

Plate Tectonics of Australia and Surrounds

Last Updated July 2023 by Dariusz Jablonski



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LEGEND

ABBREVIATIONS

A	- ARKARINGA BASIN
SA	- SOUTH AMERICA
AP	- ASHMORE PLATFORM
B	- BOWEN BASIN
BB	- BONAPARTE BASIN
BR	- BROWSE BASIN
B-D	- BARROW-DAMPIER FAILED RIFT
BH	- BIRD'S HEAD (IRIAN JAYA)
C	- CANNING BASIN
CE	- COOPER-EROMANGA BASIN
CS	- CENTRAL SULAWESI
CR	- CARNARVON BASIN
CT	- CENTRAL RANGES (IRIAN JAYA)
D	- DENMAN BASIN
EAR	- EAST ANTARCTIC RIFT
G	- GOULBURN GRABEN
GD	- GODAVARI BASIN (INDIA)
GLHR	- GREATER LORD HOWE RISE
GR	- GREECE
H-V	- HEYWOOD-VULCAN FAILED RIFT
L	- LAMU BASIN (KENYA)
LC	- LESSER CAUCASUS
LR	- LAMBERT RIFT (ANTARCTICA)
M	- MALITA FAILED RIFT
MG	- MADAGASCAR
MR	- MAHANADI RIFT
MZ	- MOZAMBIQUE
NP	- NORTHERN PERTH BASIN
P	- PERTH BASIN
PM	- PATERNOSTER-MERATUS
PG	- PANAGARH AREA (INDIA)
PNG	- PAPUA NEW GUINEA
PT	- PETREL SUB-BASIN
R	- ROEBUCK BASIN
S	- SYDNEY BASIN
SH	- SAHUL PLATFORM
SK	- SIKULEH (WESTERN SUMMATRA)
SP	- SOUTHERN PERTH BASIN
T	- TIMOR
WB	- WEST BURMA
WS	- WEST SULAWESI

PLATE/BLOCK BOUNDARIES

	PRESENT DAY COASTLINE/ BLOCK BOUNDARY
	ACTIVE SPREADING RIDGE/VOLCANISM
	FAILED SPREADING RIDGE/SPORADIC VOLCANISM
	EXTINCT SPREADING RIDGE
	COMPRESSION/COLLISION
	VOLCANIC CENTRE

OTHER

	SEDIMENT INPUT
	OCEANIC CURRENT

ENVIRONMENTS

	OCEANIC CRUST, DEEP
	DISTAL SHELF/BASIN
	PROXIMAL SHELF
	DELTAIC- NEARSHORE- SHELF
	LIMESTONE NEARSHORE- SHELF
	EVAPORITES
	NON-MARINE
	NON-DEPOSITION
	UPLAND, UPLIFT, SIGNIFICANT EROSION, MOUNTAINS
	ICE COVER (MAINLY EROSION)

CONTINENTAL
MARGIN

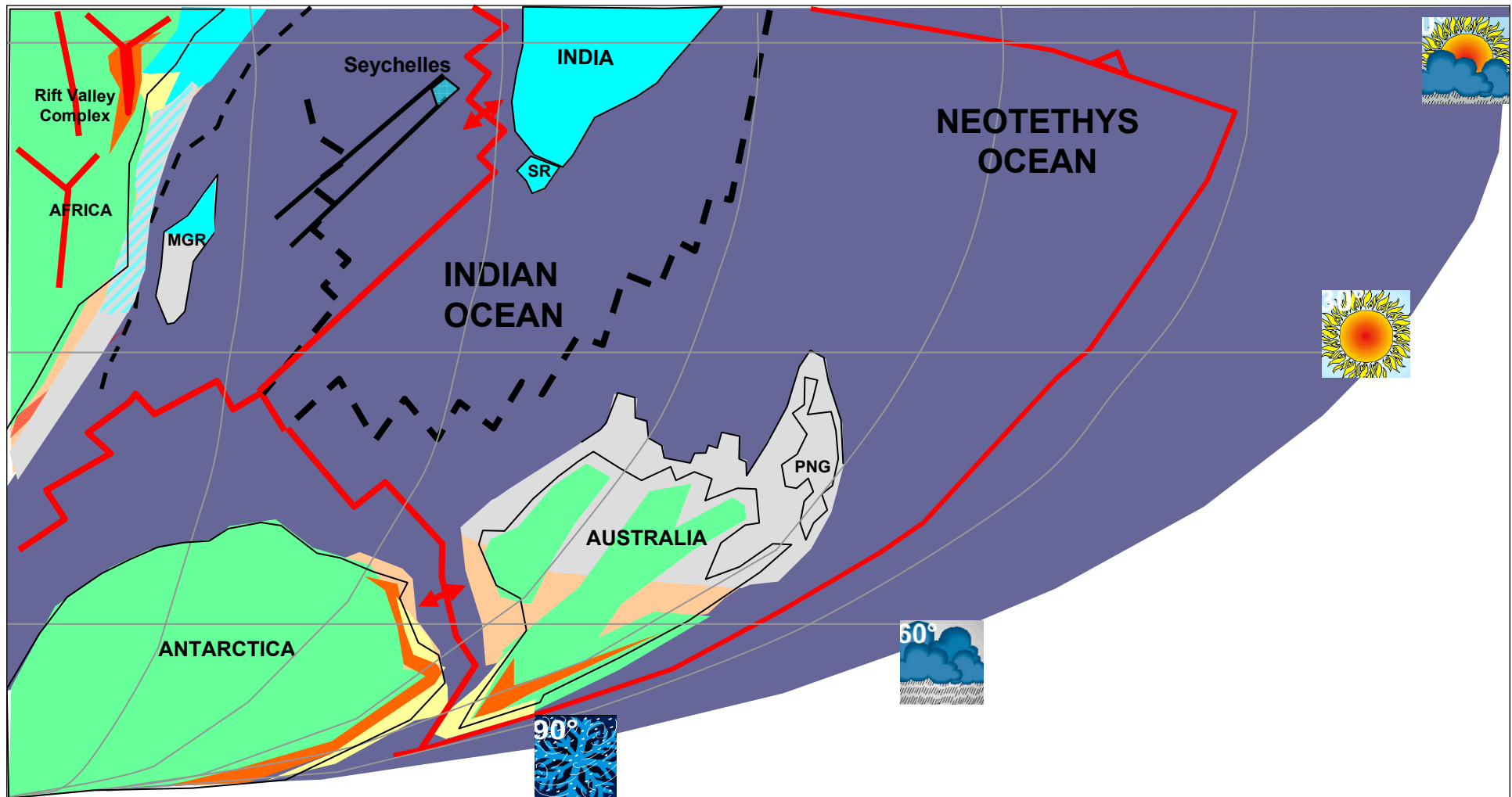
NOTE:
**PALAEOGEOGRAPHIC MAPS ILLUSTRATE MAXIMUM
LITHOFACIES DISTRIBUTION DEPOSITED DURING INDICATED
TIME SLICE (PRESERVED PRESENT DAY DISTRIBUTION NOT
SHOWN)**

NOTE:
Not All figures are referenced

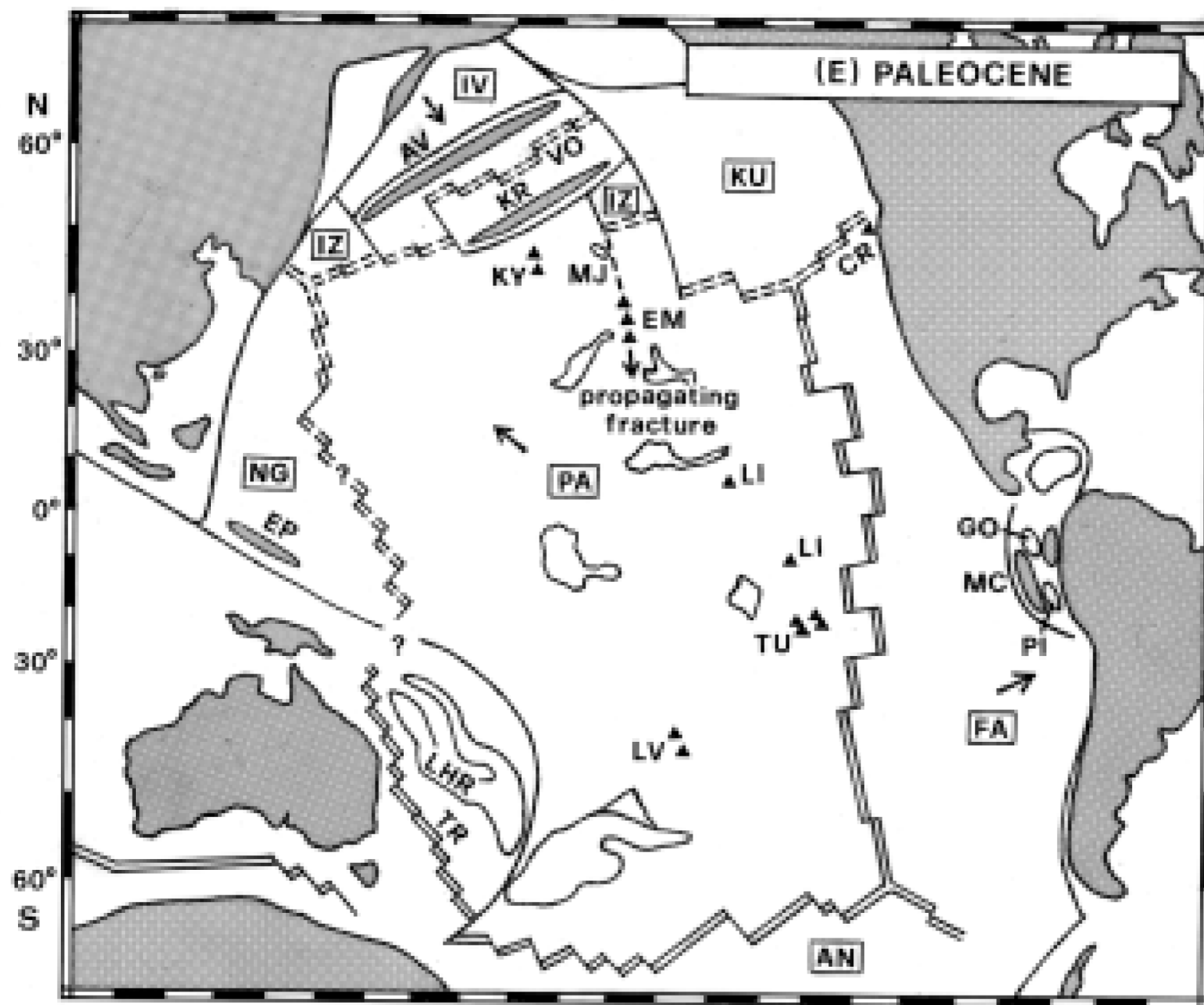
Tertiary

(65S to Present Day)

Lower Tertiary Plate Reconstruction

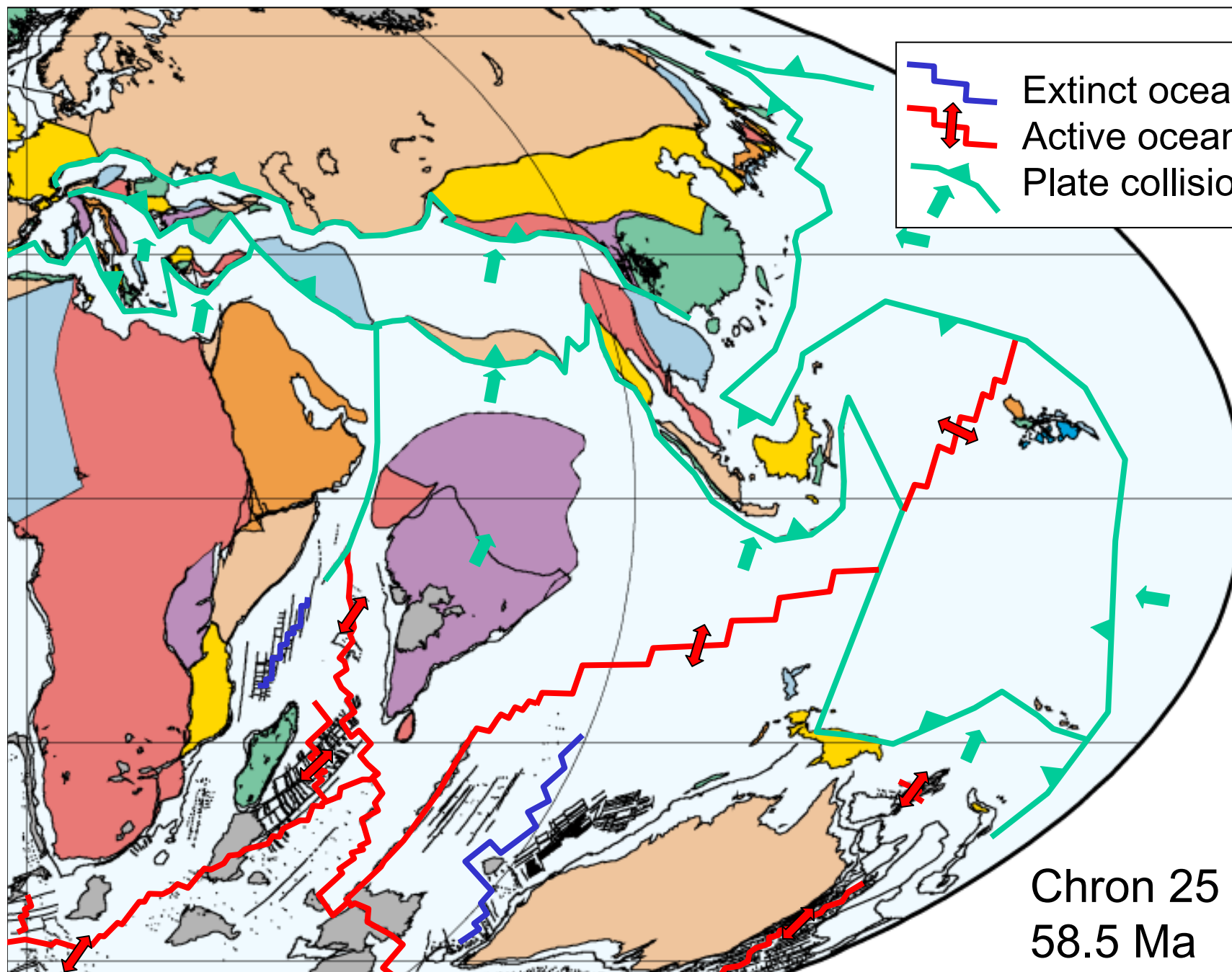


Seychelles<->Greater India Separation
– Post-rift thermal subsidence phase on NWS (T to TE)





