British Oceanographic Data Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

www.historicsealevel.wordpress.com

JISC

Rescue of historical UK sea level charts and ledgers – creation of Open Educational Resources (OERs)

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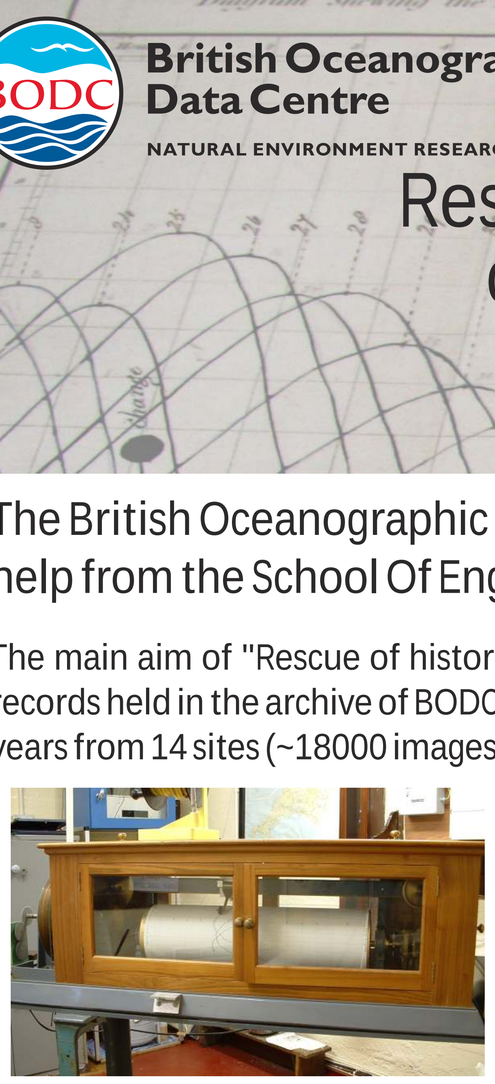
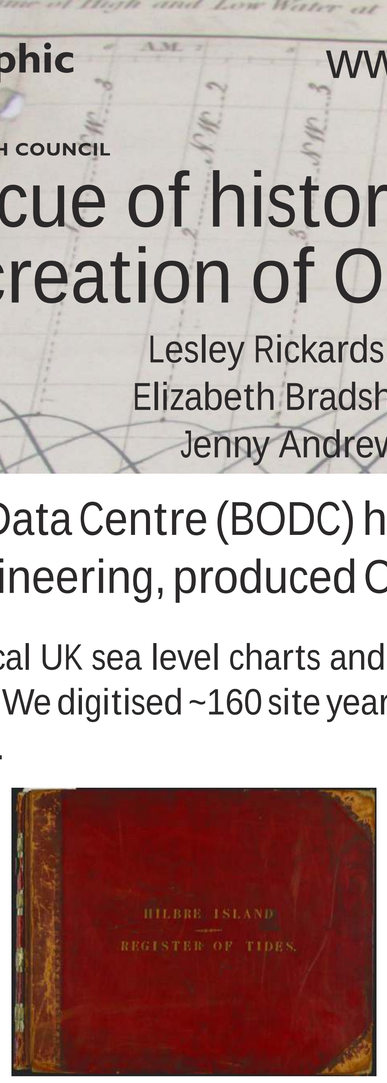
The British Oceanographic Data Centre (BODC) has, in collaboration with the University Of Liverpool Ocean Sciences group, and with help from the School Of Engineering, produced Open Educational Resources (OERs) for historical sea level data from tide gauges.

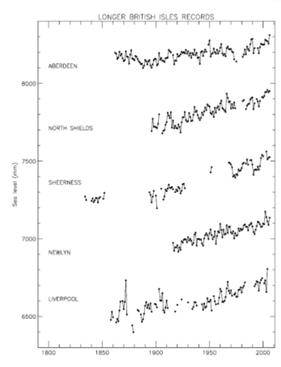
The main aim of "Rescue of historical UK sea level charts and ledgers" project was to increase the availability of long-term sea level time series by improving access to records held in the archive of BODC. We digitised ~160 site years of chart data from 22 sites around the UK coast and scanned ledgers stretching back to 1853, totalling ~500 years from 14 sites (~18000 images).



