Census of Antarctic Marine Life
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BIOGEOGRAPHIC ATLAS OF THE SOUTHERN OCEAN

▶ CHAPTER 5.16. LOPHOGASTRIDA AND MYSIDA (CRUSTACEA: MALACOSTRACA: PERACARIDA) OF THE SOUTHERN OCEAN.

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THE BIOGEOGRAPHIC ATLAS OF THE SOUTHERN OCEAN

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5.16. Lophogastrida and Mysida (Crustacea: Malacostraca: Peracarida) of the Southern Ocean

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1. Introduction

The Southern Ocean fauna of the orders Lophogastrida and Mysida has been studied during the last 160 years by a large number of authors (Dana 1852; Cunningham 1871; G.O. Sars 1883, 1885; Holt & Tattersall 1906; Illig 1906, 1930; Zimmer 1907, 1914, 1915; Hansen, 1908, 1913, 1921; W.M. Tattersall 1908, 1913, 1918, 1923; Colosi 1924; Rustad 1930; O. Tattersall 1955, 1961, 1965; Holmquist 1957; Birstein & Tchindonova 1962; Ledoyer, 1969, 1977, 1989, 1990a, b, 1995; Siegel & Mühlenhardt-Siegel 1988; Hoffmeyer 1993; Wittmann 1991, 1996; Tchindonova 1993; Crescenti 1997; Fukuoka *et al.* 1997; Brandt *et al.* 1998; Murano 1999; Petryashov 2005, 2006, 2007a, b; San Vicente *et al.* 2006, 2007; San Vicente 2007, 2010a, b, 2011; San Vicente & Sorbe 2008; Biju *et al.* 2010). Based on taxonomical and detailed distributional data, from numerous publications, a biogeographical analysis of the Southern Ocean fauna of Lophogastrida and Mysida was recently carried out by Petryashov (2007b).

Photo 1 *Antarctomysis* sp. (*Polarstern* ANTXXIX-3, st. 247-8). Image: C. d'Udekem d'Acoz © RBINS

2. Biodiversity

In the Southern Ocean s.l. (SO), Lophogastrida is represented by 8 species from 4 genera, belonging to all 3 families of the order:

- Gnathophausiidae — *Gnathophausia* Willemoës-Suhm, 1873 (1 spp.) and *Neognathophausia* Petryashov, 1992 (2 spp.) [Edit. note: the genus *Neognathophausia* is not accepted in WoRMS as it was rejected by Casanova *et al.* 1998 and Meland & Aas 2013 in favour of *Gnathophausia*]
- Eucopiidae — *Eucopia* Dana, 1852 (3 spp.),
- Lophogastridae — *Chalaraspidum* Willemoës-Suhm, 1876 (1 sp.) and *Lophogaster* M.Sars, 1857 (1 sp.).

The order Mysida includes here 64 species from 19 genera, belonging to 2 families:

- Petalophthalmidae — *Hansenomysis* Stebbing, 1893 (5 spp.) and *Ceratomysis* Faxon, 1893 (1 sp.);
- Mysidae — *Boreomysis* G.O.Sars, 1869 (7 spp.), *Birsteiniamysis* Tchindonova, 1981(1 sp.), *Euchaetomera* G.O.Sars, 18683 (4 spp.), *Caesaromysis* Ortmann, 1893 (1 sp.), *Marumomysis* Murano, 1999 (1 sp.), *Amblyops* G.O.Sars, 1869 (2 spp.), *Amblyopsoides* O.Tattersall, 1955 (3 spp.), *Dactylamblyops* Holt & Tattersall, 1906 (1 sp.), *Hyperamblyops* Birstein & Tchindonova, 1958 (1 sp.), *Paramblyops* Holt & Tattersall, 1905 (1 sp.), *Pseudomma* G.O.Sars, 1870 (11 spp.), *Mysidopsis* G.O.Sars, 1864 (3 spp.), *Mysidetes* Holt & Tattersall, 1906 (13 spp.), *Mysifaun* Wittmann, 1996 (1 sp.), *Antarctomysis* Coutiere, 1906 (2 spp.), *Arthromysis* Colosi, 1924 (1 sp.) and *Neomysis* Czerniavsky, 1882 (5 spp.).

Twenty-six species are pelagic, of which four are lophogastrids and twenty-two are mysids. Forty-three species are benthopelagic or hyperbenthic: 1 lophogastrid and 42 mysid species. Three species of Gnathophausiidae (Lophogastrida), *Gnathophausia zoea*, *Neognathophausia gigas and N. ingens*, have pelagic juveniles, but primarily benthopelagic adults (mixed life style). The distribution of pelagic and benthopelagic species differs significantly, and hence the patterns of the biogeographical distribution in these groups must be analysed separately. Three species of Gnathophausiidae were included in both groups.

Among the 72 studied species from both orders, 51 (71%) are endemic to the SO. All of them belong to the order Mysida and 12 species are pelagic. Three of these species, *Euchaetomera zurstrasseni*, *Dactylamblyops hodgsoni* and *Antarctomysis maxima*, occasionally occur in areas north of the Sub-Tropical Front, in the zone of cold currents, but their core areas are most likely to be restricted to Antarctic and sub-Antarctic waters. Endemism is relatively high at species level, especially in benthopelagic mysids (39 endemic species), but the distribution of endemic species within the SO exhibits a complex pattern. In waters comprised between the Southern Antarctic Circumpolar Current Front (SACCF or "Southern Front") and the Antarctic coast, 17 species are endemic, with 3 pelagic and 14 benthopelagic ones. Among them, 8 benthopelagic species are potentially endemic to 4 distinct regions: *Pseudomma longicaudum* and *P. schollaertensis* to the region of the Palmer Archipelago (see Map 11), *Mysifaun erigens* to the Weddell Sea (Map 11), *Mysidetes hanseni* to the East Antarctic (66°00'S, 89°38'E) (Map 11), *Hansenomysis anaramosae, H. sorbei*, *Marumomysis antarctica*, *Pseudomma bellingshausensis* and *P. melandi* to the Bellingshausen Sea. One potentially endemic (pelagic) species is known from the area comprised between the Polar Front and the Southern Front (SACCF): *Hyperamblyops antarctica* (53°10'S, 36°21'W). Two endemic (benthopelagic) species were found in the area comprised between the Sub-Antarctic Front and the Polar Front: *Ceratomysis ericula* (Map 6) and *Mysidetes morbihanensis* (Kerguelen Island region). In the region near the coast of South America, comprised between the Sub-Tropical Front (formerly Sub-Tropical Convergence) and the Sub-Antarctic Front, 15 endemic species are recorded: 1 pelagic and 14 benthopelagic species. Among them, 1 pelagic and 7 benthopelagic species are endemic to the area from the Patagonian Shelf to the Magellan Strait, including the Falkland Islands, and 4 benthopelagic to the region ranging from the south of Tierra del Fuego up to Chiloe Island (South Chile).

