Front are unlikely to be correct. The closely related species *A. hettacra* (G.W. Müller, 1906a) (Photo 1) is often the most numerous species in the halocyprid assemblages. It was the only Southern Ocean species that Baker (1954) considered to be circumpolar. It has a mesopelagic depth range that is concentrated with the 250–500 m zone. Its geographical range overlaps that of *A. belgicae,* but it extends much further northwards. Any records of this species to the north of the Sub-Tropical Front must be regarded as dubious. The temporal and spatial distributions of these two species led Kock (1992) to postulate that they undertake ontogenetic migrations. He modelled their life histories linking the distributions of the various developmental instars to the ice edge circulation. The model implied that the older instars migrate up into the surface layers in Spring, and so are advected offshore in the drift of the Antarctic Surface Waters. In Autumn when they are offshore, they migrate back down into deep water as conditions in the upper water column deteriorate. There they breed and the juvenile instars migrate up towards the surface where they are advected back southwards. Kock's sampling was limited to the upper 300 m and the mesh size of his sampler was too coarse to retain the earliest instars, so his observational data are incomplete. Blachowiak-Samolyk (2001) also observed that the earliest instars of *A. belgicae* are restricted to the deep layers of the water column in the Croker Passage in Autumn. In Spring in the Bransfield Strait they dominate the populations in the upper 1000 m (Blachowiak-Samolyk 1999), which is consistent with Kock's model. However, in the fjordic conditions of Admiralty Bay, the distributional patterns were not consistent with the Kock's hypothesis (Blachowiak-Samolyk & Angel 2007).

Austrinoecia isocheira (G.W. Müller, 1906a) (Map 3)

This is a Southern Ocean endemic, whose zoogeographic distribution is similar to those of the two *Alacia* species. It occurs almost exclusively to the south of the northern boundary of the circumpolar current. It is a small, shallow mesopelagic species that is often abundant. Its small size (~1 mm), results in it often being overlooked, because samplers being used are fitted with mesh sizes that are too coarse to retain it. Drapun (2006) was able to identify all six juvenile instars in samples collected with nets with a mesh size of 120 μm.

Boroecia antipoda (G.W. Müller, 1906a) (Map 4)

When it was first identified in the Southern Ocean Müller (G.W. Müller, 1906a) considered it to be a subspecies of *B. borealis* (Sars, 1865), and so it has often been cited as an example of bipolarity. However, we have undertaken a critical comparative appraisal of the morphology of the two species and confirmed that they are distinct species. Now *Boroecia borealis* and *B. antipoda* are regarded respectively as North Atlantic and Southern Ocean endemics. *Boroecia antipoda* is mostly restricted to latitudes south of the Sub-Tropical Front. It is a relatively large, mesopelagic species that is probably advected northwards within the flows of the deep Antarctic water masses.

Obtusoecia antarctica (G.W. Müller, 1906a) (Map 5)

This is another species that was initially considered to be a subspecies of a North Atlantic species *Obtusoecia obtusata* (Sars, 1866), and hence be an example of bipolarity. A recent detailed comparison of both forms (Angel & Blachowiak-Samolyk 2006) has confirmed their separate identities. This shallow mesopelagic species seldom extends south of the Polar Front, and only occurs in small numbers to the north of the Sub-Tropical Front.

Conchoecilla chuni (G.W. Müller, 1906a) (Map 6)

This is another Southern Ocean endemic that is restricted to latitudes north of the Polar Front. It is most abundant at mesopelagic depths to the north of the Sub-Tropical Front. For example, it occurs quite commonly in the upwelling region associated with the Benguela Current, and also along the eastern coast of New Zealand. Its highly characteristic elongate shape and unusual anterior positioning of the asymmetrical gland on the right carapace valve means that this species is unlikely to be confused with any other.

Conchoecissa symmetrica (G.W. Müller, 1906a) (Map 7)

A deep mesopelagic/bathypelagic species that is endemic to southern latitudes. Hillman (1969) reported that its bathymetric range shoals in sub-Antarctic waters. This is unusual since most high latitude species show a deepening in their bathymetric range towards lower latitudes. So did Hillman confuse this species with *C. imbricata,* which has been reported from sub-Antarctic waters (Chavtur & Mazdygan 2011). It is also superficially similar in appearance to another bathypelagic species, *C. plinthina* (G.W. Müller, 1906a). *C. symmetrica* has not been recorded from the Indian Ocean sector, probably because of the dearth of sampling at appropriate depths in this sector. The extensions of its distributional range north of the Sub-Tropical Front may be indicative of the northward spread of Antarctic water masses.

Deeveyoecia arcuata (Deevey, 1978) (Map 8)

This is a species that was first described from the Southern Ocean, but subsequently it has been identified from depths of ~2000 m in the North Atlantic. Chavtur & Angel (2011) revised the taxonomy of the subfamily Metaconchoeciini, and designated it as the type species of one of their new genera. Two differently sized populations have been observed in the Atlantic, so it is possible that there are cryptic species within the present species concept. If the presence of the Southern Ocean form of this species is confirmed at low latitudes in the Atlantic, then this species may be another indicator of the deep circulation of Antarctic water.

Discoconchoecia aff. *elegans* (Sars, 1865) (Map 9)

This is an apparently cosmopolitan species, but the complexity of taxonomy has already been referred to. In the Southern Ocean it occurs as a sub-polar species where it replaces *Alacia hettacra* as the numerically dominant halocyprid species at mesopelagic depths.

Gaussicia edentata (G.W. Müller, 1906a) (Map 10)

This rather uncommon species seems to occur sporadically almost anywhere at high latitudes. The Southern Ocean form of this species is larger that the form that is an equally uncommon species in deep water of the tropical oceans, but much the same size as the form that occurs at high latitudes in both the North Atlantic and North Pacific. This is probably another species complex and the differently sized populations in different oceans will found to be cryptic species.

