GEOCHEMICAL ELEMENTS OF SEDIMENTS IN SOUTH CHINA SEA OFF PAHANG

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FACULTY OF SCIENCE AND TECHNOLOGY
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
2004

Lihat sebelah

GEOCHEMICAL ELEMENTS OF SEDIMENTS IN SOUTH CHINA SEA OFF PAHANG

By

HAN SIEW PENG

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

Department of Marine Science
Faculty of Science and Technology
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
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APPROVAL AND CERTIFICATION FORM
RESEARCH PROJECT I AND II

I certify that the research report entitled: Geochemical elements of Sediments In South China Sea Off Pahang by HAN SIEW PENG, Matric No. UK5540 have been read and all corrections recommended by the examiners have been done. This research report is submitted to the Department of Marine Science in partial fulfillment of the requirements for the degree of Bachelor of Science in Marine Science, Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia.

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I would also like to thank my supervisor, Prof. Madya Dr. Kamaruzzaman Bin Hj. Yunus for his guidance and support throughout the project. I really appreciate his encouragement and exposed me to this great research. I am fortunate to be able experience the research work. Thanks to Dr. Antonina for reviewing the manuscript and giving advice on the text.

Not forgetting my course mates, Meng Ho, Rohana Tair, Zairil Fahairi, Nizam and Dor Jia) for helping me in the analysis. My appreciation also goes to my seniors (Willie, Jan, Wak and Ong) for the guidance and criticisms during lab works and the preparation of this thesis cum the sacrifices for bringing our samples to MINT. For sure, never forget how you guys pulled my leg twice. It is great to know and have you guys here.

I would also like to express my deep appreciation to the lab assistants of Oceanography Laboratory for allowing me to use the apparatus and instruments inside for my experiments. Special appreciation to En. Kamarie for spending his time to accompany Rohana and I to finish our column exchange until late in the night.

Thank you very much.

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LIST OF ABBREVIATIONS

%	Percentage
^{o}C	Degree Celsius
^{230}Th	Thorium-230
^{232}Th	Thorium-232
Co	Cobalt
Cu	Copper
Zn	Zinc
Pb	Lead
Li	Lithium
U	Uranium
Al	Aluminium
b	Best fit slope
cm	Centimeter
Cmy^{-1}	Centimeter per year
dpm	Disentrigated per million
$\mu g.g^{-1}$	Microgram per gram
g	gram
EDTA	Ethylenediamenetetra Acidic
ICP-MS	Inductively Coupled Plasma-Mass Spectrometer
L	Liter
mL	Mililiter
m	meter
Pa	Protactinium

ppb	Part per billion
ppm	Part per million
S	Sedimentation rate
Ti	Titanium
δ	Delta
λ_{230}	^{230}Th decay constant
OC	Organic carbon
mmy^{-1}	Millimeter per year

ABSTRAK

Kajian ini telah dijalankan di Laut China Selatan, Pahang. 2 sedimen teras (PHAD 4 dan PHAD 13) telah diambil pada bulan Oktober 2003. Sampel telah dianalisis untuk kadar sedimentasi, usia sedimen, kepekatan logam berat dan kandungan organik karbon. Daripada profil $^{230}Th_{excess}$, kadar sedimentasi bagi PHAD 4 dan PHAD 13 adalah kedua-dua sama iaitu 0.27 mmy^{-1}. Manakala daripada graf $^{230}Th_{excess}$ / $^{232}Th_{excess}$, kadar sedimentasi bagi PHAD 4 dan PHAD 13 yang dikira masing-masing ialah 0.28 mmy^{-1} dan 0.27 mmy^{-1}. Pada kedalaman 22 cm, usia sedimen yang ditentukan ialah 794.22 tahun manakala usia PHAD 13 pada kedalaman 24 cm ialah 885.61 tahun. Kepekatan purata yang dikira bagi elemen Co, Cu, Zn, Pb dan U dalam PHAD 4 ialah 5.34 $\mu g.g^{-1}$, 11.97 $\mu g.g^{-1}$, 14.28 $\mu g.g^{-1}$, 31.29 $\mu g.g^{-1}$ dan 15.26 $\mu g.g^{-1}$ masing-masing. Manakala kepekatan purata bagi elemen-elemen tersebut dalam PHAD 13 ialah 4.20 $\mu g.g^{-1}$, 10.55 $\mu g.g^{-1}$, 9.28 $\mu g.g^{-1}$, 40.66 $\mu g.g^{-1}$ dan 7.78 $\mu g.g^{-1}$ masing-masing. Julat organik karbon dalam PHAD 4 yang ditentukan ialah 0.63 % ± 0.04 % hingga 1.17 % ± 0.30 % manakala dalam PHAD 13 nilai yang diperolehi ialah 0.39 % ± 0.25 % hingga 1.40 % ± 0.02 %. Graf-graf normalisasi dan faktor pengkayaan menunjukkan elemen Co, Cu, Zn, Pb dan U berasal dari sumber semulajadi.

ABSTRACT

This study was carried out from the South China Sea off Pahang, Malaysia. Two sediment cores (PHAD 4 and PHAD 13) were collected during October 2003. The sediment samples were analyzed for organic carbon content, heavy metals, sedimentation rate and sediments age. The profiles of $^{230}Th_{excess}$ suggested that the sedimentation rate of PHAD 4 and PHAD 13 cores are the same, with values of 0.27 $mm.y^{-1}$. By using $^{230}Th_{excess}$ / $^{232}Th_{excess}$ graphs, the sedimentation rate for PHAD 4 and PHAD 13 were counted as 0.28 $mm.y^{-1}$ and 0.27 $mm.y^{-1}$, respectively. The sediment's age for PHAD 4 is 794.22 years at a depth of 22 cm while PHAD 13 sediment's age is 885.61 years at a depth of 24 cm. The average concentration of Co, Cu, Zn, Pb and U in PHAD 4 core were 5.34 $\mu g.g^{-1}$, 11.97 $\mu g.g^{-1}$, 14.28 $\mu g.g^{-1}$, 31.29 $\mu g.g^{-1}$and 15.26 $\mu g.g^{-1}$, respectively while in PHAD 13 were 4.20 $\mu g.g^{-1}$, 10.55 $\mu g.g^{-1}$, 9.28 $\mu g.g^{-1}$, 40.66 $\mu g.g^{-1}$ and 7.78 $\mu g.g^{-1}$, respectively. The percentage of organic carbon in PHAD 4 ranged from 0.63 ± 0.04% to 1.17 ± 0.30% and for PHAD 13 varied from 0.39 ± 0.25% to 1.40 ± 0.02%. The normalization graphs and enrichment factors showed that all the studied elements (Co, Cu, Zn, Pb and U) in sediment cores were derived from natural sources.