

The coastMap Approach for Visualization and Dissemination of Marine Geodata

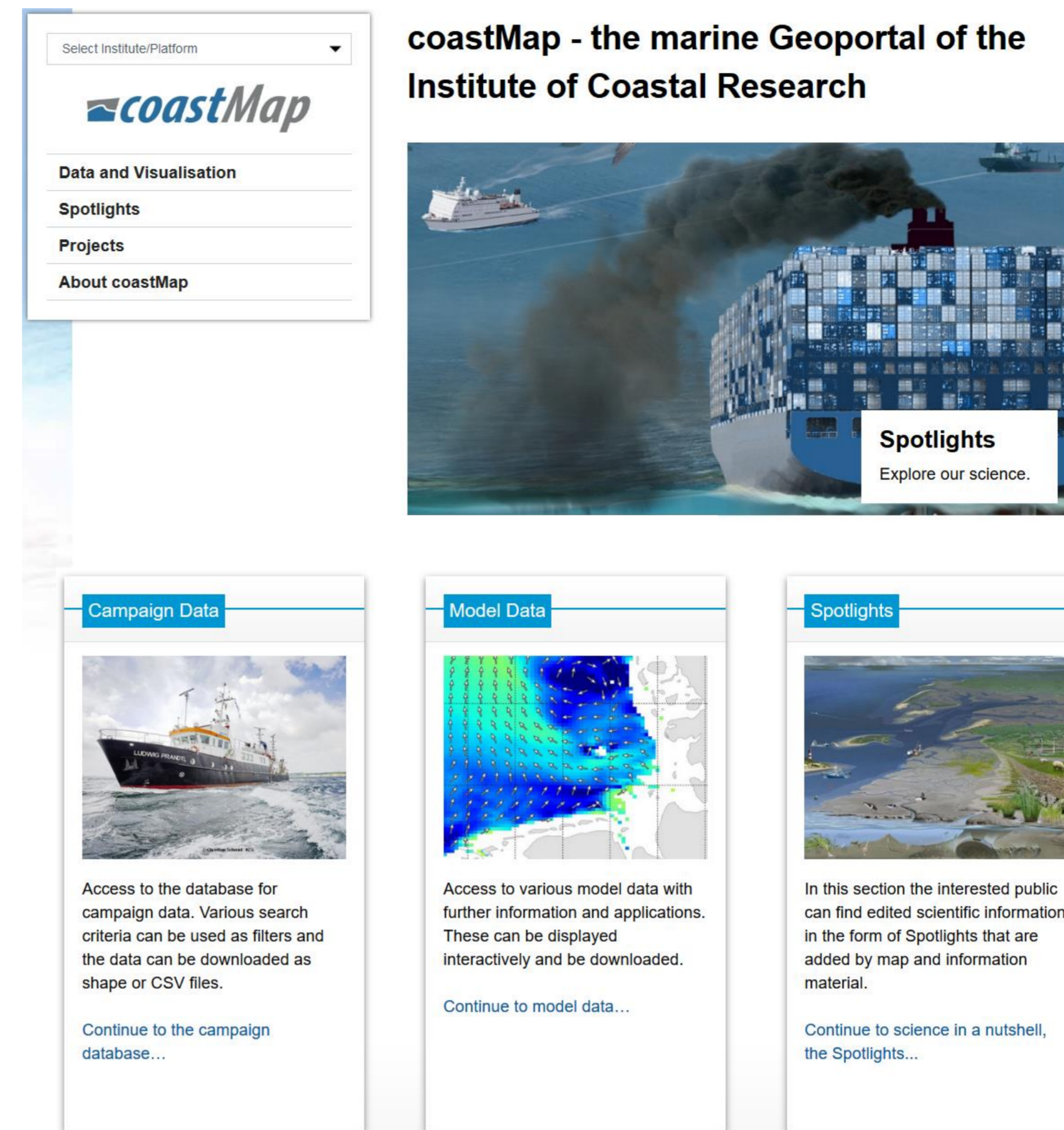
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coastMap

