



## Rescue and release of historical tide gauge charts from Clydeports

In July 2016, The Peel Group Ltd. (Glasgow) approached the British Oceanographic Data Centre (BODC) to donate their tidal archive, due to office redevelopment. The archive consisted of ledgers of tide gauge charts (345 annual bound volumes) and handwritten ledgers (91 bound books) from several locations along the Clyde, with the earliest record beginning in 1841 from Glasgow Harbour.



The Clydeport archives were delivered to the archive at BODC, catalogued and accessioned. We elected to scan data from one location, with the earliest date and longest record possible. The images (on average one per week, one volume per year, 52 images per year) are from Bowling Harbour, with 51 ledgers scanned (from 06/10/1888 10:30 to 04/01/1939 09:20).

In August 2016, the heritage digitisation firm TownsWeb Archiving Ltd launched their new TWA Digitisation Grant and BODC were also awarded £750 of match funding, towards the digitisation of the charts. TownsWeb Archiving Ltd collected the records and photographed the ledgers using their planetary overhead book scanning equipment, to minimise impact on the books. The output was 2716 TIFF images, which were delivered to BODC along with the returned ledgers.

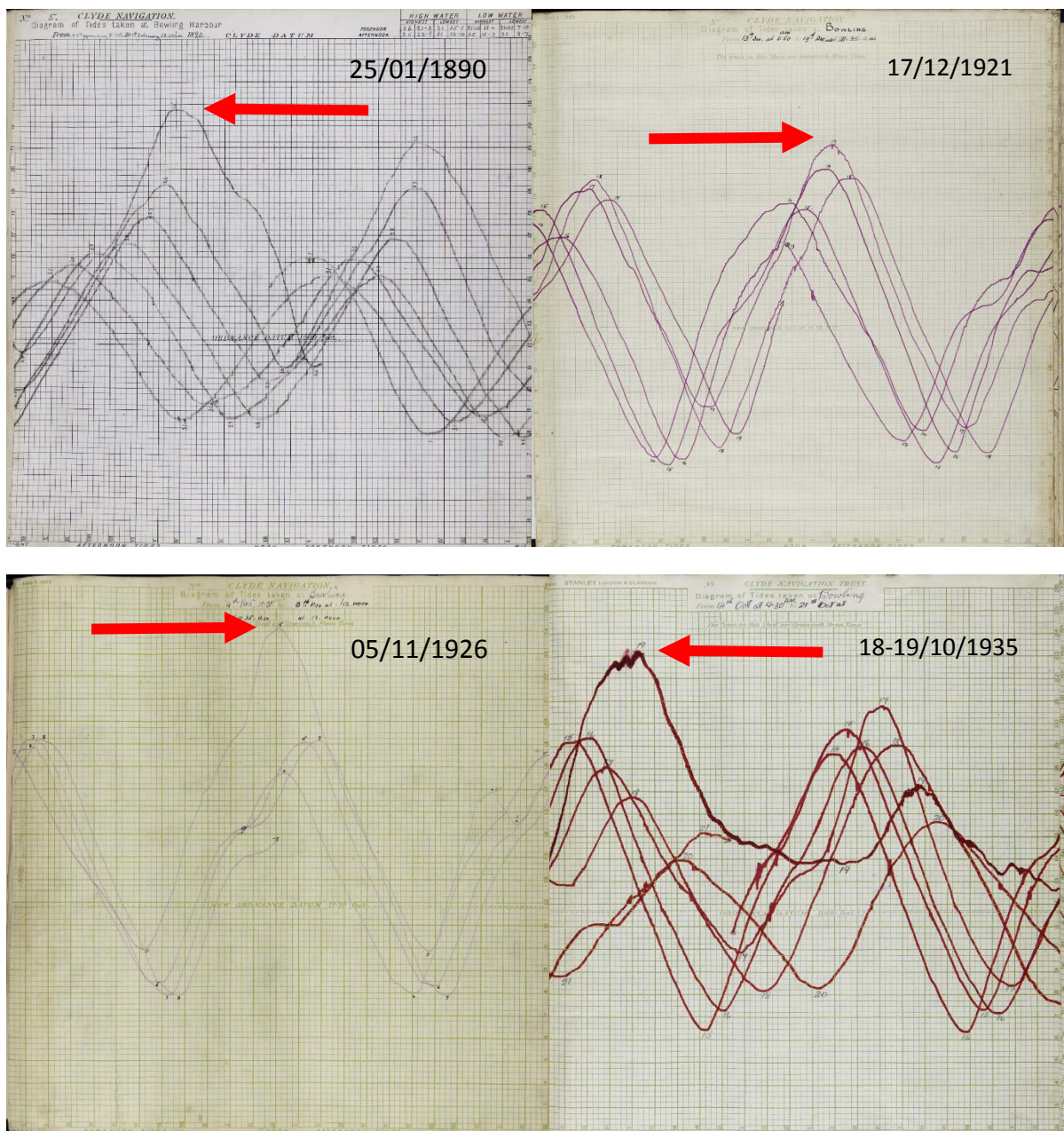
The original MEDIN grant application was for a series of 25 years and ~1300 TIFF images, but due to the award from the digitisation firm, and the transportation costs being included in the contract, it was possible to digitise twice as many ledgers as originally proposed. However, this has led to an increase in the amount of time required to complete the project.

