

## Mapping bioregions on the west coast of South Africa using epifaunal trawl survey data

Ecosystem classification maps are important for understanding and managing the marine environment. In South Africa, the classification and mapping of marine ecosystems follows an expert-driven data-informed approach to classification, with many ecosystems still requiring in-situ validation from biological data. While expert input remains valuable, statistical approaches to classification have the additional benefit of being able to predict bioregions in biologically poorly sampled regions by relating them to more expansively collected and readily available environmental variables. This study aimed to classify and predict epifaunal bioregions for the west coast continental shelf of South Africa (Southern Benguela Shelf Ecoregion) using a statistical approach to classification. Previously collected data from three years (2017, 2019-2020) of DFFE demersal fisheries research trawl surveys were used in this study, owing to their wide spatial and good temporal coverage. Biological data consisted of epifaunal (benthic invertebrate) abundance and environmental data consisted of covariates (temperature, salinity, dissolved oxygen and pressure) collected from the trawl net-mounted CTD, in addition to bathymetry and sediment data. Mixture-of-experts models, Regions of Common Profile (RCPs, Foster et al. 2013), were used to classify and predict the bioregions (regions with homogenous and distinct species profiles) using the ecomix R Package. An advantage of using a statistical approach to classification which performs both classification and modelling stages simultaneously is that uncertainty is generated throughout, allowing mapped outputs to be interpreted more easily and meaningfully. Applying a statistical approach to the classification of biological regions has the potential to contribute towards improving the automation of classification and mapping in the future.