

ICESHEET

The British Antarctic Survey Internal Newsletter

Mar-Apr 19
#101

Rothera Construction Breaks Records!

Director's Office

It has been a long summer at Rothera this year with an extended season to mid-May to ensure that the new wharf is on schedule. I'm sure the winter break will be a welcome rest for those who have worked hard during the summer and for winterers



waiting for their special experience of isolation.

A great success has been how BAS and construction staff have worked together so well in Antarctica. It's unusual that construction teams and clients live together so closely. It didn't just happen by chance though, but has taken a lot of planning by many to ensure that so many people could

live and work together safely on a small rocky point in the Antarctic Peninsula.

The numbers are truly impressive – 164 people were at Rothera at one point. That's 54 more than a peak of 110 in 2013/14. The number of bed nights for the year is 26,301 (last year was 17,661), and the Dash 7 aircraft made 35 trips to Rothera. An unbelievable 20

loaves of bread and 180 bread rolls were baked each day at peak time! Thanks to everyone who worked so hard to make this successful.

Next season we will start the foundation work for the new science support building at Rothera, as well as completing the wharf – even more impressive numbers to come!

Professor Dame Jane Francis

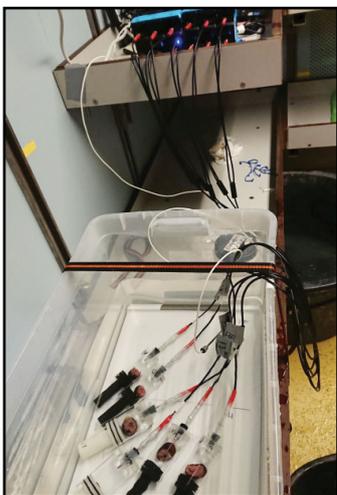
Professor Dame Jane Francis

How To Breathe In The Heat

BAS science

At present Julia Sigwart, Director of Queen's University Belfast's marine lab in Portaferry, and I are onboard RV *Polarstern* to study the biodiversity, ecology and physiology of the hydrothermal vent and seep ecosystems on the South Sandwich microplate. Professor Gerhard Bohrmann (Marum, Germany) is the PSO

and leads the multidisciplinary expedition team studying the seeps and vents from trench to back-arc of the Sandwich Plate, focussing on fluid and gas circulation as well as chemosynthetic ecosystems of the microplate. MARUM QUEST is the 4,000m-rated ROV that will be our workhorse to collect at black smokers and cold seeps.



▲ The respiration experiments

Based on knowledge gained from the previous NERC-funded ChEsSO (Chemosynthetically Ecosystems of the Southern Ocean) consortium, we are not only able to complement our biodiversity studies but also to do physiological experiments on selected species. Our target species is the gastropod *Gigantopelta chessoia* (see photo), hosting endosymbionts in its enlarged oesophagus gland, which supply the animal with all



▲ In the ROV control container as lead scientist during the first dive

required food. We want to measure the snail's oxygen consumption (right respiration chambers), compare these data with complementary ones from Southwest Indian Ridge vent gastropods, and measure the snail's heartbeat using newly designed, non-invasive probes.

something that is never certain in the Antarctic autumn.

– Katrin Linse



▲ *Gigantopelta chessoia*

All we need now are low wave heights, which will enable many more deep ROV dives –



British Antarctic Survey
NATURAL ENVIRONMENTAL RESEARCH COUNCIL

12-PAGE EDITION

BBC R4 Today – In The Arctic!



▲ The team at Ny Ålesund

It's 6.00am, -20°C outside and just getting light at the NERC Arctic Station in Ny-Ålesund, Svalbard, at 79°N in the first week of March. Presenter Martha Kearney, science editor Tom Feilden and the BBC production team, plus the BAS team and researchers from Manchester, Newcastle and Aberystwyth are all crammed into the tiny station office to see whether our stories will make the cut on that morning's BBC Radio 4's flagship news and current affairs programme

– Today. Tension, anticipation and then relief, they will! All the planning and preparation for many months leading up to this point has been worth it. Over the course of the next six days there are daily BBC news reports on radio, online and TV on the effects of climate change in the Arctic, why it matters and the role of UK science.

Reaching out to the *Today* programme's six million listeners with fantastically diverse stories on the warming Arctic, changes to shipping routes, the microbial life of glaciers and daily life at an Arctic station, amongst many others, was a huge achievement and demonstrated BAS, NERC and UK researchers at their best. Heartfelt thanks to everyone who made it such a success.
– Athena Dinar & Henry Burgess

David Walton Celebration

Professor David Walton's family invites friends and colleagues to join a celebration of his extraordinary life at 2.00pm on Friday 24th May at BAS Cambridge. Please note that there is limited capacity in the AURORA conference venue so to secure your place please register by 15th May (contact me for details).

David joined BAS in 1967 as a botanist, gradually rising to senior positions in science and administration. He was still immersed in Antarctic affairs, particularly internationally, until his untimely death in February this year.
– Linda Capper



▲ Prof David Walton at BAS

BAS Fuchs Medal Winners 2019

Each year the Fuchs Medal is awarded to one or more people who have made exceptional contributions to BAS. This year we have two worthy winners, Steve Bremner and Pete Marquis.

Steve has worked at BAS since 1984 as an engineer, particularly supporting science on ships. His passion for engineering has led to new innovations in marine science and the smooth running of science projects on ships. He was Head of Engineering and Technology until 2017, when he became part of the SDA



▲ Steve Bremner

ship construction team. The inscription on Steve's medal will read: 'Ship-Shape Engineer'.

Pete Marquis joined BAS in 1986 as a Field Assistant and then as Field Operations Manager and Station Leader, spending many summers and winters in Antarctica for which he was awarded the Polar Medal. Since 1996 he has worked with the BAS Medical Unit out of Plymouth Derriford Hospital as Remote Healthcare Manager. His medal will read: 'Unstinting, Unflappable, Unfazed'.

– Jane Francis



▲ Pete Marquis

Rothera Modernisation Update



▲ A visualisation of the new Scientific Operations building at Rothera

Rothera Modernisation Phase I has progressed at pace with the review of the Detailed Design Report commencing in May 2019.

