

National Oceanography Centre

from coast to deep ocean



Waterfront Campus, Southampton



Joseph Proudman Building, Liverpool

Vision: The National Oceanography Centre will, by 2015, be recognised as the world-leading Centre for integrated ocean sciences and technology".



**National
Oceanography Centre**

NATURAL ENVIRONMENT RESEARCH COUNCIL



**NATURAL
ENVIRONMENT
RESEARCH COUNCIL**



Liverpool

London

Southampton

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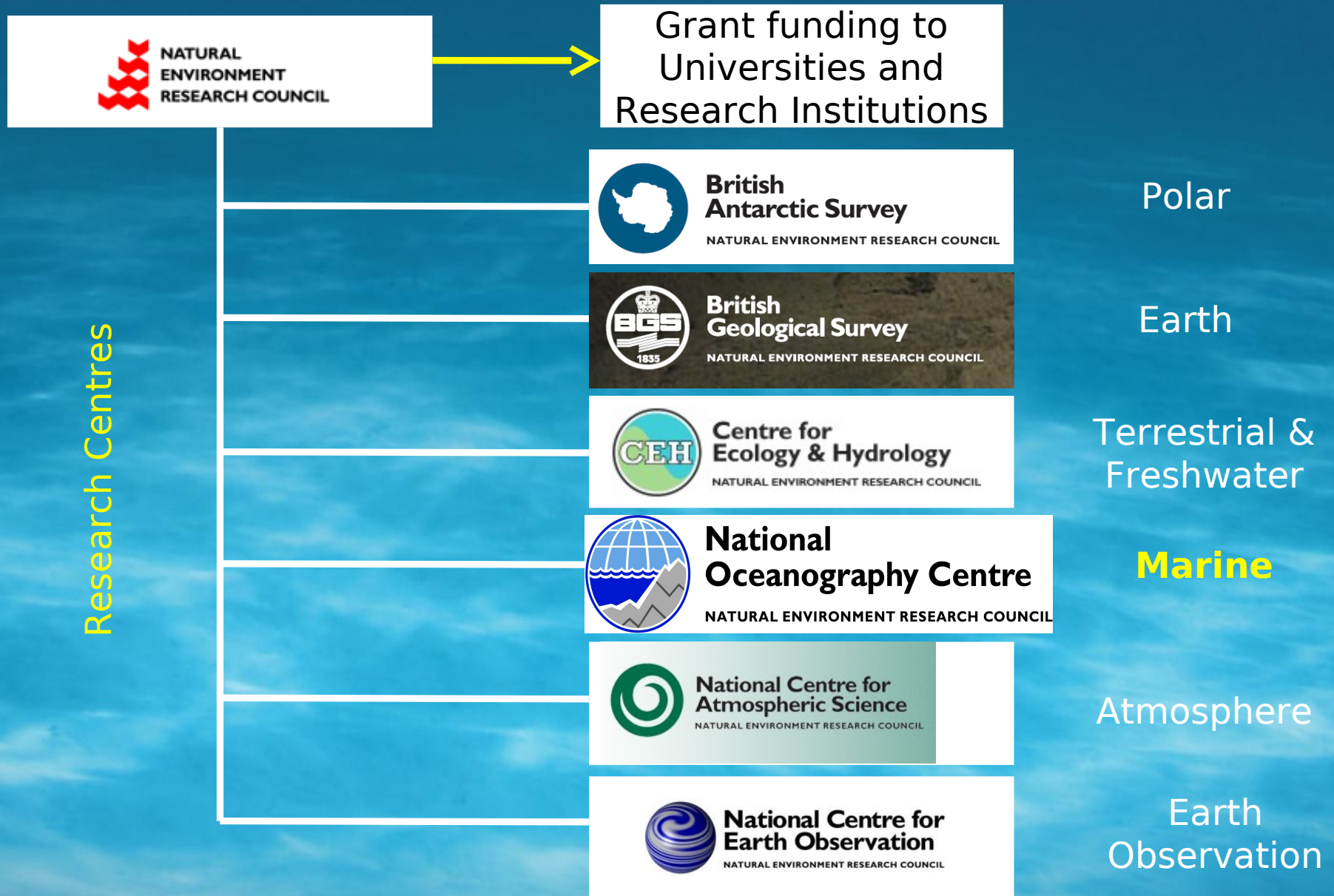
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

51°55'48.41" N 2°14'56.52" W elev 276 ft

©2010 **Go**

Eye alt 506 ft

The six NERC “Sector Centres”



Some key facts

NOC is owned by the Natural Environment Research Council (NERC)

- Coast to deep sea
- Based in two sites at Southampton (headquarters) and Liverpool since April 2010
- Hosting Partners - University of Southampton, University of Liverpool
- 560 NERC staff (>200 scientists and technologists)
- £52 million annual budget (including capital)
- Funded by NERC, EU, Industry, Government Departments and Agencies
- Delivery Partners in Plymouth, Scotland
- Building a wider association of Universities and Research Centres

