

## **Sponge Biodiversity of the Falkland Islands and South Georgia**

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### **Introduction**

It has been recognised that sponges are one of the most important components of the benthic environment in the Falkland Islands. However, there have previously been only two surveys, in the late 19th and early 20th centuries, and these worked only on dredged material from deep water. In 2008 a survey carried out by Shallow Marine Surveys Group and National Museums of Northern Ireland discovered over 12 new species of sponge on a two week diving survey of the Jason Islands. A paper describing these species has just been accepted by the *Journal of the Marine Biological Association of the United Kingdom*. The sponge fauna of the Falkland Islands differs significantly from the more studied communities of South America and Antarctica and there are many species unique to the archipelago. The fact that one of the most common species found on the 2008 survey (*Phorbas shackletoni* sp nov. – named for the SSF) is new to science demonstrates how poorly the fauna is known and the potential that a further dive survey has to contribute to existing knowledge.

The sponge faunas of the Jason Islands and southern Islands, as sampled on the last two survey trips, are distinct; although a few species are shared each area has many species which are unique to it. Two current systems split the marine environment in the Falklands into two different ecological regions: north–western areas are influenced by the temperate waters of the Argentine Drift whereas the southern edge of the Falkland Islands is influenced by strong upwelling of the colder Subantarctic Superficial Water Mass caused by the Falkland current. From these surveys it is clear that the sponge faunas of the Jason Islands and the southern islands differs considerably. Identification of the southern islands survey specimens is still in progress but once complete will reveal if the sponge fauna of this area has an sub-Antarctic component as would be expected from the oceanographic influences. A survey of the South Georgia fauna will enable further bio-geographical comparisons. It would also enable us to gain a better impression of the range of some of the newly described species in the South Atlantic.

Few shallow marine surveys have been undertaken in South Georgia and according to the World Porifera Database only 13 species have been recorded from the area. It is highly likely that more species will be discovered and evidence suggests that sponges are an important component of South Georgia's benthic environment. A previous diving survey (Barnes 2006) reported sponges from several sites including Hexactinellid (glass sponge) sponges *Rossella* spp. in unusually shallow depths of 17-18m. Glass sponges are usually reported from much deeper water. The sponge fauna was not fully sampled on this baseline survey and merits further investigation, small and encrusting sponges are likely to have been overlooked on a general survey.

Recent work has shown the potential for diving surveys in studying sponge biodiversity particularly in areas where many species are small and in habitats which are difficult to sample by other means. Sampling by SCUBA allows for the study of bedrock habitats and encrusting species which are likely to be under sampled by remote methods and consequently has the potential to significantly increase the number of species recorded. Additionally SCUBA surveys enable the *in situ* appearance of species to be recorded and photographed providing information of great use to field surveyors.

## **Methodology**

I participated in several days sampling around Stanley, including two weekends at Kidney and Cochon Islands in Berkeley Sound. I also joined SMSG on a three week survey trip of the north coast of South Georgia on board the M.V. Pharos. This was part of a Darwin Initiative project 'Mapping the benthic biodiversity of the South Georgia continental shelf and slope'.

Each sponge specimen was photographed *in situ*, following this a small piece of the sponge was cut and placed in a whirl-pak plastic bag. The specimen was then preserved in ethanol. The sponges will be identified to species level in the laboratory: this involves the examination of silica skeletal structures which are termed spicules. After returning from the Falklands I will continue to work on the specimens collected. The project will provide additional data on the sponges of the Falkland Islands and South Georgia, building on the information collected in 2008 and 2009.

## **Results**

In total 120 sponge specimens were collected from South Georgia and an additional 21 from the Falklands. Laboratory work to identify the species is underway but preliminary investigations show that at least some of the South Georgia specimens are Antarctic species. A particularly exciting find was a Volcano sponge *Rosella/Anoxycalyx* sp. in a small cave in Possession Bay. This belongs to a group of sponges known as Hexactinellids or 'glass sponges'. These deep-water sponges have been recorded as shallow as 30m in the Antarctic; this is possibly the shallowest record, the cave environment and the fjordic nature of the bay are likely to provide a refuge for deeper water species. Additional support has been obtained from British Antarctic Survey for Scanning Electron Microscope imaging of the sponge skeletal spicules. This will be of great use for publications reporting the findings of the survey.

