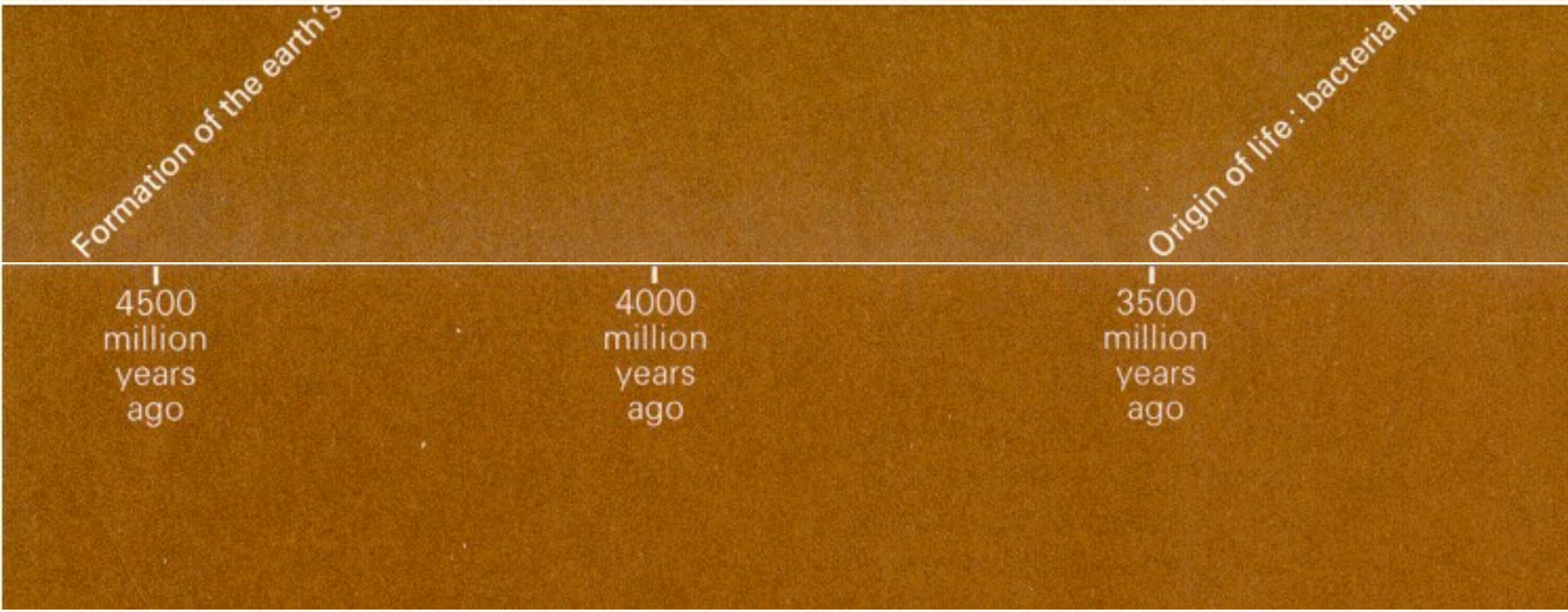
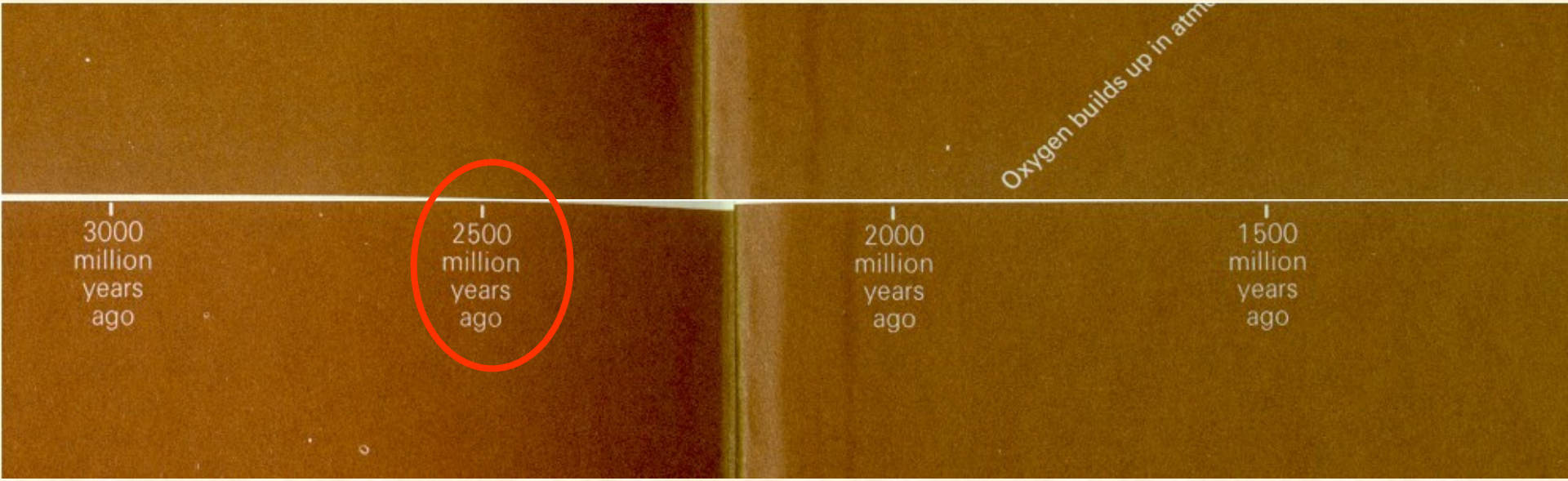
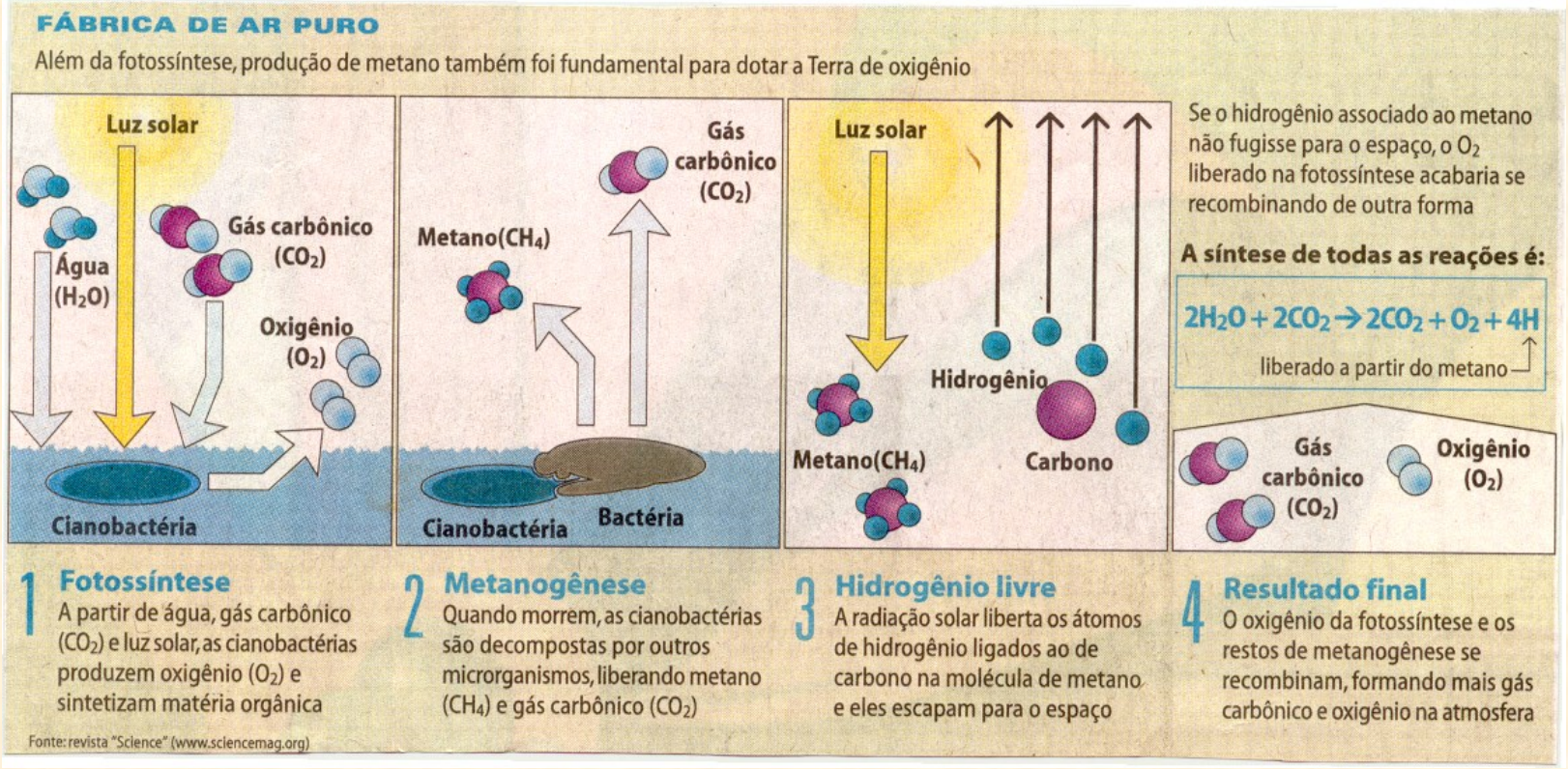
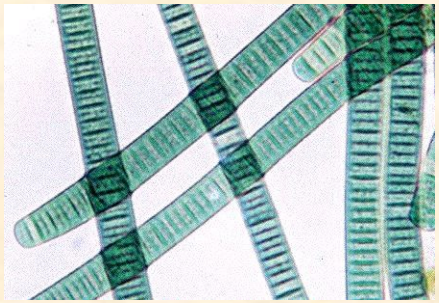
Evolução da vida na Terra

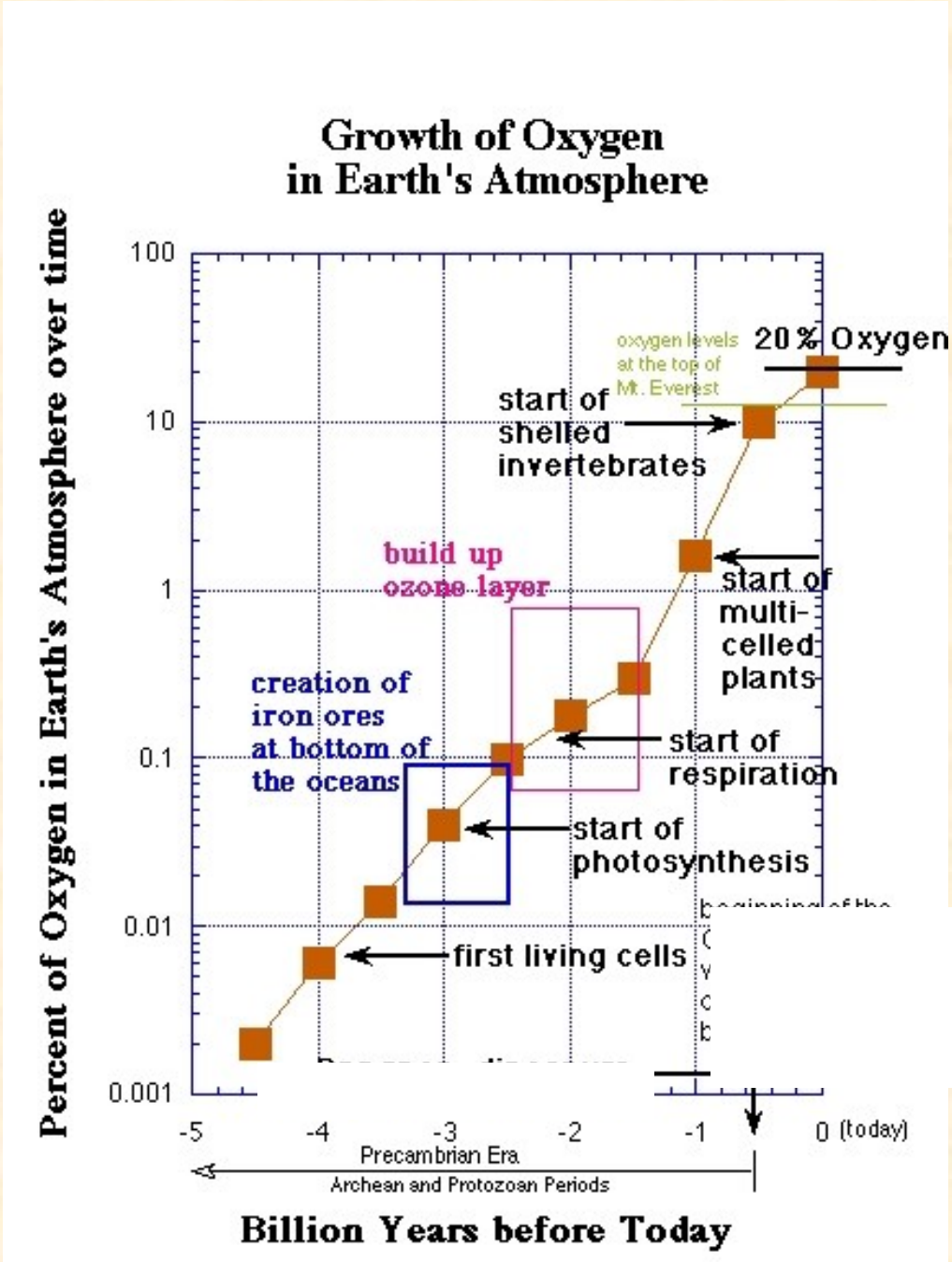

Formation of the earth's
Origin of life : bacteria fi
4500 million years ago
4000 million years ago
3500 million years ago

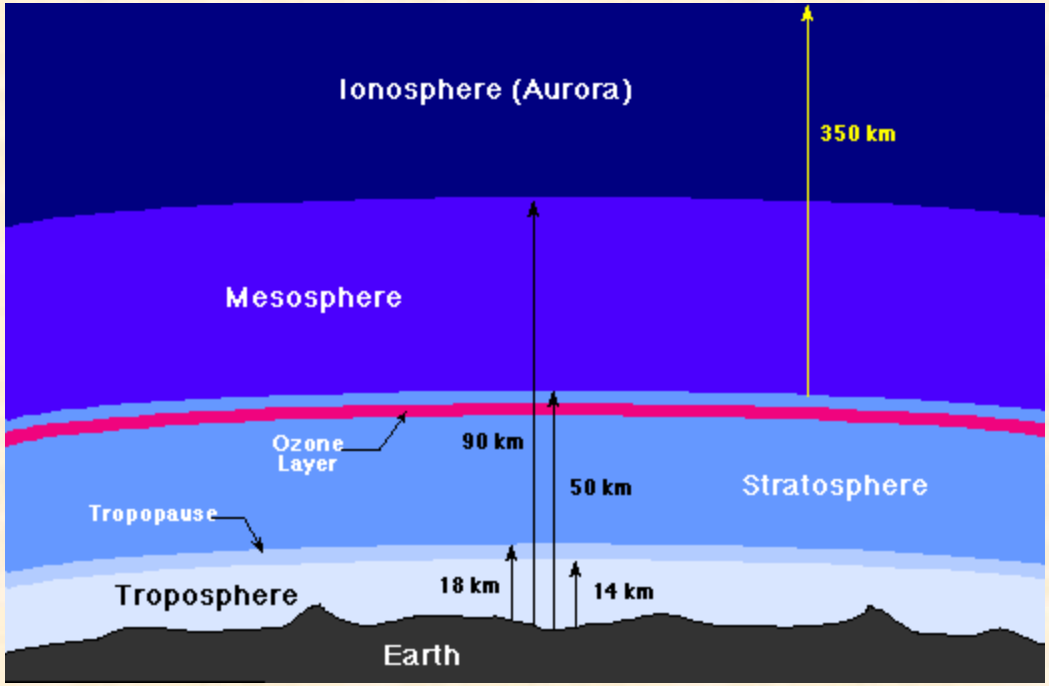

Oxygen builds up in atm
3000 million years ago
2500 million years ago
2000 million years ago
1500 million years ago

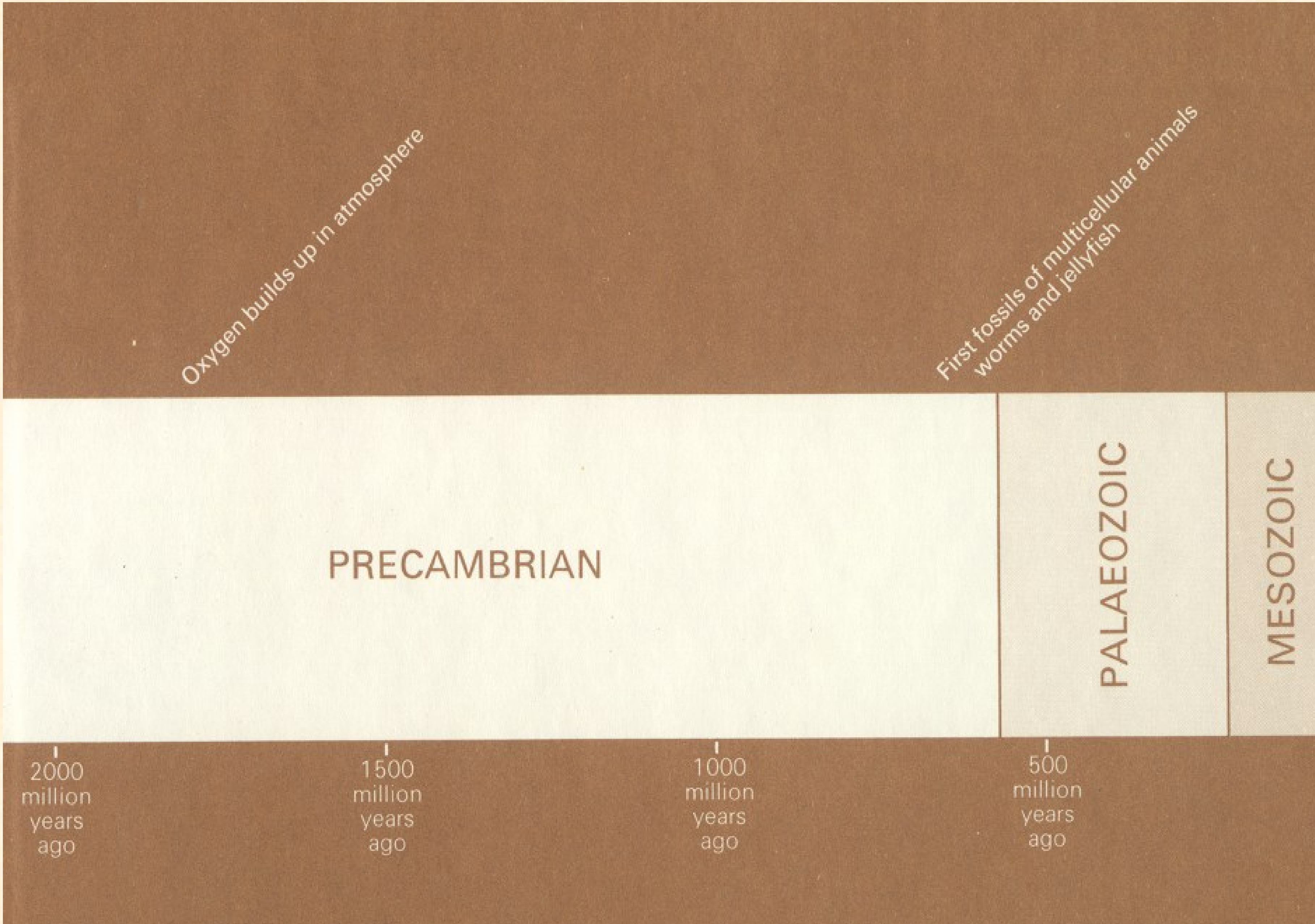




Há um lapso de pelo menos 400 milhões de anos entre o surgimento das primeiras Cianobactérias (há 2,5 bilhões de anos) e a promoção do oxigênio a componente importante da atmosfera terrestre. Cianobactérias geralmente são unicelulares, se organizam em colônias e, possivelmente, tornaram-se endosimbiontes.


Growth of Oxygen
in Earth's Atmosphere
Percent of Oxygen in Earth's Atmosphere over time
100
10
1
0.1
0.01
0.001
oxygen levels
at the top of
Mt. Everest
20% Oxygen
start of
shelled
invertebrates
build up
ozone layer
start of
multi-
celled
plants
creation of
iron ores
at bottom of
the oceans
start of
respiration
start of
photosynthesis
first living cells
-5
-4
-3
-2
-1
0 (today)
Precambrian Era
Archean and Protozoan Periods
Billion Years before Today


Ionosphere (Aurora)
350 km
Mesosphere
Ozone Layer
90 km
50 km
Stratosphere
Tropopause
Troposphere
18 km
14 km
Earth



Oxygen builds up in atmosphere
First fossils of multicellular animals
worms and jellyfish
PRECAMBRIAN
PALAEOZOIC
MESOZOIC
2000 million years ago
1500 million years ago
1000 million years ago
500 million years ago

ERA	TIME
PROTEROZOIC Soft-bodied marine invertebrates emerge 900 million years ago. Eucaryotic cells and algae in oceans.	2.5 billion - 570 million
ARCHEAN Prokaryotic cells only, bacteria and blue-green algae in the oceans Algae in the oceans begin producing oxygen, which settled in the atmosphere and was necessary for the later evolution of higher animals. Consolidation of earth's crust and first sign of life.	3.8 - 2.5 billion years
FORMATION OF EARTH	4.6 billion ago
FORMATION OF UNIVERSE	20 - 7 billions of years ago.

ERA	PERIOD	TIME
PALEOZOIC Evolution from primitive to more advanced life. Life rises out of the oceans and ventures on land.	**Permian** Great mass extinction as tribolites, many fishes and corals dies out because of environmental changes. **Cycad like plants and true conifers appear in the north**. Land masses drift together to form **Pangaea**. The Permian-Triassic extinction event wipes out about 90% of all animal species. **It is the third and most severe mass extinction event known.**	290 - 245 million years
	Carboniferous Lush forests in swamplands turned into today's coal and oil deposits. **Horsetails, lycopods, ferns around**.	360 - 290 million years
	Devonian **Age of fish with** bony fish making appearance. **Land covered with giant ferns**. **The Late Devonian extinction is the second mass extinction**	410 - 360 million years
	Silurian Later a scorpion became first air-breathing animal. Oceans teem with vertebrate, jawed fish and corals. **Vascular plants venture on land as first terrestrial life**.	440 - 410 million years
	Ordovician Trilobites are still abundant and vertebrate fish make first appearance and so do corals. Over the next ten million years, the Ordovician-Silurian extinction events occur. **Is considered the first mass extinction event.**	510 - 440 million years
	Cambrian Marine invertebrates, especially trilobites abound in sea but no land animals yet. **Seaweed in the oceans and lichens on land**.	570 - 510 million years

ERA	PERIOD	TIME
MESOZOIC Age of Reptiles	**Cretaceous** **65 million years ago, mass extinction of dinosaurs**. **Fifth mass extinction event**. **Flowering plants and modern trees appear**. **First marsupials** **Formation of the Andes begin**.	145 - 65 million years
	Jurassic **First true primitive mammals appear** **Birds make appearance**, reptiles dominate sea and land. Cycads, conifers, ginkgoes and seed ferns. **Fourth mass extinction event occurs at the Triassic-Jurassic transition** **South America breaks away from Africa**	210 - 145 million years
	Triassic Dinosaurs dominates. **Evergreen trees dominate**. **Breakup of Pangaea into 2 supercontinents**.	245 - 210 million years

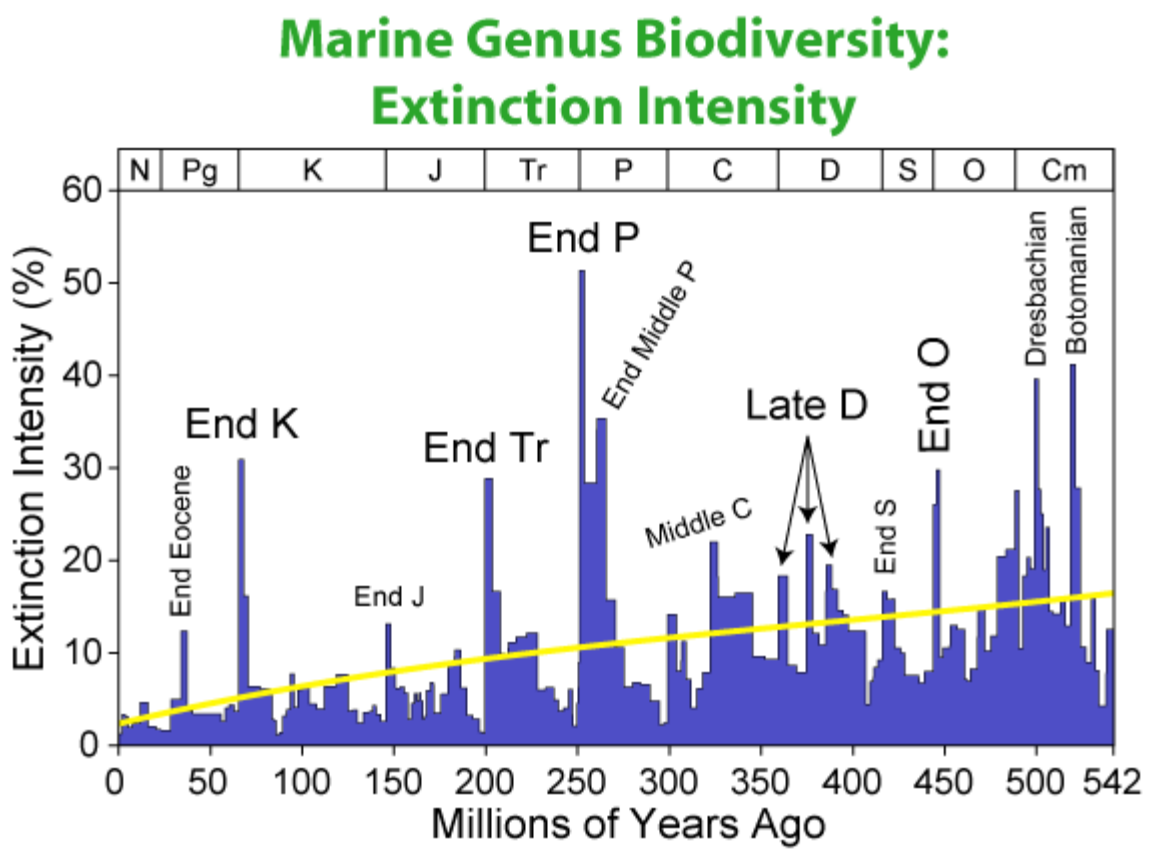
ERA	PERIOD	EPOCH	TIME
CENOZOIC Modern world with animals, plants and geographical features as we know it today, came into being	**Tertiary** Mammals become the dominant larger animals replacing the reptiles.	**Pliocene** **Human-like apes make appearance**. Climates cools as Ice Age nears. Galapagos islands rise from the sea. **2 Ma** - *Homo habilis* (handy man) uses primitive stone tools (choppers) in Tanzania. Emergence of Broca's area (speech region of modern human brain). *Homo* species are meat-eating while *Paranthropus* eats plants and termites. **Saber Tooth moves from North America to South America.** **Panama land bridge emerges 3 million connecting South with North America.**	5 - 1.7 million
		Miocene Camel, cat, horse, raccoon, weasel and rhinoceros dominate.	23 - 5 million
		Oligocene **True Primates make first appearance**. Horses and tapir on American soil.	35 - 23 million
		Eocene Mammals adapt to marine life. **Formation of Andes end**	57 - 35 million
		Paleocene Carnivores, ungulates. **Modern continents start to form**.	65 - 57 million

