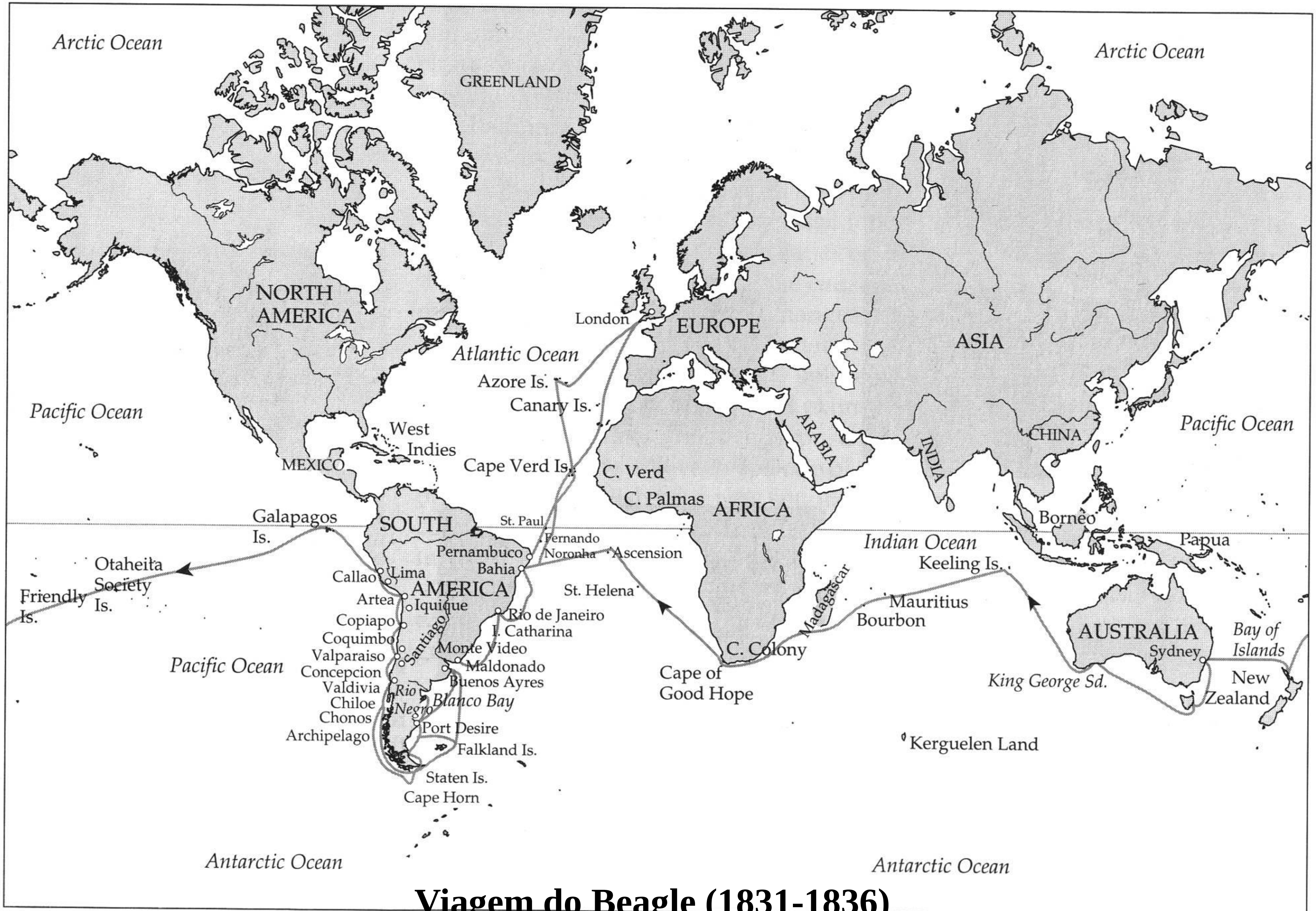
Darwin, Wallace e a Biogeografia Histórica

Charles Darwin (1809-1882), em sua viagem como naturalista a bordo do *Beagle* (1831-1836), coletou e analisou inúmeros dados sobre a distribuição geográfica de plantas e animais.



Viagem do Beagle (1831-1836)

http://www.infidels.org/library/historical/charles_darwin/voyage_of_beagle/



Seus dados formaram a base de sua teoria, publicada em *A origem das espécies* (1859), que durou mais de um século, novamente analisada e atualizada a partir de 1960, importante para a Biogeografia até hoje.

A teoria da evolução de Darwin foi o principal argumento contra o criacionismo ensinado pela Bíblia, abalando o orgulho humano (GOTTSCHALL, 2004).

ON

THE ORIGIN OF SPECIES

BY MEANS OF NATURAL SELECTION,

OR THE

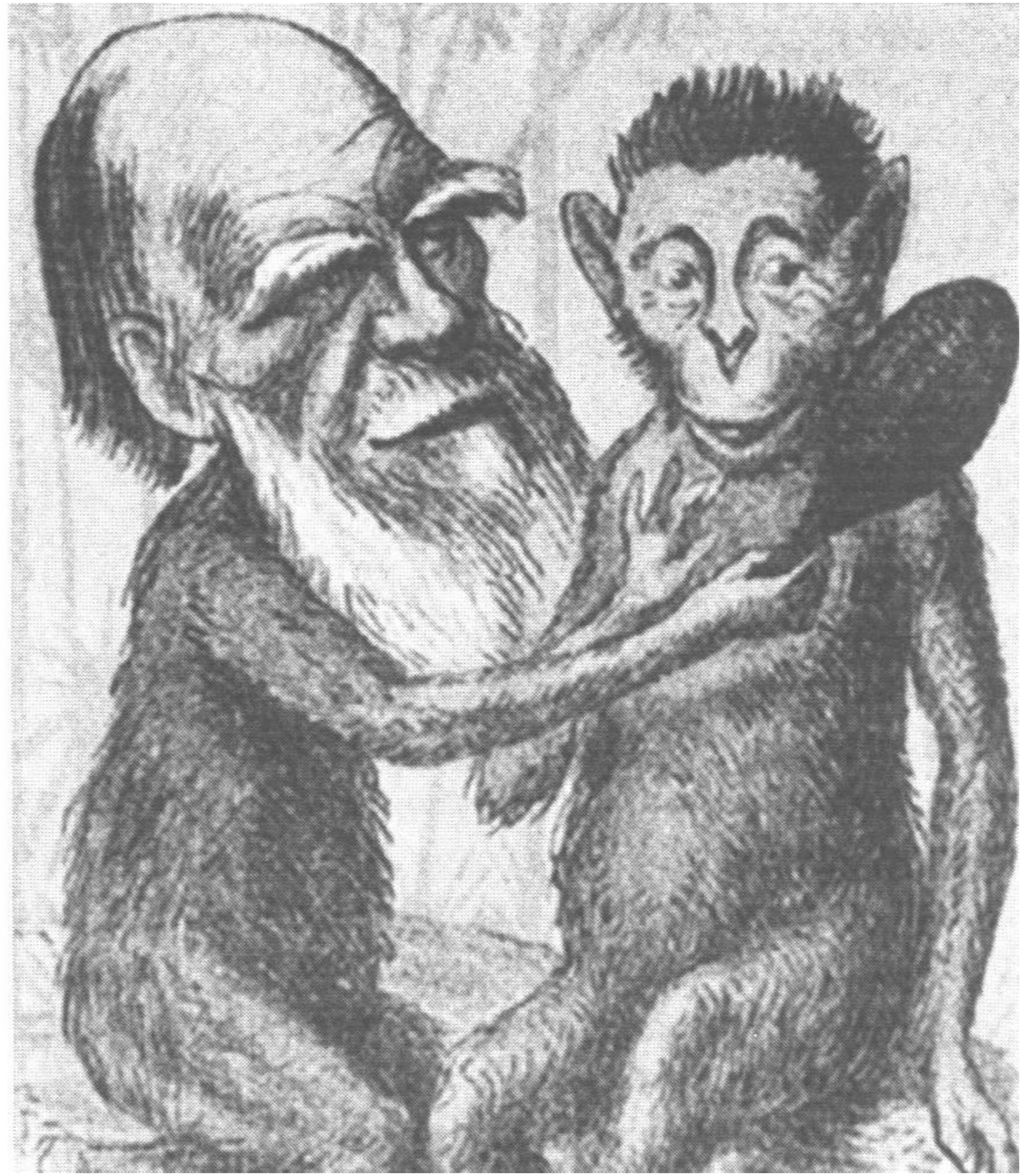
PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR LIFE.

BY CHARLES DARWIN, M.A.,

FELLOW OF THE ROYAL, GEOLOGICAL, LINNÆAN, ETC., SOCIETIES;
AUTHOR OF 'JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE ROUND THE WORLD.'

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1859.

The right of Translation is reserved.



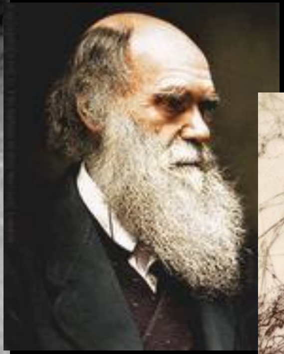
http://www.infidels.org/library/historical/charles_darwin/origin_of_species/

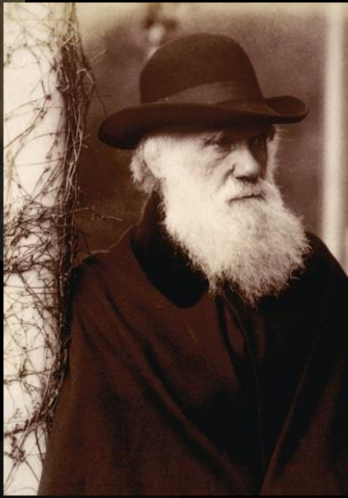
Darwin defendia que a distribuição geográfica de uma espécie, independentemente de sua configuração, é o resultado de um processo de dispersão iniciado a partir de um determinado “centro singular de suposta criação” único, ou seja, um mesmo ponto, lugar ou centro de origem de um ancestral em comum.

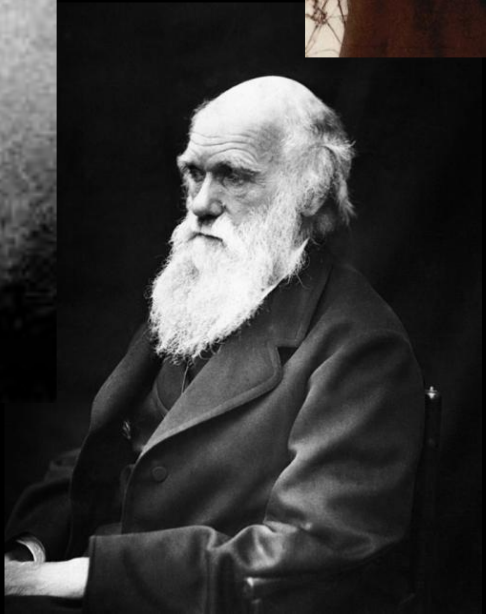
A partir disso, também desenvolveu explicações sobre a forma de dispersão ou migração. Ressalta o papel das mudanças climáticas na distribuição das espécies, como por exemplo as glaciações e da distribuição altitudinal.

http://darwin-online.org.uk/

http://www.darwinfoundation.org/







Charles Darwin (1809-1882)

Alfred Russel Wallace também elaborou uma teoria sobre a evolução das espécies, baseada na seleção natural, ao mesmo tempo que Darwin.

Wallace procurava, com as hipóteses evolutivas, respaldar, fundamentar e integrar as interpretações biogeográficas.

Já Darwin utilizava a biogeografia para respaldar as hipóteses sobre os mecanismos evolutivos.

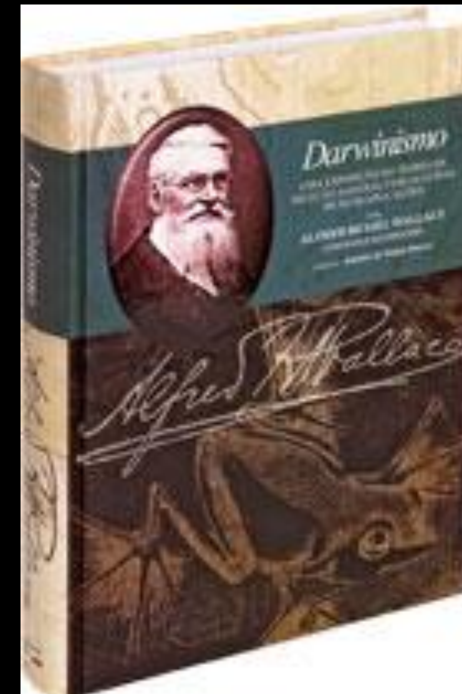
Wallace defendia as relações existentes entre geografia, ecologia e evolução.

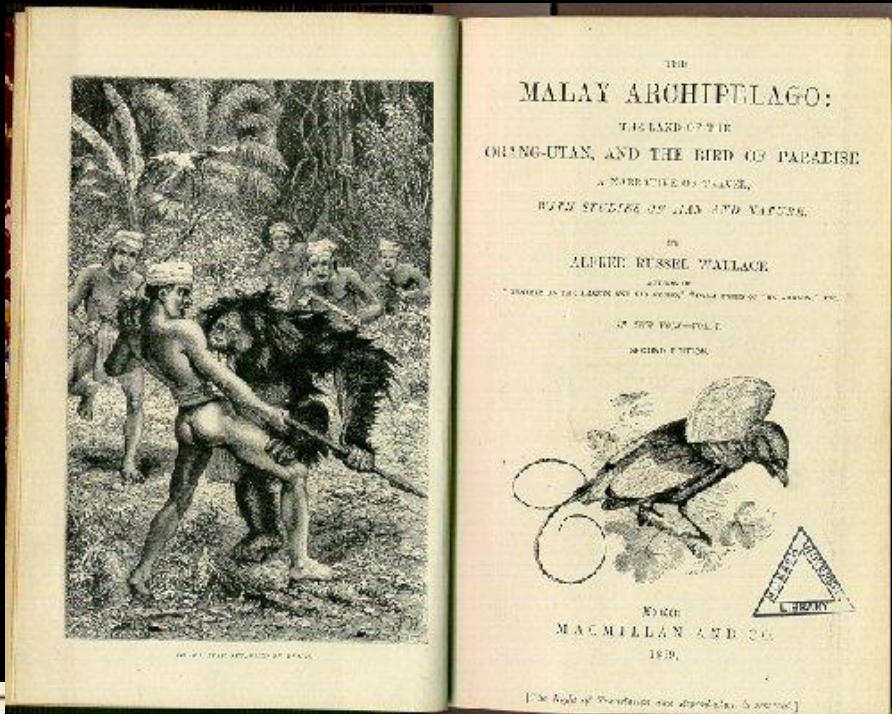
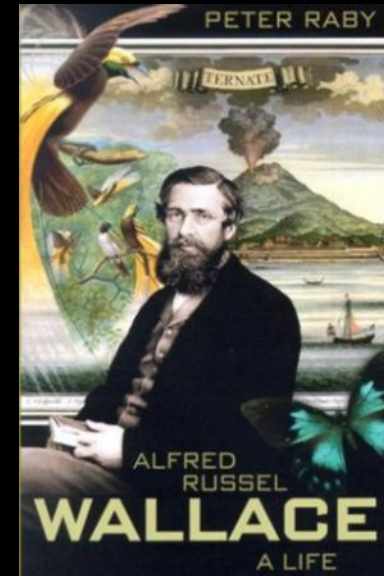
Também tratou da biogeografia de ilhas, estudando as faunas insulares e a relação com suas diferentes origens, ou seja, se as ilhas eram continentais ou oceânicas, antigas ou recentes.

Como Darwin, esteve no Brasil, porém realizou mais pesquisas, resultando na obra *Narrative of travels on Amazon and Rio Negro* (1853)


Alfred Russel Wallace
VIAGENS PELO AMAZONAS E RIO NEGRO
Tradução de ORLANDO TORRES
Prefacio de BASILIO DE MAGALHAES
EDIÇÃO ILLUSTRADA
Serie 5.ª BRASILIANA Vol. 156
Bibliotheca Pedagogica Brasileira


THE
RIO NEGRO
FROM OBSERVATIONS
made in the years 1851 and 1852
by
ALFRED R. WALLACE.
Enlarged Map
of the
RIVER UAUPES.
MACU INDIANS
MANAO INDIANS
CARAPANAS
TATUS
BAUHUNAS
COROCOROS
COWAS
Rio Negro (Black Water)
R. Solimoes or Amazon
EQUATOR
ARAPASSOS
MACUNAS
TIJUCOS
TIASSUS
TARIANAS
QUEIANAS

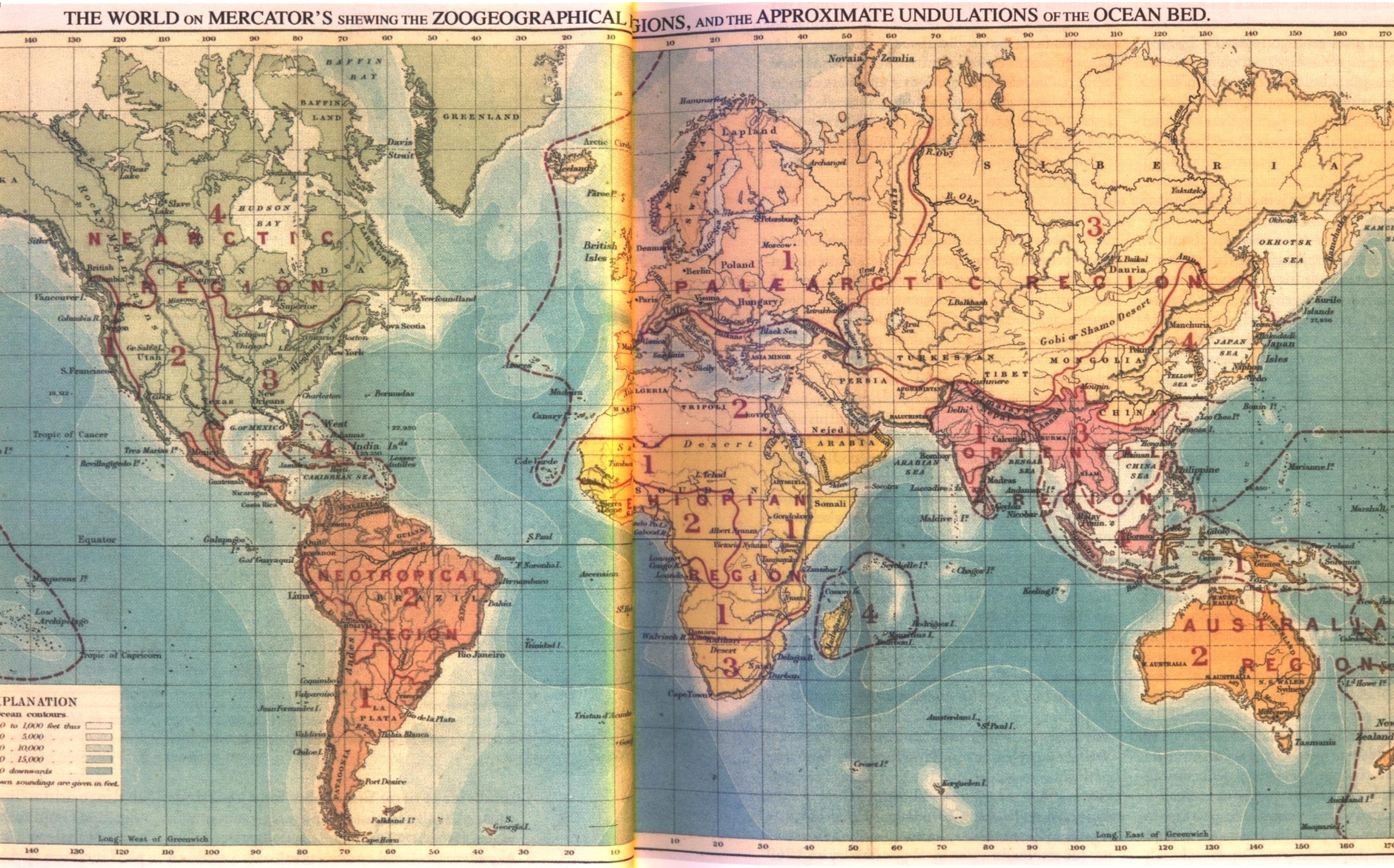

Darwinismo


THE
MALAY ARCHIPELAGO:
ORANG-UTAN, AND THE BIRD OF PARADISE
ALFRED RUSSEL WALLACE
MACMILLAN AND CO.

PETER RABY
TERNATE
ALFRED
RUSSEL
WALLACE
A LIFE

SOUTHERN PART
of the
MALAY ARCHIPELAGO
showing
Mr WALLACE'S ROUTES.
B O R N E O
C E L E B E S
J A V A
MOLUCCA ISLES
Tomini Gulf
Pearl Fishery
S h a l l o w
S e a
London: Chapman & Hall, Ltd

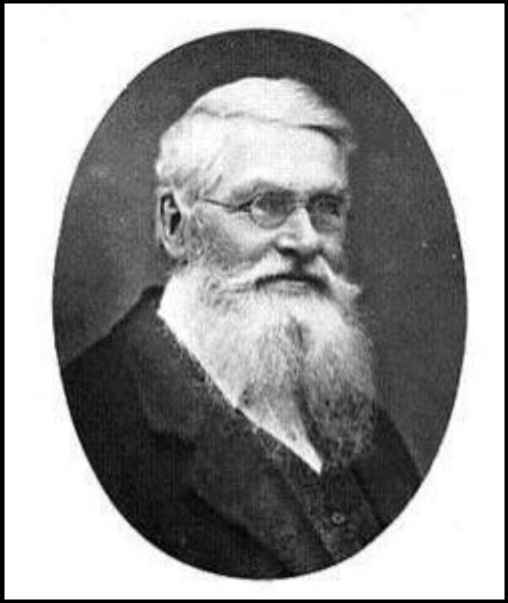
Wallace ficou mais conhecido por seu sistema de regiões e províncias zoogeográficas que, em linhas gerais, permanece válido até hoje. Baseou-se no trabalho de Sclater e nas seguintes premissas:

- as grandes divisões geográficas permanecem estáveis durante grandes períodos geológicos;
- elas são ricas e variadas em relação a cada um dos principais tipos de vida animal;
- e, apresentam alto nível de peculiaridade, com grande presença de espécies, gêneros e famílias particulares e grande ausência de gêneros e famílias abundantes e amplamente distribuídas nas regiões limítrofes.



Regiões zoogeográficas de Wallace, 1876 (Zunino & Zullini, 2003)

Linha de Wallace



Alfred Russel Wallace

1823-1913

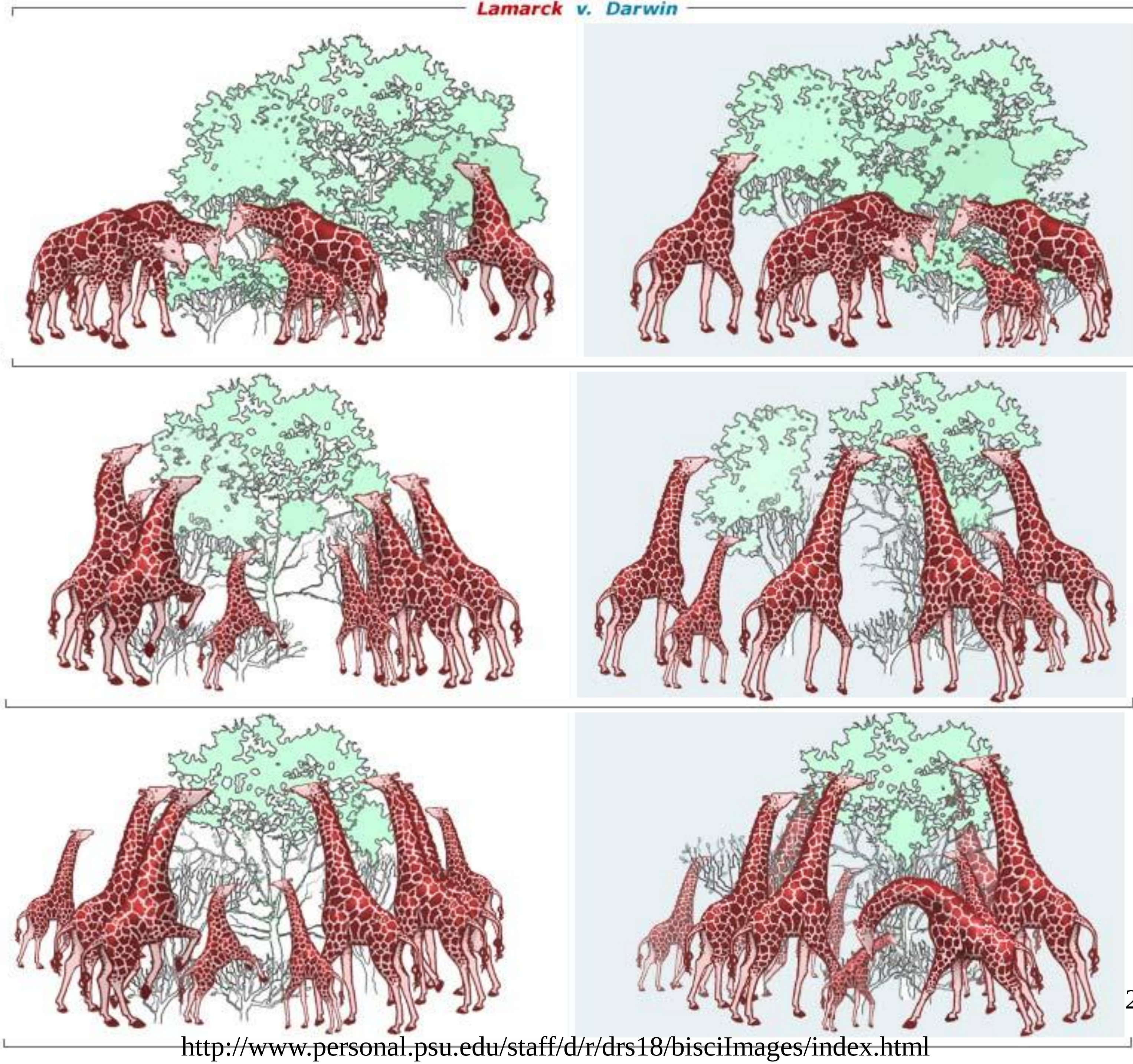
http://wallacefund.info/

Da metade do século XIX até a metade do século XX, as idéias de Darwin e de Wallace dominaram a biogeografia.

