Dataset metadata & annotation protocol

BIOMAGLO cruise: https://doi.org/10.17600/17004000
Dive 05: https://campagnes.flotteoceanographique.fr/dive?id=2436

Study Areas and Field Collection

Mayotte: Volcanic Island Outer Slopes Dominated by Hard Bottoms

Images were acquired during the BioMaGlo expedition (Corbari et al., 2017), on board the R/V *Antea* on 21 January 2017 in the Mayotte-Gloriosos area. Three slope orientations were explored by camera: (1) the northwestern slopes characterized by a plateau at 600 m depth and covering 100 km^2 then surrounded by deeper crater-like or volcanoes network features; (2) the southwestern slopes with a deeper and larger plateau at 750 m covering 250 km^2 and (3) the eastern slopes, extending continuously down to 1,000 m depth and characterized by shallower volcanic cones (Audru et al., 2006).

Dive05 presents a larger and continuous bathymetric gradient from 500 m down to 1,130 m depth, ending with a passage on a volcanic cone. The area is mainly composed of carbonate and volcanic hard bottoms and is characterized by a very heterogeneous seafloor (gravel, pebbles, cobbles, boulders, blocks, and rugged areas, etc.).

Towed Camera

Camera transects were carried out with a towed camera (SCAMPI, French Oceanographic Fleet), at 2.5–3 m above seafloor at 0.5 m/s. Images were acquired at 10 s intervals (PNG) and 30 s intervals (Mayotte) with an HD Camera (NIXON D700, focal length 18 mm, resolution 4,256 × 2,832 pixels) and geo-referenced using the ship positioning system processed with Adelie tools (French Oceanographic Fleet) developed at IFREMER and implemented using ArcGiS software V10.3.

Taxonomic Processing

Identifications From Images

Images were analyzed and annotated (i.e., organism delineation in images and labeling of taxonomic ranks) using the web platform BIIGLE 2.0 (Benthic Image Indexing and Graphical Labelling Environment) (Langenkämper et al., 2017). BIIGLE 2.0 was chosen because it provides effective methods (1) allowing collaborative and interactive work with taxonomists who can actively contribute to the identification of organisms from images and (2) allowing easy comparisons and revisions of annotations with the *LARGO* tool. The platform allows the export of observation records of each faunal annotation (in csv file format). We then summed up these observations to obtain an abundance matrix by georeferenced image.

Megafaunal identification from images consisted of three main processes that involve different levels of expertise: non-expert annotation, objective identification and contextual identification, the last two performed in collaboration with taxonomists. Finally, identification keys adapted to images were produced for Decapoda, Asteroidea and Echinoidea.

Reference paper: Hanafi-Portier et al. 2021. 10.3389/fmars.2021.749078

From annotations to densities in geo-referenced sampling units

Raw annotations from images are exported within the Biigle software, processed under R environment to obtain a matrix of the number of individuals per taxa per image. This matrix is joined to the towed camera image positioning to obtain a matrix of abundances and densities per taxa per sampling unit of standardized surface (~200m²), which are georeferenced (Adelie software). The detail of this workflow is described in the “work flow description” document.