

Future Deltas:

Can paleoenvironmental reconstructions help set targets for nutrient management and legislation in deltas under anthropogenic pressure?

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Context

Future Deltas, a focus area of Utrecht University, arises from the need to understand drivers, predict impacts and optimize solutions in delta areas under extensive anthropogenic pressure. In this context, we test the potential of paleoenvironmental records to help set targets for water quality standards and nutrient management as required by the European Marine Strategy Framework Directive. Targets must be achieved within 2020. Environmental monitoring records are generally too short for capturing the baseline and full "natural variability" of an environment.

Multidisciplinary approach: Cross-calibrating various datasets for policy purposes. The Po-delta was selected as a case study.



Po-catchment (Northern Italy)

- Area ~71.000 km²
- Human population ~16.000.000
- Intensive agricultural use 45% **Northern Adriatic Sea**
- Shallow sea



Results (Figure 1)

- Increase in simulated TP and TN at ca. 1960 and increase in monitored TN ca. 1970

- General increase of eutrophication indicators ca. 1880
- Decrease in eutrophication indicators at ca. 1980 simultaneously with a decrease in simulated TN and TP
- The benthic foraminiferal signal is similar to the signal of the planktonic algae, indicating that the entire water column was affected
- Slight general decrease of conifers at ca. 1900

Conclusion

Similar trend in various indicators of eutrophication highlights the applicability of the sedimentary record for management and legislation purposes

References: Barmawidjaja, D. M. et al. (1995) Marine Geology, 122(4), 367-384. | Marchetti, R. et al. (1989) Marine Pollution Bulletin, 20(4), 168-172. | Puškarić, S. et al. (1990) Estuarine, Coastal and Shelf Science, 31(2), 177-187. | Sangiorgi, F., & Donders, T. H. (2004) Estuarine, Coastal and Shelf Science, 60(1), 69-79. | IMAGE: http://themasites.pbl.nl/models/image/index.php/Main_Page | HYDE: http://themasites.pbl.nl/tridion/en/themasites/hyde/