O paradigma formado pelo conjunto centro de origem-dispersão imperou nas explicações biogeográficas.

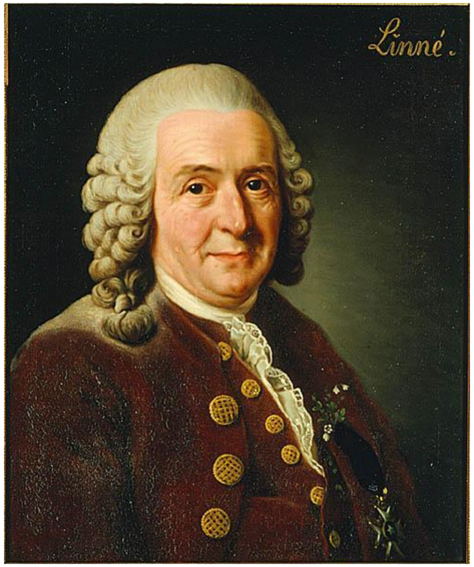
Enfoque causal: procura interpretar os fatores e causas que influenciam na distribuição geográfica dos seres vivos, podendo enfocar a perspectiva ecológica quanto a histórica.

A **perspectiva histórica** ou **diacrônica** (em escala temporal evolutiva ou geológica) propõe-se reconstituir os acontecimentos das distribuições dos seres vivos em termos de causas remotas, pela comparação entre áreas de distribuição atuais, as relações filéticas de seus ocupantes e a história evolutiva dos territórios estudados, tanto em sentido geográfico quanto geológico e climático.



http://www.personal.psu.edu/staff/d/r/drs18/bisciImages/index.html

O **Holarticismo** foi uma tentativa de explicar como os processos de **dispersão** e **migração** ocorreram a partir dos centros de origem boreais para as áreas austrais, acreditando na imobilidade dos continentes.



Lineu baseou-se nas idéias de Joseph Pitton de Turnerfort (zonação climática altitudinal) e considerou o Monte Ararat (atual fronteira entre Turquia e Armênia) como centro de dispersão dos seres vivos, considerando tanto o relato bíblico do dilúvio como suas observações pessoais.

Principais rotas de dispersão dos seres vivos de acordo com o Holarticismo, Monte Ararat (Zunino & Zullini, 2003)


Mapa
Satélite
Híbrido
Kazakhstan
Україна
Ukraine
Moldova
Romania
Srbija
България
Bulgaria
Istanbul
Ankara
Samsun
Türkiye
Turkey
Georgia
Erzurum
Azerbaijan
Van
Tabriz
Diyarbakir
Gaziantep
Halab
Syria
Lebanon
Israel
Jordan
Iraq
Baghdad
Tehran
Iran
Turkmenistan
Uzbekistan
Ashgabat
Mashhad
Afghanistan
Kabol
Pakistan
Tajikistan
Kyrgyzstan
Bishkek
Egypt
Libya
Al Kuwayt
Shiraz
Esfahan
Qom
Bakhtaran
Ahvaz
Al Qahirah
Al Iskandariyah
Amman
Dimashq
Ελλάς
Greece
Izmir
Bursa
Konya
Antalya
Adana
Manama
Ad Dawhah
Ar Riyad
Karachi
Islamabad
Peshawar
Lahore
Faisalabad
Gujranwala
New Delhi
Jaipur
Agra
Tarabulus
500 mi
Imagens ©2007 TerraMetrics, NASA, Dados cartográficos ©2007 Basarsoft, AND, Geocentre Consulting, NFGIS, Tele Atlas, Europa Technologies - Termos de Uso

George-Louis Leclerc, conde de Buffon, no século XVIII, notou problemas na explicação de Lineu:

* Deus admitia que diferentes partes da Terra apresentassem distintas floras e faunas, especialmente nos trópicos,

* As espécies sobreviventes do dilúvio tiveram que atravessar ambientes inóspitos e inabitáveis.

Buffon propunha que a vida se originou numa área boreal que tinha características climáticas diferentes das atuais, mais quentes, de onde se dirigiram em direção ao Novo e Velho Mundos e, então, evoluíram para novas espécies.

Hipóteses de diversidade e distribuição dos seres vivos terrestres:

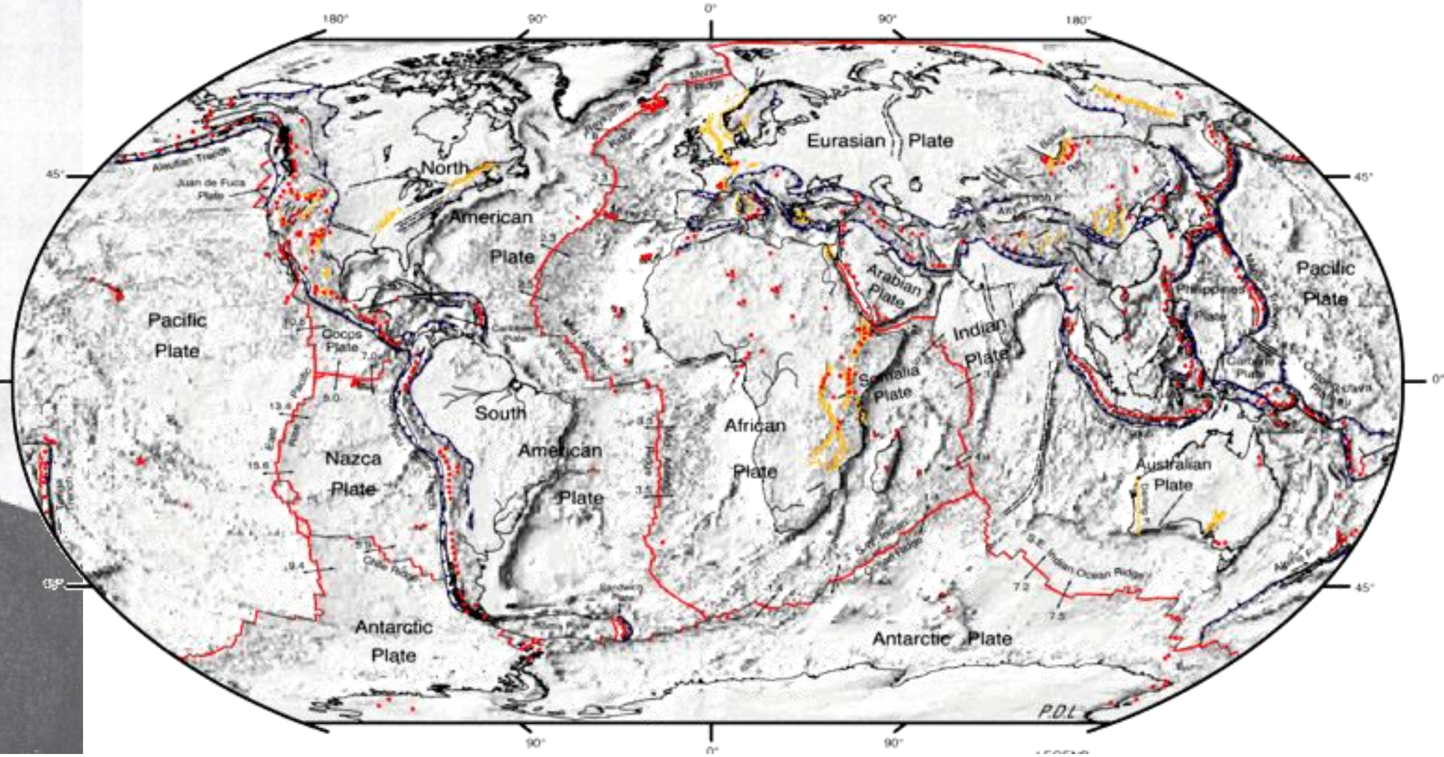
de Linneu, a partir do Monte Ararat;

de Buffon, a partir de um centro de origem ao norte.

(Brown & Lomolino, 1998)

A teoria da deriva continental e das placas tectônicas (WEGENER, 1915) deram novas perspectivas para as explicações do Holarticismo.

Sabe-se hoje que a maioria dos centros de origem estão na faixa intertropical.



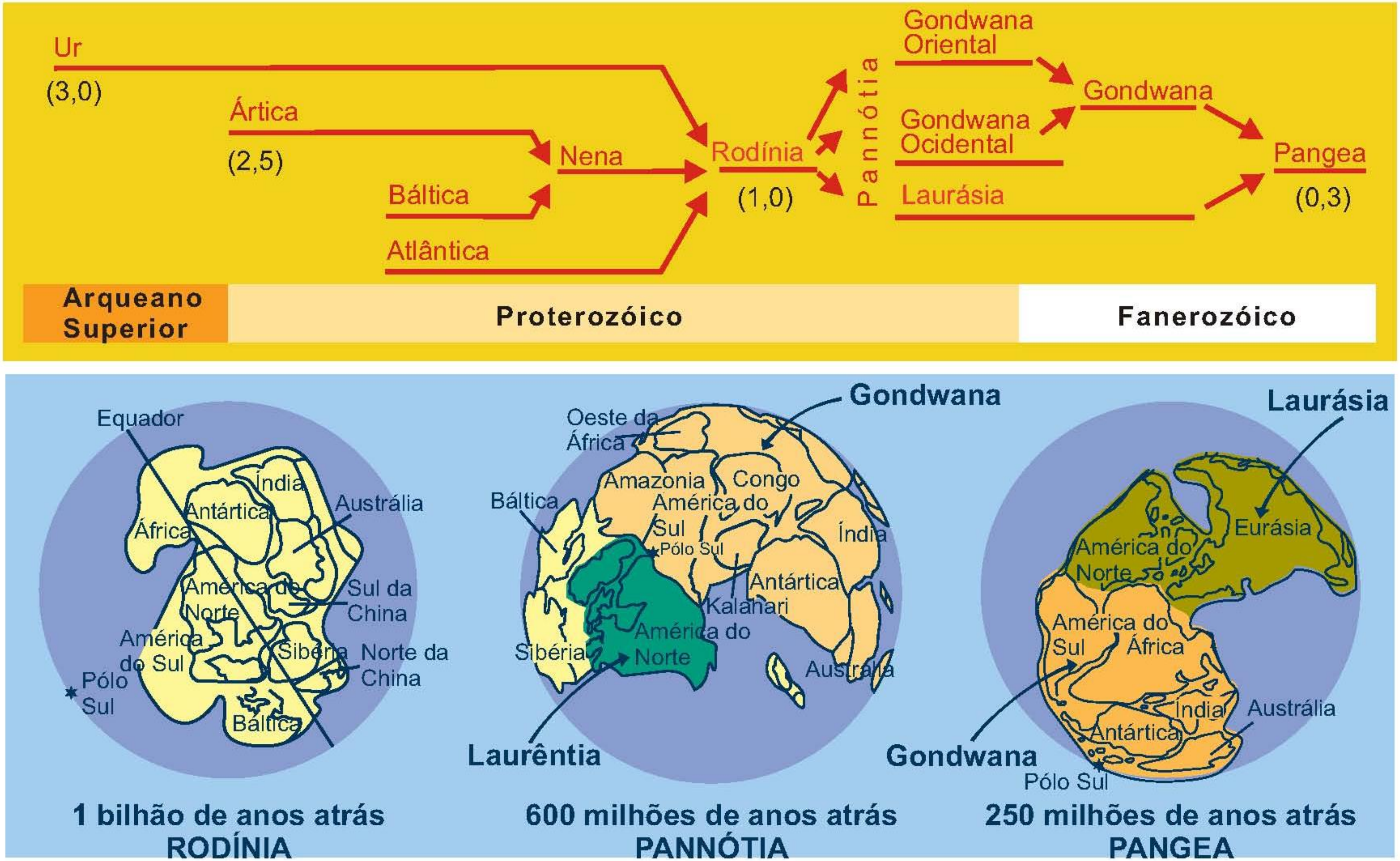
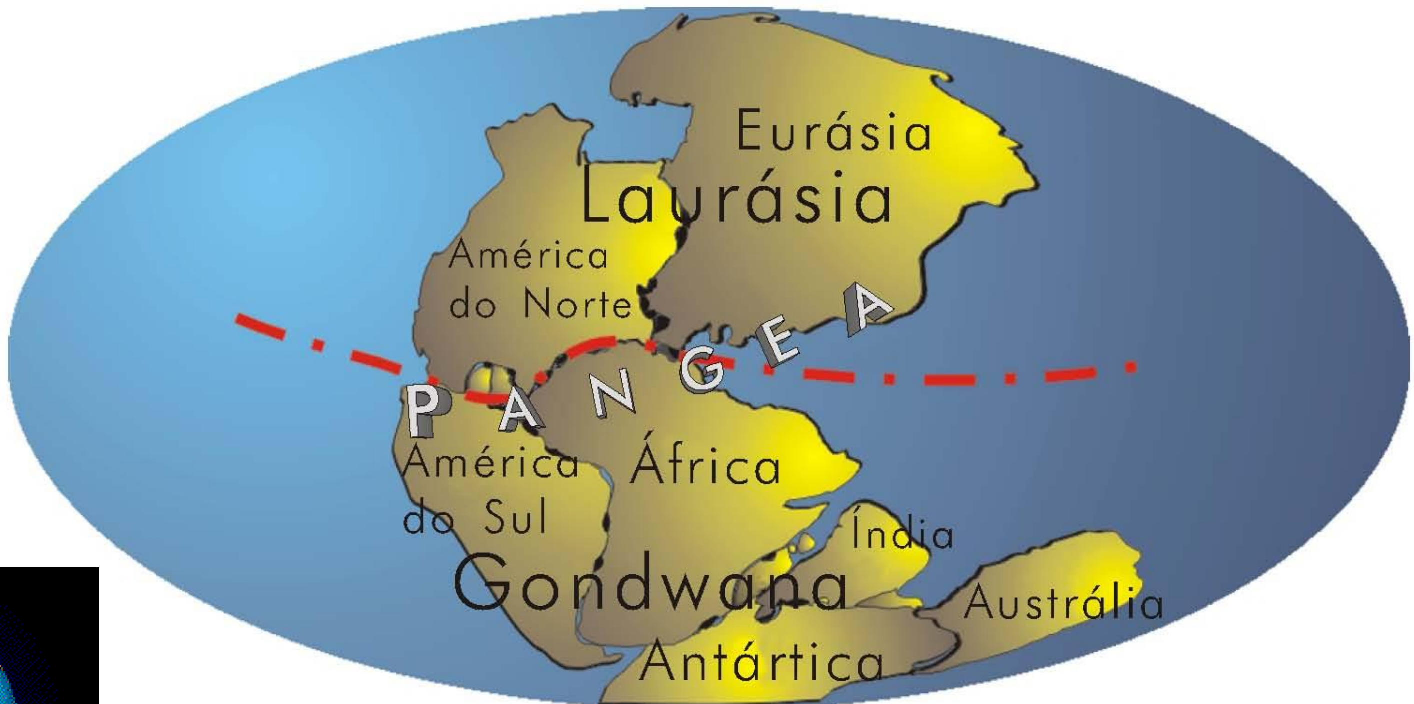


Fig. 23.13 Evolução dos principais supercontinentes ao longo da história da Terra (a). Os três principais supercontinentes do último bilhão de anos (Rodínia, Pannótia e Pangea) estão ilustrados em b. Fontes: a) J. J. W. Rogers, 1996; b) M. Yoshida.



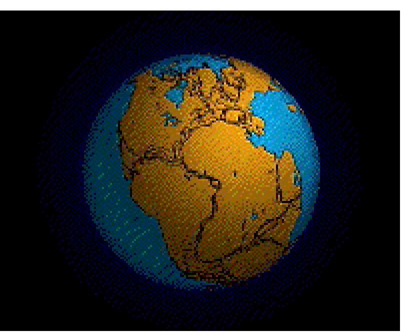
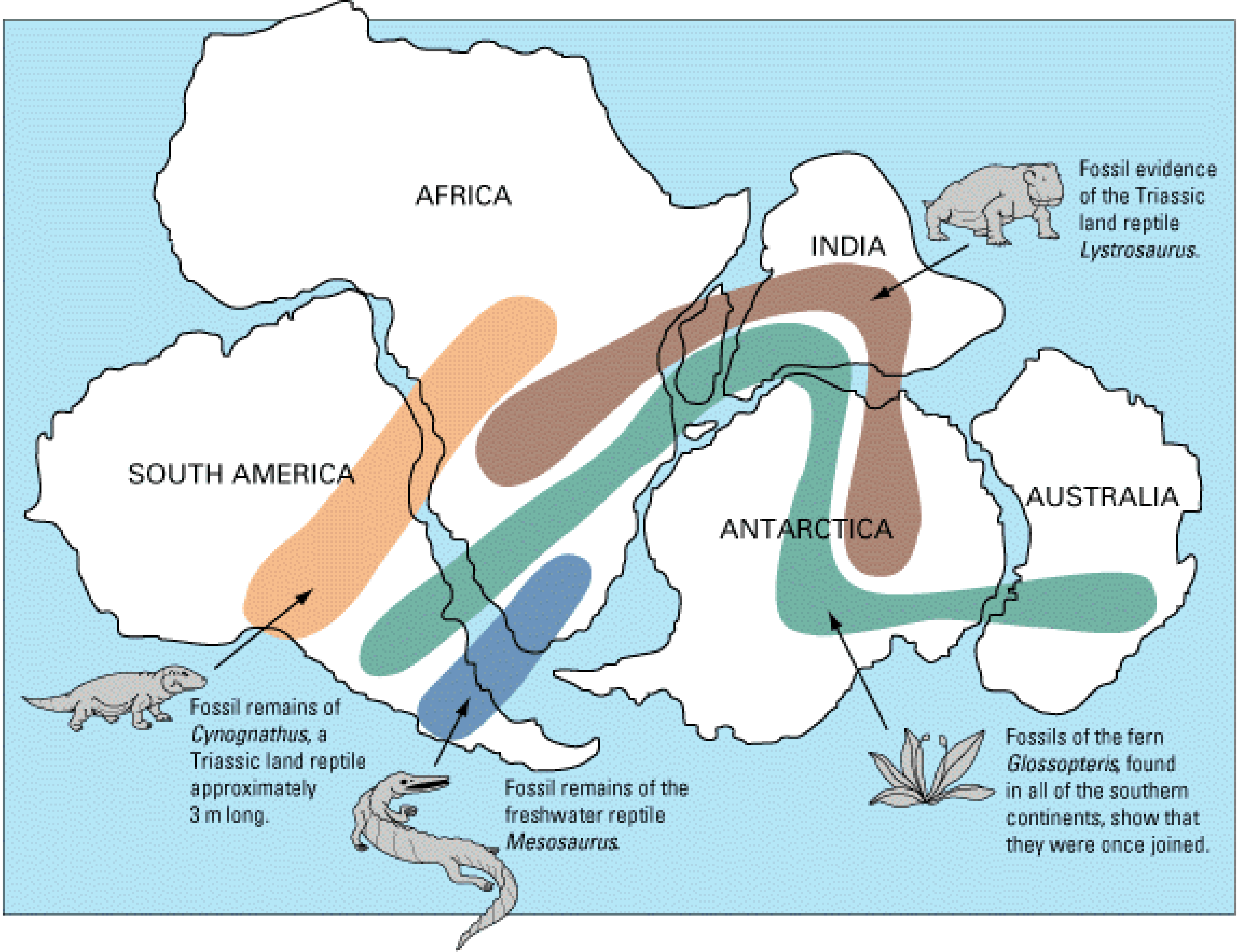


Fig. 6.1 Pangea e sua divisão em dois continentes, Laurásia a norte e Gondwana a sul, pelo Mar de Tethys.

Fonte: Decifrando a Terra / TEIXEIRA, TOLEDO, FAIRCHILD e TAIOLI - São Paulo: Oficina de Textos, 2000.



AFRICA
INDIA
SOUTH AMERICA
ANTARCTICA
AUSTRALIA
Fossil evidence of the Triassic land reptile *Lystrosaurus*.
Fossil remains of *Cynognathus*, a Triassic land reptile approximately 3 m long.
Fossil remains of the freshwater reptile *Mesosaurus*.
Fossils of the fern *Glossopteris*, found in all of the southern continents, show that they were once joined.

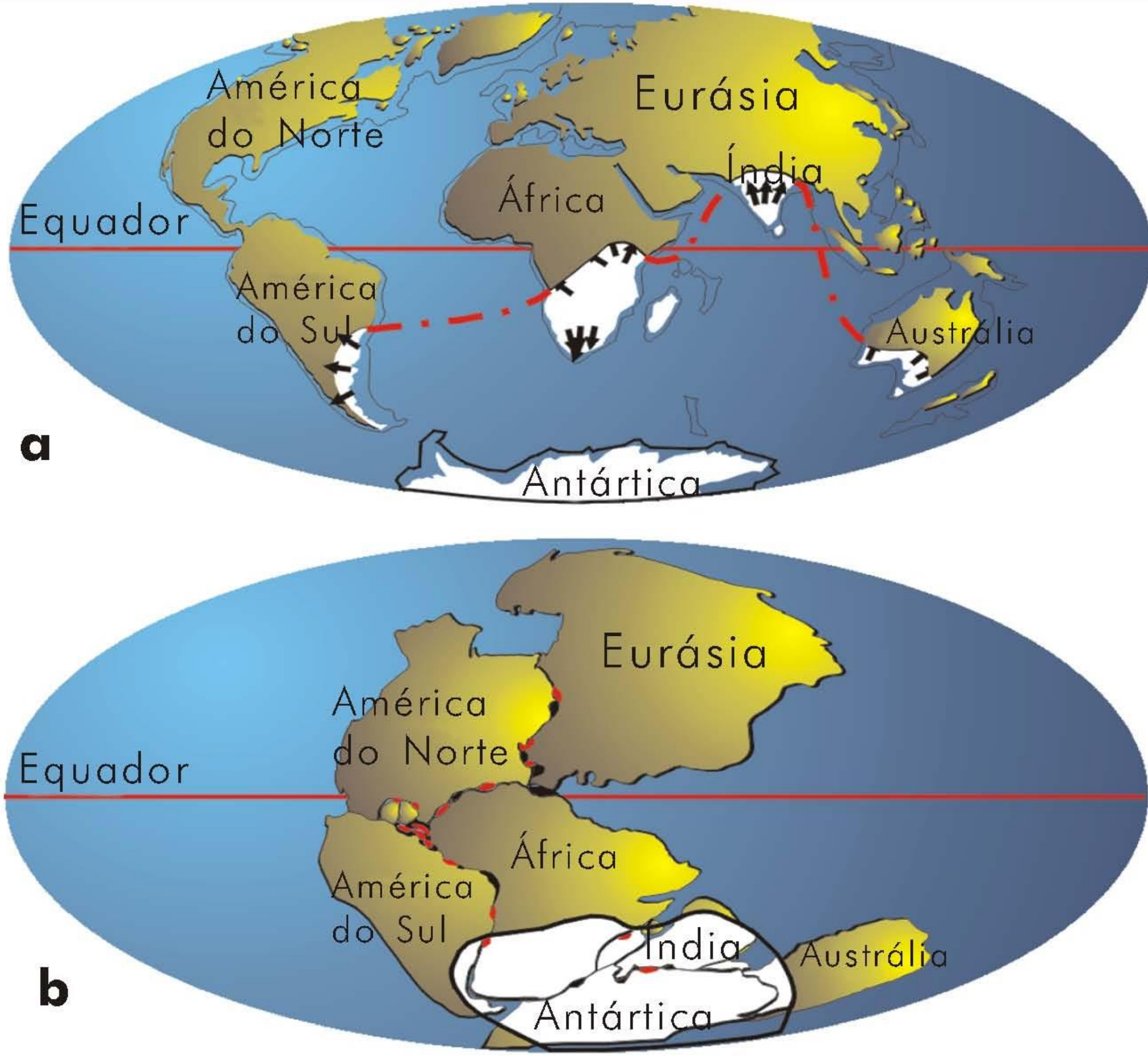


Fig. 6.2 a) Distribuição atual das evidências geológicas de existência de geleiras há 300 Ma. As setas indicam a direção de movimento das geleiras.
b) Simulação de como seria a distribuição das geleiras com os continentes juntos.

