UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PREPARED ON BEHALF OF THE MINISTRY OF MINES, GOVERNMENT OF INDONESIA, AND THE AGENCY FOR INTERNATIONAL DEVELOPMENT, U.S. DEPARTMENT OF STATE, IN COOPERATION WITH THE GEOLOGICAL SURVEY OF INDONESIA, THE AUSTRALIAN BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS, AND THE LAMONT-DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY

PROFESSIONAL PAPER 1078
PLATE I

TECTONIC MAP OF THE INDONESIAN REGION

Bathymetry compiled by Warren Hamilton, U.S. Geological Survey, in cooperation with the Scripps Institution of Oceanography (SIO) of the University of California. Indian Ocean and Andaman and Banda Seas contoured by Robert L. Fisher, SIO, in Udintsev, G. B., ed., Geological-Geophysical Atlas of the Indian Ocean (in press): Akademiya Nauk SSSR, 1972. Regional sources: Indian Ocean, Fisher, R. L., Chase and H. W. Menard, SIO, 1959, U.S. Navy Hydrographic Office Pub. 1201. Region between Equator and New Guinea: Jacqueline Mammerickx, T. E. Chase, S. M. Smith, and I. L. Taylor, SIO, 1971, Bathymetry of the South Pacific, Chart 11, University of California. Cont Sed. J. H. Gardner, 1975, Geological Society of America Bulletin, v. 71, no. 8, fig. 3. Minor corrections in various areas by Hamilton.

MERCATOR PROJECTION EQUATORIAL SCALE 1:5 000 000

100 0 100 200 300 400 500 600 700 800 900 1000 KILOMETERS
100 0 100 200 300 400 500 STATUTE MILES
100 0 100 200 300 400 NAUTICAL MILES

BATHYMETRIC CONTOURS
CONTOUR INTERVAL 1000 METERS, WITH
200-METER CONTOUR ADDED

INTERNATIONAL BOUNDARIES SHOWN ON THIS MAP ARE NOT NECESSARILY AUTHORITATIVE

NITROGEN—GEOLOGICAL SURVEY, RESTON, VA.—1978, REPRINTED, 1981, 1986, 1991

CORRELATION OF MAP UNITS
COLOR AND LETTER SYMBOL INDICATE AGE OF MATERIAL

CENOZOIC	Q	QTv	NEOGENE – Early Quaternary through Miocene	EARLY QUATERNARY THROUGH LATE MIOCENE
	T	Tm	PALEOGENE – Oligocene through Paleocene. Includes early Miocene and Late Cretaceous in Northern New Guinea, and locally early Miocene elsewhere	MIDDLE MIOCENE THROUGH OLIGOCENE
		Tv		EOCENE
MESOZOIC	Mz	K	CRETACEOUS	CRETACEOUS AND JURASSIC
		J	JURASSIC	
		TrJ	TRIASSIC	JURASSIC THROUGH PERMIAN
PALEOZOIC	Pz	PC	PERMIAN AND CARBONIFEROUS	CARBONIFEROUS AND DEVONIAN – Includes Permian in northwest Australia
		DS	DEVONIAN AND SILURIAN	
		OC	ORDOVICIAN THROUGH MIDDLE CAMBRIAN	
		Cv	EARLY CAMBRIAN	
PRECAMBRIAN	pC	Ei	LATE PROTEROZOIC	EARLY MIOCENE THROUGH JURASSIC – Includes Late Triassic in Sulawesi
		Em	MIDDLE PROTEROZOIC	
		Ea	EARLY PROTEROZOIC	TRIASSIC THROUGH CARBONIFEROUS
		A	ARCHEAN	

TK	EOCENE THROUGH LATE CRETACEOUS
KC	EARLY CRETACEOUS THROUGH CARBONIFEROUS

TECTONIC ENVIRONMENT OF DEPOSITION OF SEDIMENTARY MATERIALS

Background color and symbol indicate age
Environment is designated only where area is patterned

DEPOSITS IN BASINS IN CONVERGENT PLATE SYSTEMS OF SUBDUCTION AND ARC MAGMATISM

- Outer-arc basin – Strata in structural basin between magmatic arc and trench. Includes strata deposited in this basin, continental-shelf strata deformed into basin after deposition, and strata deposited on melange wedge in deep water and raised by subduction processes
- Forelland basin – Strata deposited on cratonic side of magmatic arc (as in Sumatra and Java) or of imbricate thrust belt produced by arc collision (as in New Guinea)
- Coastal, intermontane, and intervolcanic basins

DEPOSITS OF CONTINENTAL INTERIORS AND STABLE OR RIFTED MARGINS

- Platform cover and broad cratonic basin
- Continental shelf – Wedge of mostly shallow-water strata, deposited on stable or rifted continental margin
- Coastal and intermontane basins

DEPOSITS OF ISLAND PLATFORMS

- Mostly shallow-water carbonate strata

DEPOSITS OF CONTINENTAL SLOPE AND RISE

- Deep-water sediments — Deposited mostly along stable or rifted continental margins, and raised subsequently by subduction processes. Not separated from melange in many areas

IGNEOUS ROCKS AND RELATED FEATURES

Background color and symbol indicate age
Ophiolite shown in purple

VOLCANOES AND ROCKS FORMED MOSTLY ABOVE SUBDUCTED LITHOSPHERE PLATES

- Active volcano
- Late Quaternary volcano
- Silicic volcanic rocks
- Intermediate and basic volcanic rocks – Mostly calc-alkaline. Includes silicic or alkaline volcanic rocks in some areas
- Alkaline volcanic rocks
- Interbedded sedimentary and volcanic rocks
- Granitic rocks
- Metamorphic rocks – Age indicated is that of original rocks. Does not include metamorphic rocks in subduction complexes
- Granitic and metamorphic rocks – Age indicated is that of metamorphism and intrusion