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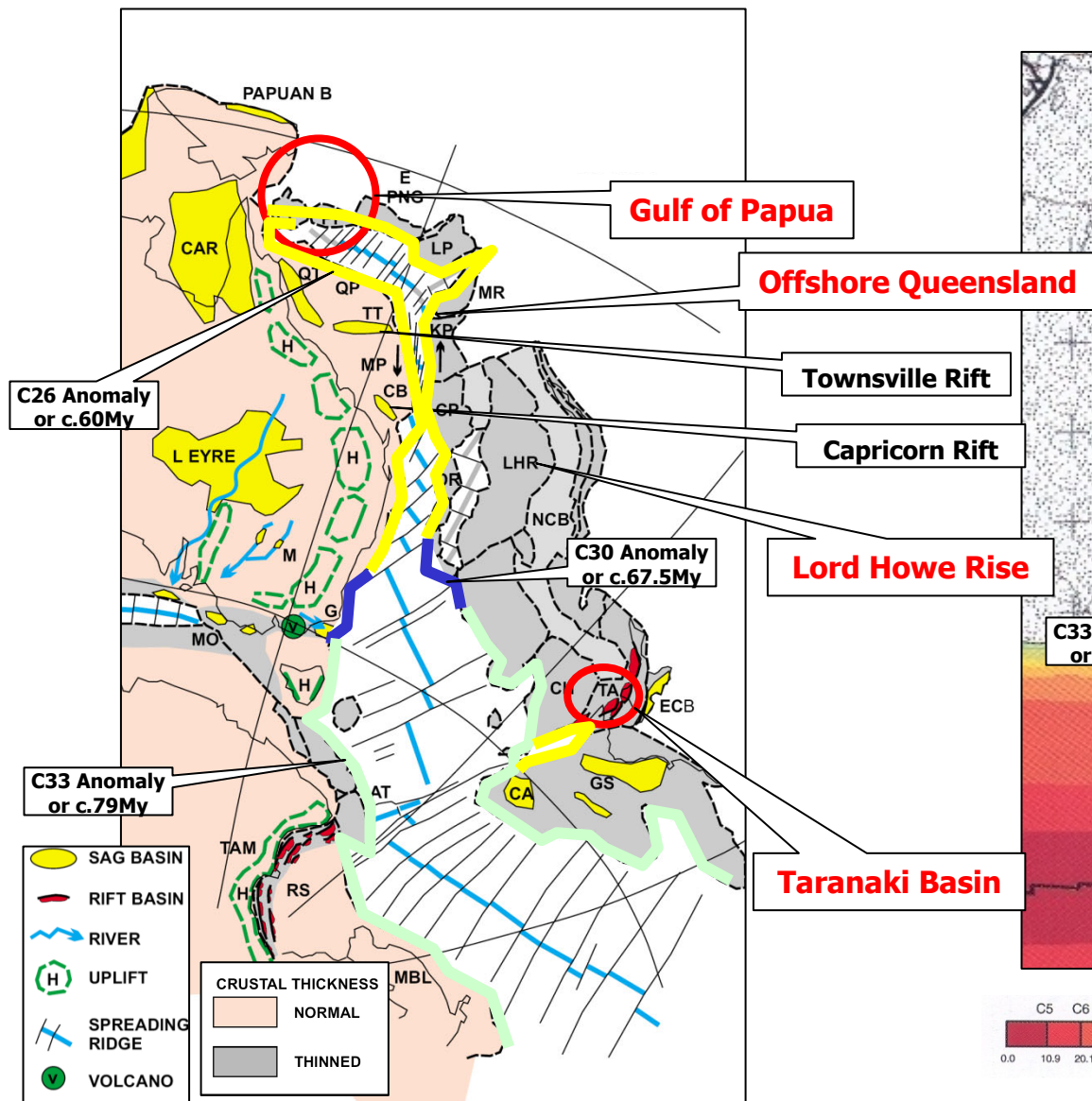


- Extinct oceanic ridge
- Active oceanic ridge
- Plate collision

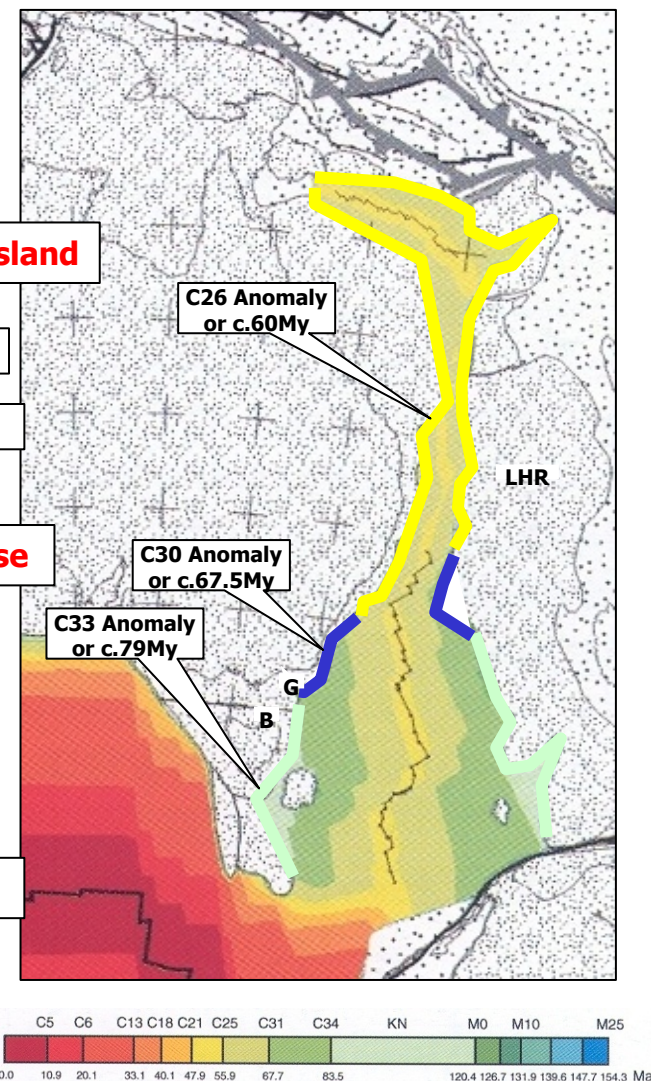
Chron 25
58.5 Ma

55My Paleocene/Eocene plate reconstruction

Break-up Unconformities (1st Coral Sea Oceanic Crust at c.60My)

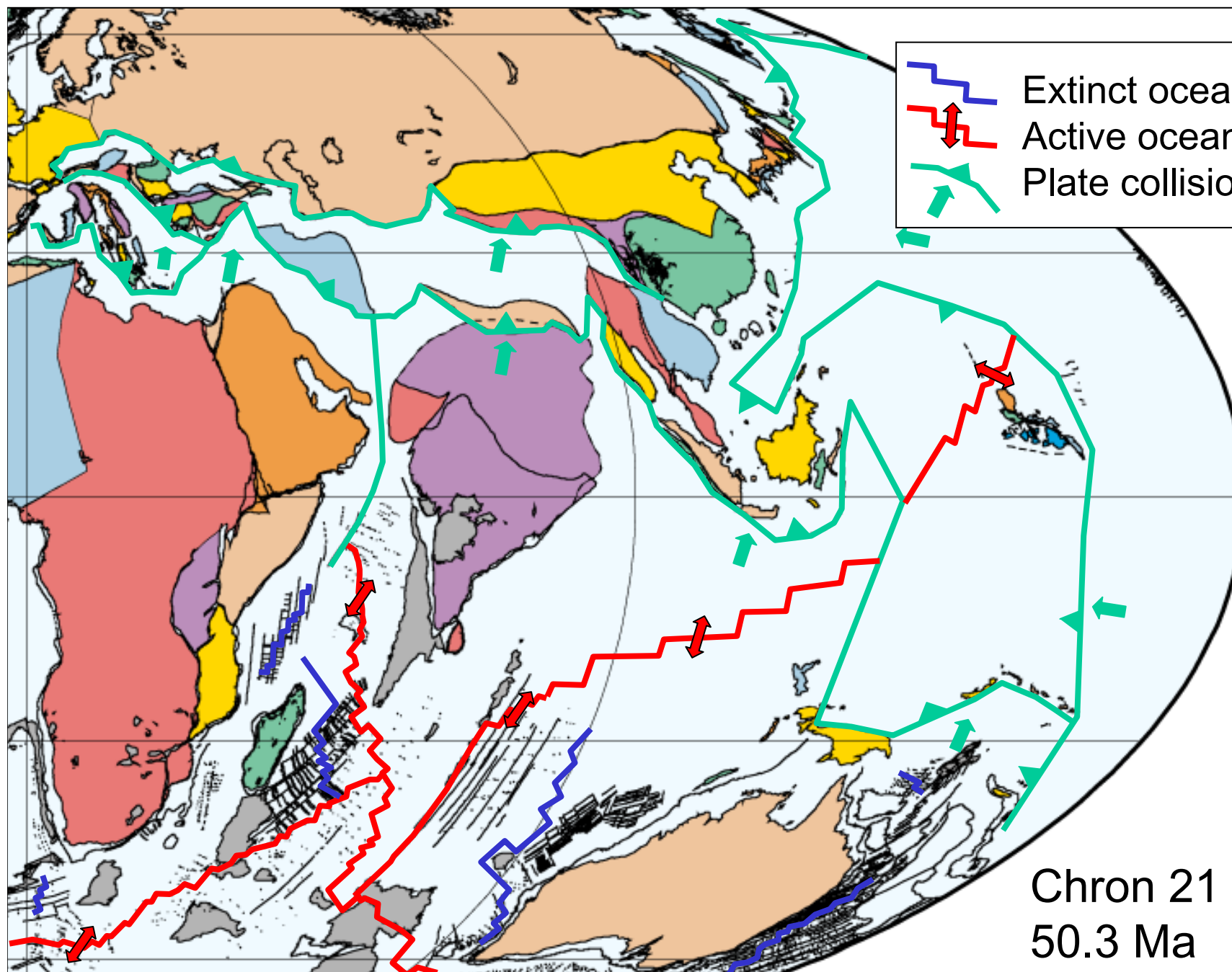


Sea Floor Spreading History



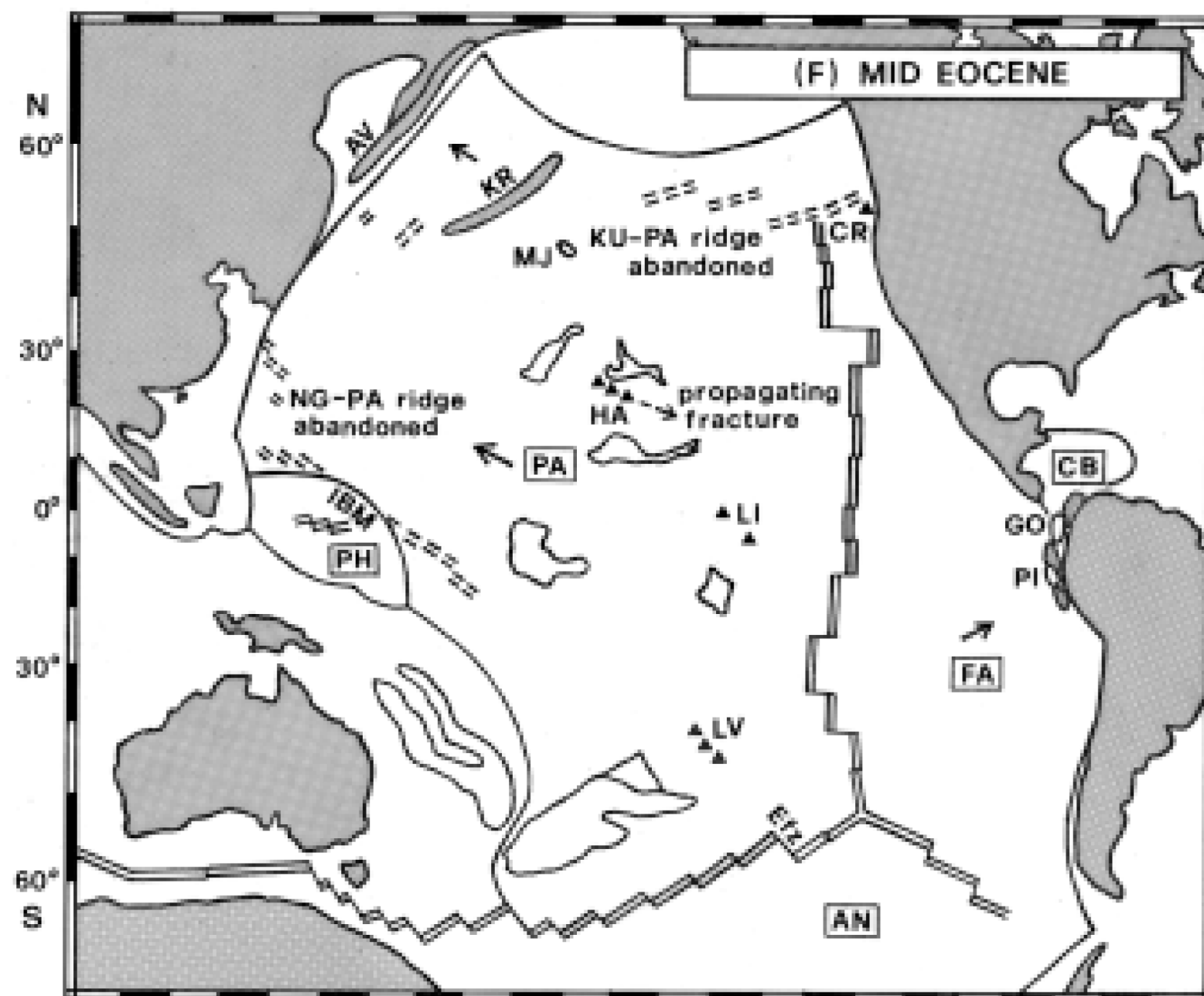


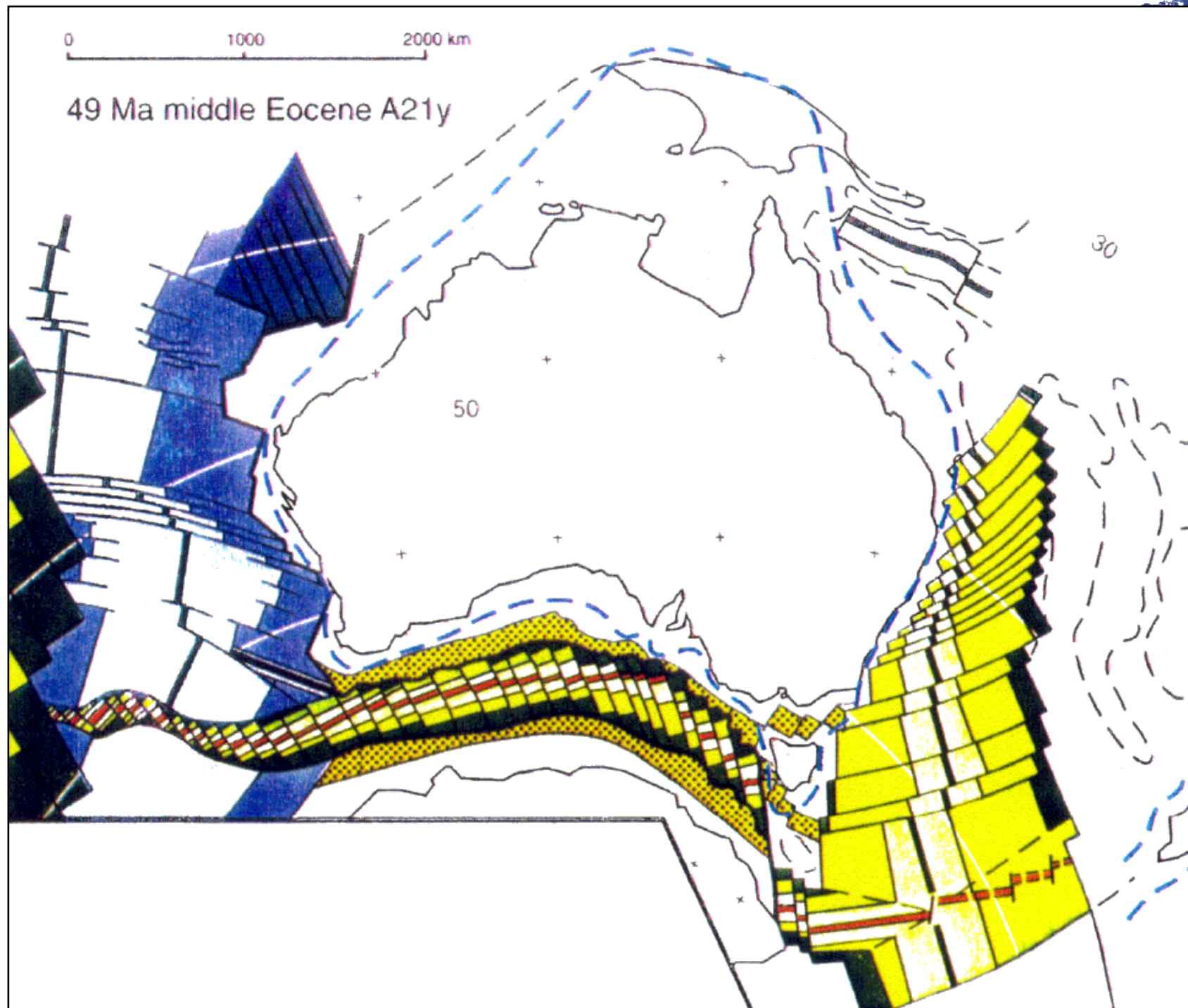
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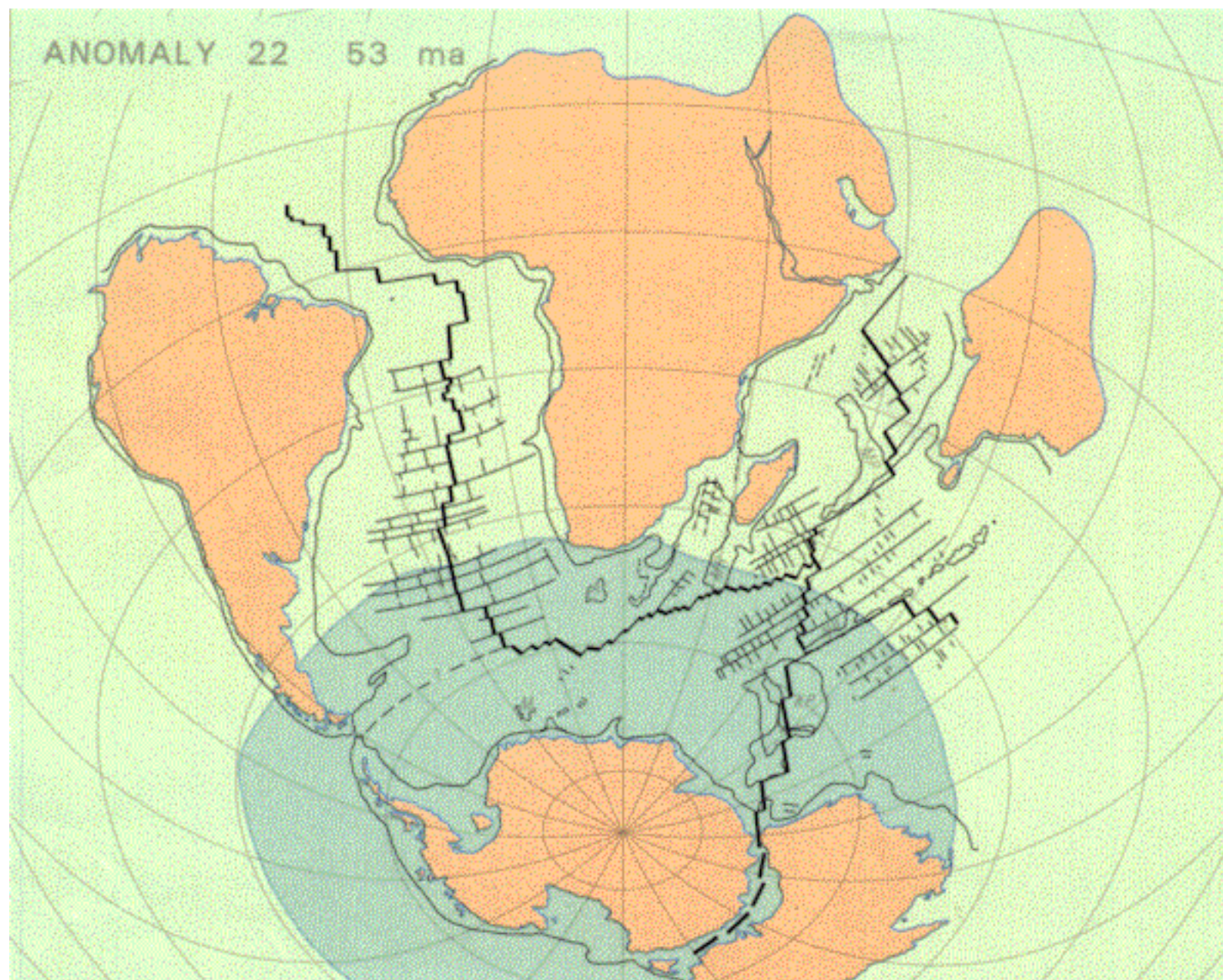