Gaussicia gaussi (G.W. Müller, 1906a) (Map 11)

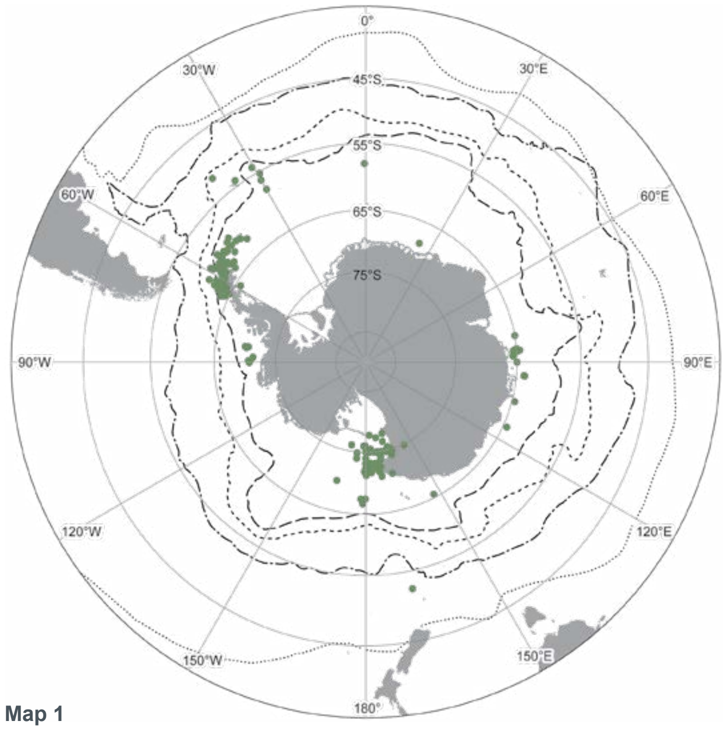
This large and rather rare species is currently only known from the Atlantic sector of the Southern Ocean. It was first described from a *Gauss* station at 35°S 2°E, but since then has been recorded from depths of 1000–2500 m throughout much of the North Atlantic and as far south as 51°30'S (Deevey 1974). A subspecies has also been reported from the North Pacific (Rudjakov 1962). The small number of records of this uncommon species from the Southern Ocean may be a reflection of the small number of samples that have been collected at appropriate depths.

Orthoconchoecia haddoni (Brady & Norman, 1896) (Map 12)

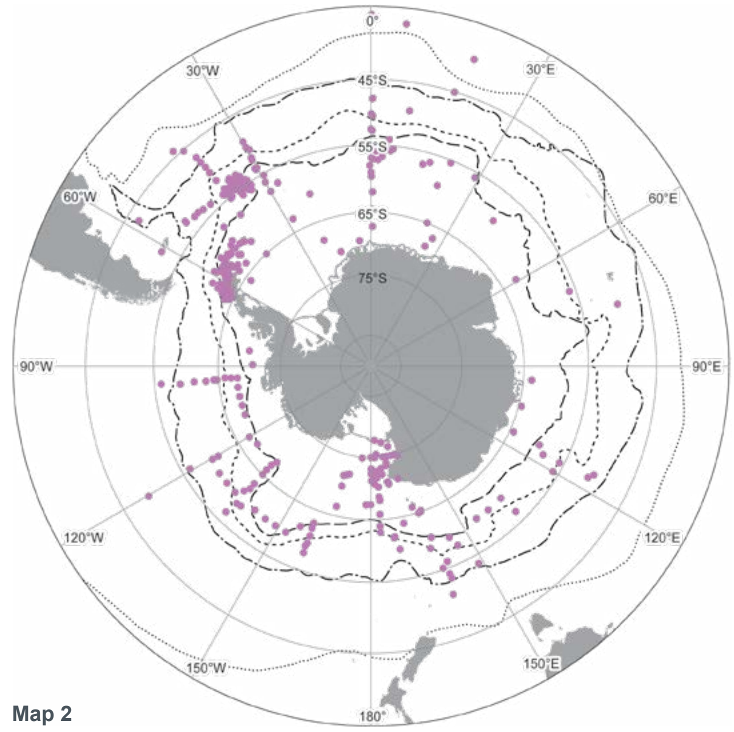
This is a species that occurs sporadically at high southern latitudes. Predominantly, it is a temperate mesopelagic species, with a subspecies off the coast of Chile (Martens 1979). It was first described from off the coast of Ireland in the North Atlantic. But then G.W. Müller (1906a) recorded it at a number of *Tiefsee* stations at latitudes ranging from 10°S to 40°N. He confusingly describes a small form that was collected off the Canary Islands as the 'northern race'. It seems likely that the populations occurring in Southern Ocean and it adjacent seas will be found to differ from the typical Northern Hemisphere populations.

Metaconchoecia skogsbergi (Iles, 1953) (Map 13)

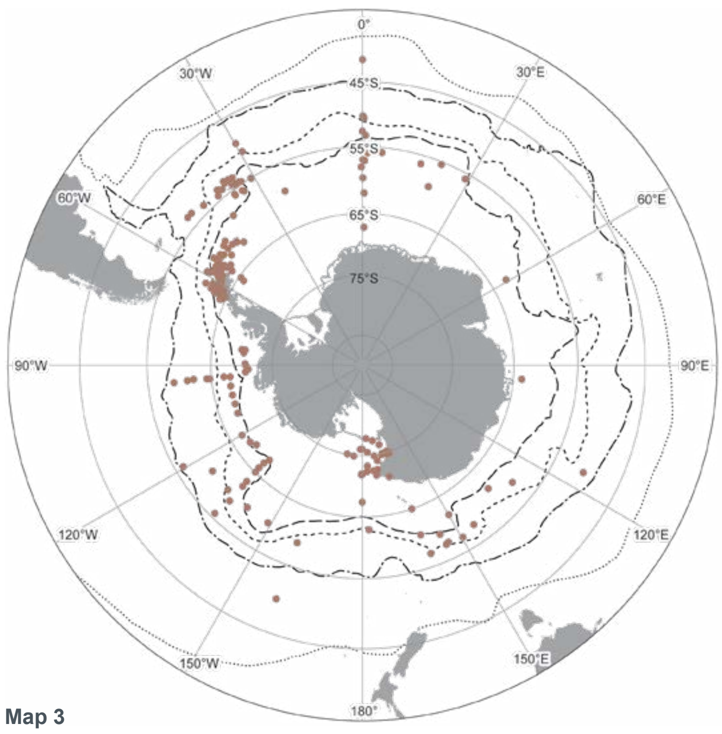
This is a widespread mesopelagic species in the Southern Ocean. It has been recorded from the most southerly latitudes sampled in the Ross Sea. Its taxonomy has a chequered history (see Chavtur & Angel 2011), and it is