A number of optimisations have been designed during the Detailed Design Work Stage that should make the new Scientific Operations building work more effectively for end users and reduce cost and time of construction at Rothera Research Station.

These include modularisation of the construction of the building, implementation

of a services termination tower, and improvements to room layouts that maximise functional space.

There is development with the rationalisation of the site-wide services to minimise and simplify maintenance in the future. The architectural

BAS stations

elevations of the building have started to take shape. Virtual Reality simulations are currently being developed by the Contractor BAM for review by BAS this summer that will enable BAS staff to visualise how they would work in the new building. A snapshot of the spaces in the building are presented below.

Groundworks including excavations and laying of foundations commences this austral summer season 2019/20 with the main construction of the new building and site-wide services starting in the 2020/21 Season.
– David Brand



▲ An illustration of some of the spaces in the new building

Lyme Regis – 10th Anniversary



▲ This year attracted the biggest audience in 10 years of attending

'Oh, we do like to be beside the seaside' with around 12,000 people on a bright and sunny bank holiday weekend in Lyme Regis. This year BAS (Rowan Whittle, Huw Griffiths, Hilary Blagbrough and Steve Roberts), with UKAHT (Danni White) and The Polar Museum (Naomi Chapman and Annette Shelford), wowed the crowds at the Fossil Festival. We met lots of budding geologists, marine biologists, polar explorers and environmentalists, who were fascinated by the plastics from

albatross nests and enjoyed meeting a palaeontologist, a marine biologist and a laboratory manager who were all just back from Antarctica.

We attracted our biggest audience in 10 years at the festival and everyone was happily exhausted by the end of the weekend. Many thanks to everyone for their hard work and to our sponsors, UKAHT and European Society for Evolutionary Biology, for their support this year.
– Hilary Blagbrough

UK-Canada Arctic Prog

We are expecting an official announcement before too long about a new UKRI-funded programme supporting UK-based Arctic researchers working with Canadian partners in the high north, focused on understanding the environmental, economic, social, cultural and engineering, and physical science implications of the rapidly-changing Arctic. There will be a workshop soon to share further information, but if you have Canadian partners, or potential partners, then now is a good time to make contact.

Register for updates on the workshop and application timings via the NERC Arctic Office mailing list: <https://www.arctic.ac.uk> and via the BAS Arctic Working Group email list maintained by Bianca Perren (biaper@bas.ac.uk).
– Henry Burgess

New BAS Biosecurity Stations



▲ Inside the yellow cabinet...

Effective biosecurity is important to help protect the Antarctic environment and its ecosystems. Added to this, unpermitted importation of non-native species to the Antarctic region is a breach of UK and Government of South Georgia legislation.

Therefore, you need to remove any soil, plant material, seeds and creepy-crawlies

Farewell To RRS Ernest Shackleton

On Wednesday 24th April, BAS collectively said farewell to long-serving Royal Research Ship *Ernest Shackleton*. BAS staff enjoyed an event in the AURORA conference room celebrating the remarkable achievements of the 'Shack' during her 20-year service to BAS.

After a brief welcome, Ships Programme and Operations Manager Chris Hindley took to the stage for an illustrated talk entitled 'Hidden stories

of the RRS *Ernest Shackleton*' – recounting some of the lesser-known tales from the Southern Ocean and beyond. A video of the *Shackleton* in action followed before a look into the future via a progress update on RRS *Sir David Attenborough* from Matt Neill, Chief Officer for the SDA.

Tea and cake was enjoyed by all who were able to celebrate the incredible contribution the *Shackleton* has made to BAS.
– Layla Batchellier



▲ RRS Ernest Shackleton at the edge of the Brunt Ice Shelf

AIMP Partner Challenge 2019

A team from BAS, BAM, Ramboll and Sweco are heading to north-west Scotland on 6th-8th June to attempt the 'Fisherfield 6', a mountaineering expedition involving a 30km hike and 2,200m of ascent on the main day, plus a 7km walk in and out either side (there is an alternative option to do a 20km hike with 1,000m climb on the main day). There will be two nights of camping.

If you would like to join us please contact David Seaton or Andy Barker.
– David Seaton



▲ Enjoy some glorious scenery!

from your cargo, equipment and clothing before sending it south. To help you with this, three biosecurity stations have been installed at Cambridge – two are located in SBI and one in SB2.

Each yellow cabinet contains a large vacuum cleaner and a biosecurity kitbag containing a mini handheld vacuum cleaner, dustpan and brush, tweezers and a stiff brush. A biosecurity kitbag has also been supplied to each of the science teams. If you have any questions, pop into the Environment Office (Room 331). Remember: Don't pack a pest!
– Kevin Hughes & Kate Morley



BAS Air2020 Update

BAS Air2020 comprised three components:

- Purchase of Dash 7 spares to significantly reduce the likelihood of a long-term failure of the aircraft to support the airbridge – COMPLETE (two engines also overhauled)
- Purchase of an interim aircraft – TENDER EVALUATION PROCESS COMPLETE
- Runway quality improvements – IN PROGRESS (procurement and installation of new approach lights, stabilisation of the runway and re-grading the runway surface using material from the Rothera wharf/modernisation foundations)

Interim aircraft

- At its February meeting the Air Capability Project Board took the decision not to

purchase an 'interim' aircraft

- This was based on a detailed evaluation by BAS, working with independent technical aviation advisors, of bids received in response to the tender issued on 18th December 2018
- Whilst one bid met the minimum requirements, BAS independent technical advisors concluded that it did not meet BAS's definition for achieving a level of safety at least comparable to that of the existing airbridge operation
- BAS Operations Team will now investigate alternative means of achieving operational resilience to the Dash 7 and have this in place for next summer season

The next step for the Air2020 initiative is to focus on air capability beyond 2024.

– Andy Barker

Biodiversity At BAS Cambridge



▲ Cowslips in the East Meadow

BioBAS volunteers have been busy over the winter keeping the East Meadow in good condition. New arrivals keep coming in, some undesirable, particularly small saplings of Ash, Hawthorn, Maple and Oak, so they are weeded out. Others, mostly introduced as seed, are more interesting and it looks like being a great year for the Grass-leaved Vetchling, which will give a dash of pink to go with the Red Clover.