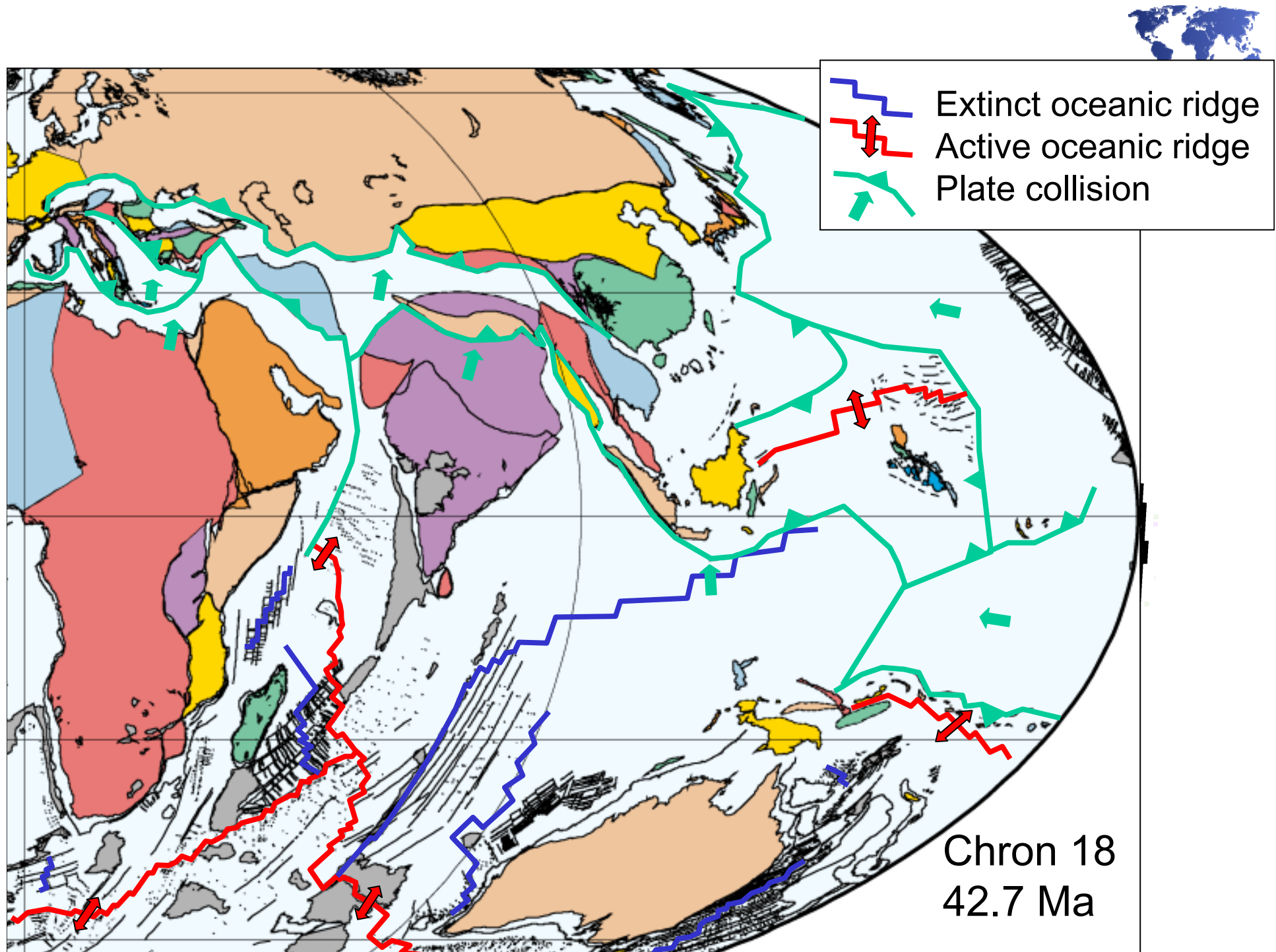


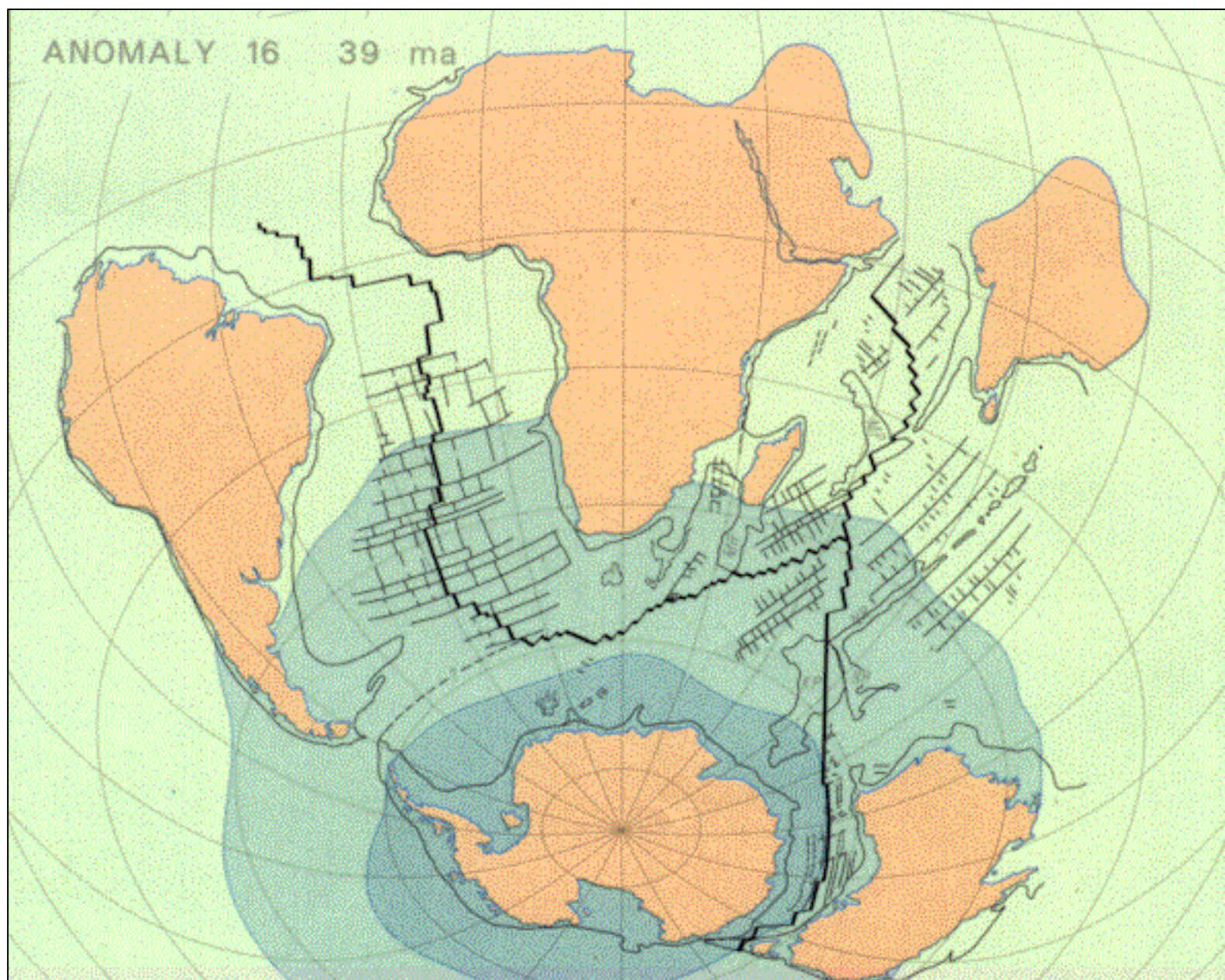
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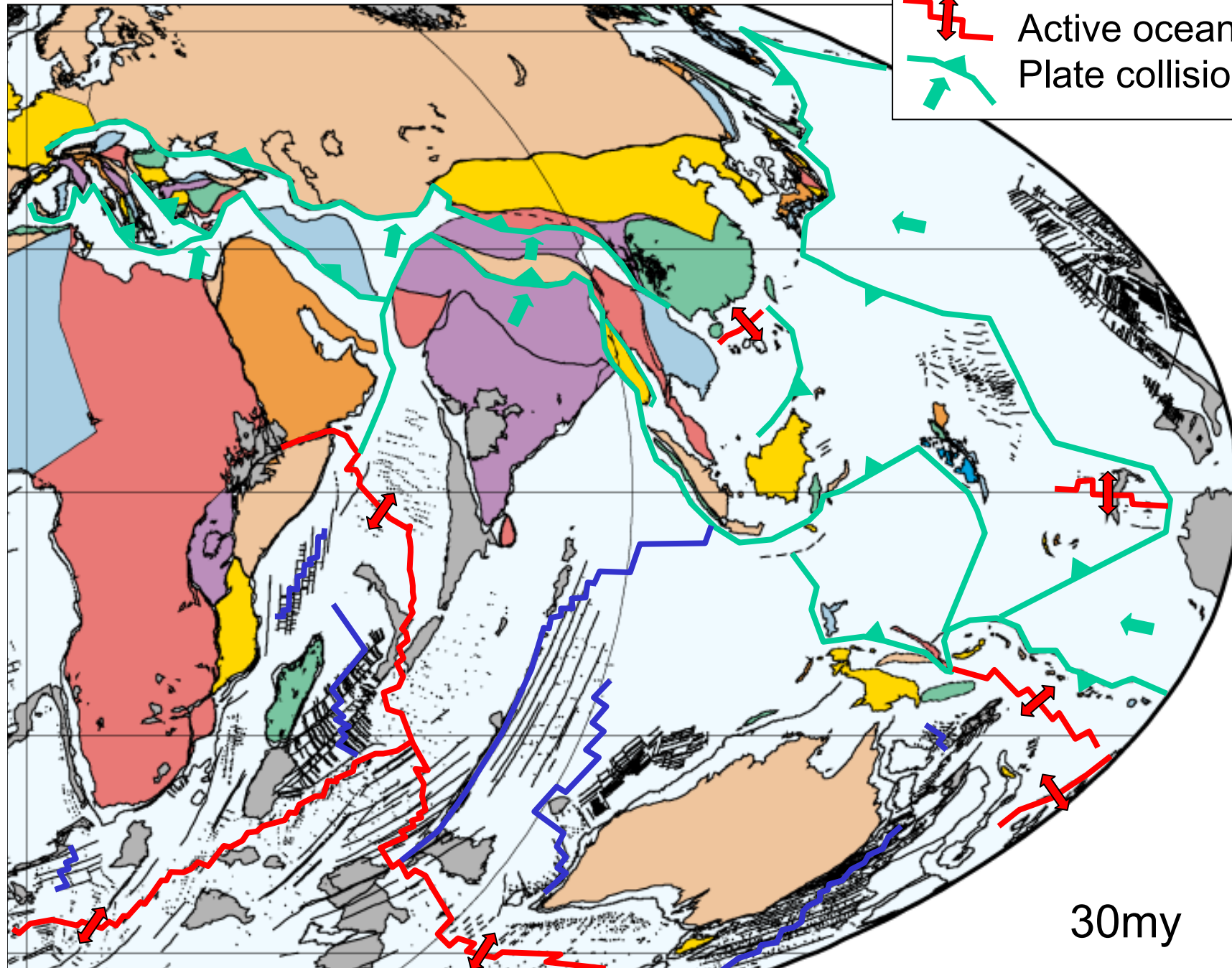


