

+ + OCEANS WORMLEY + +

Number 3 (December 2011)

A newsletter linking people who worked at NIO, IOS and IOSDL and those who still carry on their proud traditions.

OCEANS WORMLEY was the telegraphic address of the Institute. Telex was the means through which much of the communication, particularly with ships, was sent. It seems appropriate to use it as the title of this newsletter.

In this issue

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Editorial

Here is the 3rd edition of the Newsletter. The “Wrinklies” reunion at the beginning of September was slightly adventurous. We all started to collect at our usual venue, the Winterton Arms in Chiddingfold, but found a sign on the door “Closed for Cleaning”. The pub had recently changed hands and the new owners decided it needed sprucing up but didn’t tell John Ewing. After some rapid rearrangement we all decamped to the Dog and Pheasant where we were made very welcome in their upstairs room. (Only the prices seemed to have changed since I was there last - 15 years ago). Of course the major Surrey news in the past few months has been the opening of the Hindhead tunnel. It took only 40 years between first planning and the opening but let’s hope that the local impact will be a positive one.

This newsletter continues the theme of instrument developments with Bob Whitmarsh’s piece about the development of ocean bottom seismographs - first started in the 1960s and now a mainstay of our observational armoury. Ali Grey shares her personal reminiscences of the Great Storm of 1987 that coincided with the renaming of IOS in honour of Sir George Deacon and I have included a description of how oceanography has been influenced by 21st century technology. For this edition I’ve also included some snippets of news about people that have been sent to me over the past half year. If you like it we can make it a continuing feature. So, over to you for the June 2012 issue.

With all good wishes
John Gould



Of Seas and Ships and Scientists - update.

The book was nominated by Professor David Marshall of Oxford University for the Mountbatten Literary Award of the Maritime Foundation. In his nomination David said “*This is a remarkable book on many levels. As a historical work, it gives a captivating account of UK Marine Science in the 3 decades following WWII. But its greatest success lies in the engaging portraits it paints of the individuals, most notably George Deacon and the extraordinarily creative work environment he established. The book captures the essence of science at its very best. It is a tremendous advertisement for marine science.*”

The book was one of 39 nominations but unfortunately did not receive the award at the ceremony in November at the Institute of Directors. The winner was “The Great Sea: A Human History of the Mediterranean” by David Abulafia.

The first royalties from the sales of “Of Seas....” have been donated to the National Oceanographic Library in Southampton and the money will help with the purchase of a page reading machine for the archives to make them more accessible.

On November 24th, 94 year-old Professor Walter Munk from Scripps Institution in California gave a talk at NOC entitled “Waves, Long and Short” in which he made extensive reference to the pioneering early NIO wave research described in “Of Seas...”. He later opened a new extension to the library.

*Opening of the library extension:
L-R Prof Ed Hill, Director NOC, Prof Carl Wunsch, MIT; Walter Munk. John Gould, Tony Laughton.*

But Michael Fish said ... (the Great Storm of 1987) Personal reminiscences by Ali Grey



++OCEANS WORMLEY++
readers will remember that, in the 1980s, as the NERC/IOS government 'science budget' funding shrank every year, we were obliged to change our way of working and to bid for commissioned work. We were all aware that this was a tough culture change for most, with precious research time having to be spent on administration and presentations to potential

patrons.

As part of this change, it was agreed to run our first Open Days to demonstrate and attract attention to the marvellous work being carried out – from studying sediments and deep sea creatures to building innovative instrumentation which was enabling oceanographers to see and learn so much more than had been possible before – and how IOS was at the leading edge of global marine research. They would last for a week.

I was excited to join the Open Days Committee, headed by Pat Hargreaves, and plans were made for the huge task ahead as we enthusiastically stepped into uncharted territory, getting our heads around the logistics of having 'outsiders' visit the Institute. Having lost its Crown Property status a couple of years before, Health and Safety regulations now applied, of course. We had to instal fire doors and safety nets on stairwells, label fire escapes and remove clutter (vital equipment?) from the narrow corridors and generally tidy up the laboratories.

