ANALYSING SPATIOTEMPORAL CHANGES IN SEDIMENT CONTAMINATION

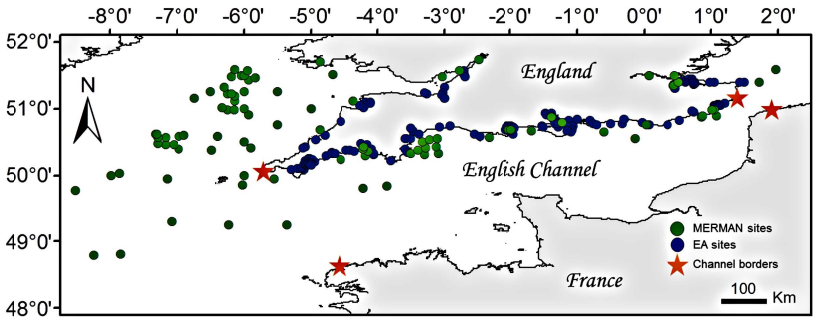
J. Richir*, J.M. Pini, S. White, G.J. Watson

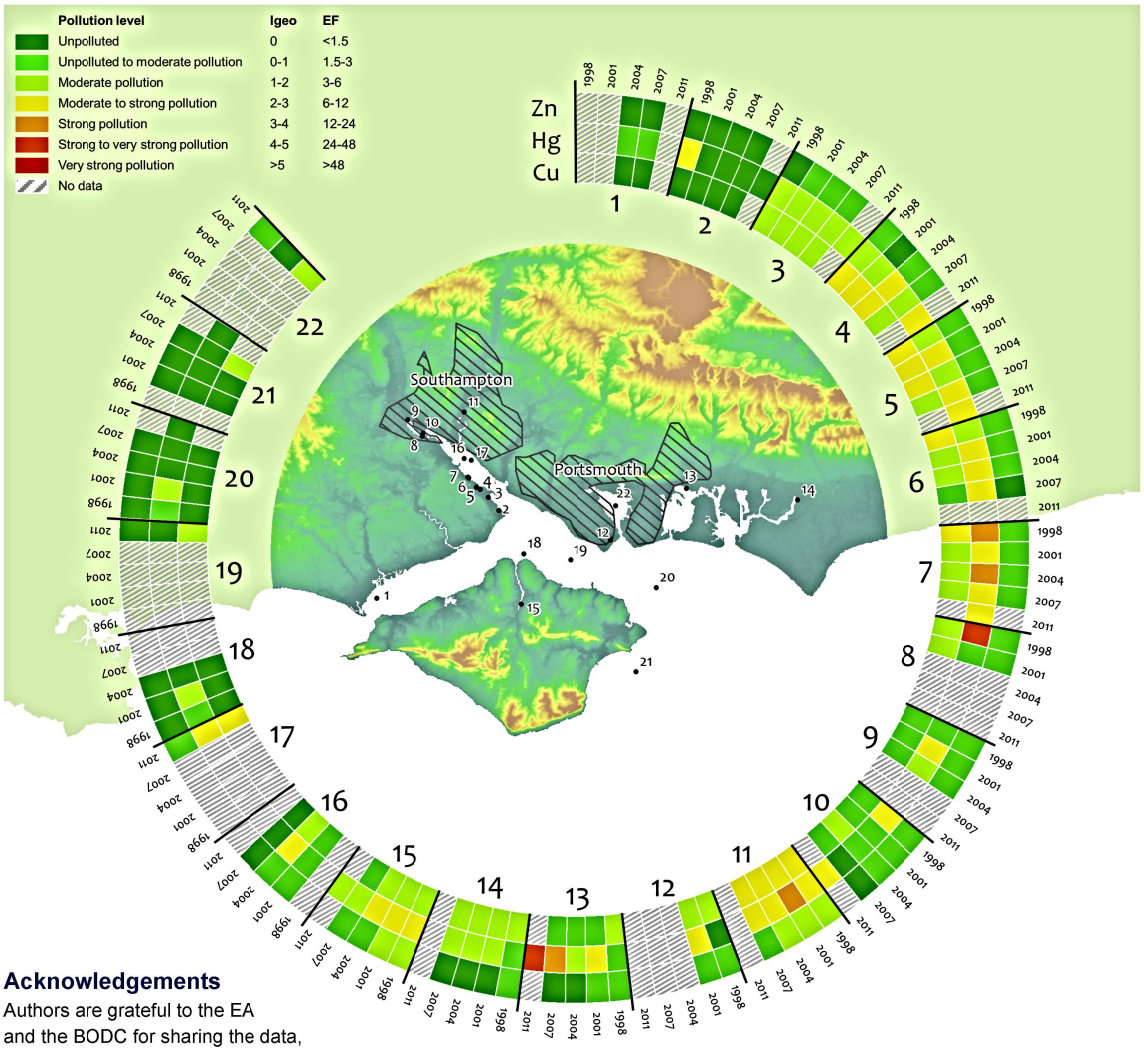
(* jonathan.richir@port.ac.uk)