ERA	PERIOD	EPOCH	TIME
CENOZOIC Modern world with animals, plants and geographical features as we know it today, came into being.	**Quaternary** **Humans appear**	**Pleistocene** 1.8 Ma – ***Homo erectus*** evolves in Africa and migrates to other continents, primarily South Asia. **500 ka - *Homo erectus* uses charcoal to control fire, though they may not know how to create or start it.** 195 Ka ***Homo sapiens*** present in Ethiopia 150 Ka – **Mitochondrial Eve** lives in Africa. She is the last female ancestor common to all mitochondrial lineages in humans alive today. 130 ka - ***Homo neanderthalensis*** lives in Europe and the Middle East. Has hyoid bone, used for speech in modern humans. 100 ka - The first anatomically modern humans (**Homo sapiens**) appear in Africa by this time. . Modern "race" formation begins. African populations remain more 'diverse' in their genetic makeup than all other humans, since only a subset of their population (and therefore only a subset of their diversity) leaves Africa.	1.7 million - 10. 000 years

ERA	PERIOD	EPOCH	TIME
CENOZOIC Modern world with animals, plants and geographical features as we know it today, came into being	**Quaternary** **Humans appear**	**Pleistocene** 70 ka - **The most recent ice age**, the Wisconsin glaciation, **begins**. 50 ka - Modern humans expand from **Asia to Australia and Europe**. 30 ka - Modern humans enter **North America** from Siberia in numerous waves, some later waves across the Bering land bridge, but early waves probably by island-hopping across the Aleutians. **Through Central America they reach South America**. 27 ka - **Neanderthals die out leaving *Homo sapiens*** as the only living species of the genus *Homo*. 15 ka - **The last Ice Age ends**. Sea levels across the globe rise, flooding many coastal areas, and separating former mainland areas into islands. 14 ka - Megafauna extinction starts (continuing to current day), where over **100 large mammal species disappear caused by climate changes and by the expanding human population**.	1.7 million - 10. 000 years

ERA	PERIOD	EPOCH	TIME
CENOZOIC Modern world with animals, plants and geographical features as we know it today, came into being.	**Quaternary**	**Holocene** 10 ka **Humans** in the Fertile Crescent of the Middle East **develop agriculture**. This process of food production, coupled later with the domestication of animals caused a massive increase in human population that has continued to the present.. 10 ka - **Sahara is green** with rivers, lakes, cattle, crocodiles and monsoons. Japan's hunter-gatherer Jomon culture creates world's earliest pottery. Humans reach Tierra del Fuego at the tip of South America, the last continental region to be inhabited by humans (excluding Antarctica). AD 1 Human population 150 million. AD 1835 Human population 1 billion. AD 1969 Humans walk on the moon.	10.000 yrs ago till present

ERA	PERIOD	EPOCH	TIME
CENOZOIC Modern world with animals, plants and geographical features as we know it today, came into being.	**Quaternary**	**Holocene** AD 2006 Human population 6.6 billion. **Holocene extinction event continues (commencing 14 ka) with the observed rate of extinction rising dramatically in the last 50 years. Most biologists believe that we are at this moment at the beginning of a tremendously accelerated anthropogenic mass extinction, leading to the sixth mass extinction event. Wilson estimates that at current rates of human destruction of the biosphere, one-half of all species of life will be extinct in 100 years.**	10.000 yrs ago till present
		Wilson, E.O. 2002. *The Future of Life*, Harvard University	


Marine Genus Biodiversity:
Extinction Intensity
N
Pg
K
J
Tr
P
C
D
S
O
Cm
Extinction Intensity (%)
0
10
20
30
40
50
60
End K
End Eocene
End J
End Tr
End P
End Middle P
Middle C
Late D
End S
End O
Dresbachian
Botomanian
0
50
100
150
200
250
300
350
400
450
500
542
Millions of Years Ago

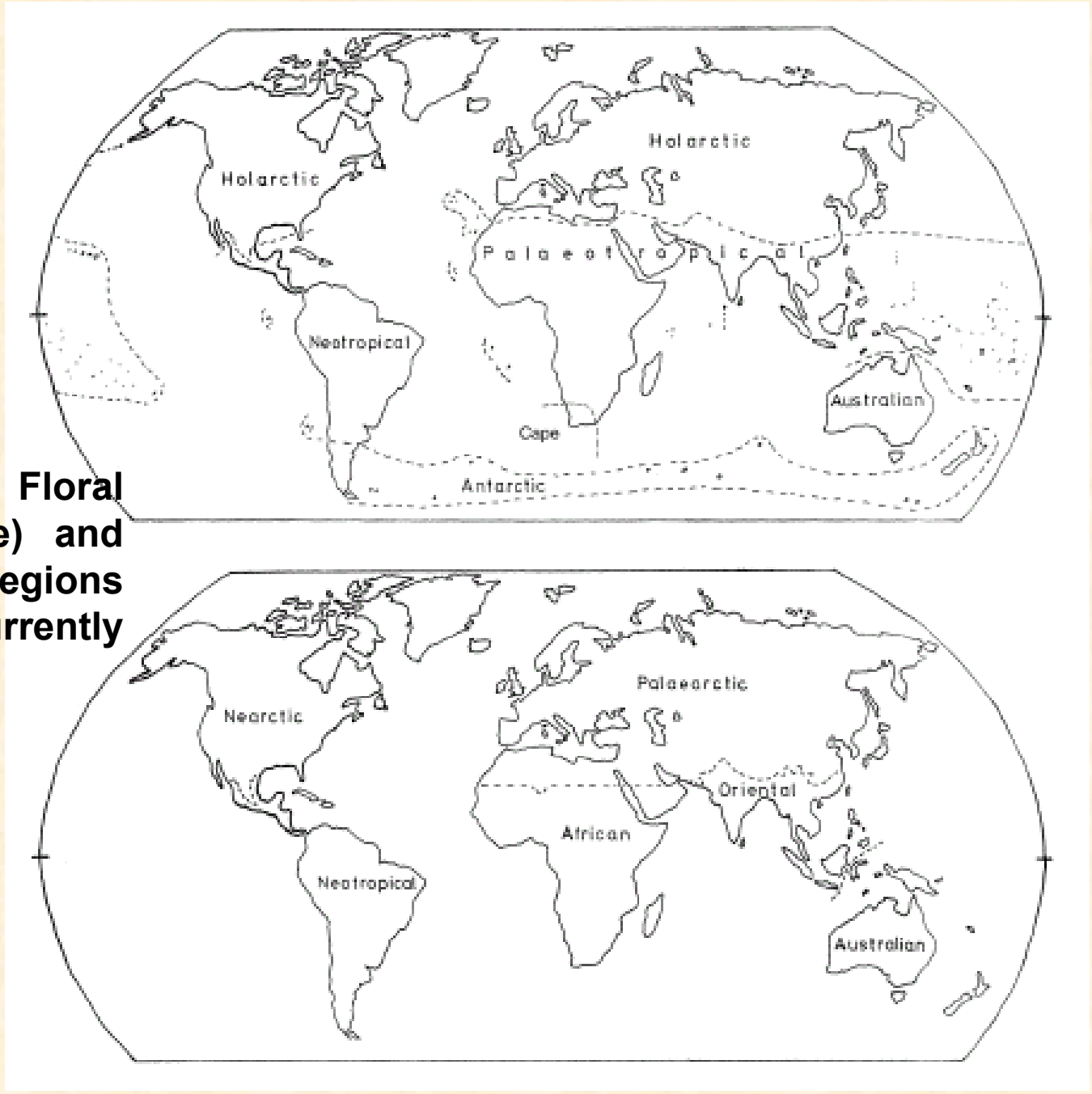
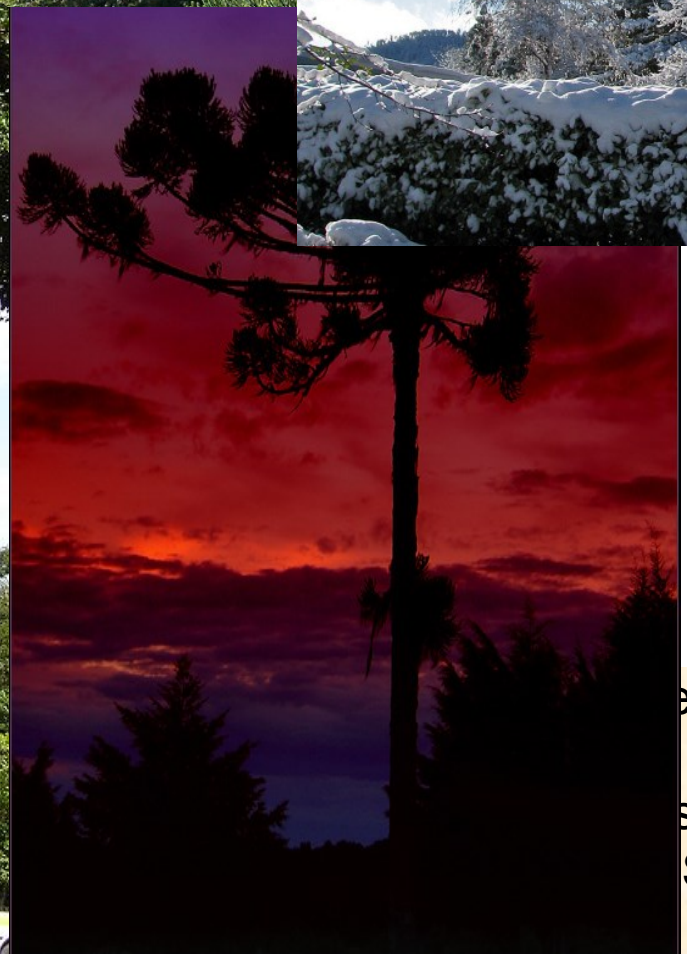


Figure 1 - Floral Kingdoms above) and zoogeographic Regions (below), as currently recognized.

Formação da região Neotropical



SA	*Araucaria*
NG	*Intermedia*
Au	*Bunya*
Au	

e Araucariaceae inferred
al. 1998). Geographical
st Asia; Va, Vanuatu; Au,
South America).

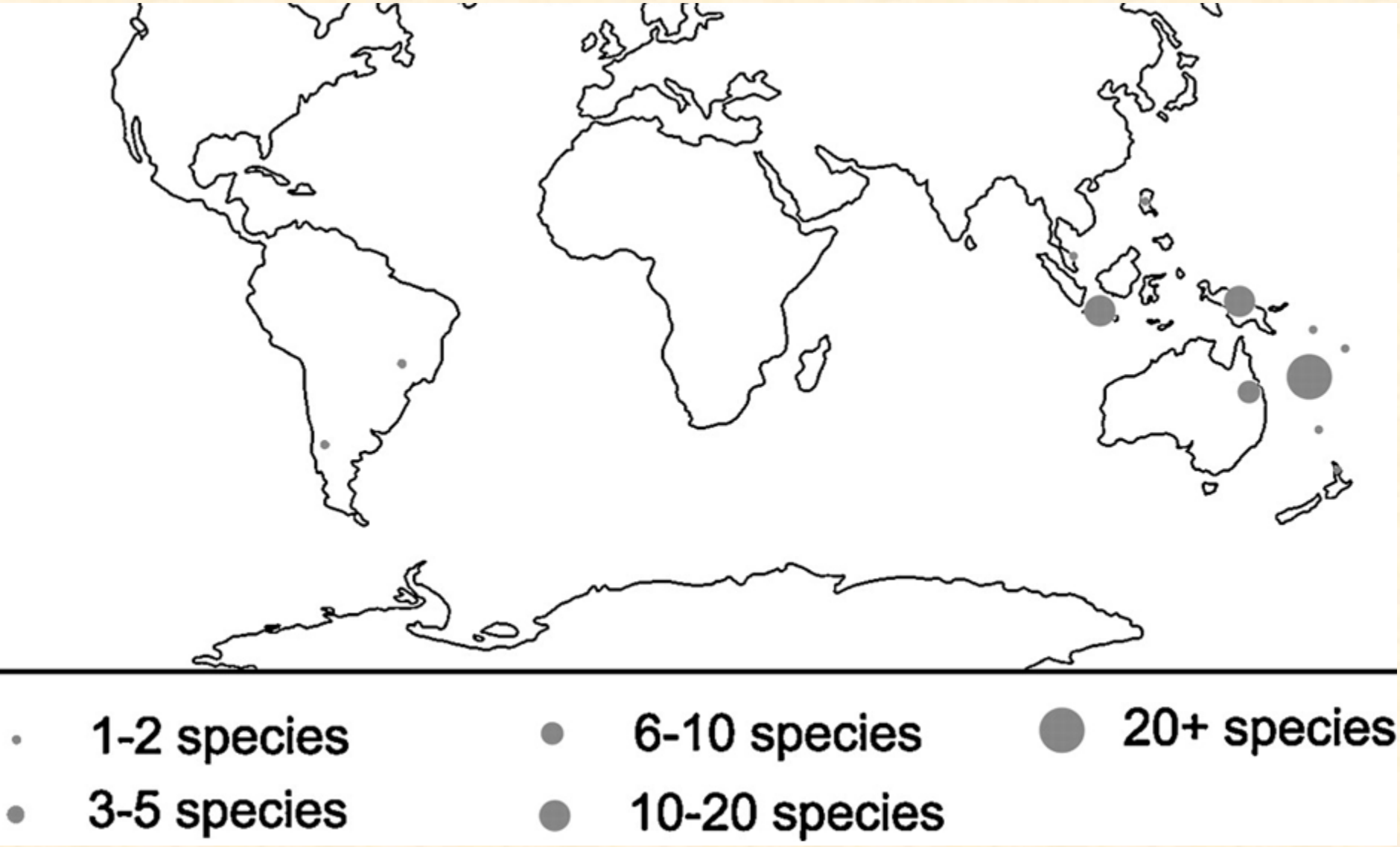


Figure 1 A generalized, global representation of species of Araucariaceae (data from **Enright & Hill 1995**).

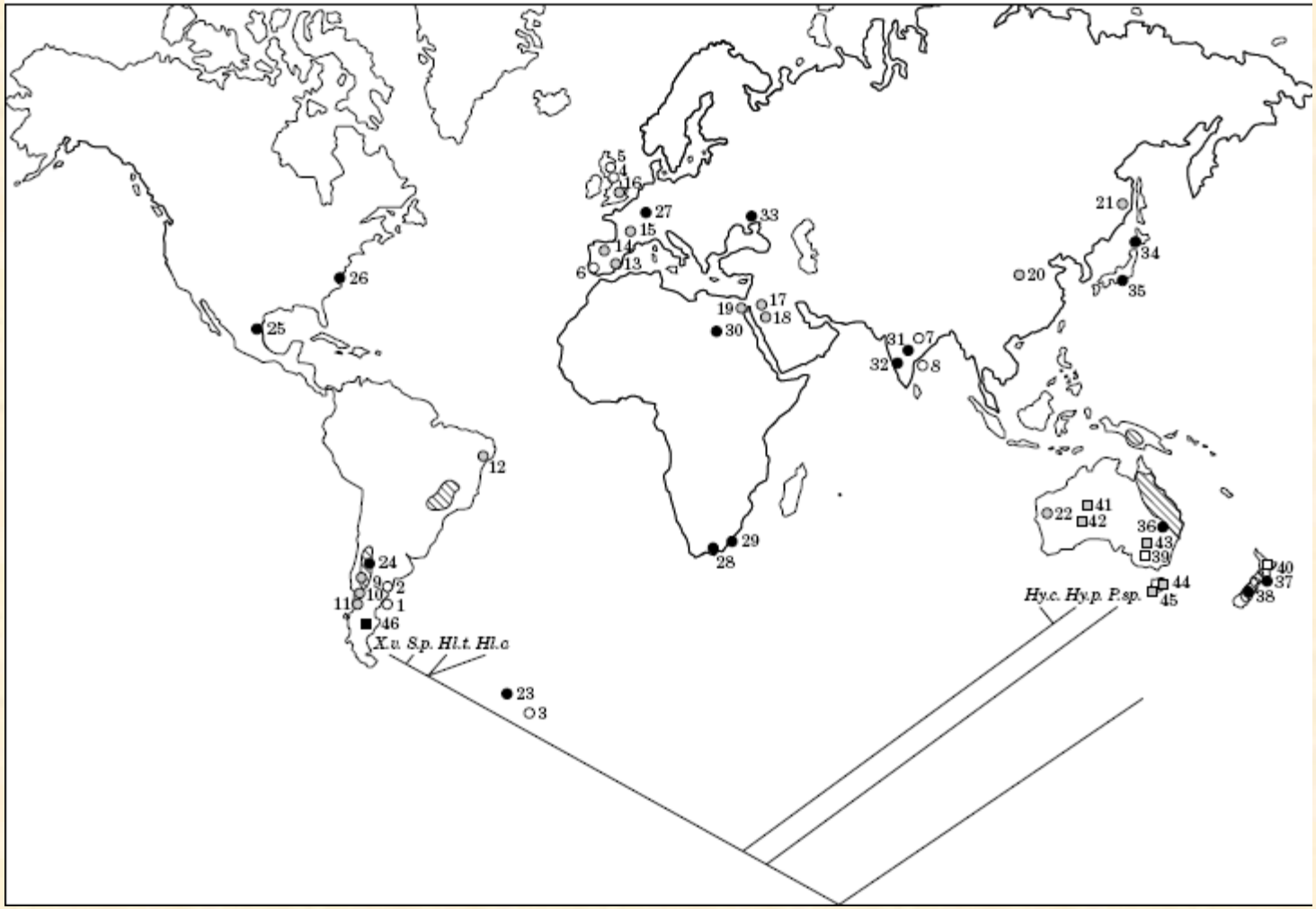
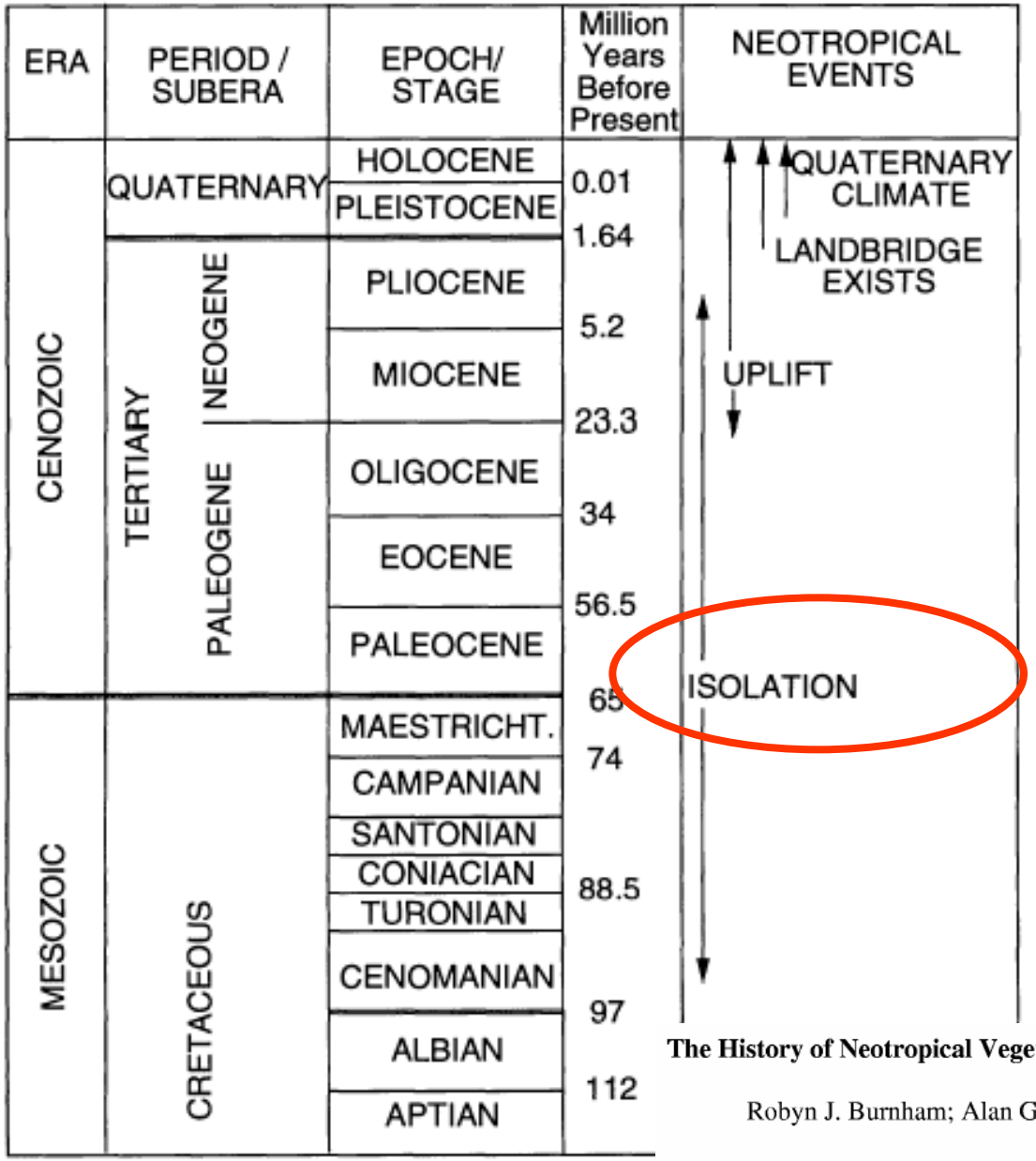


Figure 1. Cladogram depicting the relationships of the *Araucaria* feeding bark beetle lineages located according to the landmass distribution of each taxon.

A PARTIAL TIME SCALE (CRETACEOUS TO PRESENT)



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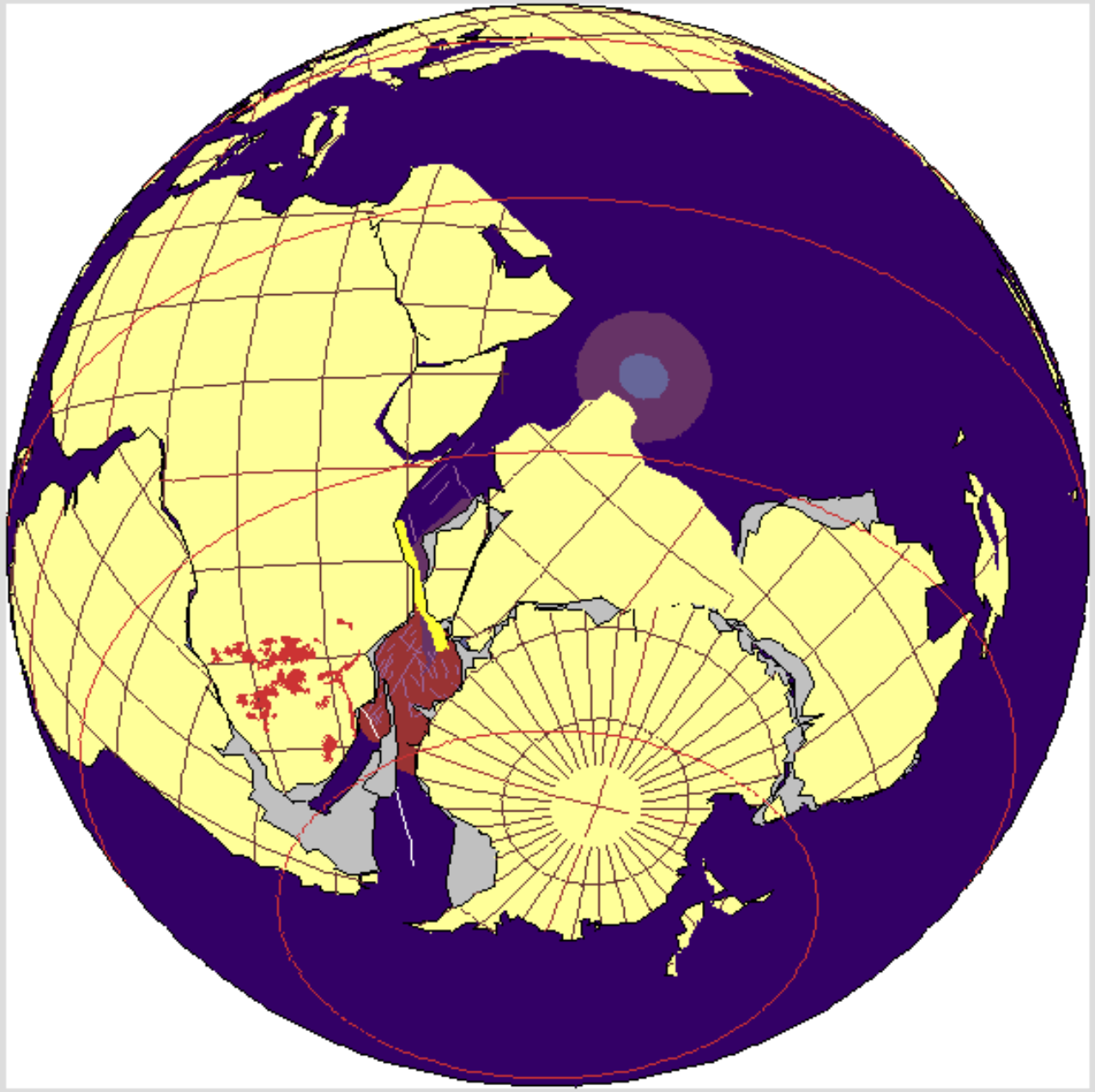
Annals of the Missouri Botanical Garden, Vol. 86, No. 2 (Spring, 1999), 546-589.



OCEAN
TRANSFORM, REGIME 4
TRANSFORM, REGIME 3
TRANSFORM, REGIME 2
TRANSFORM, REGIME 1
HOTSPOT
AFRICA - ANTARCTICA CORRIDOR
SUBMARINE VOLCANIC PROVINCE
SUBMARINE PLATEAU
SUBMERGED CONTINENTAL MARGIN
PRESENT-DAY COASTLINE
CONTINENTAL VOLCANIC PROVINCE
CONTINENT

200 Ma (Million years ago)

150 Ma

Present

5 fps

?