The Open Days were to be run over five days, Tuesday to Saturday, in the autumn. The first three days were mainly for school visits, Friday was reserved for dignitaries and a renaming ceremony. The new name – Institute of Oceanographic Sciences Deacon Laboratory – had been agreed upon, to honour Sir George Deacon, the lab's founding Director. Saturday was for the general public.

The committee endeavoured to cover every detail – displays and their locations, directing people through laboratories, who should speak to the public, who should conduct the renaming ceremony, what to have in the sandwiches – even whether we had enough smart umbrellas (mostly borrowed from staff), in case it rained on the Friday and VIP visitors needed escorting from their cars.

A large marquee was erected on the lawns – much to the chagrin of the croquet players! The biology department had moved to Hambledon by this time, so it was to house and display specimens in jars, and computers for giving demonstrations.

The first few days were very successful, with groups of school children showing great interest in every area. Staff and committee members started to settle in to the process, but we were aware that The Most Important Day of that week, Friday

15th October, was still to come, with Lord This and Sir That having been invited for guided tours of the facility and, most importantly, to hold the renaming ceremony.

It was during that Thursday evening's BBC weather report, 14 October 1987, that veteran weather reporter Michael Fish told viewers that a lady had called to say she'd heard there was a hurricane heading for southern England that night. He reassured us all with, "Don't worry, there isn't". (Poor man – that clip's been replayed on television a few times since then!)

I was really annoyed to be woken during the night by an exceptionally loud storm. It woke everyone – in the wee small hours I could hear residents from the other flats in the corridors, discussing the noisy weather. Typical – couldn't this storm have waited until the weekend? When I got up, from my small upstairs Hindhead flat I could see only the communal back garden, which looked a little messy from the storm, but nothing untoward had happened. After breakfast I went out to the car park where I met a neighbour who had tried to walk his dogs, but had found that we were actually trapped within our road. We had to await tree surgeons, firemen or anyone who could deal with fallen trees. And what trees – huge, beautiful and ancient, finally felled by a "Don't-worry-there-isn't" hurricane and now blocking the quarter-mile route to the A3. At that point we thought that the storm damage was localised, we had no concept of what had actually happened across the south of England – with the power cut we



were without radios, televisions and telephones (none of us had mobile phones), so we could not hear any news and I couldn't call the institute.

We were very lucky where we were, no one had been hurt, and trees and branches had fallen across roads, but away from homes and cars. Following sterling work by local firemen, we had access to the A3 by 10.15am, so I set off for Wormley – still panicking that colleagues

would be cross that I was so late when I had a role to play on this important day. The scene en route was incredible, surreal, landscape changed beyond recognition in places, Brook Road from the A3 impassable. Despite being surrounded by fields and hills, from Hindhead through Thursley to Milford (Brook Road being still blocked, I'd had to go via Milford), there were no signs of wildlife and all was eerily quiet.

Continued on Page 4

A short history of ocean bottom seismographs - from NIO to IOSDL

In 1967 I completed a PhD in the Department of Geodesy and Geophysics at Madingley Rise in Cambridge and came to work at NIO. During my PhD I had built the first pop-up sea bottom seismograph in the UK. The instrument was designed to study the structure of the earth's crust by measuring the speed of signals made by explosions near the sea surface as they passed through the crust and mantle - a technique called seismic refraction. The instrument was relatively simple; a tape recorder in a 16-inch diameter glass sphere and connected to an external vertical geophone. The release to separate the instrument from its ballast weight depended on some copper wire (acting as anode) being electrolytically eroded when a mechanical timer switch reached the release time. The instrument worked successfully in shallow water experiments in the Wash and off the Scilly Isles.