Newlyn chart gauge. The charts come from tide gauges around the UK and have been digitised as 15 minute interval data.



Hilbre Island High and Low water ledger 1855. Most of the scanned images are records of high and low waters.



The digitised data will help to extend back and fill in gaps in UK sea level records.

Long-term sea level records, as well as being used in climate studies (sea level rise), are also used in oceanography (ocean currents, tides, surges), geodesy (national datum), geophysics and geology (coastal land movements)

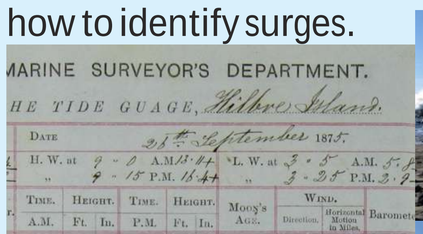
We wanted to raise awareness in the wider community of the existence of the new data and to help users understand the data, so we worked with three Ocean Sciences undergraduates to create OERs from the digitised and scanned resources. The students were able to incorporate their own learning styles and methods in the OERs, and use their experience to show us where observational data could be used in their courses. The OERs are documents which use the scanned and digitised data to explain and test understanding of an idea.

Of using the data, the students said,

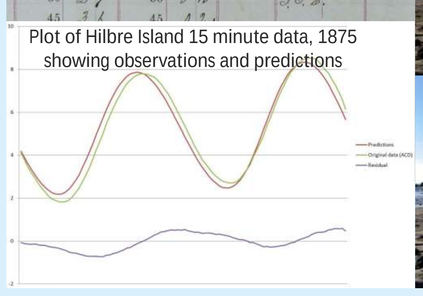
"Any time you use real data, it just feels more applicable... its real data so you're doing more real experiments." and "It makes the theory more real."

Extreme events & storm surges

Hilary Sizmore-Machen studying Oceans, Climate and Physical Geography, decided to make her OER about storm surges and extreme events and explain what storm surges are, how they happen, and what causes them. The OER explores the link between climate change and storm surges and how you might find more extreme events. It uses data from the archives to show how to identify surges.



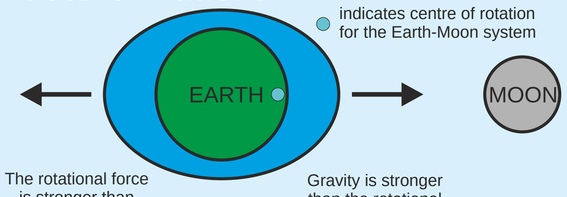
Newly scanned ledger for Hilbre, 1875



Plot of Hilbre Island 15 minute data, 1875 showing observations and predictions

Tidal formation & basic physical aspects

Danielle Rushworth is studying Ocean Science with Chemistry and used her OER to explain tidal formation. She said, "It was more personal interest. I've always been interested in how tides were formed. The astronomy of it, how its to do with the moon and gravitational force and I like physics and I thought it was a good way to learn the basics and tie it in with tidal formation."



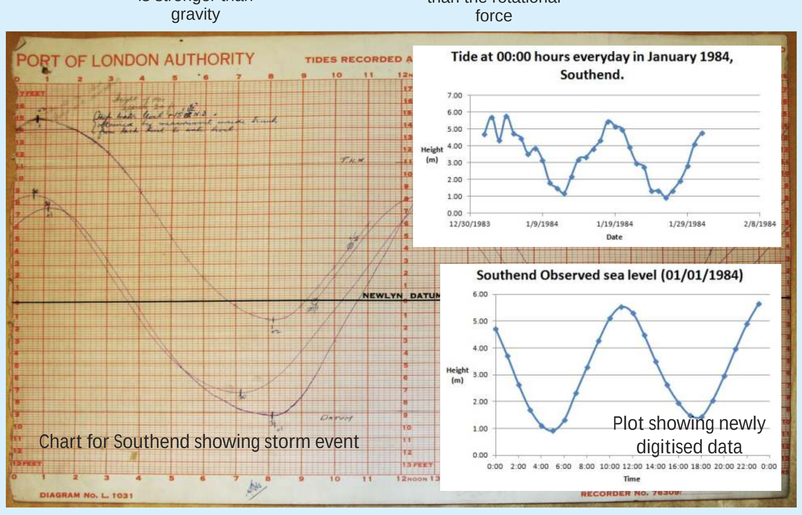
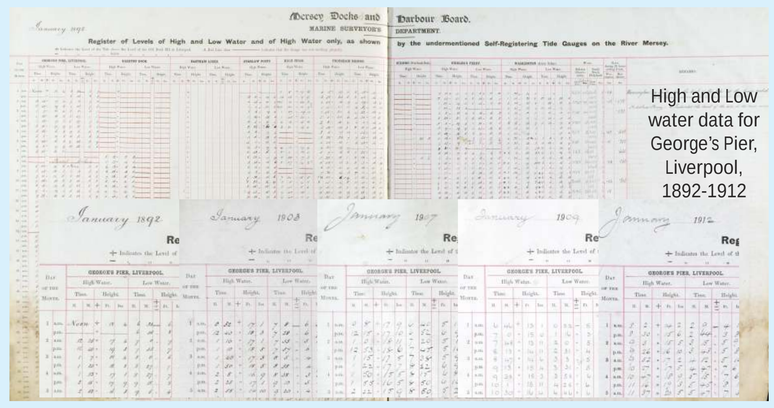