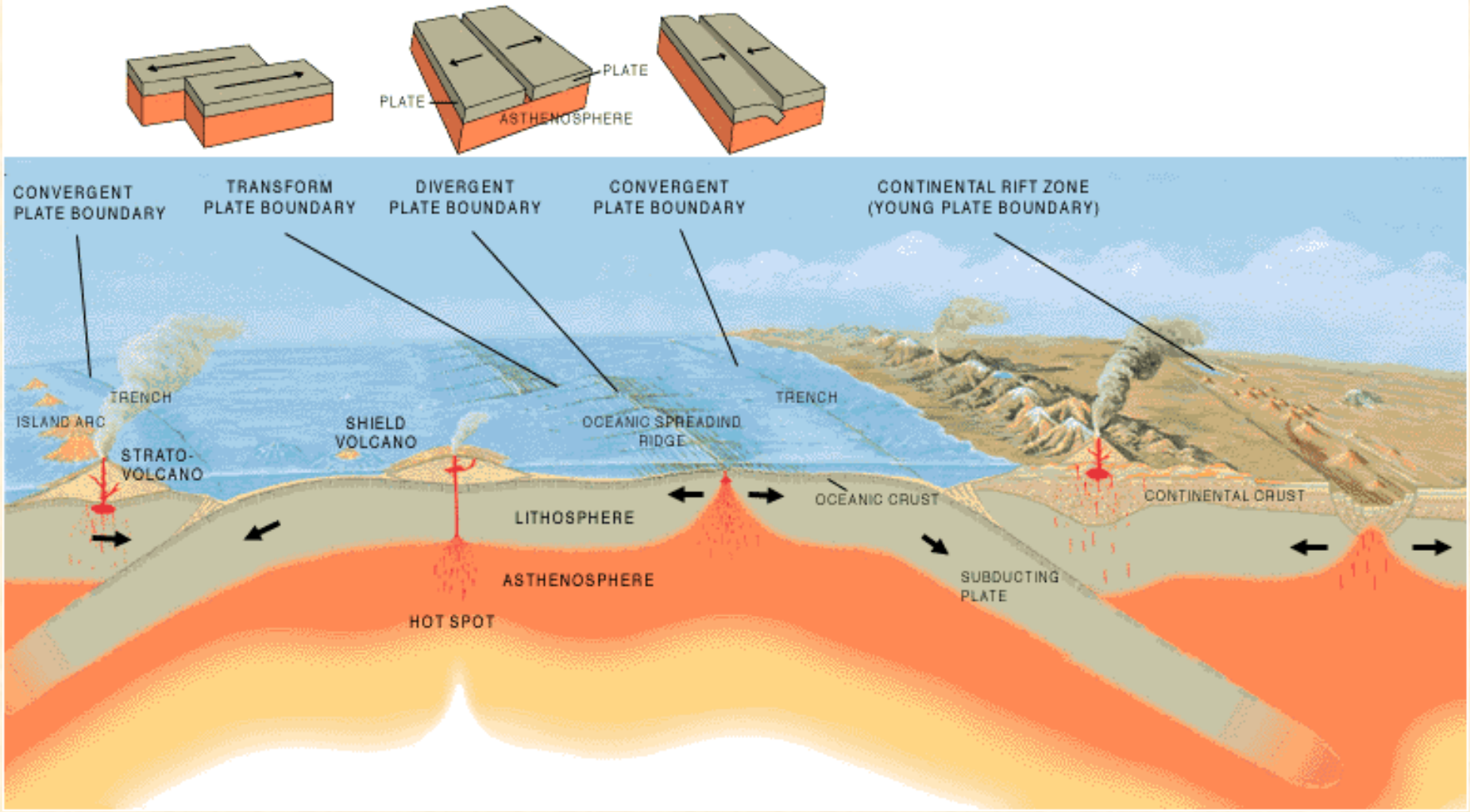
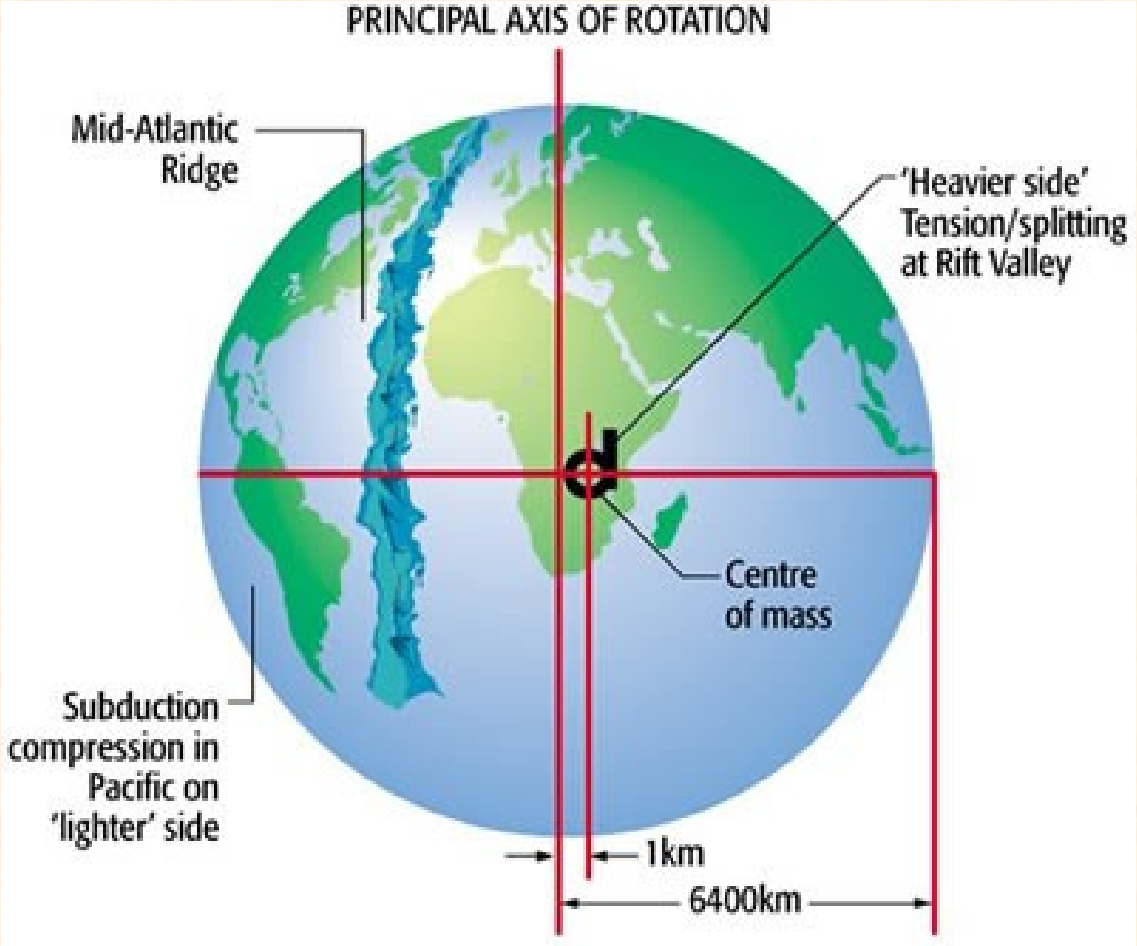
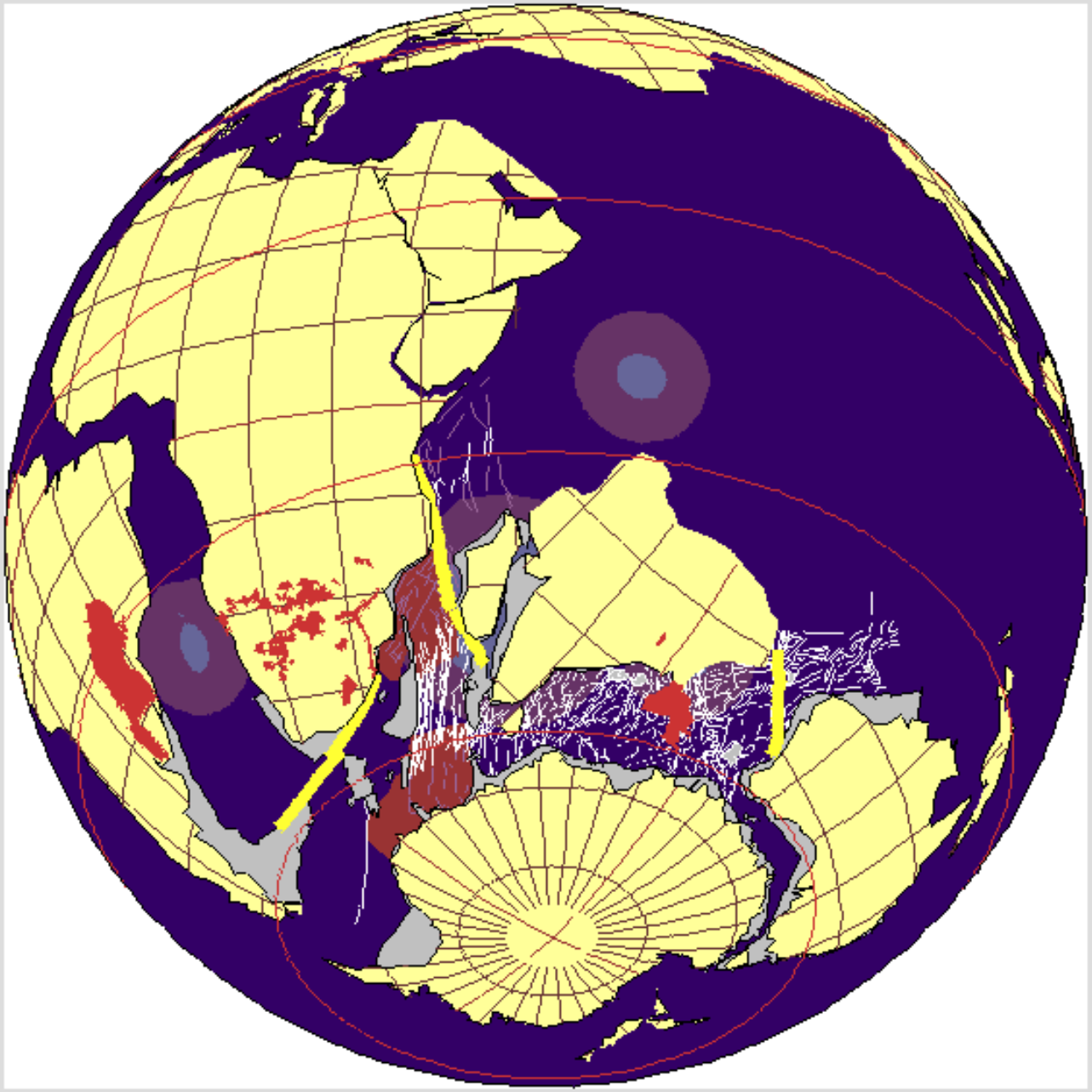


PLATE
PLATE
ASTHENOSPHERE
CONVERGENT PLATE BOUNDARY
TRANSFORM PLATE BOUNDARY
DIVERGENT PLATE BOUNDARY
CONVERGENT PLATE BOUNDARY
CONTINENTAL RIFT ZONE (YOUNG PLATE BOUNDARY)
TRENCH
ISLAND ARC
STRATO-VOLCANO
SHIELD VOLCANO
OCEANIC SPREADIND RIDGE
TRENCH
OCEANIC CRUST
CONTINENTAL CRUST
LITHOSPHERE
ASTHENOSPHERE
HOT SPOT
SUBDUCTING PLATE


PRINCIPAL AXIS OF ROTATION
Mid-Atlantic Ridge
'Heavier side' Tension/splitting at Rift Valley
Centre of mass
Subduction compression in Pacific on 'lighter' side
1km
6400km



OCEAN
TRANSFORM, REGIME 4
TRANSFORM, REGIME 3
TRANSFORM, REGIME 2
TRANSFORM, REGIME 1
HOTSPOT
AFRICA - ANTARCTICA CORRIDOR
SUBMARINE VOLCANIC PROVINCE
SUBMARINE PLATEAU
SUBMERGED CONTINENTAL MARGIN
PRESENT-DAY COASTLINE
CONTINENTAL VOLCANIC PROVINCE
CONTINENT

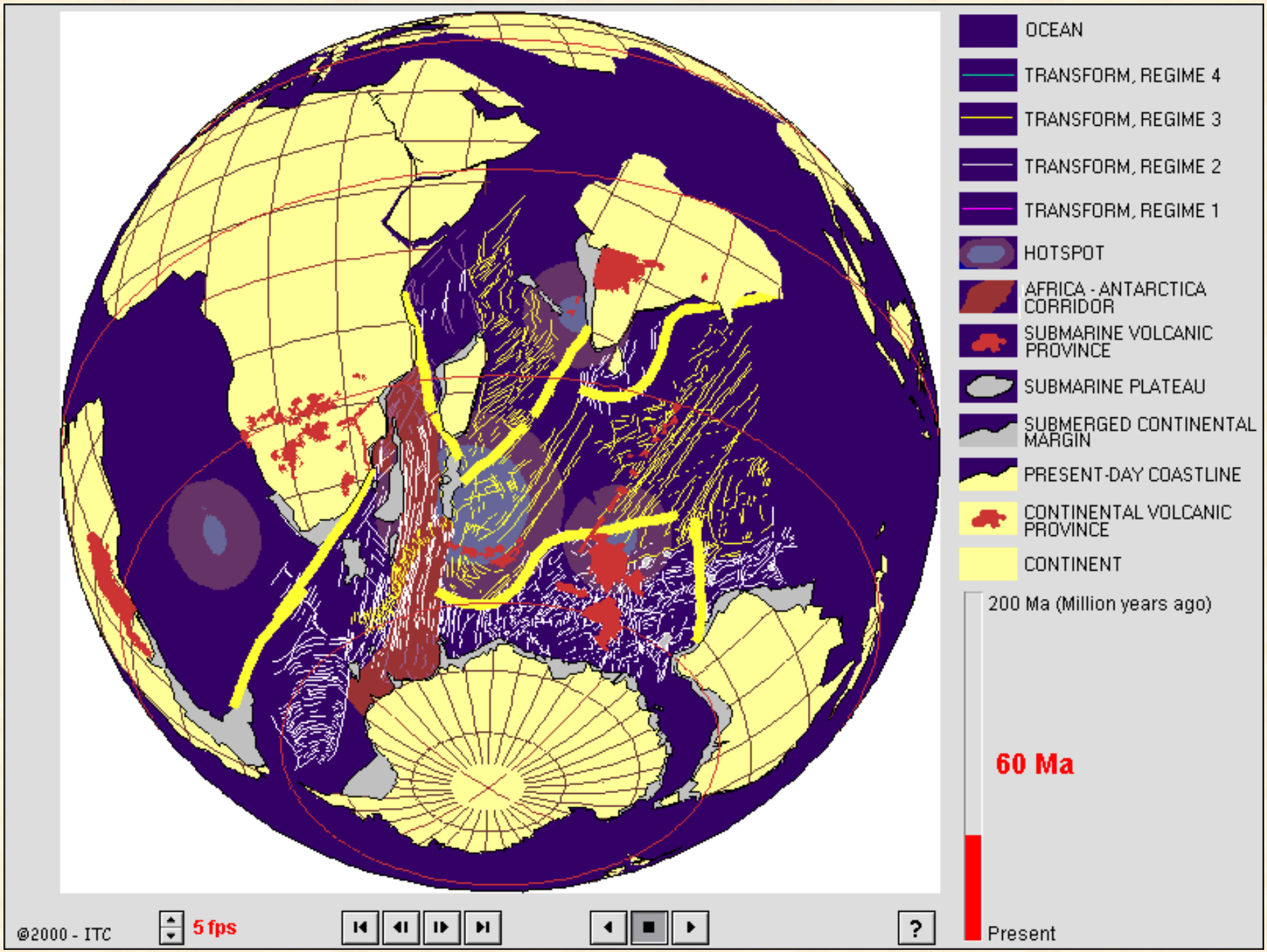
200 Ma (Million years ago)

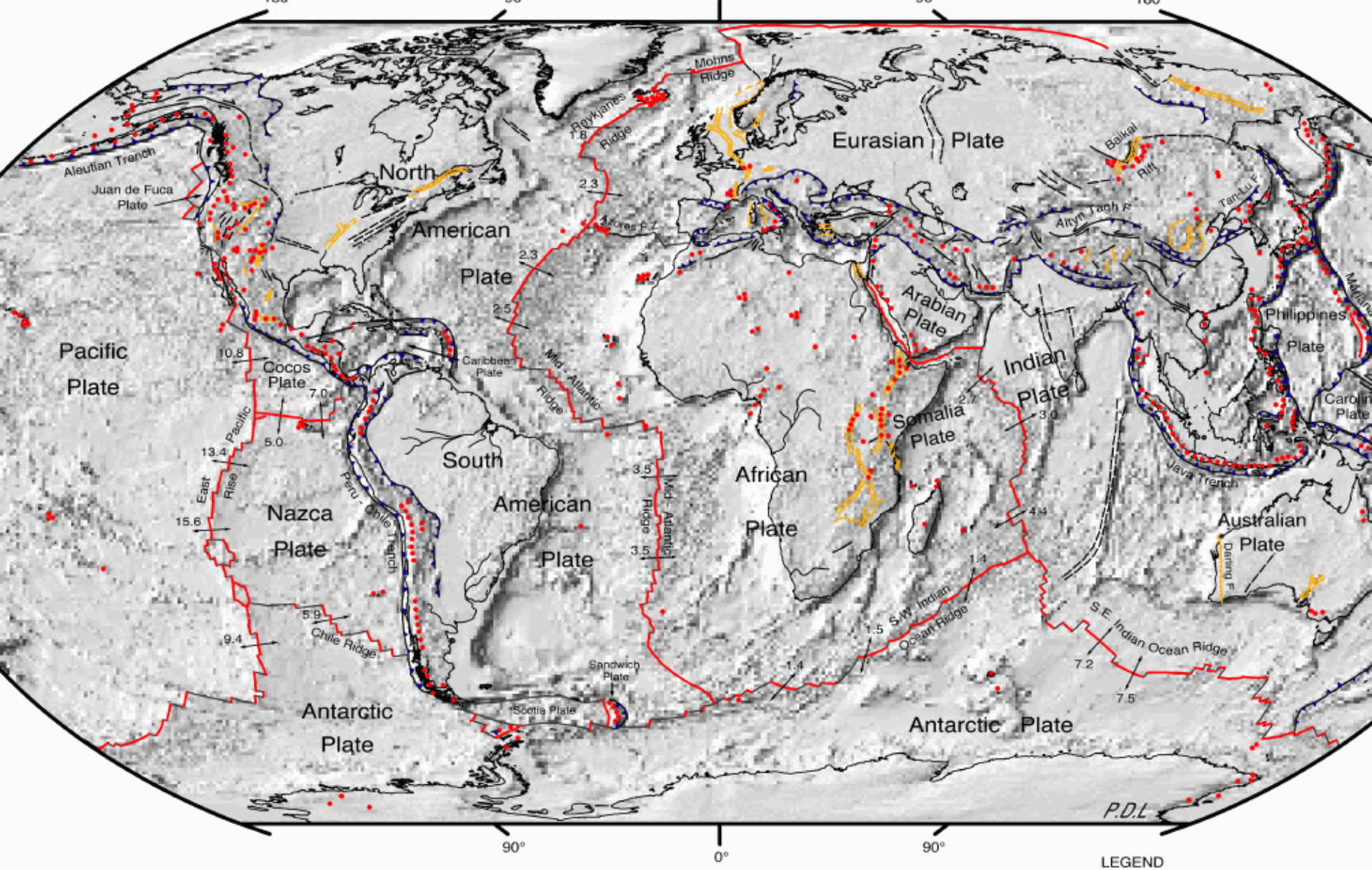
100 Ma

Present

5 fps

?


OCEAN
TRANSFORM, REGIME 4
TRANSFORM, REGIME 3
TRANSFORM, REGIME 2
TRANSFORM, REGIME 1
HOTSPOT
AFRICA - ANTARCTICA CORRIDOR
SUBMARINE VOLCANIC PROVINCE
SUBMARINE PLATEAU
SUBMERGED CONTINENTAL MARGIN
PRESENT-DAY COASTLINE
CONTINENTAL VOLCANIC PROVINCE
CONTINENT
200 Ma (Million years ago)
60 Ma
Present
©2000 - ITC
5 fps
?



DIGITAL TECTONIC ACTIVITY MAP OF THE EARTH

Tectonism and Volcanism of the Last One Million Years

DTAM

NASA/Goddard Space Flight Center
Greenbelt, Maryland 20771

Robinson Projection
October 1998

LEGEND

Actively-spreading ridges and transform faults

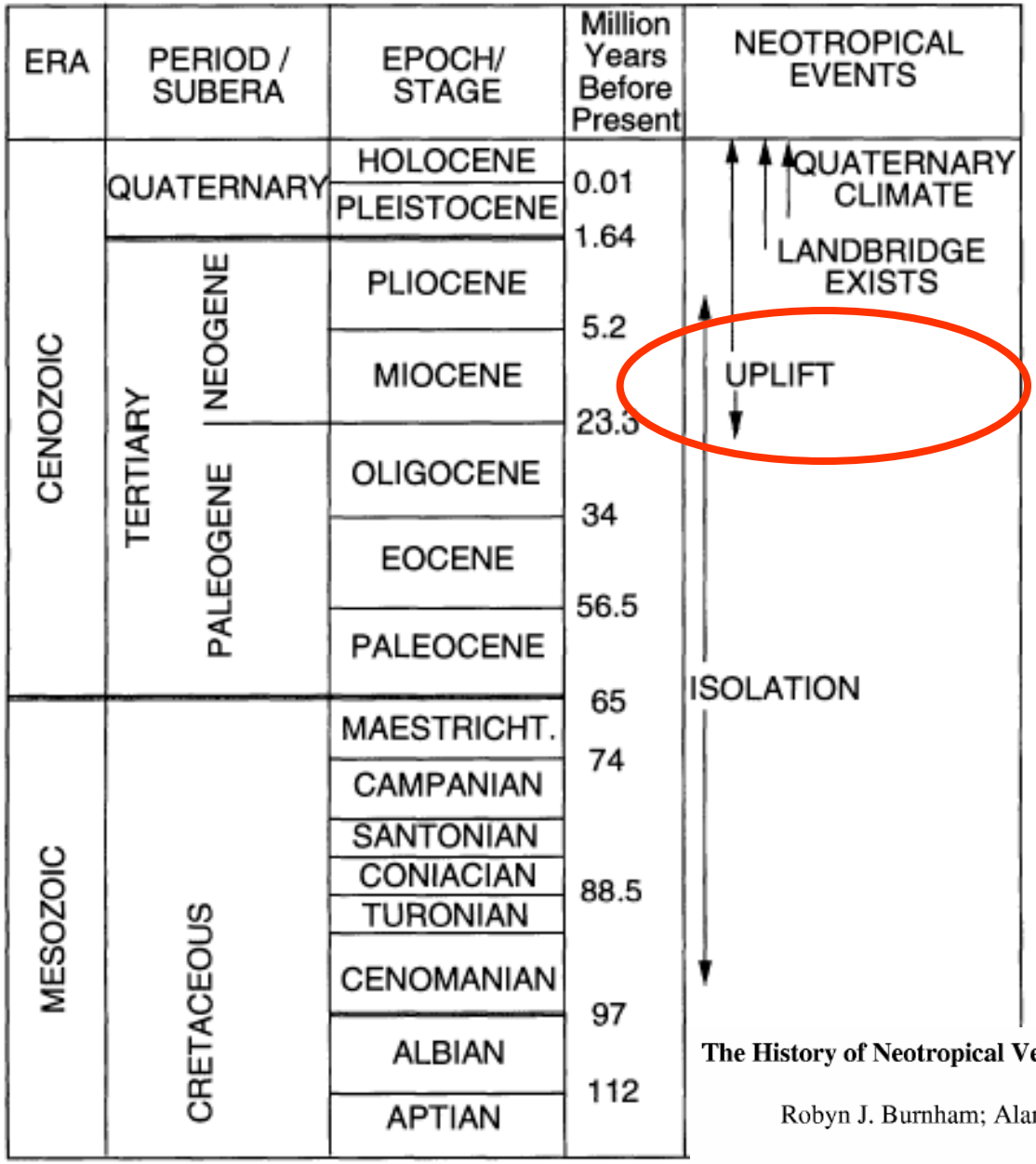
1.4 Total spreading rate, cm/year, NUVEL-1 model (DeMets et al., Geophys. J. International, 101, 425

Major active fault or fault zone; dashed where nat location, or activity uncertain

Normal fault or rift; hachures on downthrown side

Reverse fault (overthrust, subduction zones); gen barbs on upthrown side

A PARTIAL TIME SCALE (CRETACEOUS TO PRESENT)



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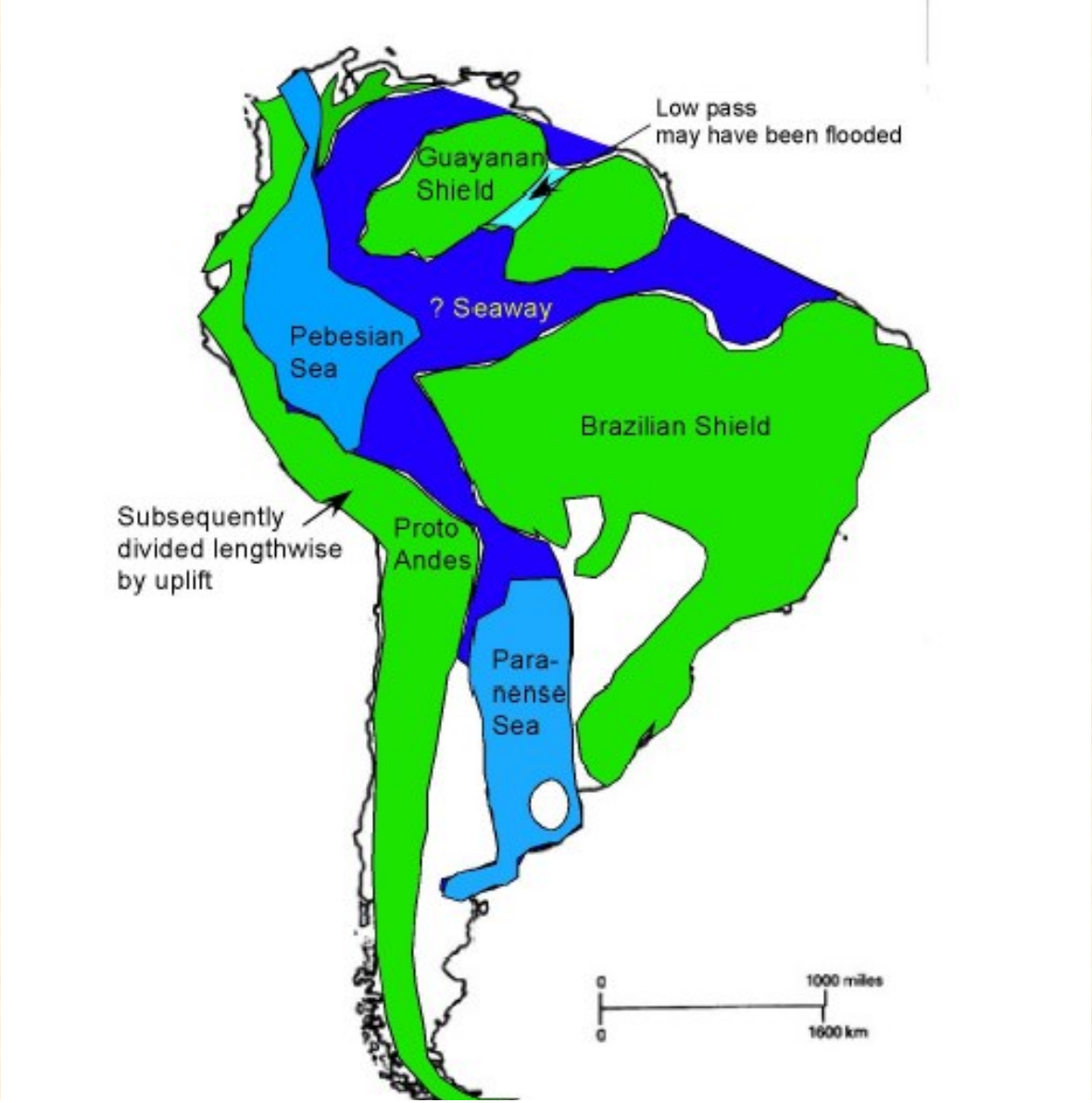