The most time-intensive aspect of the process is assigning the usage metadata to each image. The data scientist has to view each image to establish the date and time that the chart was placed on the recording drum and the date and time it was removed. As there were twice as many images as

anticipated, this process took weeks instead of days. Once the descriptive metadata was in place, the BODC transfer could be tested. The purpose of the transfer is to change the filenames to BODC internal filenames and tag the images with metadata so that they can be linked to the series in the National Oceanographic Database.

At the time of writing this report, the transfer has been tested and the next step will be to make the images available via the historical sea level web pages ([www.bodc.ac.uk/data/online\\_delivery/historical\\_uk\\_tide\\_gauge\\_data](http://www.bodc.ac.uk/data/online_delivery/historical_uk_tide_gauge_data)). BODC will use its internal funding to complete this process.

One of the reasons to carry out data rescue activities is to improve our understanding of the impact of coastal flooding. We inspected two studies of storm events that have impacted the coastline of the British Isles (Zong & Tooley (2003) and Haigh et al (2017)) and discovered several instances where the newly scanned ledgers coincided with storm events.



For some of these storm events, the only other functioning tide gauge at the time was the main UK reference tide gauge in Newlyn, Cornwall. The siting of this gauge may mean that the event was not captured in the existing tide gauge record. The 1890 event was seen in Maryport, Cumbria, the 1926 event at Broomilaw on the Clyde and the 1935 event caused damage in the Firth of Clyde. In particular, the 1926 chart shows the tide on the 5<sup>th</sup> of November was several feet above the expected level. Once these images are made available, it is hoped that sea level researchers will be able to extract data to improve storm surge modelling in the region. The SurgeWatch website ([www.surgewatch.org](http://www.surgewatch.org)) lists 9 significant storm events recorded at the tide gauge at Millport, but records only began at this station in 1978.

A European Directory of Marine Environmental Data (EDMED) discovery metadata record has been created for this dataset and this record will be published to the MEDIN portal.

#### References

Haigh I.D.; Ozsoy O.; Wadey M.P.; Nicholls R.J.; Gallop S.L.; Wahl T.; Brown J. (2017). An improved database of coastal flooding in the United Kingdom from 1915 to 2016. British Oceanographic Data Centre - Natural Environment Research Council, UK. doi:10/bzjx.

Zong, Y. and Tooley, M.J. (2003). A historical record of coastal floods in Britain: frequencies and associated storm tracks. *Natural hazards*. 29: 13. doi:10.1023/A:1022942801531.