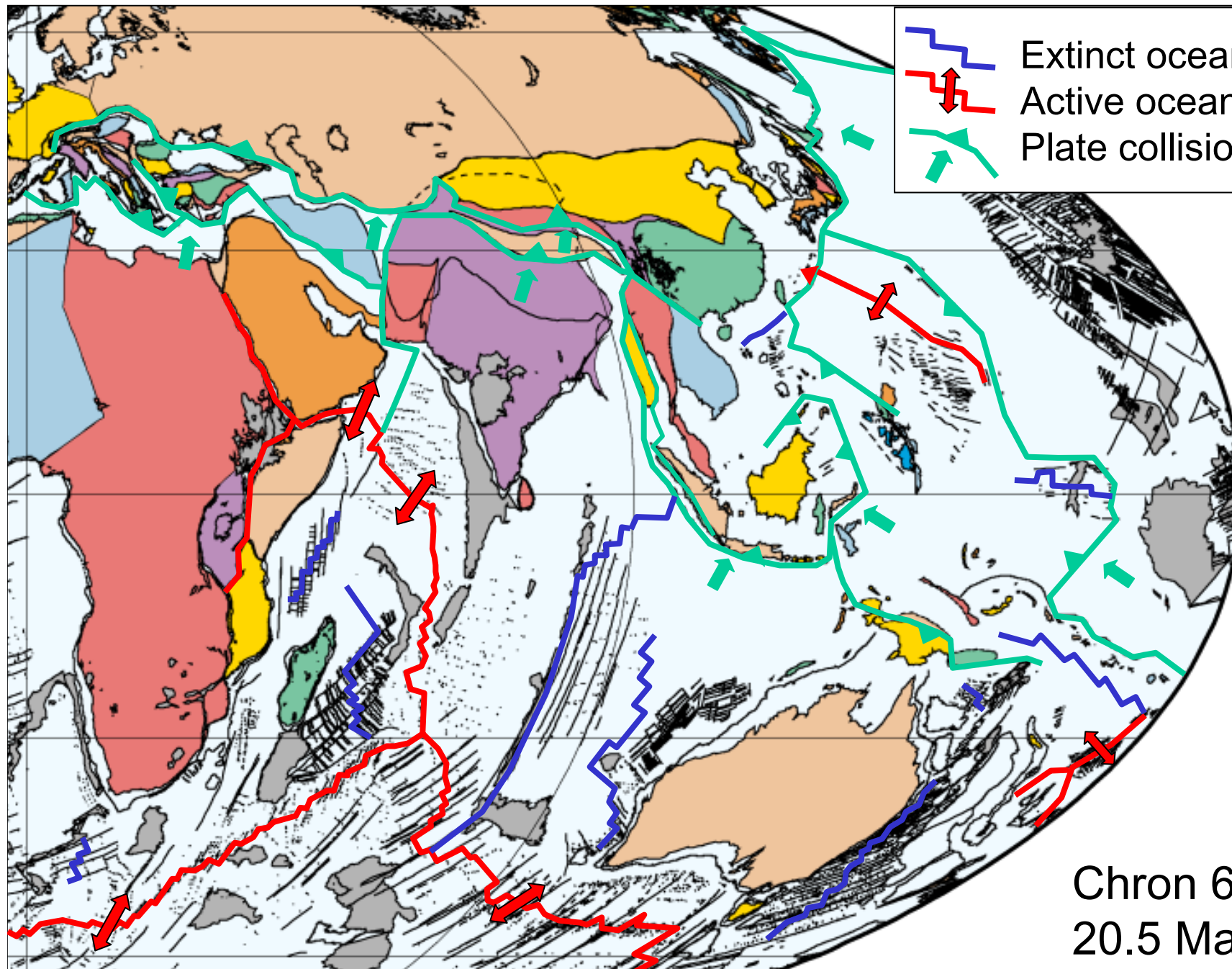






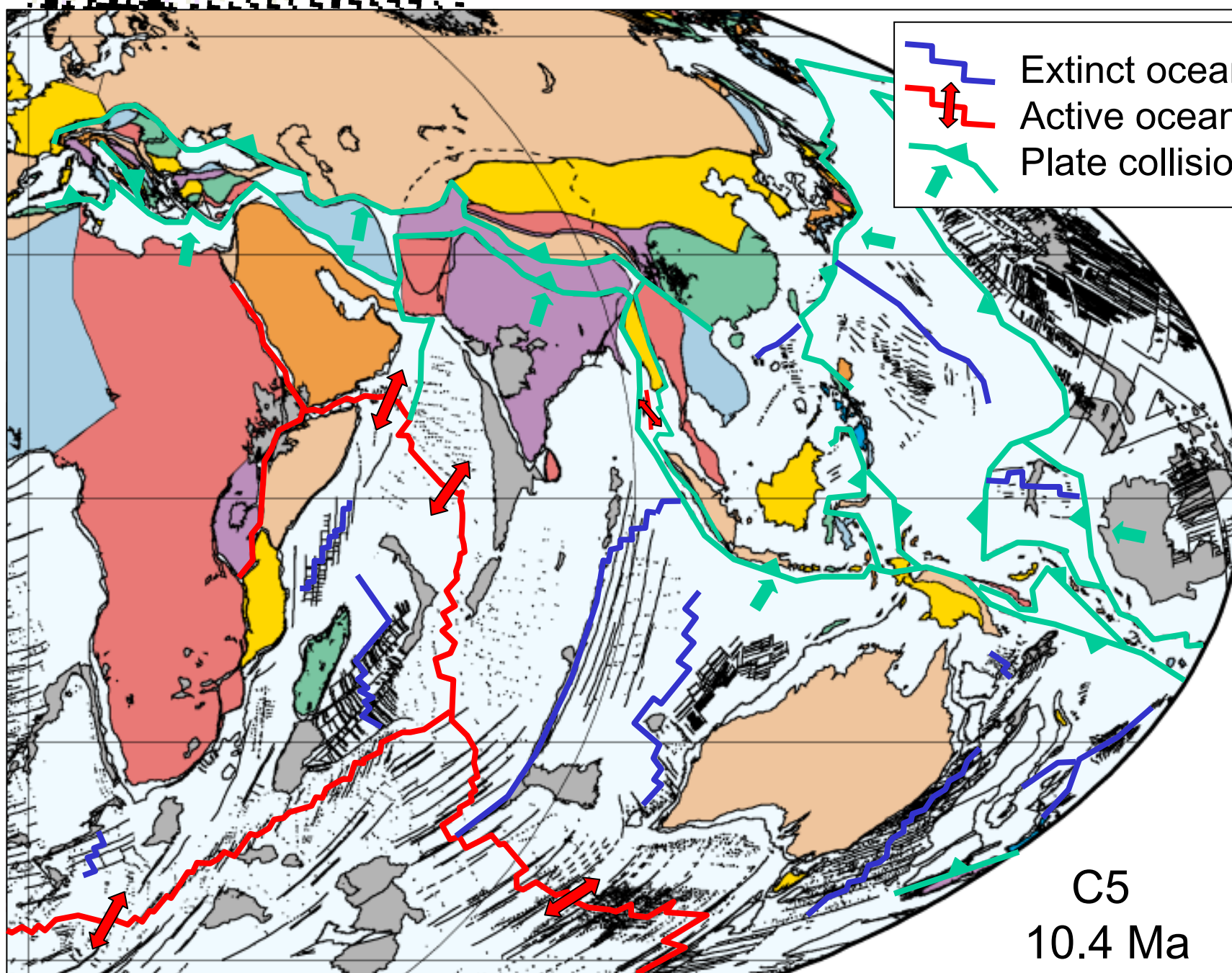
- Extinct oceanic ridge
- Active oceanic ridge
- Plate collision





- Extinct oceanic ridge
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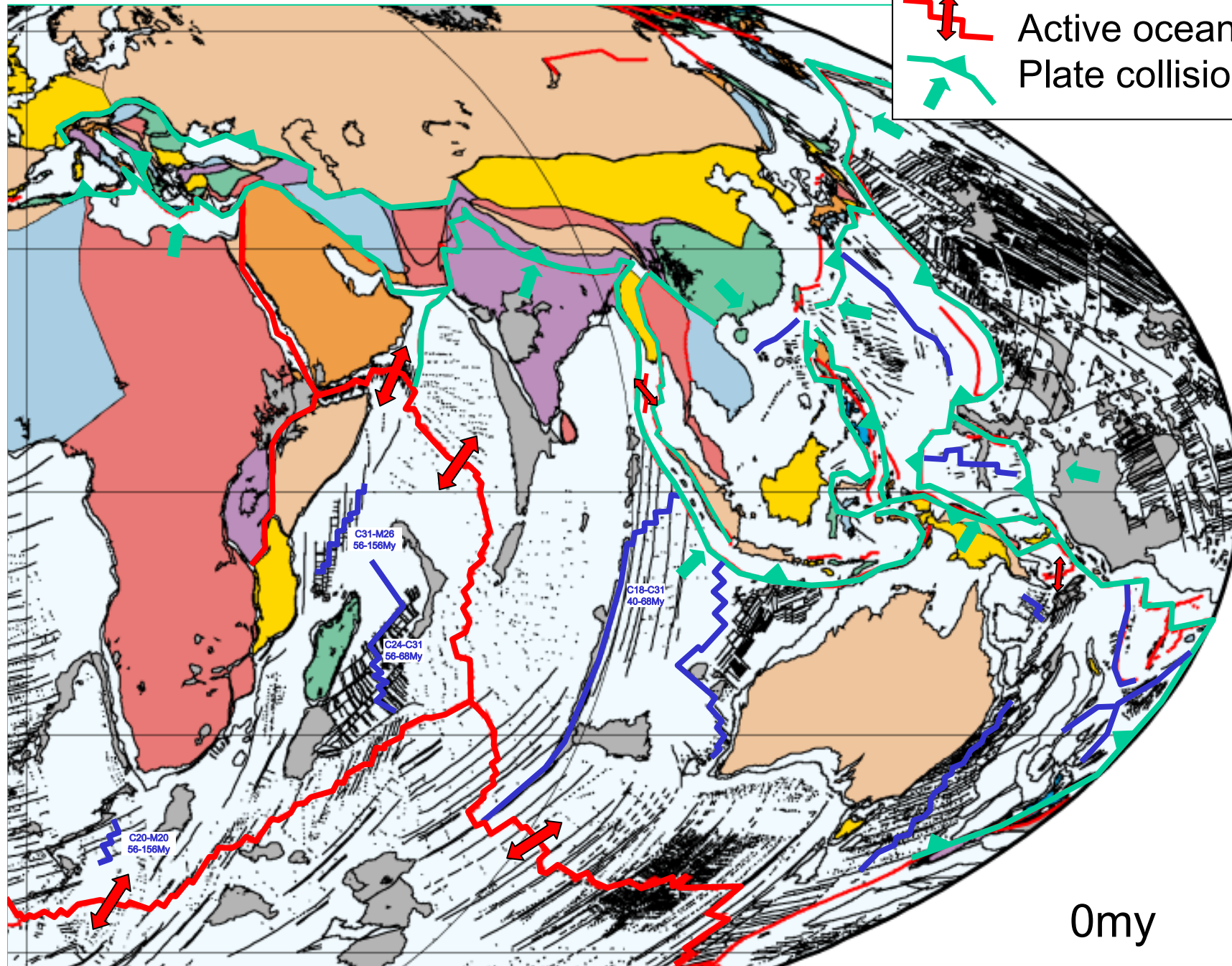
Chron 6
20.5 Ma