The rise and fall of the Refugial Hypothesis of Amazonian Speciation: a paleo-ecological perspective

Mark B. Bush[1] & Paulo E. de Oliveira[2]

Biota Neotropica v6 (n1) – http://www.biotaneotropica.org.br/v6n1/pt/abstract?point-of-view+bn00106012006

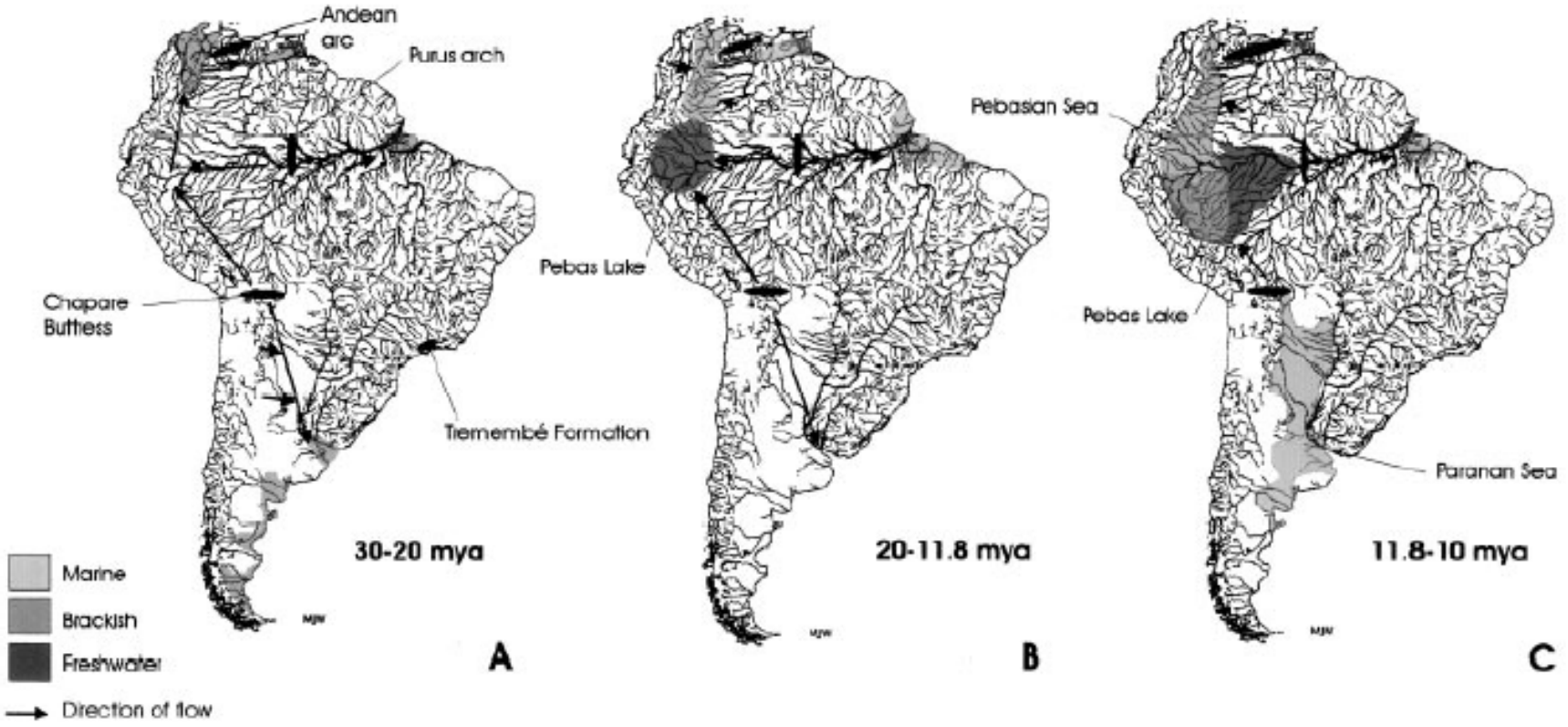

Fig. 5 A–C. Middle Tertiary palaeogeography of South America from late Oligocene to late Miocene (30–10 Mya). —A. Late Oligocene to early Miocene. —B. Early to Middle Miocene. —C. Late Miocene. Modified from Lundberg *et al.* (1998).

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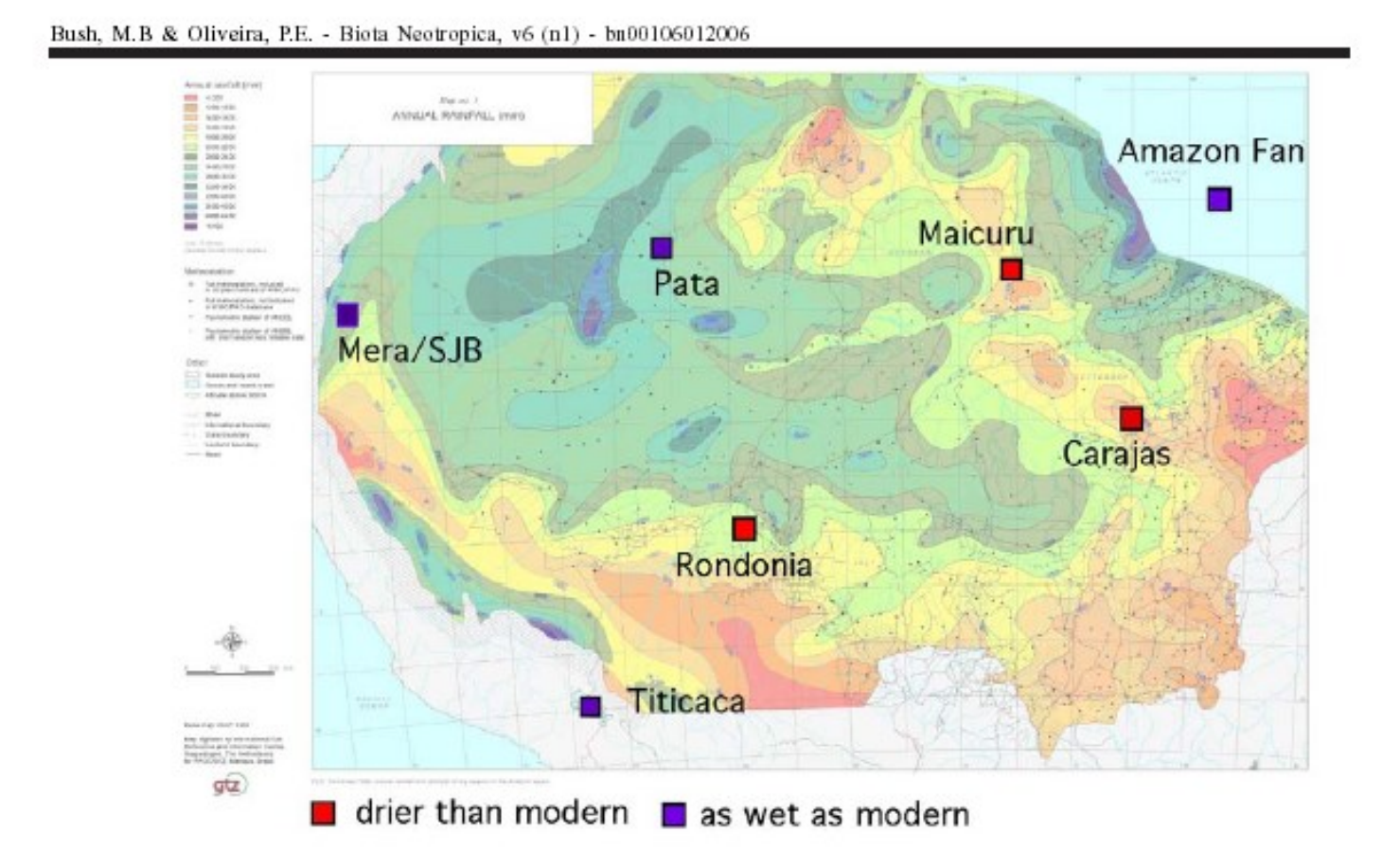
4 – no Quaternário a evolução da Bacia Amazônica foi marcada pela deposição de sedimentos andinos, pelas alterações no nível do mar e pelas flutuações climáticas do Pleistoceno.



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Finalmente, a dinâmica fluvial, com a formação de lagos, meandros e ilhas, que se observa até hoje, também influencia padrões de distribuição de espécies.

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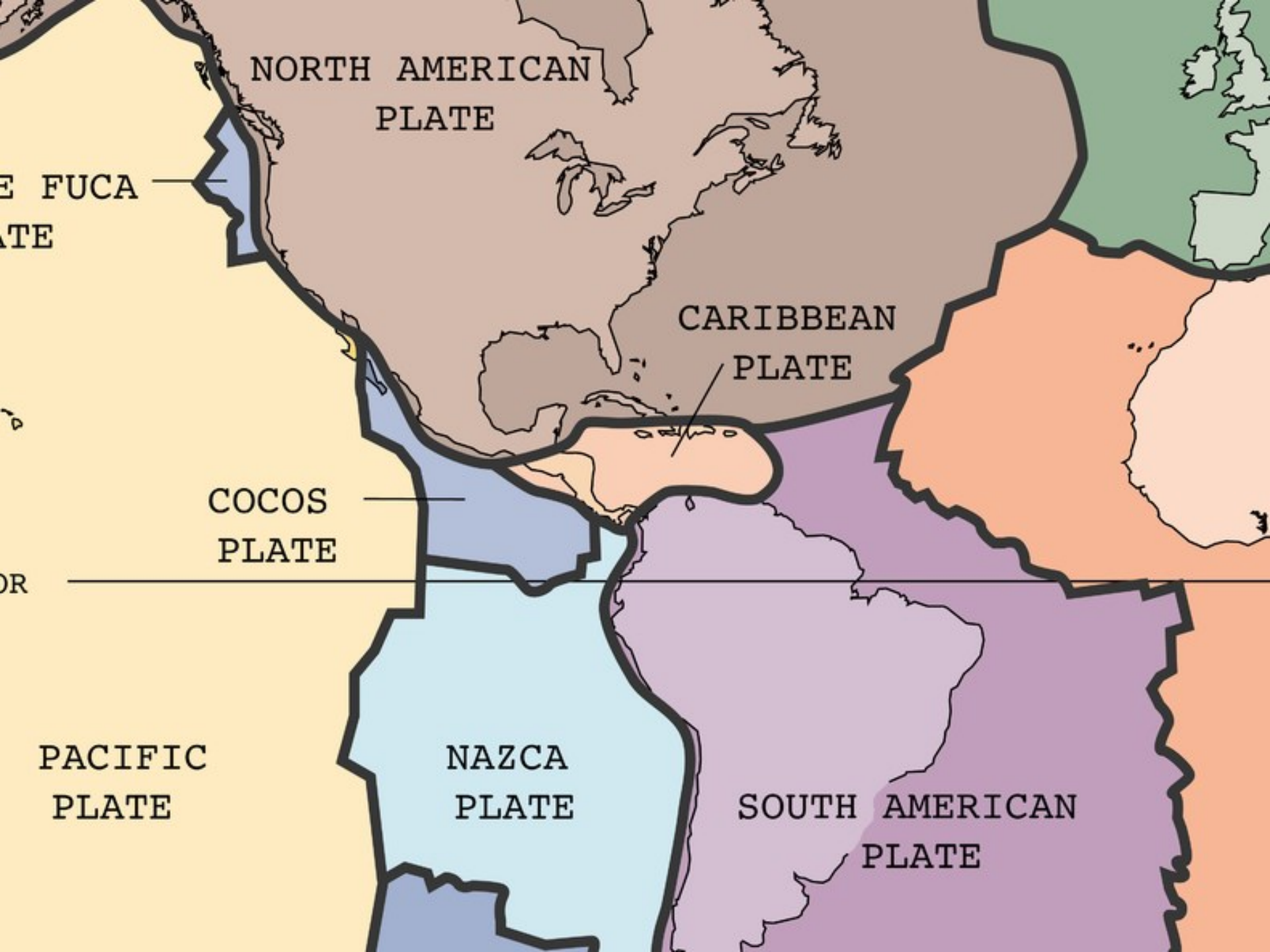
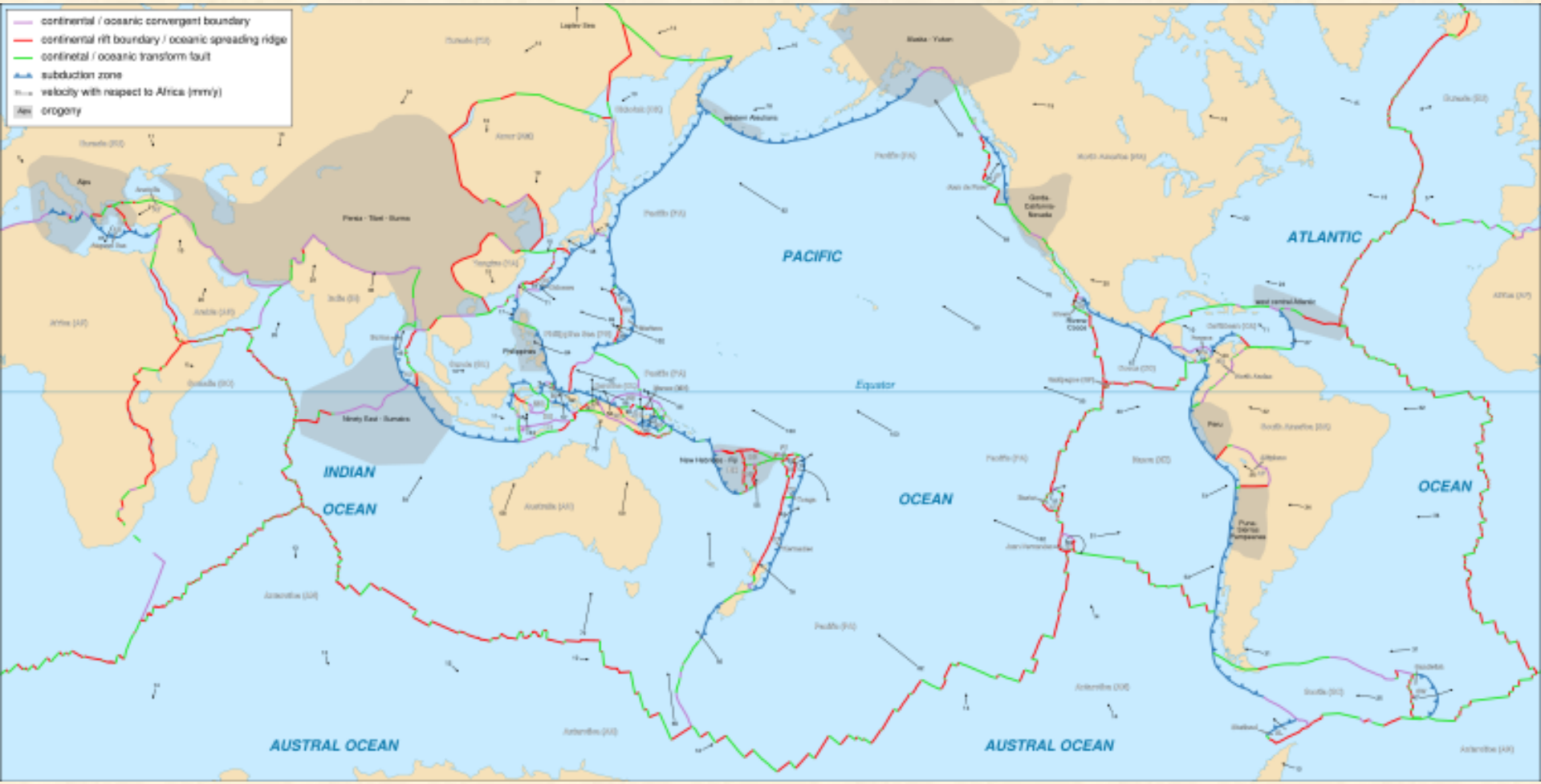
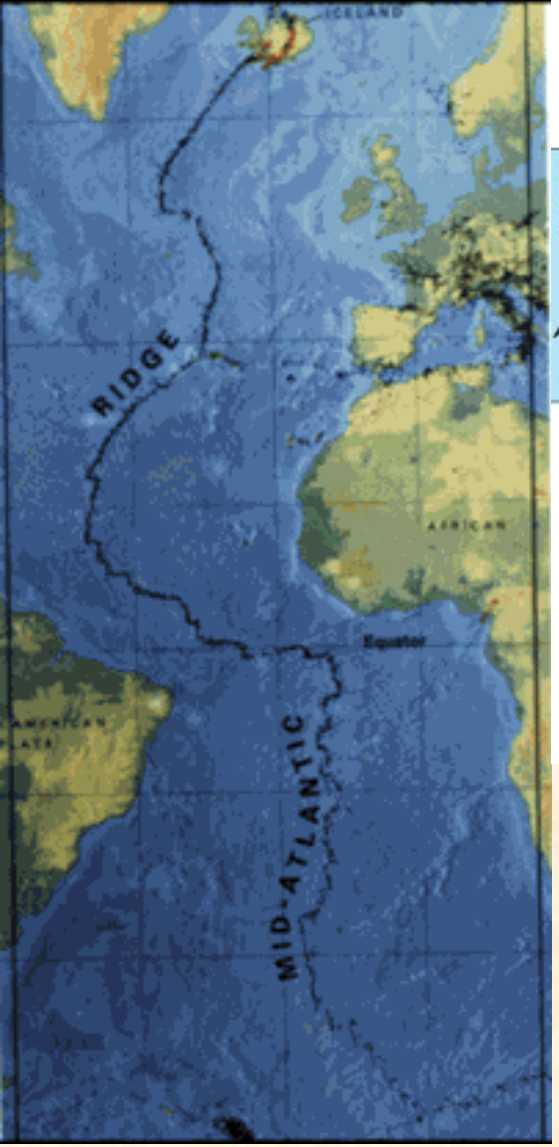
O soerguimento dos Andes vai definir também a formação de outras grandes bacias da região Neotropical, com a do rio Madalena na Colômbia e do rio Orinoco na Venezuela.

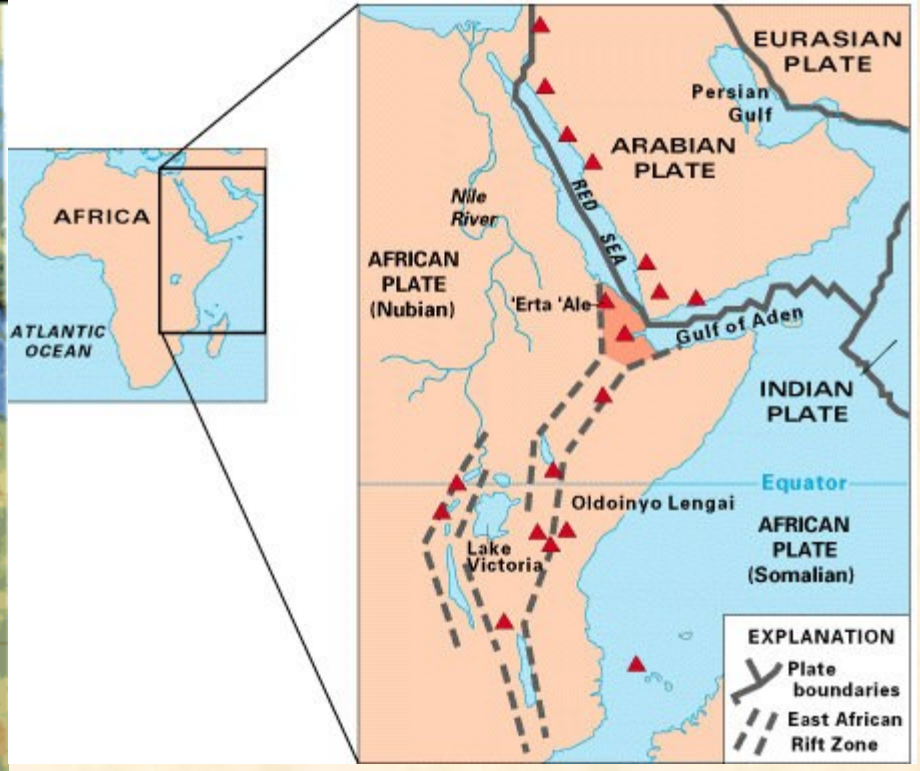
Fig. 1 Map of South America showing the geographical distributions (shaded) of extant species of *Plagioscion* (continental) and *Paralonchurus* (coastal). Disparate shading indicates major South American river drainages.

Boeger, W. A. & D. C. Kritsky (2002). Parasites, fossils and geologic history: Historical biogeography of the South American freshwater croakers, *Plagioscion* spp. (Teleostei, Sciaenidae). — *Zoologica Scripta*, 32, 3–11.


NORTH AMERICAN
PLATE
E FUCA
ATE
CARIBBEAN
PLATE
COCOS
PLATE
OR
PACIFIC
PLATE
NAZCA
PLATE
SOUTH AMERICAN
PLATE


continental / oceanic convergent boundary
continental rift boundary / oceanic spreading ridge
continetal / oceanic transform fault
subduction zone
velocity with respect to Africa (mm/y)
orogeny
PACIFIC
OCEAN
ATLANTIC
OCEAN
INDIAN
OCEAN
AUSTRAL OCEAN
AUSTRAL OCEAN
Equator


ICELAND
RIDGE
AFRICAN
Equator
MID-ATLANTIC


AFRICA
ATLANTIC OCEAN
EURASIAN PLATE
Persian Gulf
ARABIAN PLATE
Nile River
RED SEA
AFRICAN PLATE (Nubian)
'Erta 'Ale
Gulf of Aden
INDIAN PLATE
Equator
Oldoinyo Lengai
Lake Victoria
AFRICAN PLATE (Somalian)
EXPLANATION
Plate boundaries
East African Rift Zone

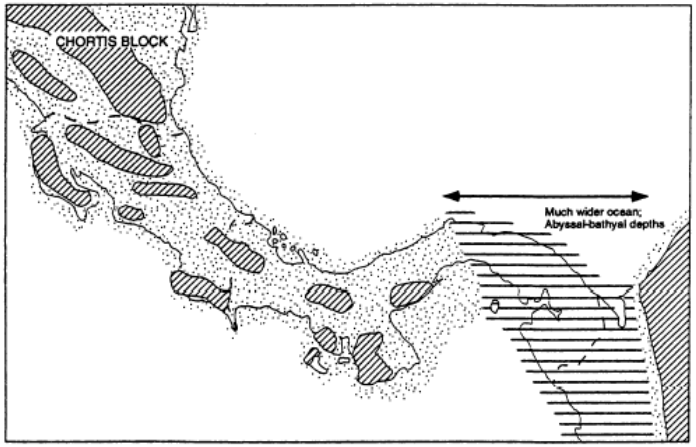
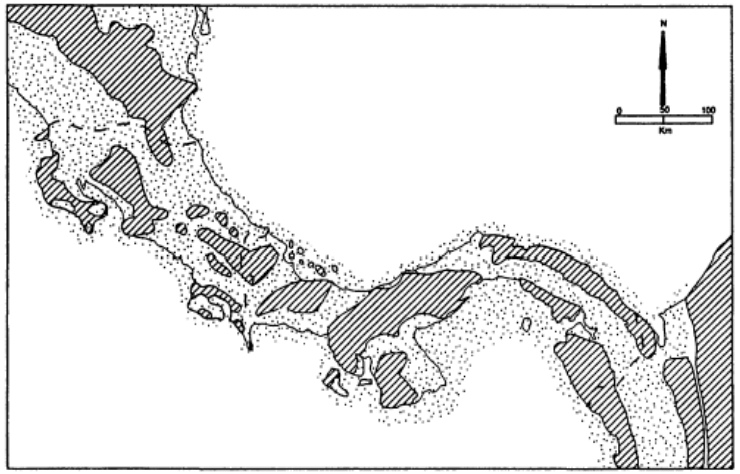


Figure 11. Central American Isthmus during the middle Miocene (16–15 Ma). Oblique parallel lines = emergent land; dots = shelf sediments; parallel lines = abyssal oceanic sediments. From Coates and Obando (1996). Used with permission of the University of Chicago Press.



.2. Central American Isthmus during the late Miocene (7–6 Ma). Symbols and source as in Figure 11.