Facilities directly managed by NOC for NERC

- Royal Research Ships, *James Cook* and *Discovery*
- National Marine Equipment Pool
- British Oceanographic Data Centre
- Permanent Service for Mean Sea-level
- British Ocean Sediment Core Research Facility

Facilities



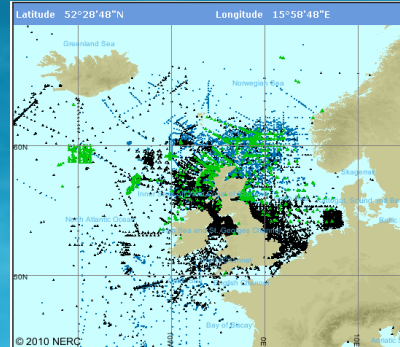
Global-class Research Vessels



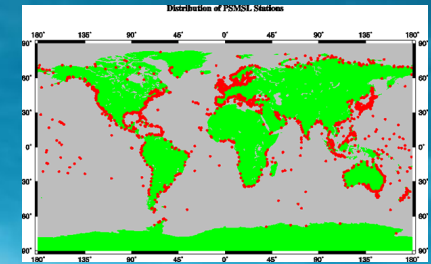
National Marine Equipment Pool and seagoing technical support



British Ocean Sediment Core Research Facility



British Oceanographic Centre



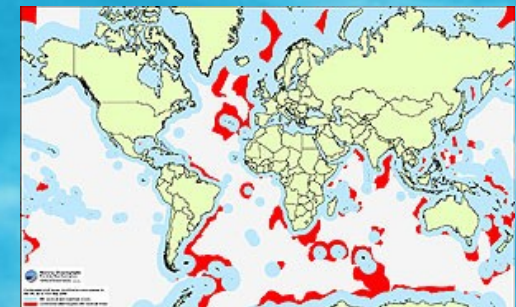
Permanent Service for Mean Sea Level



National Oceanographic Library



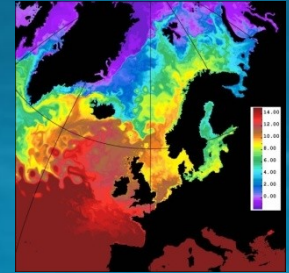
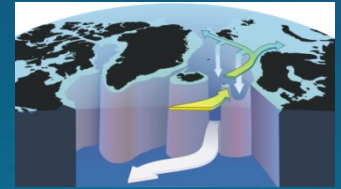
National Tidal and Sea-level Facility



Independent scientific advice

Research Expertise

- Marine Physics & Marine Climate
- Marine Systems Modelling
- Marine Biosciences
- Marine Geo-sciences
- Technology development



Some key facts

NOC research can be divided into two parts

National Capability

- Research linked to activities which are considered to be of fundamental (and probably long term) national and international importance

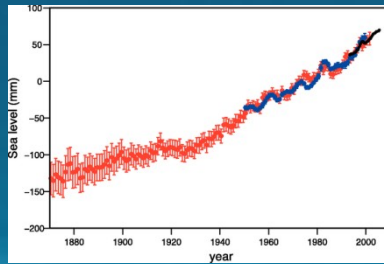
Blue Skies

- Research funded by means of science proposals to research council committees
- In principle this research can be on any topic

PhD Research

- Can be undertaken in either NC (block allocations) or BS (with studentships written into proposals) – for UK students.

National Capability Programmes



Long-term ocean observing

for decadal and rapid change

Technology development

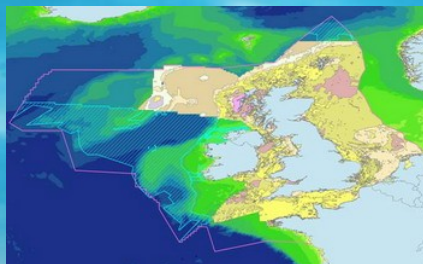
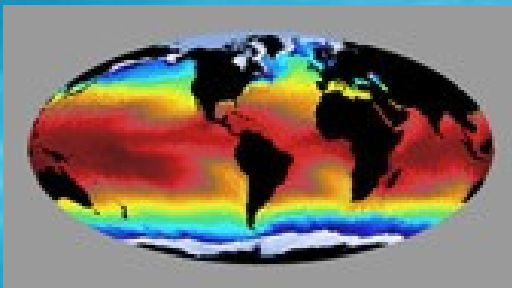
to measure the ocean in new ways