The Cowslips and Buttercups currently provide splashes of yellow, and there are blues from Forget-me-nots. A couple

of new arrivals haven't made it as far as the Meadow yet, but have jumped down from the AURORA green roof. If you look carefully at the paving around the building you can find small plants of White Stonecrop, and a really close look may reveal a single plant of Reflexed Stonecrop. There are other species on the roof that haven't yet made the jump.

The flowers and grasses of the Meadow provide habitat for insects and small mammals, and will benefit the birds, including the blue tits that are making good use of the nest boxes. Overall the East Meadow has now recorded 80 different plant species, so is doing a splendid job of increasing the biodiversity of the BAS site and provides an exemplar for what other organisations should be doing.
– Jonathan Shanklin

BAS At Science Museum Lates

Antarctic base camp moved to the Science Museum in London for the March 'Lates', a monthly event designed to get young professionals through the doors after work. Around 3,500 people attended!

Tracy Moffat Griffin and Ella Gilbert explained Antarctic meteorology with the help of a met balloon floating alongside, whilst a team from BAS Archives presented an atmospheric telling of the BAS story over 75 years since Operation Tabarin, linking into the evening's UNESCO theme.

Rob Mulvaney gave talks to packed audiences on how ice cores provide a window into the planet's past, and a view into the future; whilst back at base camp we had a pyramid tent and polar clothing for people to try out.
– Ieuan Hopkins

BI Wandering Albatross Tracking



▲ Wandering albatross

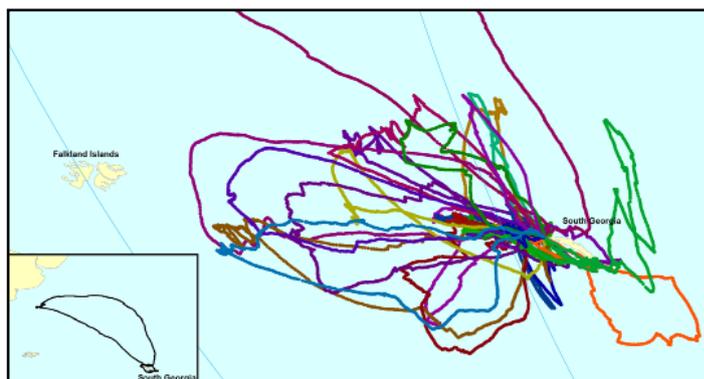
At Bird Island we have been tracking breeding wandering albatrosses during brood-guard, when the parents alternate between foraging and sitting on the nest protecting the chick.

The purpose of the study is to increase understanding of foraging movements and factors that affect reproductive trade-offs and interaction with fishing vessels, with implications for breeding success, bycatch risk and population dynamics of the declining population. The study involves attaching a GPS

logger and accelerometer to the mantle feathers to record the route and flight activity (soaring, flapping etc.), and a small logger on the leg to record immersion. Together, the three devices weigh <0.5% of body mass and are retrieved (and downloaded) after the bird returns from foraging to feed the chick. A total of 30 birds (15 male and 15 female) were tracked.

The GPS tracks show a concentration of foraging to the west of South Georgia

(25 birds). A small number of tracked birds travelled to the east, with one circumnavigating South Georgia. The furthest point of most trips was circa 200 miles from the colony, though some others went as far as 200-700 miles. One female travelled much further than the other birds; her seven-day trip comprised an outbound journey of almost 2,000 miles north and west to the shelf break off Argentina, and a return journey of 1,250 miles back to her nest.
– Rosie Hall



▲ Foraging trips taken by wandering albatrosses at Bird Island

BAS stations

Halley VI CASLab Relocation



▲ The Clear Air Sector Laboratory (CASLab) at Halley VI

The successful installation of the CASLab at Halley VI now allows Anna Jones' Tropospheric Chemistry team to use the laboratory to deliver key scientific monitoring data sets and to once again be used for summer sampling campaigns. Also, in conjunction with the Halley Automation Project, the TEI 49i ozone monitor, MAX-DOAS instrument and an All-Sky Camera will now all be

housed within the CASLab for year-round data collection.

The CASLab relocation involved two complex tandem lifts of the 30+ tonne platform. A real team effort between BAS Estates, BAS vehicles and the Halley science team ensured the safe relocation and installation of the CASLab. Well done to all, excellent work all round!

– Ollie Darke

YOE: Take A Closer Look

The UK Government Year of Engineering campaign from 2018 has transformed into 'Engineering: Take A Closer Look'. This cross-government campaign aims to inspire young people and celebrate the creative and innovative world of engineering.

Last year, BAS supported the Year of Engineering with a tour of the RRS *Sir David Attenborough* ship model and staff attended various UK public engagement events.

If you want to find out more about how you can get involved and contribute, please get in touch!

– Layla Batchellier



MAGIC Image Of The Month

Last season MAGIC completed a new aerial survey of Rothera Point in support of the ongoing modernisation project. The aim was to produce an internally consistent, high-resolution 3D dataset of the entire point during a period of minimum snow cover. This dataset will be used both as a baseline going forward and to inform future development and planning decisions.

The survey was flown at 1,400 feet (430m) using a medium-format aerial camera mounted in a Twin Otter. The resulting images and 3D model are spectacular.

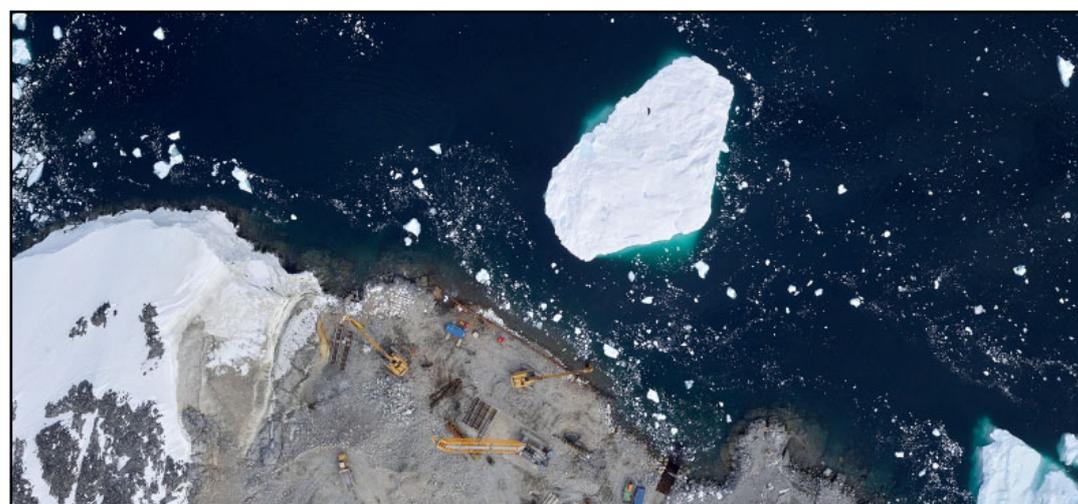
All of Rothera point has been captured at a resolution of better than 5cm and when combined with the ground reference survey, resulted in >600 million points

