MINERALOGY OF KUALA IBAI RIVER ESTUARINE SEDIMENTS DURING PRE-MONSOON AND MONSOON SEASONS

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BY

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Research report submitted in partial fulfillment of the requirements for the degree of Bachelor of Science (Marine Science)

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PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II

Adalah ini dimaklumkan dan disahkan bahawa laporan penyelidikan bertajuk: **Mineralogical of Kuala Ibai Estuarine Sediments** oleh **Abdul Manap Bin Samlee**, No. Matrik: **UK 9640** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Samudera sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda (Sains Samudera), Fakulti Pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

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LIST OF ABBREVIATIONS

^0C	degree Celsius
%	percentage
μm	micrometer
L	liter
ml	milliliter
cm	centimeter
mm	millimeter
g	gram
mg	milligram
kg	kilogram
M	mol
N	normality
$NaHCO_3$	Sodium bicarbonate
HCl	Hydrochloric acid
H_2O_2	Hydrogen peroxide
$MgCl_2$	Magnesium chloride
<	Less than
>	More than
XRD	X-Ray Diffractometer
St	Station

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ABSTRACT

This study was conducted to determine the mineral content and the textural classes of the sediments of Kuala Ibai River estuarine. The sediments were collected from ten stations which covered an area of 3 km² by using Van Veen Grab. The sediments were analyzed by using the following methods; (i) *Dry Sieving* and *Hydrometer Method.* for textural class analysis, (ii) *X-Ray Diffractometer (XRD)*, for silt and clay fractions, (iii) *Quantitative Mineral Estimation (QME)*, for heavy mineral analysis, and (iv) *Scanning Electron Microscope* (SEM), to determine the minerals elements and oxides. The results of *XRD* analysis showed that the sediment of Kuala Ibai River estuary is highly dominated by *quartz* which has the percentage more than 65%. Besides, other primary clay minerals that occurred in low percentage are *kaolinite, illite, montmorillonite, calcite, chlorite, goethite, mica* and *feldspar*. The result for QME analysis also showed that the *quartz* is the dominant mineral in the study area and it was found in stations 1, 2 and 3, while other heavy minerals which occurred in trace amounts are *andalusite, hydroillmenite, ilmenite, iron oxide, leucoxene, magnetite, pyroxene, mica, tourmaline* and *zircon*. The texture analysis showed that the dominant texture class is clay, which found especially in stations 5, 6, 7, 8, 9 and 10, while sand texture class was only found at the river mouth of the estuary (Stations 1, 2, 3 and 4).

ABSTRAK

Kajian yang dijalankan ini bertujuan untuk mengenalpasti kandungan dan jenis mineral yang terkandung dalam sampel tanah serta kelas tekstur bagi taburan sedimen di kawasan muara Sungai Kuala Ibai. Kajian ini dijalankan di kawasan yang merangkumi 3 km^2 terhadap 10 stesen dengan menggunakan pencekau Van Veen. Sampel tanah telah dianalisa menggunakan beberapa kaedah; (i) Ayakan kering dan Kaedah *Hydrometer*, untuk pengkelasan tekstur tanah (ii) *X-Ray Diffractometer (XRD)*, untuk analisa fraksi kelodak dan liat, (iii) *Quantitative Mineral Estimation (QME)*, untuk analisa mineral berat, dan (iv) *Scanning Electron Microscope (SEM)*, untuk mengenalpasti kandungan mineral serta unsur-unsur oksida. Berdasarkan keputusan analisa *XRD*, sedimen di kawasan muara Sungai Kuala Ibai mempunyai kandungan *quartz* yang dominan iaitu melebihi 65%. Selain itu, mineral primer lain yang hadir dalam peratusan yang lebih rendah ialah *kaolinite, illite, montmorillonite, calcite, chlorite, goethite, mica* dan *feldspar*. Analisa *QME* juga menunjukkan *quartz* adalah mineral yang dominan di kawasan kajian iaitu dalam peratusan yang tinggi di stesen 1, 2, dan 3, berbanding mineral berat yang lain yang hanya hadir dalam bentuk surih seperti *andalusite, hydroillmenite, ilmenite, iron oxide, leucoxene, magnetite, pyroxene, mica, tourmaline* dan *zircon*. Analisa pengkelasan tekstur sedimen menunjukkan tekstur tanah berliat mendominasi kawasan kajian khususnya di stesen 5, 6, 7, 8, 9 dan 10, manakala tekstur tanah berpasir hanya terdapat di kawasan muara sahaja (Stesen 1, 2, 3 dan 4).