

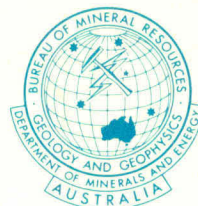
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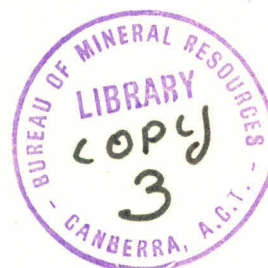
DEPARTMENT OF
MINERALS AND ENERGY

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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

Record 1974/133



OVERSEAS VISIT: THIRD INDONESIAN PETROLEUM ASSOCIATION
CONVENTION, JAKARTA
31 MAY-15 JUNE 1974

by

J.C. Branson

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SUMMARY

J.C. Branson attended presentation of all the exploration papers of the Indonesian Petroleum Association Convention delivered at the Borobudur Hotel, Jakarta on the 3 and 4 June 1974. Technical discussions on the structure of continental margins were held with overseas visitors to the convention during the remaining IPA papers.

A post-convention field excursion to Central Sumatra from 5 to 8 June was undertaken. The similarity of the Timor geology to that of Sumatra was of particular interest.

Technical discussions on the exploration techniques and shelf edge structures in the Indonesian archipelago were held with private oil companies, Pertamina, and the Department of Mines in Jakarta between 10 and 14 June.

Preprints of papers delivered at the conference and the published proceedings of the 1st and 2nd IPA conferences were passed to the BMR library.

1. INTRODUCTION

The Third Indonesian Petroleum Association Convention was held in the Borobudur Hotel, 5 km northeast of the main shopping area of Jakarta. This convention is the Indonesian equivalent of the APEA conference held in Australia. Membership of the Association is made up of 30 exploration and production companies and 31 associated service contracting companies, making a total of 61 Indonesian based companies.

This convention is planned as an annual event, and attendances were estimated to be over 500 including about 80 visitors from overseas. All sessions were conducted in English.

The writer presented a paper to this convention and attended as an official representative of the Bureau of Mineral Resources. Papers were presented over a period of two days. The first day contained papers on oil exploration and the tectonic history of the region; the second day commenced with papers on oil production and exploitation and concluded with further exploration and regional tectonic papers.

I did not attend the production and exploitation papers because I spent this time with a number of overseas visitors who were not staying on in Jakarta after the convention. I was able to show these visitors BMR data in the Timor Trough and discuss the structural development of the Indonesian archipelago. A list of the personnel involved in the discussion is given in Appendix 1.

Post-convention field excursions to Central Sumatra and East Kalimantan were arranged for three days following the convention. I chose to attend the Central Sumatra excursion as it appeared to relate to the geological structures developed between the Banda Arcs and the Australian continent.

During the week 10 to 14 June I visited a number of private exploration companies working in Indonesia, the Pertamina central office, and the Government Department of Mines. Useful discussions were held with personnel listed in the Appendix 2 on the structures detected in the margins of continental shelves and on techniques used in marine exploration of the continental shelves in Indonesia.

2. IPA CONVENTION

The 13 exploration sessions I attended during 3 and 4 June contained well prepared and delivered scientific papers (Appendix III). Other participants claimed that these papers were on a par with papers delivered at the

recent Perth APEA conference. The large reception room of the Hotel Borobudur seated about 600, but only the opening ceremony was full. All papers were delivered in English; I found no difficulty in understanding lecturers whose native language was not English, but these speakers often found they could not understand questions from the audience.

Overhead projection slides (Viewgraphs) had been recommended by the IPA committee as the best medium for the illustrations. Two powerful projectors provided good images on the large screens. The advice from the IPA lecture committee stipulated the maximum size of the viewgraph slides but they also used the word "standard" to describe these dimensions. American lecturers obviously used a different "standard" and often were unable to project the whole slide at once. 35-mm lecture slides were not adequately projected in this large auditorium.

Preprints of the papers were available before each session. A complete set, together with published proceedings of the first and second IPA conventions, have been passed to the BMR library.

3. IPA POST-CONVENTION FIELD EXCURSION

Two field excursions were arranged for the three days following the convention, one to East Kalimantan and other to Central Sumatra (Plate 1). I chose to attend the Central Sumatra excursion because the tectonic history of the region resembles parts of the regions to the north and northwest of Australia.