MAGIC Image #82

georeferenced in absolute space. This dataset is now available as a 3D point cloud, digital elevation model and orthorectified mosaic (you can zoom into an individual rock anywhere around Rothera Point!).

Please contact MAGIC for more information if you could make use of this resource.

– Nathan Fenney



▲ Aerial photograph of the wharf development at Rothera taken from a Twin Otter aircraft

Working For A 1.5°C Future



BAS is committed to addressing the 1.5°C challenge, by intensifying how we share climate evidence, by ensuring we practice what we preach, and by inviting others to join us on this journey.

As part of this movement, we hosted an event with the Impact Women's Network on 1st May at AURORA that explained the conclusions of the IPCC Special Report on 1.5°C global warming and provided evidence from BAS climate science. It also looked at Climate Justice and the role

of interdisciplinary dialogue in addressing this complex issue, and discussed how participants can contribute in their professional and private lives to make a difference.

Each delegate was invited to pledge at least one achievable change. Join the Impact Women's Network Linked-In Group to take part in the discussion group that has been set up as a consequence, and add your pledge for making a difference!

– Beatrix Schlarb-Ridley



▲ Each delegate made a pledge

BAS Solar Car Park Progress



▲ The new bicycle repair stand

We are now over halfway through the solar car park project delivery and progressing well. All the foundations and steel columns to support the PV roof of the carports are in place and the new concrete pad for the bicycle facility is laid.

We expect to finish just on time for the spring/summer sun in order to start generating our own electricity!

I would like to thank everyone for their patience regarding the ongoing disruption that this project is causing both in terms of parking and noise for the office areas of SB2.

Please also remember that as part of the project there is a fully-operational bike repair stand installed near the visitor's bicycle shed and a second identical one is going to be installed in the new bicycle storage facility. The bike repair stand includes the following tools:

- stainless steel pump piston
 - integrated pressure gauge
 - Phillips screwdriver
 - flat screwdriver
 - T25 Torx screwdriver
 - adjustable spanner
 - flat wrench 8 x 10mm
 - flat wrench 13 x 15mm
 - hex key set
 - tyre levers
- Nopi Exizidou

NERC Centre Evaluation 2020

During 2019-2020, NERC will be doing an evaluation of the NERC Centres, to evidence their benefits as major investments. This was last done in 2013, an exercise that went well and provided valuable evidence used by both NERC Head Office and the Centres.

The Research Excellence Framework (REF) methodology is used to evaluate the quality of research in Higher Education Institutions and once again, we are doing our Centre evaluation the year before a REF exercise, so that the results can be benchmarked. The results are used to demonstrate and drive excellence and to calculate Institutional Funding awarded to Centres, which is similar to the block funding awarded to HEIs based on REF performance.

The evaluation covers all Centres that receive Institutional Funding (BAS, CEH, NCAS, NCEO, NOC and PML), and is for the period 2013-2019. It's conducted by independent expert panels. Given BGS's specific role as a survey, a different approach to evaluation has been agreed with the BGS Board.

Work is taking place throughout 2019 to identify eligible staff for the evaluation, to prepare submissions and to recruit the panels. The deadline for submitting evidence will be early 2020, with meetings in spring/summer 2020 and reports in the autumn/winter. This is a significant but valuable piece of work for the Centres and is managed by the Evidence Team. For further information, contact Fiona Goff or Will Thomas (NERC).
– Beatrix Schlarb-Ridley

BAS Cricket Needs You!



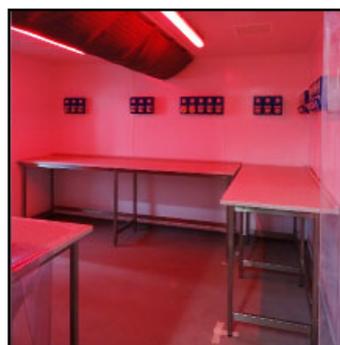
▲ Beginners welcome!

The cricket season is upon us and the BAS team will be playing a number of fixtures from June onwards. The games are mostly hosted at college grounds in and around Cambridge on mid-week evenings, generally taking between two and three hours.

All skill levels are welcome, from never picked up a bat to Brian Lara! If you are interested in playing, contact Andrew Meijers (andmei@bas.ac.uk) and ask to be added to the cricket mailing list.
– Jake Opher

Cambridge Aquarium – Phase I

BAS facilities



▲ The new red LED lighting

Phase I of the Cambridge Marine Aquarium works is nearing completion. Most of the mechanical works are now done. Thermal insulation and final electrical connections will be made within the next couple of weeks and final commissioning of the controls and refrigeration systems will then take place leading to completion on 17th May. A huge bonus for the new aquarium is a fully-insulated 29,000 litre seawater storage tank which will enable water to be stored for long

periods whilst maintaining a stable temperature. Further conditioning and cooling will then take place prior to being introduced into the aquarium specimen tanks. This will significantly reduce manual handling and time taken for scheduled water changes.

A new LED lighting system has also been installed which allows for variation in lighting

levels to mimic the natural environment. Red lighting will be used to allow staff to work in the aquarium whilst simulating the Antarctic winter conditions (red light is invisible to the animals).