Modelling

to simulate the oceans in the earth system

Mapping

to chart the oceans, sea floor and habitats for science and users



National Oceanography Centre

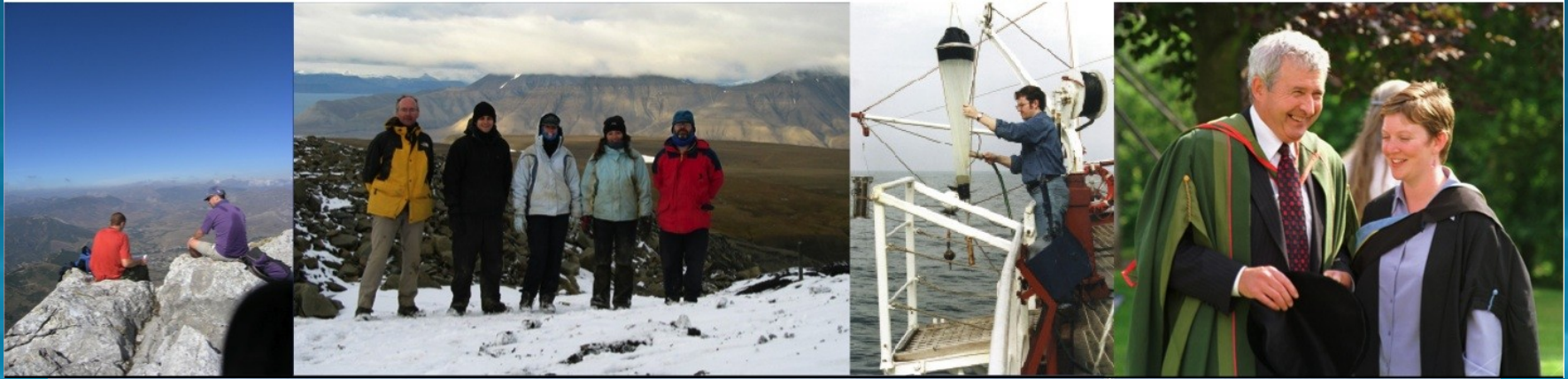
Liverpool (former Proudman Oceanographic Laboratory)

- Located alongside the Liverpool University School of Environmental Sciences which includes Oceanography, Geology, Geophysics, Geography and Marine Biology.
- Prof. George Wolff will explain more about Liverpool University School of Environmental Sciences.

Southampton (former National Oceanography Centre Southampton)

- Located alongside the University of Southampton School of Ocean and Earth Science.
- More information from its web site.

School of Ocean and Earth Science, University of Southampton



NOC Liverpool

Marine Physics and Ocean Climate

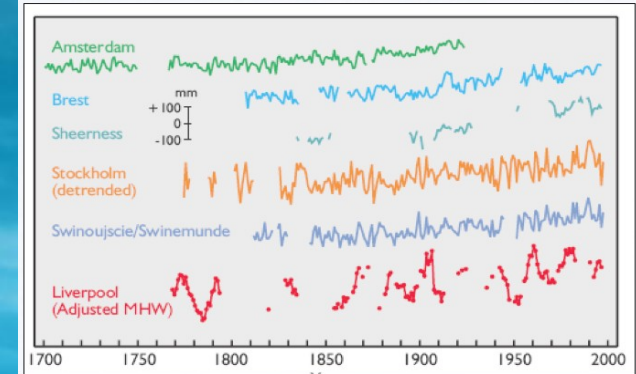
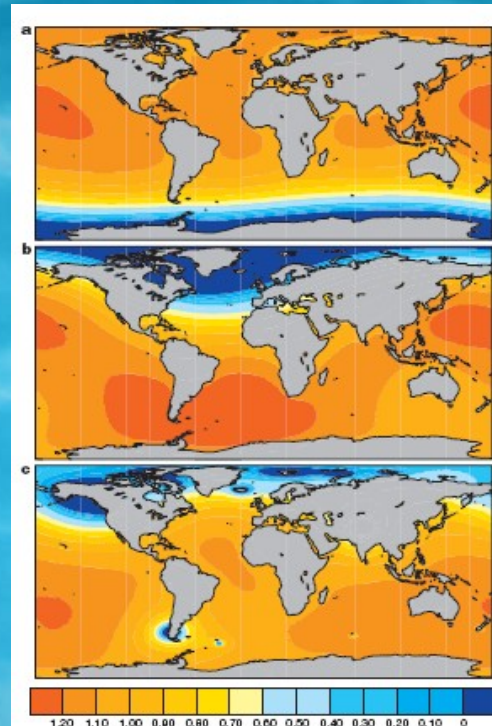
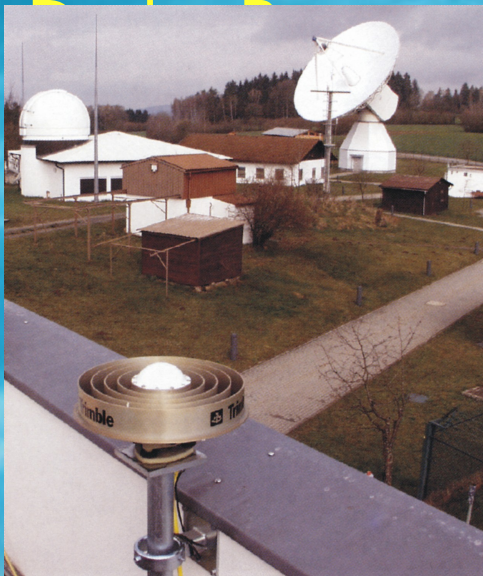
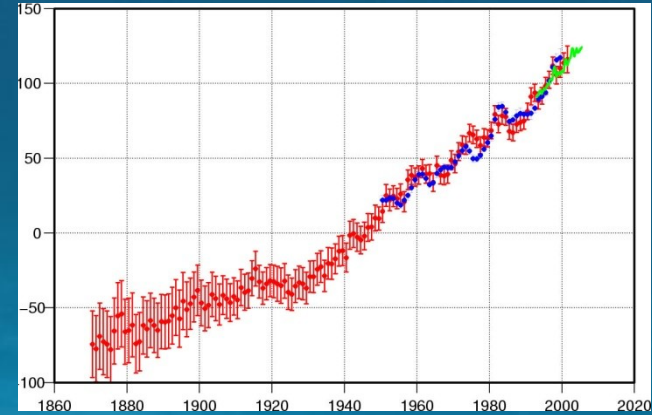
- About 120 staff
- Most research is in **Physical Oceanography, Sea Level Science, Geodesy/Geophysics, Coastal Processes, Climate Change** etc.
- A large modelling group involved in various kinds of physical oceanographic modelling and coupling to ecosystem modelling.
- PhD students could be 'visitors' i.e. registered at USP in which case financial arrangements would have to be formalised with NOC Director. (This may change in the future, see below).
- Or registered at the University of Liverpool, or both L'pool and USP jointly. The student may then have 3 co-supervisors: one at NOC, one at LU and one at USP.

