Data Article

Quantitative dataset of shallow water reef in Pulau Bidong, Southern of South China sea during pre and post of tropical storm (Pabuk - January 2019)

Zainudin Bachok\textsuperscript{a,}\textsuperscript{*}, Che Din Mohd Safuan\textsuperscript{a}, Nur Hidayah Roseli\textsuperscript{b}, Mohd Fadzil Akhir\textsuperscript{a}

\textsuperscript{a}Institute of Oceanography and Environment, Universiti Malaysia Terengganu, Kuala Nerus, Terengganu 21030, Malaysia
\textsuperscript{b}Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, Kuala Nerus, Terengganu 21030, Malaysia

A R T I C L E   I N F O

Article history:
Received 1 June 2020
Revised 29 July 2020
Accepted 12 August 2020
Available online 16 August 2020

Keywords:
Natural disturbances
Tropical storm
Coral reefs
Coral assessment
Coral Cover
Coral Community

A B S T R A C T

This article provides raw datasets of the coral reefs status in Pulau Bidong, southern of South China Sea before and after being strike by the tropical storm Pabuk on January 2019. Data were collected using a rapid coral survey method called Coral Video Transect (CVT) technique. The data were collected along a 100 m transect line set up parallel to the shoreline and at a constant depth. In total, eight transects were surveyed during both periods (pre – August 2016, post – March 2019). Back in laboratory, the footage was then extracted into non-overlapping frames or still images prior to image analysis using Coral Point Count with Excel Extension (CPCe) software. The benthic coral reefs relative percentage cover was automatically generated after the image analysis and represented by five major categories; live coral (C), algae (ALG), other invertebrates (OT), dead coral (DC), and sand silt and rock (SR). Live coral cover was identified up to the genus level. This raw dataset was used in this article. The data provided in this article could be of significant use for future studies especially on coral recovery after the natural disturbance.
disturbances. It can provide a baseline assessment especially for coral reefs management as well as to comprehend changes in coral health status in the face of natural and anthropogenic disturbances. The data presented here support the information in the article Safuan et al. (2020).

© 2020 Published by Elsevier Inc.
This is an open access article under the CC BY-NC-ND license. (http://creativecommons.org/licenses/by-nc-nd/4.0/)

Specifications Table

| Subject                              | Biology |
|--------------------------------------|---------|
| Specific subject area                | Marine Ecology |
| Type of data                         | Table |
| How data were acquired               | Coral Video Transect (CVT) technique |
| Data format                          | Analysed |
| Parameters for data collection       | The quantification of percentage benthic cover on coral reef in Pulau Bidong (5°37’7.79” N, 103° 3’49.01” E) was done utilizing CVT method. Assessments was carried out on four sites in Pantai Pasir Cina, Pulau Bidong (PPC) at two different depths (3 m and 8 m). In total, eight 100 m transects were surveyed during pre (August 2016) and post (March 2019) tropical storm. |
| Description of data collection      | Video sampling method was used to survey the coral reef. In each transects, videos were taken at every 20 m transect segment separated at 5 m interval (0 m – 20 m, 25 m – 45 m, 50 m – 70 m, 75 m – 95 m) along the 100 m transect tape to represent pseudo-replicates per transect (n = 4). Back on land, videos were extracted into non-overlapping frames and image analysis was performed using Coral Point Count with Excel Extension (CPCe) version 4.1. |
| Data source location                | Institution: Institute of Oceanography and Environment, Universiti Malaysia Terengganu, 21,030 Kuala Nerus, Terengganu, Malaysia City/Town/Region: Kuala Nerus, Terengganu Country: Malaysia Latitude and longitude (and GPS coordinates) for collected samples/data: Table 1 |
| Data accessibility                  | With the article |
| Related research article            | Safuan, C. D. M., Roseli, N. H., Bachok, Z., Akhir, M. F., Xia, C., & Qiao, F. (2020). First record of tropical storm (Pabuk-January 2019) damage on shallow water reef in Pulau Bidong, South of South China Sea. Regional Studies in Marine Science, 101,216. https://doi.org/10.1016/j.rsma.2020.101216 |

Value of the Data

- Malaysia lies at the center of a marine biodiversity hotspot, where hard coral diversity is high.
- Dataset provided in this article is the first record of coral damage by a tropical storm in Malaysia, which is a rare occurrence for this region.
- Data collected using the video sampling method offers a permanent record that can be archived and reviewed for future data verification or comparison.
- Even though Pulau Bidong is not gazetted as a Marine Protected Area, this data can be meaningful to coral reefs managers, such as the Marine Parks Department, to create policies on coral reef management and conservation.
• This dataset could serve as a significant and useful reference for future studies to assess change and recovery of these coral reefs in the face of natural and anthropogenic disturbances.