Plans for Phase 2 of the project are well underway and we hope to make a start soon after completion of Phase I.
– Andy Binney



▲ The smart new facility is located in the yard at BAS Cambridge

Spotlight On Science: Jan 2019

Krill (*Euphausia superba*) distribution contracts southward during rapid regional warming

Information about how the distributions of polar marine species respond to a changing climate is often ambiguous. One of the contributory factors is the shortage of data at appropriate spatial and temporal scales. We overcame this by compiling and analysing data on Antarctic krill from 25,000 scientific net samples.

Our analysis provides evidence for a climate-linked poleward contraction in the distribution of krill over the last 40 years. This is associated with reduced population density (number per unit area), especially at the northern fringes of its range, and a widespread increase in mean krill length. These changes are related to the



▲ An Antarctic krill

Southern Annual Mode (SAM) of climate variability. Positive SAM anomalies precede years of low population density and few small krill, suggesting reduced survival of young krill due to increasingly hostile conditions (warmer, stormier weather and reduced sea ice).

Understanding both the characteristics and drivers of change in the krill population is a necessary prerequisite for informed fishery management and for understanding change in its predators such as penguins and whales.

– Simeon Hill

Cambridge Green Energy Tariff

From 1st April 2019, BAS is purchasing low-carbon electricity for the Cambridge offices in an effort to further reduce the organisation's carbon footprint.

The BAS electricity supply, though CCS Framework and EDF Renewable for Business, is now backed by certified renewable technologies (like wind, solar and biomass) which all have a zero emissions rating.

Modern carbon reporting standards like the GHG Protocol require organisations to base their carbon emissions reporting on the choice they make for their electricity purchases (called market-based emissions), as well as their grid connection (called location-based emissions). That takes the BAS market-based emissions to zero for Cambridge!

A minimal increase of 0.3% on our electricity bill pays for REGOs (Renewable Energy Guarantees of Origin) – tradeable renewable energy certificates that prove we have sourced renewable electricity for the BAS supply contract – as well as the assured processes that apply to this product.

The Renewable for Business scheme emissions factors are independently assured by auditors PricewaterhouseCoopers (PwC) which gives us extra confidence on the accuracy of our carbon conversion process. There is still a long way for BAS to address the 1.5°C challenge and be carbon neutral. We will only achieve this with everyone's help for reducing further our energy use and carbon footprint!
– Nopi Exizidou

New Polar Ship Back In Water

After months in dry dock installing scientific equipment, fitting the propellers and painting, RRS *Sir David Attenborough* entered the water for the first time since the hull launch last July. On 23rd March, the ship moved from the dry dock to the wet basin at Cammell Laird. Fitting out will now continue, installing electric cabling, equipment and furnishing to complete the interior spaces. In addition, the ship will undergo a series of tests to ensure the switchboards, generator and systems are operating, ready for the trials.
– Layla Batchellier



▲ Afloat at Cammell Laird

Rothera Wharf Season Update



▲ Progress on the new Rothera wharf has been excellent this season

We are approaching the end of a long first construction season at Rothera for the new wharf. The BAM and BAS teams have risen to the challenge magnificently and should be very proud of their achievements.

In the 16 weeks since the DS *Wisconsin* left, the team has: built a temporary jetty

and boat shed in South Cove; built a substantial plant fitter's workshop at North Beach; carried out 12 blasts in the quarry (using around 16 tonnes of explosives) and processed 26,000 tonnes of rock fill from this; dismantled the existing Biscoe Wharf; and assembled and installed the first six of the rear frames as well as the new west wall. All

BAS stations

this has been done safely and with full consideration of the impact on the environment and ongoing station operations. Backfilling has started to ensure the partially constructed wharf is safe to leave over winter.

Everyone who has been fortunate enough to visit Rothera this season has remarked on the scale of the construction works and the professionalism of everyone involved. It has also been very clear that the BAM team have fully embraced the BAS station ethos, getting involved in the many station social and cultural events (too many highlights to mention here!). The last of the team will depart on the JCR on 17th May. We look forward to welcoming them back in November to continue their good work and complete the wharf by April 2020.
– David Seaton



▲ Construction of Pipit House at Bird Island was completed last year

Bird Island Research Station

It is now 11 months since the newly-named 'Pipit House' was completed and so far all feedback has been positive. Construction took place between January and June 2018 and the building was handed over to BAS on 31st May. As with all new buildings

there has been some areas that have required some minor remedial works and two small teams were sent down to Bird Island in February and April to complete these snags.

BAS and BAM are in the process of finalising the remaining actions to meet the full handover date of 1st

June when BAS will become the full-time custodians of the facility. The partnership team has worked extremely hard over the last three years to design, procure, ship and construct the building which will be standing on Freshwater Beach for the next 25-30 years, if not longer. None of this could have been achieved without the hard work and assistance of the BAS summer and winter BI teams.

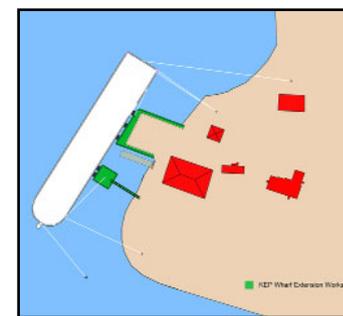
King Edward Point Research Station

The KEP wharf project is now moving into the next stages of design. Since the project initiation when Ramboll conceived the initial design, BAM have developed it further into a costed project. Since November 2018, various teams have been to KEP to carry out inspections ranging from quarry surveys, bathymetric

and topographical surveys, to ground investigations. Over the last two months we have been working hard to continue to develop the project and we are aiming to have the full construction contract signed in the next few weeks.

The project consists of a 'wrap around wharf', mooring dolphin, and new updated on-shore mooring points. Start date on site is January 2020 with a proposed completion date of June 2020.

– Joe Corner



▲ The new KEP wharf area

New Soft Facilities Contracts

As of 1st April, BAS parted ways with Mitie, who had provided the soft facilities services at BAS Cambridge for the previous five years.

The completion of this contract allowed us to look at alternative ways of managing these provisions. We decided that instead of continuing a total FM route, it would be beneficial to work with more local companies for each individual aspect of the soft FM contract.

NORSE (Cleaning provider) – All staff TUPE'd across.



▲ BAS Cambridge

DARDAN (Security provider) – Rob TUPE'd across from Mitie and Emmanuel, who was a relief guard, applied successfully for the second guard position. This team of two are supported by various mobile guards, who have been trained on BAS procedures.