When used in the deep ocean such devices have a great advantage over free-floating sonobuoys. Not only do their fixed positions help the data interpretation but the sea floor is also much quieter in the (2-100 Hz) bandwidth, thus making it easier to observe weak signals, and to separate out signals from the upper layers of the crust. Several Ocean Bottom Seismographs (OBS) had been built in the USA to detect nuclear tests but these were large, heavy and overly sophisticated for our purposes. What we needed in the late 1960s were relatively cheap, reliable instruments that could easily be deployed (and recovered!) from a research ship in sea-states up to at least six.

So, when I moved to NIO, my task was to build an ocean-bottom instrument for depths of 5000m or more. The first challenge was to find a better pressure case than pairs of glass hemispheres which tended to spall around the join - glass flaking off the inside - and leak. I distinctly remember a conversation on the stairs at Wormley with John Swallow who recommended that I talk to Dennis Gaunt in the Drawing Office. Dennis was designing a 28-inch diameter pressure case, consisting of two hemispheres and an equatorial ring. It proved to be exactly what was required.

It was then relatively easy for me to build the first three Pop-up Bottom Seismographs (PUBS). We used two Uher ana-



A PUBS Mk.I being recovered by the crew on the fore-deck of RRS Discovery. Note the broken radio aerial. Jack Langford and Bob Whitmarsh are second and third from the right.

logue tape recorders, as used for interviews by the BBC, and a homemade but effective hydrophone courtesy of Mike Somers and Brian Barrow. A big advance was Mac Harris' acoustic command release system. In 1969 we used a pyrolease, a sort of big firework that melted an alloy rod to release the PUBS from



Bob Whitmarsh with a PUBS Mk.II on MV Eastella, 1989 its ballast. On one PUBS cruise on Discovery, Tony Laughton was curious to see how the pyrolease worked and so one was 'detonated' in a bucket full of water. The bucket's contents were sprayed over the lab and thereafter pyroleases were treated with great respect; eventually being classified as a type of explosive!

In 1969 I was joined by Jack Langford whose practical experience gained in Portsmouth Dockyard was an enormous help. Jack was a keen guitar player too. Together we deployed and recovered PUBS in the Atlantic and Indian Oceans. Our adventures included retrieving a PUBS at night amid a fleet of highly illuminated Portuguese tuna boats and also locating a PUBS in a glassy calm and dense fog using the radar echo from the top of the PUBS.

Around 1976 Jack left to study for a Masters degree at the University of Southampton and I was joined by Bob Kirk. Bob oversaw the development of the Mk.II PUBS with improvements that included three-component gimballed geophones inside the pressure case, a longer recording period, a more accurate clock and a Nagra tape recorder. The PUBS now nestled in a fibre-glass 'egg-cup' and had a purpose-made concrete ballast weight. It was a much more streamlined and also practical design for handling at sea.

Continued on P4

The great storm (Continued)

As I drove through the IOS gate the scene was absolutely appalling... then the realisation: no marquee! The entire collection of specimens, collected over decades, completely destroyed, computers ruined – everything flattened, broken glass and formalin everywhere. Some staff managed to get there, but everyone was in shock, of course; others had to stay home to trying to deal with homes and cars wrecked by fallen trees.



Amazingly, most of the invited dignitaries managed to get to Wormley – by hook, crook and chauffeur-driven limousine – which impressed us greatly, as in the circumstances they could quite legitimately have decided to cancel.