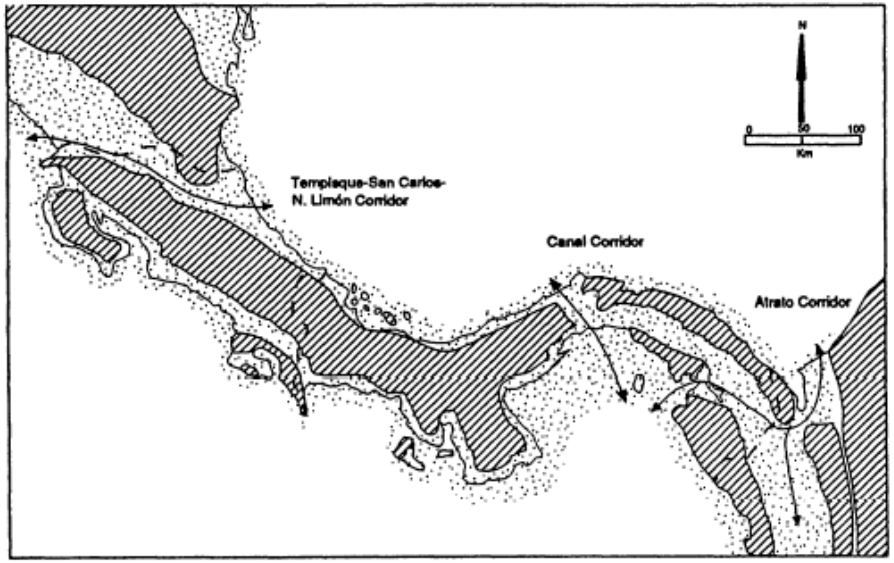


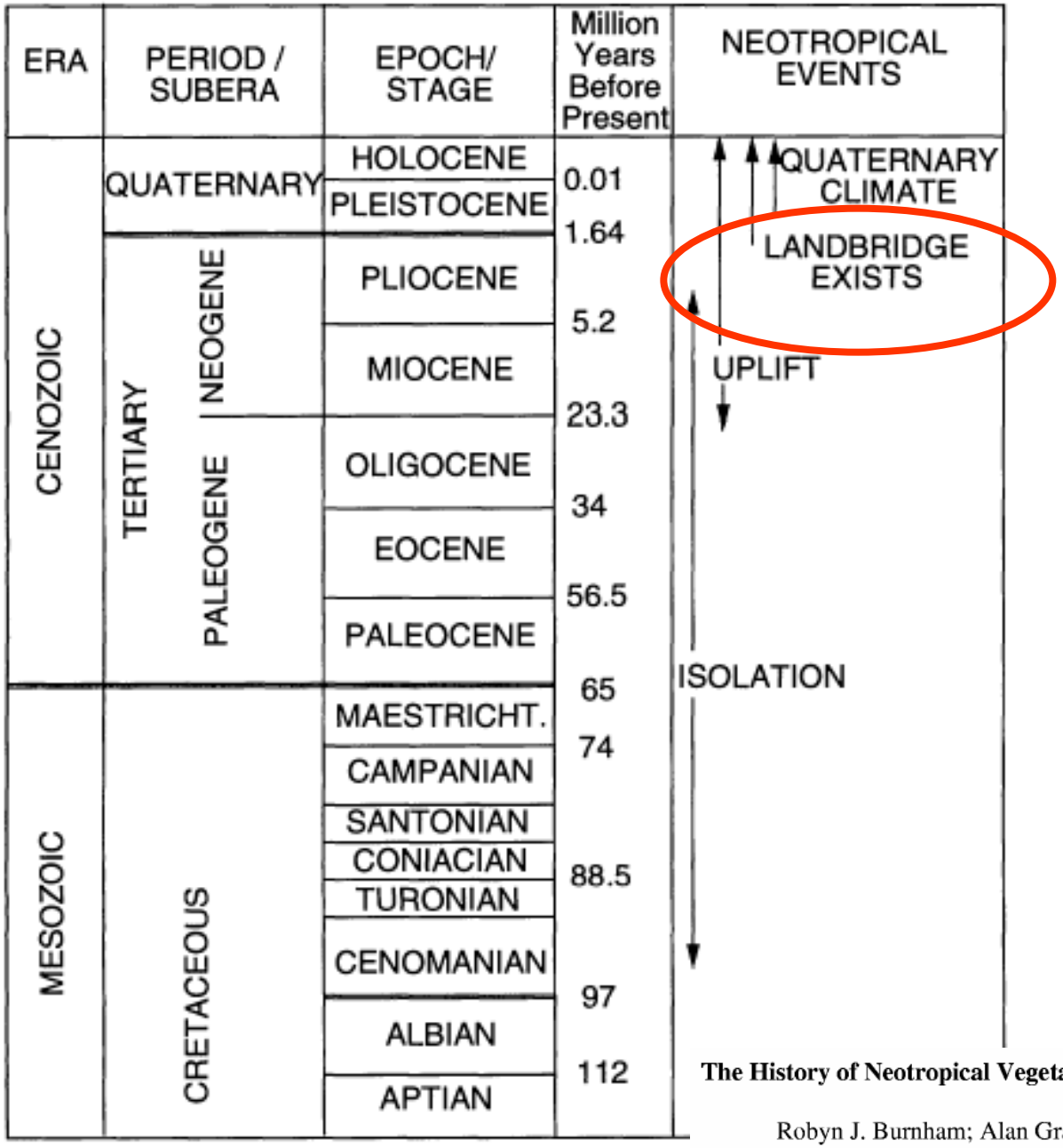
Figure 13. Central American Isthmus during the late Pliocene (~3 Ma). Symbols and source as in Figure 11.

The History of Neotropical Vegetation: New Developments and Status

Robyn J. Burnham; Alan Graham

Annals of the Missouri Botanical Garden, Vol. 86, No. 2 (Spring, 1999), 546-589.

A PARTIAL TIME SCALE (CRETACEOUS TO PRESENT)



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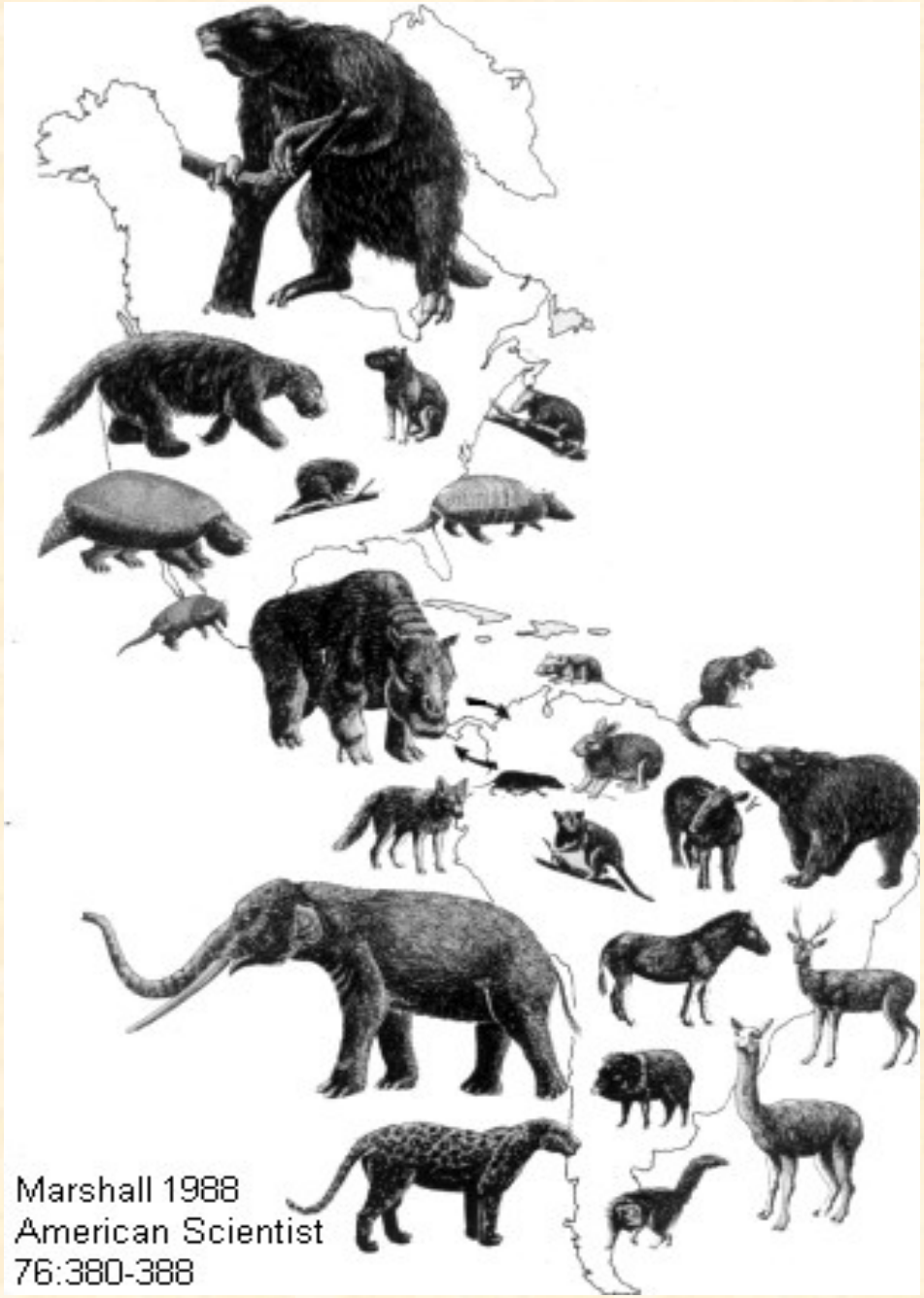
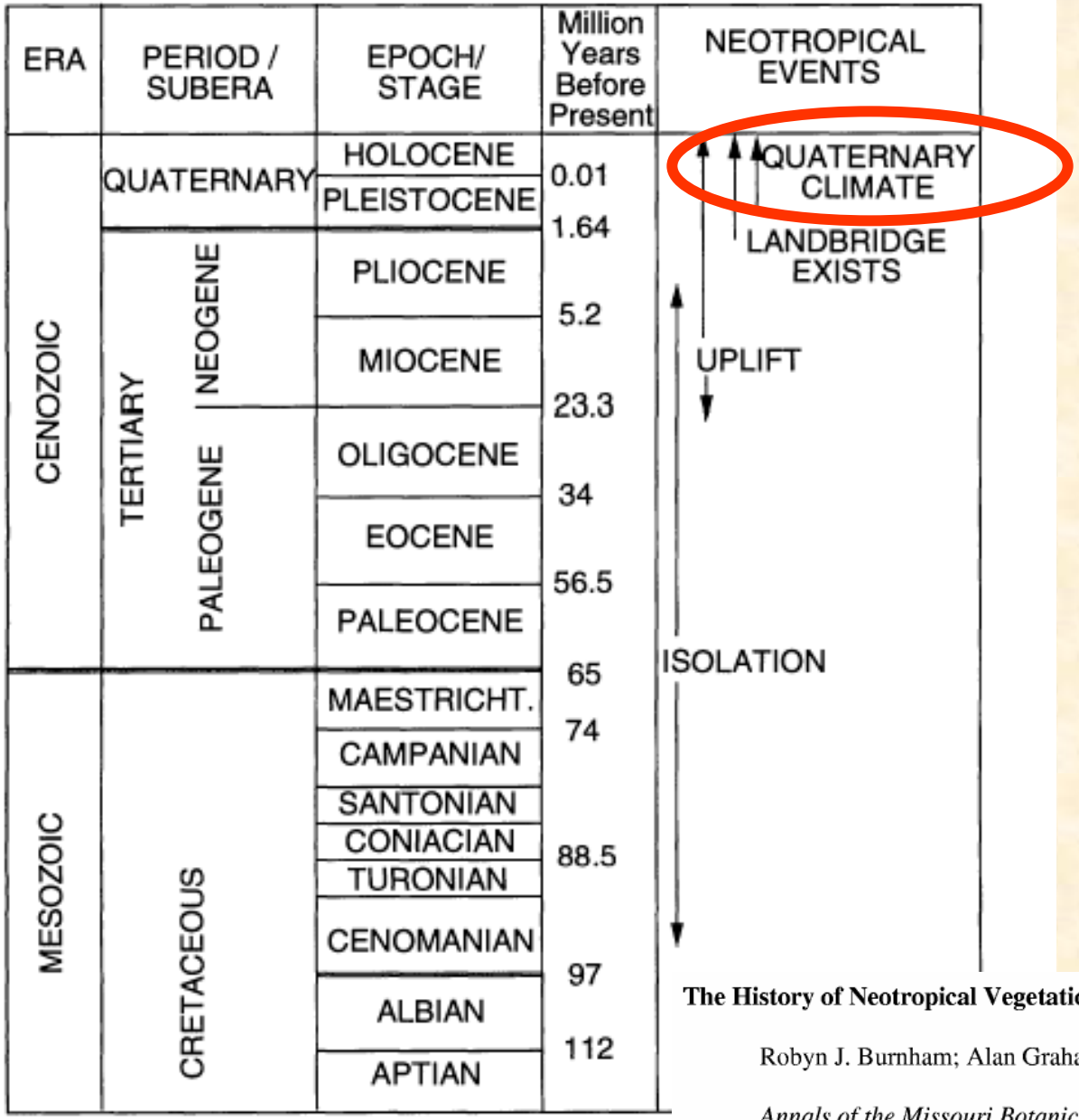


The Great American Interchange was a very important paleozoogeographic event in which land and freshwater animal faunas migrated from Central America to South America and vice versa. **The migration peaked dramatically around 3 Million years ago** (first half of the Upper Pliocene). It resulted in the joining of the Neotropic (roughly South America) and Nearctic (roughly North America) definitively to form the Americas. **Its most dramatic effect is on the zoogeography of mammals** but it also gave an opportunity for non-flying arthropods, reptiles, amphibians and even freshwater fish to migrate.

Great American Interchange

- Occurred with Formation of Land Bridge, 2-3 Myr
  - Initially total number of families increased on each continent
  - Asymmetry in success--**NA with 29** genera (21%) from SA, while **SA with 85** genera (50%) from NA

A PARTIAL TIME SCALE (CRETACEOUS TO PRESENT)



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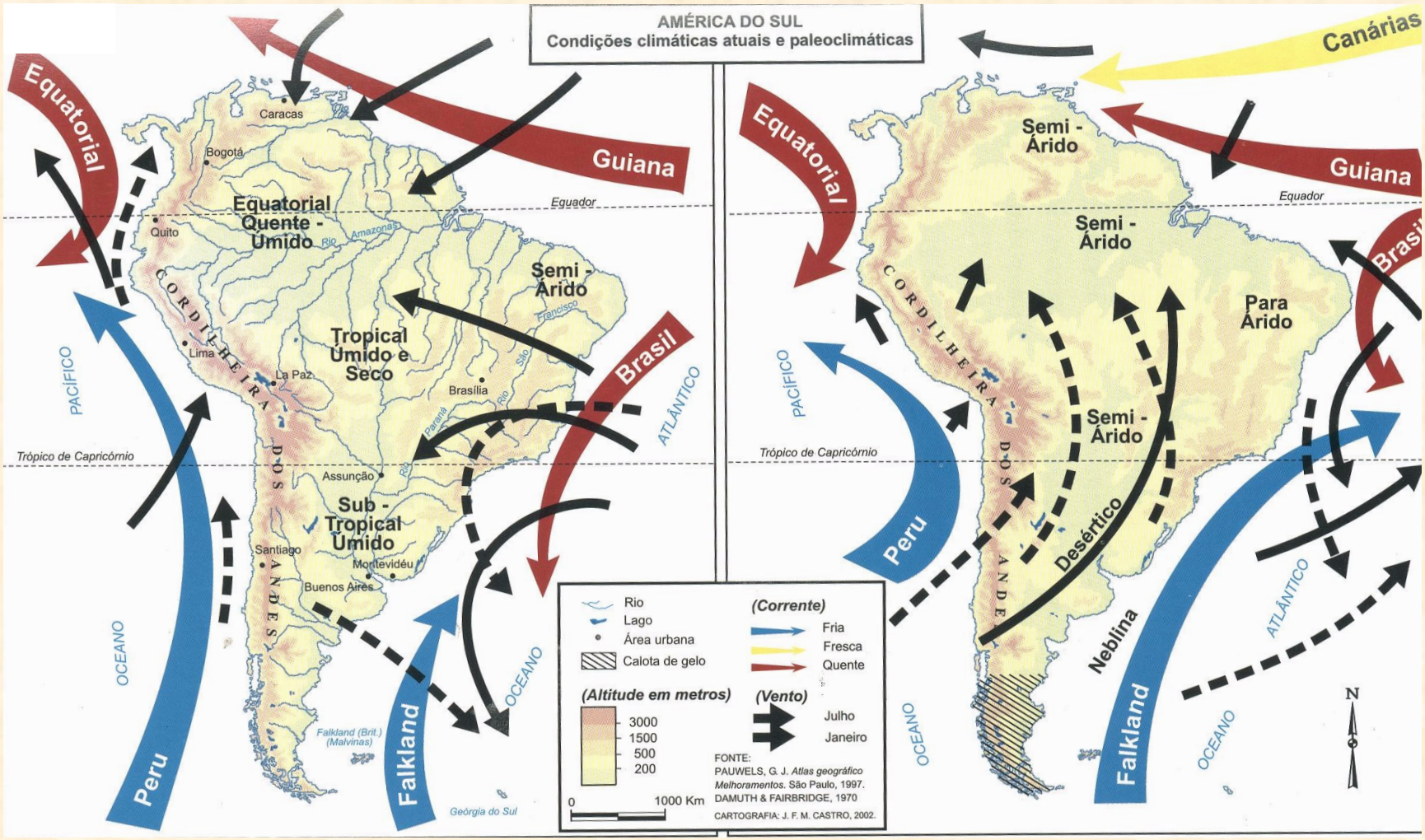

AMÉRICA DO SUL
Condições climáticas atuais e paleoclimáticas
Equatorial
Guiana
Brasil
Peru
Falkland
Canárias
Caracas
Bogotá
Quito
Lima
La Paz
Brasília
Assunção
Santiago
Montevidéu
Buenos Aires
Equatorial Quente - Úmido
Semi - Árido
Tropical Úmido e Seco
Sub - Tropical Úmido
Para Árido
Desértico
Neblina
Equador
Trópico de Capricórnio
PACÍFICO
ATLÂNTICO
OCEANO
CORDILHEIRA DOS ANDES
Rio Amazonas
Rio São Francisco
Rio Paraná
Falkland (Brit.) (Malvinas)
Geórgia do Sul
Rio
Lago
Área urbana
Calota de gelo
(Altitude em metros)
3000
1500
500
200
0
1000 Km
(Corrente)
Fria
Fresca
Quente
(Vento)
Julho
Janeiro
FONTE:
PAUWELS, G. J. Atlas geográfico Melhoramentos. São Paulo, 1997.
DAMUTH & FAIRBRIDGE, 1970
CARTOGRAFIA: J. F. M. CASTRO, 2002.
N

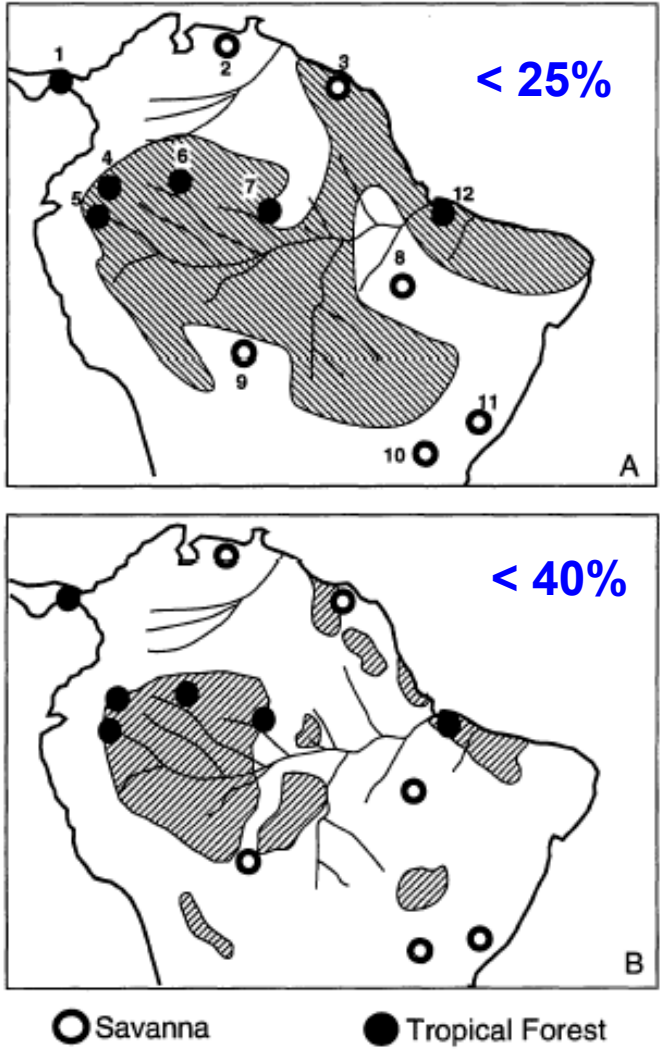
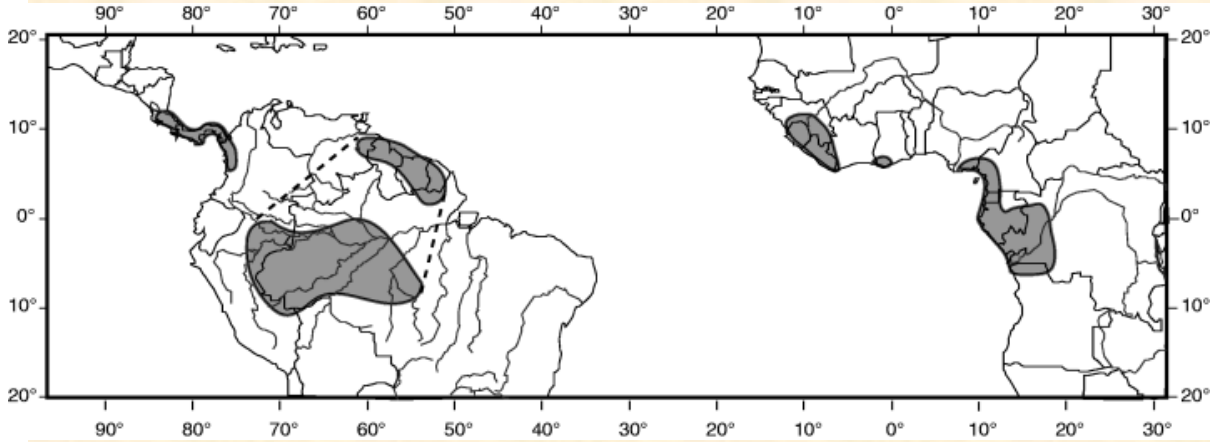


Figure 18. Projected rainforest distribution in Amazonia during the Pleistocene, with (A) 25% and (B) 40% reductions in rainfall from present-day values. Shaded area shows rainfall over 1500 mm annually. Palynological samples from Amazonia shown by symbols, with interpreted vegetation indicated by symbol coding. After Absy and van der Hammen, 1994; Colinvaux, 1996; Behling, 1998. Sites are (informal names): 1, La Yeguada; 2, Lake Valencia; 3, Guianas; 4, Mera; 5, San Juan Bosco; 6, Caqueta River; 7, Lake Pata; 8, Carajas; 9, Katira (Rondonia); 10, Lagoa Campestre; 11, Catas Altas; 12, Lagoa Curuça.