Fonte: Decifrando a Terra / TEIXEIRA, TOLEDO, FAIRCHILD e TAIOLI - São Paulo: Oficina de Textos, 2000.

VOLTAR

Placa Eurasiática
Placa Arábica
Placa Africana
Placa Filipina
Placa Pacífico
Placa Norte-Americana
Dorsal Meso-Atlântica
Placa Australiana-Indiana
Placa Nazca
Dorsal do Leste-Pacífico
Placa Sul-Americana
Dorsal do Sudeste-Indiano
Placa Antártica
1,8
2,3
2,8
2,5
8,8
4,0
5,4
7,6
7,4
6,9
5,8
7,9
5,5
5,6
3,7
5,4
1,6
2,0
2,7
4,0
6,2
1,6
1,3
7,4
7,4
10,5
7,1
3,7
11,7
9,2
7,0
16,1
10,1
18,3
11,1
7,4
10,3
3,3
7,7
5,7

Biogeografia Histórica

Trata do estudo dos seres vivos e sua distribuição na escala de tempo evolutivo, geológico ou diacrônico.

Encaixa-se no enfoque causal, apesar de apresentar preocupações sistemáticas.

Atualmente apresente quatro principais linhas de pensamento:

- **Biogeografia Evolucionista ou Dispersionista**
- **Biogeografia Vicariancista**
- **Biogeografia Filogenética ou Cladística,**
- **Panbiogeografia**.

Biogeografia Evolucionista ou Dispersionista

Baseia-se no estabelecimento da história de ocupação de uma determinada área, a partir da somatória das histórias biogeográficas dos diferentes grupos taxonômicos existentes. Envolve a análise de casos particulares desses grupos taxonômicos e suas respectivas comparações e inter-relações.

Simpson, Darlington, Cain e Briggs são autores destacados.

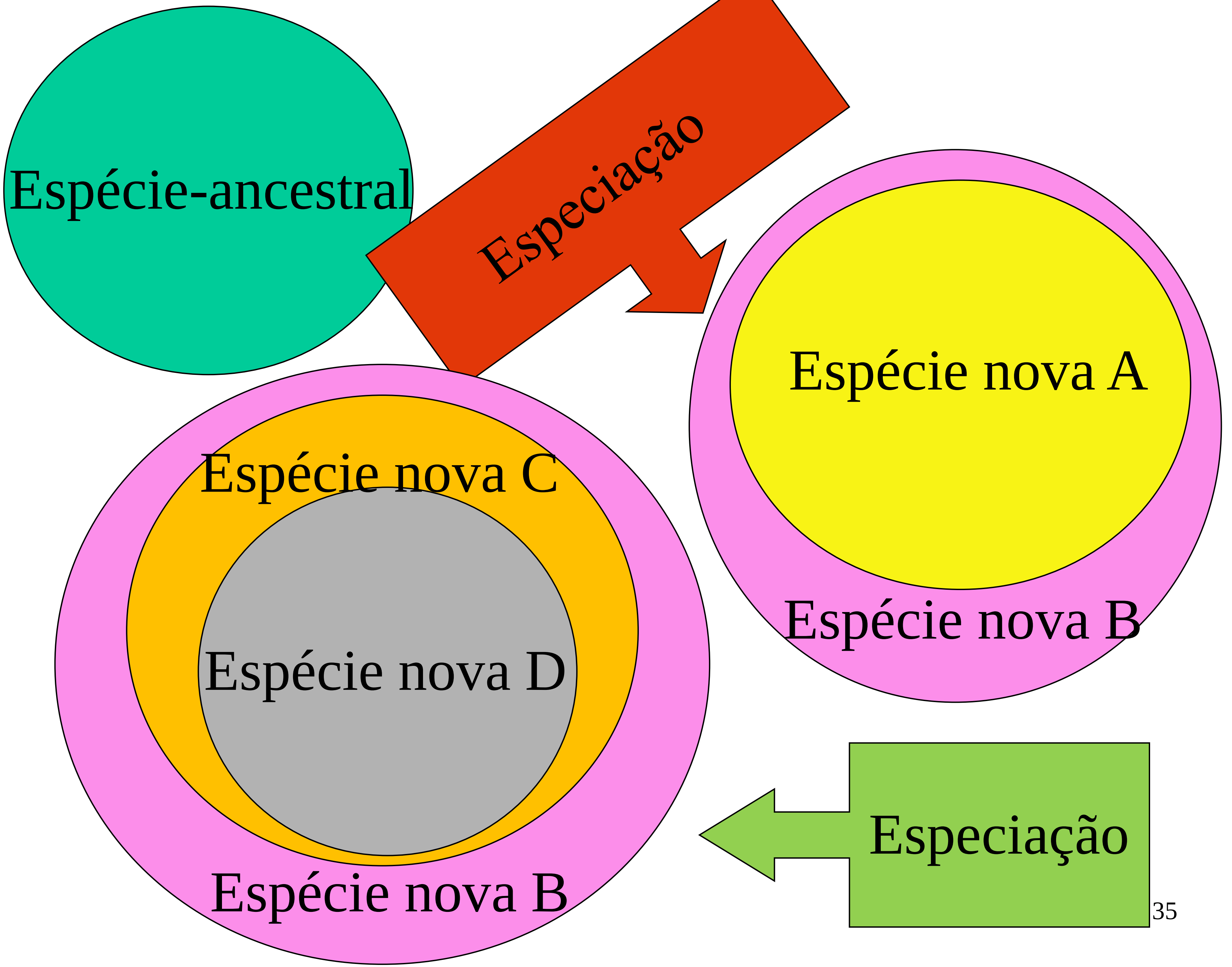
O princípio teórico fundamental dessa abordagem biogeográfica é o paradigma centro de origem-dispersão.

Centro de origem-dispersão

Uma espécie surge ocupando uma determinada área.

Nessa área, processos de especiação podem dar origem a uma nova espécie que, mais adaptada aos condicionante físicos locais, irá competir com a espécie-mãe, que poderá ter sua área de distribuição reduzida aos limites periféricos da área original.

O centro de origem de grupos taxonômicos supra específicos é a área onde se formam essas novas espécies. Sua determinação é importante para o enfoque.

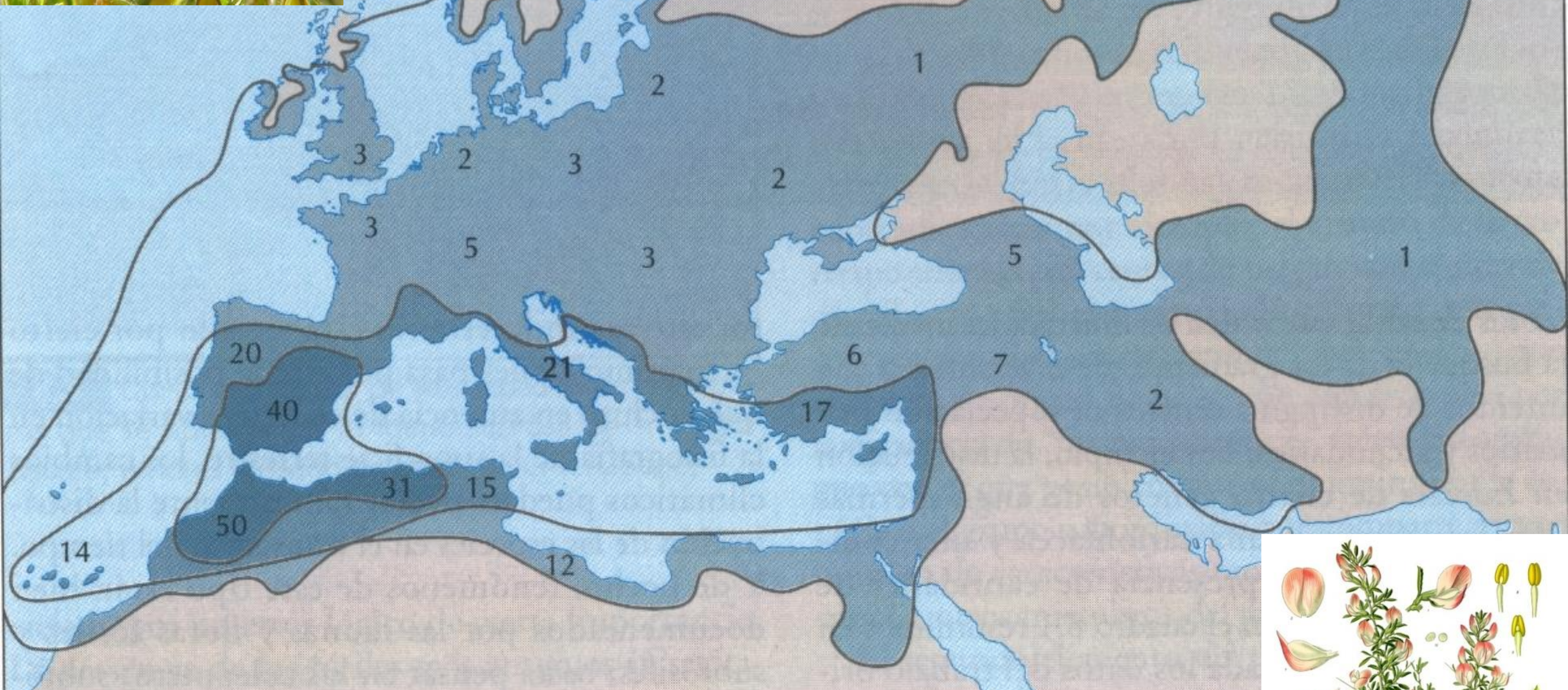

Espécie-ancestral
Especiação
Espécie nova A
Espécie nova B
Espécie nova C
Espécie nova D
Espécie nova B
Especiação





Pista de Dinossauro (icnofóssil) no Monumento Natural Vale dos Dinossauros. Passagem das Pedras (fazenda Ilha), município de Sousa – PB

http://www.unb.br/ig/sigep/sitio026/sitio026.pdf



Centro de máxima diversidade do gênero *Ononis*, Leguminosae (Zunino & Zullini, 2003)

MARSUPIAL MAMMAL FROM THE UPPER CRETACEOUS NORTH HORN FORMATION, CENTRAL UTAH

RICHARD L. CIFELLI AND CHRISTIAN DE MUIZON

Oklahoma Museum of Natural History and Department of Zoology, University of Oklahoma, Norman 73019, <rlc@ou.edu>, and Laboratoire de Paléontologie–URA CNRS 12, Muséum National d'Histoire Naturelle, 8, rue Buffon, F-75005 Paris, France

ABSTRACT—Little is known of the non-dinosaurian fauna from the Cretaceous (Maastrichtian) part of the North Horn Formation, despite its biogeographic importance. Herein we describe a new marsupial mammal from the unit, founded on an exceptionally complete specimen of a juvenile individual, and present new information on the incisor region of early marsupials, based on comparison with complete specimens from the early Paleocene of Bolivia. *Alphadon eatoni*, new species, is the smallest Lancian species of the genus, and departs from a presumed marsupial morphotype in having the second lower incisor enlarged. The species is, however, primitive in lacking a "staggered" pattern to the incisor series and in having a labial mandibular foramen, and in these respects it differs from Paleocene and later marsupials. Poor representation of other taxa precludes meaningful comparison to most other North American Cretaceous marsupials, although *Eodelphis*, thought to be distantly related, also has an enlarged i2. Although *Alphadon* is characterized by many primitive features, the relative development of the incisors is not what would be predicted in a morphological antecedent to later Marsupialia.

Marsupiais: Austrália é o país com maior diversidade e poderia ser considerado como seu centro de origem. Porém, alguns autores sustentam que o estado de Utah (USA) é o centro de origem do grupo porque é onde se encontrou o fóssil de marsupial mais antigo (*Journal of Paleontology*, Vol. 72, No. 3 (May, 1998), p. 532-537).

A outra parte do paradigma centro de origem-dispersão da Biogeografia Evolucionista é a **dispersão**.

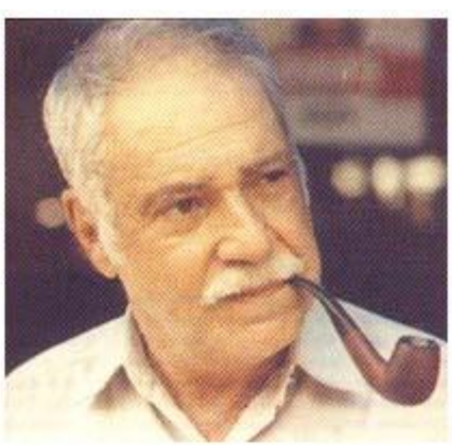
As espécies tentem a se expandir no espaço na medida em que as condições ambientais permitem e de acordo com a mobilidade ou capacidade de deslocamento da espécie.

Assim, a Biogeografia Evolucionista interpreta a história de ocupação da Terra e as razões das distribuições disjuntas mais complexas.

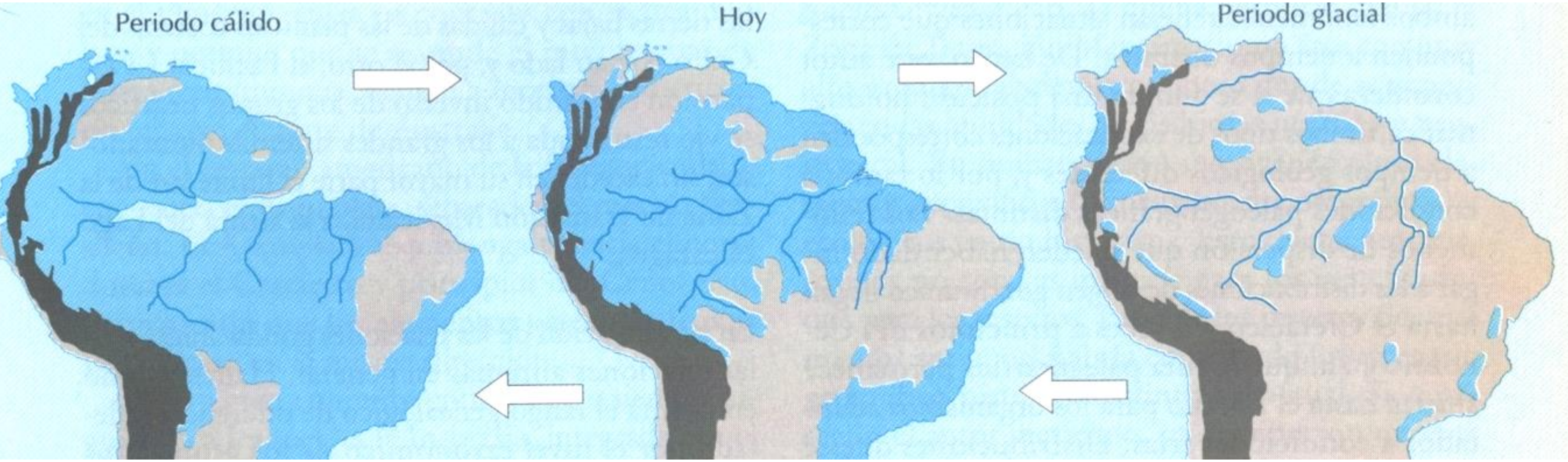
Teoria dos refúgios

Um refúgio biogeográfico é uma parte mais ou menos extensa da biota de uma região, podendo ser comparada a uma “ilha” biogeográfica, que permanece estável quanto comparada com suas áreas contíguas que, por diferentes motivos, tais como flutuações climáticas, formação de mares, etc., passam a sofrer mudanças e até grandes extinções.

De acordo com essa teoria, essas áreas estáveis ou refúgios, permanecendo assim por longos períodos, seriam áreas fornecedoras de espécies que se dispersariam para outras áreas, quando os fatores que estavam restringindo suas distribuições mudassem ou desaparecessem.




Haffer, Müller, **Vanzolini**, Prance e **Ab'Saber** são autores destacados, entre outros.



Extensão da floresta tropical na América do Sul em períodos quente, glacial e atual (Zunino & Zullini, 2003).

Fig. 2: Regiões da Amazônia onde foram encontrados, recentemente, indícios paleoecológicos adicionais de períodos climáticos secos do fim do Pleistoceno. Outros dados da Amazônia são mencionados no texto. Para mudanças climático-vegetacionais do Quartenário são também disponíveis dados básicos importantes do norte da América do Sul e de várias partes do Brasil fora da Amazônia (não indicados neste mapa). 1 – Serra dos Carajás; 2 – Região da Serra do Cachimbo; 3 – Região do Rio Tapajós inferior; 4 – Região de Pitinga; 5 – Região de Porto Velho e Humaitá; 6 – Região do Rio Acre; 7 – Rio Caquetá superior. A linha pontilhada segue o limite externo aproximado da região da floresta Guiano-Amazônica anterior a recente desflorestamento. Veja o texto para pormenores adicionais.

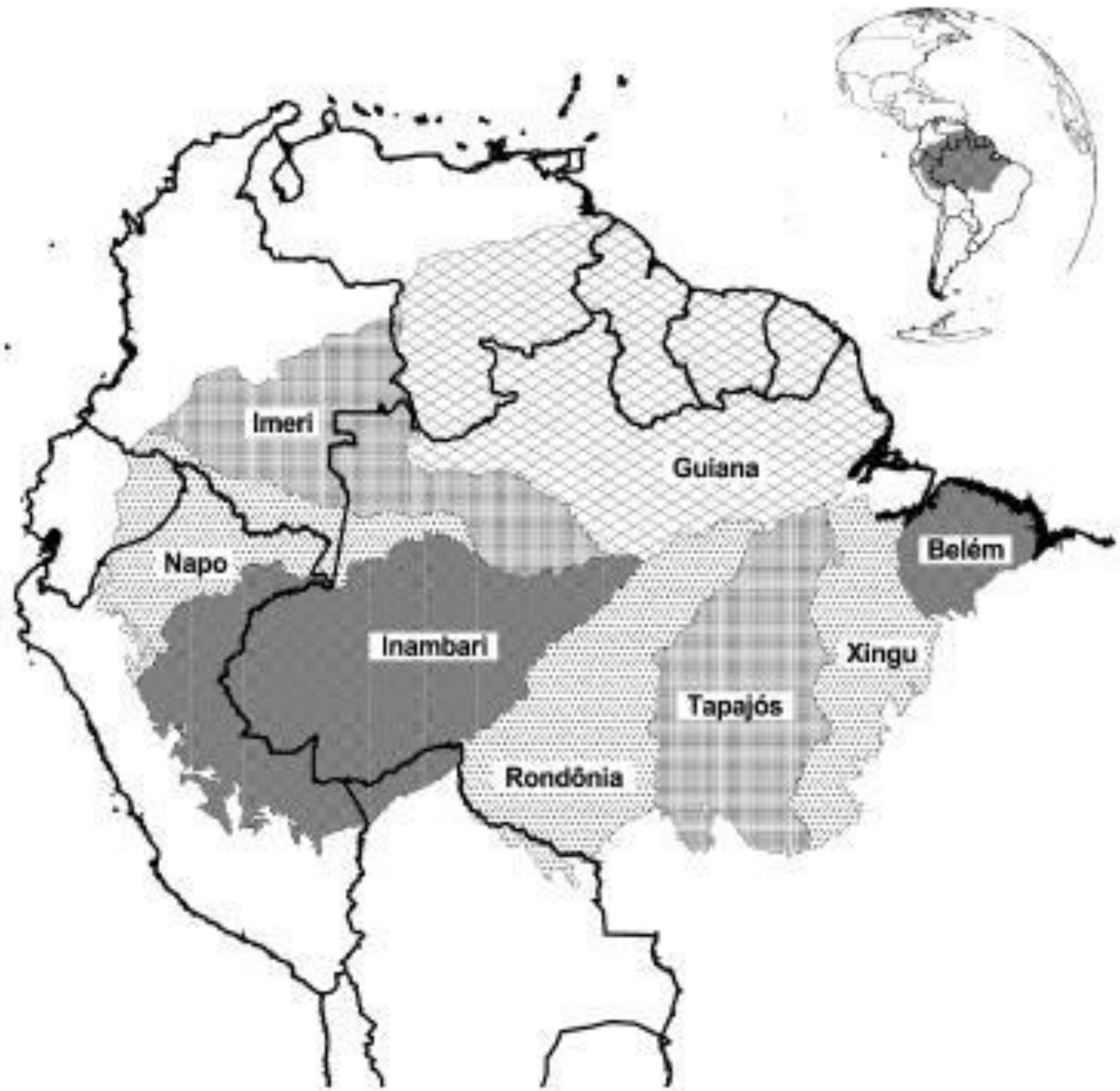
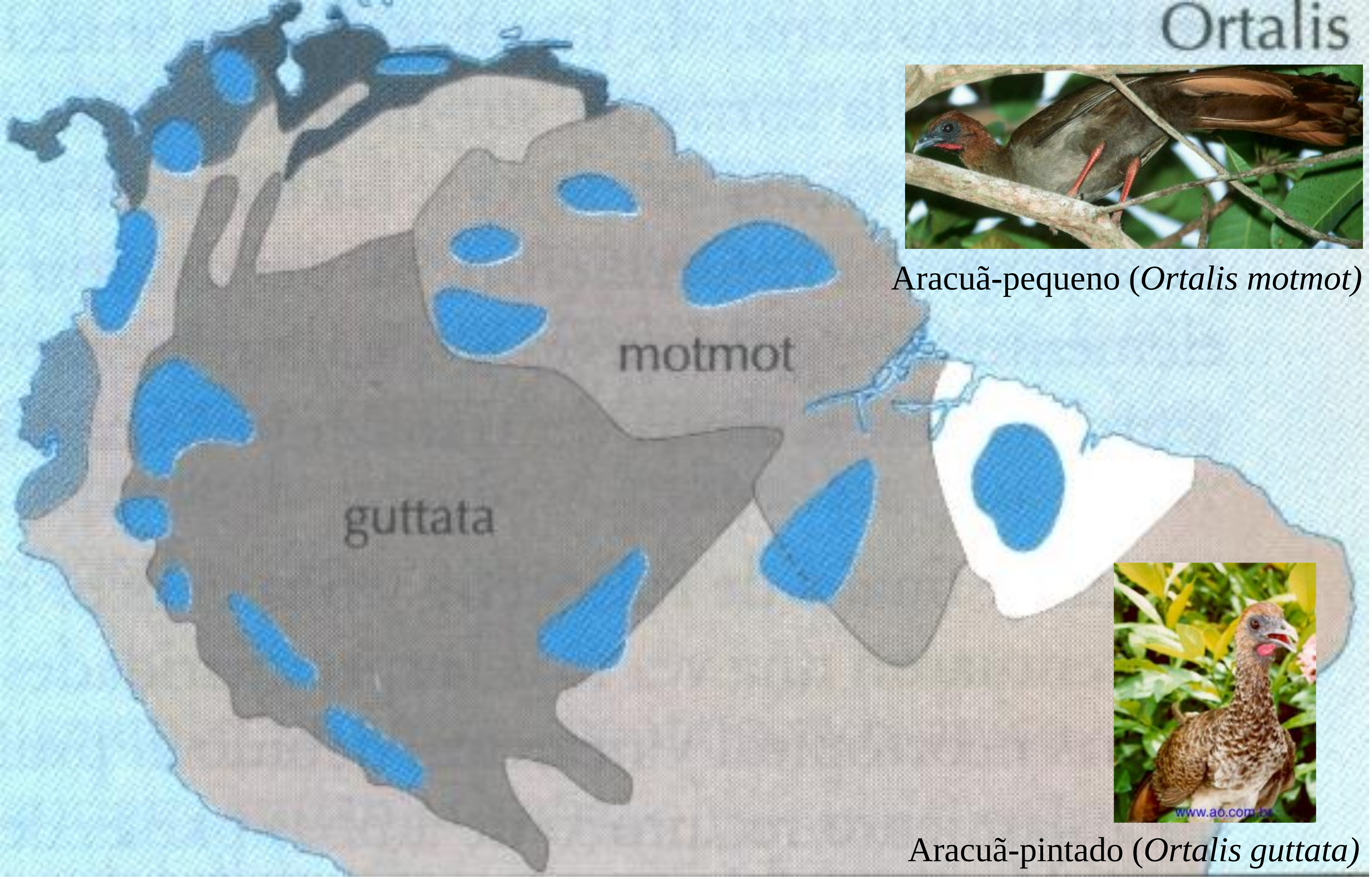


Figure 1. Amazonian lowland areas of endemism based on the ranges of terrestrial vertebrates.