I also provided informal training on sponge identification to Shallow Marine Surveys Group divers during the survey. The visit provided me with the opportunity to liaise with them on projects such as the community marine life identification guide and the forthcoming book on marine life of the Falkland Islands, to which I am contributing.

Without the support of the scholarship it would not have been possible for this project to take place. Whilst my post at the museum is funded from other sources there is no money for such fieldwork. I would like to thank the scholarship committee for their continued support. I hope to continue working with SMSG and revisit the Falkland Islands and South Georgia in the future.

## **Associated Publicity**

Article in Penguin News – 12<sup>th</sup> November 2010

Article in Penguin News – 21<sup>st</sup> January 2011

Talk at National Museums Northern Ireland – 1<sup>st</sup> February 2011

Talk at Carrickfergus Sailing Club – 16<sup>th</sup> March 2011

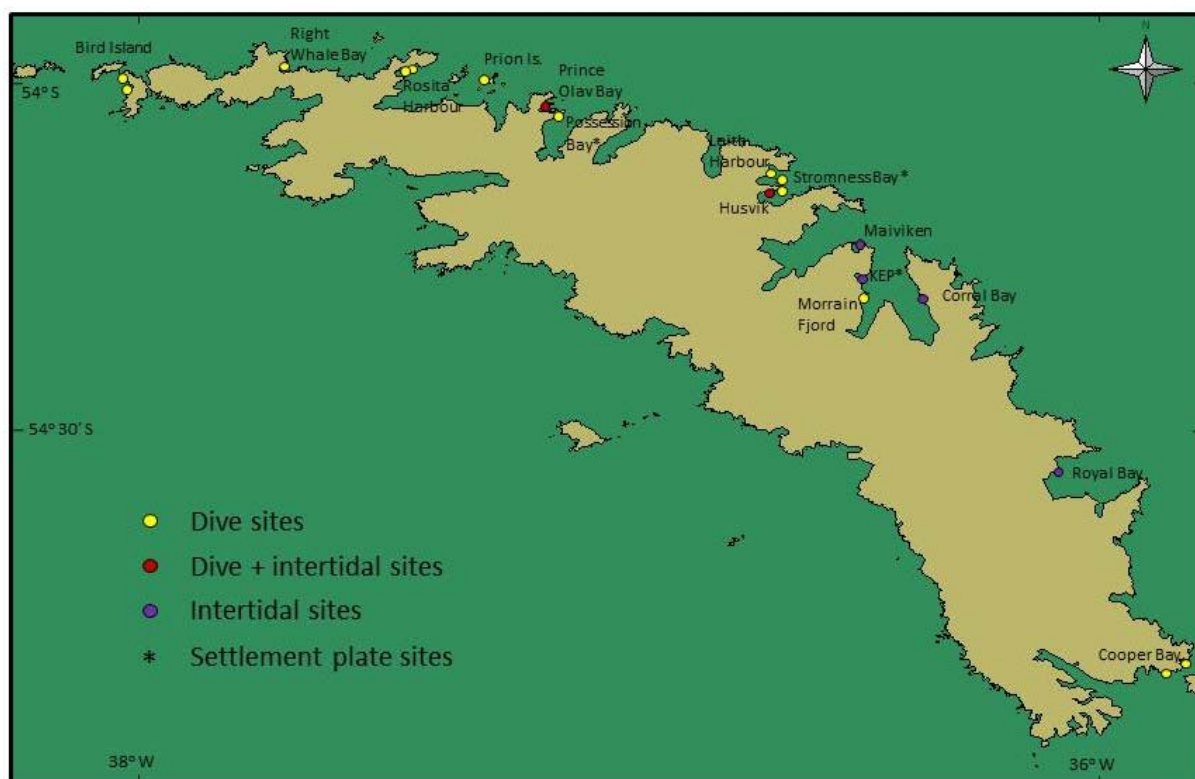
Talk at Northern Ireland Environment Agency (March/April, date to be confirmed)

Article in Subsea, the magazine of the Irish Underwater Council (in submission)

An article is being prepared for submission to 'Diver' magazine.