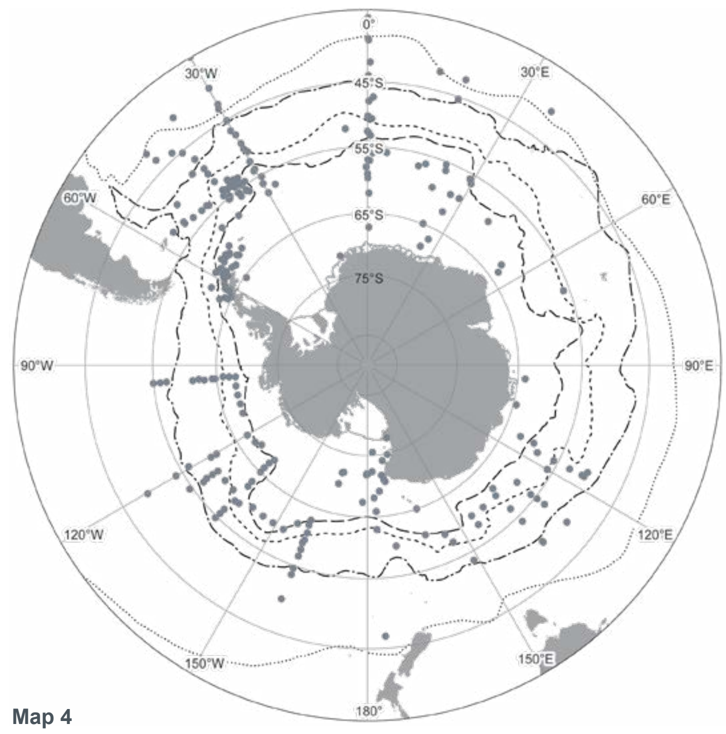
Map 1
● *Alacia belgicae*



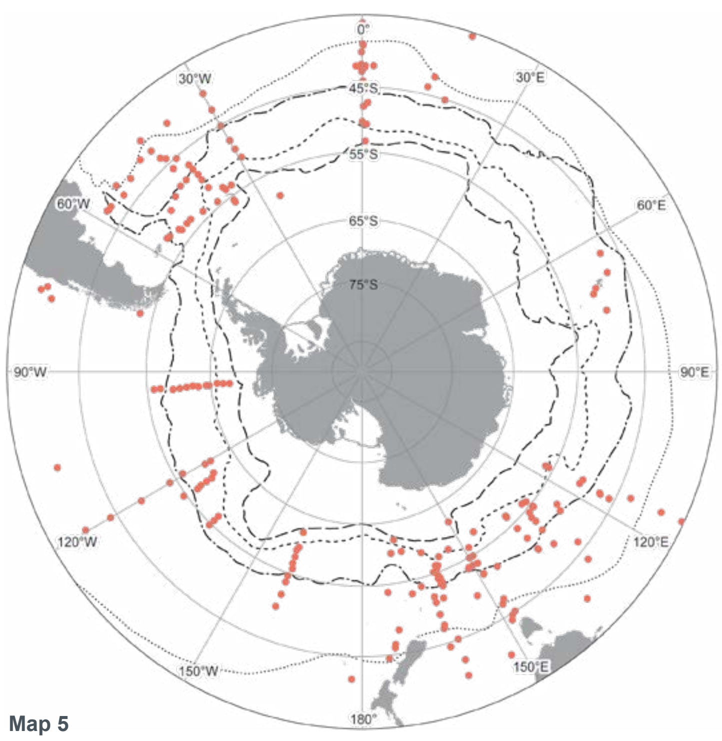
Map 2
● *Alacia hettacra*



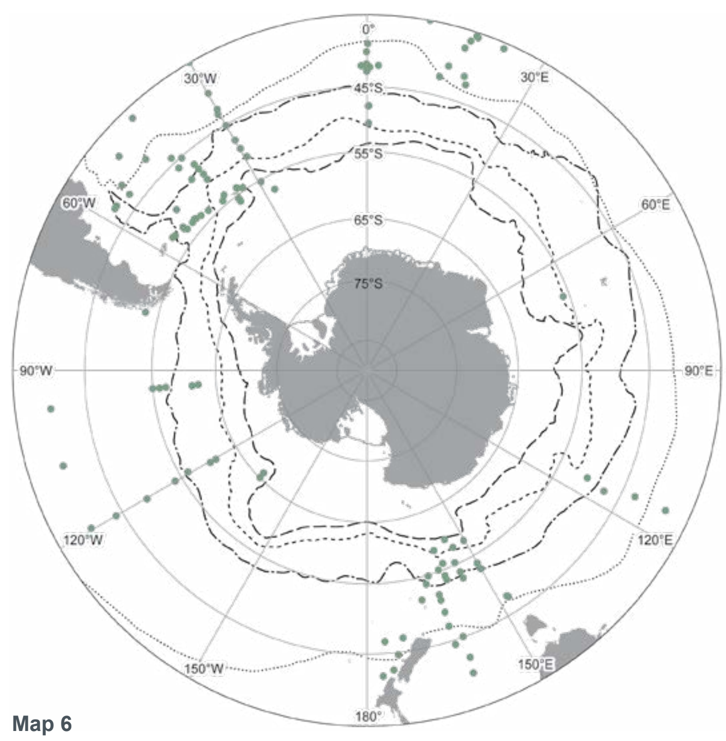
Map 3
● *Austrinoecia isocheira*



Map 4
● *Boroecia antipoda*

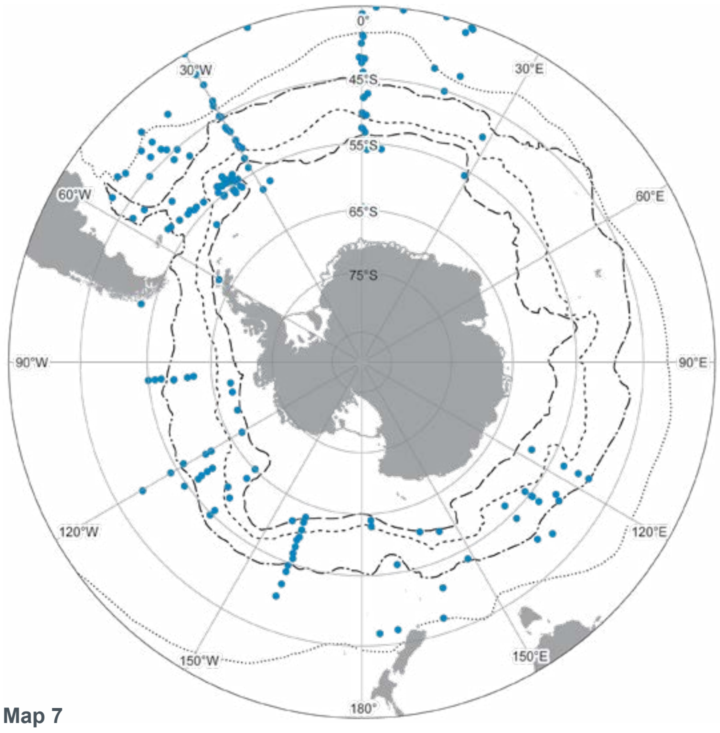


Map 5
● *Obtusoecia antarctica*

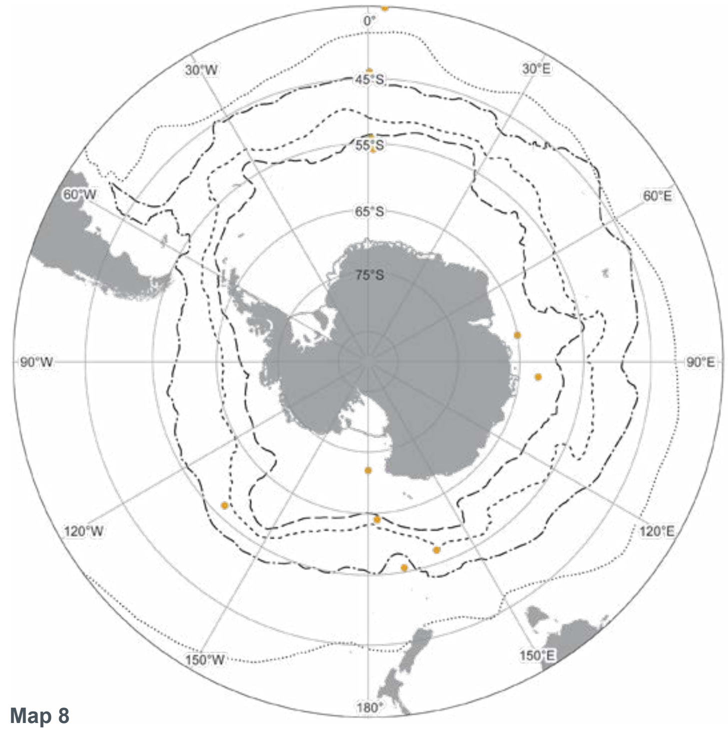


Map 6
