Southern Ocean Sponges Expedition – Preliminary report

Introduction

This expedition collected sponge and water samples for analysis of silica levels to be used in a three year multidisciplinary study of Southern Ocean sponges (funded by the Leverhulme Trust) which aims to provide taxonomic descriptions of sponges (expected to include several species new to science); and assess bio-geographical variation in sponge assemblages and the role of the environment (including Silica levels) in sponge distribution and chemistry. This is a collaborative project between Dr Claire Goodwin (National Museums Northern Ireland), Dr Kate Hendry (University of Bristol) and Dr Jade Berman.

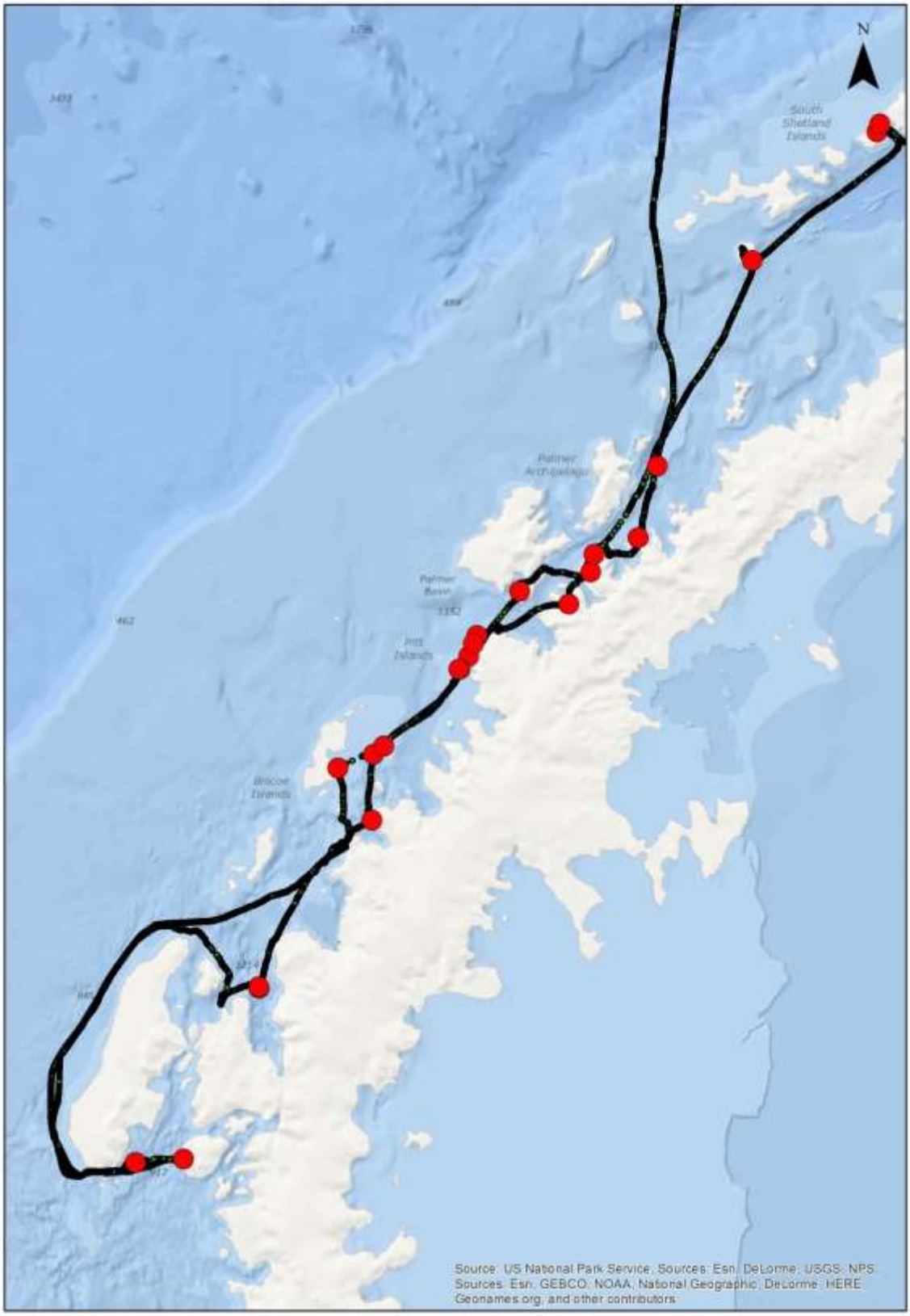
Jade Berman had additional funding which made the Antarctic fieldwork possible from the Antarctic Science Bursary, Shackleton Scholarship Fund and Trans-Antarctic Association. The South Atlantic Environmental Research Institute provided logistical support and facilities in the Falkland Islands and the Shallow Marine Surveys Group assisted with the provision of diving equipment. Emily Priestly joined the dive team as a self-funded volunteer.