The party was made up of 25 members who travelled by bus; each bus had a guide. Excursion notes were well prepared and exposures were easily accessible from the main road.

The excursion commenced at the Minas oil field on the Quaternary deposits near Pekanbaru (Plate 1), traversed the central graben region near Bukittinggi and ended at the coastal town of Padang near the subduction zone. Exposures were variable in quality as is typical of tropical regions. The guides had difficulty in demonstrating a correlation with other regions because of the lack of fossil faunas or the intense recrystallization of the limestones. Tertiary volcanics dominated the geological sections as the excursion approached the subduction zone in the southwest.

4. TECHNICAL DISCUSSIONS DURING THE IPA CONVENTION

Only general descriptions of the geological structure discussed with oil companies are presented in this report. Most of the data I was shown were confidential.

Overseas visitors who were not remaining in Jakarta after the conference were interested in discussing the Timor Trough structures and inspecting the BMR slow-speed seismic records before they left. A list of IPA participants involved in these discussions is given in Appendix 1.

Most people approved of the concept of an overthrust sequence, including Tertiary rocks in an old subduction zone in the Timor Trough and a new subduction zone on the northern side of Timor. Dr M. Audley-Charles does not agree with this view and considers that the island of Timor is the imbricate margin of the Australian continent. He believes it has been in the same position relative to the Australian continent since Mesozoic times and suggests the JOIDES ages may not represent the whole of the trough. Dr Audley-Charles does concede that part of the Mesozoic section on Timor has been derived from an island arc north of the Australian continental margin.

Unpublished confidential seismic sections were inspected across the Timor Trough and subduction zones in other parts of the world. The latter look very similar to the Timor Trough sections and there is little evidence of sedimentary structures in the overthrust mass. Many other features of the Timor Trough and the Java Trench conform with Don Seeley's models proposed in his "Fore arc structures" paper to the convention.

The Bandung Geological Survey proposes to carry out a gravity survey in the Timor region and would appreciate any gravity tie data and assistance BMR could provide for this work.

5. TECHNICAL DISCUSSIONS AFTER THE IPA CONVENTION

In the week following the IPA convention and field excursion, discussions were held with the Director and Foreign Affairs Director of the Mines Department, the Exploration Co-ordinator in Pertamina, and staff of six private oil companies working under contract to Pertamina.

Both the Pertamina central office and the Mines Department are primarily concerned with onshore exploration for minerals and oil. Caltex carries out the largest onshore operation, but there are many active private oil companies. Oil exploration costs in the jungle areas average about \$US1000 per kilometre and run as high as \$US3000 per kilometre in the swamp areas of East Kalimantan. Production rates of exploration have risen over the last year from 80 km per month to 100 or 120 km per month. Offshore the private exploration companies are left to carry out exploration.

Field processing centres have been set up in West Irian to process seismic field data, provide stacked sections, and control further development of the Trend oil-field. A new G.S.I. centre, operated by Pertamina, for processing seismic data is being set up in Jakarta and should be operational within 6 months. This processing centre uses an IBM370 computer and is almost entirely Indonesian staffed. Some private company representatives fear that they will be required to use the Jakarta processing centre. They feel this would be a disadvantage over their present freedom to choose their own overseas centres.

The cheapest offshore operations cost about \$US225 per mile and have used the Aquapulse energy source. Although this source has been extensively used by Ray Geophysical Co. and G.S.I., the most favoured seismic source is an airgun array. The airgun arrays give better penetration (3-4 sec) and the G.S.I. recording system is described in the 1st IPA Proceeding. The G.S.I. recording system is not favoured by all private companies because the processing is tied to the recording system. Marine Vibroseis is also in use but so far appears to lack the penetration of airguns. Only the Mobil overseas operation manager, Richard Sweet, commented on the Maxipulse system. He considered this source has the highest resolution and very good penetration.

Both 24-fold and 48-fold recording are common throughout the Indonesian area. The boat speed is necessarily very low when airguns are used for 48-fold coverage and these speeds become comparable with cross currents in the sea (3 to 4 knots). In shallow water (less than 30 m) the "back off" cable is used. With this system the boat is stationary and the cable rests on the sea bed during the shot and recording time. The cable floats when the boat moves to the next shot-point location.