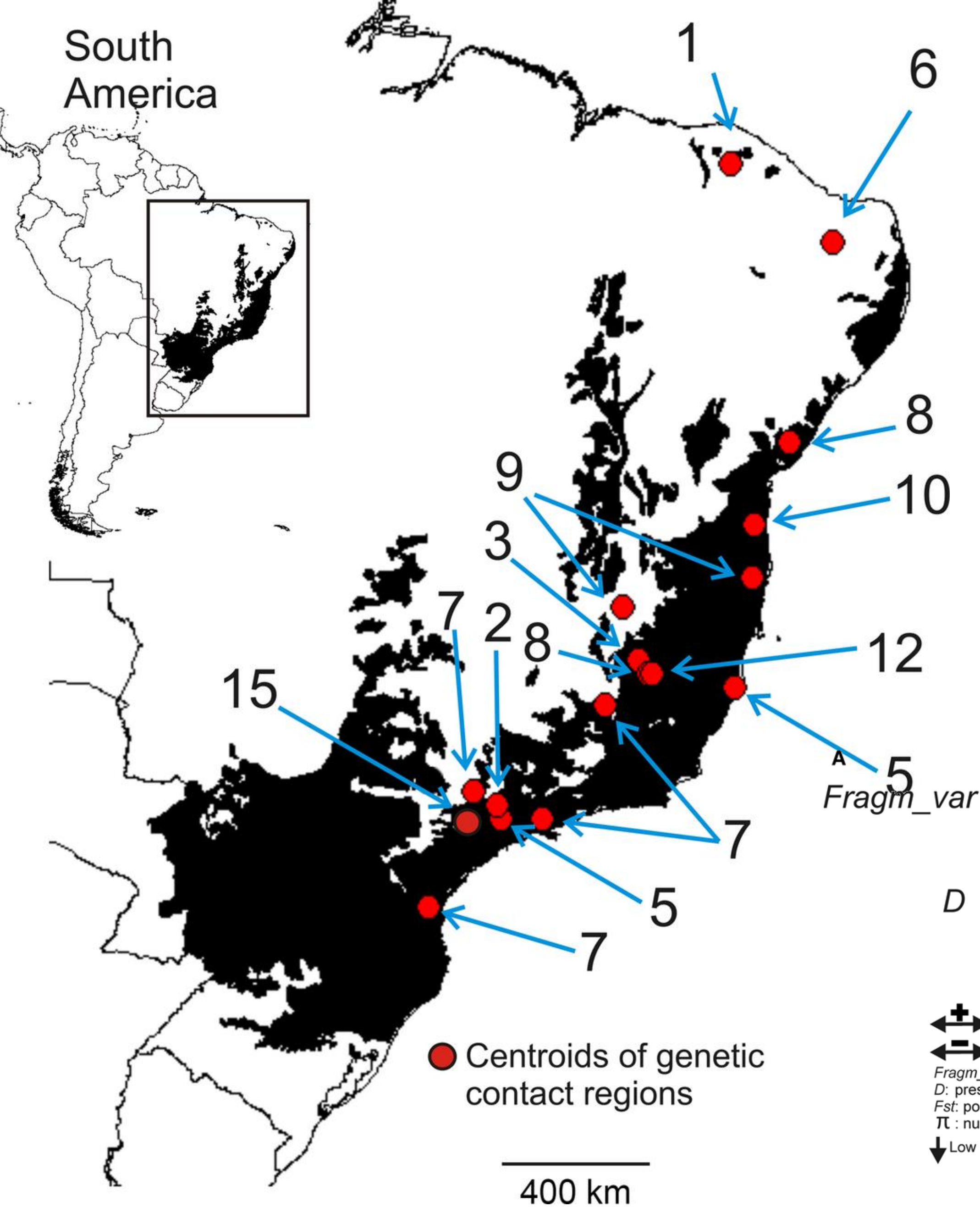
Distribuição de aves de subespécies do gênero *Ortalis*. As áreas em azul mostram os possíveis refúgios florestais (Zunino & Zullini, 2003).

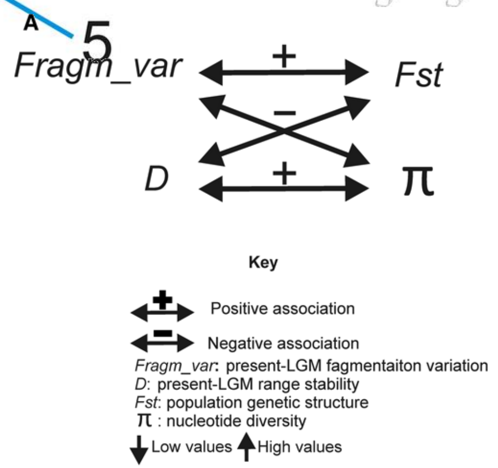
Pode-se concluir desse exemplo:

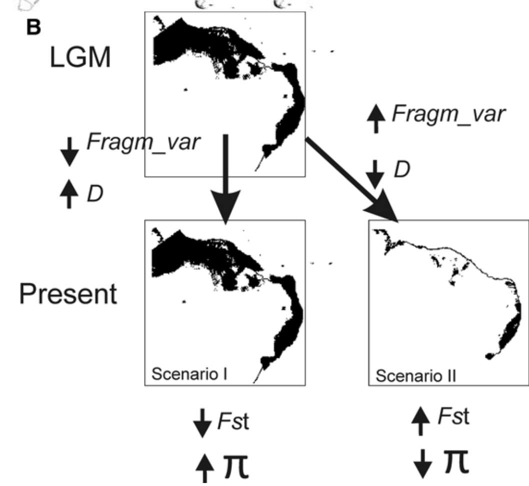
- o padrão de distribuição dessas aves amazônicas também se aplica a rãs, lagartixas, mariposas e plantas;

- as antigas áreas de refúgio amazônicas contêm, atualmente, o maior número de espécies endêmicas;

- as espécies novas que surgiram nos refúgios amazônicos somente ocorrem, atualmente, na floresta pluvial e não em outros ambientes.

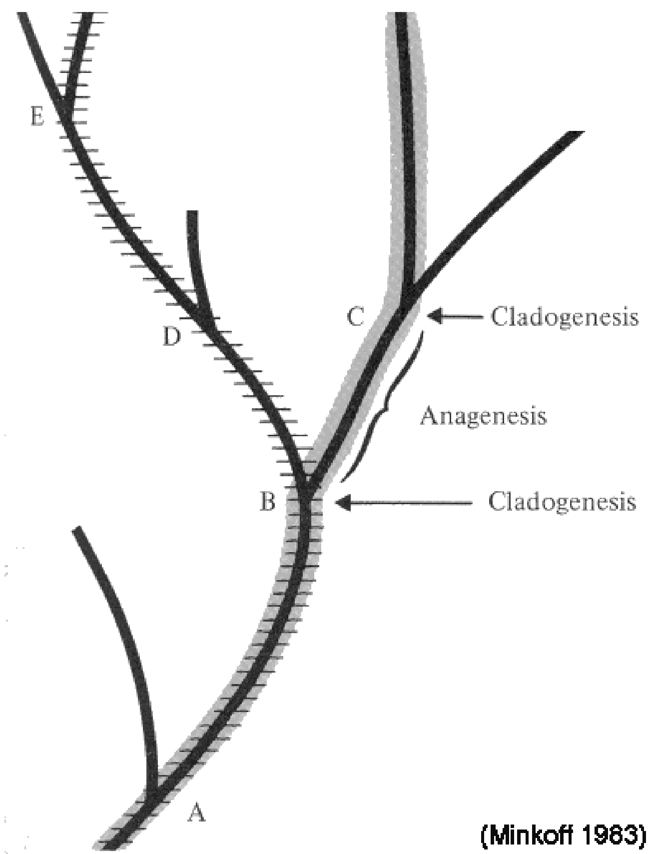


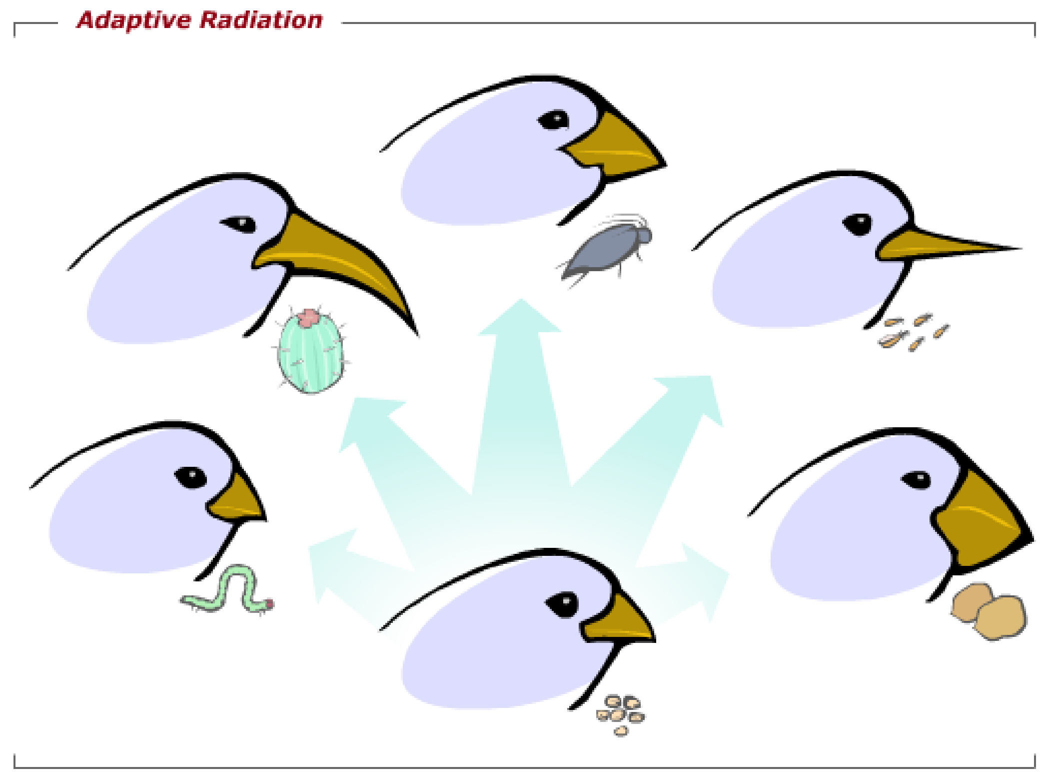




Effects of Pleistocene climate changes on species ranges and evolutionary processes in the Neotropical Atlantic Forest. 2016 http://onlinelibrary.wiley.com/doi/10.1111/bij.12844/full

A Biogeografia Evolucionista também desenvolveu a teoria da pulsação de táxon, que é a alternância de ciclos evolutivos no tempo e no espaço estáticos e de intensa especiação (cladogênese) e expansão (radiação adaptativa).





http://www.personal.psu.edu/staff/d/r/drs18/bisciImages/adaptiveRadiation2.png

http://www.mun.ca/biology/scarr/Cladogenesis_Anagenesis_Exintction.htm

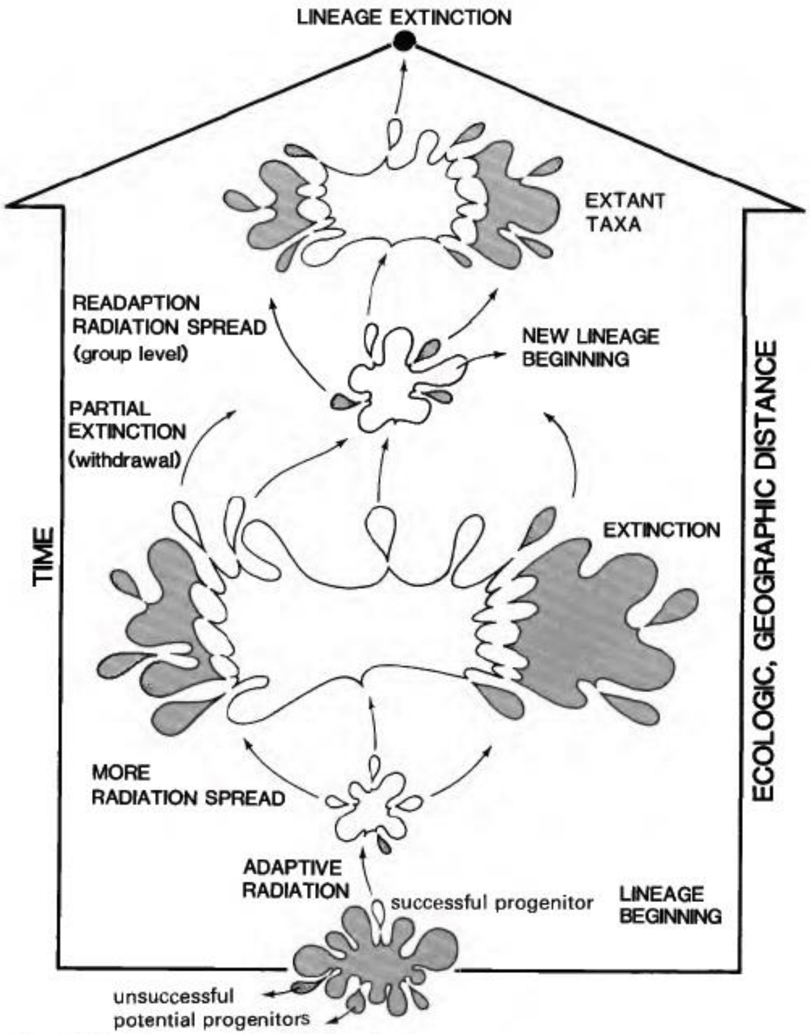
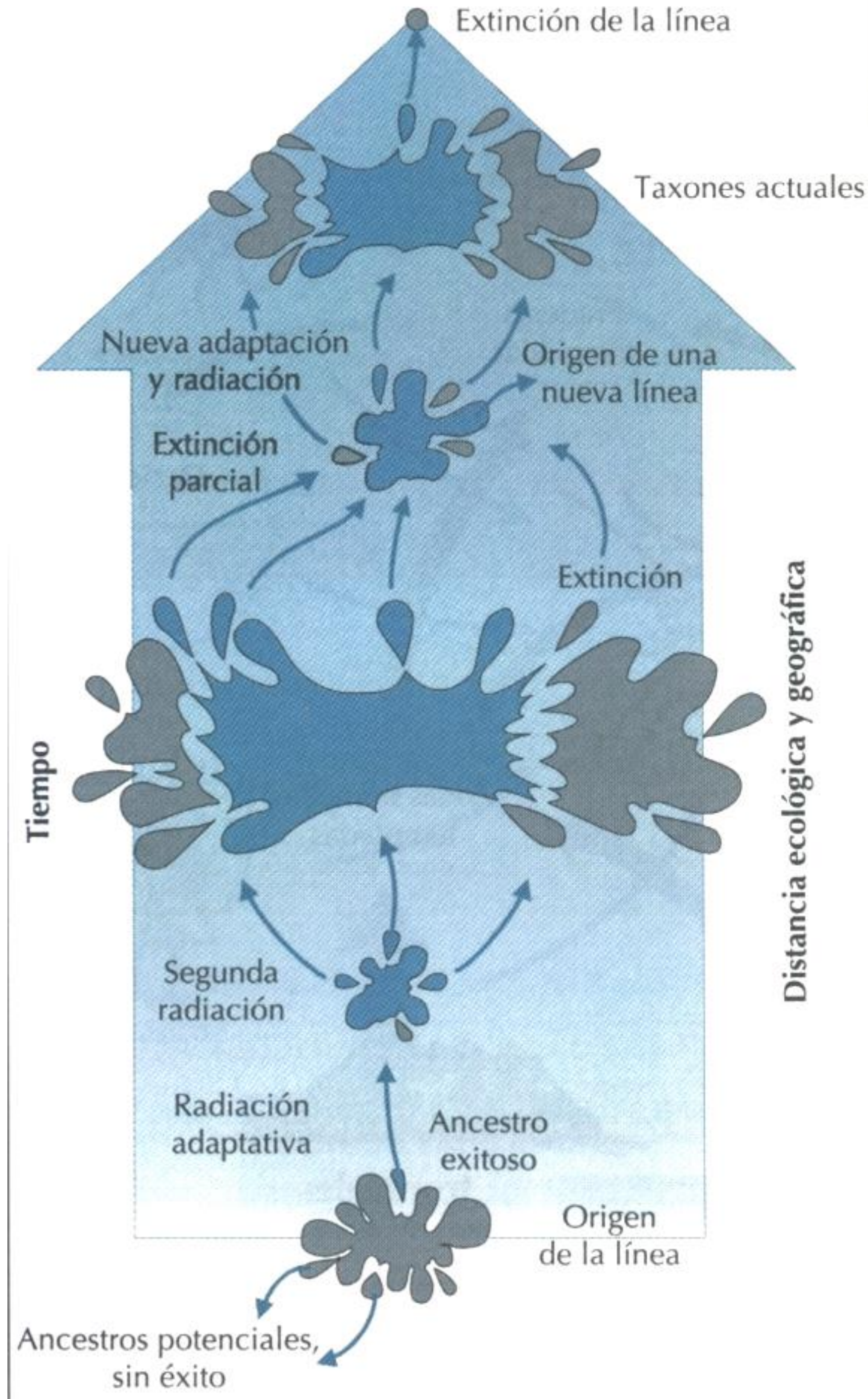


Figure I. Graphic representation of a taxon pulse.

Teoria de pulsação de Terry L. Erwin (1985)

(Zunino & Zullini, 2003)



Biogeografia Vicariancista

Tanto essa abordagem quanto a Panbiogeografia tentam reconhecer os padrões de distribuição e reconstruir as histórias biogeográficas gerais capazes de explicar as distribuições correspondentes.

Difere das biogeografias evolucionista e filogenética pois, além de tentar estabelecer o padrão de distribuição atual pela soma das histórias biogeográficas não necessariamente interdependentes, procura reconhecer processos causais comuns que possam explicar a existência dos padrões homogêneos.

A Biogeografia Vicariancista dá maior importância ao fenômeno da vicariância do que à dispersão.

Essa abordagem biogeográfica nasceu com os trabalhos de Croizat, Nelson e Rosen.

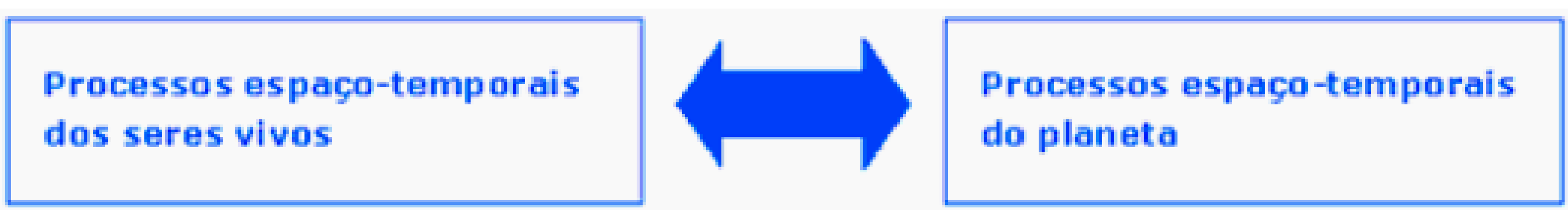
LEÓN CROIZAT (1894 – 1982)

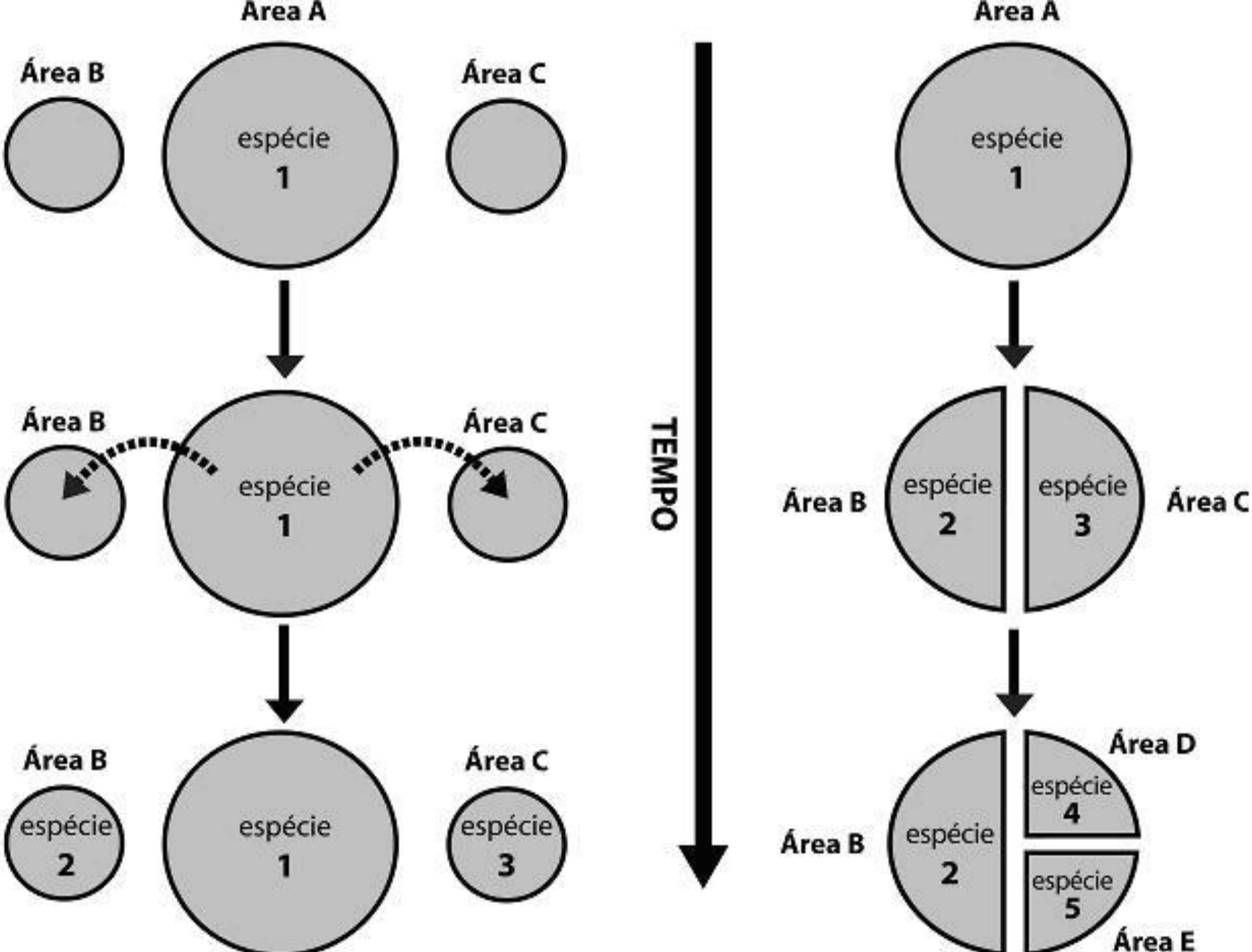
(Pai da Biogeografia Vicariante)

"life and earth evolve together" (Croizat, 1964)

Antes mesmo do conhecimento da deriva continental e tectônica de placas, Croizat já dava mostras, pelo seus estudos de padrão de distribuição de plantas, que os continentes se movimentavam.

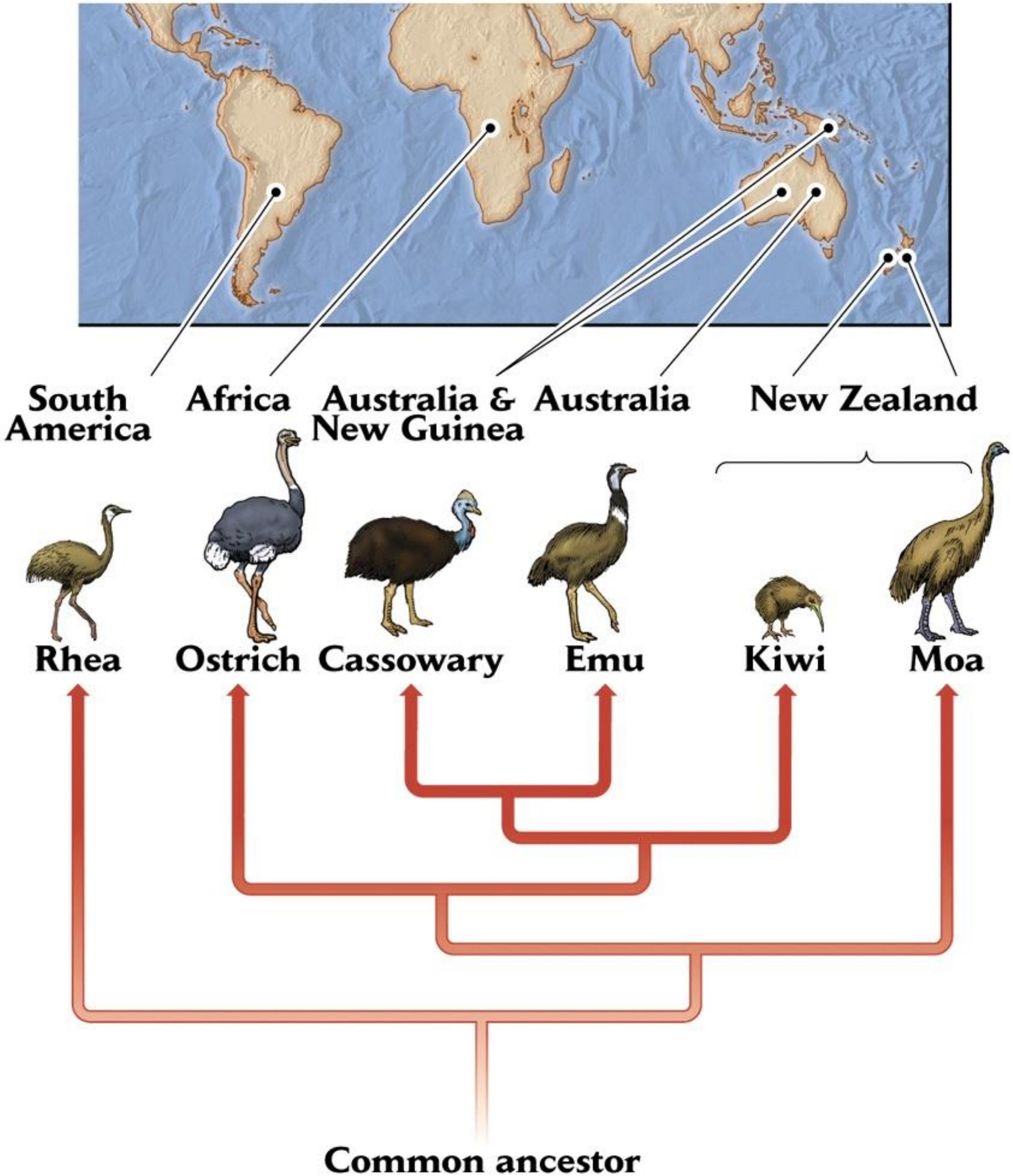
Chegou a concluir que os oceanos Atlântico, Índico e Pacífico já foram mais próximos entre si no passado do que da forma como são hoje conhecidos.