1. Data Description

In January 2019, tropical storm Pabuk was formed in the southern South China Sea near Malaysia. The storm generated a strong wind with a maximum wind speed more than 50 mph, strong currents (>1 m/s) and large significant wave heights (>4 m). As the storm passed through near east coast of Peninsular Malaysia, the physical disturbances due to this storm have caused some damage to the coral reefs surrounding that area. The extent of coral damage caused by the tropical storm Pabuk was determined for one embayment, Pantai Pasir Cina (PPC), on the west coast of Pulau Bidong. Datasets of percentage benthic cover were collected along a 100 m transect tape at four sites. At each site, the tape was laid over the benthos following the contour of the reef at constant depth (3 m and 8 m depth) and parallel to the shoreline. A description on the survey sites is shown in Table 1. Surveys were conducted in 2016 (pre-) and 2019 (post-tropical storm Pabuk).

2. Experimental Design, Materials, and Methods

Coral assessment was carried out using standard Coral Video Transects (CVT) [1]. Data were collected using an underwater camera (Panasonic Lumix FT4 with LUMIX 40 m marine case, set in wide angle ratio of 16:4, 1920 × 1080 resolution and set in underwater mode to get a high definition (HD) video) and by facing the camera lens perpendicular to the reef floor at a vertical elevation of 0.5 m. A reference bar was used during video recording to maintain the vertical elevation and minimize parallax error. Recording was conducted while slowly swimming along the transect line at a speed of approximately 5 m per minute. Data were collected along each transect (broken into 4 × 20 m segments) at each site [PPC1 3 m and PPC1 8 m, PPC2 3 m and PPC2 8 m; n = 16 × 20 m segments x two time period (2016 and 2019)]. The assessment was conducted by two divers with the transect set up by the first diver and the second diver carrying out the video surveying.

In the laboratory, all footage was extracted into non-overlapping frames to avoid analyzing repetitive video frames. A systematic non-overlapping frames were generated using Video Image Master Software. The software automatically extracting the non-overlapping frames by dividing the video duration with 50 frames. The extracted frames were then carefully observed to remove any overlapping images prior to analysis. For every 20 m segment video, 50 video frames were extracted. In total, 1600 still images [(four twenty-meter transects × four sites × 50 frames × two time periods (2016 and 2019)] were extracted from the video. The images were then analysed using Coral Point Count with Excel Extension (CPCe) software [2] using point count method (50 points per image) [1] to quantify percentage benthic cover of the coral reef. The analysed data were then summarised as percentage cover of five major categories; live coral (C – indicates

| Survey Site | Depth | Latitude | Longitude | Date of Survey | Survey Method / Transect Length |
|-------------|-------|----------|-----------|----------------|---------------------------------|
| PPC1        | 3 m   | 5°37’18.88”N | 103°3’26.76”E | 4th | Coral Video |
|             | 8 m   | 5°37’19.40”N | 103°3’24.95”E | Au- | Transect / 100 m |
| PPC2        | 3 m   | 5°37’15.30”N | 103°3’25.91”E | 2016 | transect per site |
|             | 8 m   | 5°37’15.70”N | 103°3’24.41”E | gust | 2019 |

Table 1
Location of survey site in Pulau Bidong during pre and post tropical storm Pabuk.
Table 2
Raw dataset of relative percentage benthic cover of major category used in the study.

