## A.I-based characterization of seafloor habitats and megafaunal species composition: Examples using optical images from the Pacific and tropical Northeast Atlantic

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The characterisation of seafloor habitats and their resident megafaunal communities contributes to our collective understanding of the global ocean health and resilience. Whereas direct sampling e.g using box corers provides physical samples that can be archived and analysed later in the lab, recent advances in optical imaging platforms have enabled the generation of high-resolution images and at high temporal frequency. This makes image-based analysis the prefered approach for exploring and mapping seabed ecosystems at mediumto-large spatial scales. However, manual inspection of these huge volumes of acquired images is a time consuming endeavor that poses a real bottleneck when extracting both qualitative and quantitative actionable insights about marine biodiversity. Here, we automate this process using our A.I-based seafloor classification (AI-SCW) and megafaunal species composition (FaunD-Fast) workflows. We present findings following our application of these workflows to specific case studies in the Pacific and tropical Northeast Atlantic. Based on this, we demonstrate that the integration of A.I and marine sciences significantly expedites the generation of baseline information for objective monitoring of remote benthic ecosystems.

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