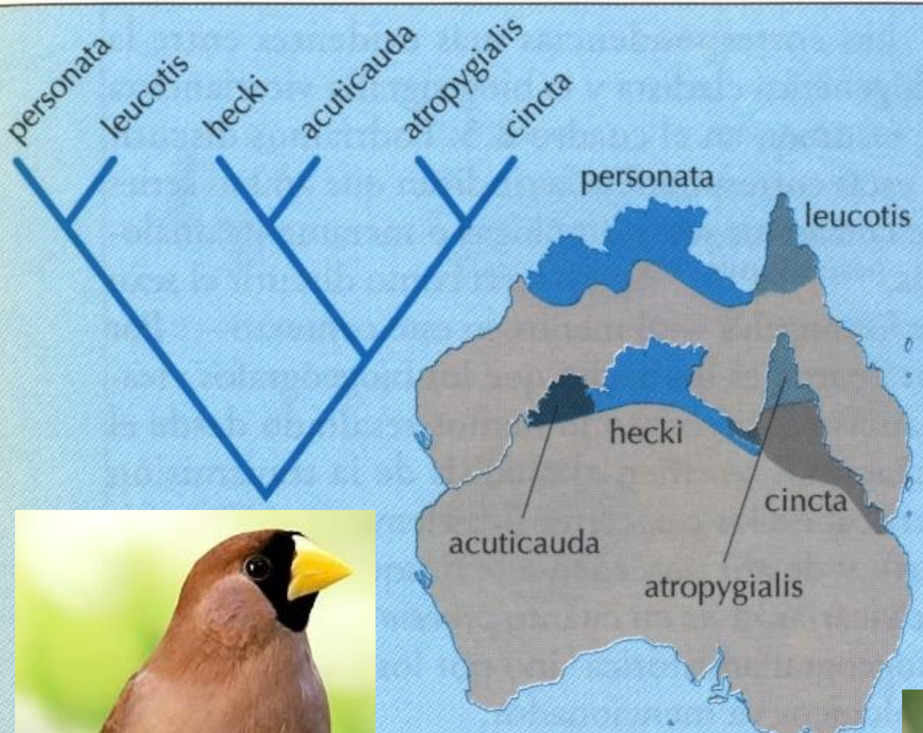


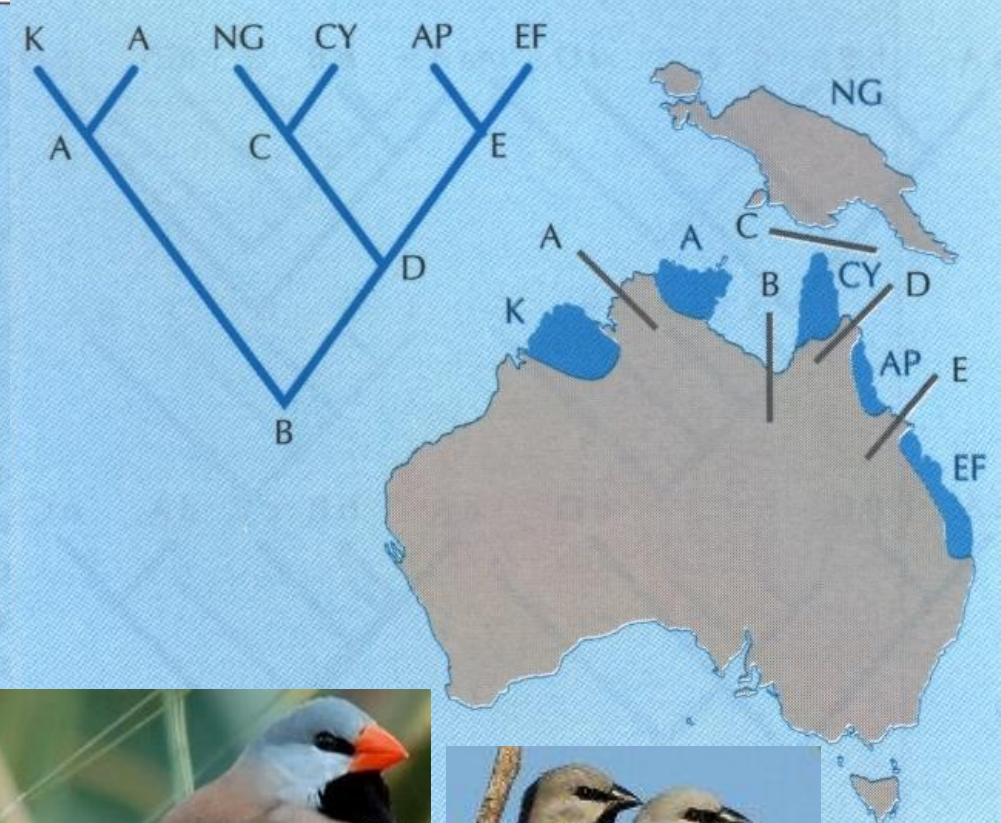

Área A
Área B
Área C
espécie 1
Área B
Área C
espécie 1
Área B
Área C
espécie 2
espécie 1
espécie 3
TEMPO
Área A
espécie 1
Área B
espécie 2
espécie 3
Área C
Área D
espécie 4
Área B
espécie 2
espécie 5
Área E

A.

B.


South America
Africa
Australia & New Guinea
Australia
New Zealand
Rhea
Ostrich
Cassowary
Emu
Kiwi
Moa
Common ancestor





Poephila personata

Poephila cincta

Poephila acuticauda

Poephila atropygialis

Exemplo de estudo de biogeografia vicariancista: aves australianas do gênero *Poephila* (mandarins) separadas por barreiras A – vale seco; B – golfo árido de Carpentaria; C – Estreito de Torres; D – Savana baixa árida; E – savana (Zunino & Zullini, 2003)

Journal of Biogeography (*J. Biogeogr.*) (2008) **35**, 88–104

ORIGINAL ARTICLE

Evidence for Gondwanan vicariance in an ancient clade of gecko lizards

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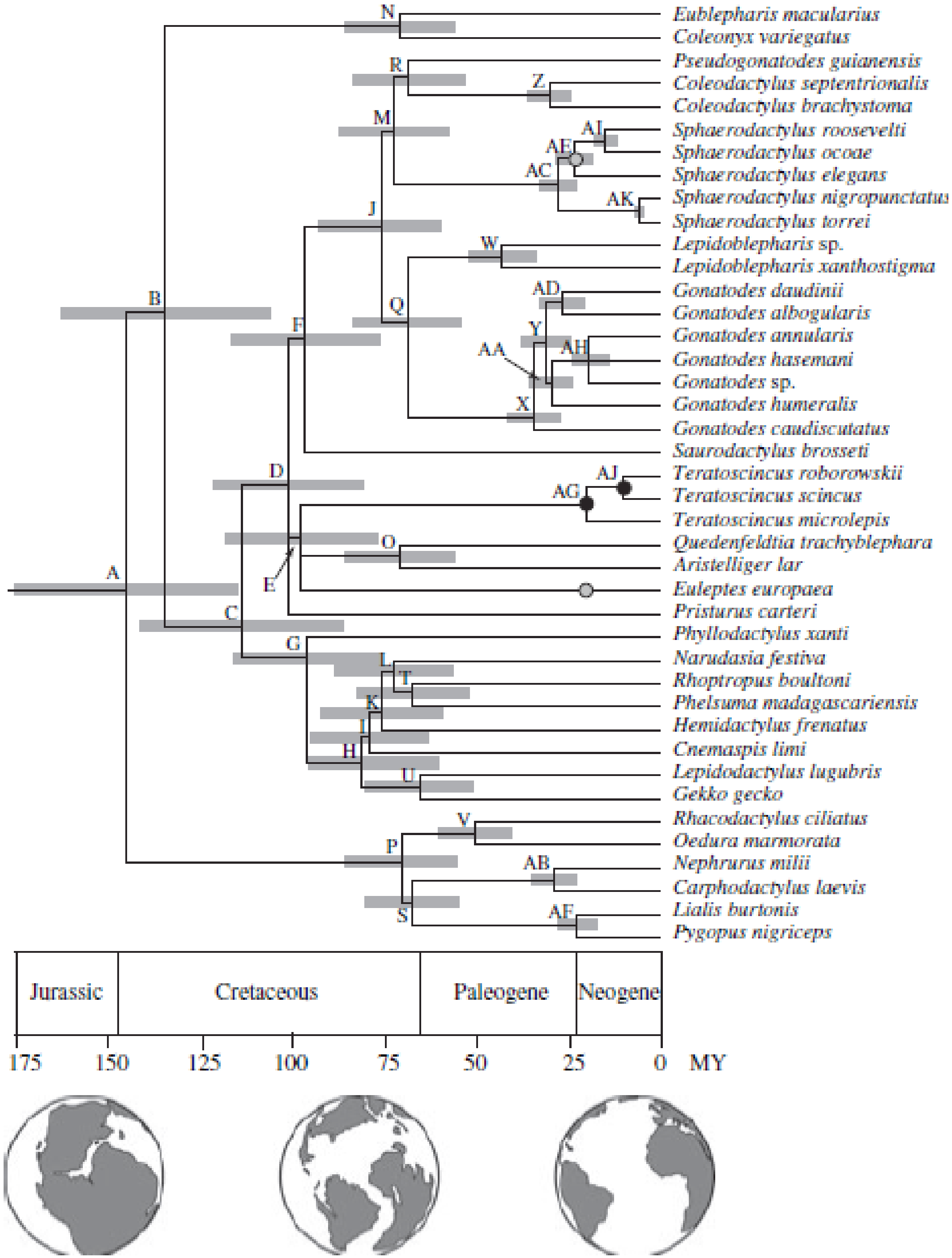
[1]*Conservation Biology Graduate Program, Bell Museum of Natural History, University of Minnesota, St Paul, MN 55108, USA,* [2]*Department of Biology, Villanova University, 800 Lancaster Avenue, Villanova, PA 19085, USA*

ABSTRACT

Aim Geckos (Reptilia: Squamata), due to their great age and global distribution, are excellent candidates to test hypotheses of Gondwanan vicariance against post-Gondwanan dispersal. Our aims are: to generate a phylogeny of the sphaerodactyl geckos and their closest relatives; evaluate previous phylogenetic hypotheses of the sphaerodactyl geckos with regard to the other major gecko lineages; and to use divergence date estimates to inform a biogeographical scenario regarding Gondwanan relationships and assess the roles of vicariance and dispersal in shaping the current distributions of the New World sphaerodactyl geckos and their closest Old World relatives.

Location Africa, Asia, Europe, South America, Atlantic Ocean.



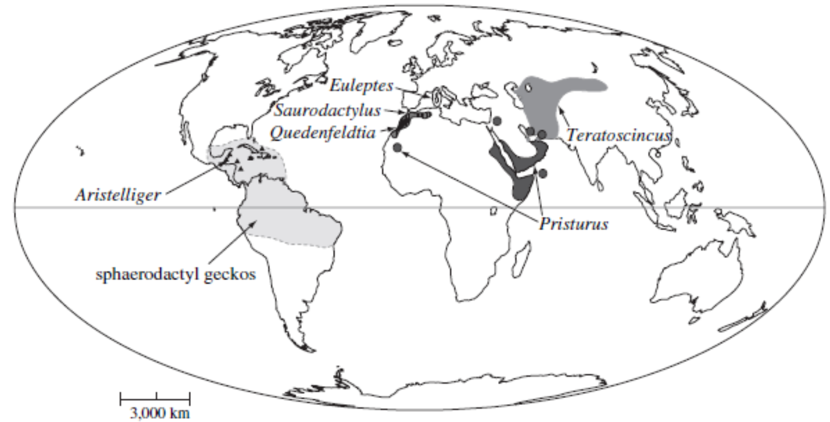
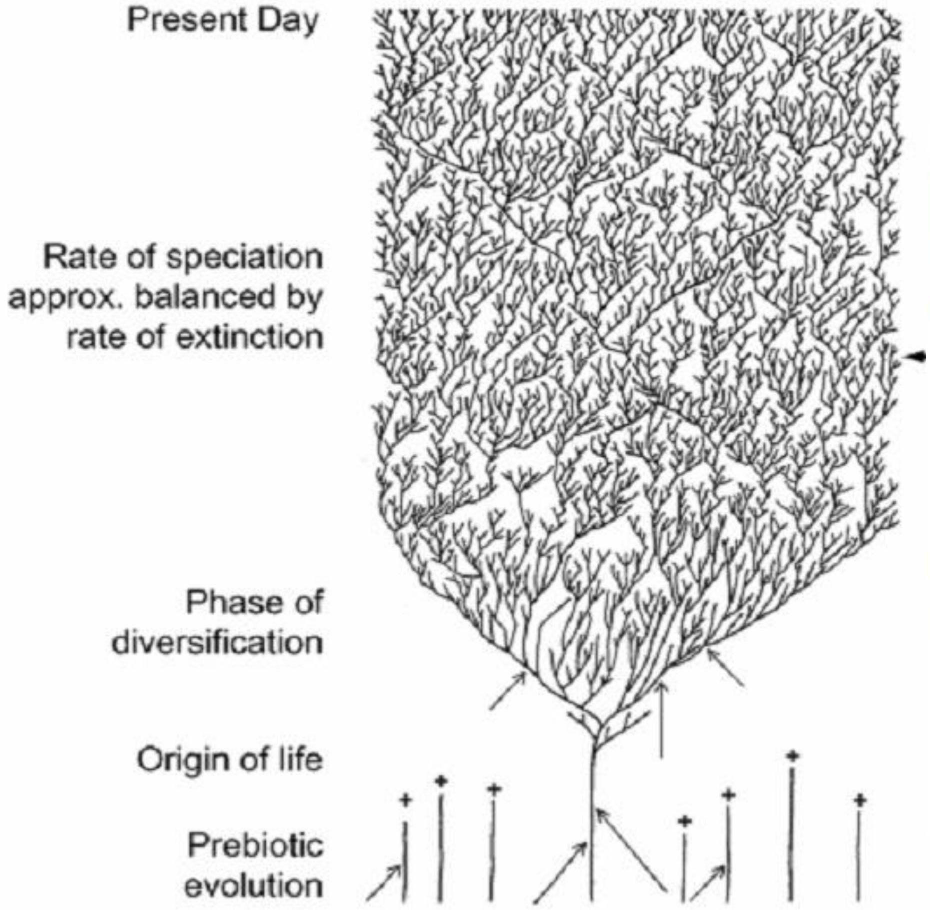


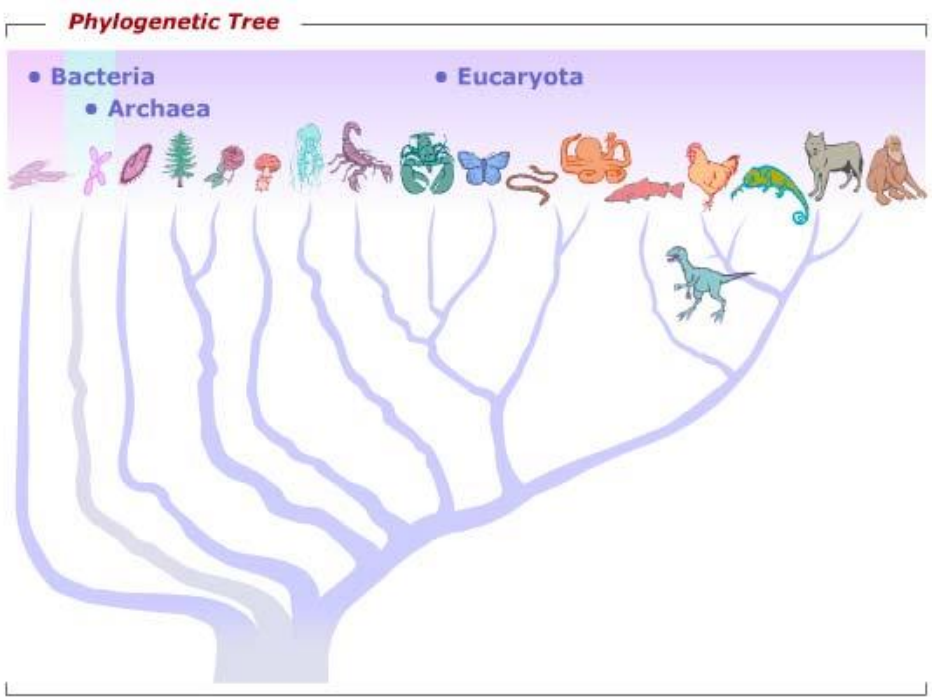
Figure 3 Chronogram of the partitioned Bayesian phylogeny generated using non-parametric rate smoothing. Approximate divergence dates are indicated along the *x*-axis. Grey bars indicate 95% confidence intervals calculated from bootstrap analysis. Actual dates and confidence intervals are listed in Table 6. Black circles represent fixed-age nodes; grey circles, minimum-age constraint nodes. Globes illustrate the break-up of Gondwana and the opening of the Atlantic Ocean shown at 200 Myr BP, 90 Myr BP and the present (modified from PALEOMAP website, http://www.scotese.com).

Biogeografia Filogenética ou Cladística

Não se diferencia muito da Biogeografia Evolucionista, uma vez que ambas estão envolvidas na determinação da história biogeográfica das áreas pesquisas. Geralmente, grupos monofiléticos diferentes mas que têm o mesmo padrão de distribuição, têm, provavelmente, uma mesma história biogeográfica evolutiva.

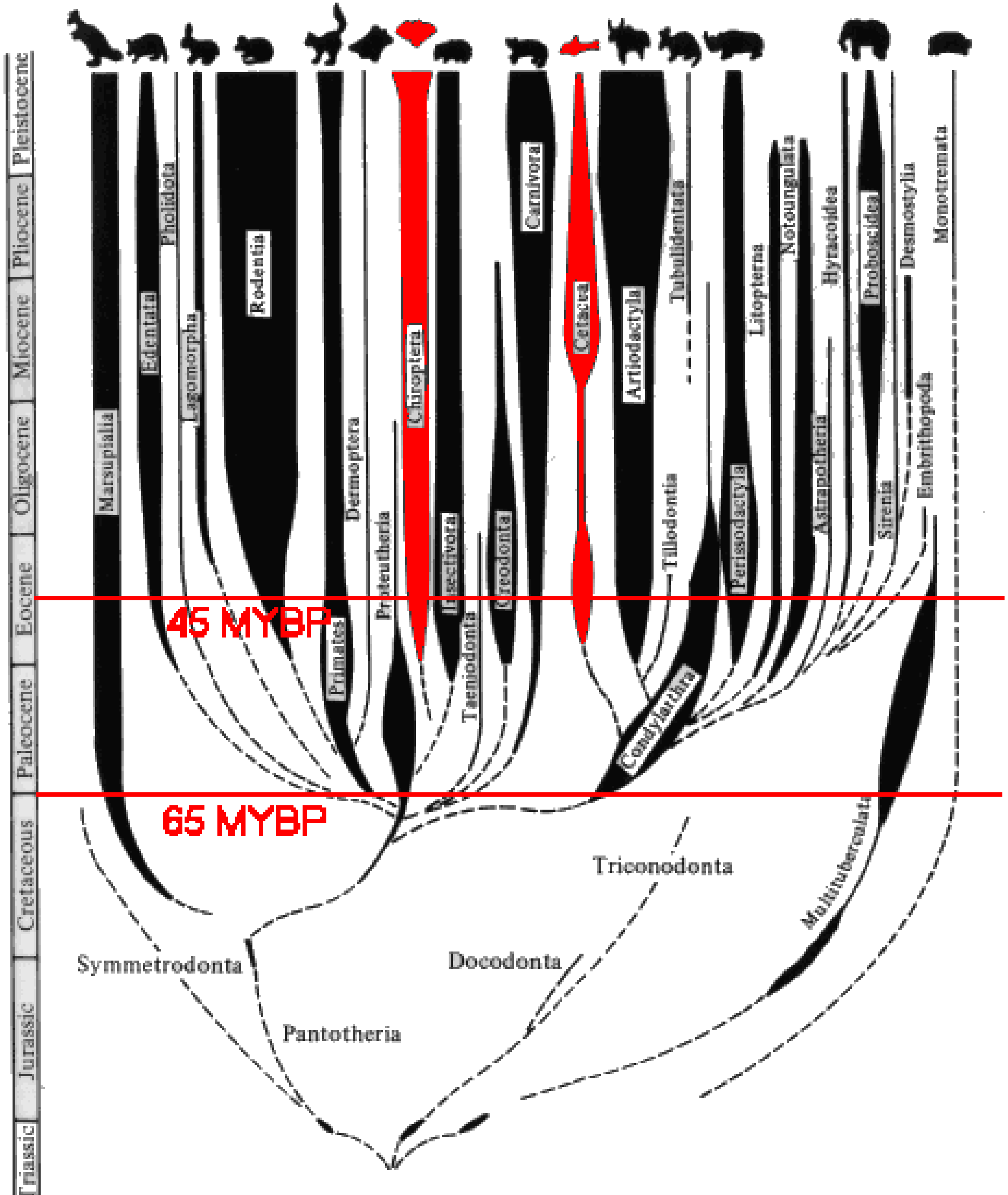
Hennig e Brundin são autores destacados dessa abordagem.





