Darwin Initiative: Half Year Report

(due 30 October 2011)

Project Ref No	18-019
Project Title	Mapping benthic biodiversity of the South Georgia continental shelf and slope
Country(ies)	UK, South Georgia, Falkland Islands
UK Organisation	British Antarctic Survey
Collaborator(s)	Government of South Georgia and South Sandwich Islands, Shallow Marine Surveys Group
Project Leader	David Barnes
Report date	*24/10/12*
Report No. (HYR 1/2/3/4)	
Project website	http://www.antarctica.ac.uk/sgmarbase/

1. Outline progress over the last 6 months (April – September) against the agreed baseline timetable for the project (if your project has started less than 6 months ago, please report on the period since start up).

Overall the project has made great progress in terms of novel biodiversity discoveries, science (cruise) planning and preparation, outreach from scientific to popular, local to national and across media types and culminating in the main cruise of RRS James Clark Ross leaving Falkland Islands for South Georgia with an interdisciplinary team representing six countries.

Progress in UK (British Antarctic Survey).
Both hardware and software of a new piece of apparatus – the Shelf Underwater Camera system (SUCS) have been designed and assembled. This tripod lander can be lowered from a ship to the seabed enabling us to view and record live low resolution video on a computer screen on ship. In addition a powerful LED light source and high resolution stills camera can be operated on the platform from the ship. The first test of this was successfully conducted at a local swimming pool followed by a field test in the Arctic and North sea. Images taken were high enough quality to reveal sand grains on the tentacles of a sea star.

We have updated our website with publications and cruise planning in the last few months. The project has attracted a great deal of media interest such that Oliver Hogg devoted an entire week to handling press inquiries. The highlight of this was a two page spread the *Independent* [see appendix 1] (our work appears as the first hit under 'highly diverse' on Google). Such coverage can be far reaching; the current base commander of the Bird Island Research Station revealed that reading this article is what encouraged him to apply for the post! Two scientists on the main science cruise are taking questions from, and writing updates for, schools in Bremerhaven, Germany and Cambridge, UK.

Utilizing the large quantity of biodiversity data collated for South Georgia during the first stage of the Darwin Initiative project, Hogg *et al*. has begun work on a second manuscript: "Geologically old and geographically isolated: does the sub Antarctic island of South Georgia fit the paradigm of high endemism".

The aim of this research piece is to look at what environmental and geographical variables might drive the high levels of endemism at South Georgia reported in the recent PLoSONE publication. Building on this it will also utilize large datasets from the Southern Ocean and other oceanic archipelagos including Hawaii, Easter Island and Bermuda bringing the research undertaken at South Georgia onto a truly global stage. Using these datasets as a means for comparison and context, we aim to answer whether given South Georgia geographical isolation and geological age (traditionally cited as drivers of endemism), does it exhibit anomalously high levels of marine endemism.

Initial findings from the study identify a significant change across some phyla in our knowledge of South Georgia's marine endemic species. Increases in georeferenced sampling, especially from other Sub Antarctic islands, has resulted in revisions in numbers of reported endemics from South Georgia in almost all phyla despite the short period since our last publication. What is clear from analysis is that both endemism and biodiversity as a whole at South Georgia arise from a combination of environmental, oceanographic and geological factors, none of which in isolation can be used to explain South Georgia's unique faunal character.

Progress in host country (Shallow Marine Surveys Group).
Paul Brewin and Paul Brickle have completed a first pass analysis of the most comprehensive collection of subtidal and intertidal samples ever made around South Georgia (which took place in 2010). This process has identified over 300 species identities among the 9000 individuals examined. Species accumulation curves do not show signs of reaching asymptote, suggesting species inventories are still incomplete. The profile of the project has attracted 11 taxonomic specialists (across 4 continents) to work in kind and identify samples, with much of this work ongoing. These taxonomists have identified over 40 new records and undescribed species for South Georgia so far, with a high likelihood of more novelty to be found as analyses progress. These results were presented at the World Conference on Marine Biodiversity in Aberdeen Sept 2011 (see outputs below).

