



# Data on Holocene Fossil Benthic Foraminifera from Sunda Shelf, Offshore Southeastern Peninsular Malaysia

DATA PAPER

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## ABSTRACT

This paper documents a database of fossil foraminiferal occurrences from a core sample (2 m) retrieved from offshore southeastern Peninsular Malaysia, in 1993, with additional data on their modern distribution from published source. Five sub-samples were analysed for foraminiferal studies (0.1 m, 0.4 m, 0.6 m, 1.2 m, and 2.0 m), alongside with their diversity indices values. In addition, we also present the lithological description of the core sediment, together with the radiocarbon age of our sample. These data are potentially be reused in other paleoceanography related research, such as reconstructing paleo environments, and for future research on the Late-Quaternary/Holocene sedimentary and sea-level history of Sunda Shelf.

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## KEYWORDS:

microfossil; radiocarbon age; paleoceanography; Sunda Shelf; Holocene; Quaternary

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## REPOSITORY LOCATION

Harvard Dataverse (<https://thedata.harvard.edu/dvn/dv/openquaternary>)

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## INTRODUCTION

An extensive marine geophysical and sampling survey over the shallow continental shelf area off the east coast of Peninsular Malaysia was conducted by Mineral and Geoscience Department (JMG) of Perak, Malaysia in 1993. Our selected core sample was retrieved offshore of Tanjung Sedili, Johor (**Figure 1**). In this paper, we present a database of fossil foraminiferal occurrences from a core sample (2 m) with additional data on their modern distribution from published source (Suriadi et al. 2019). Five sub-samples were analysed for foraminiferal studies (0.1 m, 0.4 m, 0.6 m, 1.2 m, and 2.0 m), alongside with their diversity indices values. In addition, we also present the lithological description of the core sediment, together with the radiocarbon age of our sample. These data are potentially be reused in other paleoceanography related research, such as reconstructing paleoenvironments, and future research on the Late-Quaternary/Holocene sedimentary and sea-level history of Sunda Shelf.

## CONTEXT

### SPATIAL COVERAGE

Description: Malaysia, Southeast Asia, offshore Johor

Northern boundary: +/- 2°10'

Southern boundary: +/- 0°00'

Eastern boundary: +/- 104°20'

Western boundary: +/- 0°00'

## TEMPORAL COVERAGE

4215 – 3935 cal yr BP to present.

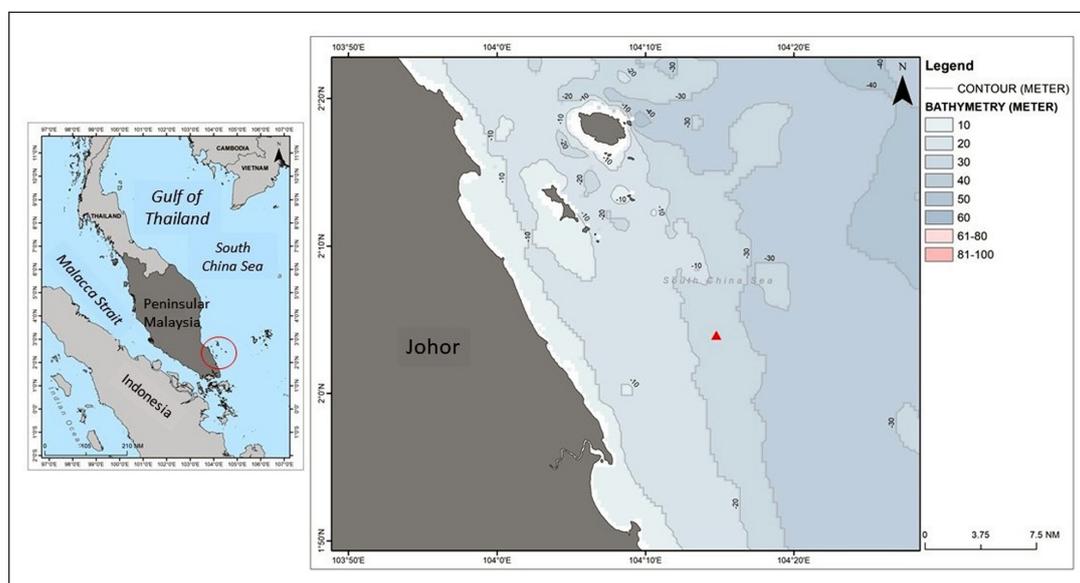
## METHODS

### STEPS

The core sample was acquired using a 2-in-1 system which could be used either as a gravity corer or a piston corer at about 26.0 m below present sea surface, and ±22.9 km away from the coastline. Five core sediment sub-samples (0.1 m, 0.4 m, 0.6 m, 1.2 m, and 2.0 m) were selected based on their lithological characteristics. The sediment sub-samples were then sieved over a 200 mesh (75 µm) sieve, and dried. These procedures took place in the Marine Geology laboratory, JMG in 1993. Later in 2014, these samples were brought to INOS, UMT for foraminiferal identification. 300 specimens were picked and identified to the species level whenever possible. Shannon-Wiener Information function ( $H'$ ) and Fisher's alpha ( $\alpha$ ) were used as diversity indices; and Pielou's evenness index ( $J'$ ) was used to describe how individuals were divided between species. All these statistical analyses were run in PRIMER version 6.1.12 software.