**Figure 1 -The SMSG South Georgia team: Dr Paul Brewin, Dr Emma Wells, Steve Brown, Dr Paul Brickle, Dion Poncet, Steve Cartwright, Dr Judith Brown and Dr Claire Goodwin.**



**Figure 2 - Dive Survey Sites**



**Figure 3 - The Survey vessel the M.V. Pharos**



**Figure 4 - Claire Goodwin and Emma Wells (Algal taxonomist) just having surfaced from a dive in Port William, Falkland Islands.**





**Figure 5 - Volcano Sponge at Jagged Point, Possession Bay.**



**Figure 6 - Sponges collected from South Georgia included this distinctive heart shaped specimen (above) which may be a *Calyx* species, and several individuals of this orange ridged species.**





Claire Goodwin and Emma Wells kitted up and ready to dive



Seaweed specialist Emma Wells on a shallow marine survey

# Surveying sea's secrets in depth

TWO marine biologists, Dr Claire Goodwin and Dr Emma Wells, have recently joined the Falklands based Shallow Marine Surveys Group to participate in scuba diving surveys.

Claire, a curator at National Museums Northern Ireland who specialises in sponges, is making her third trip to the Islands, after carrying out survey work at the Jason Islands in 2008 and Beauchêne and Sea Lion Islands in 2009.

"We have recently described 12 new species of sponge from the Jasons expedition," she said. "This trip is a great opportunity to survey some new areas and I'm sure there are many more discoveries to be made."

Emma is an independent consultant who specialises in sea-

weed. She visited the Falklands for the first time in March, keen to build on existing research.

"Although historic reports of seaweed diversity exist for the Falklands, these are scarce and hugely outdated," she said. "Already this study is revealing a number of previously unrecorded species. So far the work has been fun, exciting and important for Falklands biodiversity records."

After two weeks around Stanley, including surveys in Berkeley Sound and Port William, the scientists on Sunday will depart with the SMSG survey team on MV Pharos for a three-week survey of South Georgia.

Claire said: "I'm very excited to be visiting South Georgia as there is the possibility of seeing glass sponges in diving depths;

these normally only occur in very deep water."

The specimens collected on the expedition will be catalogued and taken back for the UK for closer examination, and eventually placed in museum collections. The scientists will also contribute to sponge and seaweed sections of local identification guides.

Dr Paul Brickle, Chairman of SMSG, said: "Seaweeds and sponges are difficult to identify without specialist training. Having these experts join our survey team will be a great help in our efforts to describe and quantify the sublittoral fauna and flora of these areas. We're very grateful to the Shackleton Scholarship Fund and Joint Nature Conservation Committee for providing financial support for the visits."



Emma takes samples to study

## FINANCE MANAGER TEMPORARY MATERNITY COVER Cable & Wireless South Atlantic Ltd Ascension Island



## VACANCY

Cable & Wireless South Atlantic Limited on Ascension Island has a vacancy to cover maternity leave for the Finance Manager commencing early 2011 for a period of up to 10 months.

The successful candidate should have the ability to work unsupervised to cover all aspects of the Finance function to the highest standard. Ideally a qualified accountant or someone with at least 3 years experience in an accounting type role is required. However, applications would also be welcome from the right individual with a finance background that could be trained to cover this position.

An attractive salary package is offered to the candidate who meets our expectations. Accommodation will be provided.

For more information contact Janet McLeod on phone number (+500) 20804, email janet.mcleod@cwfi.co.fk or Ray Ellick phone number (+247)6767, email ray.ellick@cwasc.co.ac

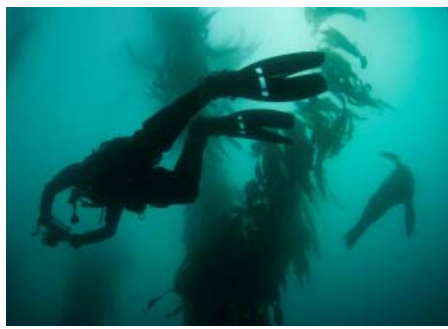
Job Descriptions & Application Forms are available from Jeanette Miller, HR & Admin Manager, Cable & Wireless SA Ltd, Ross Road, Stanley, Falkland Islands by phone on (+500) 20807 or by email to jeanette.miller@cwfi.co.fk or from Ray Ellick, Chief Executive Cable & Wireless SA Ltd, Ascension Island on the above contact details.