Two summary reports to the South Georgia Heritage Trust (SGHT) have been complete, meeting requirements for their funding support. These report on quantitative intertidal faunal surveys at 6 locations in Cumberland East Bay, and a subtidal and intertidal seaweed inventory report lead by Dr Emma Wells (see appendices 2 & 3). Publication of these data has been hindered by the volume of samples and the slow progress of taxonomic identification. The compensation for slower than usual progress is that taxonomists are providing their time free of charge. It is worth noting that all specialists have shown much enthusiasm for the project and have committed their continued support of the program into 2012.

Analysis of benthic photographs continues, with the main seaweed and megafaunal species identified. A report on results is anticipated for early 2012. Planning for a second South Georgia subtidal and intertidal survey is currently underway, with a tentative expedition date of April 2012. The MSV Pharos has been secured as a dive platform via the South Georgia Government, and the team of volunteer SMSG divers have also committed their time. Funding for 50% full time salary for Paul Brewin is being sought from SGHT. We have been successful in gaining £3000 support from JNCC (Joint Nature Conservation Committee) for Drs Claire Goodwin and Emma Wells to continue their research on South Georgia sponge and seaweed taxonomy, respectively, on the 2012 expedition. An application to the British Ecological Society has been submitted for additional support of Emma Wells.

The project has developed some important links with two related pieces of work funded by the host country including a) the annual Groundfish survey, and b) a new PhD investigating fisheries as a (hitherto unused) source of information on benthic biodiversity (undertaken by Ramon Benedet). This has involved project staff closely collaborating and information sharing with these initiatives.

Notable outputs;

Brewin et al (Oral presentation) First quantitative subtidal benthic survey of the South Georgia 'ecotone' marine region. World Conference on Marine Biodiversity in Aberdeen Sept 2011.

Hogg et al (Oral presentation) Piecing together 125 years of data reveals a polar oasis of biodiversity. World Conference on Marine Biodiversity in Aberdeen Sept 2011.

Project of the month (May 2011) for Darwin Initiative.

The project has had 1 radio (BBC world), 2 national newspaper interviews, 2 local school talks and a report in the South Georgia Heritage trust news. Highlights of the project have even featured on Twitter (May 2011). On return from the RRS James Clark Ross voyage, Paul Brewin is scheduled for an interview on Falkland Islands local television to report on partner

organisation (SMSG)'s work in South Georgia to highlight key progress on biodiversity mapping in the shallows.

Completion of novel apparatus (video and stills camera lander) design. Completion of sea trials for novel apparatus in the Arctic. Completion of packing and mobilisation for the major science cruise of RRS James Clark Ross.

2. Give details of any notable problems or unexpected developments that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.

Failure of RRS James Clark Ross rear gantry for initial sea trials of major science cruise equipment forcing delays and change in location of equipment testing.

Have any of these issues been discussed with LTS International and if so, have changes been made to the original agreement?

No need as negligible financial impacts.

Discussed with LTS: no

Formal change request submitted: no/yes, in…….(month/yr)

Received confirmation of change acceptance no/yes in…….(month/yr)

3. Do you expect to have any significant (eg more than £5,000) underspend in your budget for this year?

Yes No ✓

If yes, and you wish to request a carryforward of funds, this should be done as soon as possible. It would help Defra manage Darwin funds more efficiently if you could give an indication of how much you expect this request might be for.

Estimated carryforward request: £

4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?

No

If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document.

Please note: Any planned modifications to your project schedule/workplan or budget should not be discussed in this report but raised with LTS International directly.

Please send your **completed form by email** to Eilidh Young at Darwin-Projects@ltsi.co.uk . The report should be between 1-2 pages maximum. **Please state your project reference number in the header of your email message eg Subject: 17-075 Darwin Half Year Report**