Chart for Southend showing storm event

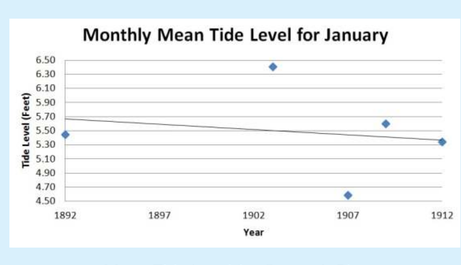
Plot showing newly digitised data

Sea level data and its uses

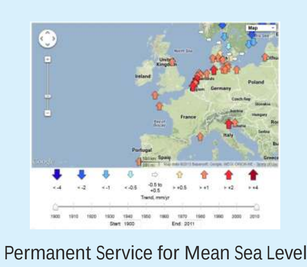
Robyn Owen is studying Mathematics with Ocean and Climate Studies. Her OER focuses on looking at long term data and identifying trends. She said, "I thought it would be good, with my maths background, to try and tie it in with a bit of numerical analysis. See how the data was changing, how you could plot that up and how you could pick out trends and any anomalies."



High and Low water data for George's Pier, Liverpool, 1892-1912



Mean Tide Level for George's Pier



Permanent Service for Mean Sea Level
Relative Sea Level Trends since 1900

Access to data and OERs

The newly digitised, quality-controlled tide gauge chart data will be available via the BODC 'all series' application:

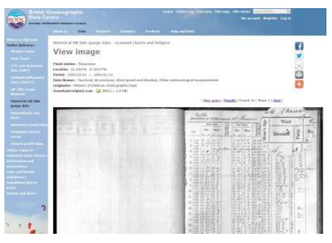
www.bodc.ac.uk/data/online_delivery/nodb/

and the scanned tide gauge ledgers will be available via the BODC historical sea level webpage:

www.bodc.ac.uk/data/online_delivery/historical_uk_tide_gauge_data

The historical sea level page allows users to search BODC's scanned charts and ledgers archive using a number of criteria, such as location, time period and parameters measured. After searching, users can examine the scanned images using a "magnifying glass" tool, with the option to login and download the high resolution original.

The OERs will be Creative Commons 0 (CC0) to encourage distribution and reuse. They will also be deposited in Jorum, which is a Jisc funded online repository, for collecting and sharing learning and teaching materials. Users can search through thousands of free OERs from a wide variety of subject areas. The resources have been shared by those who teach in or create content for the further and higher education communities in the UK.



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Project video - Production of OERs

As part of our final project report to Jisc, we produced a short video, concentrating on our production of OERs.

Dr Harry Leach, Senior Lecturer in Physical Oceanography at the University of Liverpool said the resource "offers great opportunity for undergraduate projects, where students can make use of readily available data to do interesting projects. They're always excited by big issues such as global warming and climate change."

The students said, "If you begin with a basic understanding or a basic interest, you should be able to use the internet and other resources to be able to use our OERs." and "You've got to do the full background research, not just take the first thing you see (to be true).", which is why OERs from a trusted source are particularly valuable.