AMEY (Waste collection provider) – Waste services should continue unaffected as Amey were the company providing our waste removal during Mitie's contract.

STEP (Pest control provider) – Kevin was the provider of this service prior to Mitie's takeover and is pleased to be back at BAS.

GEMS (Landscaping provider) – Richard is the brother of Rachel Senior, who used to provide landscaping services with Richard's assistance, before Mitie took over. – Madeleine Miller

KEP & Clyde In Dramatic Draw

Shorn of our two previous goalscorers through departure and injury, KEP FC's confidence was boosted by initially just one (admittedly good) opponent turning up for a football game against HMS Clyde. More arrived just after we'd picked teams, making for an instant reshuffle.

KEP started well, tech Pete slotting home from an acute angle and SL Jerry knocking in a sweet left-footer off the post. Despite Government Officer Paula giving away a penalty for a second blatant handball, the home team went in to half time 2-0 up. After the break, Museum Assistant Laura added

a breakaway third before our failure to change tactics when defending the boggy end cost us. Clyde scored two quick goals to set up a tense finish, bombarding the box with crosses, repelled by defenders putting everything on the line.

In the last minute traitorous team-swapping Museum Curator Finlay pounced on a goalmouth scramble to equalise for the Clyde, leaving the KEP team scattered in the mud and puddles where they'd fallen. We soon picked ourselves up and enjoyed a fine evening's entertainment courtesy of the Clyde.

– Jerry Gillham



▲ The teams enjoyed a fine match at the KEP stadium

A New PI For ORCHESTRA

Sadly, we have said goodbye to ORCHESTRA's PI, Emily Shuckburgh. Emily has taken on a new role at the University of Cambridge. Emily said: "It has been a pleasure to lead ORCHESTRA over the last couple of years and to see the programme develop and the results start to roll in. I would like to thank all involved for their help and support and I wish Andrew and the rest of the team every success. Although I have moved to a new role at Cambridge, I am very keen to continue to develop collaborations both with ORCHESTRA and RoSES."

Taking over the reins is Andrew Meijers, who has been ORCHESTRA Work Package 2 Leader since the project began. Andrew said: "I'm very excited to be stepping up as the new leader of ORCHESTRA. I have

both Emily and Mike to thank for their terrific efforts; both in getting ORCHESTRA off the ground and developing it into a mature and effective multi-centre collaboration. This is the point when the results of our several field seasons and extensive model development are just coming together, and the imminent scientific results promise to be very exciting."

We wish Emily the best of luck in her new role and look forward to working with Andrew and continuing the great work on ORCHESTRA.
– Nina Fox



▲ Andrew Meijers

2019 UK Arctic Science Conf

Happening every two years, the next Arctic conference will be hosted by Loughborough Uni from 11th-13th Sept. With no registration fee, reasonable accommodation costs and a focus on early and mid-career researchers, this is a very valuable opportunity to present your science and meet new collaborators. Registration and abstract (oral and posters) are available: www.arctic.ac.uk/ukarcticconf or see Nicola Munro (nalm@bas.ac.uk) or me (henrge@bas.ac.uk) in the NERC Arctic Office (Room 318) for more information.
– Henry Burgess



Demise Of British/Irish Ice Sheets



▲ The BRITICE project has tripled available ice-sheet margin data

Geologists believe that 20,000 years ago, Great Britain and Ireland were covered by ice-sheets abutting in the Irish Sea. The story of their decline has been enriched by the BRITICE project (PI Chris Clark, Sheffield University), with whom Richard Hindmarsh has been working. A highlight was gathering enormous quantities of geological data from the North, Norwegian, Irish and Celtic Seas; Chris says that BRITICE tripled the quantity of

Audit You Hear, No Need To Fear

A new environmental audit programme has just been rolled out as part of our Environmental Management System (EMS). This sets out when audits should be carried out at Cambridge, the ships and stations over the next three years.

This means that your team processes or day-to-day activities may need an environmental audit. The frequency with which your area will be audited is dependent on the level of environmental risk – higher risk areas will be audited annually and lower risk areas will be audited once over the three-year period.

We know that audits can feel a bit daunting (as the Environment Office gets audited twice a year) but it is important to remember that



they are not tests or a way to catch people out. Audits are simply a way to check whether the organisation is legally compliant, working in accordance to BAS procedures and to identify what, if anything, needs to be done to improve a process.

Any questions, we are here to help! If you want to know more about our Environmental Management System or have questions about audits please contact Kate Morley (katmor@bas.ac.uk) or Clare Fothergill (clathe@bas.ac.uk).
– Kate Morley

BAS science

provided good evidence for these replenishments of the glacio-geological data.

Modellers at Sheffield, BAS, Leeds and Bristol/PSU have been addressing the issues. A primary focus is the extent the marine ice-sheet instability (MISI) affected retreat; it is the number-one-suspect for inducing retreat that occurred before the main forcing (global warming). The MISI is strongly favoured by reverse bed-slopes, which themselves are induced by isostatic depression and so must be included in models.

BRITICE asks questions about marine ice-sheet retreat; whether it is controlled externally, by climate forcing, or internally, by ice-sheet dynamics. The answers have relevance for predicting the future of the Antarctic Ice Sheet.

– Richard Hindmarsh

ice-sheet margin-position/date data. These confirmed that the southern lobe extended to the Scilly Isles and further, to the latitude of Brittany. A further astonishment was that retreat from the Atlantic shelf edge began around 26ka BP, well before the warming at 20ka that marked the termination of the last glacial.

BRITICE is a consortium populated by geologists in Great Britain and Ireland, who

51st Marguerite Bay Reunion

The 51st Marguerite Bay reunion 2019 (MBR2019), which covers all the bases that have ever been in that area, including Rothera, will be held at the Metropole Hotel and spa in Llandrindod Wells, mid-Wales, on the weekend of 1st November. The event is open to all who have wintered or visited the area.