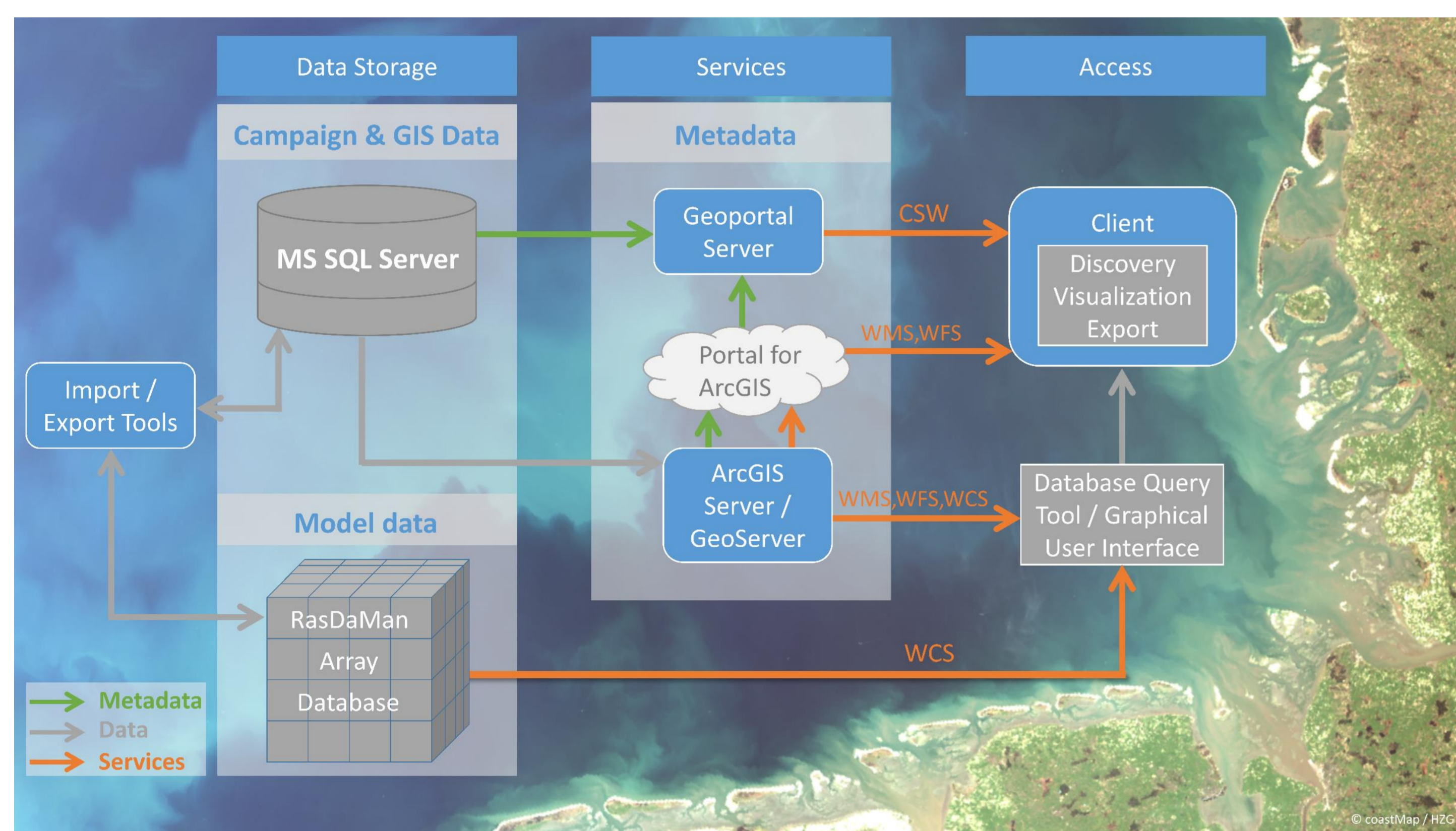
The marine Geoportal

coastMap is the marine Geoportal of the Institute of Coastal Research at the Helmholtz-Zentrum Geesthacht. It combines analyses and model data on seafloor conditions and those in the overlying water column with a focus on the North Sea and the atmosphere. The motivation behind the development of the coastMap website (www.coastmap.org) is to provide scientific data and information gained from the data to scientists, policy makers and the interested public.