Marine Biology, Chemistry and Geophysics

- Can be undertaken at Liverpool University itself – the student would then have to be registered as above. Professor Wolff can provide more details.

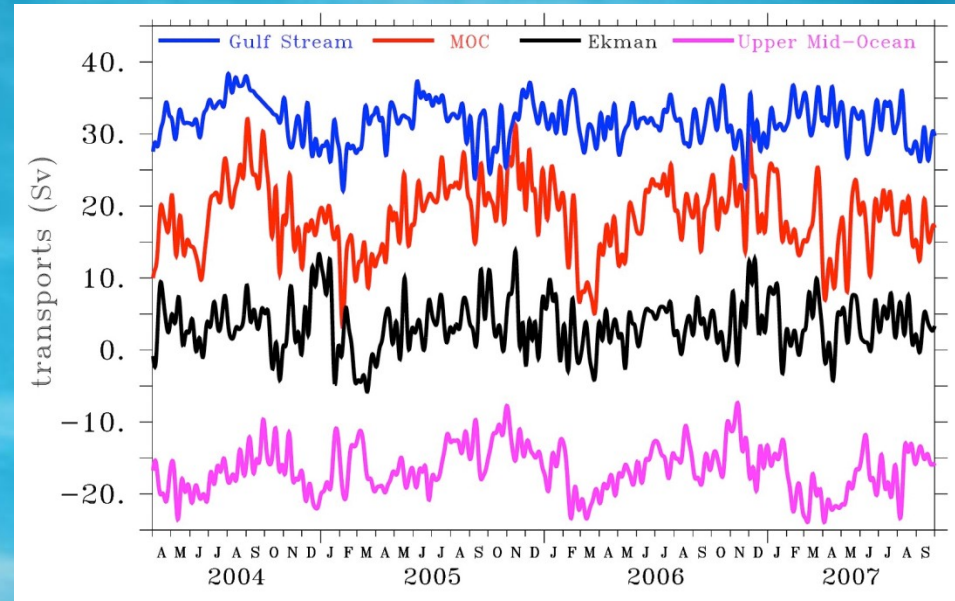
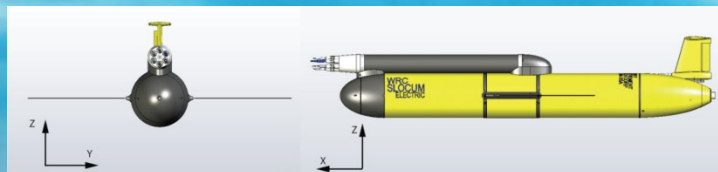
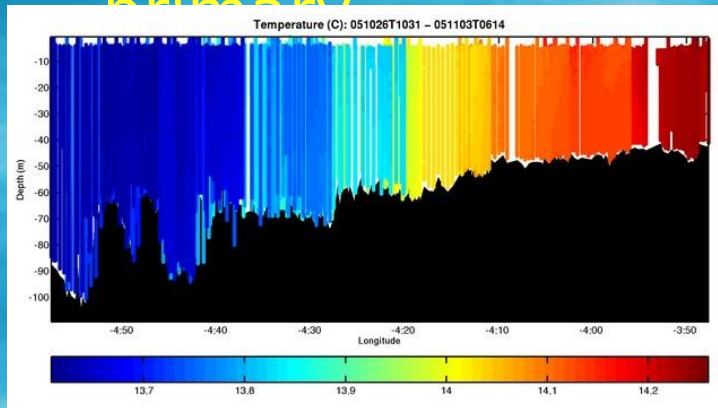
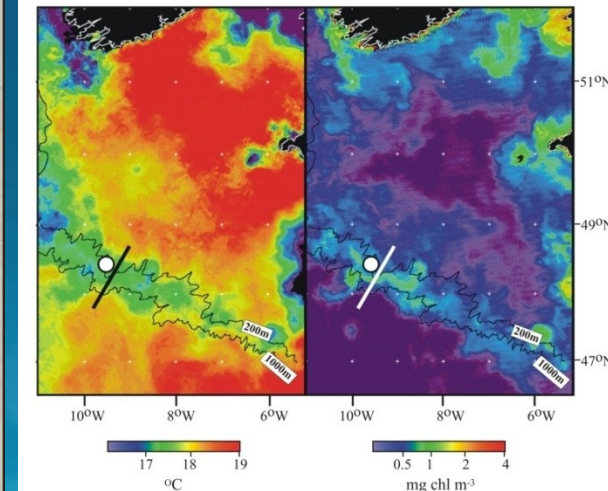
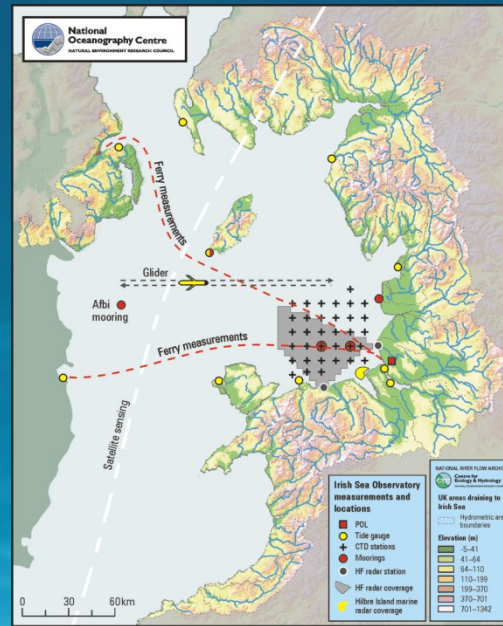
Sea and Land Level Science

