

# SO-AntEco Expedition (South Orkneys – State of the Antarctic Ecosystem) JR15005

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Figure 1. A range of animals collected during JR15005. Images by C. Waller, H. Wiklund, B. Danis and C. Moreau.

## Background

The South Orkney Islands is a small archipelago located in the Southern Ocean, 375 miles north-east of the tip of the Antarctic Peninsula. The seafloor around the South Orkney Islands has been shown to be an area with exceptionally high biodiversity. The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) closed all finfish fisheries around the South Orkney Islands in 1989, and in 2009 they established the South Orkney Islands Southern Shelf Marine Protected Area (SOISS MPA), the first MPA located entirely within the High Seas anywhere on the planet.

SO-AntEco (JR15005) was a British Antarctic Survey (BAS) led expedition undertaken in conjunction with an international team of scientists from the Scientific Committee for Antarctic Research (SCAR) AntEco research programme. The team included 22 participants from 9 different countries and 16 institutes. The expedition took place on board the *RRS James Clark Ross* in February-March 2016.

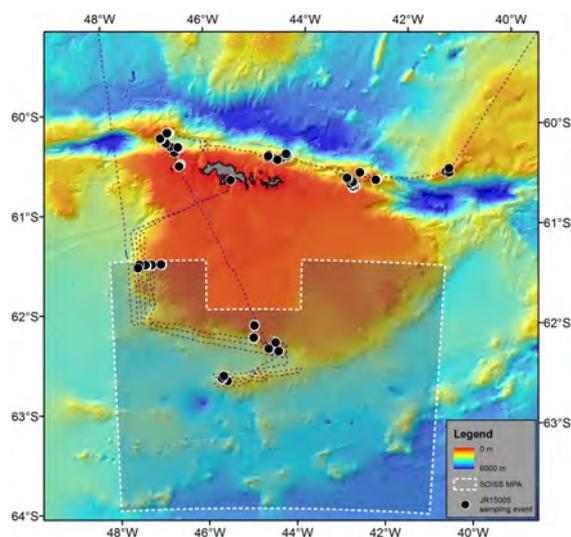


Figure 2. Map of the South Orkney Islands including the Marine Protected Area and the JR15005 cruise track and sampling locations.

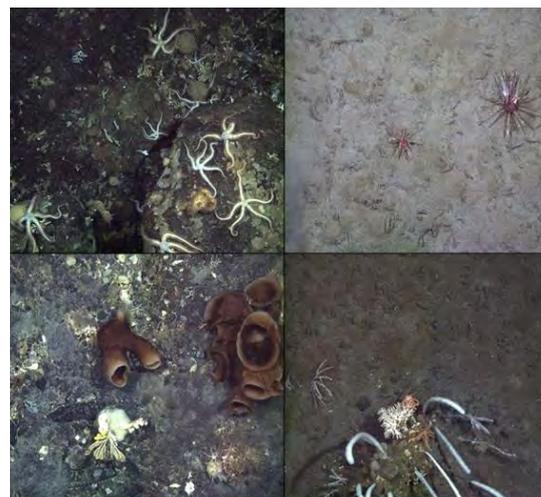


Figure 3. Seafloor habitats photographed during JR15005. Example images include Vulnerable Marine Ecosystem (VME) indicator groups.

## Objectives

- To find and identify seafloor animals from around the South Orkney Islands and to name and describe any species new to science.
- To detect any significant differences between the types of species and numbers of animals in different habitats and to identify species that are indicative of specific habitat types to help with future habitat mapping.
- To map all vulnerable species found and to report their presence and distribution to relevant stakeholders and
- To contribute information and scientific advice to the CCAMLR South Orkney Islands MPA review in 2019.

## Results

A total of 124 trawled gear and 34 video/camera deployments (Figure 2) were conducted during ~17 days of science. In total, over 700 seafloor habitat photographs (Figure 3) and 3,900 live specimen photos were taken with over 38,000 individual invertebrates and fish (158 kg) collected and preserved for future analyses. Eighteen phyla of animals were found from depths between ~500 m and ~2000 m.

## Highlights

- New species were found in most groups of animals examined on the cruise including corals, anemones, echinoderms and polychaete worms, with many other probable new species awaiting further identification.
- There was an evident correlation between abundance of animals from Vulnerable Marine Ecosystem groups and the overall diversity of seafloor life, both inside and outside of the SOISS MPA.
- A range of unusual animals including rare pelagic bryozoans, the highly publicised “Dendrogramma” (found for the first time since their discovery in Australia) and a seafloor covered with the plates of long-dead giant acorn barnacles all came as a surprise to an experienced group of Antarctic marine biologists.
- The importance of Vulnerable Marine Ecosystem indicator groups such as corals, sponges and pencil urchins as habitats for other species was highly evident and previously unknown associations and interactions were revealed (Figure 4).
- Specimens were collected for future research into the biogeography of Vulnerable Marine Ecosystem groups, molecular biology (all specimens were preserved in 96% ethanol or RNA Later), ocean acidification, palaeo-oceanography and climate, food webs, habitat mapping and biochemistry.



Figure 4. Examples of VME animals providing habitat for other species, recorded during JR15005. Images by C. Waller.

## Impact

The expedition serves as an excellent example of how national Polar Institutes can play a leadership role in developing international cooperation in policy-relevant polar science, under the umbrella of a SCAR research programme. The expedition provided hands on experience and mentoring opportunities to early career scientists and met gender balance aspirations with over half of the scientists being female.

SO-AntEco used a variety of online communication tools including blogs and social media. The most immediate of these were the regular Twitter updates, with the #SOAntEco hashtag reaching an audience of over one million twitter users.