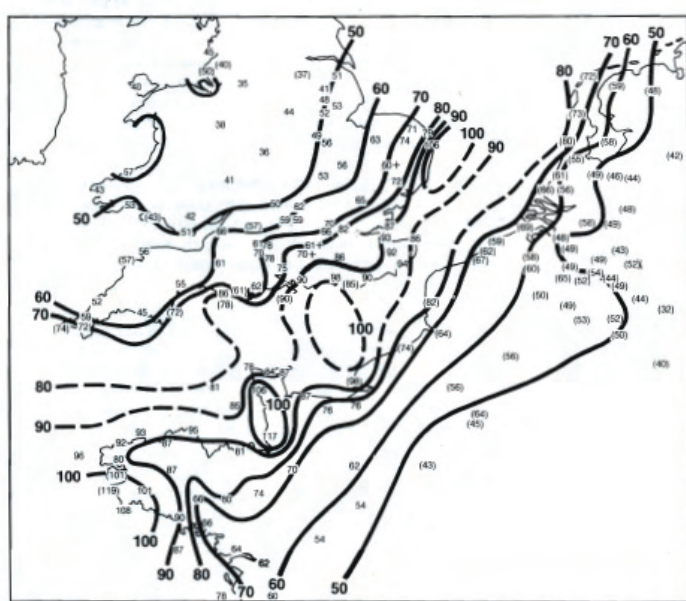
The day's timetable was slightly amended and in the event, incredibly, ran only half-an-hour late. The caterer at Brook Farm had no staff that morning, so Sally (Marine) and I drove over to collect the sandwich lunches. To think we'd been worried about having enough umbrellas available... The marquee itself was found later – in a tree in a Witley garden opposite the White Hart pub. And at that year's Christmas Revue... the acronym IOSDL just happened to fit very well into that delightful

pop tune, DISCO... so thanks to Pelton, Ridout, et al, for that!

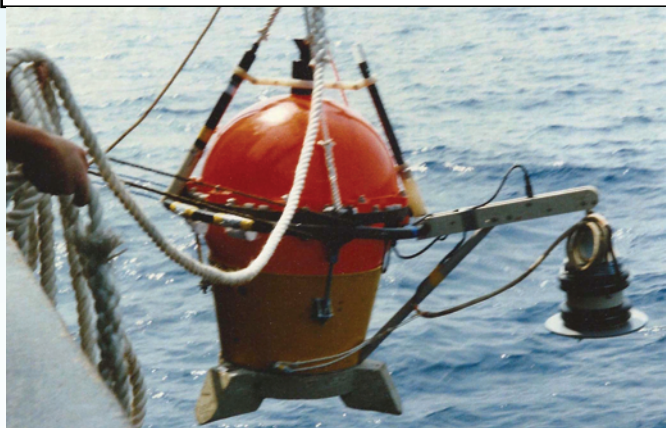
Ali joined IOS in 1980 as Ray Williams' secretary, then progressed around the building working for various others, via Colin Read, Brian Butler, Maurice Sumner in Wormley and Swindon, Tony Laughton, Colin Summerhayes, David Pugh then finally with David Billett and Colin Pelton in Marketing. She left in 1994.

Editor's footnote. My clearest memories of that event were that the lab windows even on the 5th floor were covered with what looked like pesto but was actually shredded leaves and that our house in Milford was without electricity for ten days. For those who are interested in the meteorology the chart below shows the maximum recorded wind speed (gust) that night.

Figure below From Burt and Mansfield - "Weather" Royal Meteorological Society, 1988.



Ocean Bottom Seismographs (Continued)



Deploying a PUBS Mk.II. The unit on the right contains three orthogonal geophones

Deploying a PUBS was always easy; gravity saw to that. The nail biting began when we tried to release the instrument acoustically. In 1969 navigation was, by today's standards, rudimentary. We used Transit satellite fixes that were nominally accurate at best to 100m but we usually waited for a 'good' fix before deploying the PUBS. Once the acoustic transponder on the PUBS had been switched on and detected and the instrument released,

("We have lift off" used to be the cry of relief from the lab to the Bridge), the ship had to manoeuvre to keep in acoustic contact which became harder as the PUBS approached the surface. By the mid-1990s, with GPS, life was a lot easier and then the problem was to ensure that the PUBS surfaced ahead of the ship instead of hitting the hull!