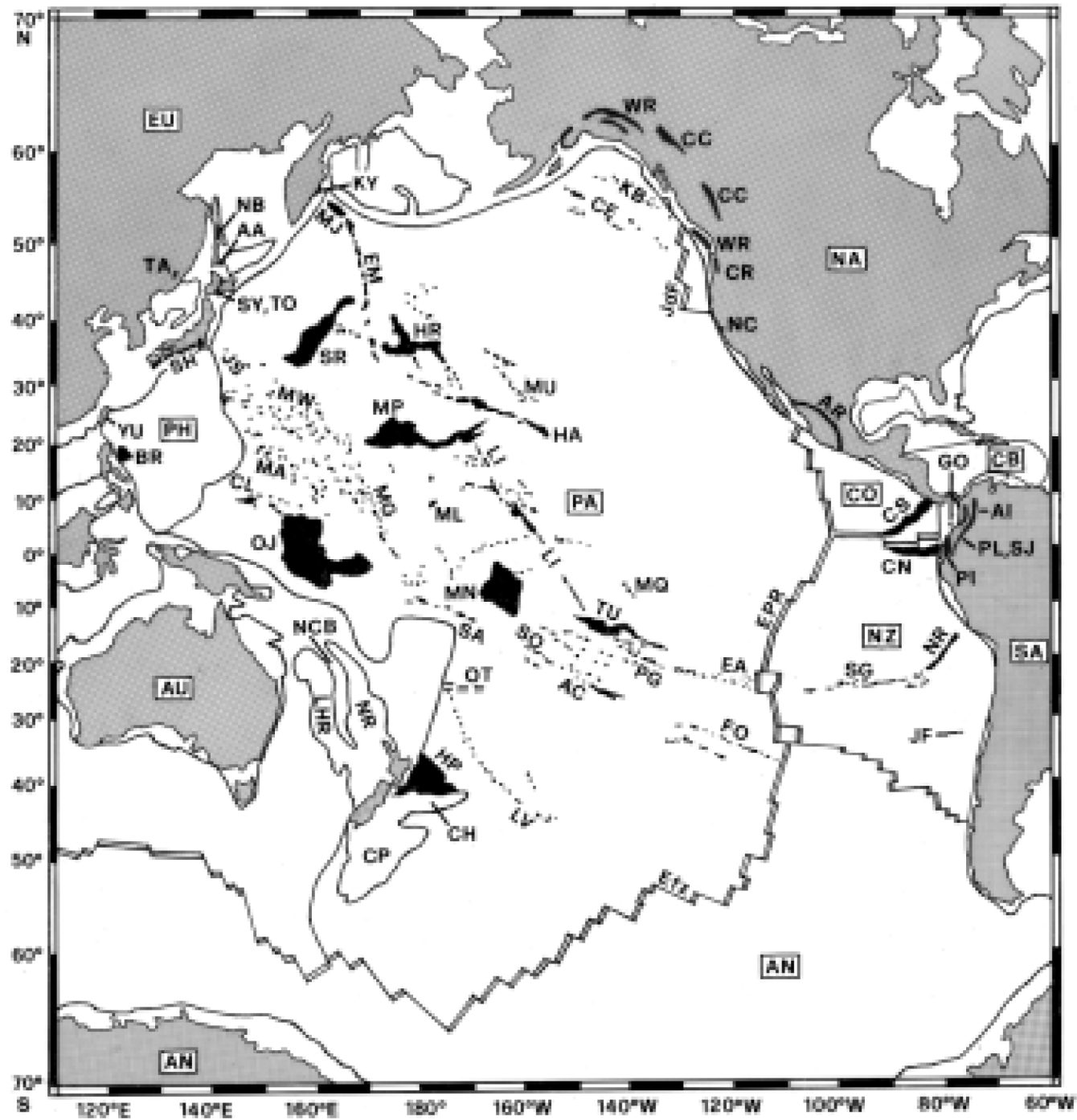


- Extinct oceanic ridge
- Active oceanic ridge
- Plate collision

C5
10.4 Ma

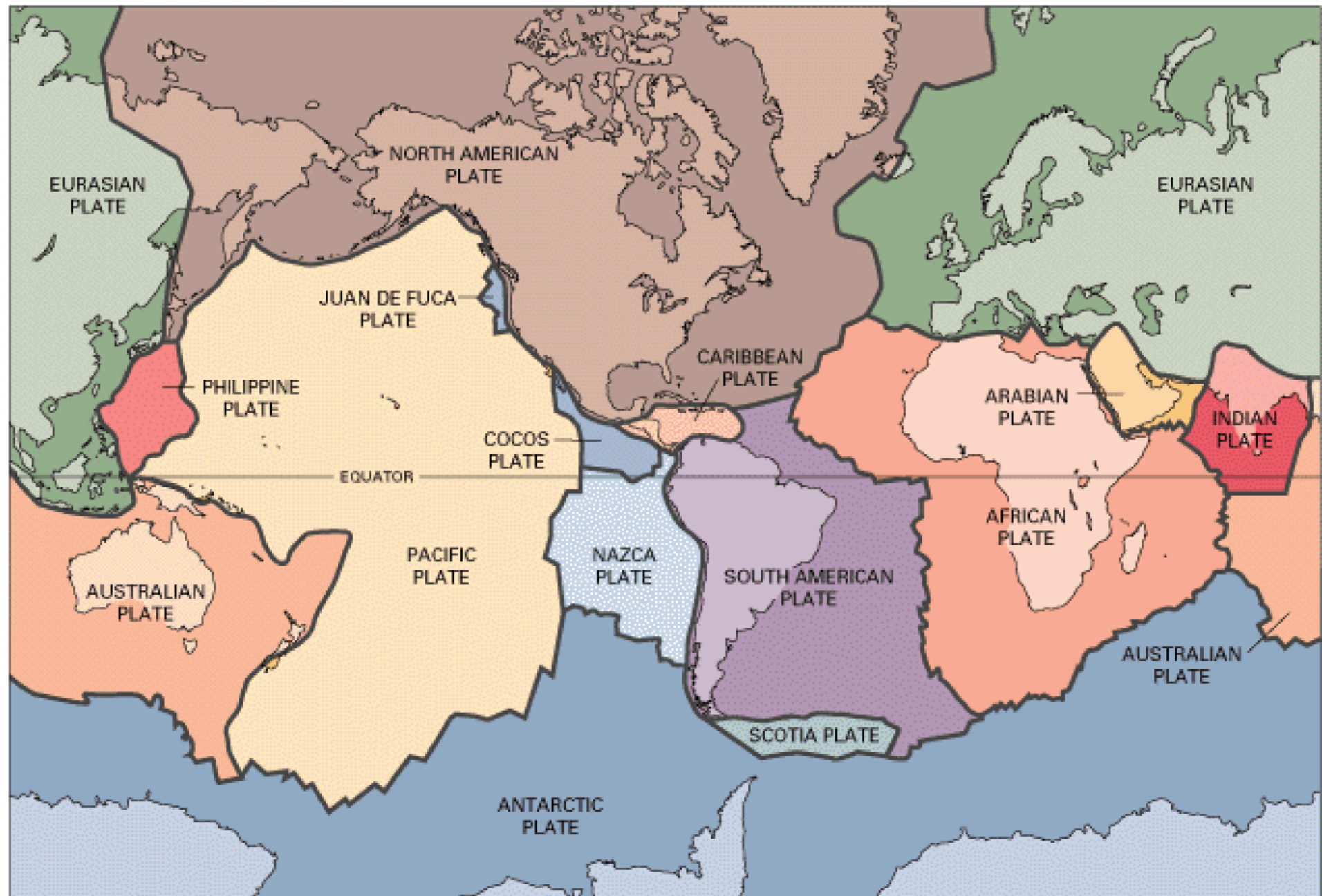
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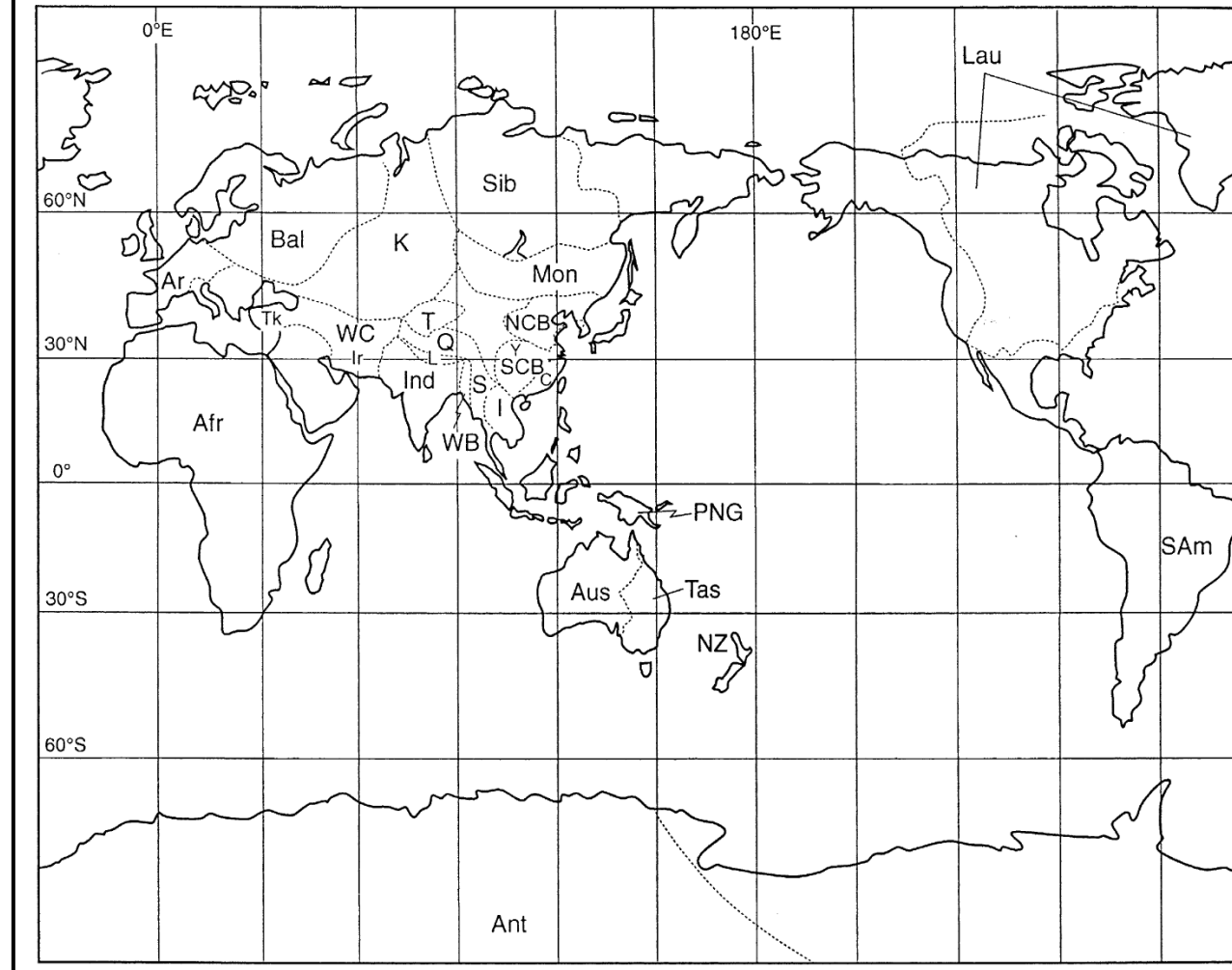




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Present Day





Afr – Africa
 Ant – East Antarctica
 Ar – Armorica
 Bal – Baltica
 Cim – Cimmerian
 (Tk – Turkey
 Ir – Iran
 Q – Qiangtang
 S – Subumasu)

WC – Western Cimmerian
 I – Indochina
 Ind – India
 K – Kazakhstan Terranes
 L – Lhasa
 Aus – Australia
 Lau – Laurentia

Mon – Mongolian Terranes
 NCB – North China Block
 NZ – New Zealand
 PNG – Papua New Guinea
 SAM – South America

SCB – South China Block
 (Y – Yangtze Block
 C – Cathaysia Block)
 T – Tarim
 Tas – Tasman Fold Belt
 WB – West Burma

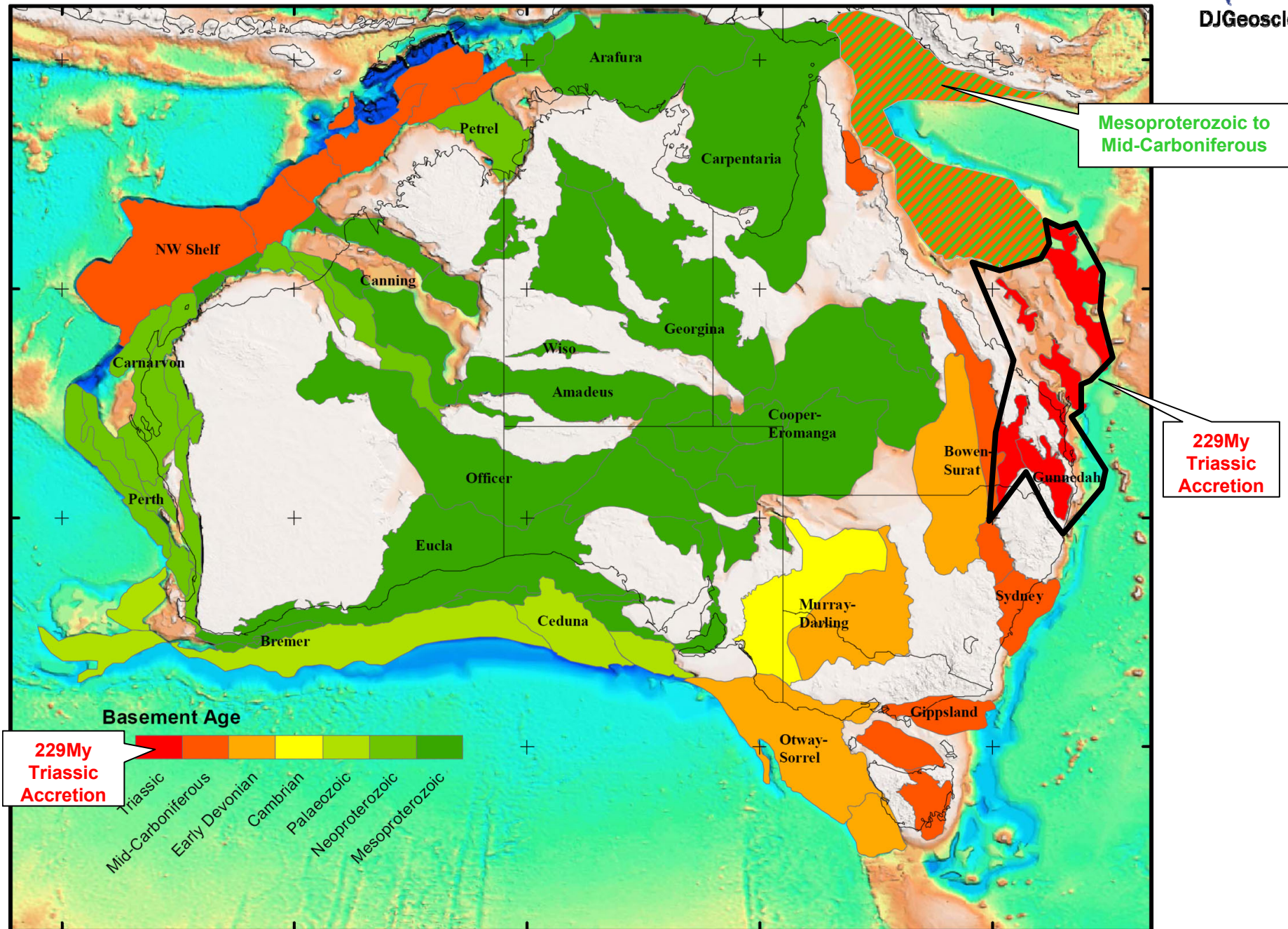


PRESENT DAY AUSTRALIAN TERRAINS & BASINS

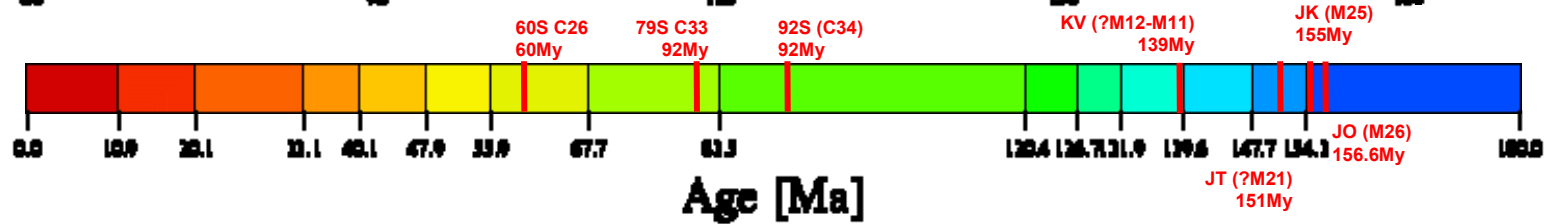