Foraminifera were identified through comparison with taxonomic monograph by Loeblich & Tappan (1964, 1994), Whittaker & Hodgkinson (1979), Hayward & Hollis (1994), Szarek et al. (2006), Debenay (2012), and Culver et al. (2012, 2013, personal communication). Most of these publications were from Malaysian and nearby waters (e.g., Terengganu/Malaysia, southwestern South China Sea/central Sunda Shelf, Sahul Shelf, southwestern Pacific/New Caledonia, and New Zealand).

Organic content in the sediment was determined by using the hydrogen peroxide ( $H_2O_2$ ) digestion method. Carbonate content was determined by using the Acid-base titration method. Grain size analysis was carried out using dry and wet sieving methods, and classification was



**Figure 1** Location of sampling site (red circle and triangle), offshore southeastern Peninsular Malaysia.

based on Folk (1980). All these analyses were conducted by JMG personnel in 1993.

Radiocarbon age analysis of in-situ bivalve shells picked from above the mottled-stiff mud, 0.4 m down the core was conducted at Beta Analytic Laboratory (Miami, Florida, USA) in 2015. Conventional radiocarbon age estimate was calibrated using Calib Rev. 6.1.0 Marine 09 (Stuiver et. al., 2010) with a local Delta R value of  $-15 \pm 38$ .

### SAMPLING STRATEGY

The corer was suspended freely above the deck with a 3/8" wire cable before lowering the system to the sea bottom. On impact of the trigger mechanism, the corer was released and driven into the seafloor. The sediments were collected into a PVC liner placed within the core barrel. The core samples were split into two halves using an automated core splitter.

### CONSTRAINTS

Since samples were collected for sand-resource mapping, they were not stained to enable live foraminifera to be recognized. Selection of sub-samples were also determined by the JMG personnel.

## DATASET DESCRIPTION

### OBJECT NAME

Foraminiferal census data, Diversity indices value, Core log, Radiocarbon age.

### DATA TYPE

Primary data (foraminiferal census data), processed data (diversity values, radiocarbon age), interpretation of data (lithological description), and previously published data with reference to published source (Station 7 in Suriadi et al. 2019).

### FORMAT NAMES AND VERSIONS

Excel, table, JPEG

### CREATION DATES

1993–2015.

### DATASET CREATORS

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Stephen J. Culver (species identification, supervision; East Carolina University)

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### LANGUAGE

English

### LICENSE

CCO

### PUBLICATION DATE

If already known, the date the dataset was published in the repository (dd/mm/yyyy).

## REUSE POTENTIAL

This foraminiferal database will be useful to other researchers who involve in the study of modern and fossil foraminifera (e.g., biogeography, paleobiology, etc.). The distributional data of modern assemblages from Station 7 (Suriadi et al. 2019) could provide information on their current ecology and diversity (supported by environmental data). On the other hand, the vertical distributional data from the present study could provide insight into the changes in their assemblages down the core, which is closely related to changes in past environment they once lived in. With the combination of these modern and fossil assemblages data, we hope to provide a detailed baseline data for future research on paleoceanography in this region, particularly the Sunda Shelf area.

The lithological and radiocarbon age data presented in this study provides geochronological information on the changes of their sedimentation over time. This data could be useful for future research on the Late-Quaternary/Holocene sedimentary and sea-level history of Sunda Shelf.

## ADDITIONAL FILES

The additional files for this article can be found as follows:

- **Core log.** Simplified lithological log and its description (not to scale). DOI: <https://doi.org/10.5334/oq.104.s1>
- **Diversity indices.** Diversity indices values of foraminifera recorded in this study. DOI: <https://doi.org/10.5334/oq.104.s2>
- **Foraminiferal census data.** Census data of benthic foraminifera recorded in all sub-samples. DOI: <https://doi.org/10.5334/oq.104.s3>
- **Radiocarbon age.** Age estimates based on radiocarbon analysis. DOI: <https://doi.org/10.5334/oq.104.s4>

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## COMPETING INTERESTS

The authors have no competing interests to declare.

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