Only the Gulfrex designers appeared to have attempted to reduce the number of magnetic tapes produced during reconnaissance surveying of the shelf and slope. The high-density tape recorder produced by Globe Universal is only used on the Gulf research vessels and not on regular exploration vessels. Exploration staff in other companies

are seriously concerned at the number of basic data tapes they now collect and store.

A number of seismic sections, many of them confidential, have been recorded over the shelf edge into deep water. One section across the Java Trough has a number of features similar to those observed in the Timor Trough sections. The north wall of the Java trench is similar to the north wall of the Timor Trough and contains no discernible sedimentary structures in the main slope mass. Pockets of sediment resting on the overthrust mass are similar to those in the American subduction zones, discussed by Don Seeley at this conference (Preprints in BMR library) and the BMR section of the Timor Trough. On the shelf near Java, post-Oligocene sediments can be seen dipping seawards in a broad convex slope. Between the Java Trench and the shelf, an offshore ridge holds back a pond of sediment. This sediment contains an unexpected landward dip in the major part of the section, but fits Don Seeley's theories (Plate 2, Fig. 1).

Between the Asian craton region of East Kalimantan and the mobile arc regions of Sulawesi and Java, basement at the shelf edge is often covered by thick Tertiary and Quaternary basins or sedimentary wedges (Plate 2, Fig. 2). None of the shelf edge structures are well defined. Compression of the sediment on the shelf edge causes mud volcanoes and diapiric structures in some place in the slope. These disturbed zones restrict the effective penetration of seismic energy, and often no basement structures can be detected. Off East Kalimantan (Plate 2, Fig. 2) the reef growths near the edge of the shelf are covered by thick sequences of mud and silt. Continental slope sediments are unstable and produce slides and contain disturbed bedding. Off SE Sulawesi the sections were described as very similar to those recorded on the narrow New South Wales shelf and slope (Plate 2, Fig. 3).

In summary, there are some marginal barriers in Indonesia which produce extensive basins near the shelf edge and slumped zones to the seaward side of these barriers. Where there are no marginal barriers, thick Tertiary sediment is carried down an extensive convex slope into a deep water basinal region. In regions remote from thick Tertiary sediment, reef growth may have continued from the mid-Miocene, but petroleum exploration leases in these regions appear to be under particularly rigorous security arrangements and these structures were not discussed or shown to me.

Dr Katili outlined his view of the movements of the Asian Pacific and Australian plates in this region, and these appear to be similar to views of most oil company geologists. Dr Katili has submitted a paper to Tectonophysics and his ideas will be detailed there (Plate 3). He considers a double island arc structure is common throughout the region. These arcs are formed at the junction of two plates along the subduction zone. A Cretaceous double island arc was created by the motion of the Australian plate against the Asian plate. This formed the Sumba, Timor, Ceram, and Buru double island chain (Plate 3, first figure). The Pacific plate moved westward against the Asian plate and formed a Sulawesi-Philippines double island arc. In Figure 2, Plate 3 the Tertiary movements of the Pacific Plate folded back the Ceram section of the Banda arc and the K shape of Sulawesi developed out of the original double island arc as a result of motion along a transform fault. At the same time a new double island arc formed to the east of Sulawesi out of which later Tertiary movements generated the K-shaped island of Halmahera. The development of the Philippines to the north of Sulawesi is not portrayed in Plate 3.

6. CONCLUDING REMARKS

I found the IPA conference very stimulating and it broadened my outlook of geology and geophysics in the Australian region. I recommend that BMR send either a geologist or a geophysicist to future conferences. Although Mr L. Williams, who represented BMR last year (Williams, 1973) recommended that only a geologist attend I believe geophysicists should be encouraged to attend and present papers because much of the geological interpretation is largely dependent on geophysical data.

Exploration methods used on the Indonesian shelf areas indicate that a substantial increase in BMR's reconnaissance surveying costs can be expected for shelf regions. Operational methods used in Indonesian seismic surveys may not entirely suit BMR reconnaissance surveying and a closer investigation is needed of oil company research vessel methods.