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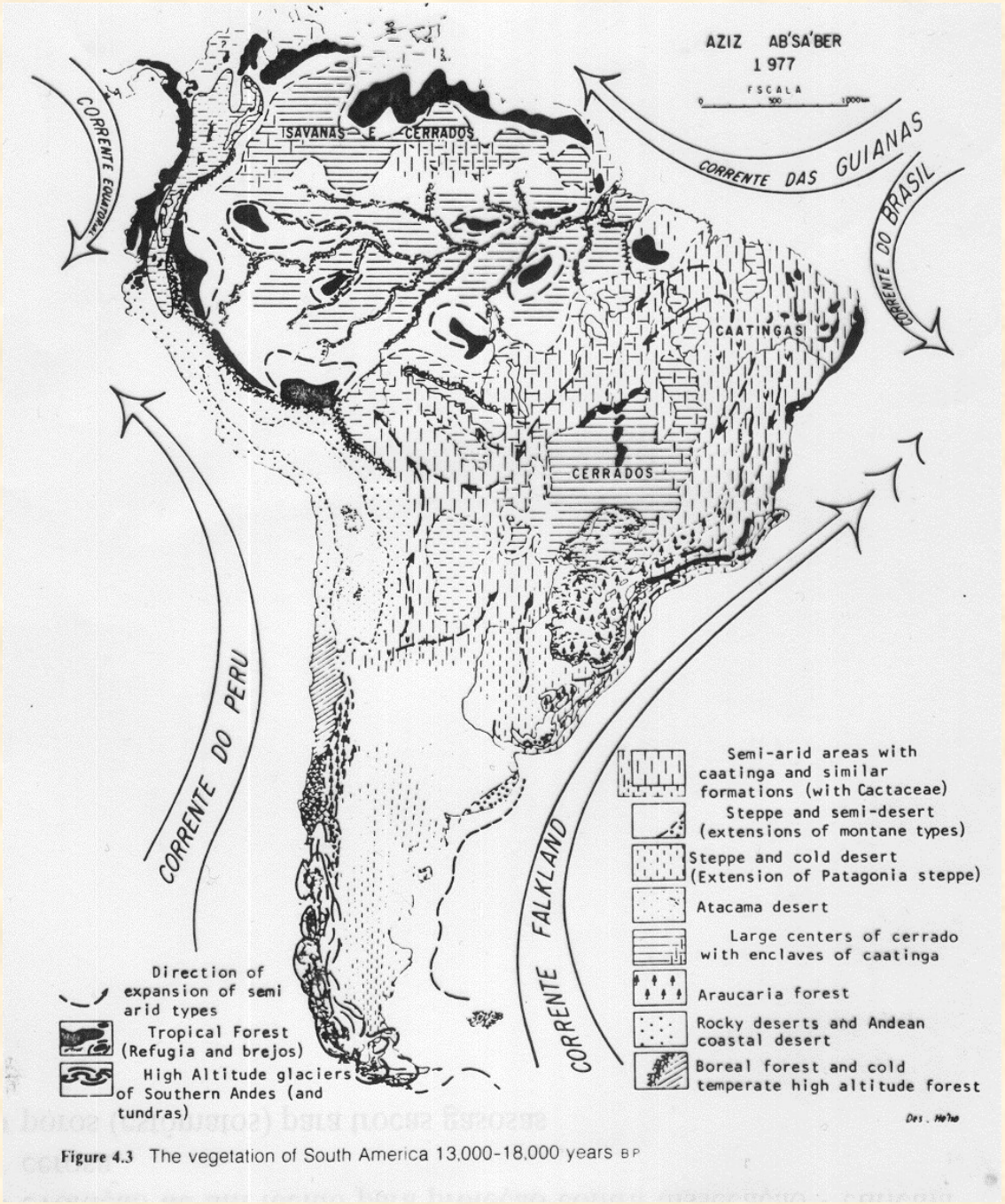
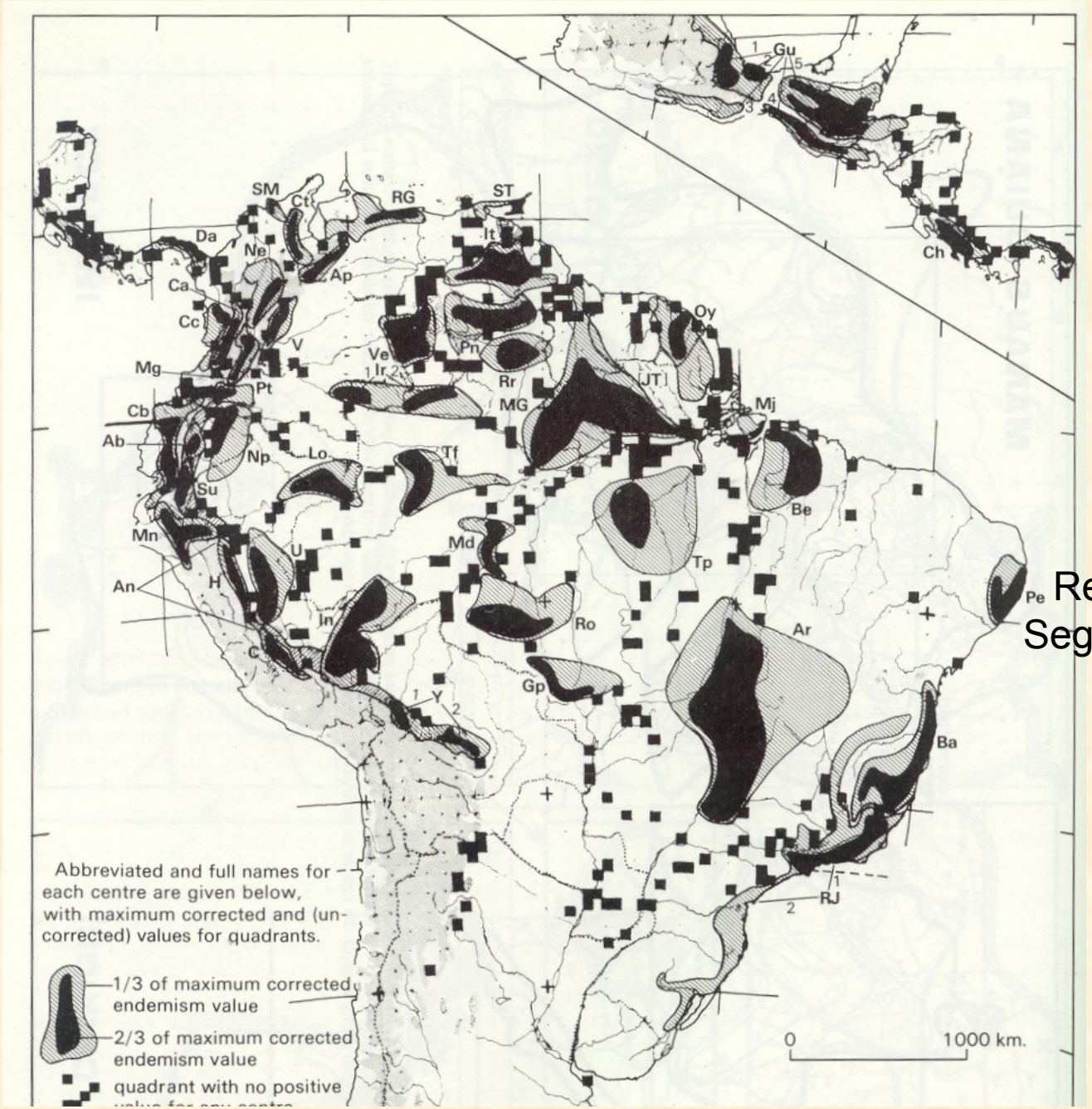
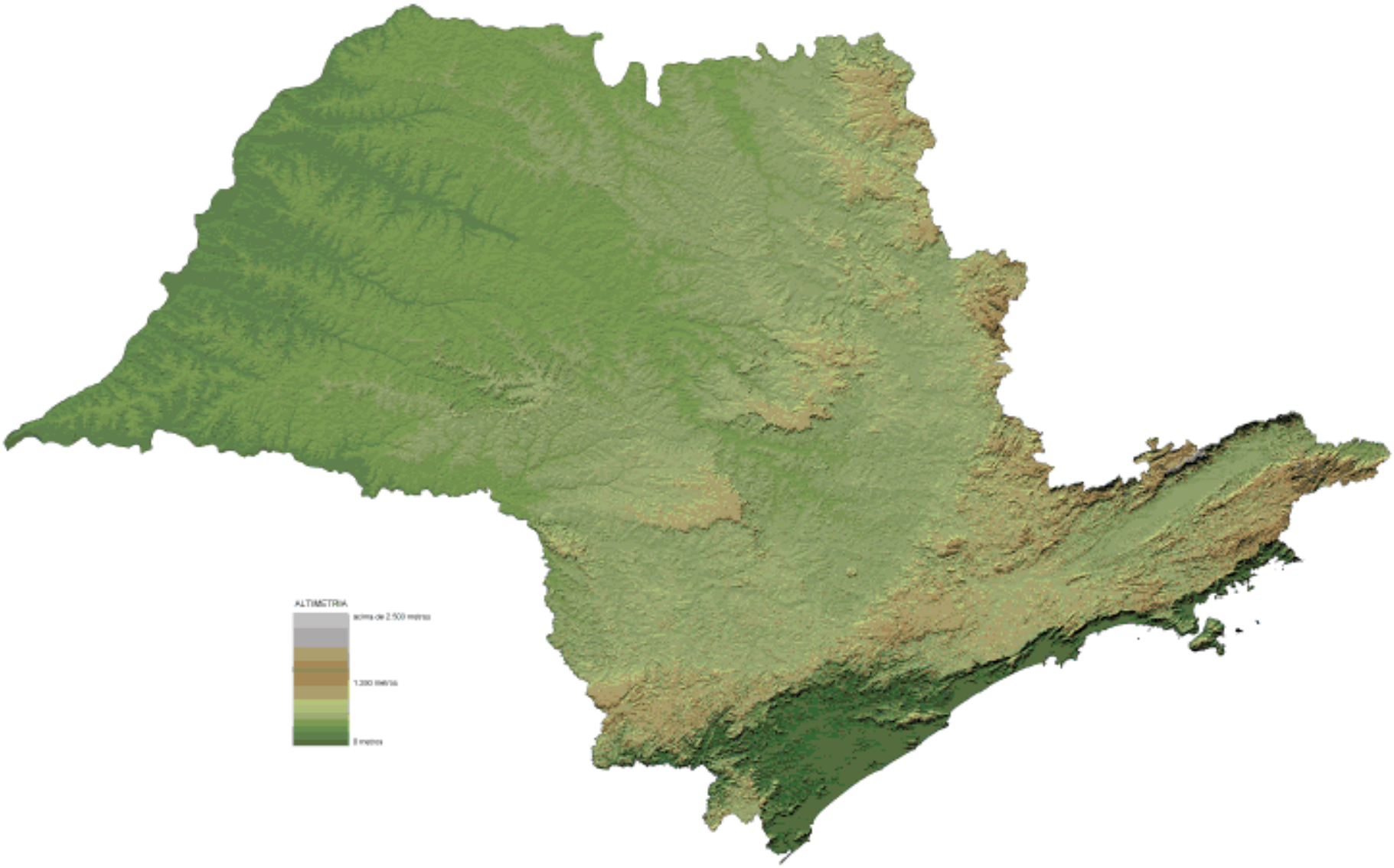


Figure 4.3 The vegetation of South America 13,000-18,000 years BP

Mapa da distribuição dos ecossistemas brasileiros durante o Último Máximo Glacial (UMG) 13.000-18.000 anos AP Segundo Ab'Saber, 1977

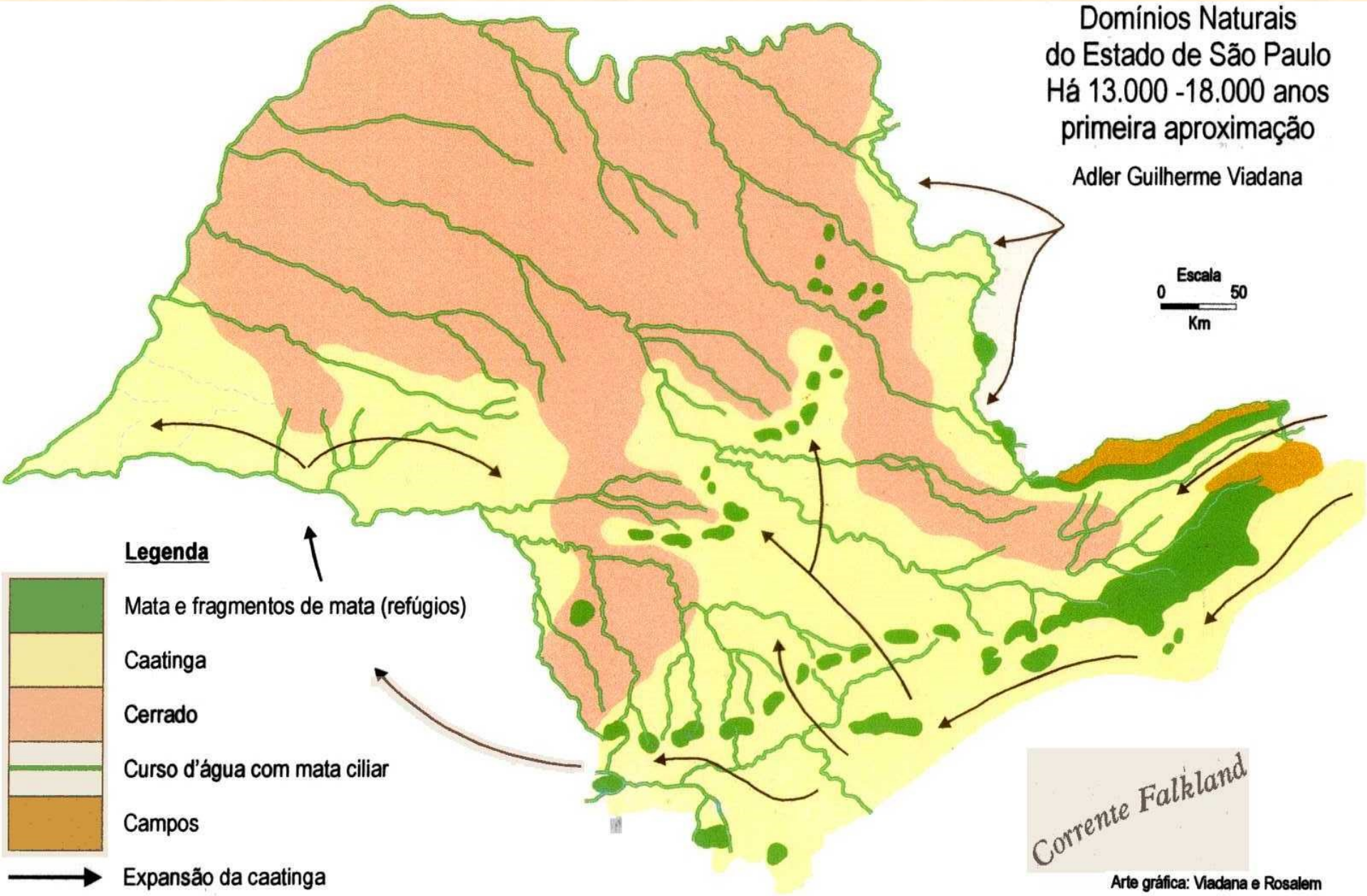


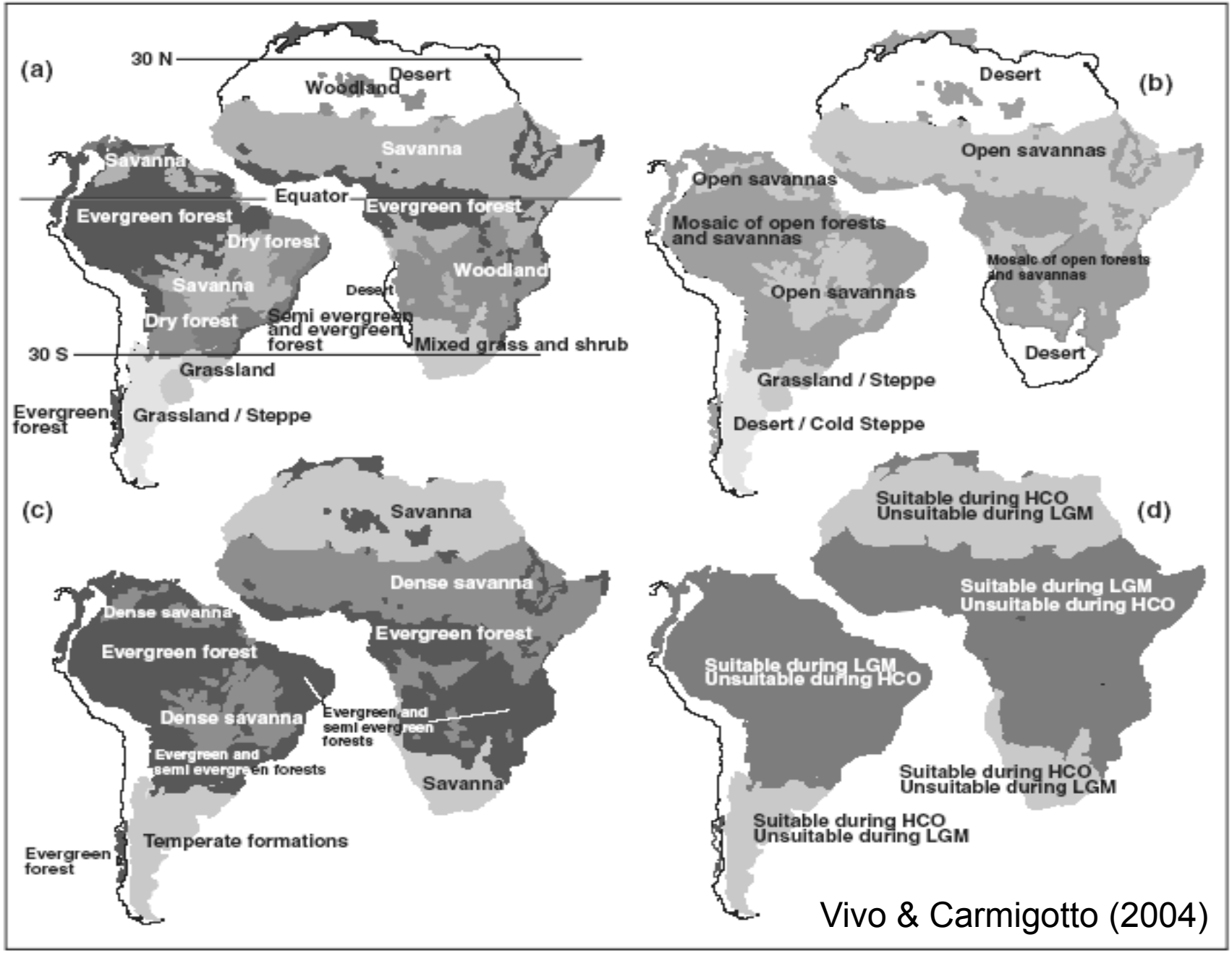
Refúgios Pleistocênicos
Segundo Brown & Ab'Saber
1979



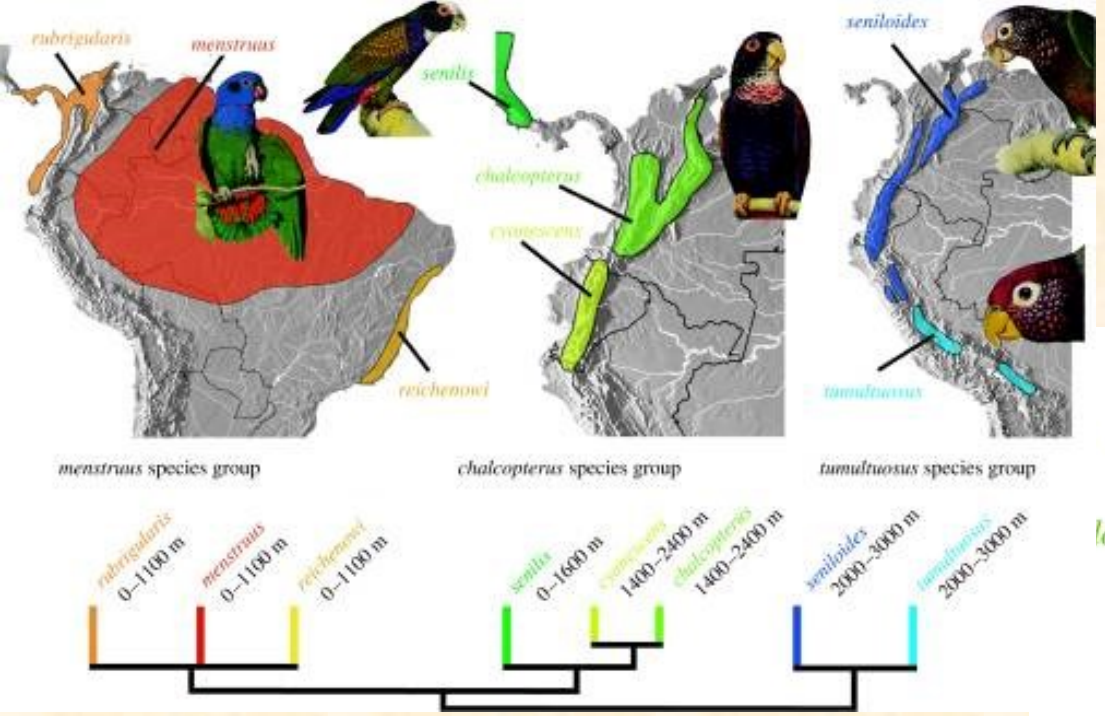
Relevo realçado do Estado de São Paulo (Fonte: SRTM)

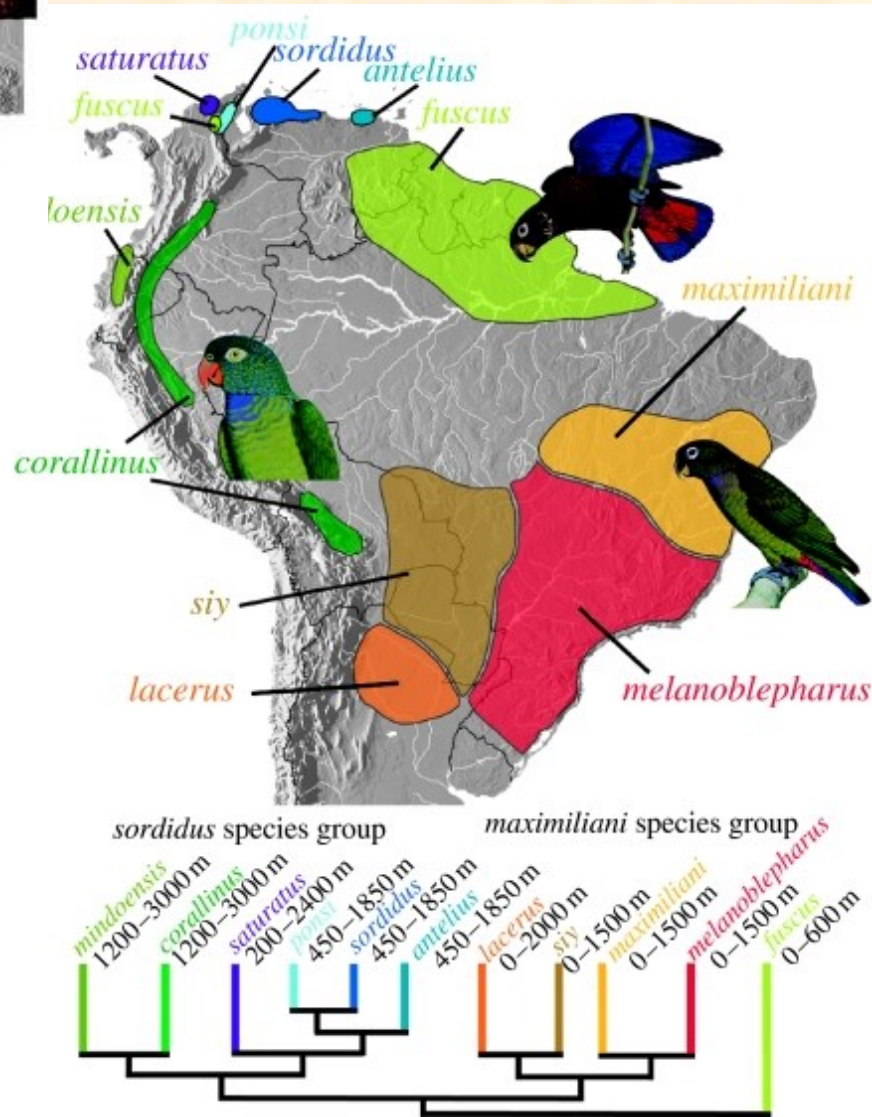
Hidrografia digitalizada sobreposta ao relevo realçado do Estado de São Paulo (Fontes: cartografia 1:250.000/IPT-SP e SRTM)


Domínios Naturais
do Estado de São Paulo
Há 13.000 -18.000 anos
primeira aproximação
Adler Guilherme Viadana
Escala
0
50
Km
Legenda
Mata e fragmentos de mata (refúgios)
Caatinga
Cerrado
Curso d'água com mata ciliar
Campos
Expansão da caatinga
Corrente Falkland
Arte gráfica: Viadana e Rosalem



Vivo & Carmigotto (2004)





Camila C Ribas, Robert G Moyle, Cristina Y Miyaki, and Joel Cracraft 2007 - Proc Biol Sciences

Úmido e frio

Botuverá
Cruz et al. (2005)

Brasilia
Barberi (2001)

Delta
Haberle *et al.* (1999)

Maicuru
Bush *et al.*(In Press)

Pata
Colinvaux *et al.* (1996)

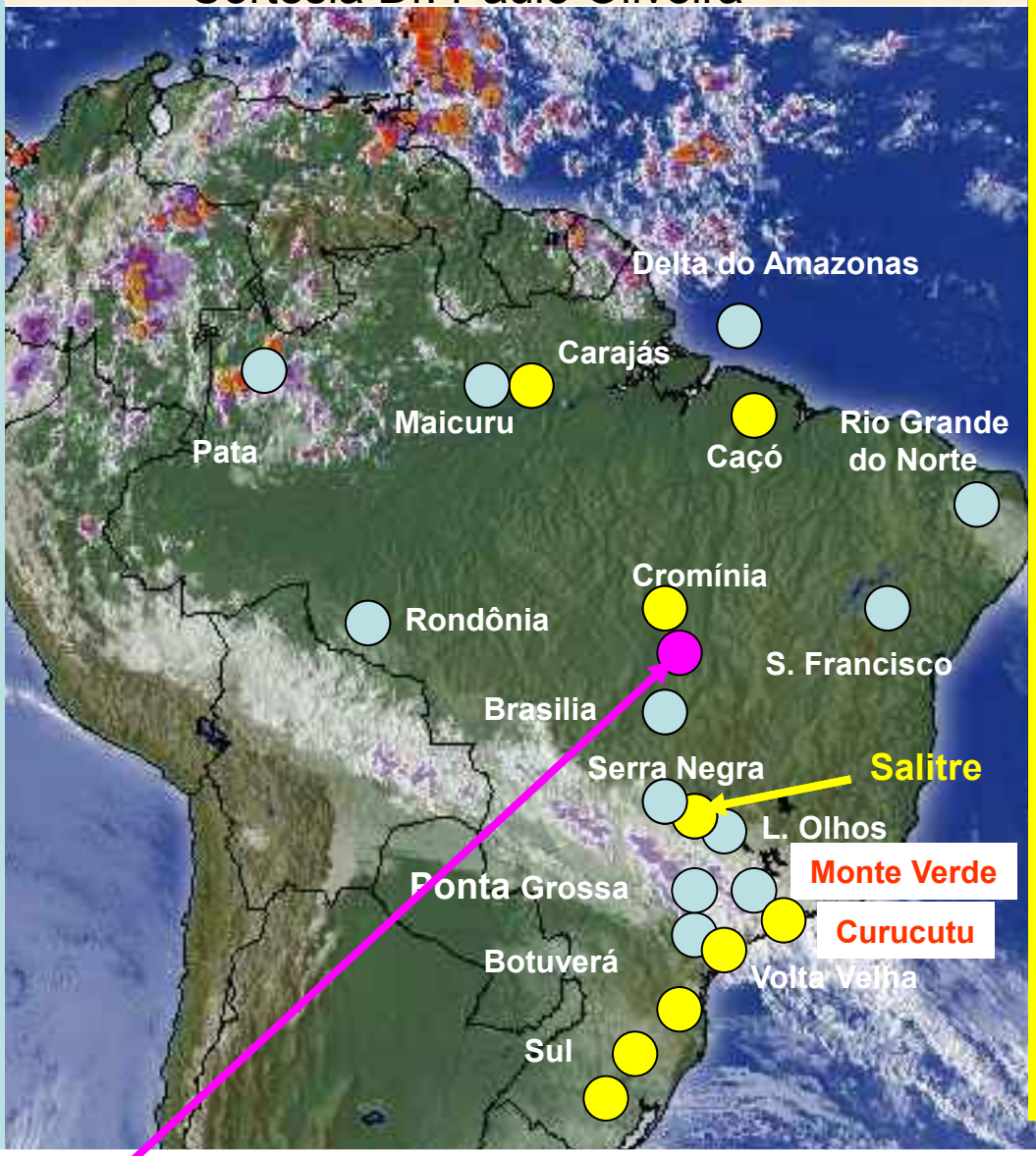
R. Grande do Norte
Cruz (2006) In Press

Rondônia
Pessenda et al. (1998)

S. Francisco
Wang et al. (2004)
Galli (2006)
De Oliveira et al. (1999)

Serra Negra e L. Olhos
De Oliveira (1992)

Cortesia Dr. Paulo Oliveira



Seco e frio

Caçó
Ledru et al. (2006)

Carajás
Absuy et al.(1991)

Cromínia
Ferraz-Vicentini (1994)

Salitre
Ledru et al. (1996)

Sul do Brasil
Behling (92, 99, 2004)

Volta Velha
Behling & Negrelle (2002)

