The investigation of marine biodiversity surrogates for classification and mapping of outer shelf ecosystems in KwaZulu-Natal province

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Ecosystem classification and mapping is foundational for effective ecosystem based marine spatial planning and to support integrated ocean management. This study advances classification and mapping of outer shelf habitats for improved biodiversity assessment and management in KwaZulu-Natal on the east coast of South Africa. A total of 17 sites, including rocky, mixed substrate, sand and gravel habitats, in the 48 to 85m depth range were examined using epifauna data quantified from seabed imagery collected by Remotely Operated Vehicle. Multivariate analyses revealed that epifauna at unconsolidated sites were significantly different to that occurring on either mixed or reef substrates and epifauna occurring on mixed substrates were also significantly different to those occurring on reef. Epifauna at mixed sites were more similar to those at reef sites than unconsolidated sediment sites; however species such as Homophyton verrucosum were more abundant in mixed habitats than on reefs. The significantly different epifaunal communities detected did not align with the existing national or provincial habitat classifications. To further investigate the species distribution patterns of KwaZulu-Natal deep reefs, we analysed data from 17 reef stations between Tongaat and Scottburgh. Multivariate analyses revealed a clear biogeographic break off Durban with reef assemblages north and south of this break differing by approximately 65%. Reefs located north of Durban had higher abundances of octocorals and porifera morpho-species while southern reefs hosted more porifera morpho-species. Porifera species Ciocalypta sp. was among the top species that characterise the different regions being more abundant in the southern region than in the northern region. The top three potential drivers of these epifaunal distribution patterns were identified as longitude, distance from shelf edge and sea surface temperature. This study provides empirical information to support refinement of existing habitat classifications of the study region; part of the study area is now incorporated in a proposed MPA.