



Report on Data Rescue to the 14th meeting of the GLOSS Group of Experts

Action items from GEXIII

Action Item: Pursue the contacts made for the automated digitisation report, including further contact with seismologists, regarding automated digitisation and quality control of data. (Elizabeth Bradshaw).

- Svetlana Jevrejeva (Permanent Service for Mean Sea Level - PSMSL) met with Stefan Talke (Portland State University) at AGU December 2014 to discuss sea level data archaeology. This was followed by Elizabeth Bradshaw (British Oceanographic Data Centre - BODC) and Stefan Talke discussing data rescue at the Workshop on Global and Regional Sea Level Variability and Change, Palma de Mallorca, Spain (June 2015).

Action Item: Countries to let GLOSS know if they have developed their own software to digitise mareograms and also if it can be made available on the GLOSS website for others to use. (Elizabeth Bradshaw in collaboration with GLOSS Technical Secretary).

- Elizabeth Bradshaw contacted Frédéric Pons (DREC/Service Risques inondations Littoraux et Hydrauliques) via email to discuss if the NUNIEAU software could be made to run via the GLOSS web page.

"For your ask about "a version of NUNIEAU to run on the GLOSS web page", I think it could be a good solution and we have to analyse two points:

- the first is the rights associated to the protection of NUNIEAU, I have to ask an answer of the jurists of my public body where I work, recently created and named Cerema (Centre for studies and expertise on Risks, Environment, Mobility and Urban and Country Planning - <http://www.cerema.fr/>)

- the second is just technical and easier, Python could be a solution but other solution can be studied. NUNIEAU works for mareograms but also limnigrams, pluviograms and I am interested for keep only one version. It could exist some solution to convert Matlab source in javascript... Moreover, I am not an informatician and codes of sources are not well documented. For information, my version of Matlab is Version 7.1.0.246 (R14) Service Pack 3 and we have matlab compiler. For the moment, I have the source in matlab format but also available in exe and ctf format, and perhaps in C/C++ if needed. I need also funds if I have to spend time to improve or change some sources."

Action Item: Investigate if the NUNIEAU mareogram scanning/digitization software can be translated into English (Elizabeth Bradshaw in collaboration with Guillaume Voineson and GLOSS Technical Secretary).

- Elizabeth Bradshaw contacted Frédéric Pons about translating the NUNIEAU software into English.

“About NUNIEAU, we have a version in French, English and Spanish. Documentation is mainly available in French and we create tutorial videos in French for the use of NUNIEAU with the project to rescue a lot of limnigrams and pluviograms in France by our French flood forecasting service (SCHAPI). I give you an example of video which can be send by e-mail.”

Action Item: Countries to let GLOSS know if they have historical ledgers of tide gauge data and if possible supply a list of the ledgers and example images and if they would be willing to collaborate in a citizen science project (like oldweather.org) to digitise these ledgers.

- Marta Marcos (University of the Balearic Islands) provided listings and example files of the tide gauge and meteo observations that exist at the IGN archives at Madrid.
- Elizabeth Bradshaw attended the workshop on Global and Regional Sea Level Variability and Change, in Mallorca, Spain (June 2015) and held discussions with a number of historical data archive operators in order to promote sea level data archaeology and international cooperation. Opportunities to work together in the future on creating automatic digitisation software, both for tide gauge charts and hand written ledgers were discussed. In particular we spoke to Dr Kathleen McInnes (CSIRO) to discuss the digitisation of Australian tide gauge records.

Activities undertaken

Since the GLOSSGEXIII meeting, we have been investigating digitising rescued images via a citizen science activity, such as the International Environmental Data Rescue Organization project Weather Wizards (where citizen scientists are helping to digitise rainfall charts), using the NUNIEAU software via the Global Sea Level Observing System (GLOSS) website or setting up a Zooniverse project, like the successful OldWeather.

Adam Leadbetter (previously at BODC) attended the 2013 International Data Rescue Award: Award Ceremony at the American Geophysical Union Fall Meeting 2013 in San Francisco.

BODC, through funding from the UK Department for Business, Innovation and Skills (BIS) 'Breakthrough Fund', have scanned tidal charts from Valletta, Malta (1871-1926). The records were uncovered as part of a previous GLOSS Data Archaeology activity carried out by Pat Caldwell (UHSLC).

In November 2014 Lesley Rickards (PSMSL, BODC) gave a presentation on “The future of sea level data archaeology from a GLOSS perspective” at the International Conference on Data Sharing and Integration for Global Sustainability (SciDataCon), in New Delhi, India.

In August 2014 Elizabeth Bradshaw gave a presentation via webex in the Data, data rescue & Citizen Science session of the 7th Atmospheric Circulation Reconstructions over the Earth (ACRE) workshop on “Historical Sea Level”. The 9th ACRE workshop will be in Ireland in 2016 and will have a special focus on data rescue and the GLOSS Group of Experts have been invited to send a representative to attend.

Svetlana Jevrejeva attended the Integrative Study of Sea Level Budget Workshop at the International Space Science Institute (ISSI) in Bern, Switzerland in February 2015 and included data archaeology in her presentation “Sea level budget of the 20th century”.

Andy Matthews (PSMSL) attended the Data Rescue Town Hall Meeting at EGU in April 2015 and presented a one slide presentation about recent data archaeology efforts.