As opposed to species-level endemism, the regional fauna endemism at generic level is rather low: only 3 (all Mysida) out of 24 genera are endemic for the Antarctic and sub-Antarctic regions. The genus *Mysifaun* is potentially endemic to the Weddell Sea. *Arthromysis* was recorded in the Magellan Strait and in the adjacent Atlantic area. Only *Antarctomysis* is characterised by a widespread distribution ranging from the Antarctic to the sub-Antarctic regions. It must be noted that *A. maxima* was once recorded in the zone of Benguela Current, at the coast of Angola (about 8°S); this most likely corresponds to an 'emigration zone' (Petryashov 2007b).

3. Biogeography and depth distribution

The SO species of Lophogastrida and Mysida can be tentatively classified in the following biogeographical groups and sub-groups. In this classification we used the term "Notal" (Ortmann 1896; Andriashev 1965) to design the temperate waters of the Southern Hemisphere [Editor's note: Gill 1885, who introduced the term "notalian" used by Ortmann 1896, indicated for this zone a temperature range of 44° to 68° Fahrenheit or 6.7° to 20°Celsius], partly equivalent (see below) to the Sub-Antarctic Region of Hedgpeth (1969), but including South Georgia for benthopelagic species.

3.1. Pelagic species

***1. Panoceanic species*:** 14 panoceanic species are distributed throughout the World Ocean, with the exception of the Arctic Ocean. These species are distributed between the North Atlantic and North Pacific as far south as:

- Antarctic coastal region: *Neognathophausia gigas* (bathyal/abyssal/meso-abyssopelagic; Map 1), *Gnathophausia zoea* (bathyal/abyssal/meso-abyssopelagic), *Eucopia australis* (meso-abyssopelagic; Map 1), *E. grimaldii* (meso-abyssopelagic), *B. rostrata* (epi-bathypelagic: in the Atlantic Ocean southward of 25°S; Map 1),
- SACCF : *Neognathophausia ingens* (bathyal/abyssal/meso-abyssopelagic), *Eucopia unguiculata* (meso-abyssopelagic), *Boreomysis californica* (meso-abyssopelagic), *B. plebeja* (meso-abyssopelagic), *B. sibogae* (epi-bathypelagic: in the Atlantic Ocean southward of the equatorial region),
- Antarctic Polar Front: *Chalaraspidum alatum* (meso-abyssopelagic),
- Sub-Tropical Front, but penetrating occasionally more southwards: *Euchaetomera tenuis* (mesopelagic), *E. typica* (mesopelagic), *Caesaromysis hispida* (meso-batypelagic).

***2. Bipolar/Amphitropical*:** 1 species, *Amblyopsoides crozetii* (bathypelagic). Occurring in the Antarctic, at Crozet Island and SE of Kurile Islands (Map 2).

***3. Atlantic Tropical–Notal*:** 2 species, *Boreomysis atlantica* (bathypelagic; Map 3), *B. bispinosa* (bathypelagic; Map 3). The Atlantic Ocean and the Atlantic sector of the Southern Ocean from 38°N – 35°S to 47–48°S.

***4. West Atlantic Notal*:** 1 species, *Amblyopsoides obtusa* (epi-mesopelagic), from Falkland Islands to Magellan Strait.

***5. Potentially Notal*:** 1 species, *Euchaetomera spinosa* (epipelagic?) (43°01'S, 45°00'E).

***6. Widespread Notal-Antarctic*:** 5 species found from the Antarctic coast to:
- Sub-Antarctic Front: *Boreomysis brucei* (meso-abyssopelagic; Map 7),
- Kerguelen Islands: *Amblyopsoides halleyi* (meso-bathypelagic);
- Sub-Tropical Front, and along the Benguela Current (to 28°35'S–8°S) and Peru Current (to 32°25'S): *Euchaetomera zurstrasseni* (meso-bathypelagic; Map 7), *Dactylamblyops hodgsoni* (meso-bathypelagic; Map 7), *Antarctomysis maxima* (epi-bathypelagic; Map 9).

7. Pan-Antarctic (Georgian-circum-Antarctic): 1 species, *Antarctomysis ohlinii* (epi-bathypelagic; Map 8), distributed from South Georgia to the Antarctic coast, where it presents a circum-Antarctic distribution.

***8. Circum-Antarctic*:** 3 species, *Paramblyops brevirostris* (meso-bathypelagic; Map 10), *Amblyops antarctica* (meso-bathypelagic) and *A. tattersalli* (meso-bathypelagic; Map 10) are distributed around the Antarctic coasts, south of the SACCF.

3.2. Benthopelagic species

1. Panoceanic: 3 species. These species are distributed in the World Ocean (with the exception of the Arctic Ocean) in the North Atlantic and North Pacific as far south as:
- Antarctic coastal region: *Neognathophausia gigas* (bathyal/abyssal/meso-abyssopelagic; Map 1), *Gnathophausia zoea* (bathy-abyssal)
- SACCF: *Neognathophausia ingens* (bathyal/abyssal/meso-abyssopelagic).

***2. Bipolar/Amphitropical*:** 3 species.
- *Birsteiniamysis inermis* (bathyal/abyssal). From the Canadian Basin of the Arctic Ocean to the region between the Azores and Canary Islands; from the Bering Sea to the South Kurile Islands (44°N) and the California Peninsula (17°N); from the Peru-Chile Trench (8°25'S) and Sub-Antarctic Front to the Antarctic coast (Map 2)
- *Pseudomma sarsi* (sublittoral – upper bathyal) is found near the Kerguelen Islands, from the Patagonian shelf to the South Shetland Islands, and in the Sagami Bay (35°N) in Japan (Map 2)
- *Pseudomma antarcticum* (bathyal) is found in the Antarctic and the Iceland Basin.