A variety of tools have been developed to facilitate an optimal data- and workflow. These include advanced data storage for campaign and model data and generic analysis tools for Big Data from numerical models. Spotlights illustrate the work of scientists in texts intermingled with interactive maps and data exploration tools. Thematic maps also provide processed information on specific topics.



coastMap webpage: Image of the start page www.coastmap.org. This website provides direct links to the campaign database, the web-based model analysis tool and spotlights of coastal research topics.



Technical infrastructure: Overview of technical data storage and access, including data and metadata flows and web services.

Data Storage, Retrieval and Aggregation

Web Tools and Technical Infrastructure

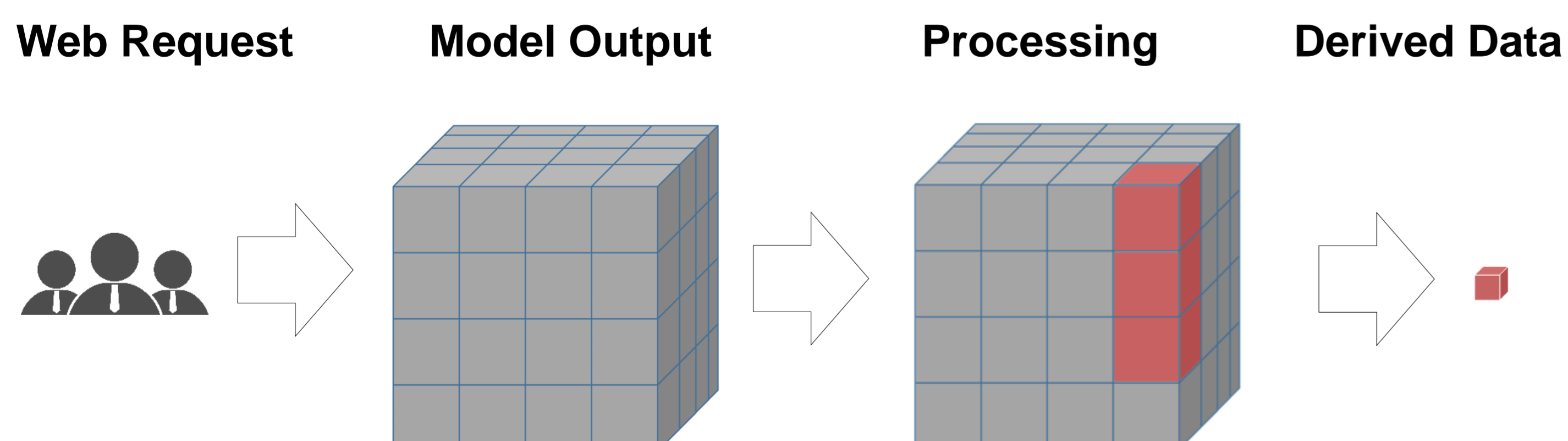
Data storage depends on the data type. Model data, often in the size of several terabyte, is stored in an innovative Array Data Base Management System. The Array Data Base is accessed through Web Coverage Processing Services.

The point data collection during sampling campaigns is guaranteed with the coastMap campaign planning app. Because of the highly complex nature of the data, extensive metadata is required in its description. Both data and metadata are stored in the relational database MS SQL Server. This allows the online campaign database tool to query, download and visualize the data and therefore facilitating a useful access to the data. The data for thematic maps are stored in the Portal for ArcGIS cloud.