Survey work

The scientists in the dive team: Dr Jade Berman, Dr Claire Goodwin and Emily Priestley joined an expedition on the Hans Hansson, a 26.5m ex-lifeboat operated by Golden Fleece Expeditions, from 7th February to 4th March 2015. The trip departed from and returned to the Falkland Islands which is a four day travel time from the Antarctic Peninsula. It had originally been hoped that the sponge team could join a full scientific expedition on the vessel, to be co-ordinated by the South Atlantic Environmental Research Institute (SAERI). However, there were not enough participants to make this trip viable so the decision was made to join an undersubscribed tourist trip as a separate scientific party. This arrangement worked very effectively: the scientific team were allocated their own small boat and boat handler, enabling them to carry out diving operations whilst the tourist party was ashore. The route of the vessel was constrained by the tour itinerary but as the scientific objectives of the trip did not require visiting particular sites, rather undertaking sampling in as many locations as possible, this was not problematic. A permit for the fieldwork and sampling of sponges was issued by the Foreign and Commonwealth Office.

In total the team carried out 24 survey dives in 22 locations. The most northerly location was the South Shetland Islands and the most southerly Jenny Island in Marguerite Bay. For safety reasons the maximum dive depth was limited to 24 metres. The plan for the diving worked well and there were no serious safety incidents. Water temperatures ranged between -1.86°C and 1°C. It was possible to dive on all but two days the vessel was in the Antarctic with one or two dives being undertaken on each day.

Above: The Hans Hansson, dive team and passengers on the sea ice near Adelaide Island.
Below: The dive team (from Left to right Jade, Emily and Claire) prepare for a survey dive.



The sponge sampling locations along the Antarctic Peninsula (red) and vessel track (black line).

In total 309 sponge samples were collected for identification (with duplicates for silica analysis). Some sites were noticeably ice-scoured and at these there were few sponges. We tried to target sites that were protected from abrasion by icebergs – either by physical barriers such as rocks or islands or their aspect (overhanging or vertical sites are less likely to be scoured). It is not possible to identify the sponges collected without examination of their skeleton but we believe from visual impressions that there are at least 30 species. Some species were common and found at many sites (*Polymastia* cf. *invaginata*, *Sphaerotylus* sp.) whereas others were found at just one or two sites. Particularly diverse sites included Spiggot Point, Orne Harbour which had a vertical wall almost entirely covered with very large (>60cm) bright yellow sponges. As well as sampling sponges the researchers completed a Seasearch recording form for each site to record habitat and other species which were present. These will be submitted to an appropriate records centre following the completion of the project.

Following the survey the researchers will undertake laboratory and analytical work as follows:

- Examination of skeletal structure to determine genus level identification (CG)
- Comparison with extant species descriptions to identify to species where possible (CG)
- Description of any species new to science (CG/JB)
- Analysis of correlation with environmental/biogeographical factors (JB)
- Analysis of water chemistry and sponge spicule composition (Kate Hendry)
- Publication of results in appropriate journals (CG/JB/KH)
- Contribution towards identification resources – e.g. Scar-MarBIN (CG).
- Site records will be forwarded to an appropriate records centre – e.g. SAERI (CG).

Above: Left: Spiggot Point, Right: Sponge diversity on an unscoured rocky wall.

Outreach/Publicity

On Thursday 8th February Jade Berman presented a talk on the Southern Ocean Sponges project at the Chamber of Commerce. The talk was well attended with an audience of 30-40 people.

On Friday 9th February Claire Goodwin and Jade Berman, assisted by Emily Priestley, delivered a workshop on sponges to 13-14 year old school children at the Falkland Islands Community School (Claire, Jade and Emily pictured with deputy head-teacher Louise Taylor). The 45 minute lesson consisted of a short introductory talk on sponges followed by a practical session where students used microscopes to examine the skeletons of sponges and prepare a species description.

Cruise blog. During the research cruise the researchers shared their activities via a blog on the National Museums Northern Ireland website (http://www.nmni.com/Home/Blog-(1)?tagid=Antarctic).

Above: Jade Berman presenting her talk at the chamber of commerce.