HABITAT SUITABILITY MODELLING OF THE NORTH SEA MACROBENTHOS: DATA EXPLORATION

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In the context of sustainable management of the North Sea it is necessary to have detailed knowledge of the ecosystem status. This study aims at developing distribution maps of the North Sea macrobenthos (i.e. bottom dwelling animals >1mm) through habitat suitability modelling. Macrobenthos was selected because of (1) its key function as a food resource for many fish species, (2) the ecological knowledge already available, and (3) the well known link between the distribution of macrobenthos and the physical habitat, indispensable for habitat suitability models. Based on the suitability of the physical habitat, habitat suitability models can predict the spatial distribution of a species. To develop the models, three datasets with varying scale and resolution are available. These datasets contain information on the macrobenthos and the physical environment (North Sea, Belgian part of the North Sea and Belgian Western Coastal Banks).

As a first step in the modelling approach, classification trees (CTs) were constructed for a set of key species. This data mining technique uses a tree to present a habitat classification scheme based on a set of rules. It can help identify the important environmental variables (and their critical values) for a species. By answering questions on the physical habitat (e.g. depth > 10 m or depth < 10 m), the user is directed through the hierarchical tree down to the level of the actual prediction of the species occurrence. Opposed to traditional classification techniques (e.g. discriminant functions), CTs have a hierarchical structure and require fewer assumptions to be fulfilled. CTs are visually attractive and allow for an easy interpretation of the patterns in the data, also by non-experts (e.g. decision makers).

In a later stage of the research, regression and neural network models will be developed. All modelling techniques will be compared and a strategy will be proposed for intertuning data collection, modelling and management. This will particularly enhance and stimulate mapping exercises of the North Sea ecosystem, necessary to protect marine resources in a sustainable manner in the future.