

SPATIAL DISTRIBUTION OF GEM MINERALS
USING GIS-BASED MAPPING: CONTINENTAL
SHELF OF MERSA JOHOR

THE STATE WIN

DEPARTMENT OF MARINE SCIENCE
SCHOOL OF MARITIME AND MARINE SCIENCE
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**SPATIAL DISTRIBUTION OF CLAY MINERALS USING GIS-BASED
MAPPING: CONTINENTAL SHELF OF EAST JOHOR**

By

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**Research Report submitted in partial fulfillment
of the requirement for the degree of
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**Department of Marine Science
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LIST OF ABBREVIATIONS / SYMBOLS

%	percentage
°C	degree Celcius
Cu	copper
Φ	phi
L	liter
mL	milliliter
μm	micrometer
mm	milimeter
cm	centimeter
max.	maximum
g	gram
N	Normality
M	mol
mA	miliampere
Å	Angstrom
W	watt
kV	kilovolt
NaHCO ₃	Sodium Bicarbonate
HCL	Hydrochloric Acid
H ₂ O ₂	Hydrogen Peroxide
MgCl ₂	Hydrogen Chlorite
XRD	X-ray Diffractometer

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ABSTRACT

This study was conducted to determine the spatial and temporal distribution of clay minerals of East Johor coastal sediments. 30 samples during the pre-monsoon and post-monsoon seasons were collected using the Smith McIntyre Grab in the study area. Identification of clay minerals and the composition of clay mineral were determined using X-Ray Diffractometer (XRD). Data on clay minerals were mapped using Geographical Information System (GIS). In general, the dominant clay minerals found in the study area are mostly illite and kaolinite during both seasons while quartz is the most dominant nonclay-mineral in all stations. Distribution of illite during both monsoonal seasons showed abundance further offshore, indicating that this mineral is transported by wave energy seaward. The dominance of quartz is due to its relative stability and due to the weathering product of granite, the dominant rock of east coast of Peninsular Malaysia. Feldspar, goethite, smectite and gibbsite were also present in the sediments while montmorillonite-chlorite is only present in trace amounts at stations 10 and 20 during post-monsoon. Climatological variation may influence the depositional conditions at the study area due to the prevailing monsoons. Therefore, monsoonal effect is one of the factors influencing the circulation of bottom sediments in the South China Sea, off east coast of Johor. GIS based mapping and analysis of clay minerals in this study is essential in the determination of distribution patterns of clay minerals and can be followed by modeling trends of their distribution in the future.

ABSTRAK

Kajian ini dijalankan untuk mengenalpasti taburan kandungan mineral liat dalam sedimen di kawasan persisiran pantai timur Johor. Sejumlah 30 sampel sedimen telah diambil sebelum dan selepas musim tengkujuh dengan menggunakan alat penyampelan Smith McIntyre dari kawasan persampelan. Identifikasi mineral dan kandungan komposisi dalam mineral telah dilakukan dengan menggunakan X-Ray Diffractometer (XRD). Data yang diperoleh kemudian dipetakan dengan menggunakan perisian Geographical Information System (GIS). Secara keseluruhannya, keputusan menunjukkan bahawa illite, diikuti kaolinite ialah mineral yang dominan di kawasan persampelan sebelum dan selepas musim tengkujuh manakala quartz merupakan mineral bukan liat yang paling dominant di setiap stesen. Taburan illite yang jauh dari persisiran pantai semasa kedua-dua persampelan, menunjukkan bahawa kuasa arus yang mempengaruhi taburan mineral ini jauh dari persisiran pantai. Quartz adalah dominant disebabkan kestabilan mineral ini dan hasil daripada hakisan batuan granit yang dominan di pantai timur Malaysia. Feldspar, goethite, smectite dan gibbsite juga hadir dalam sediment manakala montmorillonite-chlorite hanya hadir dalam stesen 10 dan stesen 20 selepas musim tengkujuh. Variasi cuaca mungkin merupakan faktor yang mempengaruhi kadar taburan mineral liat di kawasan persampelan. Kesan-kesan musim tengkujuh juga merupakan antara faktor yang mempengaruhi kitaran sediment di dasar laut. Kaedah pemetaan dan analisis dengan menggunakan GIS boleh dimanfaatkan untuk pemetaan taburan mineral dan juga membolehkan permodelan taburan mineral liat pada masa akan datang.