Both government and private oil companies appreciated the Australian government's interest in their exploration and development. No specific requests for co-operative work between the two governments were received, but gravity ties between Timor, West Irian and Darwin were discussed with the Geological Survey. The Geological Survey in

Bandung, field offices of the oil companies, and regional company offices in Singapore hold survey data not available in Jakarta. I recommend that future BMR representatives visit these other centres.

7. REFERENCES

WILLIAMS, L.W., 1973 - Overseas Visit, L.W. Williams,
1-21 June 1973. Bur. Miner. Resour. Aust. Rec. 1973/97
(unpubl.).

APPENDIX 1

Personnel in Technical Discussions during the convention.

Richard Sweet	(Mobil, Dallas, U.S.A.)
Don Seeley	(Exon, Houston, U.S.A.)
Mike Audley-Charles	(Imperial College, London, U.K.)
Mohamud Untung	(Geological Survey, Bandung, Indonesia)
James Rae	(Digicon, Singapore)
G. Evans	(A.A.R. Brisbane, Australia)
R. Paten	"
N. Zillman	"
M. Drew	"
Fletcher McCutchan	(Texaco, Brisbane, Australia)
R. Jessop	(Endeavour, Sydney, Australia)

APPENDIX II

Personnel in Technical Discussions after the convention
(Jakarta)

Dr J. Katili	(Director, Department of Mines)
Dr Bambang Sulesmoro	(Foreign Affairs Director, Dept of Mines)
Dr Lui Soeparyadi	(Exploration Co-ordinator, Pertamina)
Dr Bachtoel Chatab	(Caltex)
R. Wiggins	(Cities Services, Indonesia)
J. Wilson	"
J. Brooks	(Sunda Shell)
A. Stebinger	(Mobil Oil Indonesia)
G.L. Fletcher	(Atlantic Richfield (ARCO))
R. Bommel	"
E. Gurney	(Gulf Oil)
C. Little	(Gulf Oil)

APPENDIX III

IPA Sessions Attended

Opening Ceremony.

Tectonic development of Eastern Indonesia in relation to Gondwanaland dispersal.

Palaeogeography of N.E. Sumatra.

The Tertiary basinal area of Central Sumatra.

The geology of the Central and Southern Sumatra Basins.

The discovery and development of the Petapahan Oil Field, Central Sumatra.

The basement configuration of Northwest Java area.

Exploration of the South Barito Basin Reef Tract, Kalimantan.

Geology of Misool Island.

Deep water drilling with the SEDCO 445 offshore Java.

Late Tertiary biostratigraphics zonation, offshore Kutei Basin, E. Kalimantan.

The Geology of the Badak Field, E. Kalimantan.

Fore arc structure.

Closing Ceremony.