● *Conchoecilla chuni*

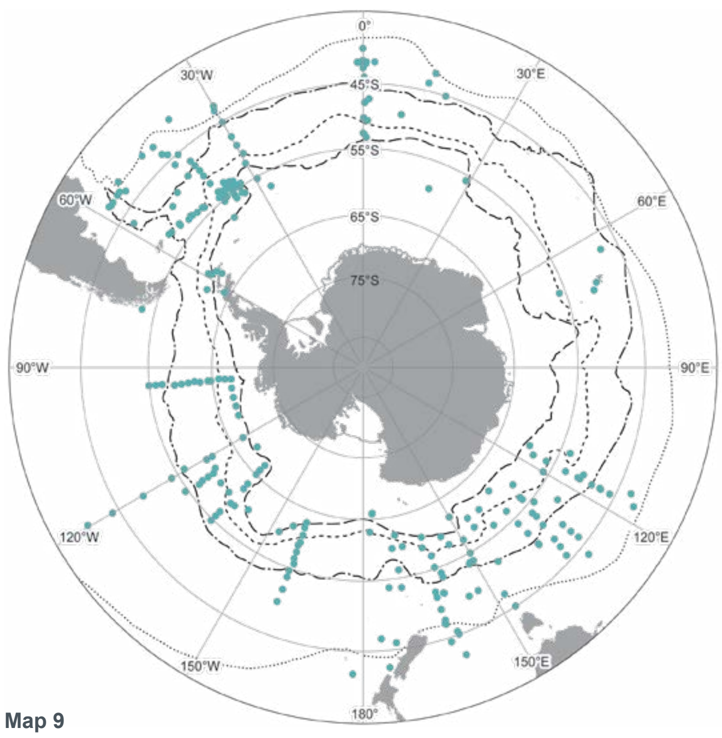
Halocyprida Maps 1–6 Map 1. *Alacia belgicae* (G.W. Müller, 1906b). Map 2. *Alacia hettacra* (G.W. Müller, 1906a). Map 3. *Austrinoecia isocheira* (G.W. Müller, 1906a). Map 4. *Boroecia antipoda* (G.W. Müller, 1906a). Map 5. *Obtusoecia antarctica* (G.W. Müller, 1906a). Map 6. *Conchoecilla chuni* (G.W. Müller, 1906a).