Last year we had a grand total of 132 attendees at the Saturday dinner, with a spread of Antarctic years from 1948 to the present day. Full booking details will be sent out to all those on the database in the summer. Anybody else who is interested or wishes to go on the database, please contact either jenny.dean@cantab.net or allan.wearden@btinternet.com

– Allan Wearden (BAS Club)

Spotlight On Science: Feb 2019

Impact of abrupt sea-ice loss on Greenland water isotopes during the last glacial period

A new study on ice cores shows that reductions in sea ice in the Arctic in the period between 30-100,000 years ago led to major climate events. During this period, Greenland temperatures rose by as much as 16°C. The results were published February in the journal *Proceedings of the National Academy of Sciences* (PNAS).

A team from BAS, University of Cambridge and University of Birmingham studied data from ice cores drilled in Greenland. They looked at oxygen isotopes and compared them to climate models run on the ARCHER supercomputer. From this they determined that sea-ice changes were



▲ Ice cores were analysed

massively significant in past climate change events in the North Atlantic. These periods, called Dansgaard-Oeschger events, are some of the fastest and largest abrupt climate changes ever recorded.

During some of these Dansgaard-Oeschger events, Greenland temperatures are likely to have increased by 16°C in less than a decade.

– Louise Sime

Netflix 'Our Planet' Series

The epic new eight-part series 'Our Planet', narrated by Sir David Attenborough and released on Netflix in 4K, features scenes of albatrosses that were filmed on Bird Island. The crew from Silverback Productions visited the station as part of the BAS Media Visits Programme last season.

The documentary series has attracted a lot of praise for its strong environmental messages and is well worth a watch for its stunning imagery. The albatross footage appears in Episode 2 – Frozen Worlds.

– Athena Dinar



▲ Wandering albatrosses

Latest AURORA Members Arrive

Murat Tunaboylu, co-founder of Antiverse, became the 18th business to join AURORA on 1st April. Antiverse uses artificial intelligence to build a world-first computational antibody drug discovery platform. They combine in-house lab expertise with state-of-the-art machine learning to predict antibody-antigen binding and provide antibody drug candidates in one day. They are also experts in automating manufacturing of oligo synthesis, gene synthesis, sub-cloning and plasmid preparation for synthetic biology. Contact Murat at: murat@antiverse.io.

Rebecca Orde, Director of Rebecca Orde Ltd., became the 19th business to join AURORA on 1st May. She is an experienced project manager working in the field of property development, renovation and refurbishment.

Rebecca can provide access to a wide network of industry professionals and artisans and is currently developing ideas and networks focused on eco-design and accessibility. A disrupter in the making! You can contact Rebecca by emailing her at the following address: rebecca@condnet.net

– Matt Polaine



▲ Murat Tunaboylu



▲ Rebecca Orde

New BAS Science Funding

We offer our congratulations to all those with recent successful grants.

UK Research Council Funding

T Lachlan-Cope – Leeds University led (NERC Large Grant). Elucidating the role of cloud-circulation coupling in climate.

S Hosking – Cambridge University led. (UKRI Artificial Intelligence – UKRI CDTs) Application of AI for the study of Environmental Risks. The full CDT allocated £6M for five cohorts to fund 10 PhD students per cohort. It includes over 30 industrial partners. Website: <https://ai4ercdt.esc.cam.ac.uk>

NERC Funding Seminar: It was great to gain the perspectives, insightful advice, and 'insider knowledge' from Anna Jones, Tom Bracegirdle, Tracy Moffat-Griffin and Louise Sime at last

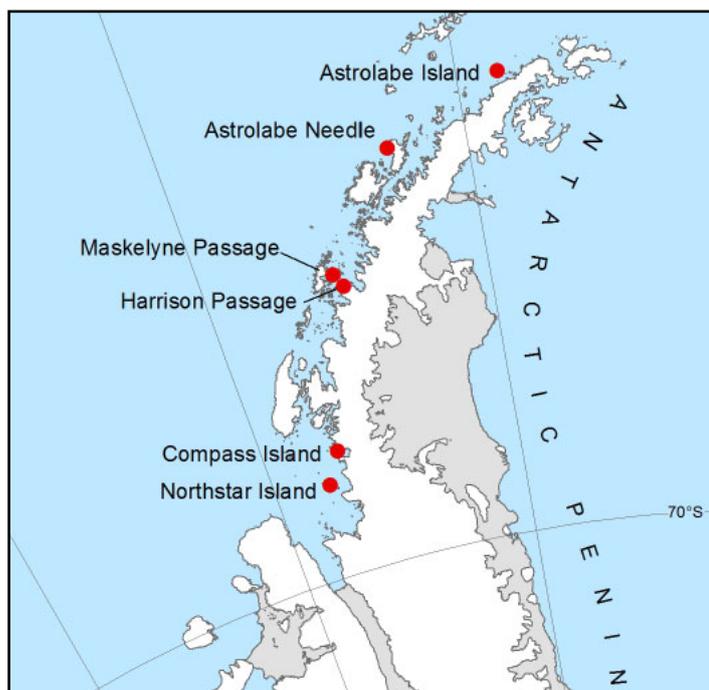
April's funding seminar about NERC funding. We are most grateful for their time and effort. Never underestimate the online pro-forma sections in Je-S (Joint Electronic Submissions) – this captures the interest and sets the scene for reviewers and panel members ahead of reading the full proposal. Please note, all BAS Funding presentations (videos and slides) are on the intranet, under ReDS Team.

Funding tip of the month: If you need help using JeS, the BAS guide we prepared may help. See [P:\Grant Resources\ General info & guidance - UKRI_RCKU \(NERC, etc.\)](#)

Next workshop: Fellowship Funding – 9th May, 1.00pm, in the AURORA conference theatre.

Need help with funding? Get in touch funding@bas.ac.uk.

– Ana Pereira-O'Callaghan



▲ Marine navigation inspires several Antarctic Peninsula names

RRS *Ernest Shackleton* has been a core part of BAS operations for the last 20 years and left BAS service at the end of April.

The current focus on BAS ships and our reliance on them for core logistics and science underlines the importance

(and difficulty) of marine navigation in Antarctic waters. This theme is highlighted in place names across the Territory.

Compass Island (68°38'10"S, 67°47'09"W), in Marguerite Bay, was surveyed by FIDS from Stonington Island in 1948/49. It was initially named Compass Inlet due to difficulties experienced with compass bearings during the initial surveys. Nearby, Northstar Island (68°11'20"S, 67°06'02"W) was named after USMS *North Star*, one of the USAS ships to visit the area in March 1940.