ISLANDS OF THE INDONESIAN ARCHIPELAGO

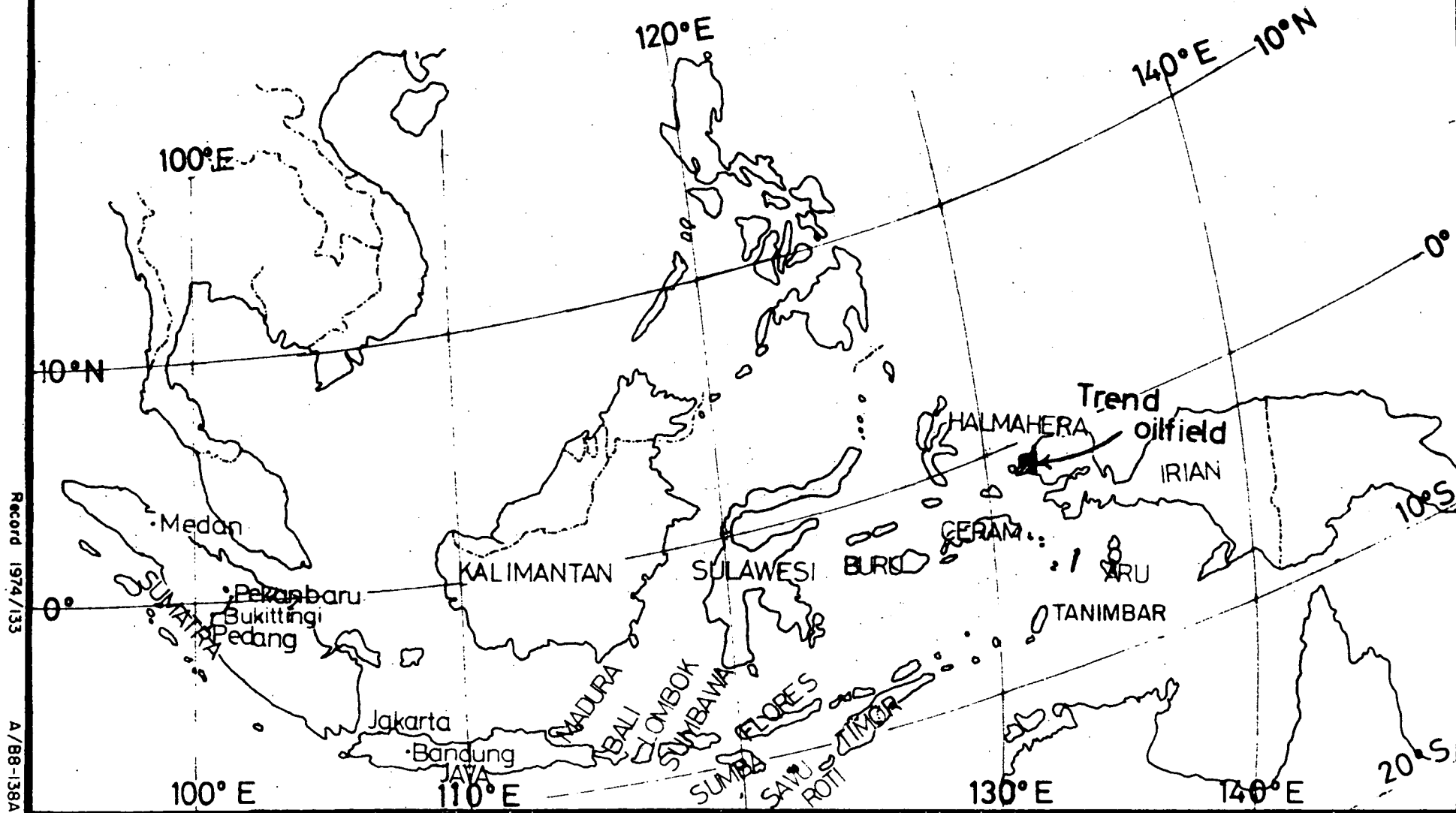