In 1982/3 we were fortunate that Ken Peal, from Woods Hole Oceanographic Institution, spent a sabbatical at Wormley and worked with Bob Kirk to design and build a new digital recording system for the PUBS which consequently became known as a Digital Ocean Bottom Seismograph (DOBS). From then on we didn't have to spend hours back in Wormley digitising the analogue recordings.

The first digital data were obtained in 1986 and for the next decade, the five IOSDL DOBS were frequently at sea. Data collection almost became routine thanks to Bob Kirk's meticulous pre-launch preparations. By the end of that period a second set of DOBS had been built in Durham University bringing the UK total to around ten. In 1995 the DOBS moved with IOSDL to Southampton.

21st century ocean science Stuart Cunningham

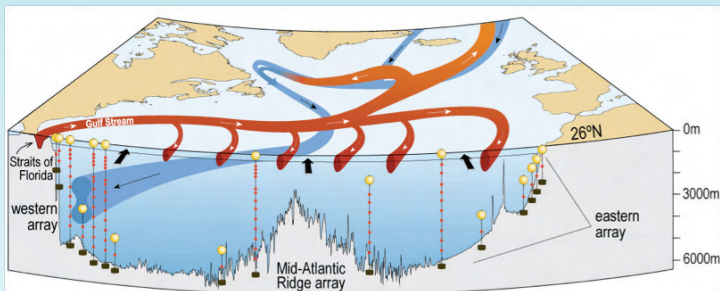


Stuart was recruited in Nov 1991 and worked for six months at Wormley before joining the James Rennell Centre in Southampton. He is now in the Marine Physics and Ocean Climate Group at NOC

Ask a member of the general public what keeps Britain's climate so benign and you'll probably get the answer "It's the Gulf Stream". Well, that is almost true but a more accurate answer would be "It's the heat lost to the atmosphere by the warm Atlantic Ocean and the westerly winds that

carry that heat towards us". That heat is collected by the ocean in the tropics and carried northwards by the warm upper ocean currents (the Gulf Stream and Florida Current and the wind-driven surface flows) while in the deep ocean cooler water returns southwards. Climate models show that changes in this circulation, the Meridional Overturning Circulation, are implicated in onset an ending of ice ages.

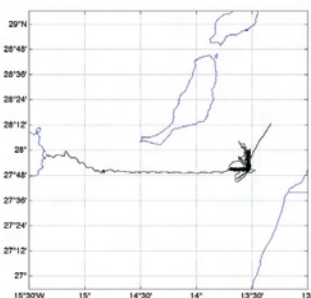
So, how much heat does the Atlantic carry and can we measure it well enough to detect changes in the transport? Tra-



Schematic of the Rapid Watch array and the major currents that make up the Atlantic MOC

ditionally estimates came from calculations based on measurements of temperature and salinity stretching across the ocean and show that the heat transport is greatest near about 25°N and amounts to around 1000 million megawatts. At 25°N there have been such measurements dating back to the work in 1957 during the International Geophysical Year. Comparison of those with three other estimates spanning almost half a century suggested that the MOC had slowed by about 30%. So was that real or was it just an accident of having only 4 measurements of something that was very variable?

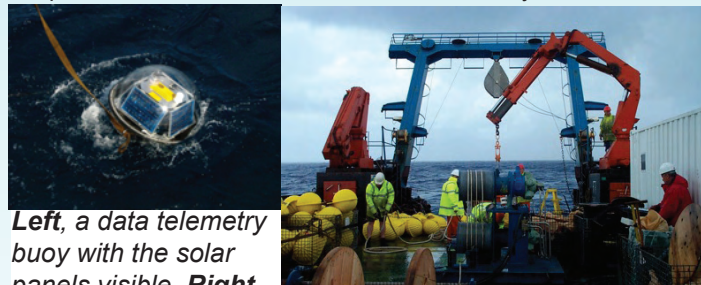
Research at Southampton led to the discovery that you could monitor the MOC by making measurements of how temperature and salinity changed, not all the way across the ocean but near its eastern and western boundaries and on the slopes



of the mid-Atlantic Ridge. This monitoring near 25°N became a key part of a joint British-US programme called Rapid that investigates links between the MOC and rapid climate change. The monitoring is known as Rapid-MOC and I lead this effort.