- Global and regional mean sea level;
- GPS, land movements and geodesy;
- Geophysics (GIA) studies;



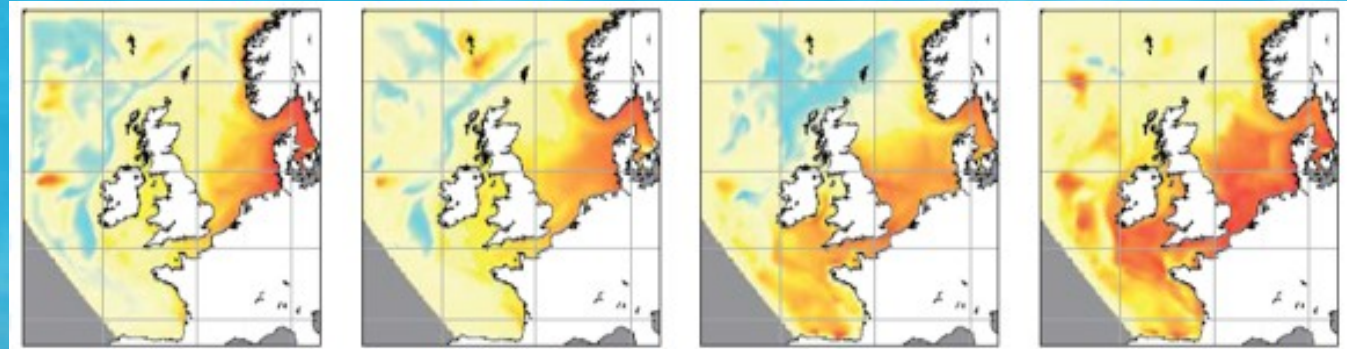
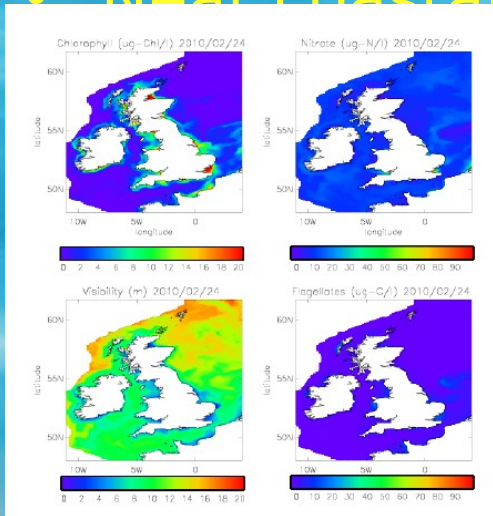
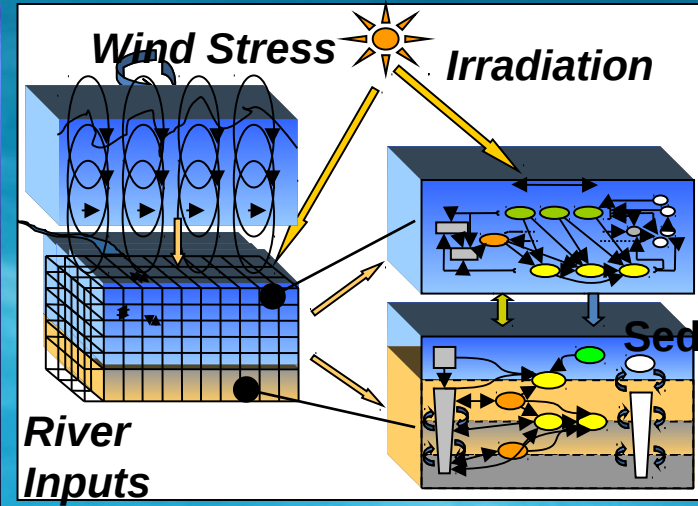
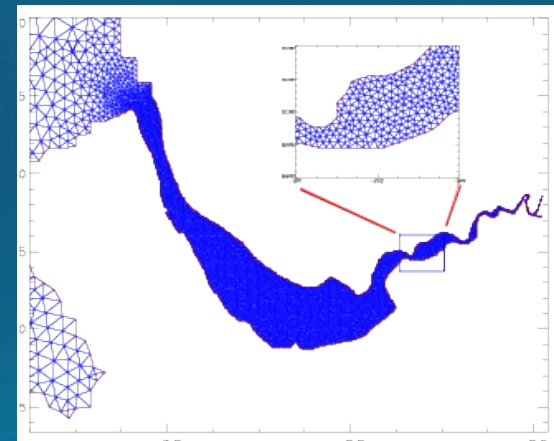
Ocean and Shelf Sea Science