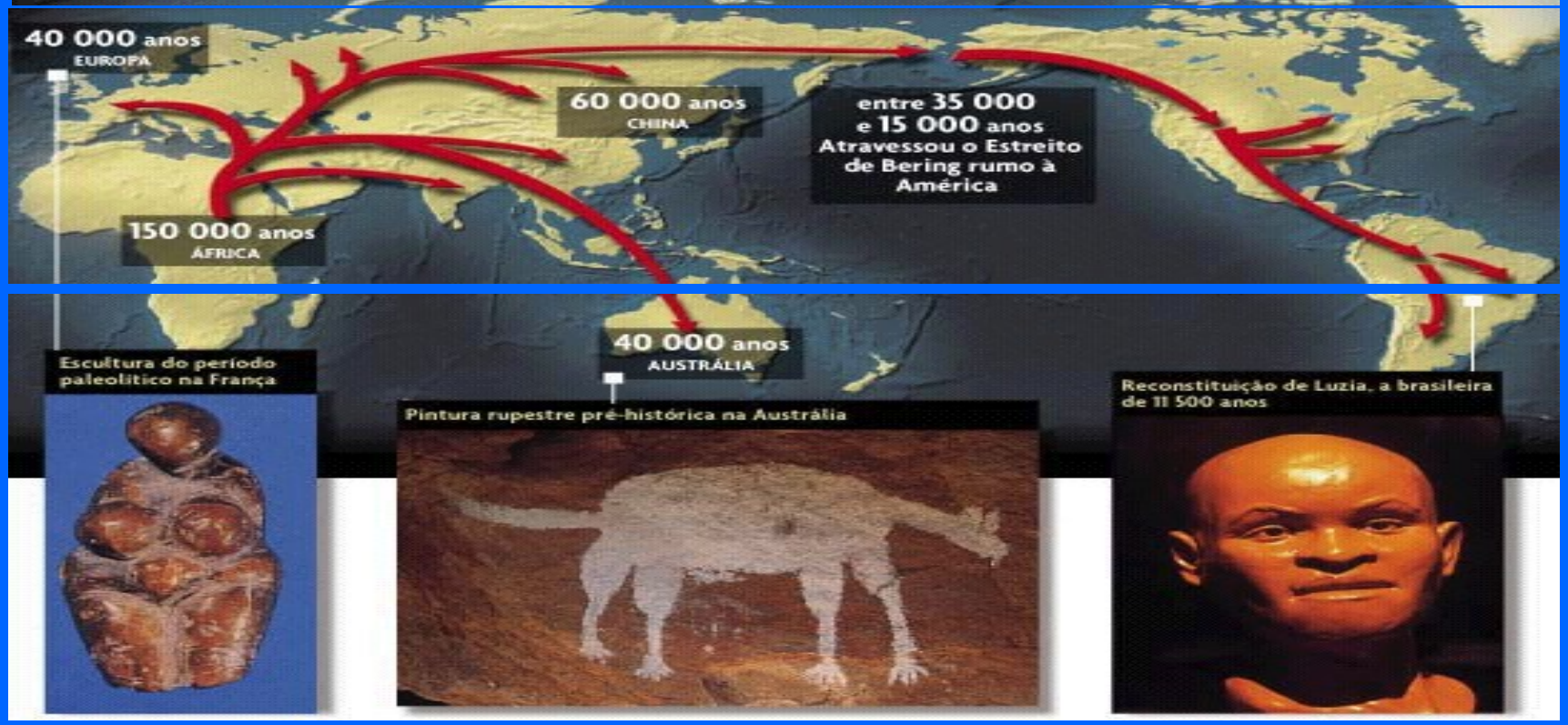
Curucutu
Pessenda et al. In Press
De Oliveira et al. In Press

Chapada dos Veadeiros (Ferraz-Vicentini, 1996) – não houve mudança

O HOMEM NA REGIÃO NEOTROPICAL


Quem somos nós?
Pesquisadores mineiros traçam o primeiro perfil genético do brasileiro e concluem: 1) somos mesmo o país da miscigenação; 2) há brancos que são geneticamente negros, e vice-versa

Existe consenso quase absoluto de que a espécie humana se originou na África há cerca de 150 000 anos. De lá se espalhou para os outros continentes



Escultura do período paleolítico na França

Pintura rupestre pré-histórica na Austrália

Reconstituição de Luzia, a brasileira de 11 500 anos

Pleistoceno

30 – 14 mil anos atrás

TEORIAS CONCORRENTES

O que dizem os modelos de ocupação da América

Três ondas
Modelo proposto pelo linguista Joseph H. Greenberg em 1986
- Os povoadores teriam vindo da Ásia pelo estreito de Bering, em três migrações: uma originou os ameríndios (a maior parte dos índios atuais); outra, os falantes de línguas do tronco na-dene (Alasca); e a última, os esquimós do Ártico

Origem única
Proposta inicial do americano Ales Hrdlicka (1925), defendida desde então por vários pesquisadores
- Supõe que um único grupo, de traços asiáticos (mongolóides), tenha dado origem a toda a diversidade genética dos americanos nativos

Dois componentes
Teoria do brasileiro Walter Neves e pelo argentino Hector Pucciarelli
- Afirma que os primeiros americanos eram mais parecidos com os aborígenes da Austrália. Os mongolóides teriam vindo numa leva posterior

Novo estudo - apesar de reforçar a hipótese dos dois componentes, o novo estudo não diz se os mongolóides vieram numa segunda onda migratória ou se evoluíram a partir dos "paleoíndios" (não-mongolóides) já dentro da América


Parque Nacional
SERRA DA CAPIVARA

UNIDADES DE CONSERVAÇÃO
FEDERAIS DO BRASIL

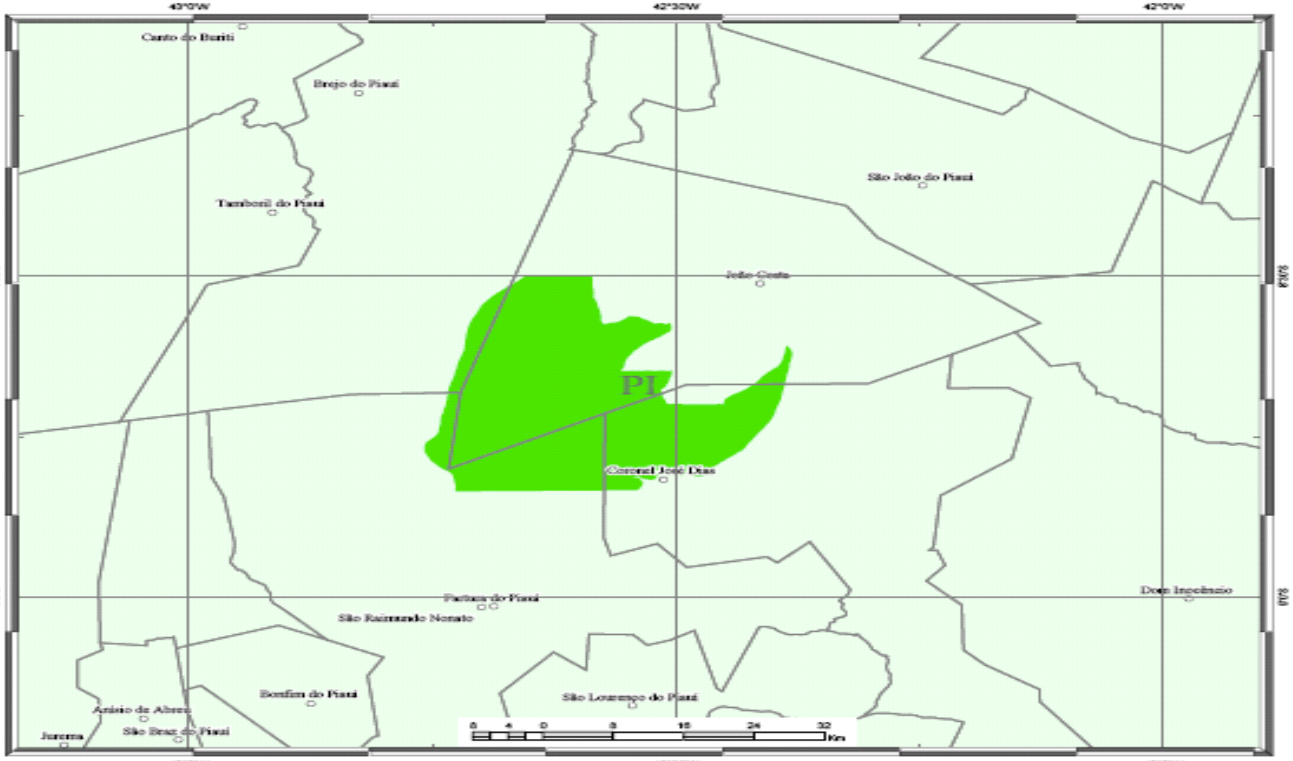
- Localização no Brasil -

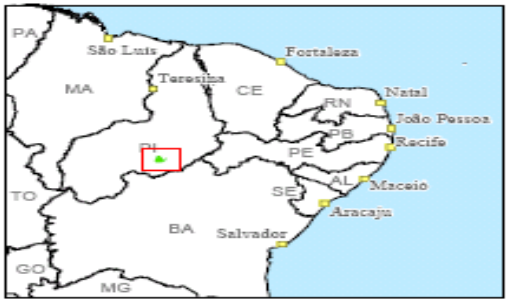
Parque Nacional Serra da Capivara

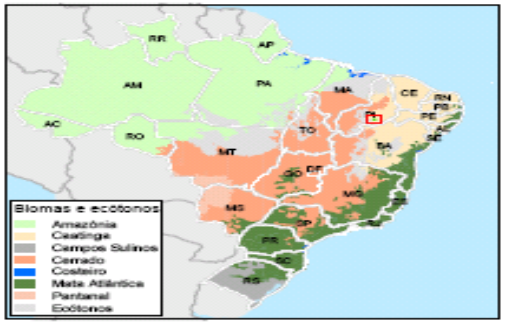
MMA - MINISTÉRIO DO MEIO AMBIENTE

IBAMA - Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis

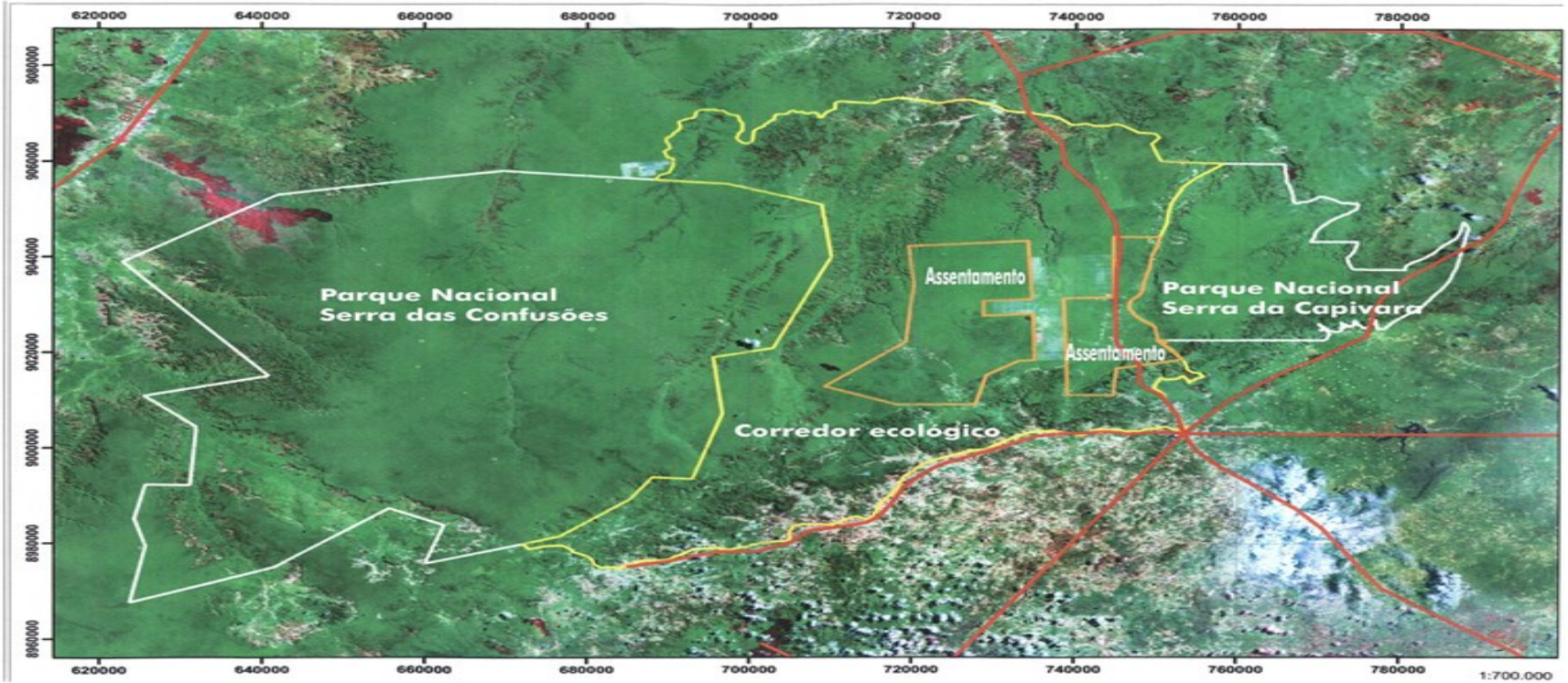
Diretoria de Ecossistemas







Capital
Cidade
Vila
Estado
Município
Zona Costeira
Faixa de Fronteira
Amazônia Legal


620000
640000
660000
680000
700000
720000
740000
760000
780000
9060000
9040000
9020000
9000000
8980000
8960000
Parque Nacional
Serra das Confusões
Assentamento
Assentamento
Parque Nacional
Serra da Capivara
Corredor ecológico
1:700.000

Nas épocas pré-históricas as condições ambientais eram muito diferentes. As escavações arqueológicas demonstraram que, até cerca de 9.000/8.000 anos atrás, existiam grandes rios e a região era coberta por florestas tropicais úmidas. Escavações realizadas no sítio Toca do Fundo do Baixão da Pedra Furada permitiram a descoberta de vestígios de origem européia (uma faca metálica) enterrada a 1,40 metros de profundidade, na margem de um antigo rio. Carvões encontrados em uma fogueira ao lado deram uma data carbono (C-14) entre os anos de 1.640 e 1.730 de nossa era (Beta 156408 e Beta 154636). Portanto, até essa data os rios corriam no vale da Pedra Furada. Uma vegetação abundante, perenifólia, assegurava a alimentação para a fauna, majoritariamente herbívora e de grande porte.

Durante milênios, espécies da megafauna existiram na região e co-habitaram com os grupos humanos que a povoavam. As espécies mais comuns da megafauna eram a preguiça gigante (*Catonyx cuvieri* e *Eremotherium lundi*), o tigre-de-dente-de-sabre (*Smilodon populator*), o mastodonte (*Haplomastodon waringi*), o tatu gigante (*Glyptodon clavipes*), as lhamas (*Palaeolama major* e *Paleolama niedae*) e cavalos (*Hippidion bonaerensis* e *Hippidion sp.*) (Guérin, 1991). Junto a esta fauna gigante, existiam também as espécies de médio e pequeno porte, que foram fontes de alimentação das populações que aí viviam.

Nesta região existem evidências de presença humana que remontam a 60.000 anos. O sítio Toca do Boqueirão da Pedra Furada, escavado entre 1978 e 1988, forneceu a mais completa estratigrafia até hoje encontrada nas Américas (Parenti, 2002, Parenti et al, 1990, Guidon and Delibrias, 1986, Guidon et al., 1994). Hoje podemos afirmar que a entrada de *Homo sapiens* para o continente americano fez-se em vagas que, saindo de diferente lugares, seguiram diferentes caminhos e que as primeiras devem ter entrado na América entre 150.000 e 100.000 anos atrás.


"E as últimas florestas de angico, aroeira, pau-d'arco, estão sendo destruídas, o paredão rochoso lambido pelas chamas, as pinturas rupestres caindo com os pedaços da rocha que explode com o calor."
Niède Guidon
novembro de 2004

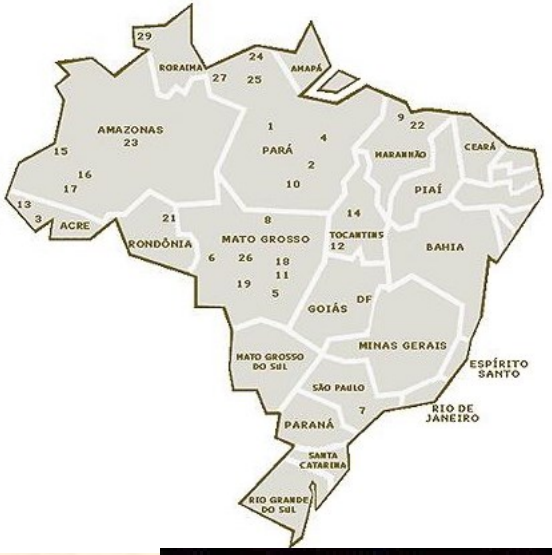
Luzia foi o nome que recebeu do biólogo **Walter Alves Neves** o fóssil humano mais antigo encontrado nas Américas, com cerca de 11.400 a 12.000 anos.

Aborígenes Australianas

Índia brasileira

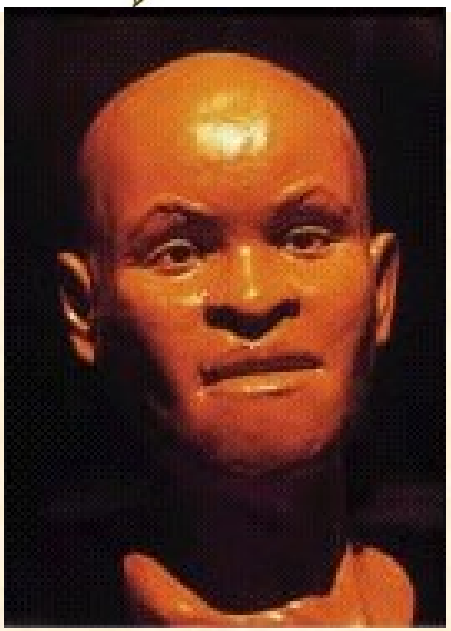
Povos da Polinésia


18
10
?
3) Aleutas-Esquimós
2) Na-Denes
18
10
?
23
1) Ameríndios
18
10
?
23



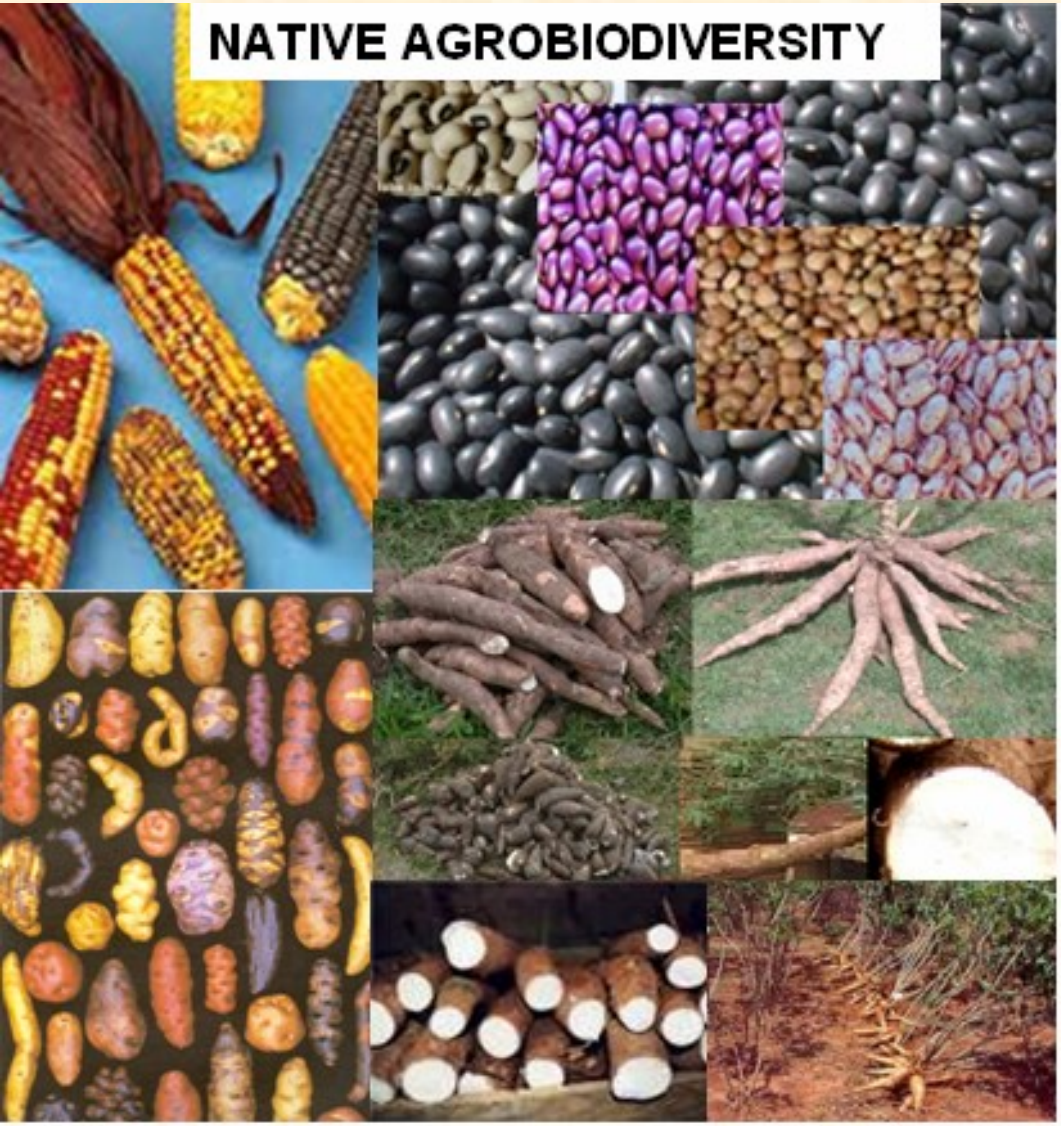
01- Arara
02- Araweté
03- Ashaninka
04- Asurini
05- Bororo
06- Enawenê Nauê
07- Guarani
08- Juruna/Yudja
09- Kaapor
10- Kayapó
11- Kalapalo
12- Karajá
13- Kaxinawá
14- Krahô
15- Maioruna

16- Marubo
17- Matis
18- Matipu
19- Mehinako
20- Rikbaktsa
21- Suruí
22- Tembé
23- Ticuna
24- Tirió
25- Waiana Apalaí
26- Waurá
27- Wai Wai
28- Waiãpi
29- Yecuana/Maiongong



Diversidade étnica e cultural da América Latina Pré e Pós Colombo – 15.000 anos de ocupação humana

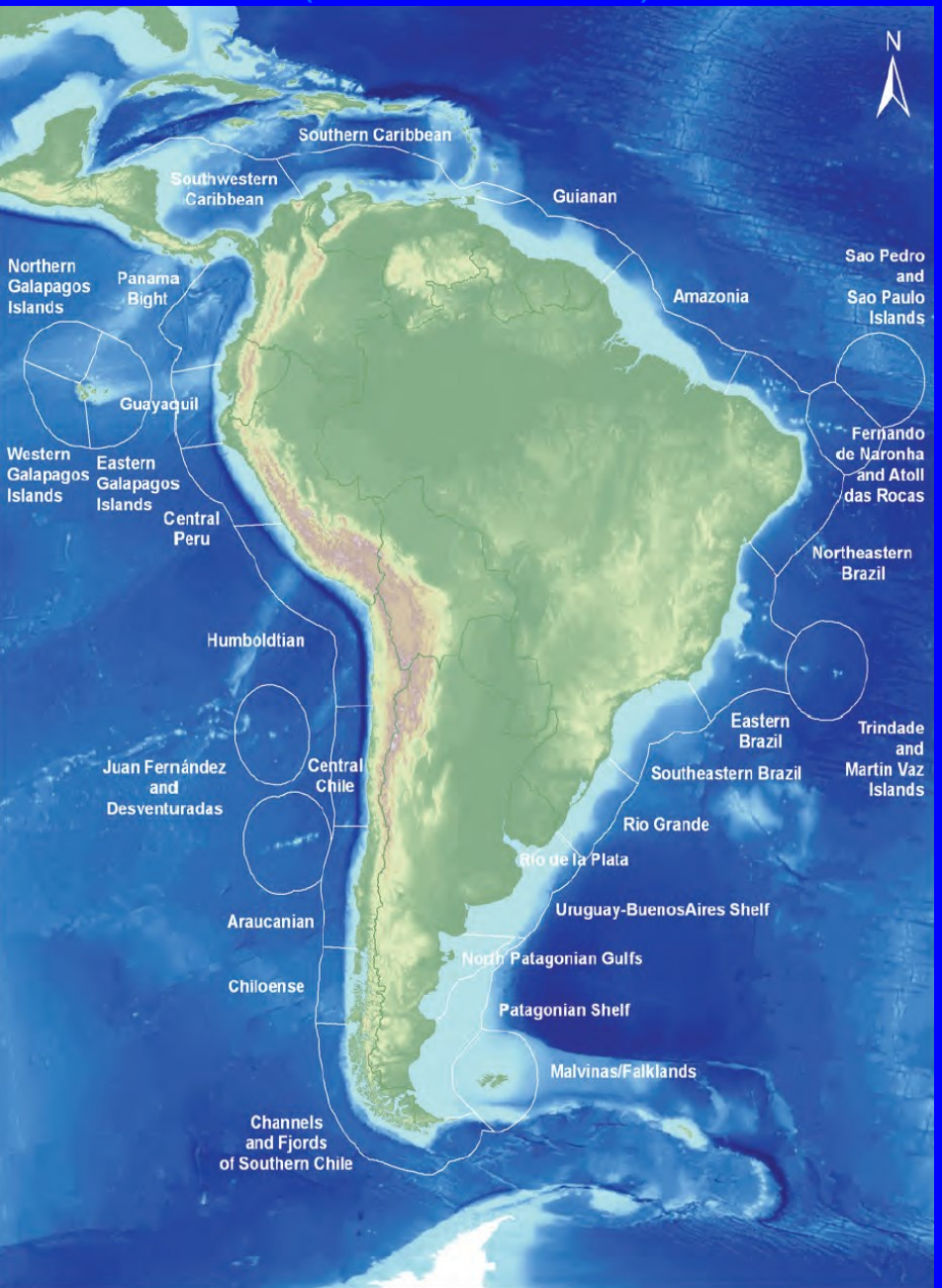
NATIVE AGROBIODIVERSITY



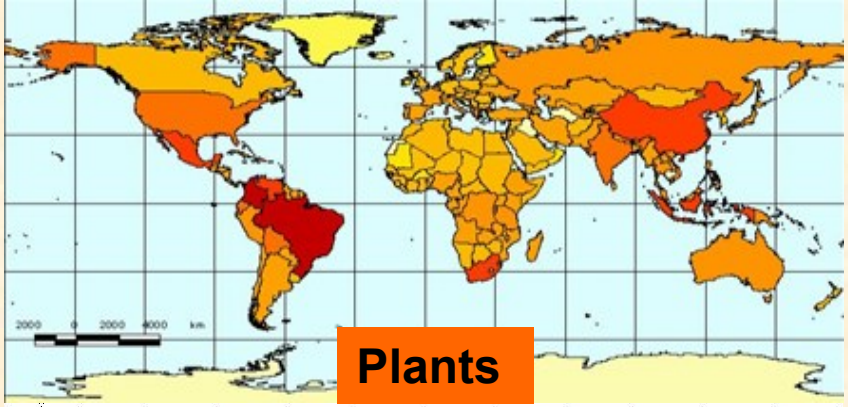
PLANTS USED AS FOOD, TO MAKE HOUSES, BOATS & PADDLES, HAMMOCKS, HUNTING ATEFACTS, MUSICAL INSTRUMENTS, RITUAL PAINTINGS, NECKLACES & BRACELETS

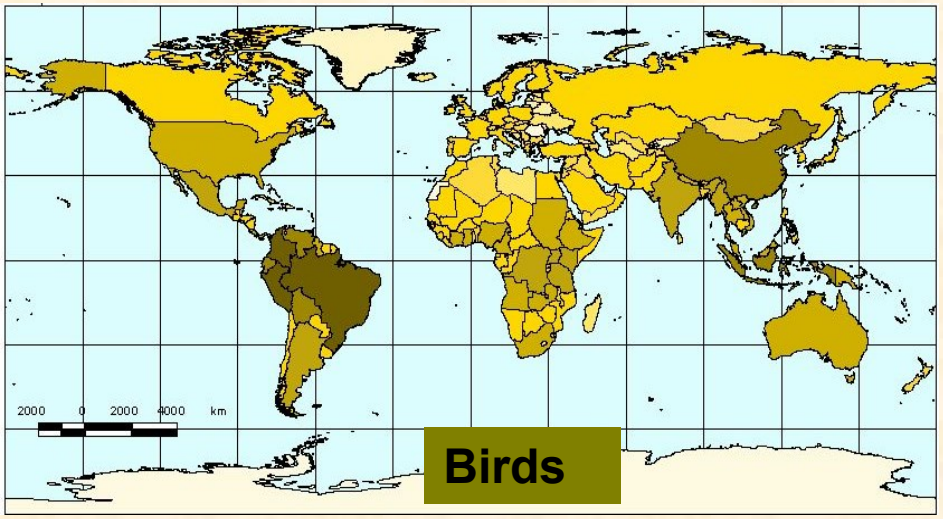
Ecossistemas terrestres da América Latina e Caribe (Josse et al 2003).