Elizabeth Bradshaw attended the Royal Society Citizen Science meeting “People-powered science: citizen science in the 19th and 21st centuries”, in May 2015, to discuss sea level data archaeology with the Principal Investigator of the Zooniverse project. Zooniverse presented us with two possibilities of taking a sea level data rescue project forward. If we could obtain more images that were in need of digitisation, and the support of other organisations, we could possibly pursue creating a custom built project, but this would need financial backing. A second possibility would be to explore Zooniverse’s new Project Builder beta software which allows you to set up a “project homepage, upload your data, and create the tasks you would like people to perform”.

Lesley Rickards and Elizabeth Bradshaw joined the Research Data Alliance (RDA) Data Rescue Interest Group. We attended the RDA 6th Plenary meeting in September 2015, and Elizabeth Bradshaw gave a presentation in the special session hosted by the Data Rescue Interest Group. The session was titled “The Data Corridor: You, The Past, and The Future”. One of the main outcomes of the session was to decide on case studies for a joint RDA and Committee on Data for Science and Technology (CODATA) book on Data Rescue. “One of the key ingredients for the book...is a list of, or website for, stories that describe efforts, successes and maybe failures of data rescue projects.” We have asked that the GLOSS Group of Experts be considered for authors of one of the chapters.

Data rescue papers since GEXIII

Ferret, Y., Voineson, G., & Pouvreau, N. (2014, May). Historical sea level data rescue to assess long-term sea level evolution: Saint-Nazaire observatory (Loire estuary, France) since 1863. In *EGU General Assembly Conference Abstracts* (Vol. 16, p. 4977).

Bradshaw, E., Rickards, L., Holgate, S., & Aarup, T. (2014). The GLOSS Delayed Mode Data Centre and the GLOSS Implementation Plan 2012. *Proceedings of HP2/HP3, IAHS-IAPSO-IASPEI Assembly*, Gothenburg, Sweden, July 2013 (IAHS Publ. 365, 2014).

Wöppelmann, G., Marcos, M., Coulomb, A., Míguez, B. M., Bonnetain, P., Boucher, C., Gravelle, M., Simon, B., & Tiphaneau, P. (2014). Rescue of the historical sea level record of Marseille (France) from 1885 to 1988 and its extension back to 1849–1851. *Journal of Geodesy*, 88(9), 869-885.

Hogarth, P. (2014). Preliminary analysis of acceleration of sea level rise through the twentieth century using extended tide gauge data sets (August 2014). *Journal of Geophysical Research: Oceans*, 119(11), 7645-7659.

Bradshaw, E., Rickards, L., & Aarup, T. (2015). Sea level data archaeology and the Global Sea Level Observing System (GLOSS). *GeoResJ*, 6, 9-16.

Murdy, J., Orford, J., & Bell, J. (2015). Maintaining legacy data: Saving Belfast Harbour (UK) tide-gauge data (1901–2010). *GeoResJ*, 6, 65-73.

Le Cozannet, G., Raucoules, D., Wöppelmann, G., Garcin, M., Da Sylva, S., Meyssignac, B., Gravelle, M. & Lavigne, F. (2015). Vertical ground motion and historical sea-level records in Dakar (Senegal). *Environmental Research Letters*, 10(8), 084016.

Raicich, F. (2015). Long-term variability of storm surge frequency in the Venice Lagoon: an update thanks to 18th century sea level observations. *Natural Hazards and Earth System Science*, 15(3), 527-535.

Posters, reports and presentations

Rickards, L., Bradshaw, E., & Aarup, T. (2014, November 03). *The future of sea level data archaeology from a GLOSS perspective*. Presented at International Conference on Data Sharing and Integration for Global Sustainability (SciDataCon), New Delhi, India.

Jevrejeva, S., Bradshaw, E., Tamisiea, M. E., & Aarup, T. (2014, December). The Future of GLOSS Sea Level Data Archaeology. [Poster] In *AGU Fall Meeting Abstracts* (Vol. 1, p. 3656).

McGinty, Jo Craven. (2015, February 28). Why Sea-Level Data Don't Measure Up. *The Wall Street Journal*, pp. A2

Bradshaw, E. and McGarrigle, P. (2015, March). *The societal impact of sea level Data Archaeology*. Poster presented at the UK Sea Level Science Meeting, Liverpool, U.K.

Bradshaw, E. et al. (2015, April). *Sea Level Data Archaeology for the Global Sea Level Observing System (GLOSS)*. Poster presented at the European Geosciences Union General Assembly 2015, Vienna, Austria.

Bradshaw, E. et al. (2015, June). The future for global sea level data archaeology – A GLOSS perspective. Presented at the 26th General Assembly of the International Union of Geodesy and Geophysics, Prague, Czech Republic. Abstract retrieved from <https://www.czech-in.org/cm/IUGG/CM.NET.WebUI/CM.NET.WEBUI.scr/SCPRfunctiondetail.aspx?confID=05000000-0000-0000-0000-000000000053&sesID=05000000-0000-0000-0000-000000003342&absID=07000000-0000-0000-0000-000000022997>

Bradshaw, E. (2015, June). *Rescuing historic Maltese tide gauge data*. Poster presented at the Workshop on Global and Regional Sea Level Variability and Change, Palma de Mallorca, Spain.