| Depth | Site | Time | Transect | Major Category (% Cover) |
|-------|------|------|----------|--------------------------|
|       |      |      |          | C  | ALG | OT | DC | SR  |
| 3 m   | PPC1 | Before | 1     | 44.89 | 3.00 | 0.20 | 30.72 | 0.12 |
|       |      |        | 2     | 43.91 | 3.97 | 0.44 | 29.11 | 0.24 |
|       |      |        | 3     | 44.48 | 0.60 | 1.20 | 32.43 | 0.08 |
|       |      |        | 4     | 21.25 | 0.04 | 0.12 | 74.03 | 0.04 |
|       |      | After  | 1     | 25.30 | 2.43 | 0.13 | 72.13 | 0.00 |
|       |      |        | 2     | 1.00  | 0.25 | 0.00 | 88.25 | 10.50 |
|       |      |        | 3     | 2.70  | 0.00 | 0.00 | 86.95 | 10.35 |
|       |      |        | 4     | 18.20 | 1.30 | 14.30 | 64.50 | 1.70 |
| 8 m   | PPC1 | Before | 1     | 72.84 | 2.54 | 0.52 | 23.41 | 0.69 |
|       |      |        | 2     | 64.09 | 0.49 | 0.21 | 32.66 | 2.55 |
|       |      |        | 3     | 70.48 | 0.28 | 1.13 | 28.11 | 0.00 |
|       |      |        | 4     | 71.23 | 0.97 | 0.52 | 27.28 | 0.00 |
|       |      | After  | 1     | 26.10 | 3.00 | 0.75 | 70.15 | 0.00 |
|       |      |        | 2     | 23.71 | 0.00 | 0.00 | 76.29 | 0.00 |
|       |      |        | 3     | 16.57 | 0.00 | 0.00 | 83.43 | 0.00 |
|       |      |        | 4     | 32.06 | 0.00 | 0.00 | 67.94 | 0.00 |
|       | PPC2 | Before | 1     | 37.96 | 10.17 | 0.28 | 10.37 | 0.84 |
|       |      |        | 2     | 26.42 | 0.89 | 0.81 | 7.66 | 1.28 |
|       |      |        | 3     | 14.31 | 3.89 | 0.48 | 13.31 | 0.24 |
|       |      |        | 4     | 26.44 | 5.68 | 0.28 | 13.99 | 1.36 |
|       |      | After  | 1     | 13.95 | 0.00 | 2.51 | 76.21 | 7.33 |
|       |      |        | 2     | 46.10 | 1.45 | 0.75 | 45.15 | 6.45 |
|       |      |        | 3     | 54.00 | 0.45 | 0.15 | 44.65 | 0.55 |
|       |      |        | 4     | 34.40 | 6.90 | 0.35 | 57.60 | 0.75 |
|       | PPC2 | Before | 1     | 62.60 | 3.37 | 0.53 | 20.20 | 13.31 |
|       |      |        | 2     | 70.62 | 2.63 | 0.08 | 17.28 | 9.39 |
|       |      |        | 3     | 63.12 | 5.06 | 0.04 | 30.22 | 1.57 |
|       |      |        | 4     | 31.76 | 11.89 | 0.16 | 31.28 | 24.91 |
|       |      | After  | 1     | 39.00 | 0.25 | 1.35 | 44.45 | 14.80 |
|       |      |        | 2     | 38.86 | 0.86 | 1.57 | 58.71 | 0.00 |
|       |      |        | 3     | 47.74 | 1.38 | 0.82 | 46.15 | 3.90 |
|       |      |        | 4     | 40.33 | 0.056 | 0  | 58.89 | 0.61 |

Numbers 1 to 4 represent transect segment while values indicates the percentage cover. Major category was represented by biotic [live coral (C), algae (ALG) and other invertebrates (OT)] and abiotic [dead coral (DC) and sand, silt and rock (SR)] components.

living Scleractinian or hard coral), algae (ALG – macro algae such as encrusting, filamentous or fleshy algae), other invertebrates (OT – slow moving or sessile invertebrates such as giant clam, anemone, sea urchin, etc.), dead coral (DC – dead coral with or without algae colonization, bleaching, diseased, dead coral with eroded surface or due to predation by Crown-of-Thorn and Drupella snails) and sand, silt rock (SR –abiotic component in coral reefs such as sand, silt and rock) as shown in Table 2. Live coral was identified up to the genus level (Tables 3 and 4). Percentage cover of live coral is commonly used as a precursor to determine the health status of coral reefs [3,4,5].

3. Ethics Statement

Ethical Statement for Solid State Ionics

Hereby, I (Zainudin Bachok) consciously assure that for the manuscript / Quantitative Dataset of Shallow Water Reef in Pulau Bidong, Southern of South China Sea During Pre and Post of tropical storm (Pabuk - January 2019) / the following is fulfilled:

1) This material is the authors’ own original work, which has not been previously published elsewhere.
### Table 3
Raw dataset of relative percentage coral taxa before and after tropical storm Pabuk at 3 m depth.

| Depth | Site | Time | BEFORE | AFTER | Site | Time | BEFORE | AFTER |
|-------|------|------|--------|--------|------|------|--------|--------|
| 3m    | PPC1 | Transect |        |        | PPC2 | Transect |        |        |
|       |      | 1     | 2     | 3     | 4     | 1     | 2     | 3     |
|       |      | 1     | 2     | 3     | 4     | 1     | 2     | 3     |
| Acropora | 39.29 | 8.76 | 21.42 | 16.89 | 24.26 | 0.05 | 2.65 | 17.80 |
| Astreopora | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ctenactis | 0.12 | 0.68 | 1.08 | 0.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| Echinopora | 0.36 | 0.00 | 0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Favia | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Favites | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fungia | 5.09 | 33.88 | 14.69 | 3.44 | 0.00 | 0.00 | 0.00 | 0.00 |
| Galaxea | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Goniastrea | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Halomitra | 0.00 | 0.00 | 0.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Heropolitha | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Merulina | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Montipora | 0.00 | 0.00 | 0.00 | 0.00 | 0.85 | 0.00 | 0.00 | 0.00 |
| Pachyseris | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pavona | 0.00 | 1.44 | 2.68 | 0.44 | 0.61 | 0.00 | 0.00 | 0.00 |
| Pectinia | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Platygyra | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pocillopora | 0.00 | 3.64 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Porites | 0.00 | 0.00 | 0.08 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| Turbinaria | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Numbers 1 to 4 represent transect segment while values indicates the percentage cover.