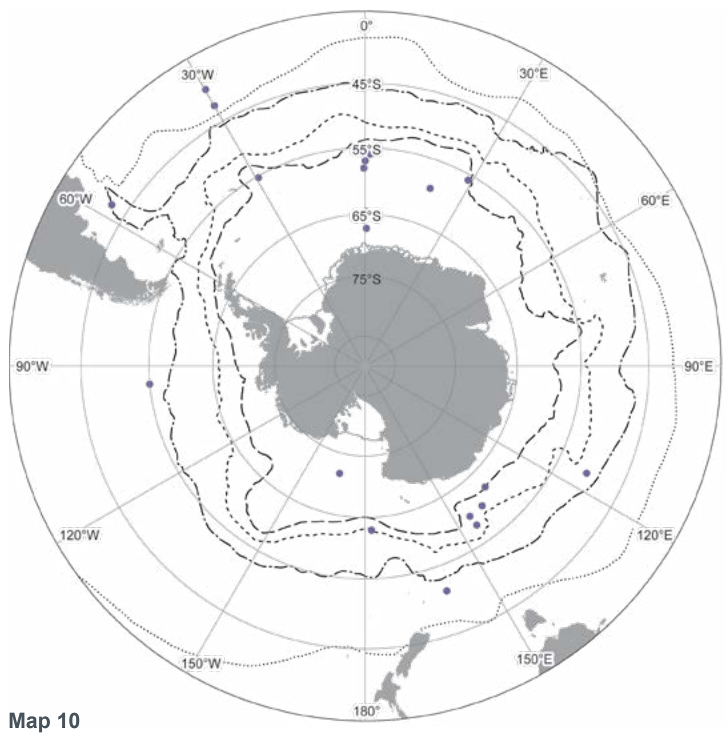
Map 7
● *Conchoecissa symmetrica*



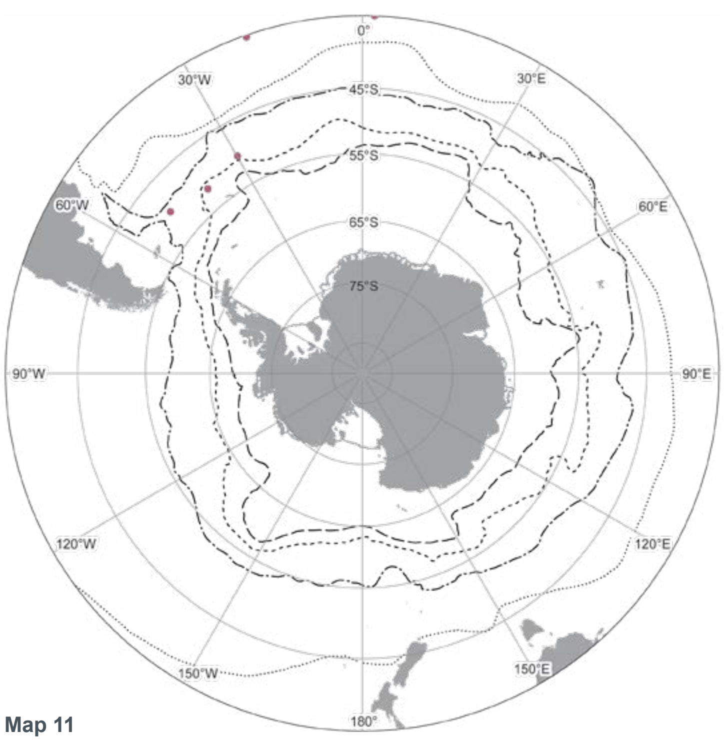
Map 8
● *Deeveyoecia arcuata*



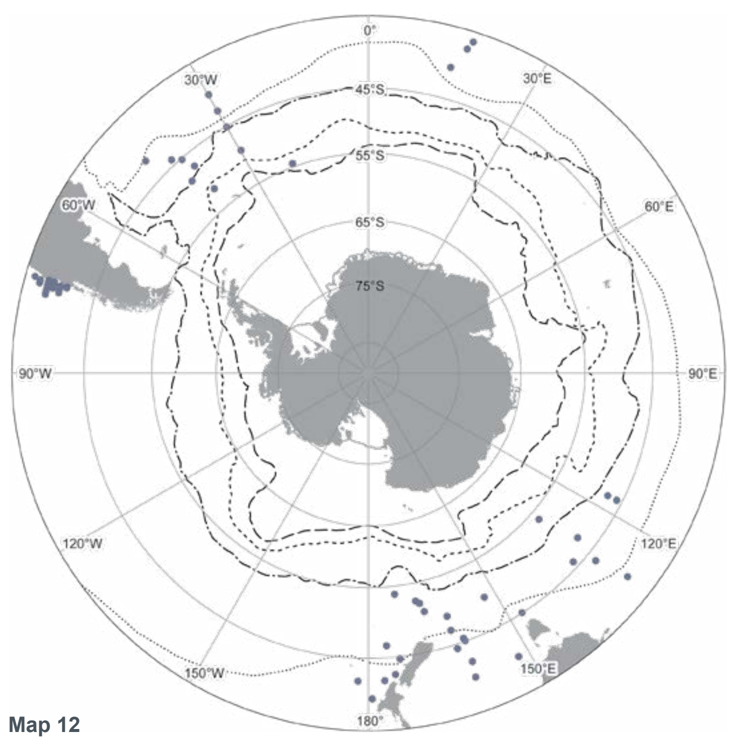
Map 9
● *Discoconchoecia elegans*



Map 10
● *Gaussicia edentata*

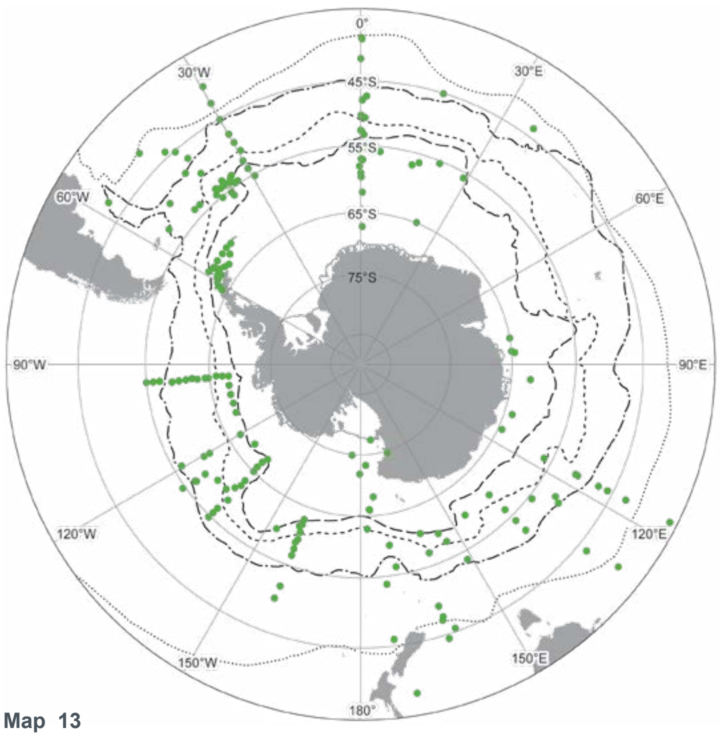


Map 11
● *Gaussicia gaussi*

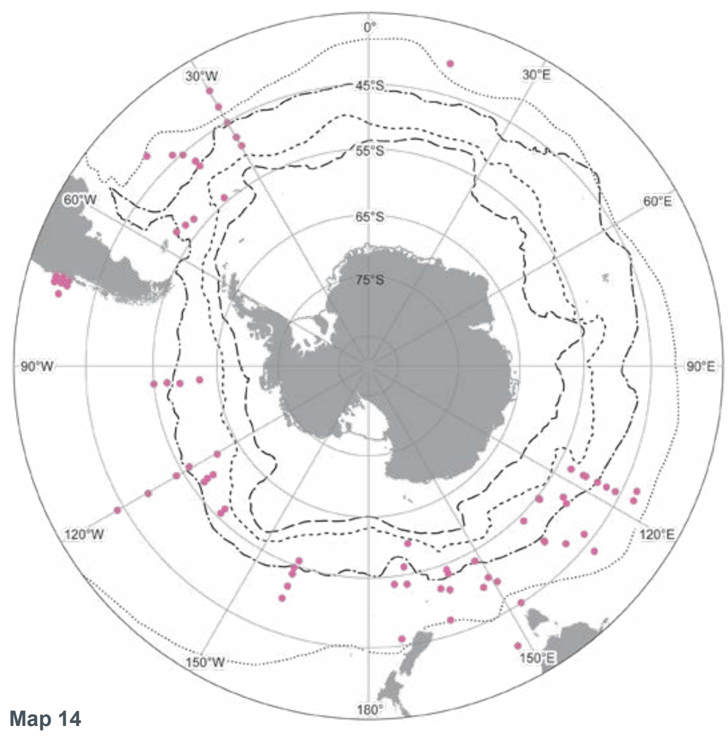


Map 12
● *Orthoconchoecia haddoni*

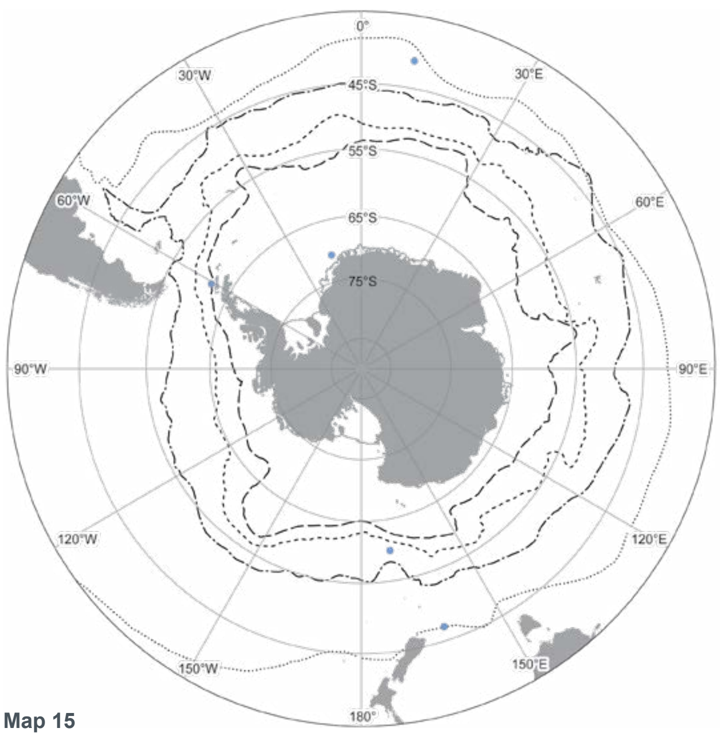
Halocyprida Maps 7–12 Map 7. *Conchoecissa symmetrica* (G.W. Müller, 1906a). Map 8. *Deeveyoecia arcuata* (Deevey, 1978). Map 