A broad-scale habitat map is, in its basic form, a combination of two key categorial layers: seabed substrate types (4) and biological zones (5). In the Black Sea, an additional categorial layer also comes into play: the oxygen regimes (6).

The seabed substrate layer is provided by EMODnet Geology. The biological zone and oxygen regime layers are produced by overlaying oceanography data layers that are compiled from fundamental physical parameters in the basin (i.e. bathymetry, light, temperature, and density). The entire workflow is carried out with the use of Geographical Information System (GIS) techniques.

Generating oceanography data layers

The bathymetry (1) is directly provided by EMODnet Bathymetry. All other oceanography layers (seabed light energy, temperature, and density) are produced within the framework of EMODnet Seabed Habitats by compiling datasets provided by various European or local oceanography data archives.

The seabed light energy (3) is calculated by intersecting the bathymetry with bespoke modelled layers of surface light energy and light attenuation coefficient, the latter being used as a proxy to turbidity (5). The seabed temperature (2) and density layers are obtained by averaging over a given time period archived time series from MyOcean.

Classifying the oceanography layers into the categorial layers

The thresholds previously identified are used for the classification of the oceanography layers into the categorial layers. For the classification into biological zones (5), light is used for separating between infralittoral and shallow circalittoral, and temperature is used for separating between shallow circalittoral and deep circalittoral. Density is used for the classification into oxygen regimes (6).

Methods for creating a broad-scale map of seabed habitats is the production of a broad-scale map of seabed habitats for all the European basins. A threshold is the value of a given physical variable (here temperature) above which a category (here shallow circalittoral) will be classified as present and below which the adjacent category (here deep circalittoral) will be classified as present. Threshold values are defined before GIS processing takes place. For identification of the optimal threshold, a statistical analysis is undertaken on observational sample points of biological communities that are indicators of the various categories. Those sample points are collated from existing datasets. As an example here, the statistical analysis indicates that the threshold that best separates between occurrences of shallow circalittoral and deep circalittoral is a temperature of 9.7°C.

The habitat map is the result of the spatial combination of seabed substrate, biological zone and oxygen regime layers. For example, where the seabed substrate is mud, the biological zone is deep circalittoral and the oxygen regime is anoxic, the resulting habitat is Deep circalittoral anoxic muds.