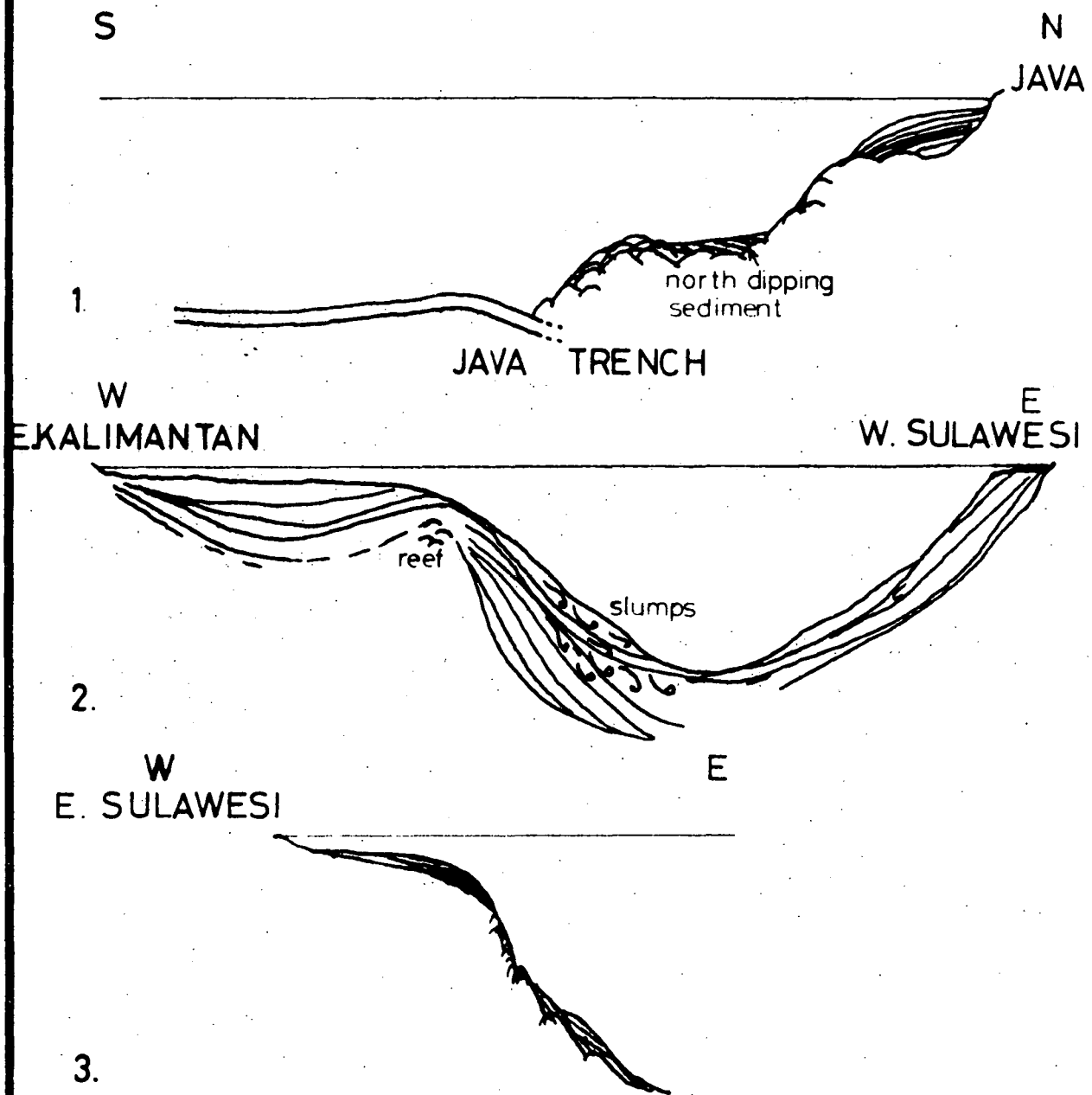
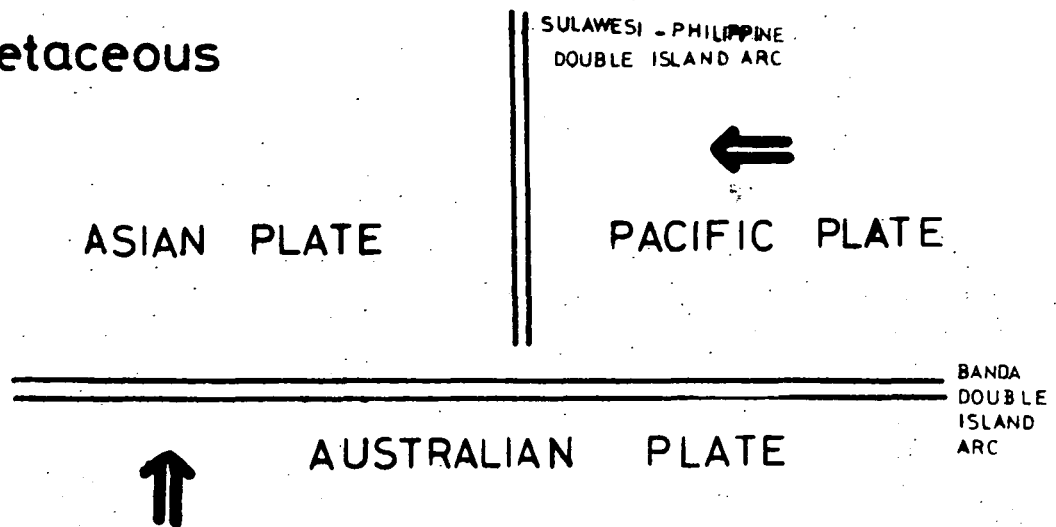