9. *Discoconchoecia* aff. *elegans* (Sars, 1865). Map 10. *Gaussicia edentata* (G.W. Müller, 1906a). Map 11. *Gaussicia gaussi* (G.W. Müller, 1906a). Map 12. *Orthoconchoecia haddoni* (Brady & Norman, 1896).



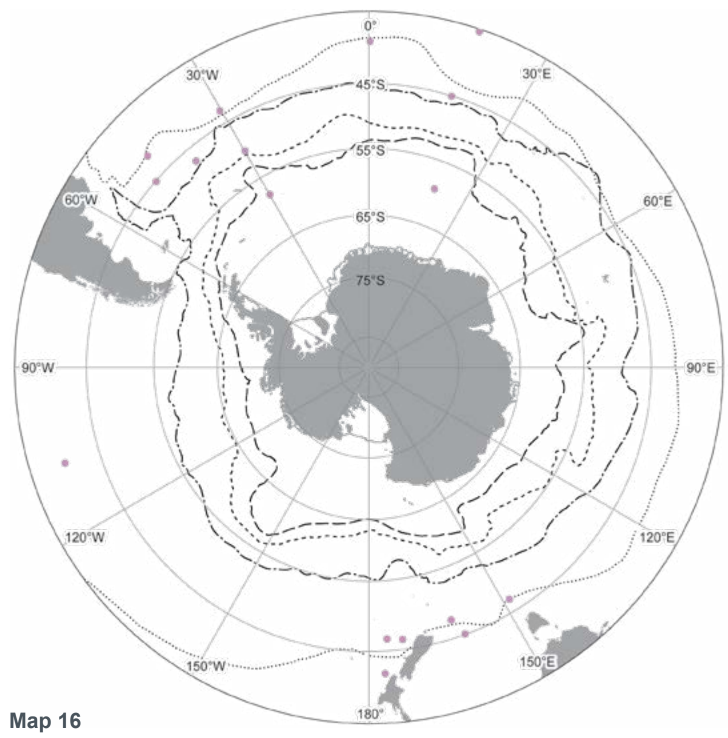
Map 13
● *Metaconchoecia skogsbergi*



Map 14
● *Rotundoecia teretivalvata*



Map 15
● *Vityazoecia lunata*



Map 16
● *Mollicia amblypostha*

Halocyprida Maps 13–16 Map 13. *Metaconchoecia skogsbergi* (Iles, 1953). Map 14. *Rotundoecia teretivalvata* (Iles, 1953). Map 15. *Vityazoecia lunata* (Deevey, 1982). Map 16. *Mollicia amblypostha* (G.W. Müller, 1906a).