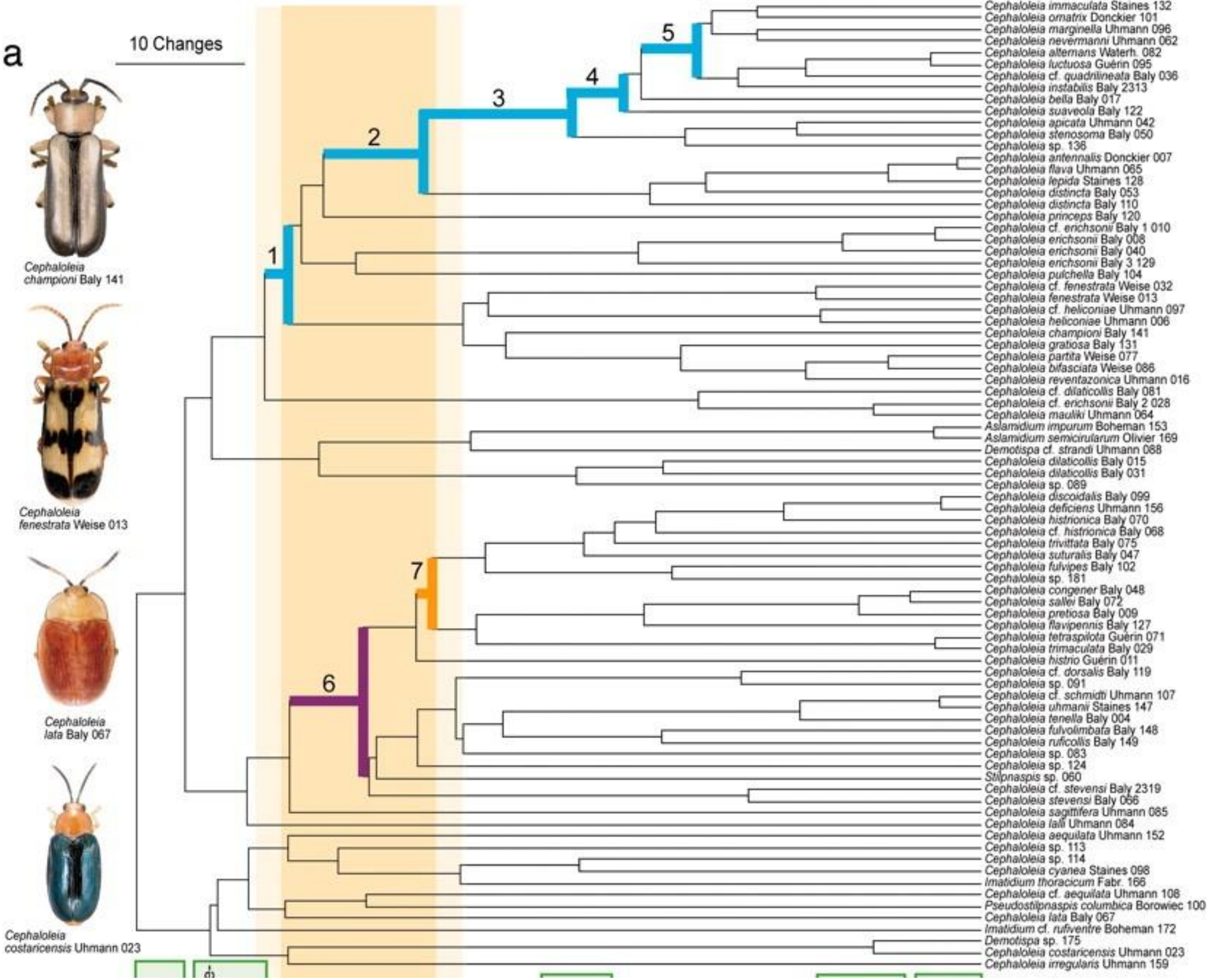
http://web.uconn.edu/gogarten/ToL.gif

http://www.personal.psu.edu/staff/d/r/drs18/bisciImages/

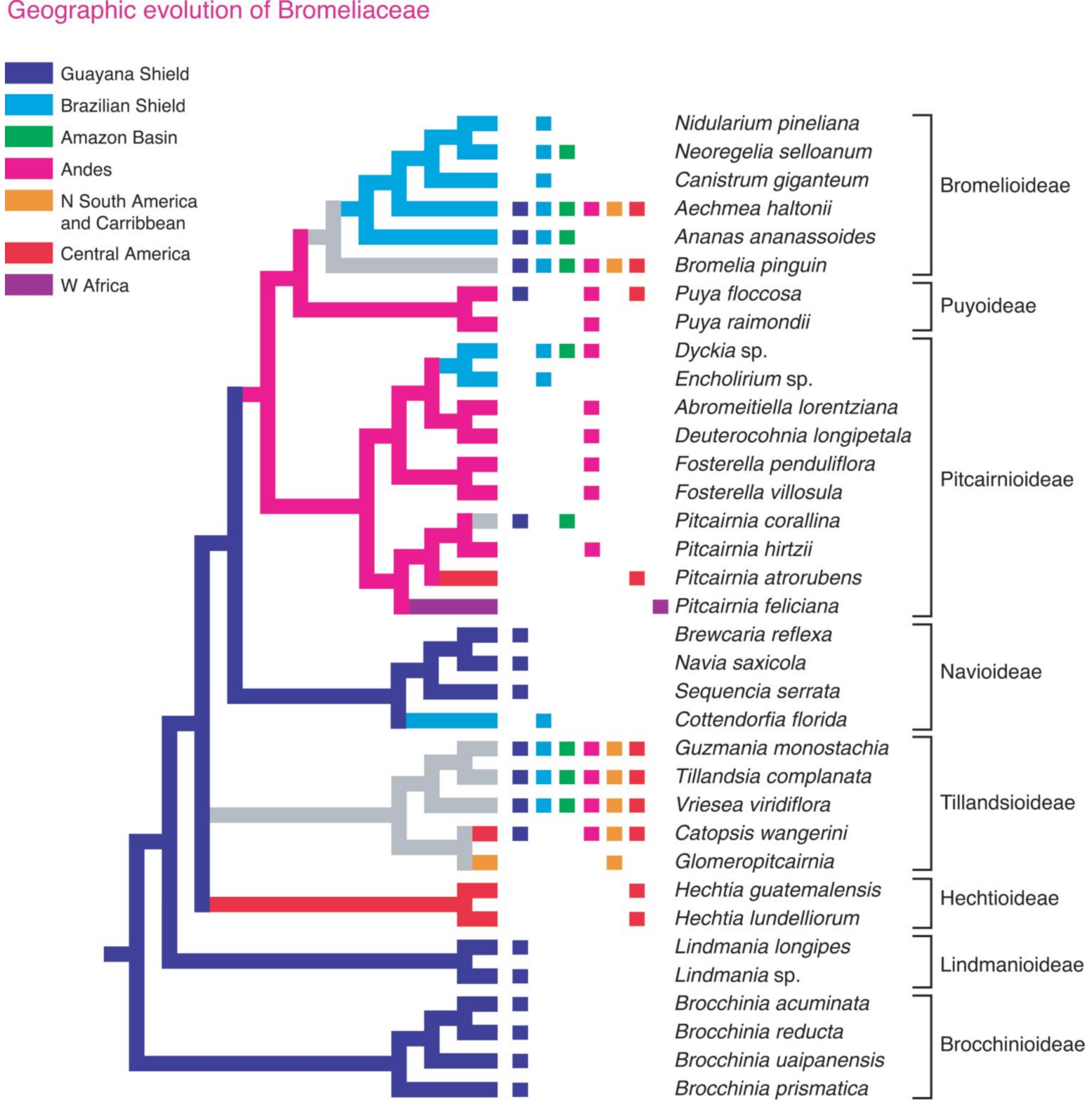


http://www.mun.ca/biology/scarr/

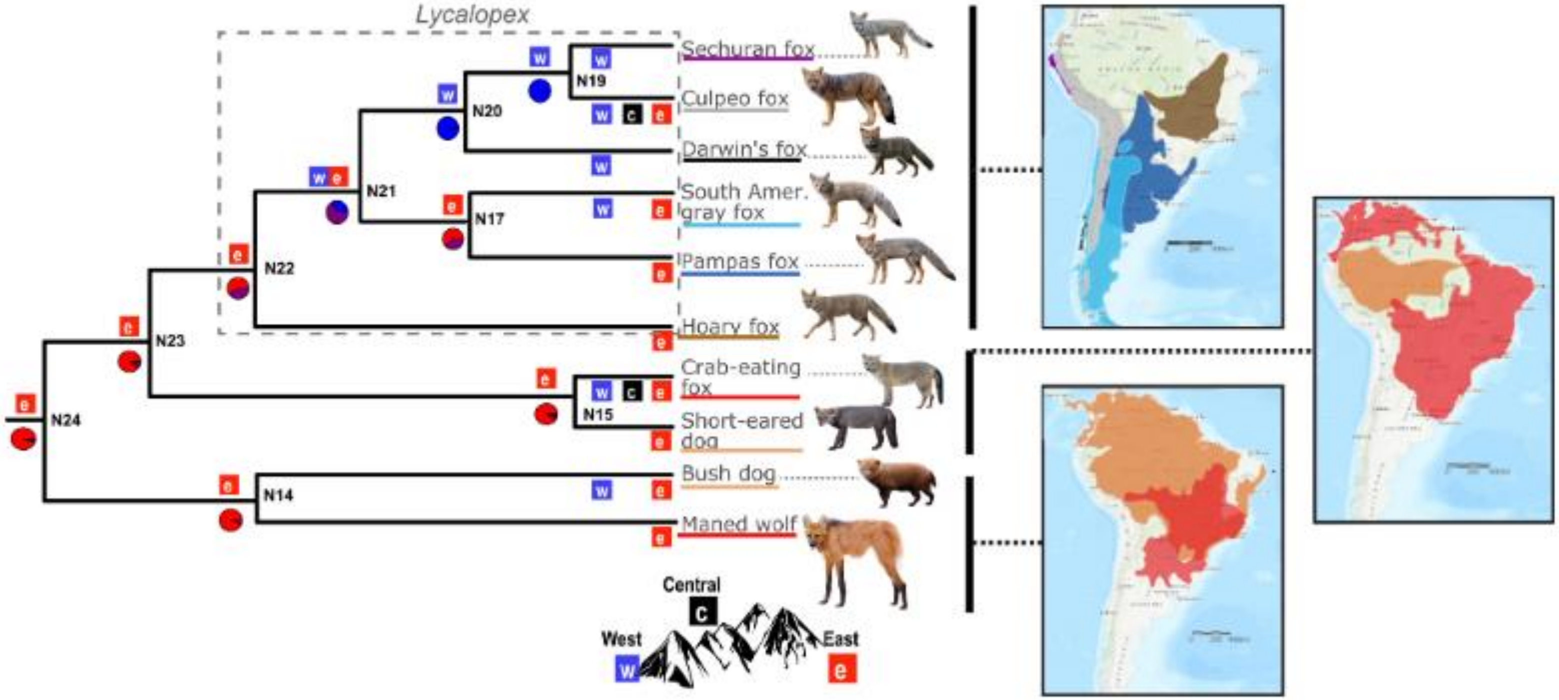
Mammal_Adaptive_radiation_2.gif



http://www.pnas.org/content/103/29/10947/F2.large.jpg



Aliso 23, pp. 3–26, 2007. Phylogeny, adaptive radiation, and historical biogeography of bromeliaceae inferred from *ndhF sequence data* . GIVNISH, et al.

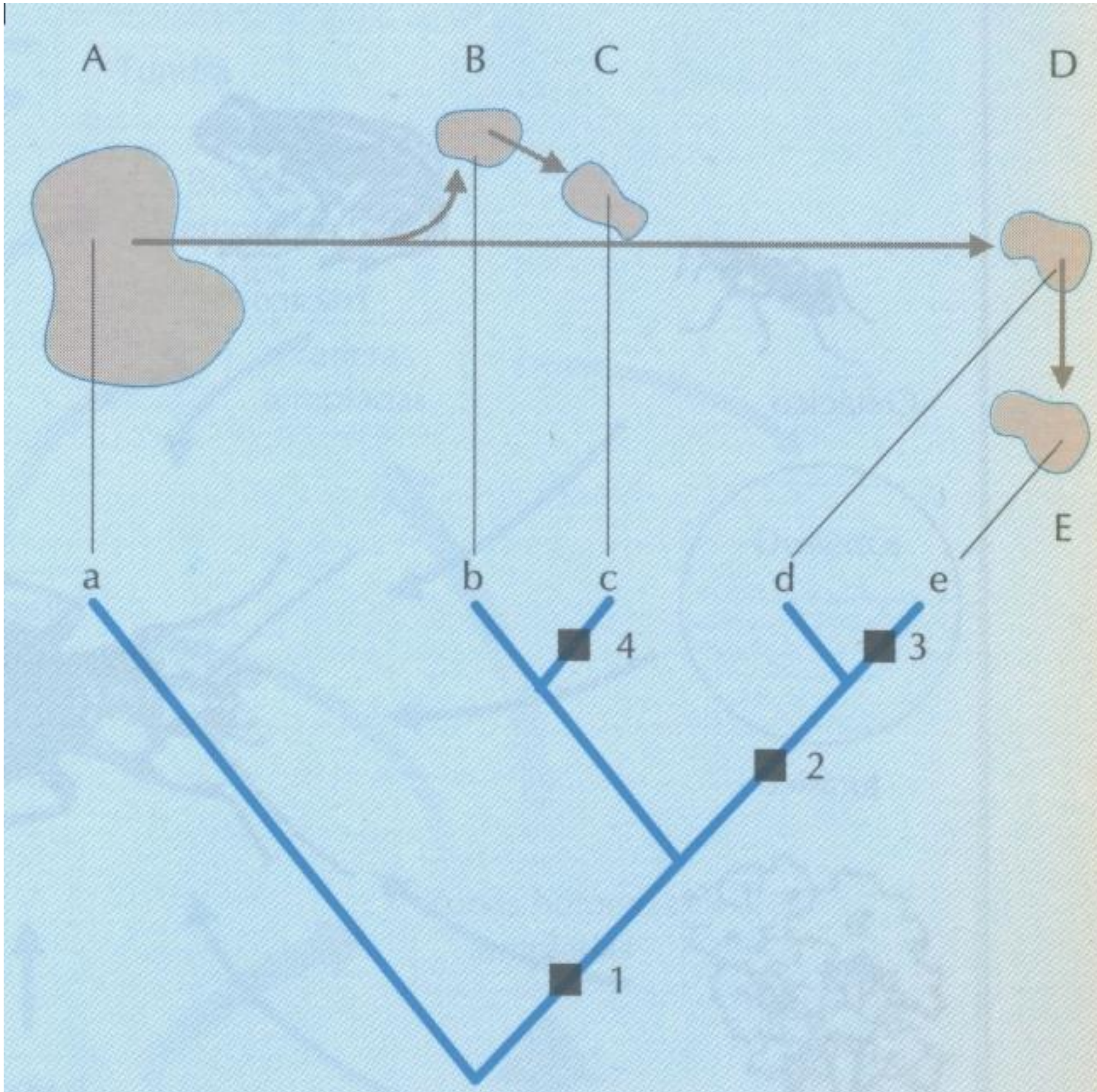


Species tree and ancestral area reconstruction of SA canids. The species tree was estimated by applying ASTRAL-III (45) to 6,716 genomic windows (25 kb each). A total of 31 genomes were included in the analysis (SI Appendix, Table S1), but only the clade containing SA canids is shown here (see complete tree in SI Appendix, Fig. S1). All nodes had 100% bootstrap support based on 100 replicates. The best-fitting BioGeoBEARS (46) model was DIVALIKE (dispersal vicariance) with the parameter "J" that represents a founder event (SI Appendix, Fig. S2 and Table S2). Colored boxes on each node indicate estimated ancestral ranges, while boxes at terminal branches indicate current species distribution ("e," east of the Andes; "c," central region of the Andes; and "w," west of the Andes). The probabilities of these ancestral regions are shown in the pie charts below each node. Purple-colored pie charts indicate a distribution on the west and east of the Andes. The maps on the Right represent the distribution of species within three major clades. The colored distributions on the map match the colors underlining species names. Canid illustrations from ref. 2 are used with permission from Princeton University Press.

Comparative genomics uncovers the evolutionary history, demography, and molecular adaptations of South American canids. https://doi.org/10.1073/pnas.220598611

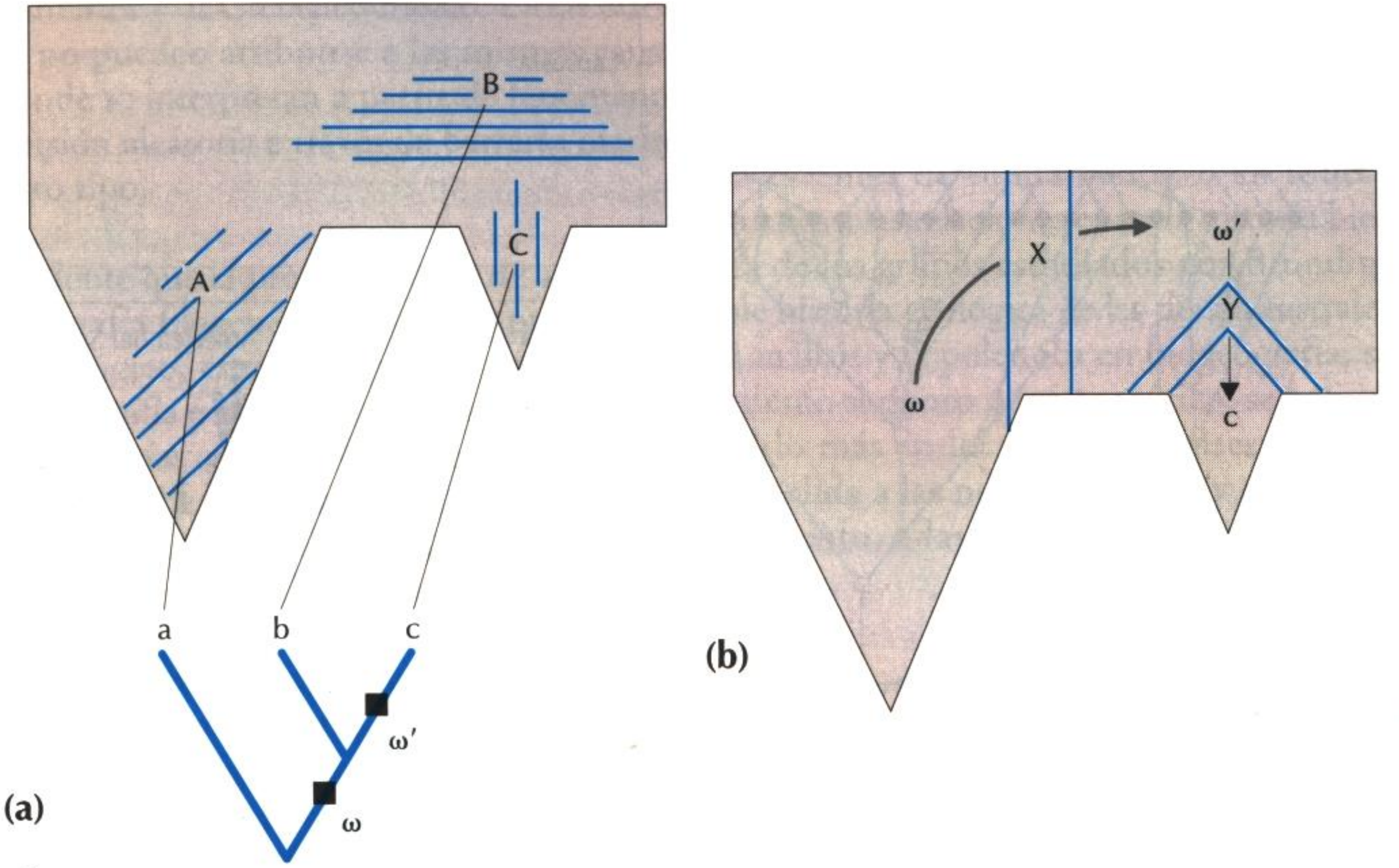
Os principais critérios da Biogeografia Filogenética são:

- Regra de progressão: um evento cladístico dicotômico origina duas espécies, das quais uma se separa menos e a outra mais em comparação com a condição da espécie ancestral. A área da espécie mais ancestral é aquela que tem relações mais estreitas com o centro de origem, que é a área de distribuição do ancestral exclusivo do táxon estudado;



Regra da progressão: os quadrados indicam os ramos filéticos; a área A é o centro de origem do grupo; as setas indicam eventos de vicariância e ou dispersão (Zunino & Zullini, 2003)

- Vicariância: é mais considerada do que a dispersão; as biotas únicas teriam se fragmentado e originado os grupos ou táxons aparentados e estudados;
- há certa correspondência entre o nível taxonômico de um grupo e sua idade relativa na história da evolução. Por exemplo, uma família ou uma tribo são mais antigas do que um gênero.



Exemplo biogeográfico filogenético: espécies *a*, *b* e *c* são vicariantes nas áreas atuais *A*, *B* e *C*; *w* e *w'* são os ancestrais; *X* e *Y* são barreiras geográficas (Zunino & Zullini, 2003).

1913-1976

http://www.cladistics.org/

FAPESP
FUNDAÇÃO DE AMPARO À PESQUISA DO ESTADO DE SÃO PAULO

Índice

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English version

International Symposium on Phylogeography (November 8 and 9, 2010)

O simpósio tem o objetivo de discutir os avanços e desafios na área da Filogeografia bem como demonstrar e promover a Filogeografia como área de interface com outras áreas do conhecimento, no contexto dos estudos em biodiversidade. A reunião possibilitará a interação entre pesquisadores interessados nesta área, integrando os grupos de pesquisa brasileiros na comunidade internacional e servindo de plataforma para discutir questões relevantes para a pesquisa filogeográfica brasileira.

Data: 8 e 9 de novembro de 2010
Horário: das 8h30 às 18h15

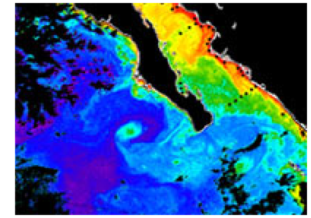
Local:
Auditório da FEA 5 – USP
Faculdade de Economia e Administração - USP
Av. Prof. Luciano Gualberto, 908

Estacionamento:
Bolsão da FEA

https://fapesp.br/5906/international-symposium-on-phylogeography-november-8-and-9-2010

Desafios da filogeografia

09 de novembro de 2010



Em simpósio internacional do Biota-FAPESP, cientista aponta os principais desafios na área de filogeografia, que combina biologia e geociência. Levantamento indica poucos trabalhos justamente sobre as regiões de maior biodiversidade

Por Fábio de Castro

Agência FAPESP – "As publicações na área de filogeografia vêm crescendo de forma exponencial, graças à gradual integração entre biólogos e geocientistas, às novas tecnologias de DNA e aos novos métodos estatísticos disponíveis", disse Luciano Beheregaray, professor das universidades Flinders e Macquarie, da Austrália.

A filogeografia combina biologia e geociência, estudando os processos históricos que podem ser responsáveis pela distribuição geográfica contemporânea de uma espécie.

Segundo Beheregaray, enquanto a maioria esmagadora da produção científica na área vem do hemisfério Norte, a contribuição dos países que concentram a maior parte da biodiversidade do planeta ainda é muito pequena. "Essa distorção dificulta a síntese comparativa da informação produzida globalmente, que é um dos desafios centrais da filogeografia", disse nesta segunda-feira (8/11), durante o Simpósio Internacional sobre Filogeografia, organizado pelo Programa Biota-FAPESP.

Para reverter esse cenário, segundo o cientista brasileiro radicado na Austrália, é preciso que os países desenvolvidos invistam na pesquisa filogeográfica em países megadiversos, como o próprio Brasil.

"A filogeografia vem crescendo muito, mas os estudos ainda estão muito concentrados nos ambientes terrestres e nos países desenvolvidos. Seria importante investir em trabalhos em áreas de grande biodiversidade, onde há grandes lacunas de informação. Isso permitiria avanços científicos globais", disse Beheregaray à **Agência FAPESP**.

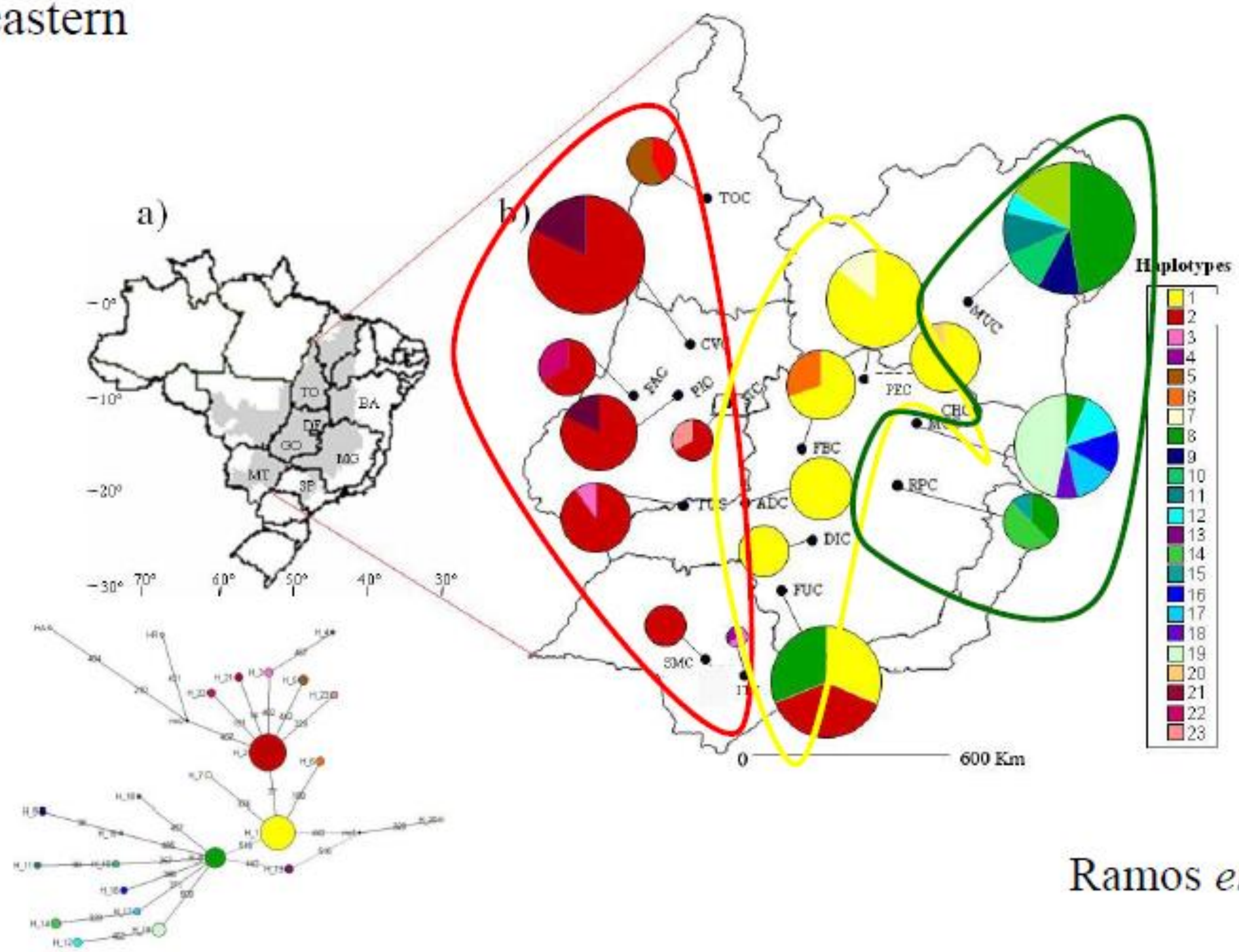
Segundo ele, no contexto brasileiro o Estado de São Paulo tem se destacado nos estudos na área. "Mas há uma escassez de trabalhos no resto do país. Seria preciso fazer em todo o Brasil o que a FAPESP faz em São Paulo. Acredito que, para que isso seja feito em um nível satisfatório, será preciso ter recursos do exterior", disse.