Mod. FrOG TECH, 2006



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This geological map illustrates the age distribution and tectonic features of the Southern Ocean region, including the Wharton Basin, L. Cret (KV), U. Jur (JO), Australia, Broken Ridge, AAD, Kerguelen Plateau, Antarctica, Tasman Sea, and various tectonic zones (CAP, GAP, PAP, GAB, LHA, MTJ, OT 89). A color scale at the bottom indicates age in Ma, ranging from 0.0 to 169.0, with specific age markers for various geological units: 60S C26 (60My), 79S C33 (92My), 92S (C34) (92My), KV (?M12-M11) (139My), JK (M25) (155My), JO (M26) (156.6My), and JT (?M21) (151My).

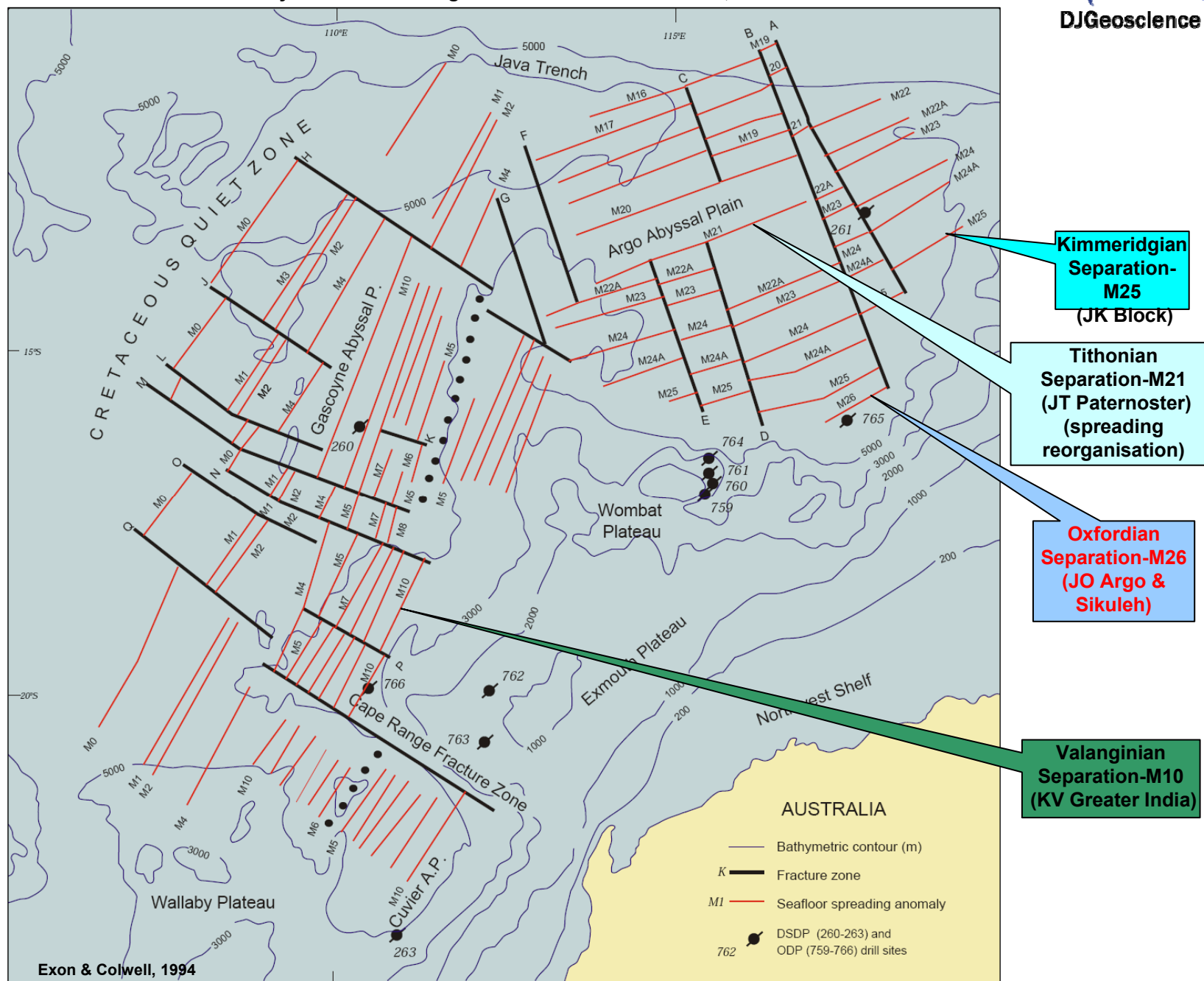


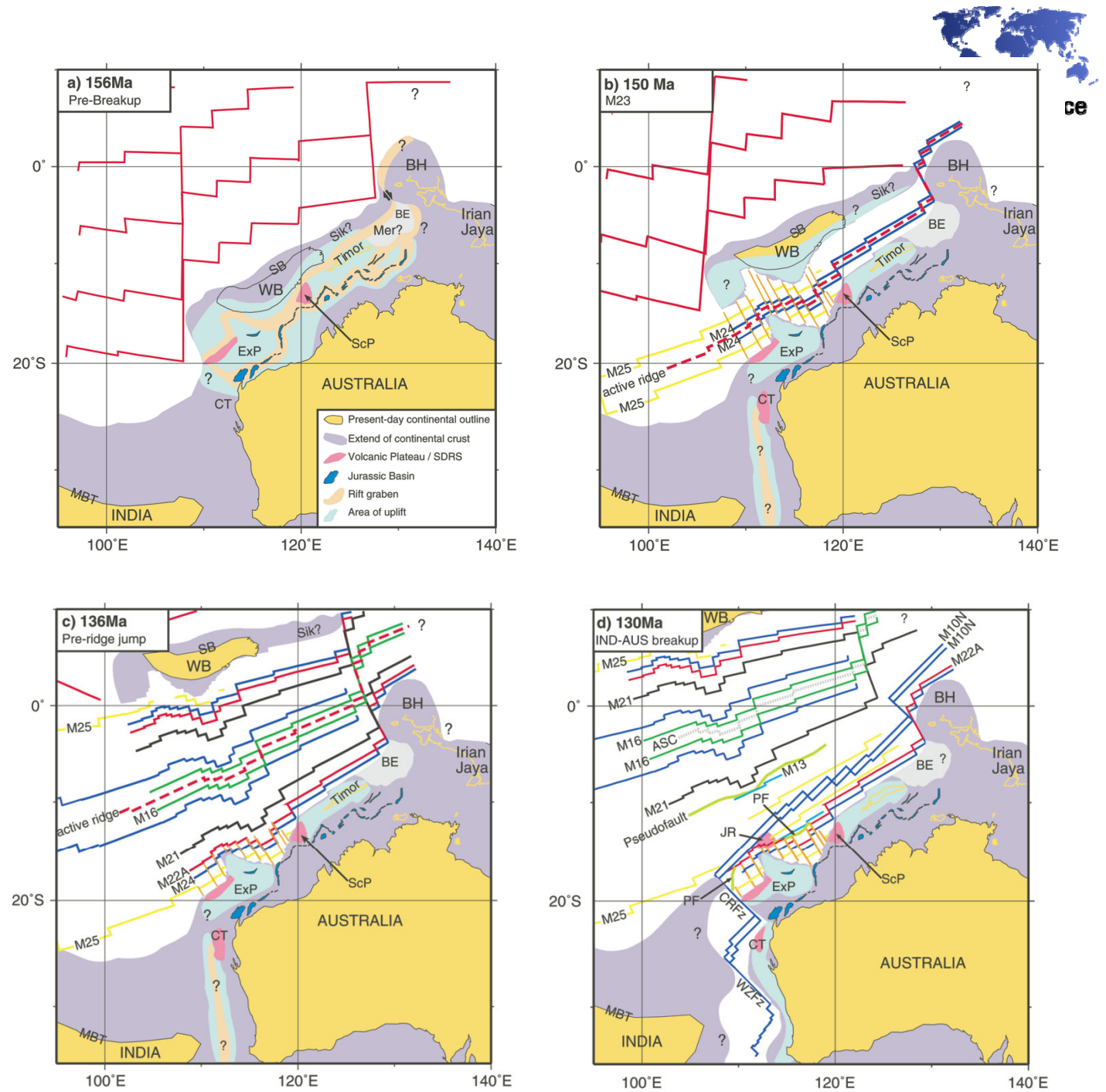
Crustal Block Origin Trails

Present Day Oceanic Crust Age Distribution Offshore NWS, Australia



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Eastern Gondwana

Legend

40°N Paleolatitude based Paleomagnetism (750 Ma)