CONTINENTAL AND ISLAND BASALTS NOT RELATED TO SUBDUCTION

- Tholeiitic basalt
- Alkaline basalt

STRUCTURAL FEATURES

BOUNDARIES OF LITHOSPHERE PLATES

- Trace of subduction zone – Teeth on overriding plate. Solid where active; dashed where inactive; dotted where buried by sediments or overridden by another subduction zone. Wedges, more than 100 km wide and 10 km thick, of imbricated sediments, melange, and crystalline rocks lie upon the subducting plates and hide actual lithosphere-plate contacts around the Java Trench-Sunda Trough subduction system and in the Moluccas Sea region. Subduction-zone symbol is placed at the gentle-sided trench at the front of the wedge where present
- Strike-slip fault – Showing sense of relative motion. Solid where active; dashed where inactive; dotted where covered
- Spreading center – Showing direction of relative separation. Axis solid where active; dashed where inactive. Age indicated by note
- Inactive collision suture between opposed subduction systems

LESSER STRUCTURES

- Strike-slip fault – Showing sense of relative motion. (The same symbol is used for plate-bounding strike-slip faults)
- Normal fault – Hachures on downdropped side. Active and inactive fault shown by the same symbol
- Thrust fault – Teeth on overriding sheet. Active and inactive faults shown by the same symbol
- Fault – Type unspecified (on the ocean floor, mostly transform faults). Solid where active; dashed where inactive
- Folds – Axes of folds or trends of structures in deformed layered rocks
- Boundary of small continental plate or of basement tectonic province – Annotated to indicate specific usage. Solid where control good; dashed where poor

FEATURES OF SUBDUCTION ZONES AND OF OCEANIC CRUST AND MANTLE

SUBDUCTION-ZONE COMPLEXES

- Mélange, broken formations, or imbricated terrain — Formed as wedge above subducting lithosphere plate. Sedimentary rocks, metamorphic rocks (blueschist, greenschist, and amphibolite facies), and unmapped masses of ophiolite. Age of youngest thoroughly disrupted material indicated by letter symbol following "m". Lines show structural trend
- Wedge of melange, broken formations or imbricated terrain beneath sea level – Lines show structural trend. Shown only where there is little cover of undeformed sediment
- Fragments of oceanic crust and upper mantle – Occur on land as dislocated masses in, or bounded by, subduction complexes
  - op, ophiolite
  - b, basalt
  - gb, gabbro
  - um, ultramafic rocks

BENIOFF SEISMIC ZONES

- 200 — Depth to inclined zone of mantle earthquakes – Contour interval 100 km. Hachures on down-dip side. Contours mark tops of subducting plates at shallow depths and interiors at greater depths. Plates are assumed to be continuous for long distances laterally rather than fragmented into tongues of different dips. Modified slightly from Warren Hamilton, 1974, Earthquake map of the Indonesian region (U.S. Geol. Survey Misc. Inv. Map I-875-C), which also shows epicenters and first-motion solutions

AGE OF OCEANIC CRUST

- 150 — Age of crust formed by sea-floor spreading – Age, in millions of years, as dated by the magnetic-anomaly method. Solid where correlations good; dashed where dubious. Interpolated to intervals of 5 m.y. where data permit. Sources of data: south of Sumatra, J. G. Sclater and R. L. Fisher, 1974, Geol. Soc. America Bull., v. 85, p. 683–702; northwest of Australia, R. L. Larson, 1975, Geology, v. 3, p. 69–71
- DSDP 211 — Drillhole of Deep Sea Drilling Project — Note indicates age and character of deepest material reached. Data from published reports

ISOPACHS

- 5000 — 6000 — Thickness of sediments and sedimentary rocks – In meters. The age of materials contoured is given by notes. Generally limited to materials that are at most moderately deformed, but includes highly deformed strata in inland part of Sarawak basin and in medial New Guinea. Isopachs end arbitrarily against areas of correlative deformed strata, against correlative or younger volcanic rocks, or before reaching isopachs of younger sedimentary series. The data contoured are of widely variable quality and spacing. Modified from Warren Hamilton, 1974, Sedimentary basins of the Indonesian region, U.S. Geol. Survey Map I-875-B, to incorporate additional data; see that map for basin descriptions

SOURCES OF DATA

Onshore geology is adapted, following plate-tectonic interpretations and having incorporated new evidence for age of materials, from primary geologic maps and reports wherever available, rather than from previous national or regional compilations. Data on thickness of strata in onshore and shallow-water offshore basins were provided mostly by many oil companies operating in the region.

Tectonic and stratigraphic interpretations offshore in deep water are based largely on unpublished seismic-reflection profiling. The extensive profiling by Lamont-Doherty Geological Observatory of Columbia University was usually the most important, but deep-penetration oil- and geophysical-company profiles provided critical control, as well as much additional coverage.

Sources of data for Benioff-zone contours and for age of oceanic crust are noted in the Explanation.

GLOSSARY OF INDONESIAN GEOGRAPHICAL TERMS

Jazirah		peninsula
Kepulauan	Kep.	island group
Pulau	P.	island
Sungai		river
Teluk		bay
Danau		lake