still unresolved. Skogsberg (1920) gave a detailed description of *Conchoecia rotundata* collected from the Southern Ocean. Iles (1953) designated Skogsberg's description as defining *C. skogsbergi* Iles, 1953, which he split off from what he considered to be the 'small form' of *C. rotundata* (G.W. Müller, 1891). Unfortunately, Iles (1953) neither designated a type locality nor any type material. Since Skogsberg (1920) noted that his specimens of '*C. rotundata'* included at least two size classes, the precise identity of this species remains uncertain. The distribution shown is probably that of a species complex. The various size forms can co-occur at the same station, but are usually segregated bathymetrically with the large form occurring at deeper depths than the smaller form.

Rotundoecia teretivalvata (Iles, 1953) (Map 14)

This is the species that Iles (1953) considered to be the small form of *Conchoecia rotundata*, which he described from samples collected in the Benguela upwelling region. Recently it has been re-classified in a new genus by Chavtur & Angel (2011), who also fortuitously found the slides designated by Iles as the type specimens. These are now archived in the Natural History Museum, London. It is a shallow mesopelagic species with a very widespread distribution at low latitudes. Some of the specimens collected at high latitudes in the Southern Ocean are larger than average.

Vityazoecia lunata (Deevey, 1982) (Map 15)

Deevey (1982) described this species from *Eltanin* samples as *Conchoecia lunata*. It has intermittently been reported in deep benthopelagic samples collected, not only in the Southern Ocean during the ANDEEP programme, but also in abyssopelagic samples collected in the Atlantic during CMarZ cruises.

Mollicia amblypostha (G.W. Müller, 1906a) (Map 16)

This large bathypelagic species is predominantly a temperate species in the Southern Hemisphere. It does not extend south of the Polar Front in the northern Weddell Sea. However, since it occurs at depths that have seldom been sampled with large fine-mesh nets in the Southern Ocean, it may have a more widespread distribution. *Note*: the generic name is pre-occupied and a new generic name will have to be proposed.

Paramollica major (Deevey, 1974) (Map 17)

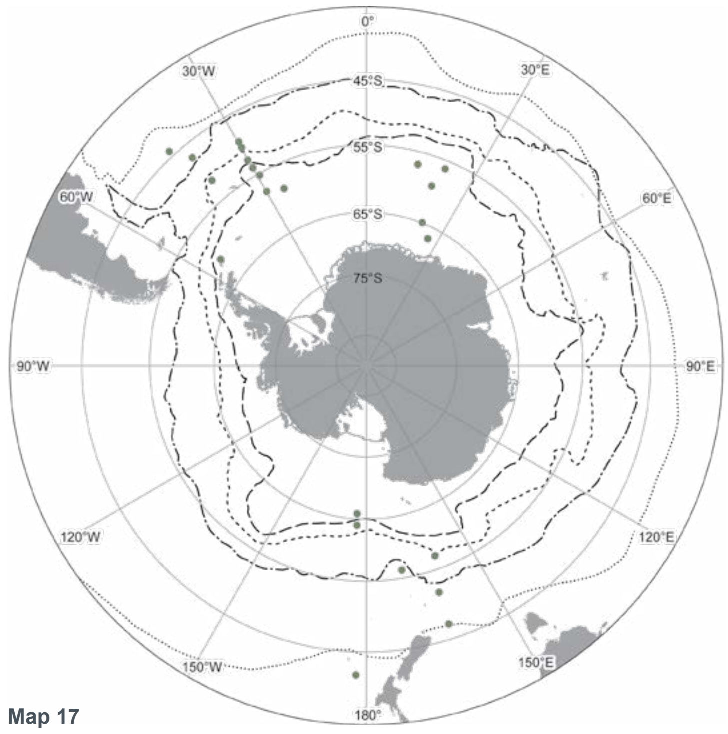
This is the large form of a *P. plactolycos* that has been split off. It has regularly been found in the Southern Ocean whenever sampling extends below 2000 m, and has been sampled regularly at similar depths in the Atlantic.

Pseudoconchoecia serrulata (Claus, 1874) (Map 18)

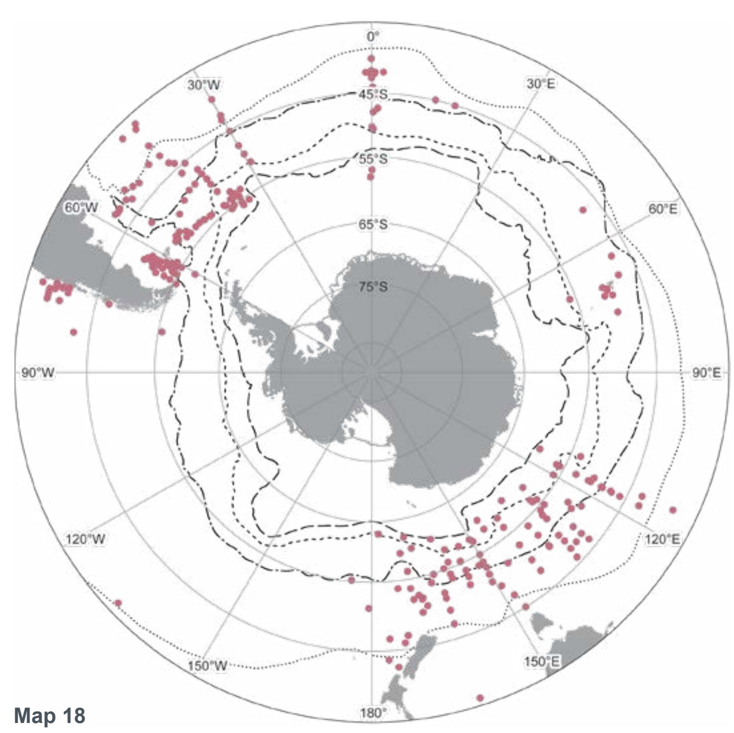
A species that is often very abundant at shallow mesopelagic depths within the core of the ACC (Antarctic Circumpolar Current) to the south of Australia and in south-west Atlantic in the vicinity of South Georgia and in the South Pacific (Deevey 1978).