3. Widespread American sub-Tropical–Notal: 1 species, *Mysidopsis acuta* (sublittoral – upper bathyal). It is distributed along the Atlantic coast (from 32°S) and along the Pacific coast (41°30'S) of America as far south as Tierra del Fuego and South Georgia (Map 3).

***4. West Atlantic sub-Tropical–Notal*:** 1 species, *Lophogaster muranoi* (sublittoral) is present along the Atlantic coast of America from the Rio de la Plata estuary to the San Matias Gulf (Map 3).

***5. Widespread American Notal*:** 3 species, *Pseudomma calmani* (sublittoral – upper bathyal) (Map 4), *P. minutum* (sublittoral – upper bathyal) (Map 4) and *Neomysis patagona* (upper sublittoral). Present from the Patagonian Shelf (45°–50°S) and South Chile (41°28'–41°30'S) to the region of the Falkland Islands, Tierra del Fuego and South Georgia.

***6. West Atlantic Notal*:** 8 species, *Hansenomysis falklandica* (sublittoral – upper bathyal) (Map 5), *Pseudomma magellanensis* (sublittoral – upper bathyal) (Map 5), *Mysidetes macrops* (sublittoral – upper bathyal) (Map 5), *M. patagonica* (sublittoral – upper bathyal) (Map 5), *Arthromysis magellanica* (sublittoral), *Neomysis monticellii* (sublittoral) and, possibly, *Mysidopsis rionegrensis* (sublittoral) and *Mysidetes anomala* (sublittoral – upper bathyal). Found from the Patagonian Shelf to the Magellan Strait, some species to South Georgia.

7. East Pacific Notal: 4 species (all in upper sub-littoral), *Mysidopsis intii* (Map 6), *Neomysis ilyapai* (Map 6), *N. meridionalis*, *N. sopayi* (Map 6) are present off Southern Chile (41°47'–41°52'S); some of them also off Tierra del Fuego.

***8. Kerguelen Notal*:** 2 species, *Ceratomysis ericula* (upper bathyal?) and *Mysidetes morbihanensis* (sub-littoral) are found off Kerguelen Islands (Map 6).

***9. Widespread Notal–Antarctic*:** 3 species (all in sublittoral – upper bathyal), *Mysidetes dimorpha*, *M. kerguelensis* (Map 7), *M. posthon* (Map 7) are found from Kerguelen Islands, Falkland Islands and South Georgia to the Antarctic coast.

***10. West Atlantic Notal–Antarctic*:** 4 species (all in sublittoral – upper bathyal), *Mysidetes brachylepis*, *M. crassa* (Map 8), *M. intermedia* (Map 5) and *M. microps* (Map 8) are found from the Patagonian Shelf to the Antarctic coast.

***11. Pan-Antarctic (Georgian-circum-Antarctic)*:** 1 species, *Pseudomma armatum* (sublittoral – upper bathyal) is found from South Georgia to the Antarctic coast (Map 8).

***12. Circum-Antarctic*:** 9 species, *Hansenomysis angusticauda* (sub-littoral – upper bathyal, Map 10), *H. antarctica* (upper bathyal, Map 10), *Pseudomma belgicae* (sub-littoral – bathyal) (Map 10), *Mysidetes antarctica* (sublittoral) are found in the East and the West Antarctic.
Hansenomysis anaramosae (upper bathyal), *H. sorbei* (bathyal), *Marumomysis antarctica* (bathyal), *Pseudomma bellingshausensis* (upper bathyal), *P. melandi* (bathyal) were recorded only from the Bellingshausen Sea and are potential regional endemics.

***13. Potentially West Antarctic*:** 2 species (both sublittoral). *Pseudomma longicaudum* (Map 11) and *P. schollaertensis* (Map 11) are present off the Antarctic Peninsula and in the Schollaert Channel (the Palmer Archipelago).

14. Potentially East Antarctic: 2 species, *Mysidetes hanseni* (sublittoral?, Map 11), *Mysifaun erigens* (sub-littoral – upper bathyal in the Weddell Sea, Map 11).

All widespread American Notal, West Atlantic Notal, East Pacific Notal, Kerguelen Notal, widespread Notal – Antarctic, West Atlantic Notal – Antarctic, pan-Antarctic, circum-Antarctic, West Antarctic and East Antarctic species are endemic species of the SO.

4. Biogeographic zonation

The pelagic Lophogastrida and Mysida fauna of the SO is biogeographically rather homogeneous. In the studied region, the most significant faunal changes were observed at the level of the SACCF zone. The pelagic lophogastrids and mysids of that region were represented by a rather small number of endemic species. The widespread World Ocean (panoceanic, bipolar and Atlantic sub-Tropical – Notal) species constitute 59 % of the fauna; whilst only 41 % are Antarctic and sub-Antarctic endemics. Barely more than half of the latter correspond to widespread Notal – Antarctic species. Only 3 species were recorded exclusively in Antarctic waters south of the SACCF. Three species were Notal endemics: two had a southernmost limit located north of the SACCF and one species inhabits the area extending from the Magellan Strait to the Falkland Islands. One endemic genus of pelagic mysids, *Antarctomysis*, is characteristic of the SO (only *A. maxima* penetrates occasionally into the Benguela Current area, which is apparently an emigration zone.

