

A typology for reef passages

Annette Breckwoldt^{1*}, Alexandra Nozik¹, Nils Moosdorf^{1, 2}, Jan Bierwirth³, Elodie Fache⁴, Sebastian Ferse^{1,5}, Amanda Ford⁶, Sangeeta Mangubhai⁷, Dominique Pelletier⁸, Susanna Piovano⁶

1 Leibniz Centre for Tropical Marine Research (ZMT), Bremen, Fahrenheitstrasse 6, 28279 Bremen, Germany, annette.breckwoldt@leibniz-zmt.de

2 Institute of Geosciences, Kiel University (CAU), Kiel, Germany

3 MSc programme 'Marine Biological Resources' (IMBRSea), Ghent University, Ghent, Belgium

4 SENS, IRD, CIRAD, Univ Paul Valéry Montpellier 3, Univ Montpellier, Montpellier, France

5 Department of Marine Ecology, Faculty of Biology and Chemistry, University of Bremen, Bremen, Germany

6 School of Agriculture, Geography, Environment, Ocean and Natural Sciences (SAGEONS), The University of the South Pacific, Laucala Bay Road, Suva, Fiji

7 Talanoa Consulting, Suva, Fiji

8 Unité Halieutique Grand Ouest, Département Ressources Biologiques et Environnement, Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER), Nantes, France

Supplementary Material

Figure S1: Steps taken in the spatial analysis for the GIS-based visual interpretations of the satellite imagery.

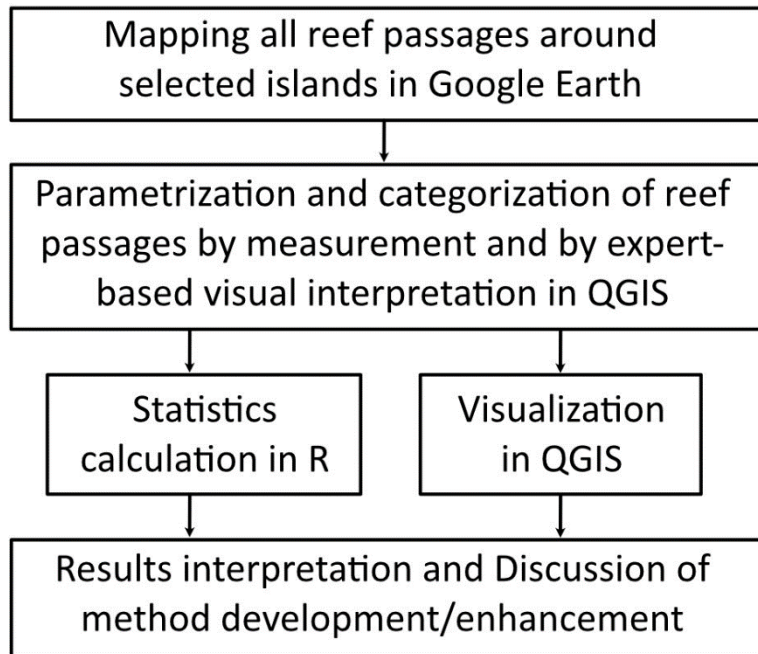


Table S1: Data used and respective sources.

Data	Application	Source	Last checked
Satellite imagery	Visual interpretation for locating the reef passages and parametrization	Google Earth, Map data: Google, © 2021 SIO / NOAA / U.S. Navy / NGA / GEBCO	18 January 2021 in Google Earth Pro
Island outlines	Visualization	Database of Global Administrative Areas (https://gadm.org/data.html) Shapefiles for: <ul style="list-style-type: none"> • Fiji • New Caledonia • Vanuatu 	5 January 2021 Download from GADM
Basemap OSM Standard	Visualization	OpenStreetMap and OpenStreetMap Foundation (Basemap in QGIS)	27 July 2021 in QGIS
Basemap ESRI Satellite	Visualization	ArcGIS/Worldimagery (available in QGIS through QuickMapServices plugin)	27 July 2021 in QGIS

App. Sources for Imagery:

Google Earth Pro 7.3.3.7786. (January 18, 2021) New Caledonia. 20°00'02.06"S 163°54'36.05" E. Eye alt 139.4 mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. Landsat / Copernicus 2021. <https://earth.google.com/web/> [December 14, 2015]

Google Earth Pro 7.3.3.7786. (January 18, 2021) New Caledonia. 21°27'26.10"S 163°43'08.75" E. Eye alt 139.4 mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. Landsat / Copernicus 2021 Data LDEO-Colombia, NSF, NOAA. <https://earth.google.com/web/> [December 14, 2015]

Google Earth Pro 7.3.3.7786. (January 18, 2021) New Caledonia. 22°30'33.64"S 166°56'55.13" E. Eye alt 84.4 mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. Landsat / Copernicus 2021 Data LDEO-Colombia, NSF, NOAA. <https://earth.google.com/web/> [December 14, 2015]

Google Earth Pro 7.3.3.7786. (January 18, 2021) Cicia, Fiji. 17°45'09.99" S 179°19'09.64" W. Eye alt 22243 feet. SIO, NOAA, U.S. Navy, NGA, GEBCO. Maxar Technologies 2021, TerraMetrics 2021. <https://earth.google.com/web/> [February 25, 2016]

Google Earth Pro 7.3.3.7786. (January 18, 2021) Gau, Fiji. 18°03'50.62" S 179°16'43.16" E. Eye alt 10.76mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. Landsat / Copernicus 2021, Maxar Technologies 2021. <https://earth.google.com/web/> [July 22, 2019]

Google Earth Pro 7.3.3.7786. (January 18, 2021) Kadavu, Fiji. 18°56'19.88" S 178°15'49.76" E. Eye alt 34.83mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. CNES / Airbus 2021 Data LDEO-Columbia, NSF, NOAA. <https://earth.google.com/web/> [December 14, 2015]

Google Earth Pro 7.3.3.7786. (January 18, 2021) Efate, Vanuatu. 17°40'41.04" S 168°30'46.38" E. Eye alt 20.85mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. CNES / Airbus 2021, TerraMetrics 2021. <https://earth.google.com/web/> [September 28, 2017]

Google Earth Pro 7.3.3.7786. (January 18, 2021) Malekula, Vanuatu. 16°07'30.02" S 167°27'30.48" E. Eye alt 32.77mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. Maxar Technologies 2021, Landsat / Copernicus 2021. <https://earth.google.com/web/> [December 14, 2015]

Google Earth Pro 7.3.3.7786. (July 27, 2021) Yadua, Fiji. 16°49'03.19" S 178°18'01.93" E. Eye alt 3.49mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. Maxar Technologies 2021. <https://earth.google.com/web/> [September 27, 2020]

Google Earth Pro 7.3.3.7786. (July 27, 2021) Makogai, Fiji. 17°25'59.14" S 178°57'01.46" E. Eye alt 4.56mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. Maxar Technologies 2021, TerraMetrics 2021. <https://earth.google.com/web/> [March 1, 2006]

Google Earth Pro 7.3.3.7786 (July 27, 2021) Kanacea, Fiji. 17°15'12.26" S 179°07'34.73" W. Eye alt 7.64mi. SIO, NOAA, U.S. Navy, NGA, GEBCO. TerraMetrics 2021, Landsat / Copernicus, Maxar Technologies 2021. <https://earth.google.com/web/> [December 14, 2015]

General Bathymetric Chart of the Oceans (2020) Gridded Bathymetry Data. GEBCO_2020 Grid. https://www.gebco.net/data_and_products/gridded_bathymetry_data/ [Downloaded on January 4, 2021]