PLATE 2

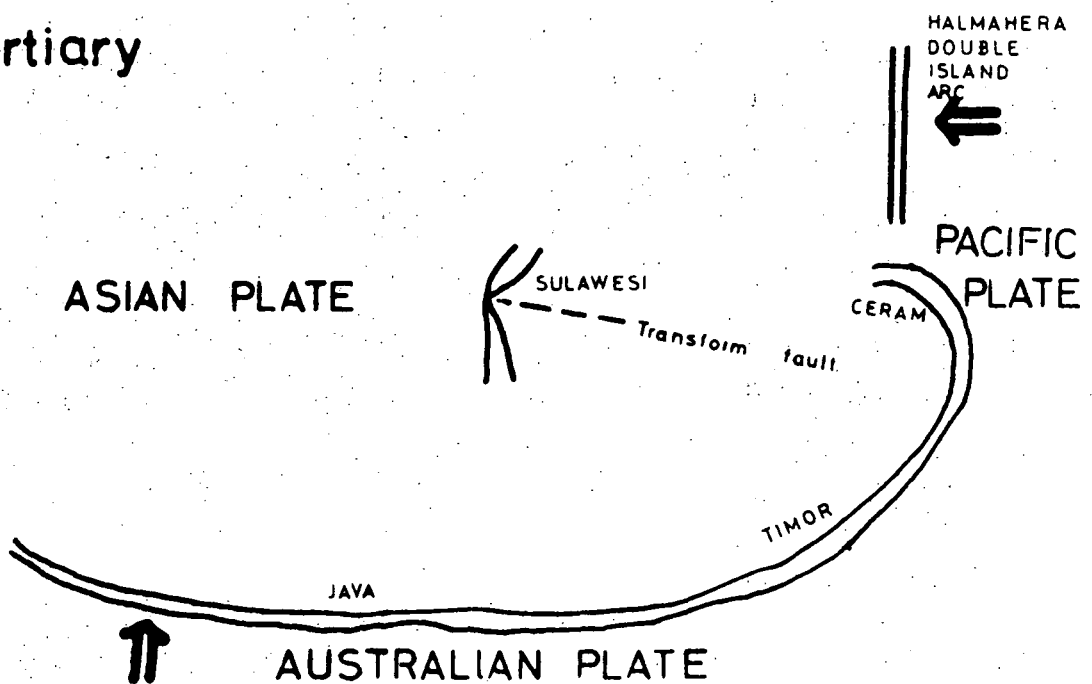


CONTINENTAL MARGINS IN INDONESIA

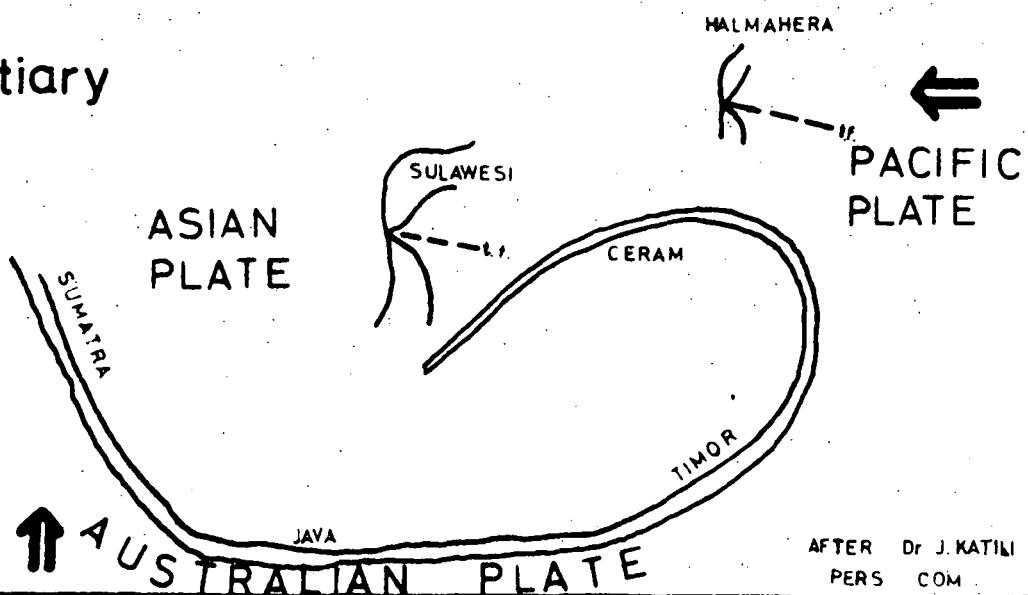
1. Cretaceous



2. Tertiary



3. Tertiary



AFTER Dr J. KATINI
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DEVELOPMENT OF THE INDONESIAN ARCHIPELAGO