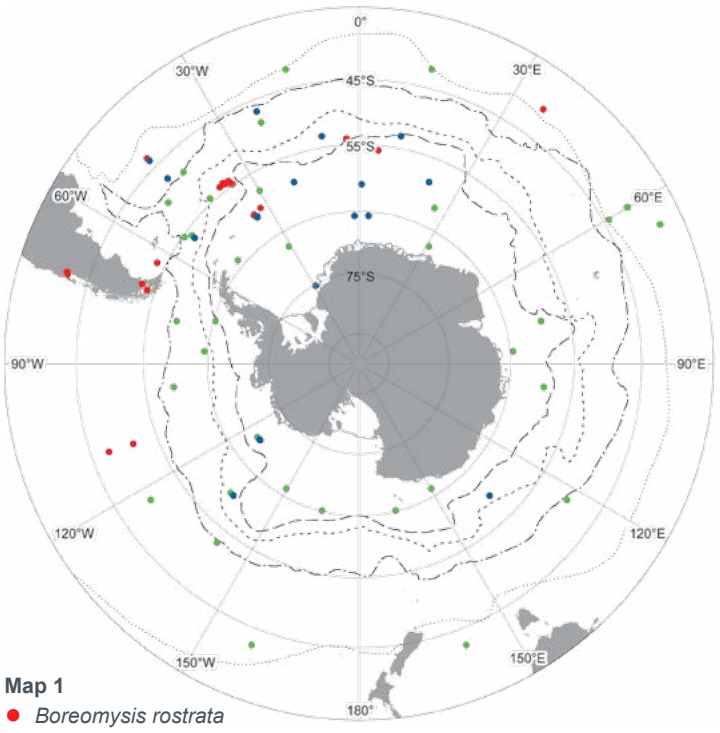
The presently available data enabled us to distinguish one Notantarctic Realm for the pelagic lophogastrid and mysid fauna in the studied region. This realm includes two provinces: the Antarctic (Circum-Antarctic) Province, extending from the Antarctic coast to the SACCF zone and the Notal Province, located between the SACCF and the Sub-Tropical Front (Map 12). The Patagonian Region is located in the Notal Province and includes the waters of the Magellan Strait and around the Falkland Islands to, approximately, the zone of the Sub-Tropical Front. Thus, the Antarctic (Circum-Antarctic) Province is located primarily in the zone of the Antarctic Coastal Current (or East Wind Drift) and the Ross and Weddell Sea current systems, whilst the Notal Province is typically located in the zone of the Antarctic Circumpolar Current (or West Wind Drift).

Benthopelagic lophogastrids and mysids exhibit a more complex pattern of distribution than pelagic species. The benthopelagic fauna consist mainly of Antarctic and sub-Antarctic endemics (approximately 84% of benthopelagic species are endemic). Benthopelagic species constitute 36% of the Notal species, 30% of the Antarctic species, and only 18% of the Notal-Antarctic species. Two endemic genera, *Mysifaun* (from the Weddell Sea) and *Arthromysis* (from the Magellan Strait and adjacent Atlantic waters), are known in the SO.

For the benthopelagic lophogastrid and mysid fauna in the studied region, the presently available data enabled us to distinguish two realms the Antarctic (Circum-Antarctic) Realm and the Notal Realm (Map 13). The Antarctic Realm comprises two provinces: the West Antarctic Province (defined herein as the west coast of the Antarctic Peninsula and the coasts of some nearby islands, i.e. the Biscoe, Palmer and South Shetland Islands) and the East Antarctic Province (from the southern part of the Weddell Sea to the east, up to Alexander I Land). There was, however, almost no data available for the east coast of the Antarctic Peninsula. Within the latter province, two biogeographical regions, the Ross and Weddell seas, can be distinguished. The Notal Realm includes three provinces: the South Chilean Province (from the northern end of Chiloe Island to Tierra del Fuego), Patagonian Province (from the Rio Negro estuary to the west part of the Magellan Strait, the Falkland Islands and South Georgia) and Kerguelen Province (Kerguelen Islands area). The Lophogastrida and Mysida fauna of other sub-Antarctic islands is practically unstudied. The fauna of South Georgia may be distinguished as a biogeographic transitional region of the Patagonian Province, which has common species with the fauna of Patagonia (10 spp.), Antarctic (10 spp.) and Kerguelen (6 spp.) (Petryashov 2007b).

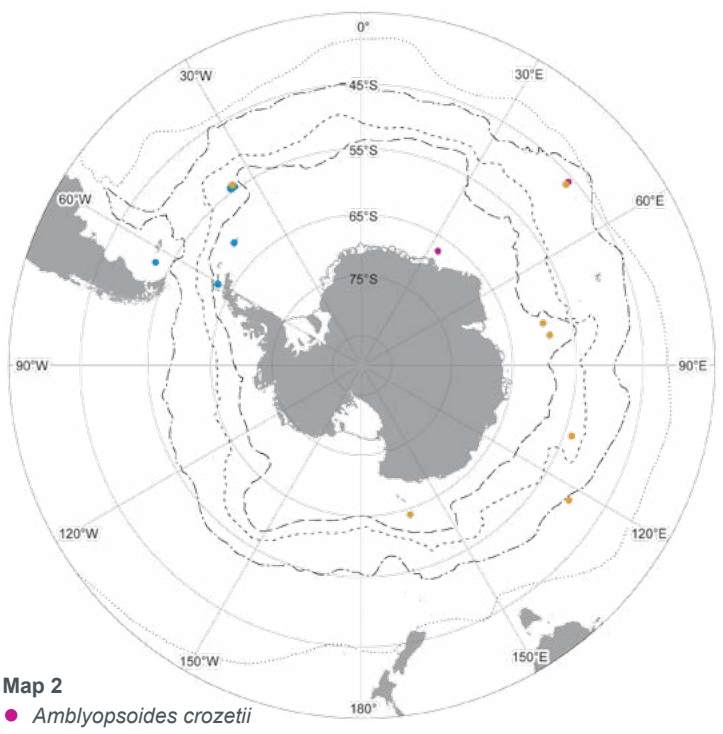
5. Biogeographic processes

A number of abiotic environmental factors influence lophogastrid and mysid distributions in the SO: a number of them, increasing the homogeneity of the fauna, whilst others factors contribute to its dissociation. Factors homogenizing species' distributions include water circulation patterns in the SO. The Antarctic Coastal Current and the Antarctic Circumpolar Current (ACC) might favor dispersal of pelagic lophogastrids and mysids in the Southern Ocean and benthopelagic ones in Antarctic waters. The presence of *Antarctomysis maxima* in the Falkland Islands region was probably related with the passive dispersal using the cold Falkland Current, and emigration of some species pelagic populations as far north as the sub-Tropical regions might be explained by dispersal with cold waters of Benguela and Peruvian Current. Occasionally, meanders and rings of warm-water from the southern Sub-Tropical Front and the rather warm Peruvian-Chilean Subsurface Countercurrent might have



