

Coastal Data Portals to Support Marine Science and Management – the coastMap Approach

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Managing ecosystems in the marine environment requires cooperation between the spheres of policy and science, and between the differing perspectives from the various scientific disciplines. Modern IT solutions allow for the combination of in situ measurements, laboratory-analyzed samples, interpolated point data and model outcomes. To support integrated advice for management on a regional sea basin scale, this union is essential.

The coastMap portal (www.coastmap.org) addresses a large variety of topics with a particular focus on their effect on the North Sea. Within the data portal, the combination of analyses and model data relevant to the conditions of the seafloor, the overlying water column and the atmosphere is used to explore issues, such as human impacts on coastal zones from shipping emissions, as well as habitat changes from wind farm constructions and marine pollutants. In 'Spotlights', these important research topics are clearly explained for the benefit of the interested public and policy makers using edited science writings that are supported by interactive maps, videos and links to further information.

Data products freely available to the public on the portal include campaign data, preprocessed maps and large-scale oceanographic and atmospheric models. coastMap offers applications to visualise and download field and laboratory work and to connect the information with interactive maps. Using filter functions, the user can search a relational campaign database for both general and specific topics. The broad data pertaining to a marine field of interest, for example, or the specific data pertaining to a selected ship campaign or of one of 1000 measured parameters can all be explored. The workflow for scientists who want to submit data has been simplified as to encourage high submission rates and quick response times. For example, during ship campaigns, researchers can run an application that collects the metadata for their samples on waterproof tablets.

Oftentimes, model output for the coastal regions is in the range of terabytes and is stored in a way that only experts can retrieve and further use the results. The Model Analysis Tool differs from this and uses a "Big Data" approach, giving non-modelling experts access to detailed and high-resolution oceanographic model data. An interface allows statistically examining and on the fly downloading subsets of model-derived data. Thus, the tool bridges the gap between modelling scientists and experts of other disciplines, who are required to use model results, but who, in general, lack the knowledge of how best to approach them.

Data stored and refined in coastMap may provide the evidence based knowledge for the creation of new models and may help scientists and laymen to understand ecosystem connectivity. Such tools, on a regional scale, support policymakers in their decisions toward fashioning a sustainable development of the coastal resources, and allows scientists access to existing regional data to develop and test new theories.