

Jodie Smith

Geoscience Australia, Australia

Seabed mapping in shallow, coastal waters to assess status and detect change in benthic communities

Dr Jodie Smith, Dr Alix Post, Dr Scott Nichol

Geoscience Australia, Canberra, Australia

Detecting change in benthic communities requires baseline information to assess current status, understand natural variability and identify trends in ecosystem condition. In order to fully understand the spatial relationships between the occurrence of benthic organisms and their preferred habitats, information should be collected about both biological distributions and physical habitat characteristics. However, to fully characterise the biological, physical and chemical aspects of the marine environment, detailed mapping and sampling is required, but this is generally expensive and time consuming. Hence a surrogacy approach is typically used, whereby the strong association between benthic communities and seafloor characteristics allows physical parameters to be used to extend our knowledge of the nature of benthic habitats into areas with little or no biological data.

Here we present a range of different approaches to seabed mapping in the shallow, coastal waters of the Vestfold Hills in East Antarctica as a means of assessing the current status and detecting change in benthic communities. Integrated acoustic, optical and sampling techniques demonstrate that the distribution and diversity of benthic communities is shaped by physical characteristics of the seafloor environment, with these datasets applied here to create a detailed benthic habitat map for the Vestfold Hills nearshore area. Across the broader region, geomorphic features identify potential habitats. We also identify new techniques which offer promise for assessing status and detecting change in benthic communities. These include utilising satellite imagery for detailed seabed mapping of coastal zones, deriving acoustic backscatter information to map macroalgae distribution, and deployments of automated underwater vehicles (AUV's) with multiple sensors to conduct repeat benthic surveys in targeted areas.