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Using citizen science to digitise 3 million hand-written tide-gauge data entries

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How can you get sea-level data faster than one day at a time? Get it from the past!

The port of Liverpool is one of the world's longest sea-level records, but for the 1800s the only digital record is hand-calculated monthly mean data, which have many gaps. Hand-written ledgers contain high frequency (15 minute) records from 1853 to 1903, both at Liverpool and neighbouring Hilbre Island. In 2021, we coordinated over 3600 volunteers through the Zooniverse website to transcribe this data. At the time of writing this abstract, the transcription is nearing completion. From the newly digitised data we can examine whether tides in the Mersey have changed and reassess the frequency of rare storm surge events. We now understand the reason for the gaps in the Liverpool monthly mean sea-level, which are due to a dock fire and an intermittent siltation problem at low water, and may be able to use the Hilbre data to help fill them.

We report on the feasibility of this process for other transcription projects, the unusual quality control requirements for volunteer transcription, and present the newly restored data with 19th Century tides, storm surges and sea-level.