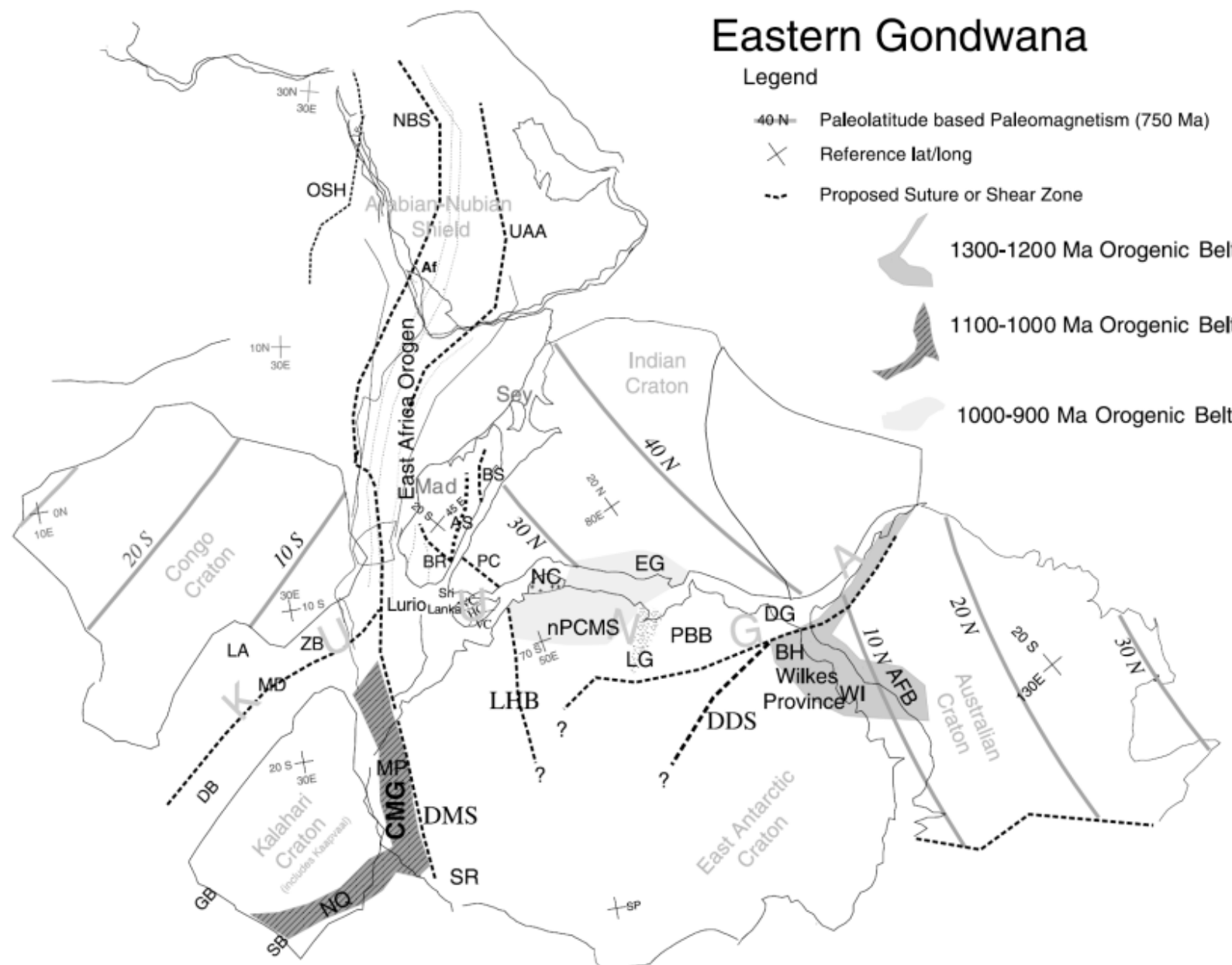
× Reference lat/long

--- Proposed Suture or Shear Zone

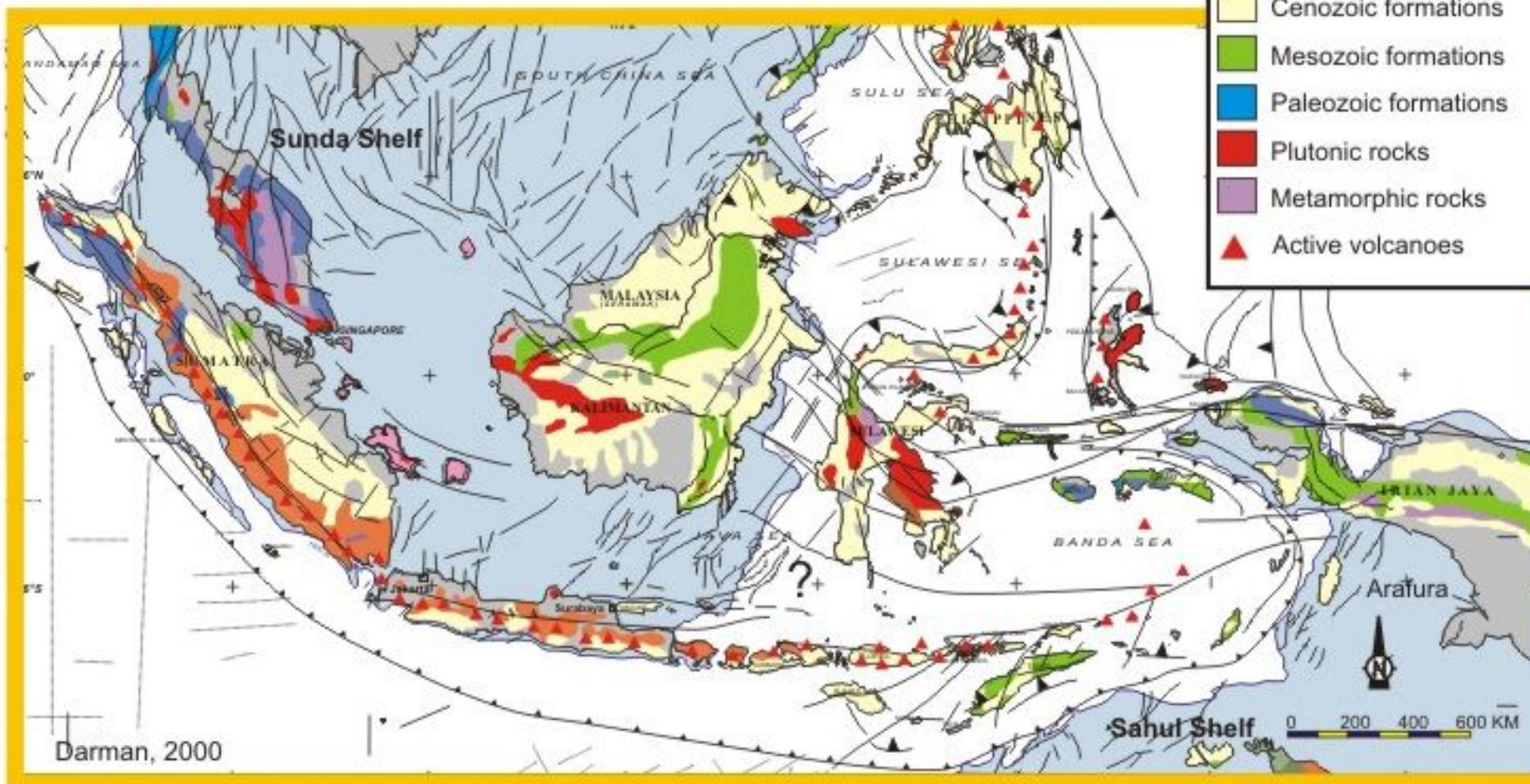
1300-1200 Ma Orogenic Belt

1100-1000 Ma Orogenic Belt

1000-900 Ma Orogenic Belt

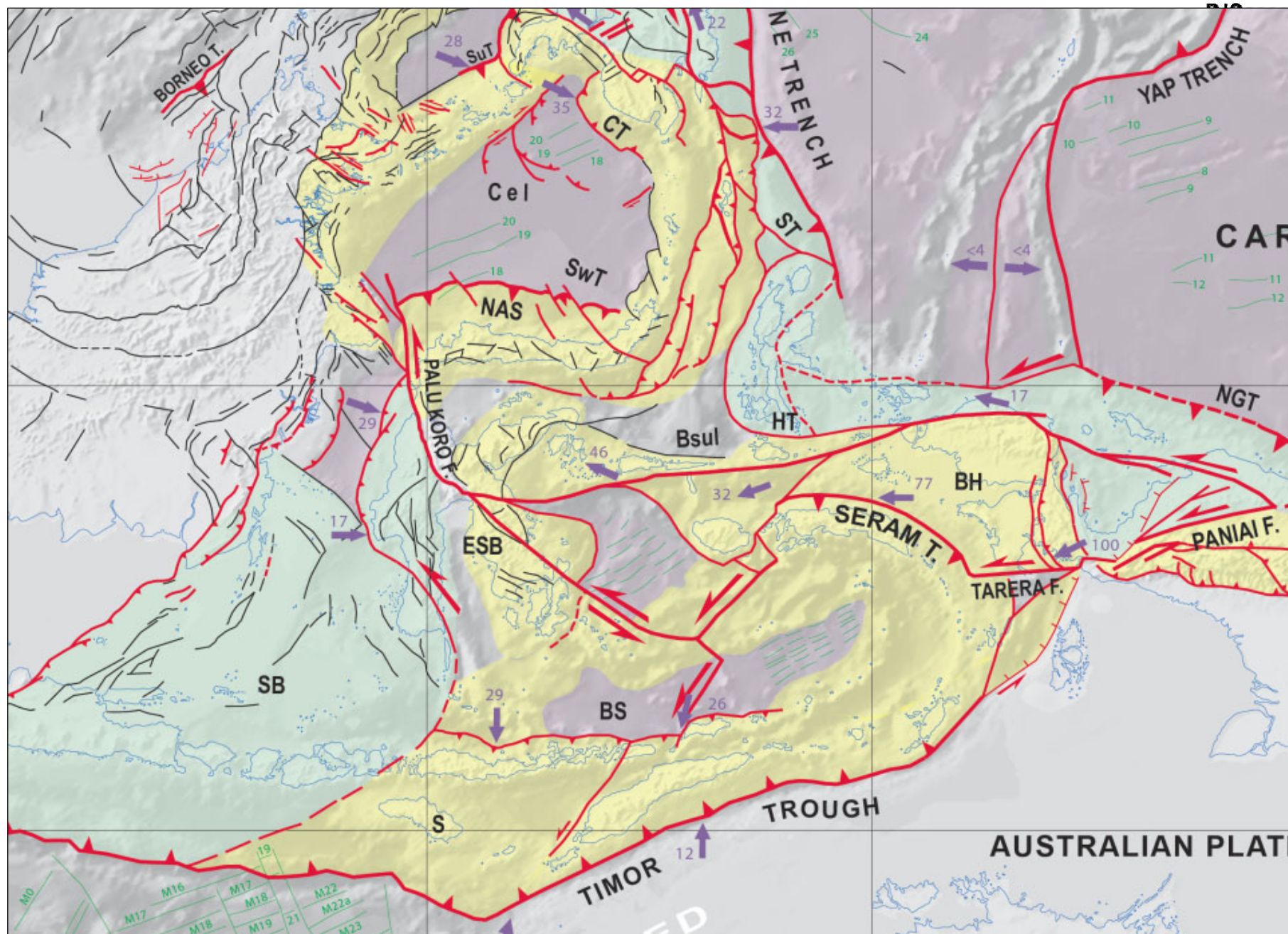


REGIONAL GEOLOGY OF INDONESIA





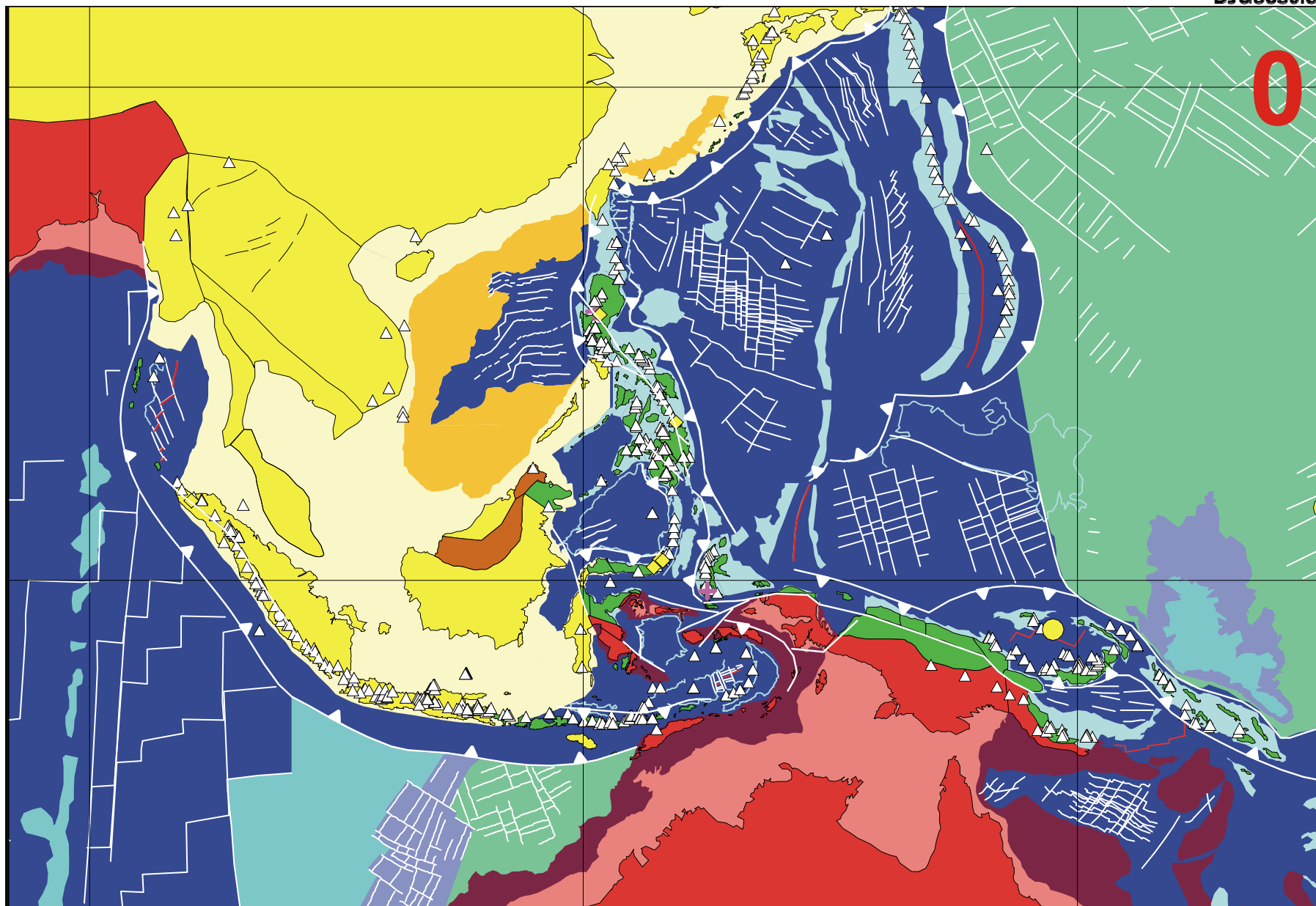
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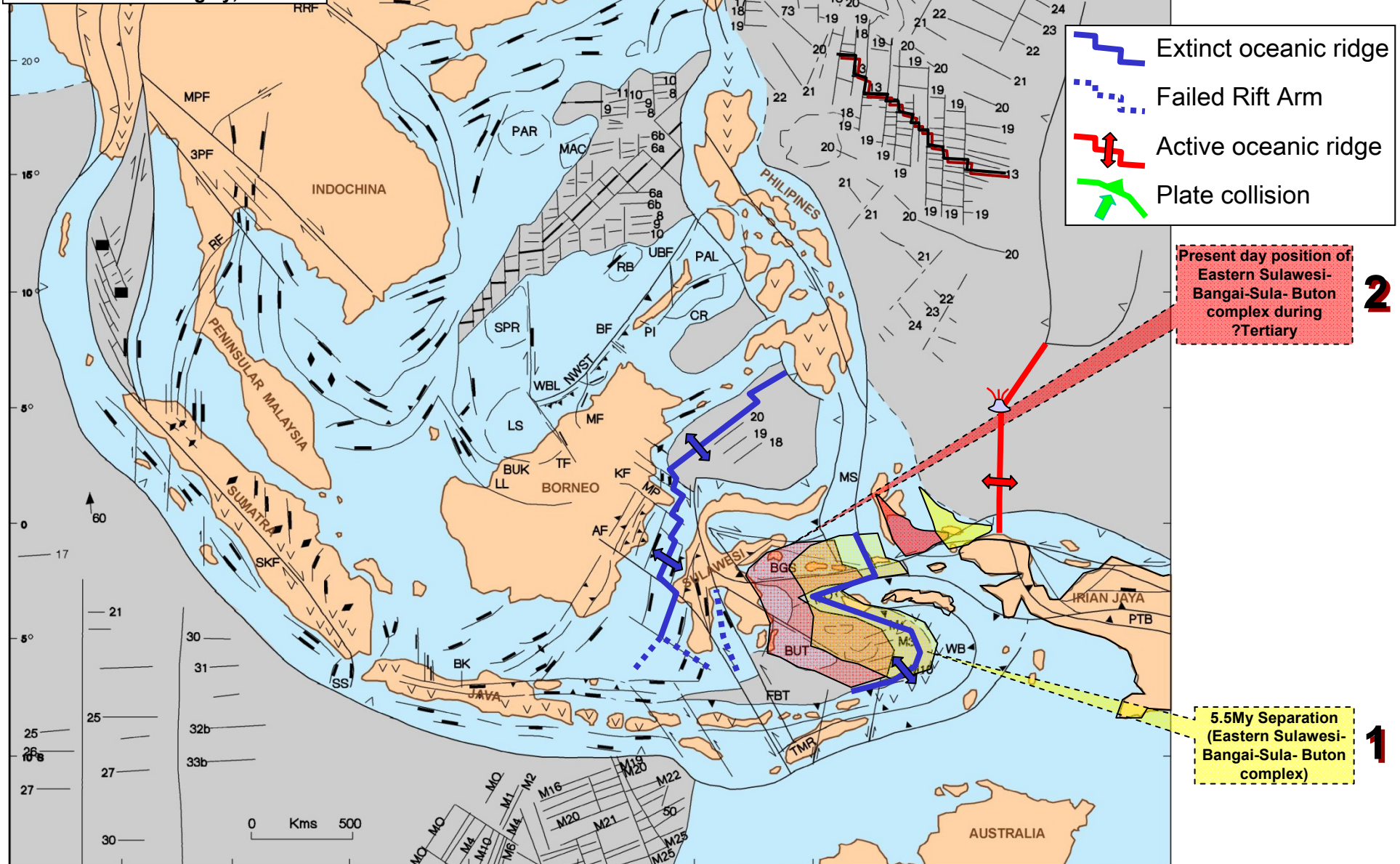
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Crustal Block Docking

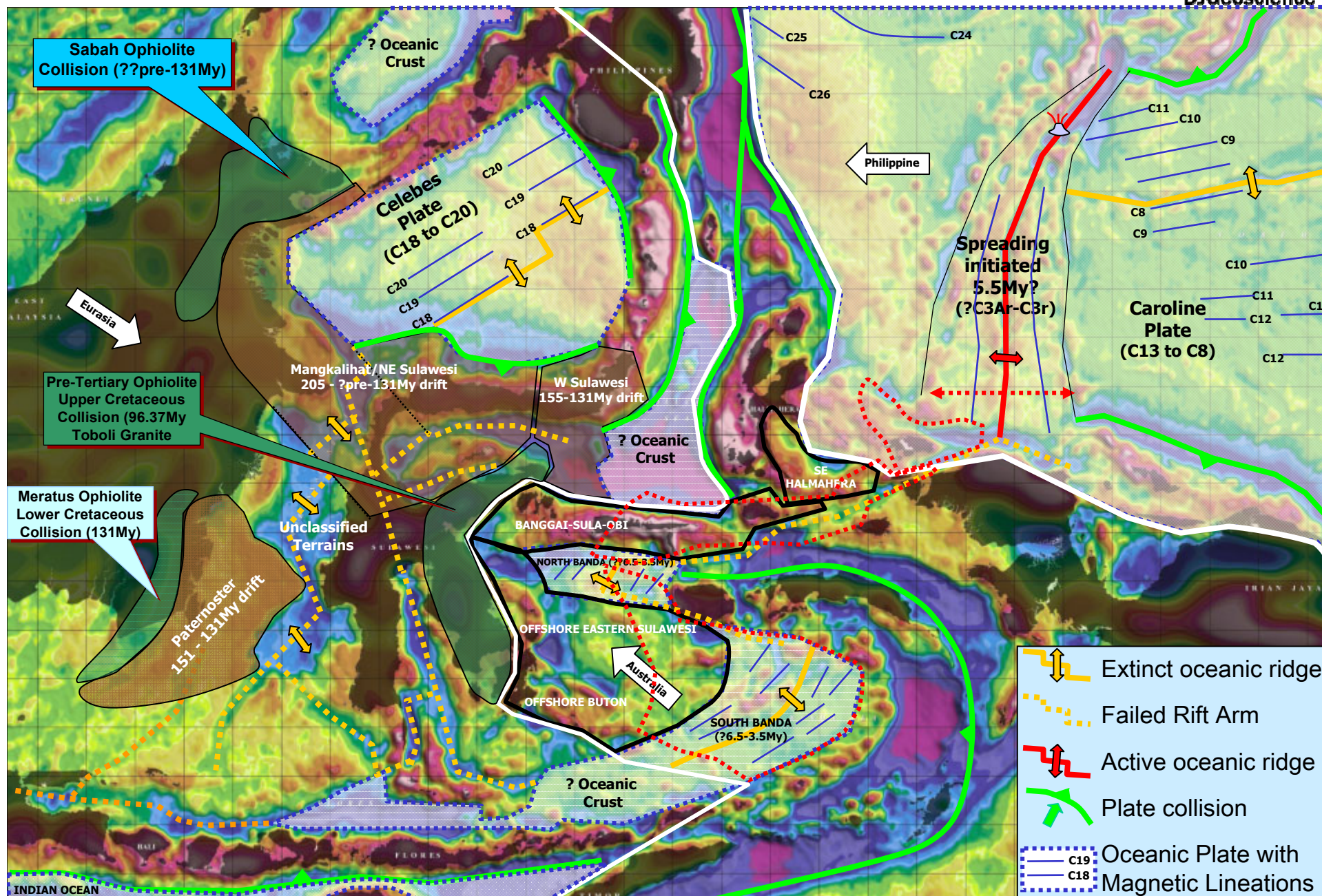
PRESENT DAY
SE ASIAN TERRAINS
Mod. from I.Longley,2000



PRESENT DAY EURASIAN-PHILIPPINE-AUSTRALIAN PLATE SETTING IN EASTERN SE ASIA (superimposed on satellite gravity)