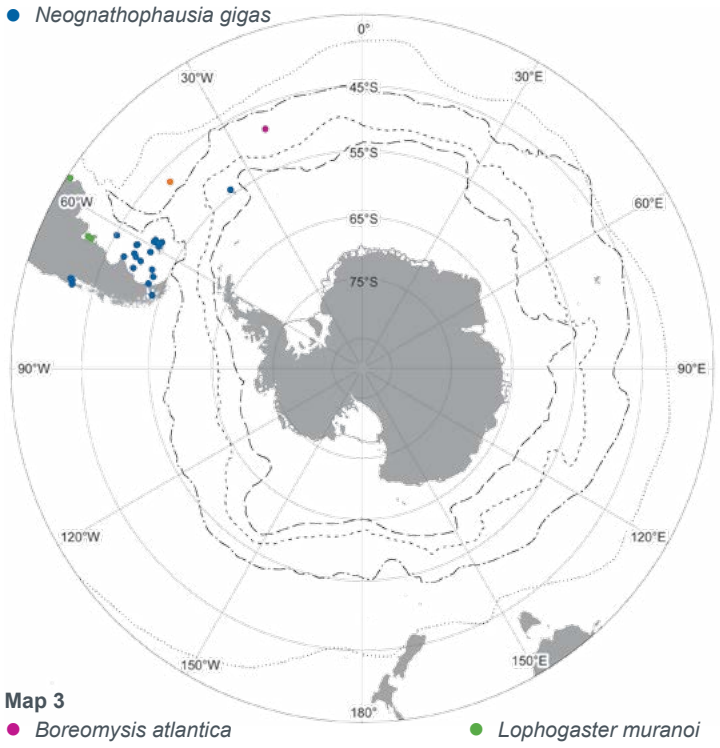
Map 1

- *Boreomysis rostrata*
- *Eucopia australis*
- *Neognathophausia gigas*



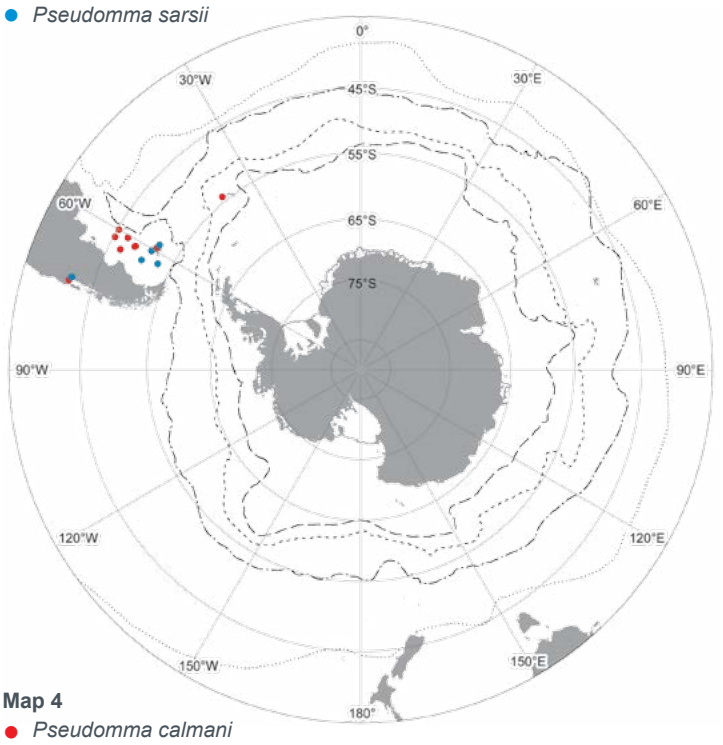
Map 2

- *Amblyopsoides crozetii*
- *Birsteiniamysis inermis*
- *Pseudomma sarsii*



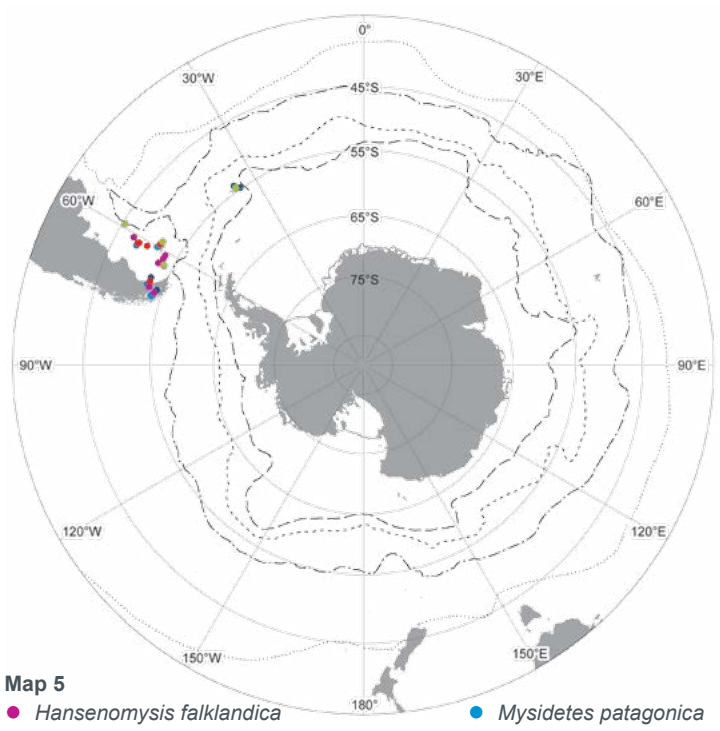
Map 3

- *Boreomysis atlantica*
- *Boreomysis bispinosa*
- *Lophogaster muranoi*
- *Mysidopsis acuta*