### Table 4
Raw dataset of relative percentage coral taxa before and after tropical storm Pabuk at 8 m depth.

| Depth | Site | Time | BEFORE | AFTER | Site | Time | BEFORE | AFTER |
|-------|------|------|--------|--------|------|------|--------|--------|
| 8m    | PPC1 | Transect |        |        | PPC2 | Transect |        |        |
|       |      | 1     | 2     | 3     | 4     | 1     | 2     | 3     |
|       |      | 1     | 2     | 3     | 4     | 1     | 2     | 3     |
| Acropora | 14.60 | 8.83 | 1.04 | 0.00 | 12.97 | 21.10 | 43.55 | 18.50 |
| Astreopora | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ctenactis | 0.40 | 0.00 | 0.36 | 0.00 | 2.15 | 0.20 | 1.60 | 0.00 |
| Echinopora | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.45 | 1.75 |
| Favia | 0.04 | 0.04 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 |
| Favites | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fungia | 15.85 | 1.01 | 7.98 | 24.17 | 0.41 | 12.75 | 5.20 | 6.45 |
| Galaxea | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Goniastrea | 0.04 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 |
| Halomitra | 0.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Heropolitha | 0.24 | 0.00 | 0.24 | 0.00 | 0.00 | 0.25 | 0.10 | 0.00 |
| Merulina | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Montipora | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pachyseris | 0.04 | 0.15 | 0.36 | 0.41 | 0.00 | 0.00 | 0.00 | 0.70 |
| Pavona | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pectinia | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Platygyra | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pocillopora | 2.82 | 14.02 | 4.69 | 0.00 | 0.10 | 3.75 | 1.30 | 0.35 |
| Porites | 1.57 | 0.49 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Turbinaria | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Numbers 1 to 4 represent transect segment while values indicates the percentage cover.
2) The paper is not currently being considered for publication elsewhere.
3) The paper reflects the authors’ own research and analysis in a truthful and complete manner.
4) The paper properly credits the meaningful contributions of co-authors and co-researchers.
5) The results are appropriately placed in the context of prior and existing research.
6) All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference.
7) All authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.

I agree with the above statements and declare that this submission follows the policies of Solid State Ionics as outlined in the Guide for Authors and in the Ethical Statement.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

CRediT authorship contribution statement

Zainudin Bachok: Funding acquisition, Supervision, Writing - review & editing.
Che Din Mohd Safuan: Conceptualization, Formal analysis, Writing - original draft, Writing - review & editing.
Nur Hidayah Roseli: Writing - review & editing.
Mohd Fadzil Akhir: Funding acquisition, Supervision.

Acknowledgments

We would like to thank Institute of Oceanography and Environment, Universiti Malaysia Terengganu for the equipment and facilities used in this study. This research was funded by Ministry of Higher Education (MoHE) Malaysia under the research grant of Higher Institution center of Excellence (HICoE, 66928) and International Collaboration Fund, MESTECC, Malaysia (TE52075).

References

[1] M. Safuan, W.H. Boo, H.Y. Siang, L.H. Chark, Z. Bachok, Optimization of coral video transect technique for coral reef survey: comparison with intercept transect technique, Open J. Mar. Sci. 5 (04) (2015) 379, doi:10.4236/ojms.2015.54031.
[2] K.E. Kohler, S.M. Gill, Coral point count with excel extensions (CPCe): a visual basic program for the determination of coral and substrate coverage using random point count methodology, Comput. Geosci. 32 (9) (2006) 1259–1269 https://doi.org/10.1016/j.cageo.2005.11.009.
[3] T. Yeemin, S. Pengsakun, M. Yucharoen, W. Klinthong, K. Sangmanee, M. Sutthacheep, Long-term changes in coral communities under stress from sediment, Deep - Sea Res. Pt II 96 (2013) 32–40 http://dx.doi.org/10.1016/j.dsr2.2013.04.019.
[4] M. Zhaoa, K. Yu, Q. Shi, H. Yang, B. Riegl, Q. Zhang, H. Yan, T. Chen, G. Liu, Z. Lin, The coral communities of Yongle atoll: status, threats and conservation significance for coral reefs in South China Sea, Mar. Freshwater Res. 67 (2016) 1888–1896 https://doi.org/10.1071/MF15110.
[5] E.S. Darling, T.R. McClanahan, J. Maina, G.G. Gurney, N.A. Graham, F. Januchowski-Hartley, M. Puotinen, Social–environmental drivers inform strategic management of coral reefs in the anthropocene, Nat. Ecol. Evol. 3 (9) (2019) 1341–1350 https://doi.org/10.1038/s41559-019-0953-8.