Institute of Marine Sciences, School of Biological Sciences, University of Portsmouth, Ferry Road, Portsmouth, PO4 9LY, UK

Chronexpo

Sediment Trace Element Contamination - Among the variety of contaminants that threaten the marine environment, trace elements are of concern because of their toxicity, their ability to concentrate in biota and persistence in sediments. Large spatiotemporal surveys are thus performed in the UK to monitor their environmental occurrence. But the resulting databases generated remain often underexploited. This research work therefore aims to investigate the long term changes in trace element contamination in the sediments along the coasts of South England, using the 2 main marine environmental UK databases of the Environment Agency and the MERMAN project (right map).





Pollution Scale - The 7-level Geoaccumulation Index (Igeo) pollution scale classifies the sediments from unpolluted to very strongly polluted (Müller, 1979 - Umschau). Igeo scale levels correspond to given enrichment factor (EF) values. The EF of a trace element is the ratio between its concentration in the sediments and its natural background concentration (Tomlinson et al., 1980 - Helgolander Meeresun). These two indices therefore give qualitative and quantitative information on the natural and human-induced contributions to the observed sediment contamination.

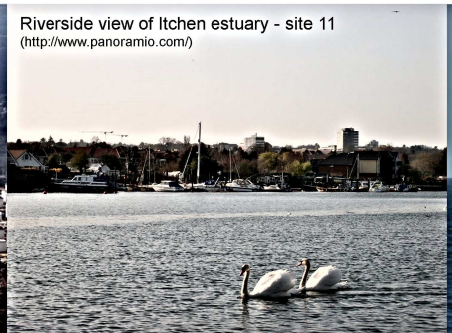
The Solent as a Case Study - The left map shows the changes in the levels of Zn, Hg and Cu contamination in the < 63 µm sediments in the Solent. The contamination displays an important spatial variability, presumably linked to the distribution of anthropogenic pollution sources (pictures below). The contamination generally decreases during the survey time interval, although this trend cannot be generalized to all the sites.

Acknowledgements

Authors are grateful to the EA and the BODC for sharing the data, and to Lucy Morris and Laurence Couldrick (Westcountry Rivers Trust) for performing the pollution map. This work is part of the Channel Catchments Cluster (3C) programme, funded by the European Regional Development Fund.

Perspectives - Mining of existing environmental databases is a relevant (and cost effective) way to monitor the spatiotemporal evolution of the pollution, and to transfer relevant information to managers and policymakers on the efficiency of the implementation of European environmental directives.


Aerial view of Esso refinery - site 4
(http://www.telegraph.co.uk/; Photo: Solent News)


Riverside view of Itchen estuary - site 11
(http://www.panoramio.com/)


Open sea view of the Solent's eastern end - site 20
(http://www.panoramio.com/)