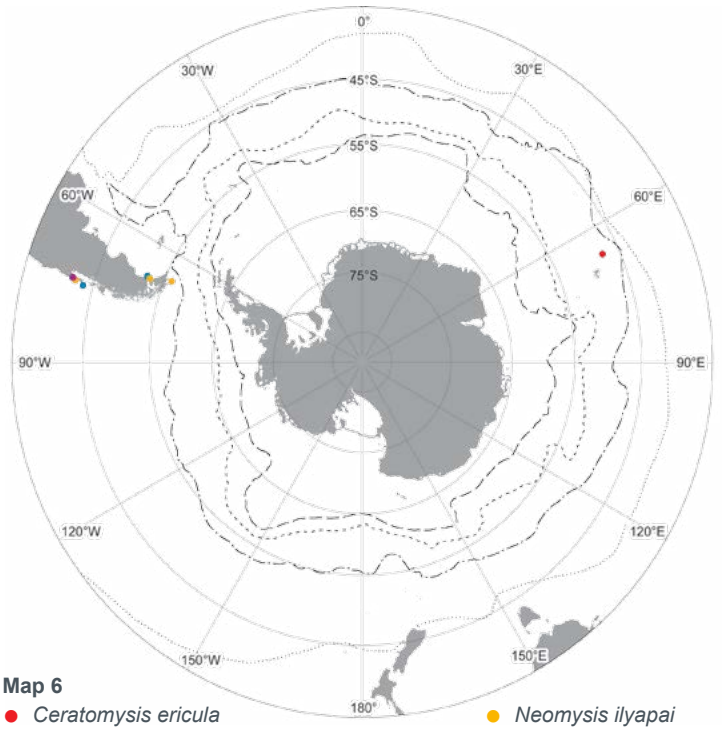
Map 4

- *Pseudomma calmani*
- *Pseudomma minutum*



Map 5

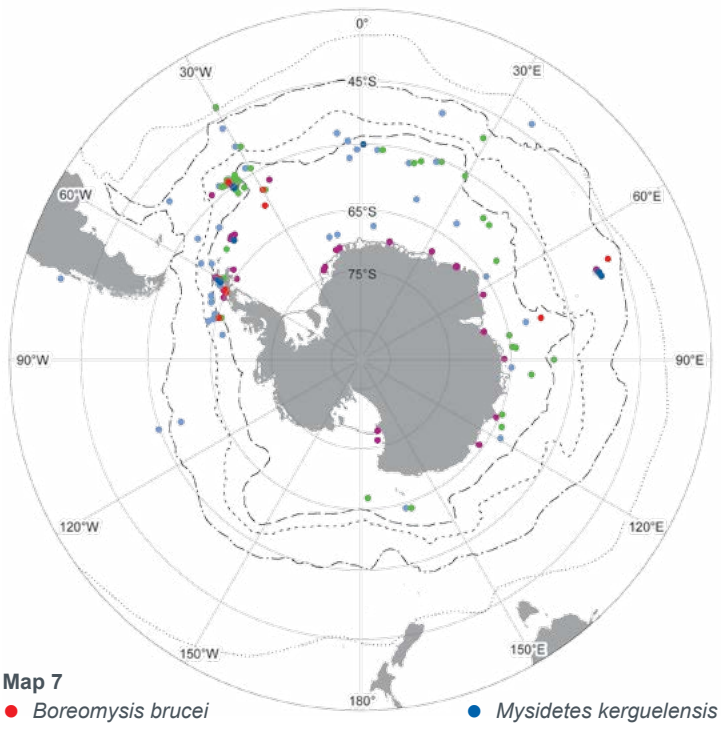
- *Hansenomysis falklandica*
- *Mysidetes intermedia*
- *Mysidetes macrops*
- *Mysidetes patagonica*
- *Pseudomma magellanensis*



Map 6

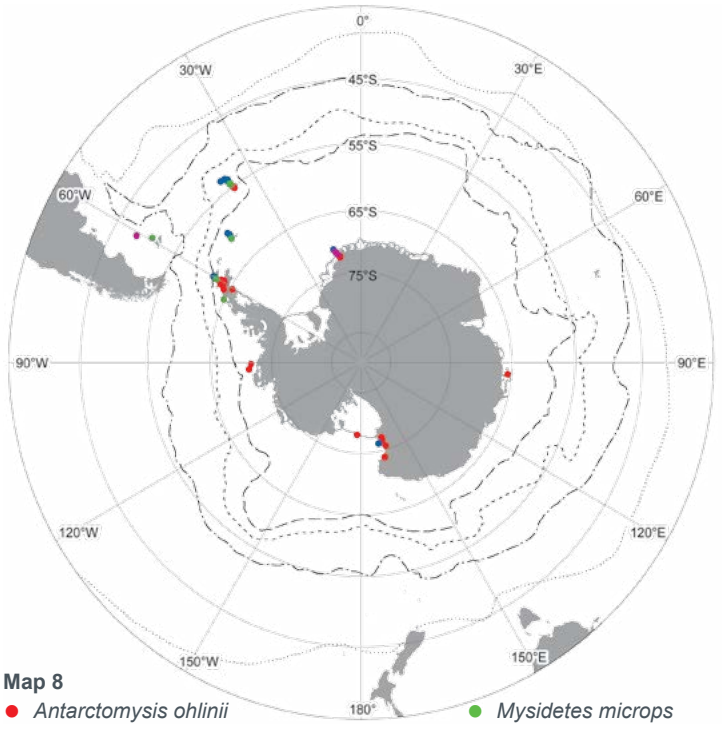
- *Ceratomysis ericula*
- *Mysidopsis intii*
- *Neomysis ilyapai*
- *Neomysis sopayi*

Mysida-Lophogastrida Maps 1-6 Map 1 *Boreomysis rostrata* Illig, 1906; *Eucopia australis* Dana, 1852; *Neognathophausia gigas* Willemoes-Suhm, 1875. Map 2 *Amblyopsoides crozetii* (G.O. Sars, 1884); *Birsteiniamysis inermis* (Willemoes-Suhm, 1874); *Pseudomma sarsi* G.O. Sars, 1883. Map 3 *Boreomysis atlantica* Nouvel, 1942; *Boreomysis bispinosa* O. Tattersall, 1955; *Lophogaster muranoi* Fukuoka, Hoffmeyer & Vinas, 1997; *Mysidopsis acuta* Hansen, 1913. Map 4 *Pseudomma calmani* O. Tattersall, 1955; *Pseudomma minutum* O. Tattersall, 1955. Map 5 *Hansenomysis falklandica* O. Tattersall, 1955; *Mysidetes intermedia* O. Tattersall, 1955; *Mysidetes macrops* O. Tattersall, 1955; *Mysidetes patagonica* O. Tattersall, 1955; *Pseudomma magellanensis* O. Tattersall, 1955. Map 6 *Ceratomysis ericula* Ledoyer, 1977; *Mysidopsis intii* Holmquist, 1957; *Neomysis ilyapai* Holmquist, 1957; *Neomysis sopayi* Holmquist, 1957.