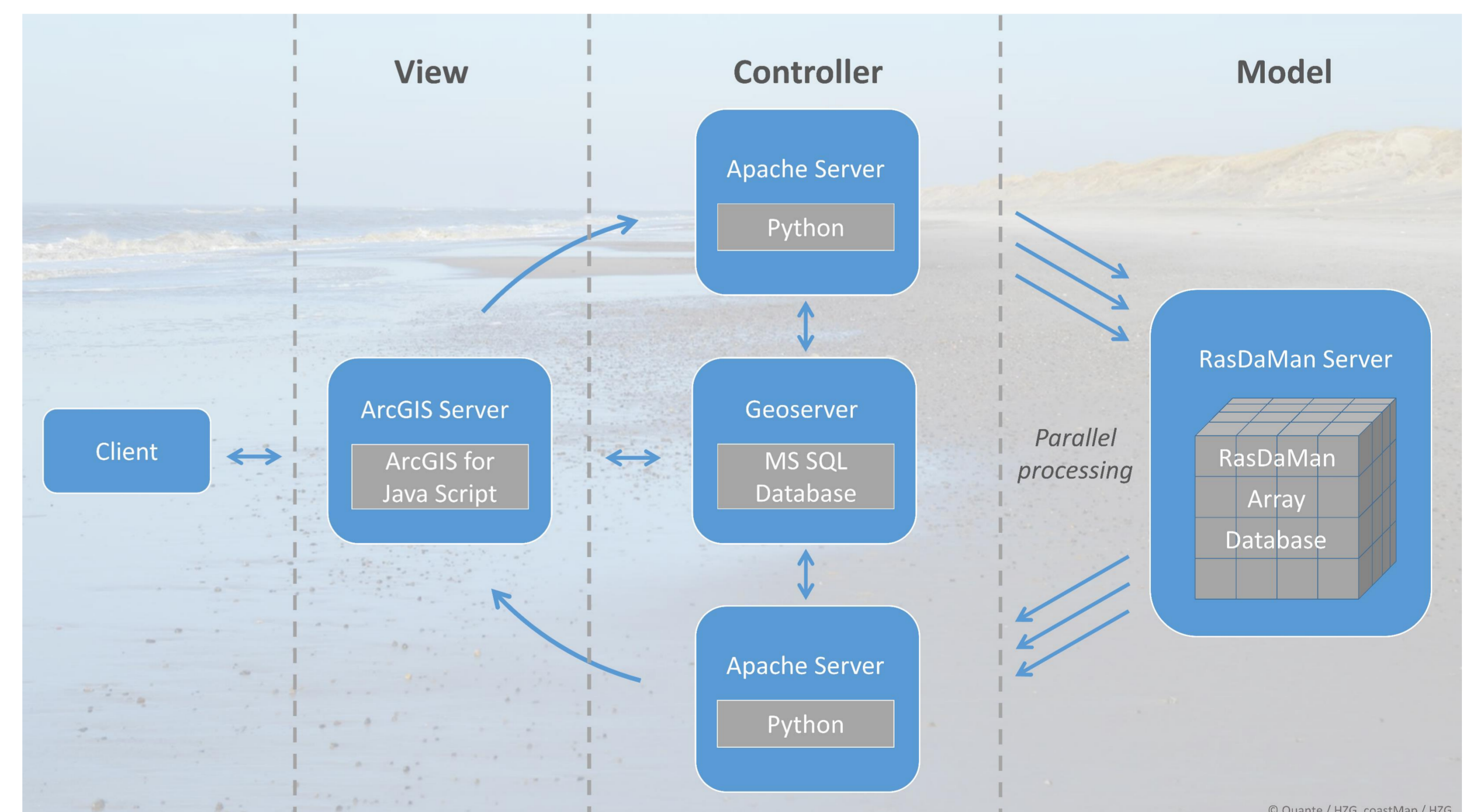
Technical Understanding of the Model Analysis Tool

OGC Standards and Developing Paradigm

The coastMap Model Analysis Tool allows data analysis, management, discovery and visualization of large quantities of marine and atmospheric model data. The focus of the tool is set on creating timely responses for any user defined spatial and temporal subsetting of the data. The front end is set up with an ArcGIS Server, which provides the user with a relatively simple graphical user interface. Web Coverage Processing Services (WCPS) allow a fast access and processing of model data to derive a much smaller dataset.



Web Coverage Processing Service (WCPS): A Standard for the extraction and the processing of multi-dimensional coverages



Architectural Pattern: The model-view-controller (MVC) paradigm of the coastMap Model Analysis Tool

The architecture of the Model Analysis Tool follows the model-view-controller (MVC) software development paradigm. The high-resolution model data is stored in the RasDaMan multidimensional Array Database on the RasDaMan Big Data Server. For optimal performance, the user requests for analysis and data access are split into parallel processes by Python scripts. These processes formulate rasql queries, to process and extract model data. Further Python scripts recombine the derived model data and reformat it, so that the user receives the output in the desired format, such as netCDF files and file geodatabases. The user interface is configured to be derived from the model metadata that is stored in the MS SQL database and delivered by the Geoserver.