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A biologically-validated, global-scale, benthic habitat map for use in area based management of Biodiversity Beyond National Jurisdiction

Kerry Howell^{1,2}, Amelia Bridges², and Kirsty McQuaid³

¹Plymouth Marine Laboratory, Marine Ecology and Biodiversity, (kho@pml.ac.uk)

²School of Biological and Marine Sciences, University of Plymouth, Plymouth (amelia.bridges@plymouth.ac.uk)

³South African National Biodiversity Institute, Cape Town, South Africa (K.McQuaid@sanbi.org.za)

The global ocean is critical to life on our planet and is increasingly the subject of human use. Society depends on services provided by ocean ecosystems in which ocean life plays an intrinsic part. Predicting how ocean life will respond to pressures, because of both increasing human use and impacts of climate change, is the central basis for science informed decision-making and sustainable use. At its heart this requires a comprehensive spatial understanding of the distribution of species and habitats, i.e. maps. While there have been notable efforts to develop habitat maps for the world ocean, few have been developed specifically to represent variation in biological diversity. We have developed and validated a global benthic biological habitat map for use in spatial management of the ocean. Environmental data layers (or proxies thereof) for the five most well reported drivers of marine species distributions (biogeography, water mass structure, substrate, primary production), are used in a multi-step classification process to develop two new global scale seafloor biological habitat maps. These new maps, together with existing published global and Atlantic scale habitat classifications are validated using a global benthic dataset, derived from OBIS, in a replicated Permanova analysis at the genus level. Results suggest both new models are statistically significantly better (explain more variance) than previously published benthic habitat maps. We demonstrate how these maps may be used as a decision-support tool for area-based management of the global ocean and particularly areas beyond national jurisdiction within the context of the new Biodiversity Beyond National Jurisdiction Agreement.