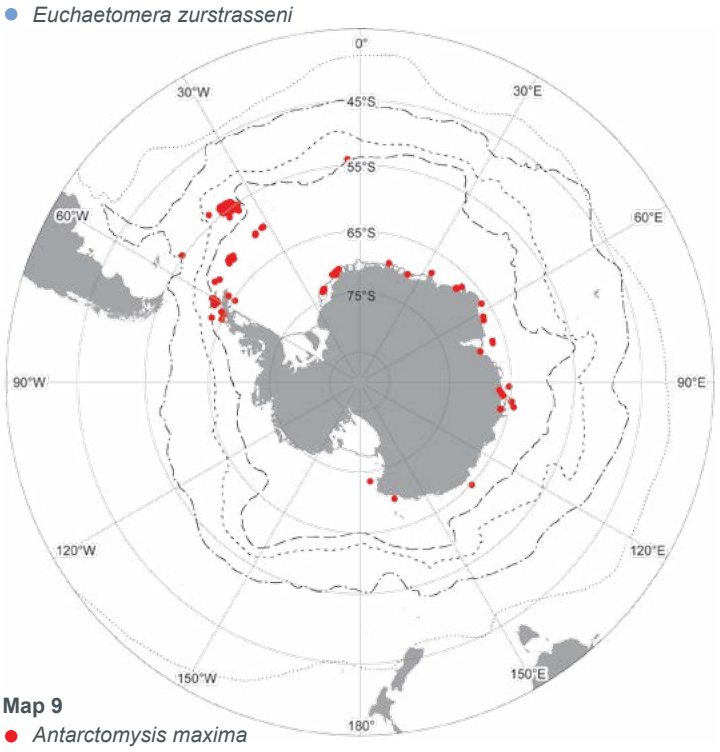
Map 7

- *Boreomysis brucei*
- *Dactylamblyops hodgsoni*
- *Euchaetomera zurstrasseni*
- *Mysidetes kerguelensis*
- *Mysidetes posthon*



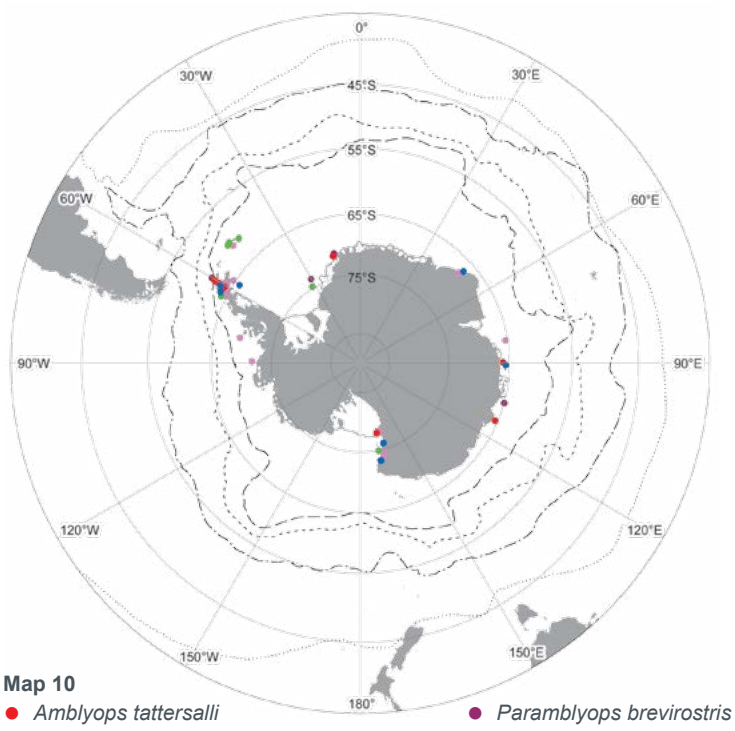
Map 8

- *Antarctomysis ohlinii*
- *Mysidetes crassa*
- *Mysidetes microps*
- *Pseudomma armatum*