Proceroecia brachyaskos (G.W. Müller, 1906a) (Map 19)

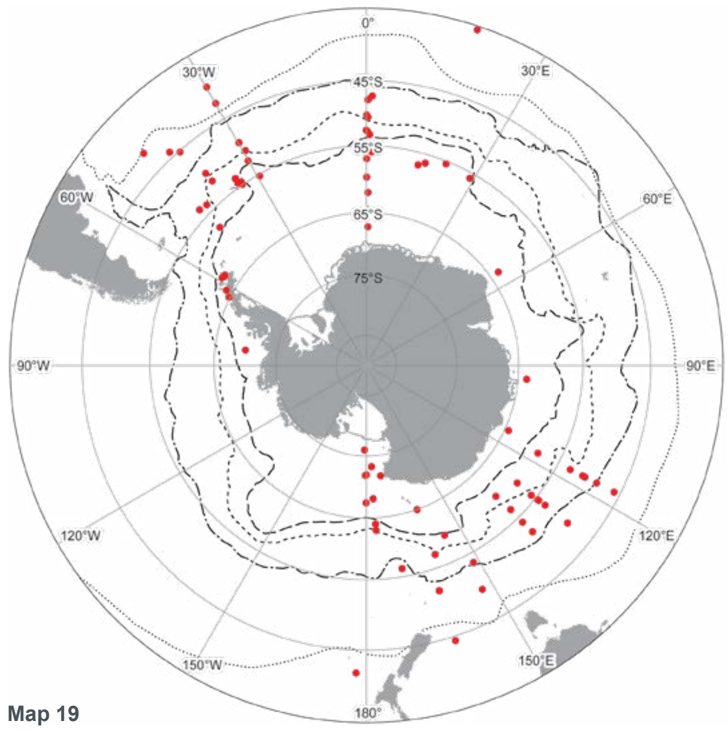
This relatively small mesopelagic species is widely distributed throughout the Southern Ocean. At low latitudes in the North Atlantic a small form occurs at depths of 800–1000 m and a larger form occurs at greater depths. Whether or not these are the same species has not been investigated.



Map 17
● *Paramollicia major*



Map 18
● *Pseudoconchoecia serrulata*



Map 19
● *Proceroecia brachyaskos*

Halocyprida Maps 17–19 Map 17. *Paramollica major* (Deevey, 1974). Map 18. *Pseudoconchoecia serrulata* (Claus, 1874).*Proceroecia brachyaskos* (G.W. Müller, 1906a).

Acknowledgements

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THE BIOGEOGRAPHIC ATLAS OF THE SOUTHERN OCEAN

Scope

Biogeographic information is of fundamental importance for discovering marine biodiversity hotspots, detecting and understanding impacts of environmental changes, predicting future distributions, monitoring biodiversity, or supporting conservation and sustainable management strategies.

The recent extensive exploration and assessment of biodiversity by the Census of Antarctic Marine Life (CAML), and the intense compilation and validation efforts of Southern Ocean biogeographic data by the SCAR Marine Biodiversity Information Network (SCAR-MarBIN / OBIS) provided a unique opportunity to assess and synthesise the current knowledge on Southern Ocean biogeography.

The scope of the Biogeographic Atlas of the Southern Ocean is to present a concise synopsis of the present state of knowledge of the distributional patterns of the major benthic and pelagic taxa and of the key communities, in the light of biotic and abiotic factors operating within an evolutionary framework. Each chapter has been written by the most pertinent experts in their field, relying on vastly improved occurrence datasets from recent decades, as well as on new insights provided by molecular and phylogeographic approaches, and new methods of analysis, visualisation, modelling and prediction of biogeographic distributions.

A dynamic online version of the Biogeographic Atlas will be hosted on www.biodiversity.aq.

The Census of Antarctic Marine Life (CAML)

CAML (www.caml.aq) was a 5-year project that aimed at assessing the nature, distribution and abundance of all living organisms of the Southern Ocean. In this time of environmental change, CAML provided a comprehensive baseline information on the Antarctic marine biodiversity as a sound benchmark against which future change can reliably be assessed. CAML was initiated in 2005 as the regional Antarctic project of the worldwide programme Census of Marine Life (2000-2010) and was the most important biology project of the International Polar Year 2007-2009.

The SCAR Marine Biodiversity Information Network (SCAR-MarBIN)

In close connection with CAML, SCAR-MarBIN (www.scarmarbin.be, integrated into www.biodiversity.aq) compiled and managed the historic, current and new information (i.a. generated by CAML) on Antarctic marine biodiversity by establishing and supporting a distributed system of interoperable databases, forming the Antarctic regional node of the Ocean Biogeographic Information System (OBIS, www.iobis.org), under the aegis of SCAR (Scientific Committee on Antarctic Research, www.scar.org). SCAR-MarBIN established a comprehensive register of Antarctic marine species and, with biodiversity.aq provided free access to more than 2.9 million Antarctic georeferenced biodiversity data, which allowed more than 60 million downloads.

The Editorial Team

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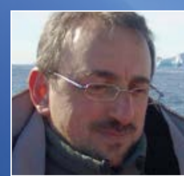

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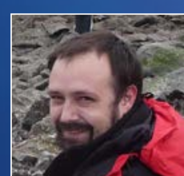

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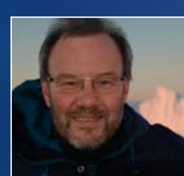

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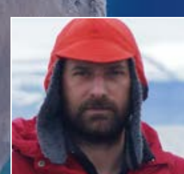

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