Since 2004 we have had cruises every 6 months to maintain the array of 17 moorings and 19 bottom landers measuring pressure. The American group in Miami have responsibility for moorings at the western end of the monitoring line and for providing data on the water transported by the Florida current using measurements from a disused telephone cable between Florida and the Bahamas. The data are at the heart of efforts to forecast European climate over tens of years.

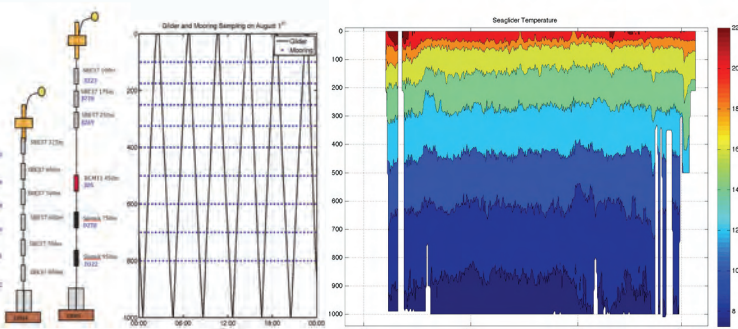
In many ways the Rapid MOC is similar to mooring work pioneered at NIO and IOS starting in the 1960s but in many ways it is very different. Moorings last reliably for 6 months or more; navigation is not now a problem thanks to GPS; commercially manufactured acoustic releases have low failure rates though there is still the frisson of waiting to for the release to respond. On some moorings data are telemetered back via satellite in real time and solid state memory leads to low failure rates in the current meters and temperature/salinity recorders. The latest innovation is to use free-swimming underwater gliders to collect data from the top 1km in areas where moorings are vulnerable to fishing damage. The glider data also give important information about horizontal variability.



Left, a data telemetry buoy with the solar panels visible. Right. Mooring deployment using the double-barrelled winch

Rapid-Watch is an exciting and important programme that is revealing important facts about the variability of the oceans' involvement in climate and it is important that it should continue. More information on Rapid and Rapid Watch can be found at <http://www.noc.soton.ac.uk/rapid/rw/> and <http://www.noc.soton.ac.uk/rapidmoc/>.

If you'd like to see the variability turn to page 8.



The glider mission in 2011 between the Canary Islands and West Africa.

Photo gallery



Not quite the Olympics - The IOS annual Cross Country run (late 60s - early 70s). How many people can you recognise. Who is number 8 just finishing? Photo from Peter Collar.



Wormley "Wrinklies" reunion September 2011. More photos at ([flickr.com/gp/38916796@N08/5Yt7c6/](https://www.flickr.com/photos/gp/38916796@N08/5Yt7c6/))



The last days at Wormley (Margaret Mikowski, Mike Conquer, "Ace" Wallace, Rob Bonnor and Sylvia Harvey) photos by Peter Saunders

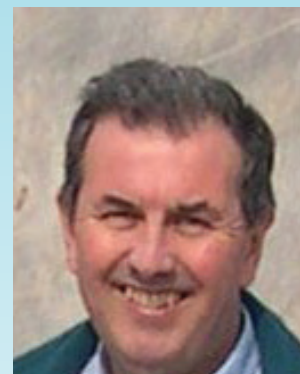
News from here and there Snippets from the editor's desk



Pam Talbot, formerly departmental secretary for Biology at IOS and the Ocean Biogeochemistry and Ecosystems Research Group at NOC, collected her MBE from the Princess Royal last month. Pam, said: 'I was terribly nervous, but the Princess Royal was very relaxed and she, of course, knew about NOC.' The award in the Queen's birthday honours list was for the award for services to oceanography. Pam, who retired at the end of March 2010, joined the National Institute of Oceanography (NIO) at Wormley in 1965, after working for the Ministry of Power in London.