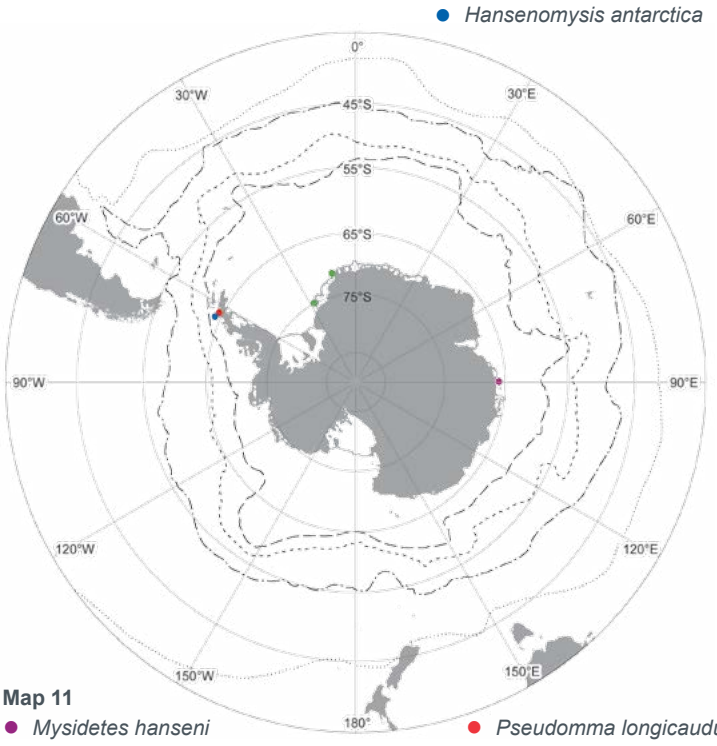
Map 9

- *Antarctomysis maxima*



Map 10

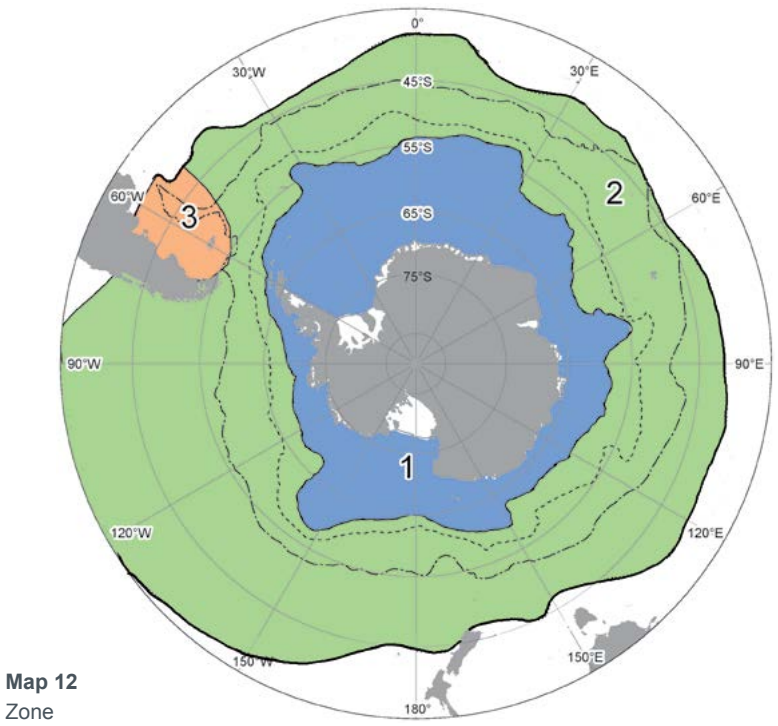
- *Amblyops tattersalli*
- *Hansenomysis angusticauda*
- *Hansenomysis antarctica*
- *Paramblyops brevirostris*
- *Pseudomma belgicae*



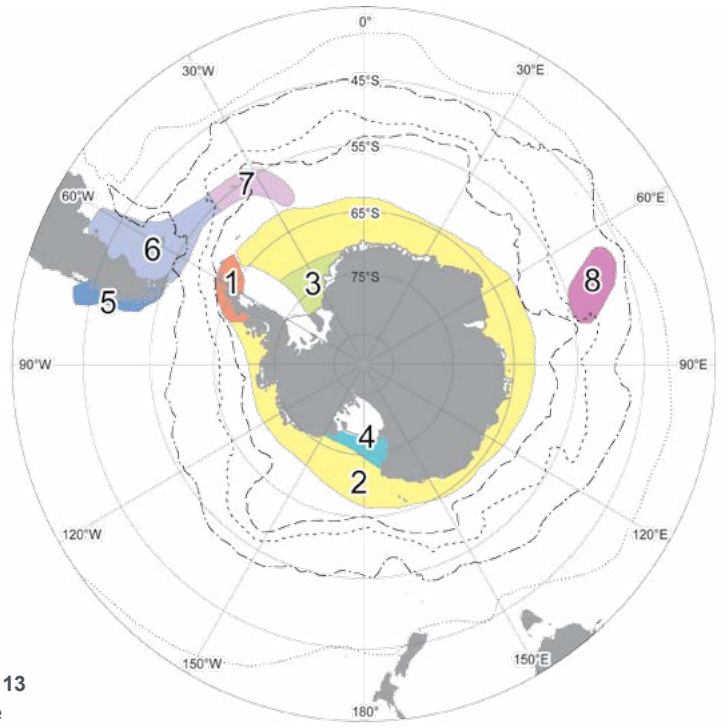
Map 11

- *Mysidetes hanseni*
- *Mysifaun erigens*
- *Pseudomma longicaudum*
- *Pseudomma schollaertensis*

Mysida-Lophogastrida Maps 7-11 Map 7 *Boreomysis brucei* W. Tattersall, 1913; *Dactylamblyops hodgsoni* Holt & Tattersall, 1906; *Euchaetomera zurstrasseni* (Illig, 1906); *Mysidetes kerguelensis* (Illig, 1906); *Mysidetes posthon* Holt & Tattersall, 1906. Map 8 *Antarctomysis ohlinii* Hansen, 1908; *Mysidetes crassa* Hansen, 1913; *Mysidetes microps* O. Tattersall, 1955; *Pseudomma armatum* Hansen, 1913. Map 9 *Antarctomysis maxima* (Holt & Tattersall, 1906). Map 10 *Amblyops tattersalli* Zimmer, 1914; *Hansenomysis angusticauda* O. Tattersall, 1961; *Hansenomysis antarctica* Holt & Tattersall, 1906; *Paramblyops brevirostris* O. Tattersall, 1955; *Pseudomma belgicae* Holt & Tattersall, 1906.Map 11*Mysidetes hanseni* Zimmer, 1914; *Mysifaun erigens* Wittmann, 1996; *Pseudomma longicaudum* O. Tattersall, 1955; *Pseudomma schollaertensis* O. Tattersall, 1955.



Map 12
Zone
1 2 3



Map 13
Zone
1 2 3 4 5 6 7 8

Mysida-Lophogastrida Maps 12-13 Scheme of biogeographical division of the Southern Ocean for pelagic lophogastrid and mysid fauna (modified from Petryashov 2007b). (1–3) Notantarctic Realm. (1) Circum-Antarctic Province. (2–3) Notal Province. (3) Patagonian Region. Map 13 Scheme of biogeographical division of the Southern Ocean for benthopelagic lophogastrid and mysid fauna (modified from Petryashov 2007b). (1–4) Antarctic Realm. (1) West Antarctic Province. (2–4) East Antarctic Province. (3) Weddell Sea Region. (4) Ross Sea Region. (5–8) Notal Realm. (5) South Chile Province. (6–7) Patagonian Province. (7) South Georgia Region. (8) Kerguelen Province.

favored dispersal and emigration of populations of some pelagic species from sub-Tropical waters into the most northern areas of the sub-Antarctic. Furthermore, invertebrates inhabiting the sublittoral zone have been reported to migrate over deep oceanic depressions using floating macrophytes drifting in the area of the ACC (e.g. Fell 1962). Indeed, 3 sublittoral — upper bathyal species of the genus *Mysidetes* have dispersed penetrated from South American and South Georgian waters the Kerguelen Islands region by drifting on floating substrata. Finally, the distribution of sublittoral — upper bathyal benthopelagic species occurring at the Falkland Islands, South Georgia and Antarctica can be explained by potential migration over the Scotia Arc, a chain of islands, rocks and rather shallow banks, facilitating dispersal of sublittoral and upper bathyal species.

Frontal zones, where the ranges of thermohaline parameters of surface and intermediate waters change drastically, represent a main factor causing differentiation of the regional fauna. Oceanic depressions reaching abyssal depths can restrict the distribution of sub-littoral and bathyal benthopelagic species. The differentiation of the South Chilean and Patagonian fauna can be linked with the Pleistocene glaciations, during which powerful mountain-cover glaciers extending to the oceanic coast, were formed in the South Andes and Tierra del Fuego Mountains, up to 40°S (Petryashov 2007b).

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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.

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