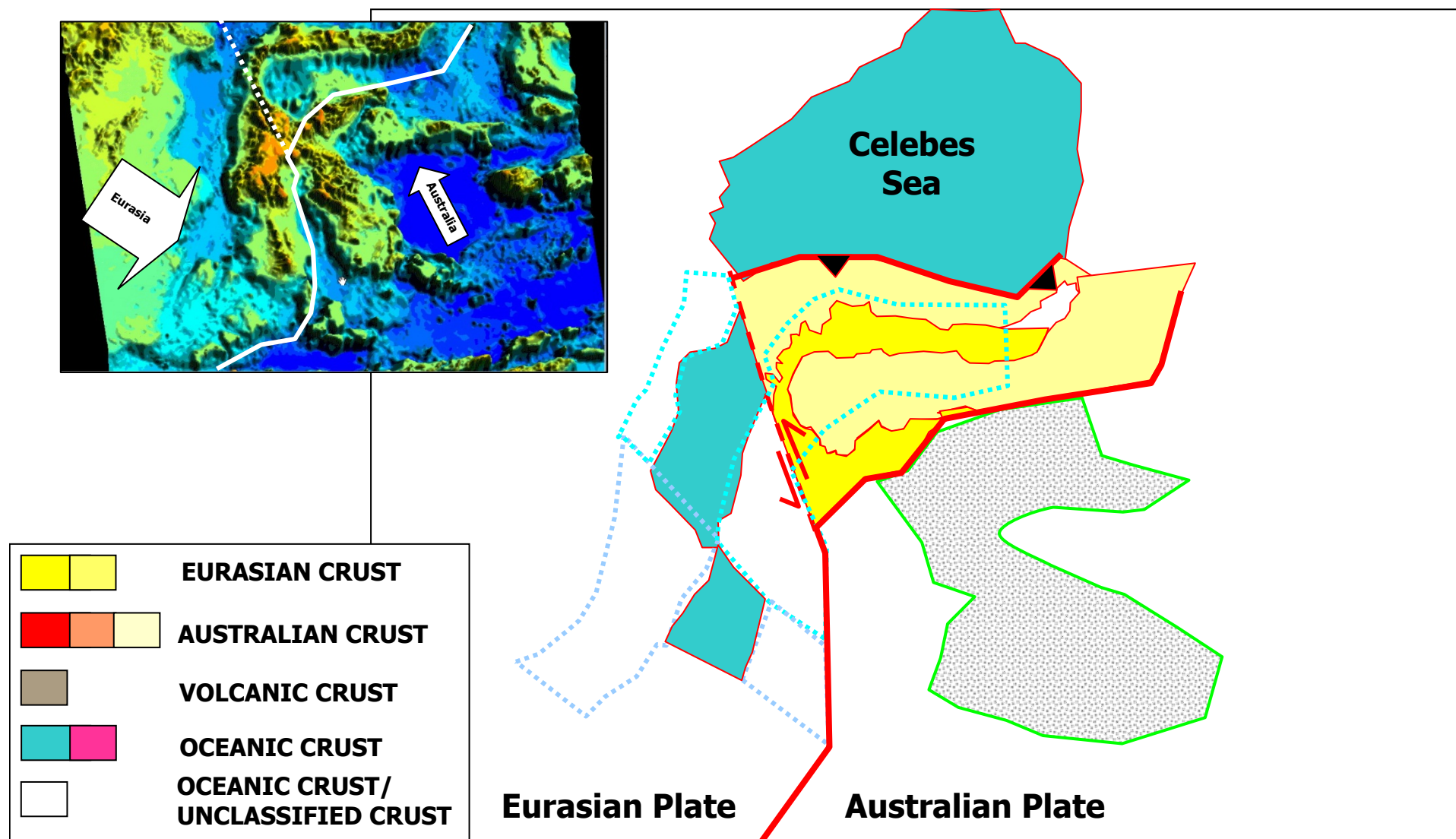


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Central Indonesia

Present Day Tectonics



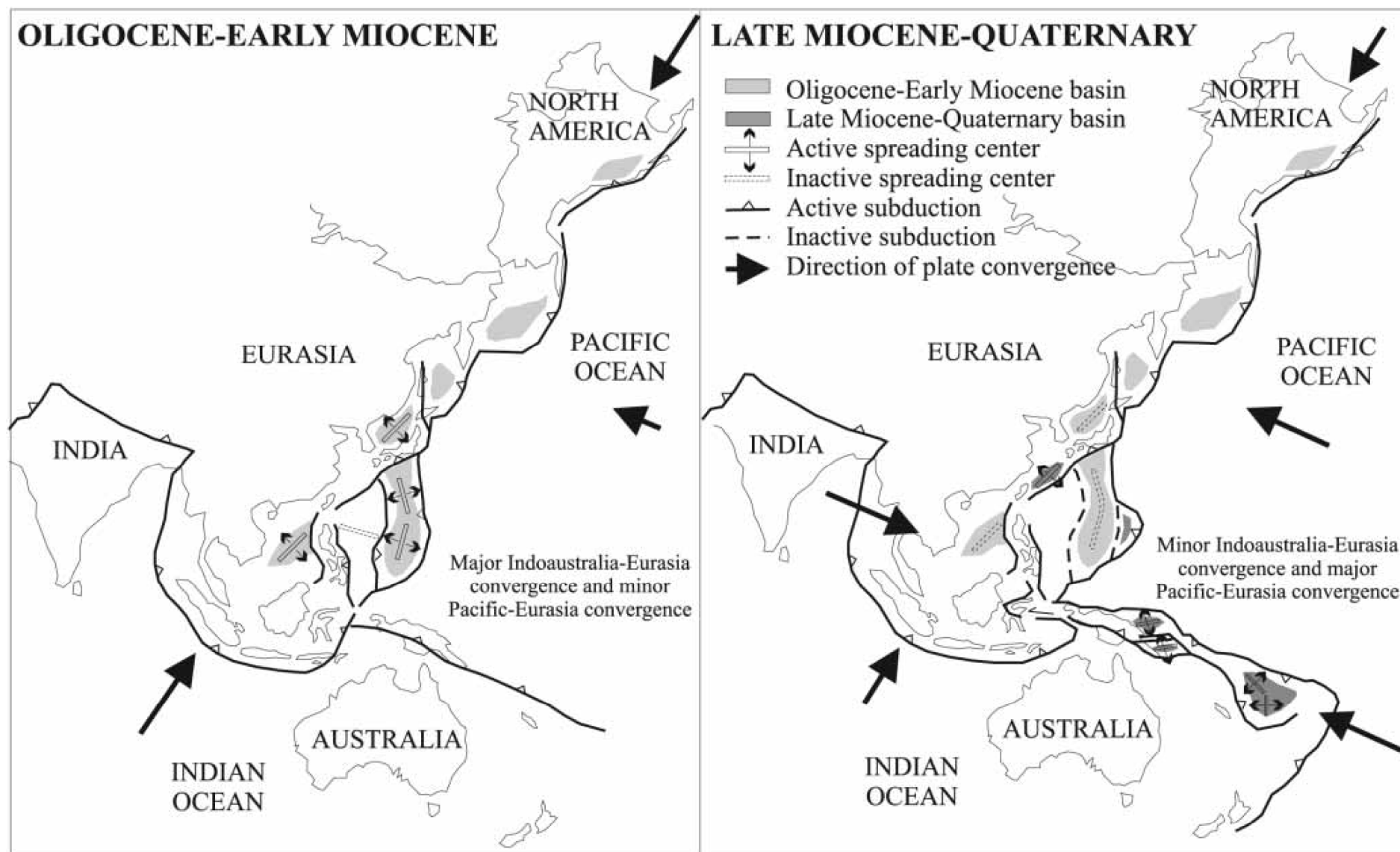
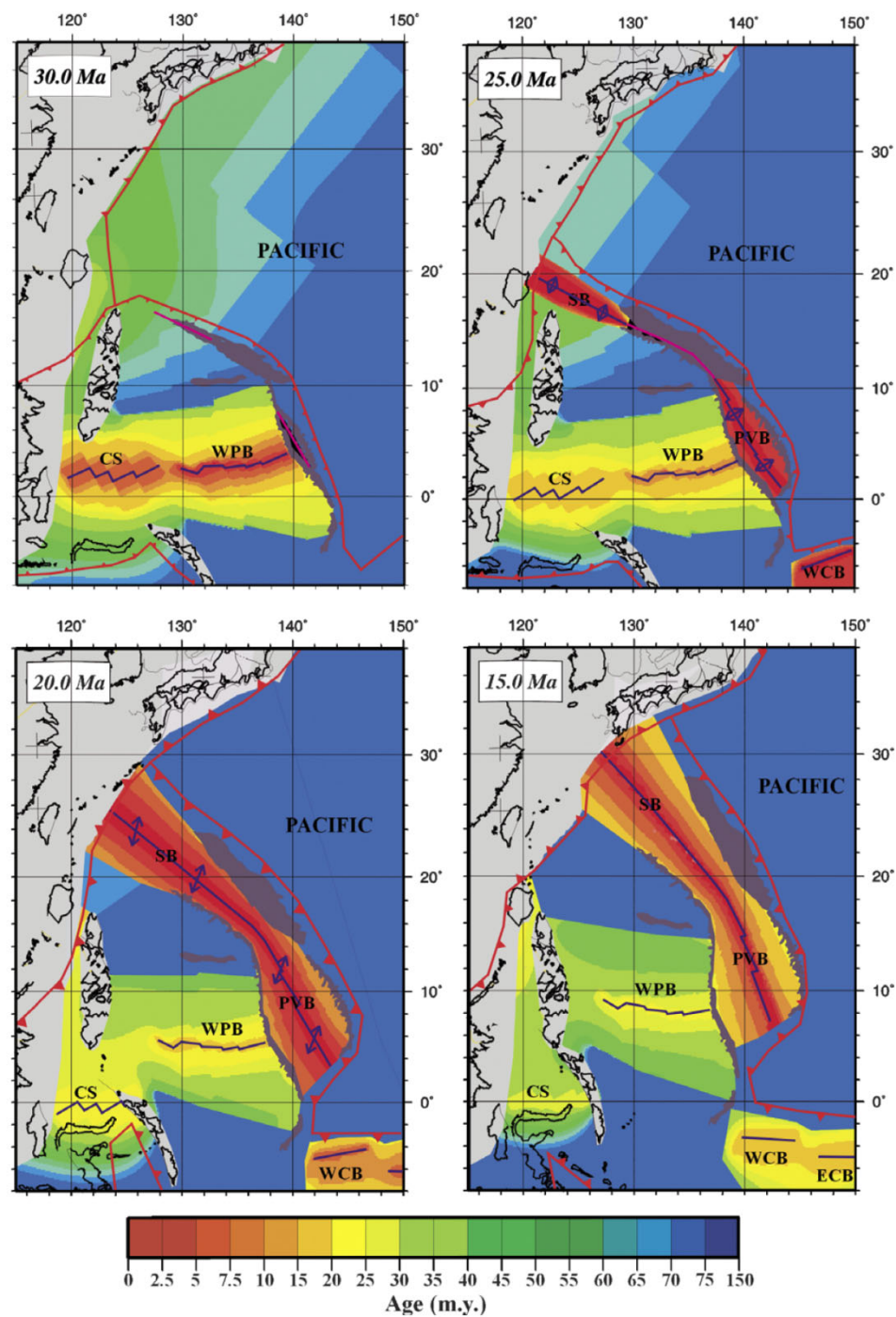
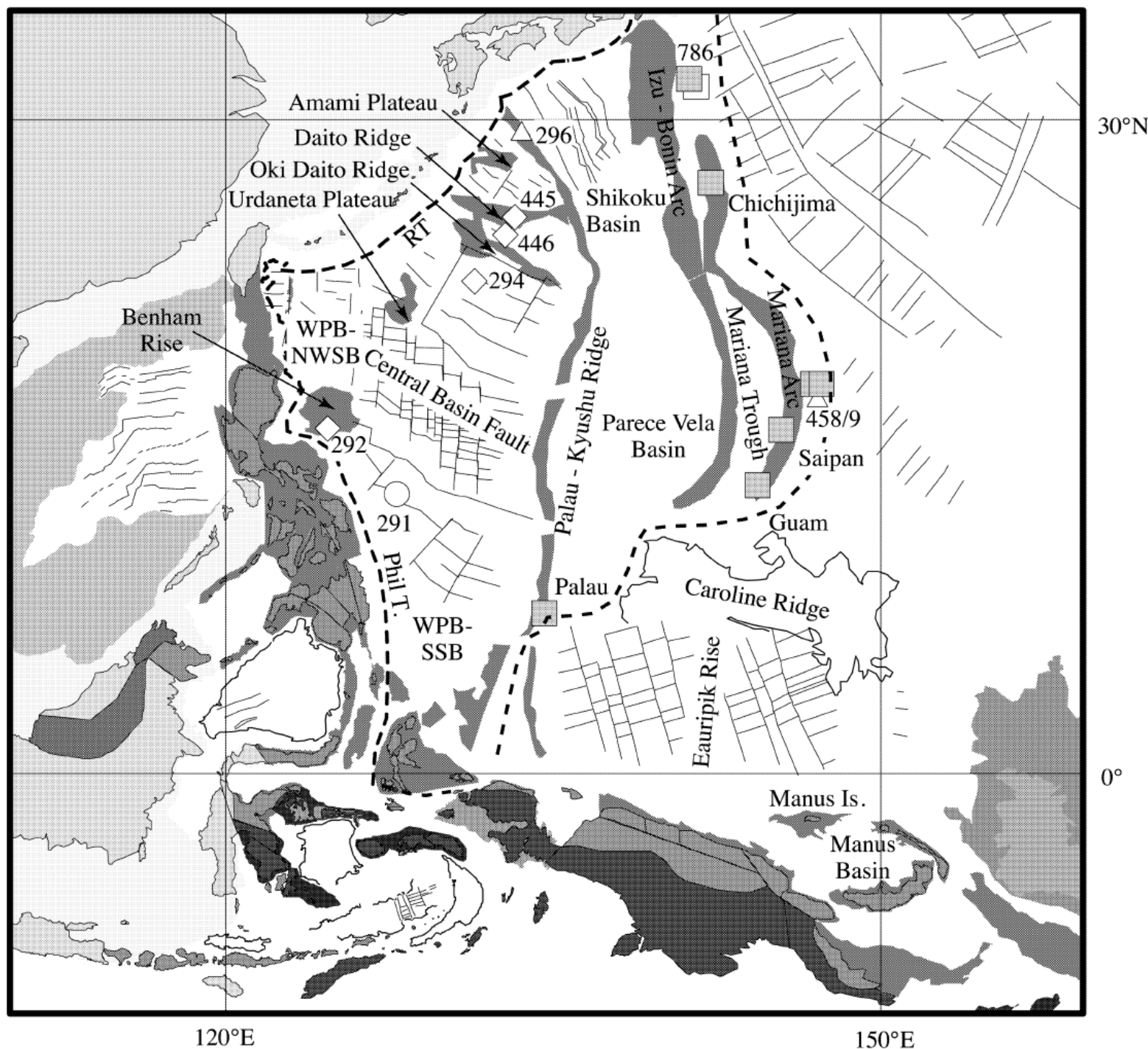


FIGURE 8 | Tectonic evolution of SE Asia and SW Pacific since the early Cenozoic. Explanation in the text.





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Crustal Block Docking

PRESENT DAY
SE ASIAN TERRAINS
Mod. from Metcalf, 2002

JH Mangkalihat/NE Borneo

Base Jurassic Separation - 205My
Sabah Ophiolite Collision - ?pre131My

JK Western Sulawesi

Kimmeridgian Separation - 155My
155 to pre-131My
()

Uppermost Miocene
to Pliocene
Separation
~5.5-3.5My drift
Eastern Sulawesi-
Buton-Bangai-Sula)

Tithonian
Separation
151-131My drift
(JT Paternoster)

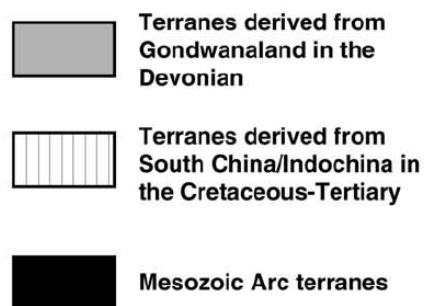
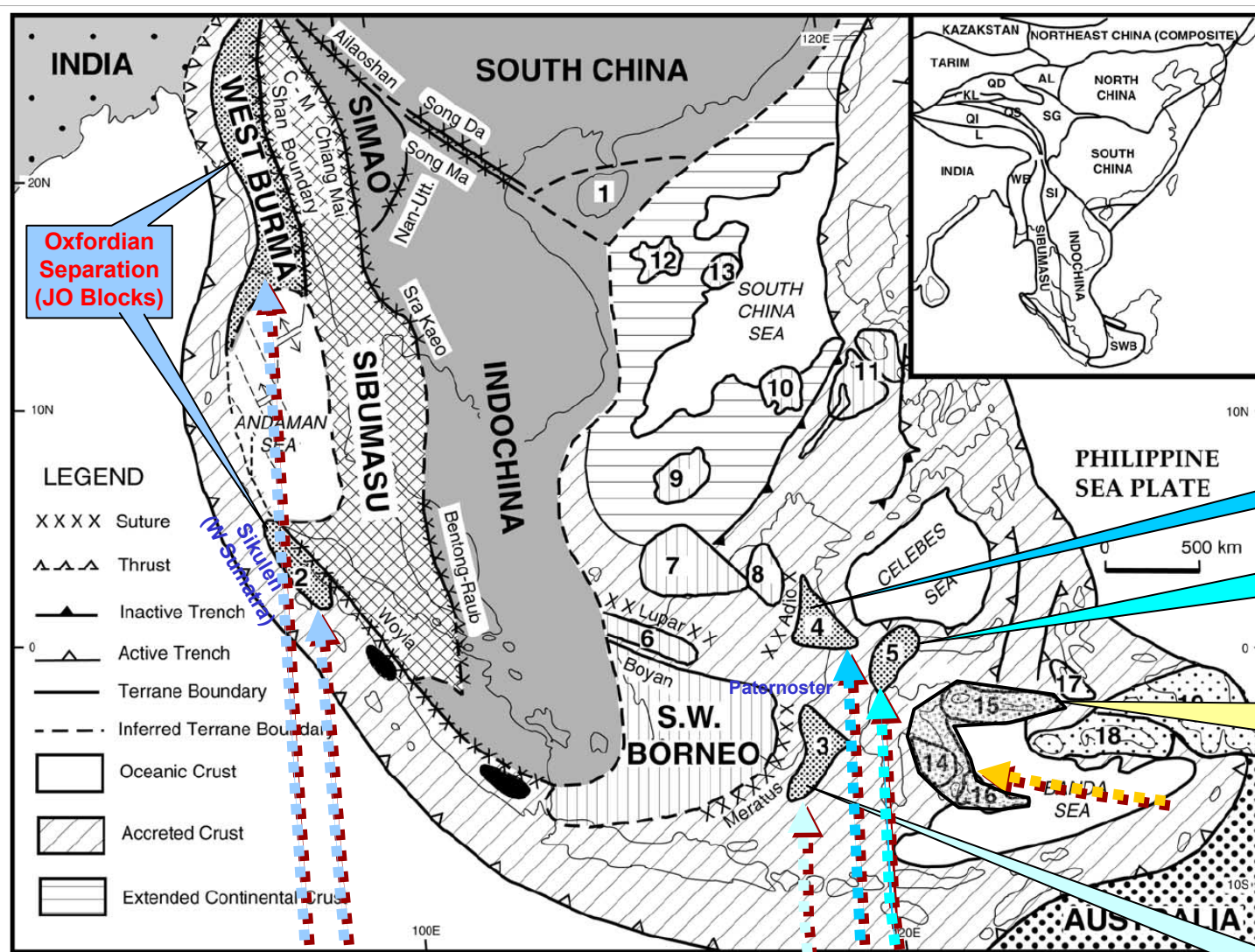
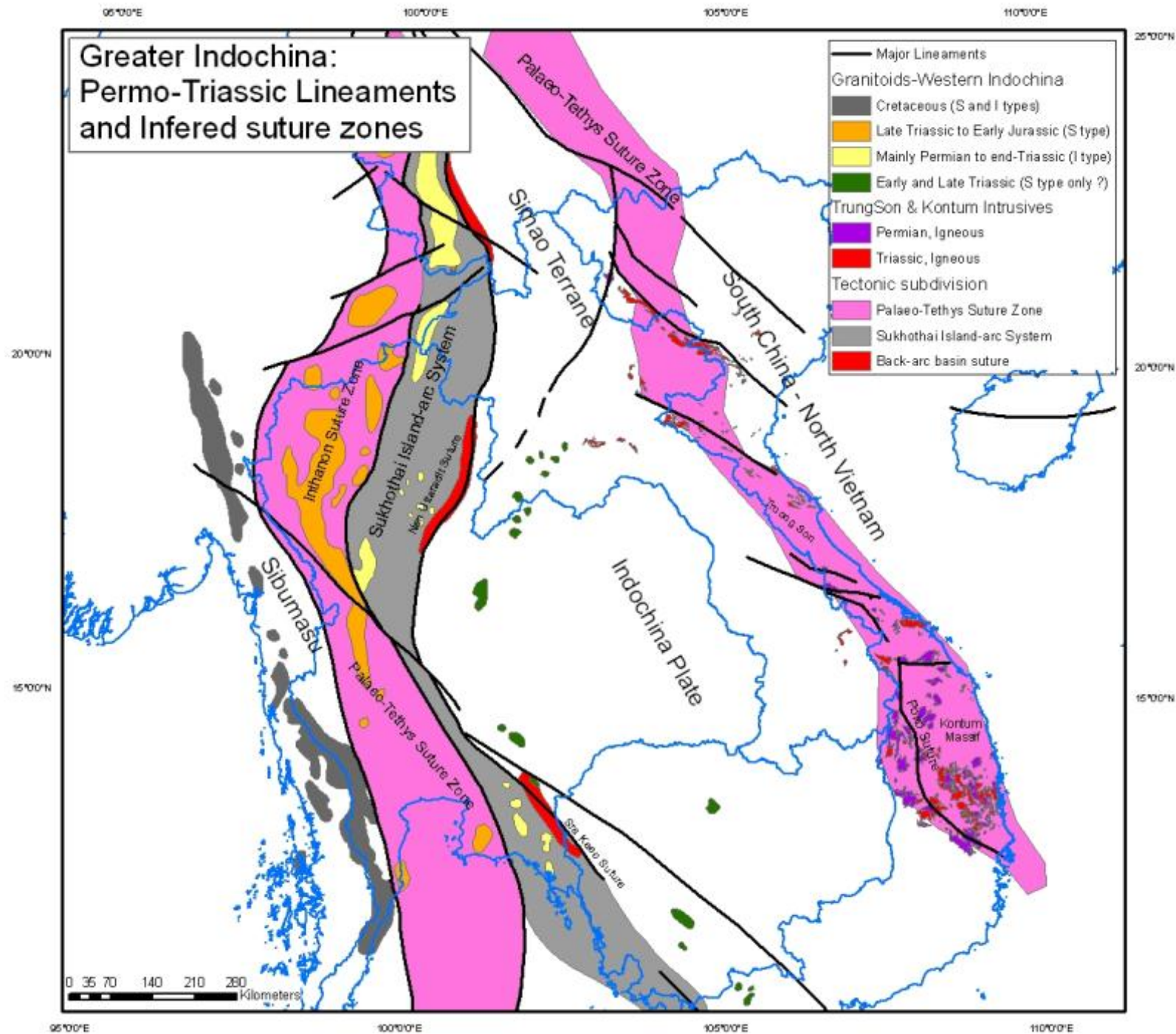


Fig. 1. Distribution of continental blocks, fragments and terranes, and principal sutures of Southeast Asia (modified after Metcalf, 1990) and East Asia (inset). Terrane abbreviations in inset map: WB, West Burma; KL, Kunlun; QD, Qaidam; AL, Ala Shan; QS, Qamdao-Simao; QL, Qiangtang; L, Lhasa; SI, Simao Terrane; SWB, SW Borneo; SG, Songpan-Ganzi accretionary complex. Numbered microcontinental blocks: (1) Hainan Island terranes, (2) Sikuleh, (3) Paternoster, (4) Mangkalihat, (5) West Sulawesi, (6) Semitau, (7) Luconia, (8) Kelabit-Longbowan, (9) Spratley Islands-Dangerous Ground, (10) Reed Bank, (11) North Palawan, (12) Paracel Islands, (13) Macclesfield Bank, (14) East Sulawesi, (15) Banggai-Sula, (16) Buton, (17) Obi-Bacan, (18) Buru-Seram, (19) West Irian Jaya. CM: Changning-Menglian Suture.



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