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Roger Searle (Wormley 1976-1987) has been awarded the prestigious Price Medal by the Royal Astronomical Society. The medal is for investigations of outstanding merit in solid-earth geophysics, oceanography or planetary sciences. Roger is Professor of Geophysics in the University of Durham. Roger won the Medal this year, for his work on the geological processes on the ocean floor. His early research saw him pioneering the processing and use of the GLORIA sonar system developed at Wormley that he used to define the boundaries of tectonic plates and understand the evolution of rifts and oceanic microplates. More recently he has worked on the effects of hotspots in the earth's mantle. He has led many research cruises and has taken part in cruises of the Ocean Drilling Programme. The sum of his work has led to real advances in our understanding of Earth's most active and extensive geological system on the ocean floor, making him a deserving recipient of the medal.



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Chris Folland worked with John Swallow at Wormley from 1966 to 1968. He then moved to the Met Office and then to the Hadley Centre for Climate Change where he made major contributions to the study of climate variability. Following his retirement from the Hadley Centre Chris became a guest professor at the Department of Earth Sciences, University of Gothenburg, Sweden. He has also been awarded Fellowship of the American Geophysical Union and is an honorary professor at the School of Environmental Sciences, University of East Anglia and an adjunct professor at University of Southern Queensland, Australia.

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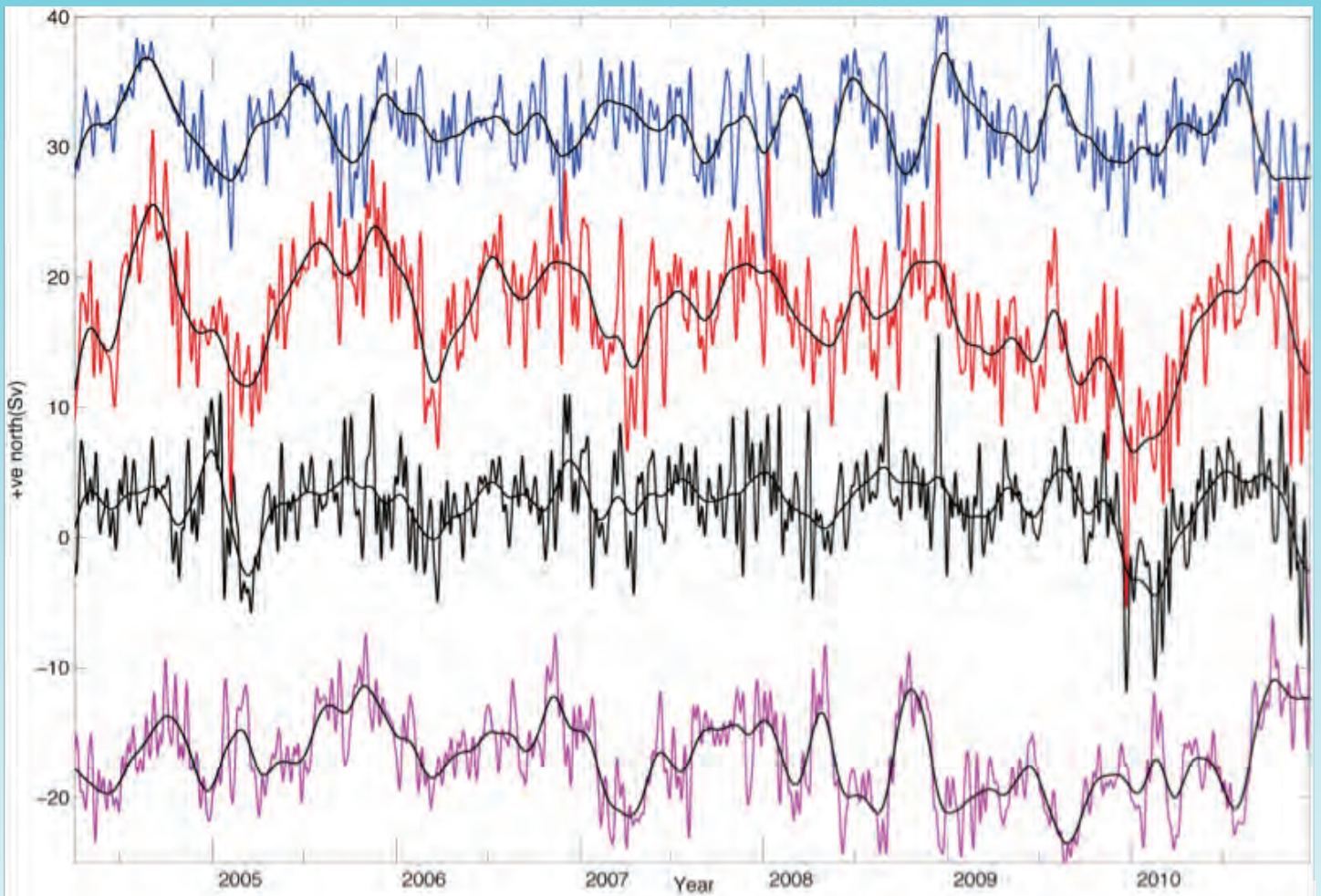
Nic Flemming was on BBC2 (<http://www.bbc.co.uk/programmes/b015yh6f>) describing recent underwater archaeological investigations of the city of Pavlopetri. Nic discovered this underwater Early Bronze Age city in southern Greece in 1967, and a survey was conducted the following year by Cambridge University. The original discovery was published in Nature in 1968.