No contexto mundial, segundo Beheregaray, para que a pesquisa avance ainda mais, é preciso que os filogeógrafos deixem de lidar

https://agencia.fapesp.br/desafios-da-filogeografia/13014/

Hymenaea stigonocarpa – Jatobá do Cerrado

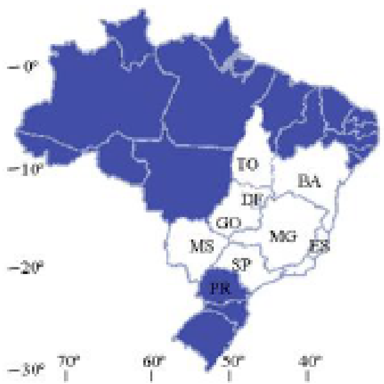
3 phylogeographic groups (SAMOVA, Barrier): west, central and eastern

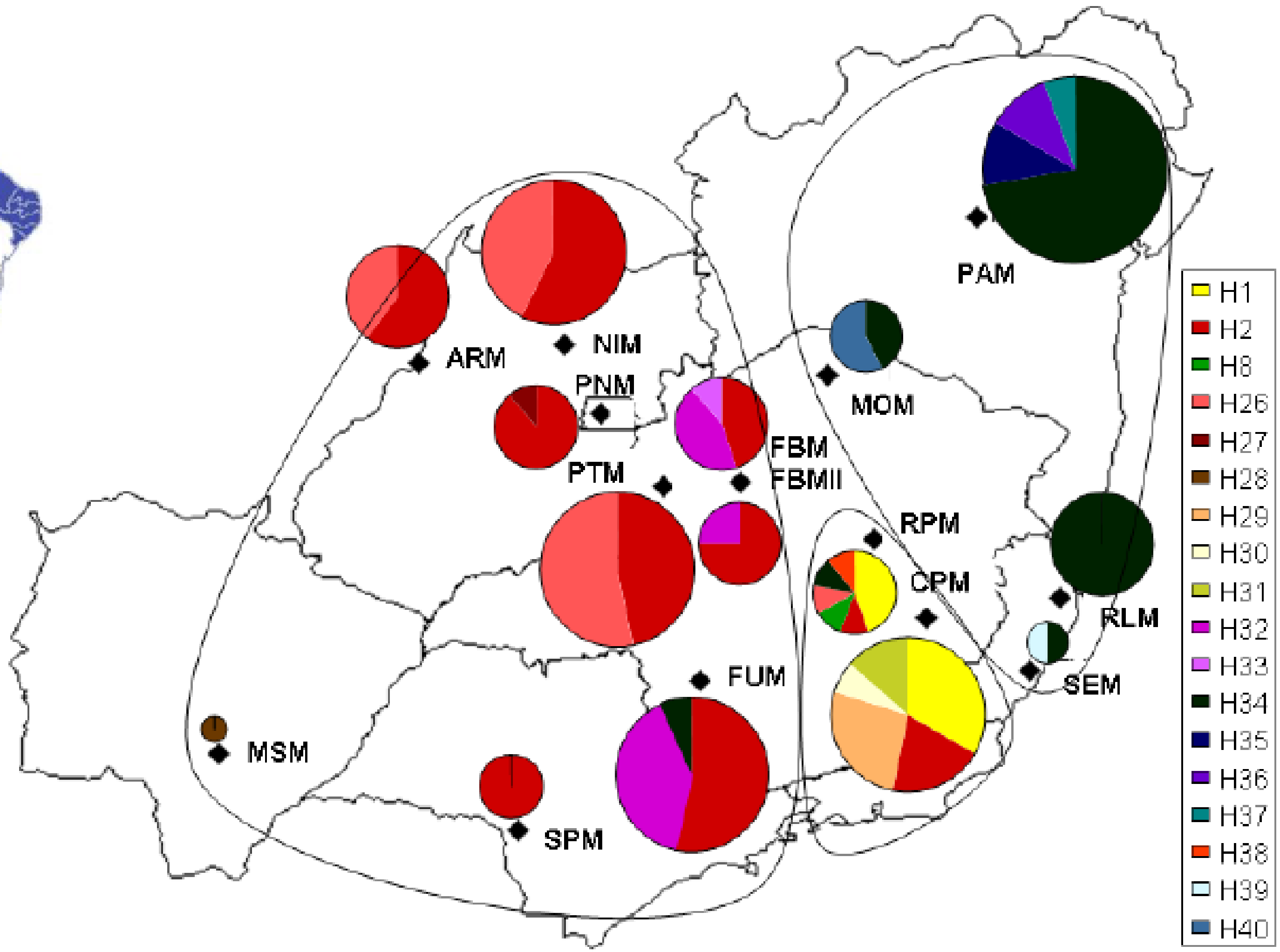


Ramos *et al.*, 2007

Hymenaea courbaril – Jatobá da Mata

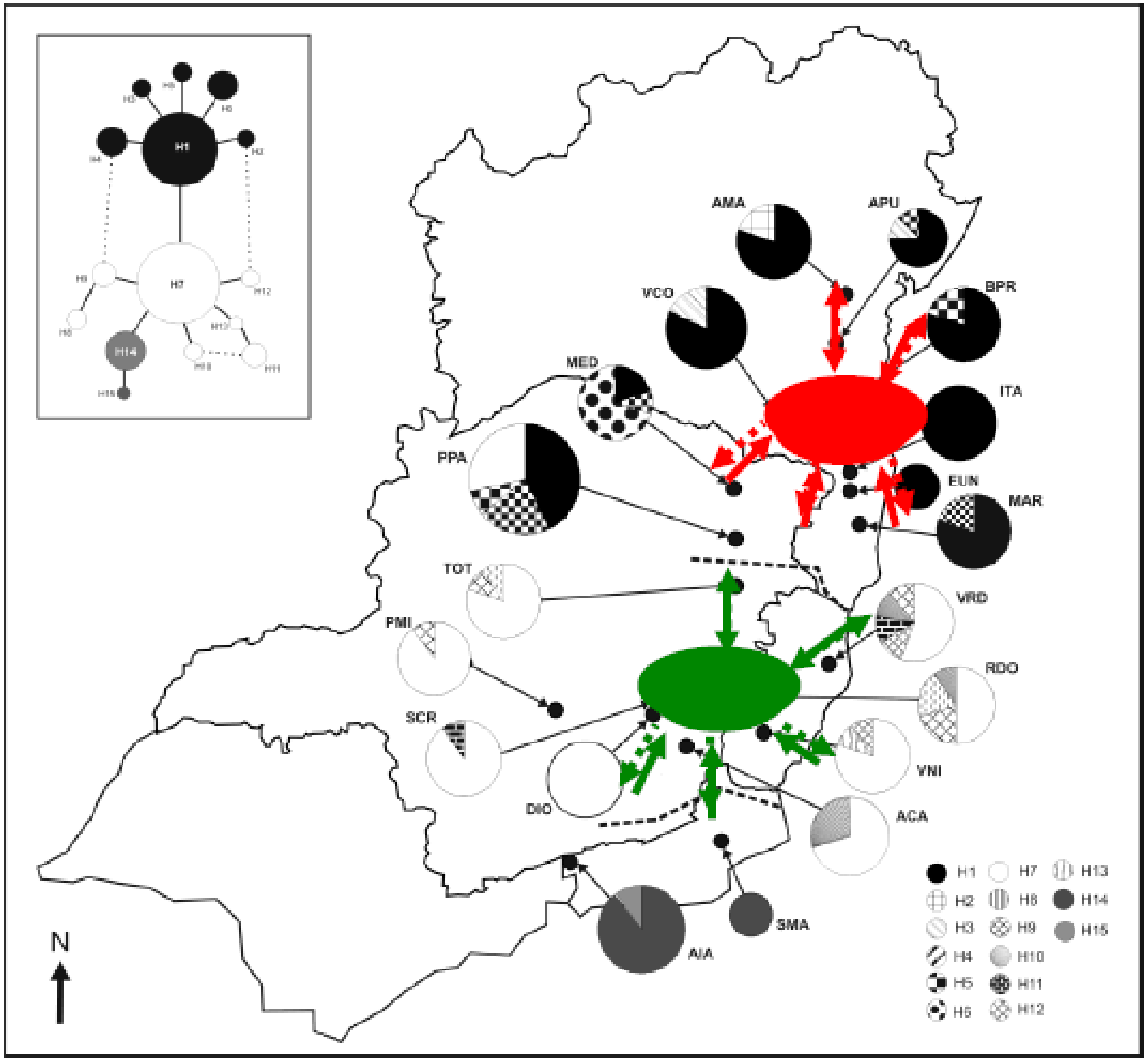
- 15 populações
- cpDNA (*psbC-trnS*)
- 18 haplotypes





Ramos *et al*., 2009

Dalbergia nigra – Jacarandá da Bahia



Cycles of forest expansion and contraction

↓

Repeated vicariance events

↓

Genetic differentiation of the three phylogeographic groups

Ribeiro *et al.*, 2010

Genetic disjunction in the split region between SG1 e SG2 groups of *D. nigra* (~21ºS):

Caesalpinia echinata – Pau-Brasil

The divergence time was not estimated

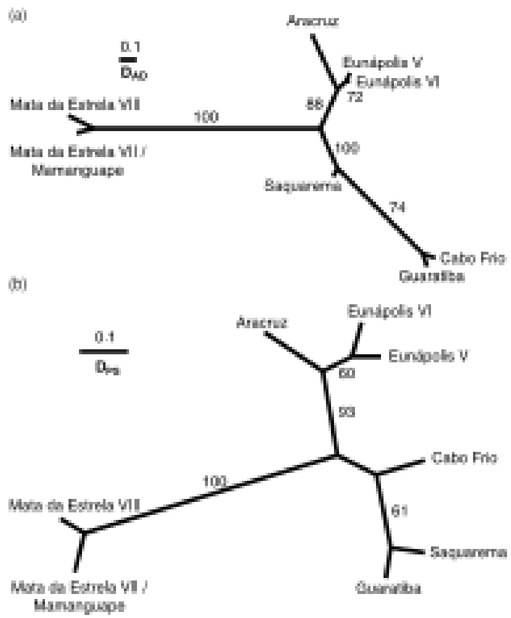
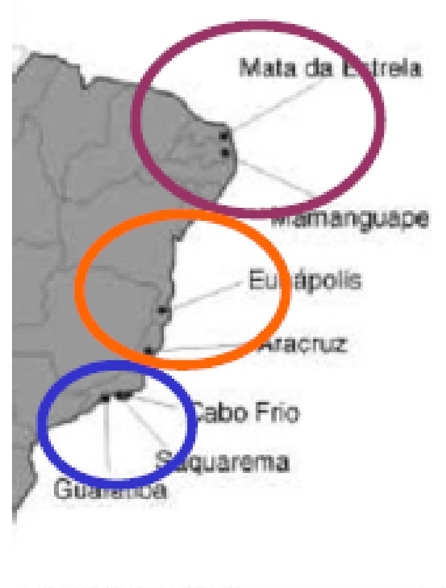
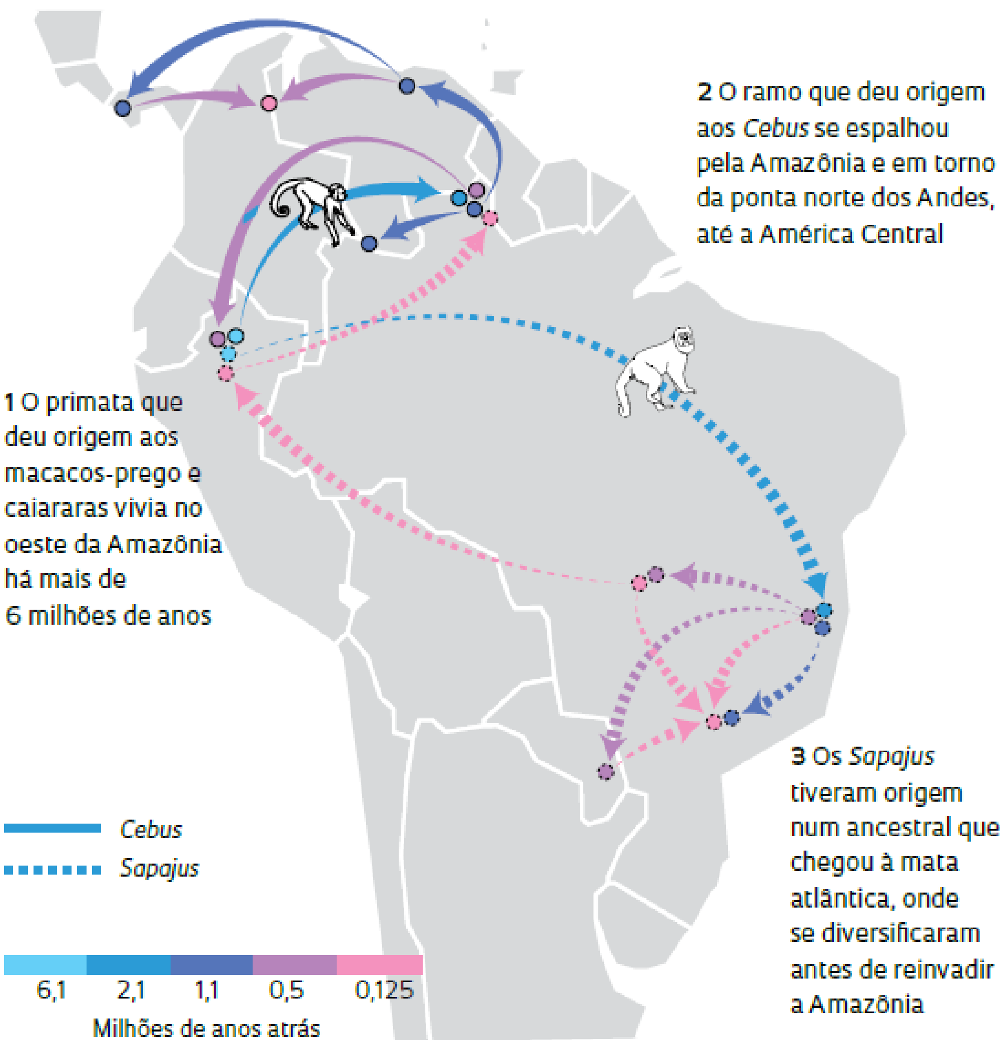
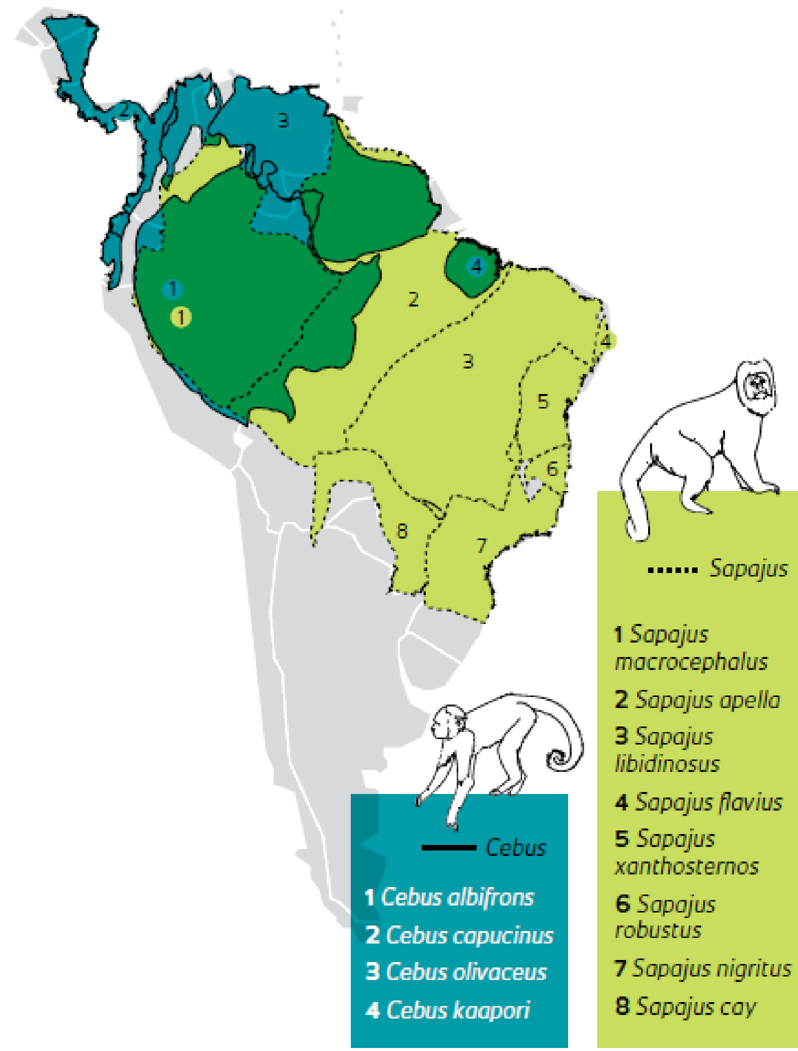


Fig. 2 Neighbour-joining trees showing relationships between populations: (a) tree based on D_{AD} metric; (b) tree based on D_{PS} metric. Roman numerals refer to haplotypes where a population displayed more than one haplotype.

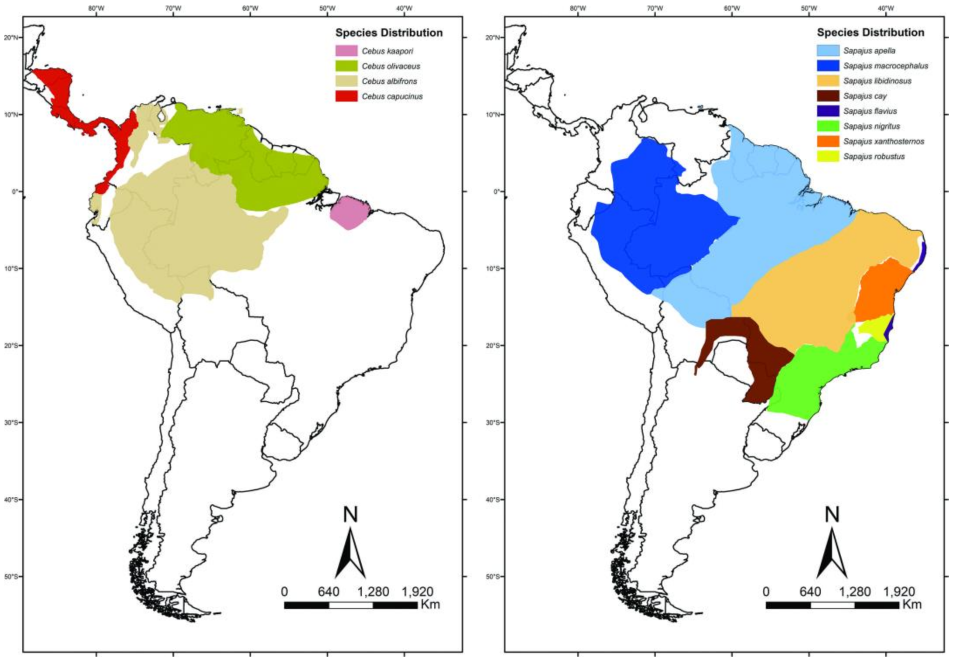


Lira *et al.*, 2003





http://revistapesquisa.fapesp.br/2012/06/14/ramificacoes-ancestrais/



Phylogenetic relationships among Capuchin (Cebidae, Platyrrhini) lineages: An old event of sympatry explains the current distribution of Cebus and Sapajus

https://www.scielo.br/scielo.php?script=sci_arttext&pid=S1415-47572018000400699

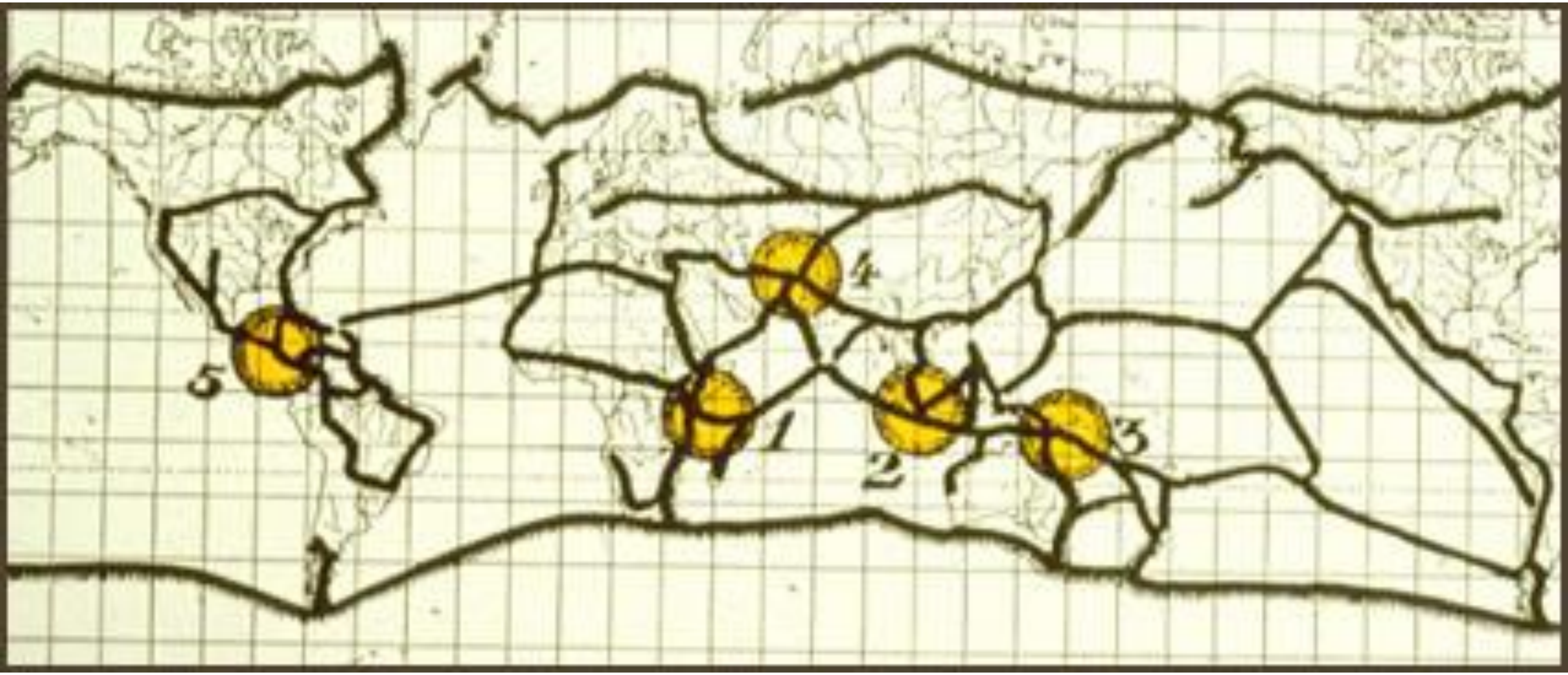
Panbiogeografia

Entende que as expressões da diversidade dos seres vivos são resultado de três aspectos inseparáveis – espaço, tempo e forma – de um processo único histórico, passado e atual.

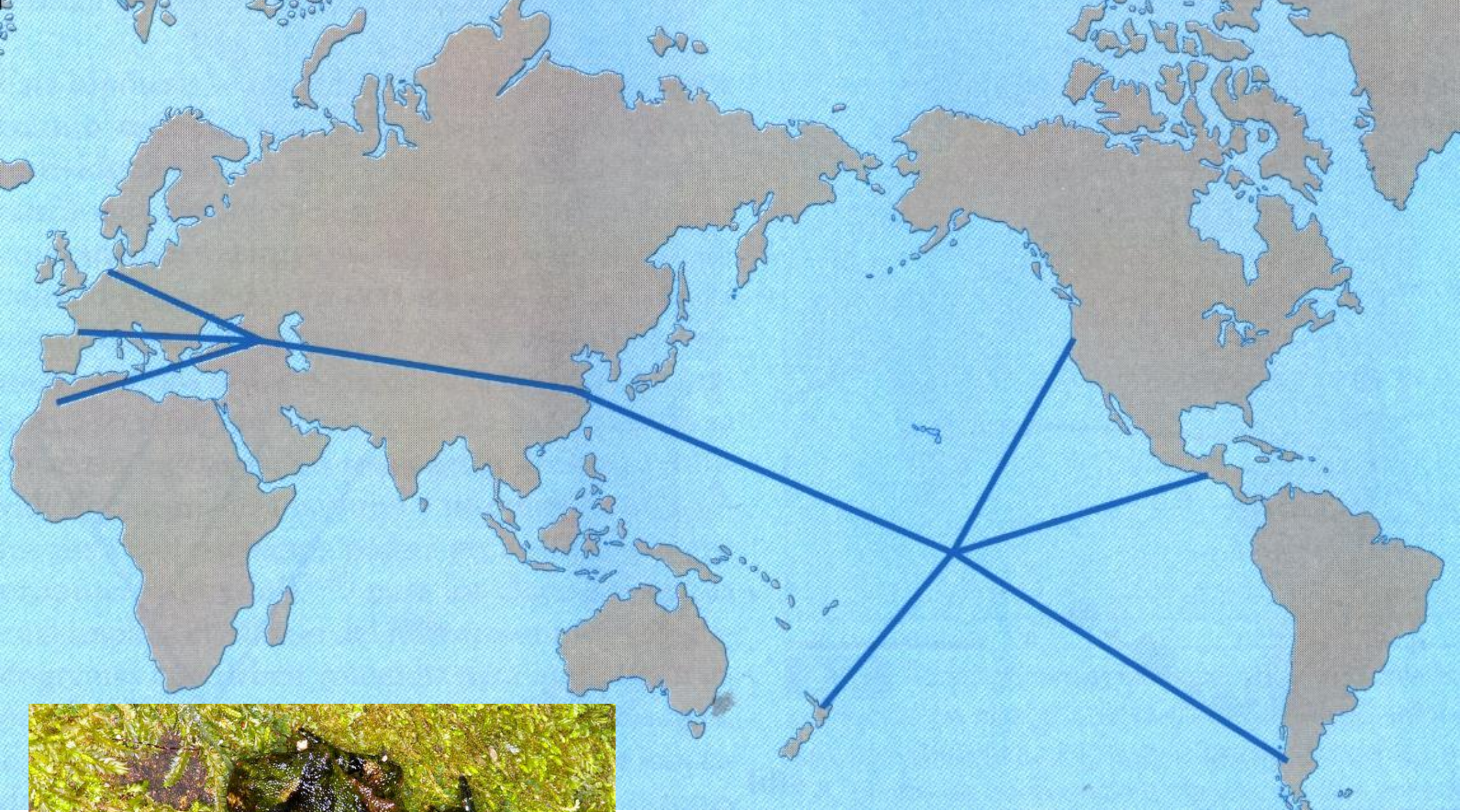
Considera que dois seres vivos pertencem a uma mesma espécie se podem intercambiar suas informações genéticas e se compartilham o mesmo espaço e o mesmo tempo.