- RAPID programme at 26°N observing;
- RAPID wave monitoring off the US coast;
- Shelf-edge mixing - effects on



Ocean Modelling

- Shelf and coastal modelling - shelf seas & processes;
- Integrated physical and ecosystem modelling;
- Advanced model development;
- Near coastal



Technology at NOC Liverpool

- Tide Gauges
- Telemetry
- Bottom pressure - Drake Passage and Atlantic Wave (20 and 5 years)
- Gliders
- Coastal radars and other shelf



Sea Level Monitoring at NOC Liverpool:

- Around the UK
- South Atlantic and Antarctica
- Gibraltar
- Contributions to African and Indian Ocean networks



NOC (UK) Sea Level Stations in the South Atlantic, Antarctica and Gibraltar

9 Sea Level Stations

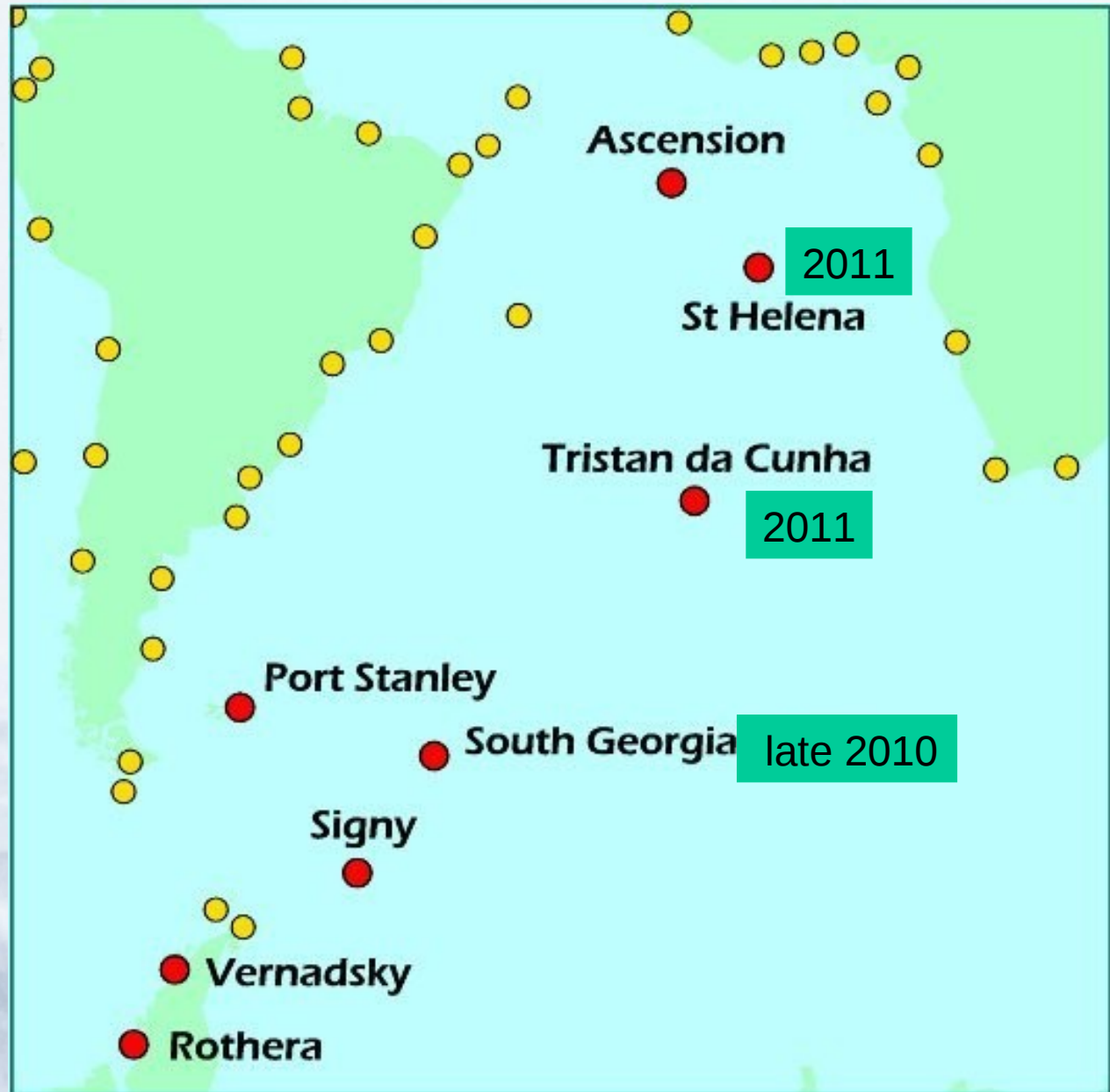
Real time telemetry:

Ascension Island
Saint Helena
Port Stanley
Tristan
Vernadsky (Faraday)
Rothera
Gibraltar

Delayed mode data:

Signy

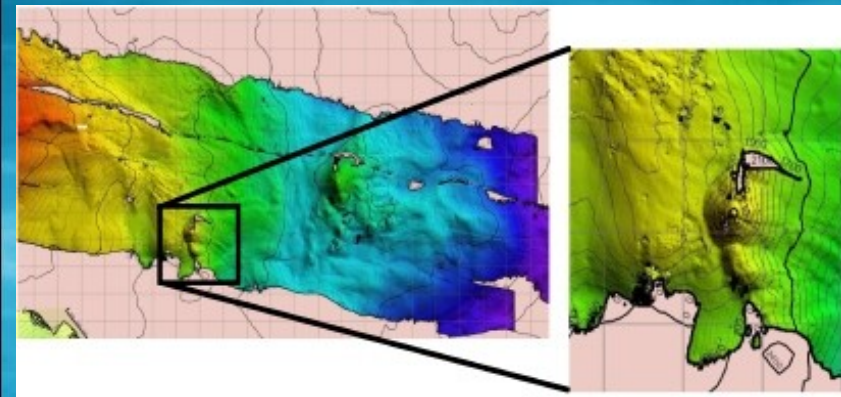
St.Helena and Tristan
recently re-built
after storm damage



Autosub6000



Autosub Long Range



First science use: pinpointing world's deepest hydrothermal vent sites known to date, mid-Cayman Rise, April 2010



6000m depth
6000km range
January 2011 trials

Data Management at NOC Liverpool

- Permanent Service for Mean Sea Level
- British Oceanographic Data Centre

The screenshot shows the PSMSL website in a Windows Internet Explorer browser window. The address bar displays <http://www.psmsl.org/>. The website header includes the PSMSL logo and the text "Permanent Service for Mean Sea Level". A navigation menu contains links for "About Us", "Data", "Products", "Training & Information", and "Links". A "You are here" breadcrumb trail shows "home >". A "News" section lists several items, including "French Station Records Updated for 2010" and "Fonta Delgadada's RLR Factor Revised". A "Welcome to the Permanent Service for Mean Sea Level (PSMSL)" message is displayed, followed by a world map showing tide gauge locations. A "Data" section offers options to "Obtain and submit tide gauge and bottom pressure data". A "Products" section mentions "Browse the data set via GoogleEarth or obtain derived view regional commentaries and author". A "Training & Information" section lists "variety of FAQs, training and software documentation, information on non-oceanographic signals in tide gauge (e.g. glacial isostatic adjustment, atmospheric pressure, etc.)".

The screenshot shows the British Oceanographic Data Centre (BODC) website in a Windows Internet Explorer browser window. The address bar displays <http://www.bodc.ac.uk/>. The website header includes the BODC logo and the text "British Oceanographic Data Centre" and "NATURAL ENVIRONMENT RESEARCH COUNCIL". A navigation menu contains links for "Home", "Contact us", "Glossary", "Site map", "Site styles", "SHARE", "My account", "Register", "Log in", and "Tweet". A "Data management" dropdown menu is open, showing options for "UK", "European", and "International". The main content area features a "Welcome to the British Oceanographic Data Centre" banner with the tagline "a national facility for preserving and distributing marine data". Below the banner, a message states: "We hope you enjoy our web site and would appreciate your [comments](#). If you experience any difficulties, please contact our [Web Master](#)." A table with four columns provides information about the center's services:

About us	Data	Projects	Help and hints
What do we do? Do you want to contact us? Learn about our history and the information technology we rely on. [more]	We process, archive and distribute biological, chemical, physical and geophysical marine data. Find out how to download and request data, search our inventories and submit data to us. [more]	Explore the data management services we provide to our scientific colleagues during marine research projects. [more]	Learn how to use our web site. Read our content, copyright and privacy policies. Access errata information and software updates. [more]
Partners	Products	Help and hints	
Find out about the data management partnerships we have forged with our scientific colleagues at marine research centres. [more]	Learn about our Web Services and software products. Find out how to order our digital atlases and the data sets available on CDROM. [more]		

Below the table, it states: "We also host various data portals and project web sites".

www.psmsl.org

www.bodc.ac.uk

NOC Liverpool

Survey of Interest in Cooperation with USP

- There have been many years of collaboration between Liverpool and USP (especially Profs. Mesquita and Harari), primarily on topics such as tides, sea level change etc.
- The problem is that there is now a completely new generation of scientists in Liverpool with a much wider range of research interests.
- Therefore NOC Liverpool science staff were surveyed as to their interest in collaboration with IOUSP and their responses are included in a report which is available.
- This report consists primarily in ideas for possible PhD projects.
- We were very pleased with the level of response.

Nevertheless knowledge by NOCL staff of staff at IOUSP (and vice versa) is limited and it will take more work to spin up many of these ideas.

- Perhaps the findings of the report can be discussed and further discussions can take place with video conferences?

Potential Science Cooperation between the National Oceanography Centre Liverpool, the School of Environmental Sciences of Liverpool University and the Instituto Oceanográfico of the University of São Paulo

1. Background

In 2009, the Proudman Oceanographic Laboratory (POL, now the Liverpool component of the National Oceanography Centre, NOCL), the Department of Earth and Ocean Sciences of Liverpool University (DEOS, now a component of the School of Environmental Sciences of Liverpool University, SoES-LU) and the Instituto Oceanográfico of the University of São Paulo (IO-USP) signed a Cooperation Agreement on science areas of common interest. Three of the stated objectives included (paraphrased):

- To identify specific projects in which the Institutions concerned might collaborate.
- To disseminate on their respective campuses all information concerning the resources and interests of the three Institutions.
- To help students and staff from each Institution to take part in collaborative research and exchange visits.

Appendix: Replies to Survey of July 2011

NOCL Science Staff

Dr. Simon Holgate (Atlantic Sea Level Change and the AMO)

Prof. Chris Hughes (Ocean Bottom Pressure in the Tropical Atlantic)

Prof. John Huthnance (Shelf Slope Modelling)

Prof. Jonathan Sharples, Dr. Matthew Palmer (NOCL) and Dr. Claire Mahaffey (SoES)
(Phytoplankton Studies using Ocean Gliders)

Drs. Mark Tamisiea and Simon Williams (Solid Earth response to Changing Loads)

Prof. Peter Thorne (Sediments in Estuaries)

Dr. Judith Wolf (Air-Sea Interactions etc.)

Prof. Philip Woodworth and Others (South Atlantic Sea Level Studies)

And short inputs were received from:

Dr. Richard Cooke (Technology Projects)

Drs. Alan Davies and Jiuxing Xing (Ocean Modelling)

Dr. Kevin Horsburgh (Meteotsunamis at Mid-latitudes)

Dr. Svetlana Jevrejeva (Sea Level Change)

Drs. Jeff Polton and Matthew Palmer (Modelling and Glider Measurements of the Fate of Fresh Water in Coastal Waters)

Dr. Alejandro Souza (Estuarine and Sediment Research)

Dr. Chris Wilson (Diagnosing Ocean Circulation)

Input was also received from Dr. Lesley Rickards (British Oceanographic Data Centre)

SoES Science Staff

Dr. Harry Leach (Eddies in the ACC)

Prof. Andy Plater (Three Proposals to do with Coastal Evolution and Sea Level)

Prof. Andy Plater (SoES), Drs. Judith Wolf and Kevin Horsburgh (NOCL) and others (Security of Coastal Energy Infrastructure under Climate Change)

Dr. Leonie Robinson and Prof. Chris Frid (Marine Biology and Ecosystems)

Prof. Stan van den Berg (Chemical Oceanography)

Prof. Ric Williams (South Atlantic Heat Content and Sea Level on Decadal Timescales)

Prof. George Wolff (Organic Biogeochemistry)

NOC Southampton

Southampton Responses to the Survey

- NOC scientists at Southampton were also asked to contribute to the survey but responses were far fewer and they have not been included in the report.
- However I can pass on to anyone interested in the identified areas (e.g. sea bed mapping).

Research at Southampton

- So far as I know, Southampton does not have the 'visitor' option (except for short collaborative visits) but all students must be registered with the University of Southampton. Because of the formation of NOC, it is possible that NOCL may adopt this NOCS practice at some point.

National Oceanography Centre

If you are interested in studying at Liverpool (either NOC or LU):

- Talk to George and me while we are here, you can email us afterwards
- Check out the NOC-USP survey (although that is not exclusive)
- Check out the NOC and LU web sites
- We would be happy to put you in touch with possible supervisors

www.noc.ac.uk