Nic returned to the site in 2007, and realised that it was under threat from expanding tourism, and lobbied the authorities to provide a full permit for a 4 year survey and excavation by modern methods. This is led by Jon Henderson at Nottingham University. Nic is responsible for running the research aspects of sea level change, tectonics, and coastal change at the site. The BBC filmed some of the work during 2011 and broadcast it in October.



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Antarctic cameras - can anyone help? Arnold Madgwick is now in a home in Sussex and when his daughter, Julia, was clearing his house in Fernhurst she came across two plate cameras and a magic lantern projector. Conversations John Driver had with Arnold suggest these instruments could be linked to Antarctic research (Discovery Investigations?). Evidently Arnold rescued them from the scrap heap when a clear out was taking place at Wormley. Does anyone know their origins? It may save some research. Any information please to John Driver<johnsdriver@gmail.com>



Variability revealed by Rapid MOC. Units are in Sverdrups (1 million cubic metres per second). From top to bottom Florida Straits (blue), total MOC (Red), wind-driven (Black), upper mid-ocean (purple)

RRS Discovery (New and old)

The old Discovery is at present in the Eastern Pacific Ocean on Cruise 372.

Meanwhile her replacement is taking shape in the shipyard in Spain



The next

++ OCEANS WORMLEY ++

I'm grateful for the material that has been sent to me. It would be good if we could have more from our biologists. I will do the layout for the next issue (though I'm not a design expert) but will need text and photos. Here are some ideas for possible items

- Reminiscences of memorable cruises
- Reminiscences of life at Wormley (not necessarily about science)
Are there photos of the IOS Christmas reviews?
- Photographs, preferably including people.
- Articles linking science in the Wormley days to science today.
- Glorious failures (the bits of kit that didn't work).

Please send any material to me at wjg@noc.soton.ac.uk

I would aim for the next issue in June 2012.

Spreading the word

Not everyone has e-mail access so please print copies and give them to anyone you know who might be interested and please let me know the e-mail address of others who might like to be on the mailing list..