**Closing Date:** Applications to be sent to either Jeanette Miller or Ray Ellick by end of business on Tuesday, 30th November 2010.





A nudibranch (*Flabellina* sp.) crawls over a kelp holdfast



Diver ascending through *Macrocyctis pyrifera* kelp forest



Starfish (*Porania anatarctica*) gather to eat sea squirts (*Sycozoa* sp.)

# Survey team plumbs the depths of an underwater wonder world

SCIENTISTS from the Shallow Marine Surveys Group have recently returned from a groundbreaking expedition to survey the marine flora and fauna of South Georgia by scuba diving.

The shallow marine life of the area is very poorly known with only six sites previously surveyed by diving. Based on the MV Pharos SG for the three week expedition, the team surveyed 46 sites over three depth zones, along the north coast of the island.

They collected 2,270 specimens of marine invertebrates, and specialists working with the group collected an additional 120 sponge and 160 seaweed samples.

Project officer Dr Paul Brewin said it was an "awesome opportunity" to gather information about a unique environment: "I'm looking forward to spending the next year analysing the data collected and examining and describing the specimens."

Giant kelp forests (*Macrocyctis pyrifera*) and trailing *Himantothallus grandifolius* algae dominated the seabed, providing a habitat for stripy topshells, giant red sea spiders, limpets, colourful sea slugs and a variety of starfish.

Beautiful overhangs and rock walls were also encountered, covered in a vibrant array of sea



The survey team enjoys the scenery off South Georgia. From left: Paul Brewin, Emma Wells, Steve Brown, Paul Brickle, Dion Poncet, Steve Cartwright, Jude Brown, Claire Goodwin

squirts, anemones and sponges. Cameramen for the trip, Steve Brown, Steve Cartwright and Dion Poncet, not only gathered quadrat photos for later analysis of species cover but also took some amazing footage of the playful fur seals which accompanied the team on every dive.

Specialists Dr Emma Wells (algae, Wells Marine) and Dr Claire Goodwin (sponges, National Museums Northern Ireland) joined the group for the expedition.

Emma said: "Although the diversity of algae is less than in the Falkland Islands due to the isolated nature of South Georgia, there were a number of interesting endemic species." Claire was particularly excited to encounter the

"volcano sponge" *Rosella* sp. in shallow waters. She said: "This belongs to a group of sponges called glass sponges which are normally encountered only in depths over 200m."

"Due to the fjordic nature of the South Georgia environments we found them here in only 8m."

The team of eight volunteers spent 11 days surveying down to 18m, a depth restriction imposed for safety reasons, as well as completing some intertidal surveys. Settlement plates were also deployed in three locations to determine if invasive species are present.

Dive Officer Judith Brown said: "The team coped well with the icy waters, with temperatures

down to 0°C at some sites. In total 64 hours were spent underwater without incident."

Dr Paul Brickle, chairman of the SMSG, said: "The expedition surpassed expectations due to unusually calm weather, the professionalism of the dive team and the outstanding support of the Pharos officers and crew."

"Outputs from the survey will include geo-referenced information on species diversity which will be essential for future marine management."

South Georgia Senior Executive Dr Martin Collins added: "This is important work for South Georgia."

"It is part of a larger programme investigating the marine environment of the South Georgia Maritime Zone that should lead to the designation of Marine Protected Areas and enable the Convention on Biological Diversity to be extended to South Georgia."

Support for the survey was provided by the Darwin Initiative and the Government of South Georgia and South Sandwich Islands, with additional funding and assistance from the Joint Nature Conservation Committee, British Antarctic Survey, the Shackleton Scholarship Fund, Byron Marine Ltd, Neil McKay Ltd, and Sullivan Shipping Ltd.



A seastar *Odontaster validus* impresses beneath the icy waters



A survey diver ascends with a bag of invertebrate samples