Instruments and methods used to calculate a ship's location are noted in place names. Astrolabe Island (63°18'58"S, 58°40'59"W) and Astrolabe Needle (64°06'54"S, 62°38'01"W) are

both named after the FAE expedition ship *L'Astrolabe*, in operation in the 1837-40 expeditions. An astrolabe is a navigational instrument used to measure the altitude of celestial bodies above the horizon, and so provides a method to calculate latitude. Harrison passage (65°54'32"S, 65°10'36"W) is named after John Harrison (1693-1776), an English horologist who provided the first solution to determining longitude at sea. Maskelyne Passage (65°51'00"S, 65°24'58"W) is named for Nevil Maskelyne (1732-1811), English Astronomer Royal, who started the Nautical Almanac in 1767.

If you would like to know more about place names in the British Antarctic Territory or submit one for review, please see www.apc.antarctica.ac.uk.
– Elena Field

FT Journalist Of The Year

Following the media trip to Rothera with the Financial Times last year, Pilita Clark won 'Environment Journalist of the Year' at the UK Press Awards in April. Her piece about how climate change is affecting Antarctica was written following the visit. She was also runner up in the 'Science Journalist of the Year' for the same article.

Pilita sent the following message: "Just a quick message to say the Rothera magazine story did incredibly well at the Oscars of Fleet Street last night, the UK Press Awards. Thanks again for all your extraordinary help and please pass on my gratitude to all the other scientific stars who made it happen." All the FT's Antarctic content from the visit remains freely available online at ft.com/Antarctica
– Sarah Vincent

Measuring Methane In Bolivia



▲ Flying over the wetlands of northern Bolivia

In March this year, BAS Twin Otter aircraft VP-FAZ, kitted out with atmospheric science instrumentation, was deployed over the wetlands of northern Bolivia to measure emissions of methane.

Methane is the second most important greenhouse gas contributing to climate change. Atmospheric concentrations have been increasing since 2007, and accelerated further still since 2014. The growth in methane appears to be occurring primarily in the tropics, but the reasons are not yet clear. Isotopic evidence,

however, suggests that the increase is from biogenic sources. Methane is produced by microbes living in anaerobic conditions such as in wetlands and also in a cow's stomach. Increasing numbers of cows, or changes in wetland areas could both contribute to the observed changes in methane.

Northern Bolivia is covered by seasonally-inundated wetlands, but to date, no scientific studies have been carried out to assess methane emissions. James France (AIC) led the field campaign comprising observations of methane from

BAS science

the aircraft and air-sample collection on the ground, the latter with help from colleagues from Universidad Mayor de San Andres, La Paz.

Thanks to the BAS Air Unit for their support, especially Dan Beeden for his tireless efforts with flight permissions. Thanks also to AIC members Tom Lachlan-Cope and Alexandra Weiss for installing the aircraft equipment prior to departure from the Falklands.

The Bolivia study is part of MOYA (Methane Observations and Yearly Assessments) and funded through NERC's Highlight Topic scheme.
– Anna Jones



▲ BAS Twin Otter VP-FAZ

RRS James Clark Ross Southern Ocean Success

BAS science



▲ The JCR completed the ANDREX II cruise earlier this year

The ANDREX II (Antarctic Deep Water Rates of Export) cruise was completed onboard RRS James Clark Ross from February through April, repeating cruises from 2009 and 2010. Together with other UK and American cruises, we have now measured a 'box' of sections in the Atlantic sector of the Southern Ocean for temperature, salinity, dissolved oxygen, oxygen isotopes, nutrients, carbon,

and CFCs (a useful proxy for anthropogenic carbon). These will be used to calculate the mixing and modifications to water between the inputs and the outputs, as part of the ORCHESTRA project.

A particular focus is the dense bottom water outflow. This meant a diversion to the South Sandwich Trench, the deepest outlet from the Weddell Sea. We needed a section

shallower than 6,000m so our equipment could reach the bottom safely. A sill indicated on the charts was found and turned out to be 5,975m deep, so we could measure there and return in future.

Along with wildlife, icebergs and occasional land, an extra bit of interest came from spotting a series of oil barrels in the northern Weddell Sea. Photos showed these were from Operation Deep Freeze II, in 1956/57. This was an



▲ One of six Operation Deep Freeze II barrels (1956/57)

American logistics project linked to the International Geophysical Year, building seven bases, including McMurdo and South Pole. It involved twelve naval ships, two air squadrons, a helicopter detachment, military specialists and moving a penguin colony!

The barrels were presumably recently released from an iceberg, originating from either the Weddell Sea station or further east.

– Hugh Venables



Pictures From The BAS Archives

Archive Image #75

RRS Ernest Shackleton was not the first BAS ship to bear the name of the renowned Antarctic explorer. In 1955, the Falkland Islands Dependencies Survey (FIDS) purchased the Swedish built *Arendal* from its Norwegian owners for £230,000 and rechristened her the RRS *Shackleton*. The new FIDS vessel was just over 200

feet long and 36 feet across, with a loaded displacement of 1,658 tonnes.

This image, taken in 1958/59 by meteorologist Dennis R Bell, shows the *Shackleton* in her early grey and white paint scheme (red and white wasn't standard until 1960). In November 1957 the ship was

seriously damaged by pack ice near Coronation Island and sailed under escort to South Georgia for emergency repairs. She remained in service with BAS until 1969 when she was transferred to the Natural Environment Research Council and succeeded by the newly-built RRS *Bransfield*.

– Kevin Roberts



▲ The Shack before the Shack (Archives ref:AD6/19IX/20/65)

And Finally...



▲ You can watch on BBC iPlayer

BAS Geographic Information Officer Peter Fretwell (MAGIC) worked with the BBC Natural History Unit on their new 'Earth from Space' documentary series, which featured his work in the first episode tracking emperor penguins via satellite images of their poo.

The fascinating series, which has four hour-long episodes, was released in April and tells stories of life on our planet from a brand new perspective. You can watch via BBC iPlayer.

– Athena Dinar

ICESHEET contact details:
Jamie Oliver (jaol@bas.ac.uk)