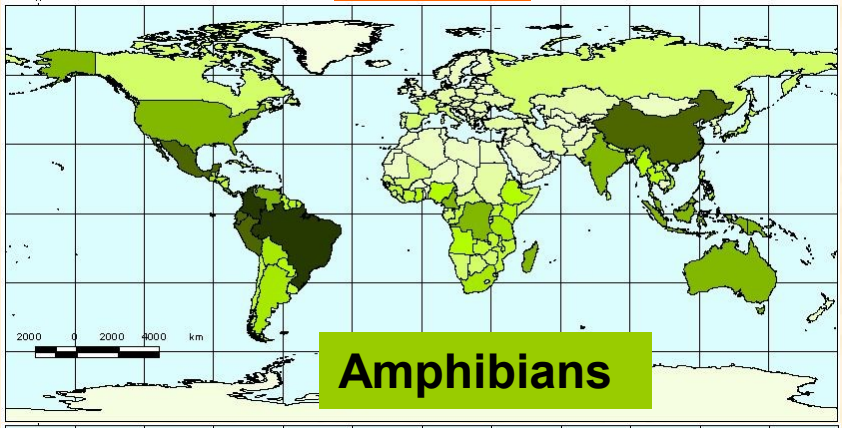
28 Ecossistemas Marinhos (Chatman, 2007)

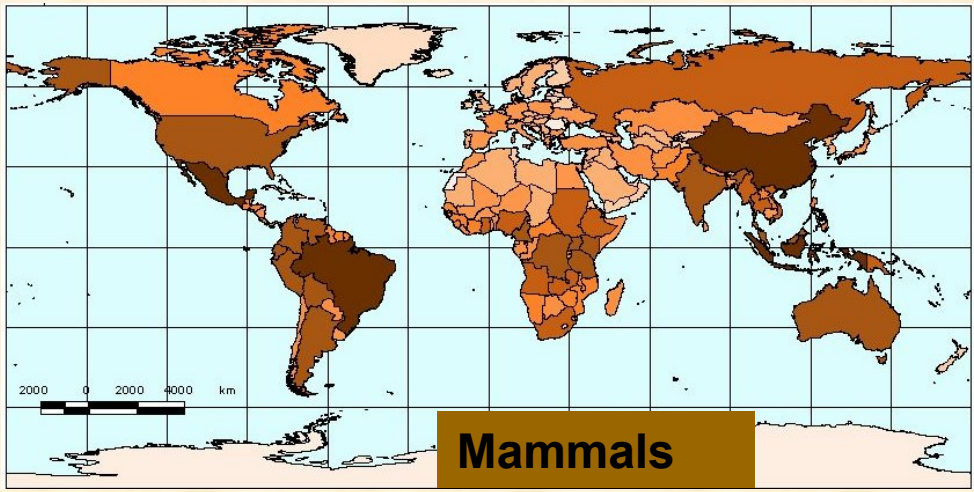


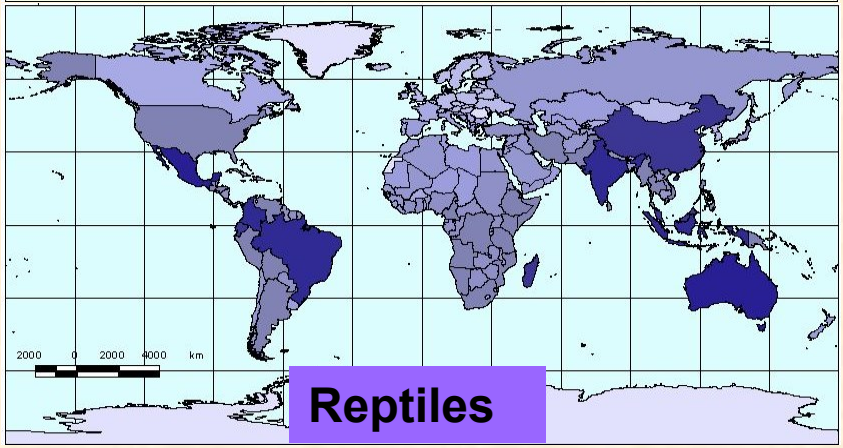
70 Províncias Biogeográficas **(Morrone, 2001)**







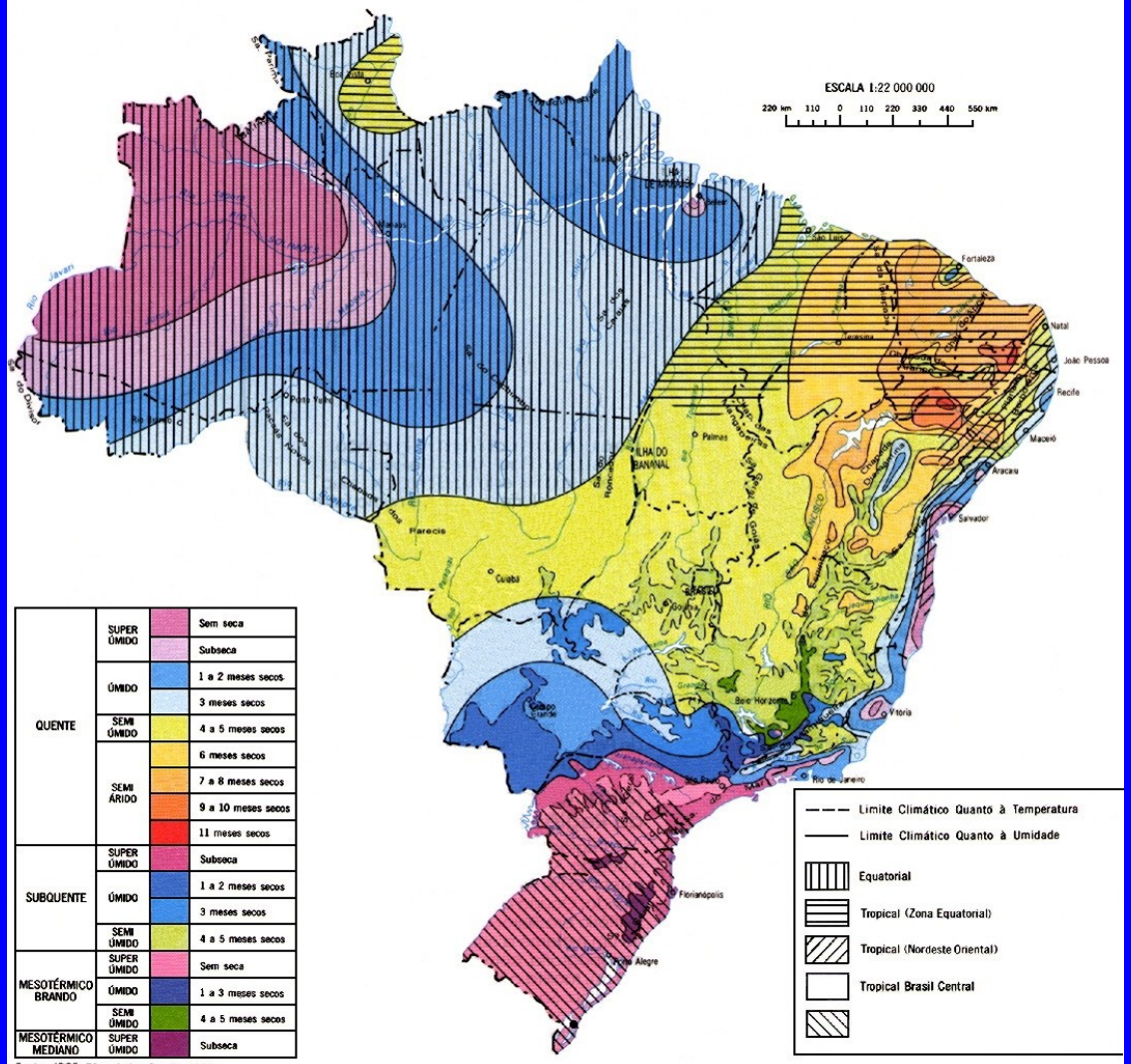




Número total de espécies e nível de endemismos na América Latina.

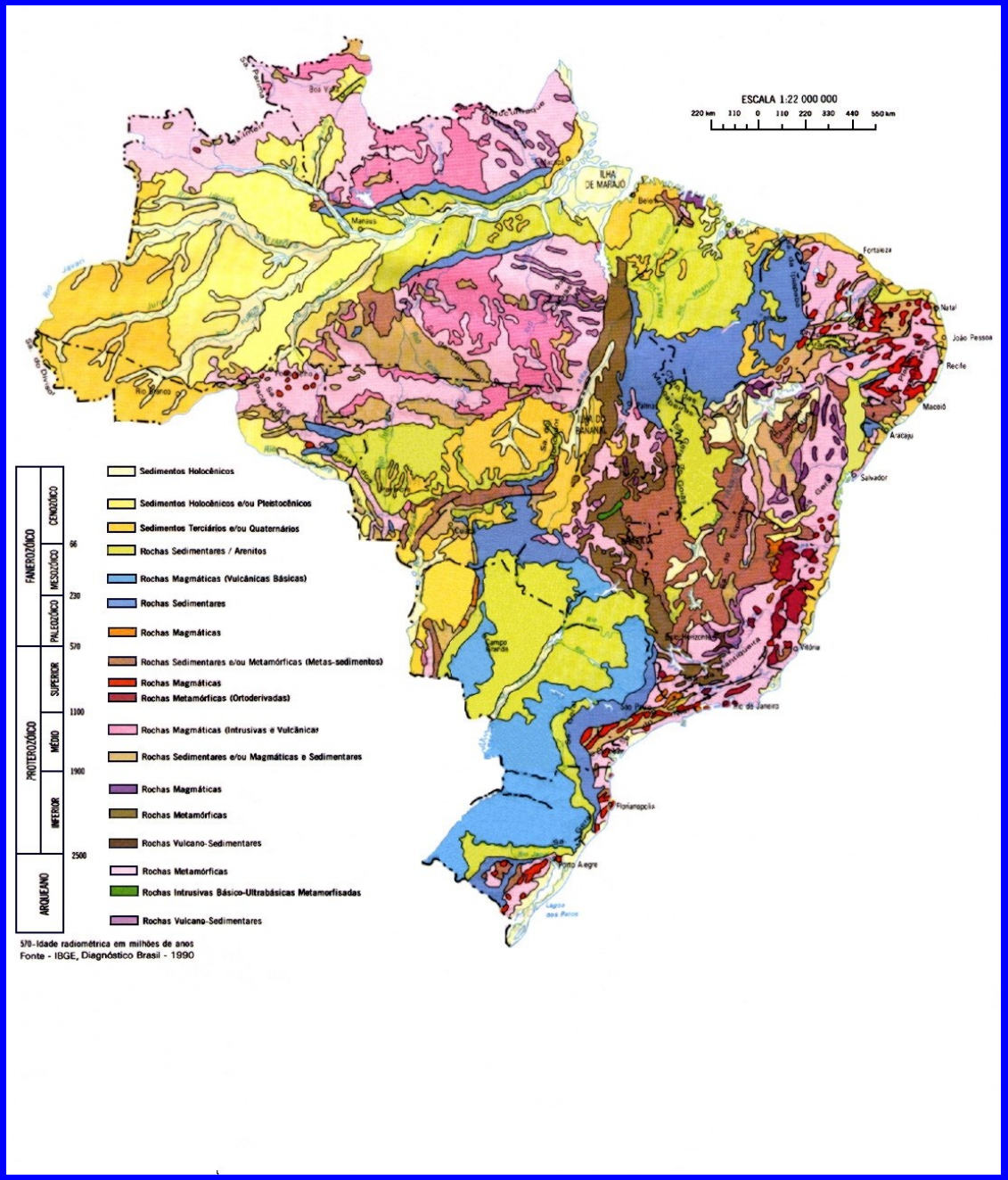
Mapa 1.16

Unidades Climáticas do Brasil



QUENTE	SUPER ÚMIDO		Sem seca
			Subseca
	ÚMIDO		1 a 2 meses secos
			3 meses secos
	SEMI ÚMIDO		4 a 5 meses secos
	SEMI ÁRIDO		6 meses secos
			7 a 8 meses secos
			9 a 10 meses secos
			11 meses secos
SUBQUENTE	SUPER ÚMIDO		Subseca
	ÚMIDO		1 a 2 meses secos
			3 meses secos
	SEMI ÚMIDO		4 a 5 meses secos
MESOTÉRMICO BRANDO	SUPER ÚMIDO		Sem seca
	ÚMIDO		1 a 3 meses secos
	SEMI ÚMIDO		4 a 5 meses secos
MESOTÉRMICO MEDIANO	SUPER ÚMIDO		Subseca

Fonte - IBGE, Diagnóstico Brasil - 1990



570-Idade radiométrica em milhões de anos
Fonte - IBGE, Diagnóstico Brasil - 1990

ORIGEM DA VEGETAÇÃO BRASILEIRA ??

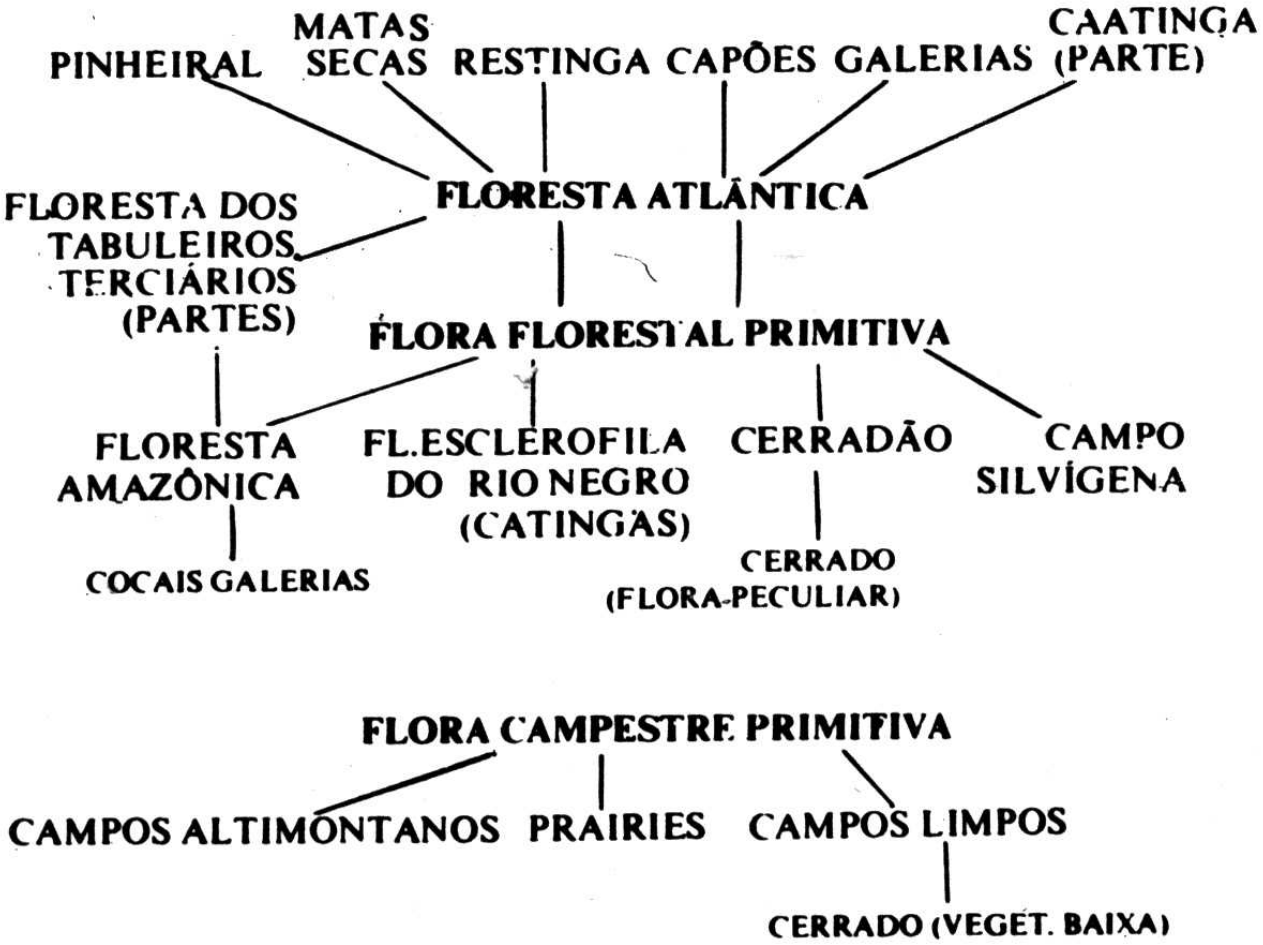
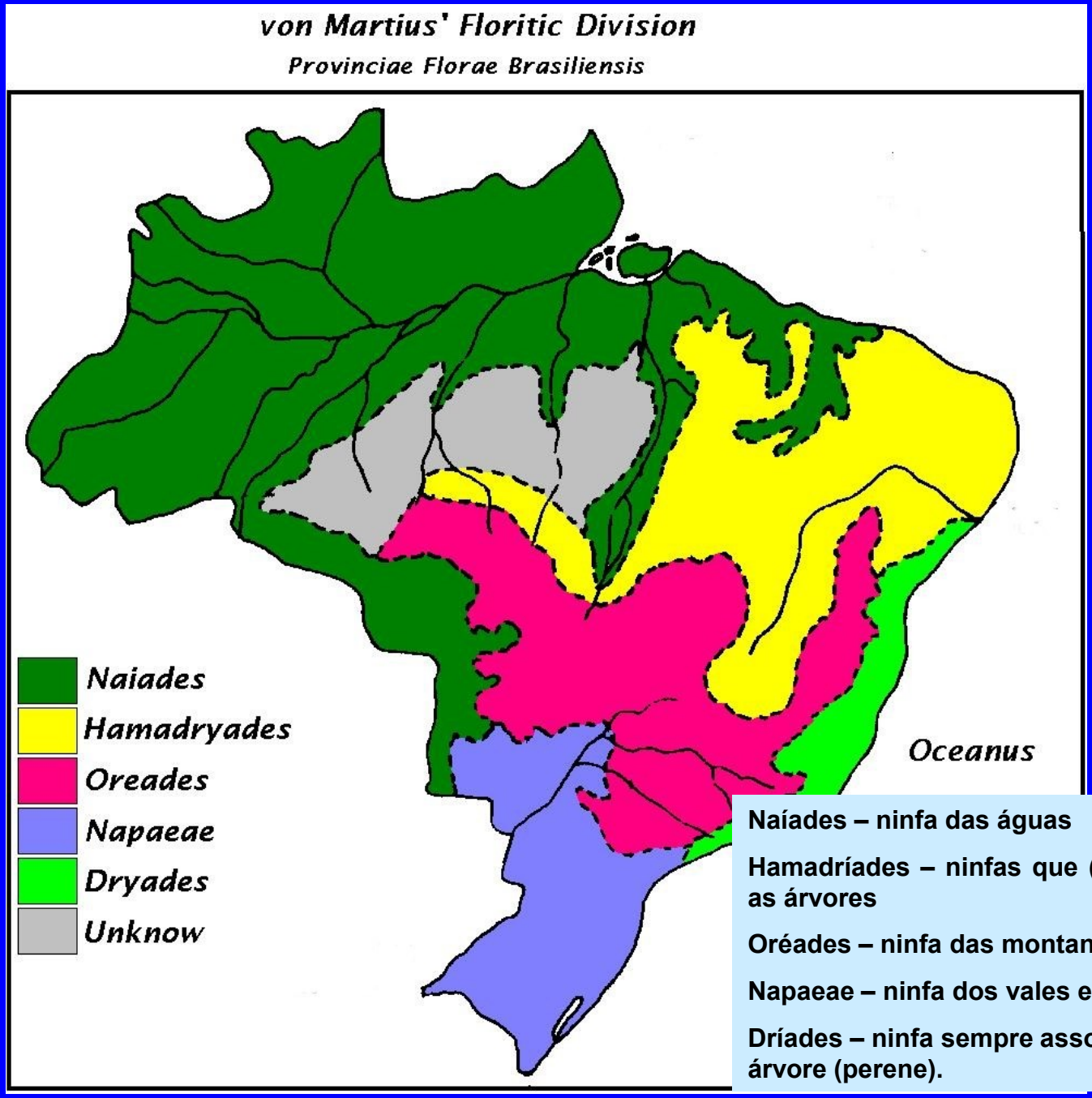


Figura 131. Esquema que sugere a derivação dos tipos brasileiros de vegetação a partir de duas formações primitivas hipotéticas.

Rizzini, 1997



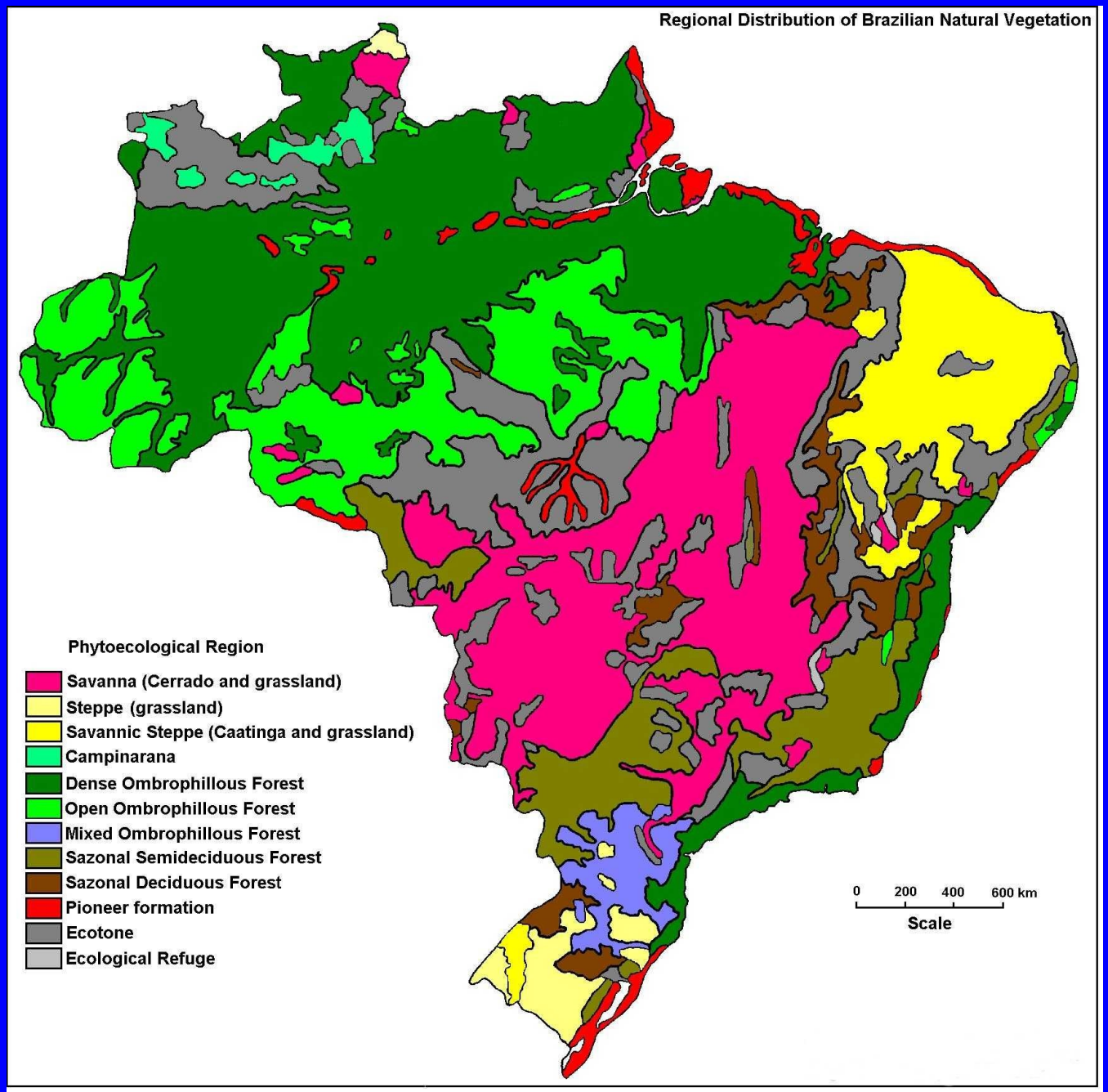
Naíades – ninfa das águas

Hamadríades – ninfas que (re) nascem com as árvores

Oréades – ninfa das montanhas e planaltos

Napaeae – ninfa dos vales e grotões

Dríades – ninfa sempre associada a uma árvore (perene).


Regional Distribution of Brazilian Natural Vegetation
Phytoecological Region
Savanna (Cerrado and grassland)
Steppe (grassland)
Savannic Steppe (Caatinga and grassland)
Campinarana
Dense Ombrophillous Forest
Open Ombrophillous Forest
Mixed Ombrophillous Forest
Sazonal Semideciduous Forest
Sazonal Deciduous Forest
Pioneer formation
Ecotone
Ecological Refuge
0 200 400 600 km
Scale

BIOMAS CONTINENTAIS BRASILEIROS	ÁREA APROXIMADA (KM2)	ÁREA / TOTAL BRASIL
Bioma AMAZONIA	4.196.943	49,29%
Bioma CERRADO	2.036.448	23,92%
Bioma MATA ATLANTICA	1.110.182	13,04%
Bioma CAATINGA	844.453	9,92%
Bioma PAMPA	176.496	2,07%
Bioma PANTANAL	150.355	1,76%
Area Total BRASIL	8.514.877	