Empirical modelling for mapping of benthic habitats in the Baltic Sea: what can be predicted and which are the efficient predictors?

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Abstract. PREHAB is a cross-disciplinary research program aiming at integrating ecological mapping and socio-economic valuation to develop a framework for integrated regional planning and future ecosystem-based management of the Baltic coastal environment. One central theme of the project is that comprehensive maps of biological properties of the benthic habitats are invaluable for rational planning and management of coastal areas. Because most biological variables vary at small spatial scales and are measured using scattered samples, interpolation using empirical models is necessary for comprehensive mapping. Therefore, a primary objective of the program is to evaluate (1) which biological variables can be predicted with sufficient accuracy, and (2) which physical or other variables can be used to predict and map benthic habitats. These questions are addressed using a variety of statistical techniques (GAM, randomForest, MARS, MAXENT and Kriging) and in a range of benthic environments in the Baltic. Initial analyses show that empirical models can be used to successfully map prevalence as well as cover of different types of vegetation in coastal areas. The explanatory power of predictor variables differed among biological response variables, areas and statistical methods, but in general those derived from bathymetry, substrate, exposure and location proved to be important. These results indicate that representative sampling of benthic habitats, combined with predictive modelling is a cost-efficient and feasible alternative for stakeholders in need of maps for decision-making of the Baltic region.