Croizat entendia que a Panbiogeografia não é uma teoria, é um conjunto de hipóteses do qual possivelmente se retiram conclusões que dependem intimamente dela; é um método.

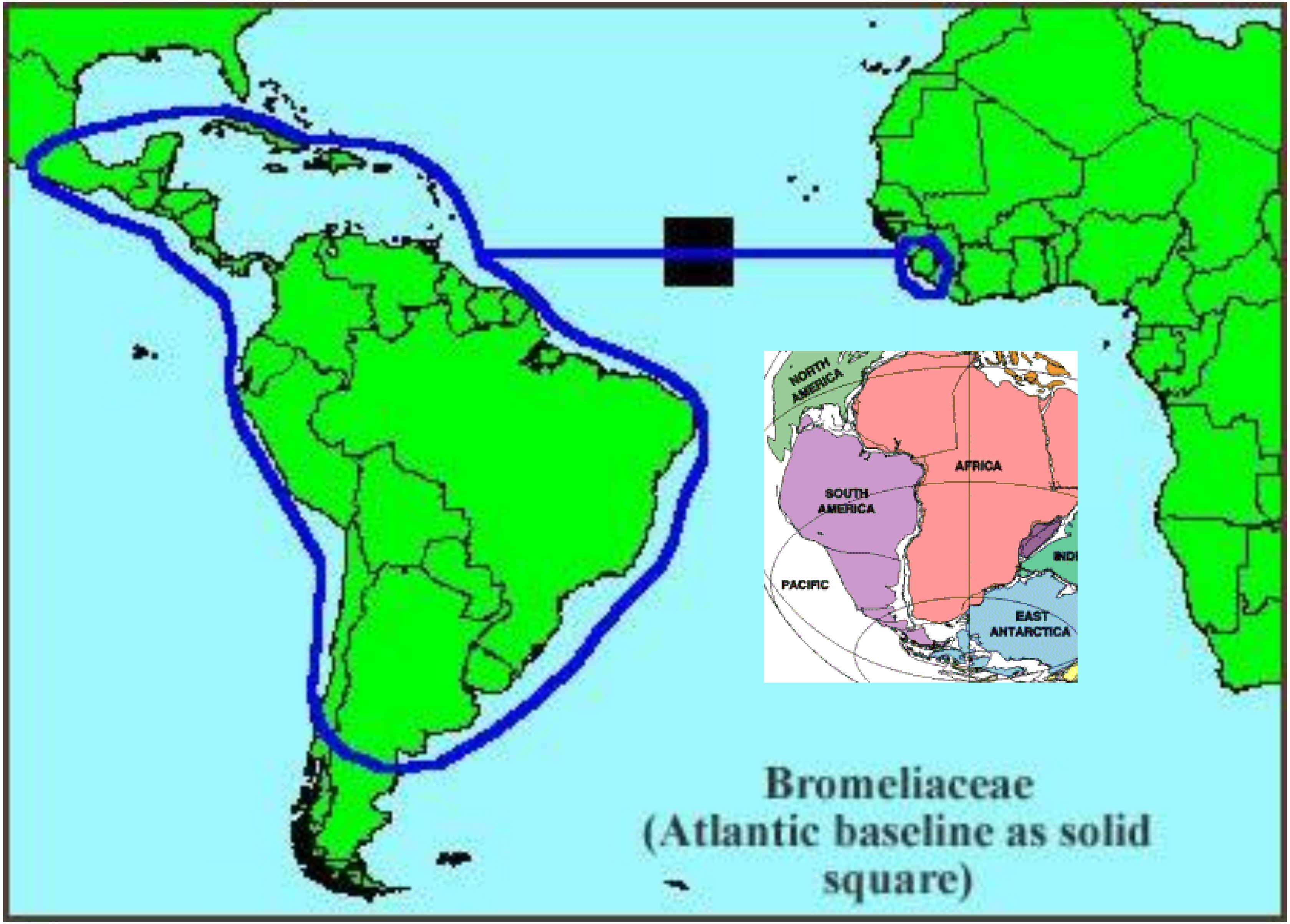
Baseada nos princípios de Croizat, também são autores destacados Nelson, Rosen, Craw, Grehan, Page e Heads.



Traços gerais mundiais e nós de intersecção (Croizat, 1958)



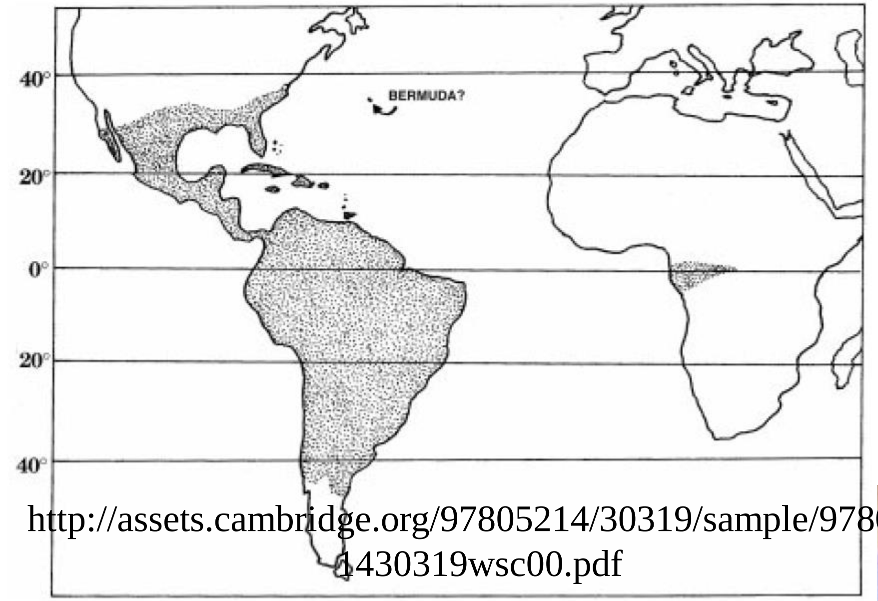
Traçado individual do gênero de anfíbio *Leiopelma* (Zunino & Zullini, 2003)



Traço geral de Bromeliaceae

(http://www.sciencebuff.org/panbiogeography_methods.php)

A família Bromeliaceae (bromélias) é endêmica do Novo Mundo, exceto um gênero africano (*Pitcairnia*).



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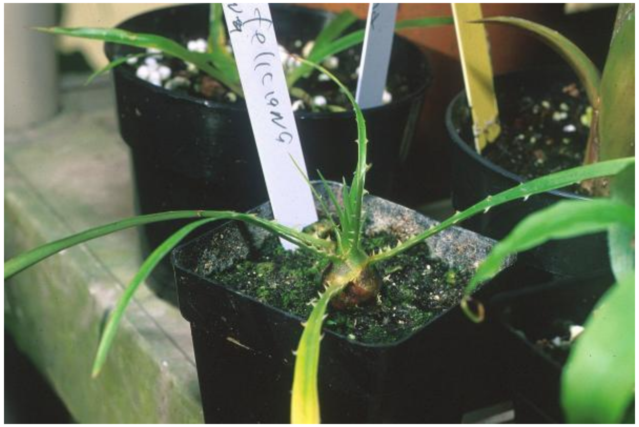
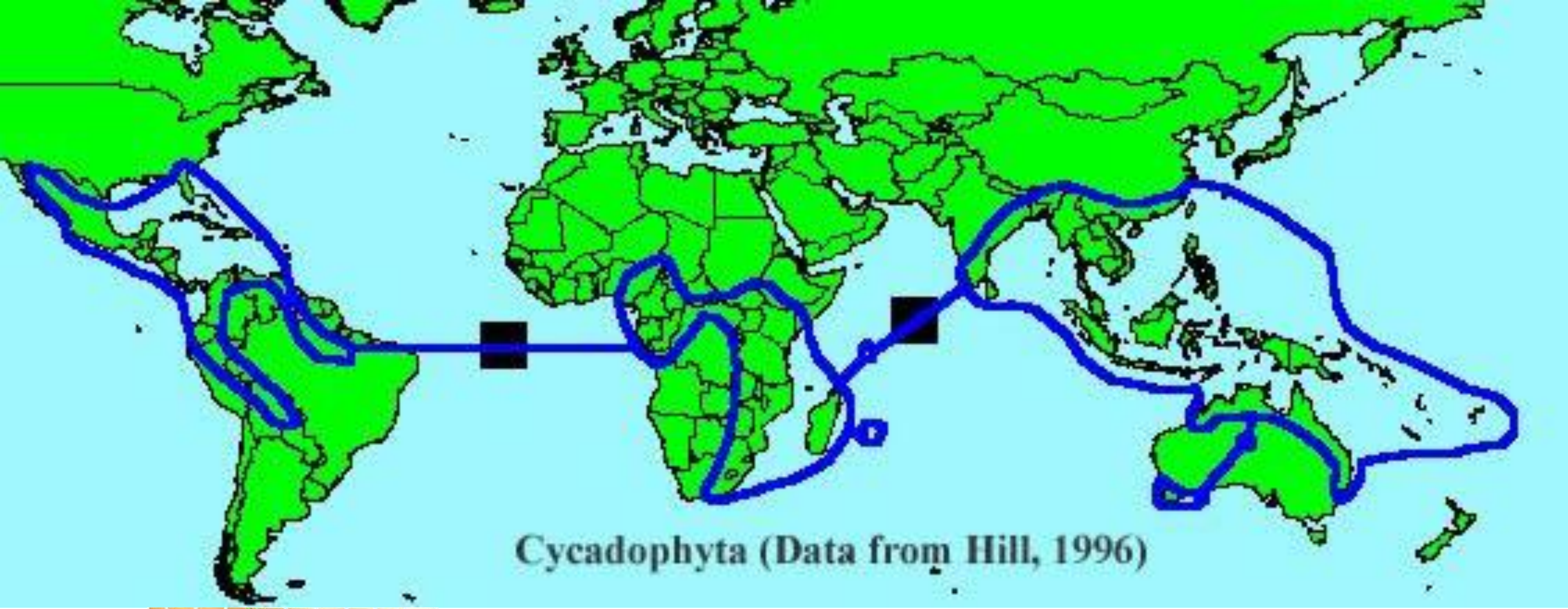
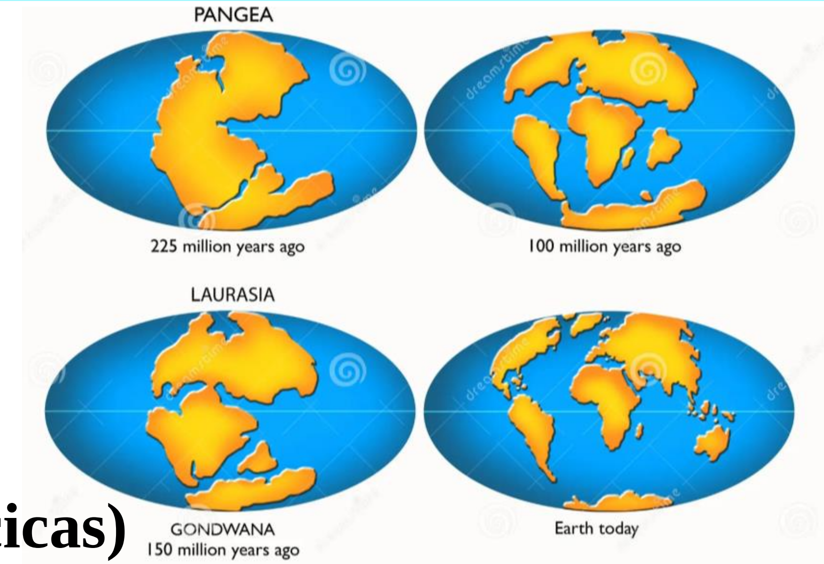






Traço geral da Divisão Cycadophyta (cicas) http://www.sciencebuff.org/panbiogeography_methods.php)

Journal of Biogeography (*J. Biogeogr.*) (2009) **36**, 1739–1749

ORIGINAL ARTICLE

Influence of large South American rivers of the Plata Basin on distributional patterns of tropical snakes: a panbiogeographical analysis

Vanesa Arzamendia* and Alejandro R. Giraudo

Instituto Nacional de Limnología (CONICET, UNL), Paraje El Pozo s/n, Ciudad Universitaria, Santa Fe, Argentina. Facultad de Humanidades y Ciencias (UNL), Santa Fe, Argentina

ABSTRACT

Aim The main drainages of the Plata Basin – the Paraná, Paraguay and Uruguay rivers – begin in tropical latitudes and run in a north–south direction into subtropical–temperate latitudes. Consequently, the biota of these rivers has tropical elements that contrast with temperate biomes through which the rivers run. We apply a panbiogeographical approach, to test whether the large rivers of the Plata Basin have a differential influence on distributional patterns of tropical snakes in subtropical and temperate latitudes of South America.

Location Subtropical and temperate sections of the major Plata Basin rivers, South America.

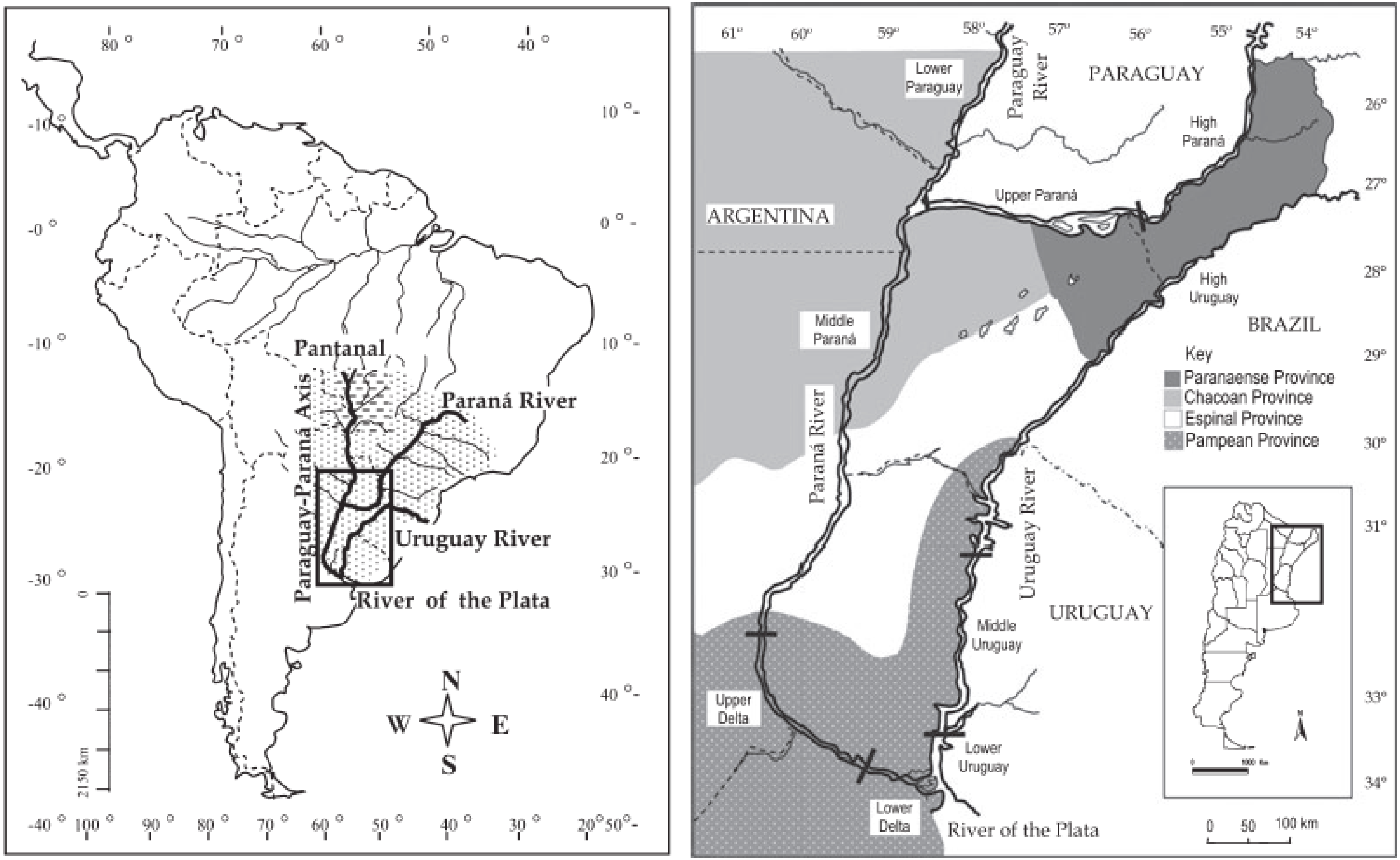


Figure 1 Location of the Plata Basin in South America (left) and of the subtropical–temperate region (right). The river sections considered and the phytogeographic provinces covering the study area are indicated.

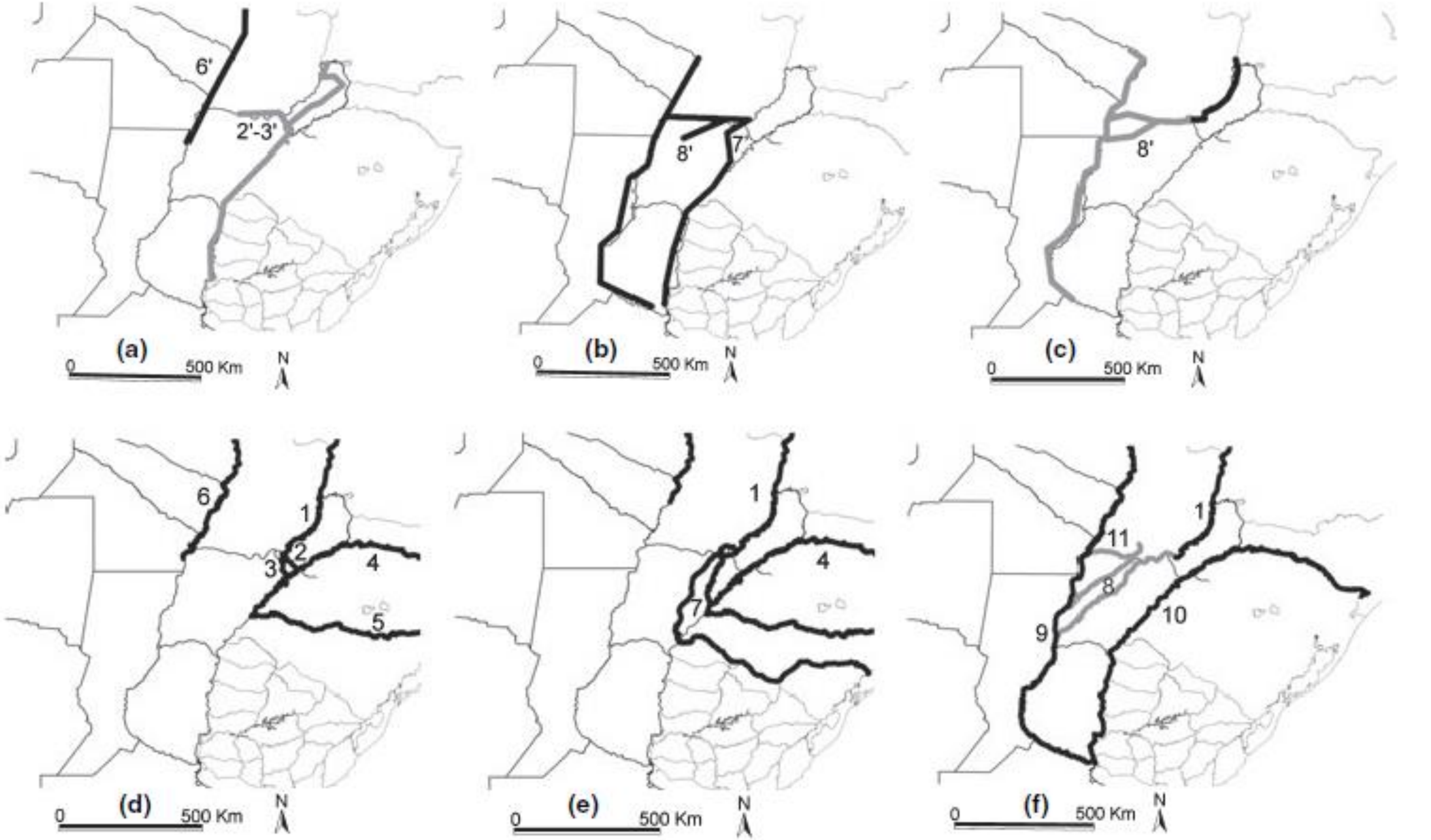


Figure 4 Generalized tracks obtained (panels a–c) and palaeochannels of the rivers (panels d–f). (a) Generalized tracks 1 (black) and 4 (grey), (b) generalized track 3, and (c) generalized tracks 2 (grey) and 5 (black). (d) Connection of the High Paraná (1) through Garupá–Tunas (2) and Pindapoy–Chimiray (3) streams to High Uruguay (4) draining to the sea by the Ibicuy River (5); the Paraguay River (6) was a tributary of the Amazon Basin. (e) Connection of the High Paraná (1) through Aguapey and Miriñay (7) streams to the Uruguay River towards the sea in the south-east of Brazil. (f) Connection of the High Paraná (1), for the Iberá–Carambola–río Corriente and Santa Lucía (8) basins, draining in the Middle Paraná–Paraguay fluvial axis (9). The High Paraná (1) reaches the Yabebiry River (11), where it takes the present Upper Paraná channel. The Uruguay River (10) is in its present position. Notice the coincidence between sections of the generalized tracks and some palaeochannels of rivers (2'–3' above with 2–3 below, 6' with 6, 7' with 7, 8' with 8).

Diversity and Distributions, (Diversity Distrib.) (2007) **13**, 818–828

BIODIVERSITY RESEARCH

Classification, diversity, and distribution of Chilean Asteraceae: implications for biogeography and conservation

Andrés Moreira-Muñoz[1] and Mélica Muñoz-Schick[2]*

[1]*Geographical Institute, University Erlangen-Nürnberg, Kochstr. 4/4, 91054 Erlangen, Germany,* [2]*Museo Nacional de Historia Natural, Casilla 787, Santiago, Chile*

*Correspondence: Mélica Muñoz-Schick, Museo Nacional de Historia Natural, Casilla 787, Santiago, Chile. E-mail: mmunoz@mnhn.cl

ABSTRACT

This paper provides a synopsis of the Chilean Asteraceae genera according to the most recent classification. Asteraceae is the richest family within the native Chilean flora, with a total of 121 genera and *c.* 863 species, currently classified in 18 tribes. The genera are distributed along the whole latitudinal gradient in Chile, with a centre of richness at 33°–34° S. Almost one-third of the genera show small to medium-small ranges of distribution, while two-thirds have medium-large to large latitudinal ranges of distribution. Of the 115 mainland genera, 46% have their main distribution in the central Mediterranean zone between 27°–37° S. Also of the mainland genera, 53% occupy both coastal and Andean environments, while 33% can be considered as strictly Andean and 20% as strictly coastal genera. The biogeographical analysis of relationships allows the distinction of several floristic elements and generalized tracks: the most marked floristic element is the Neotropical, followed by the anti-tropical and the endemic element. The biogeographical analysis provides important insights into the origin and evolution of the Chilean Asteraceae flora. The presence of many localized and endemic taxa has direct conservation implications.

Keywords

Compositae, phylogeny, phytogeography, panbiogeography, synopsis Chilean flora, floristic elements, generalized tracks.

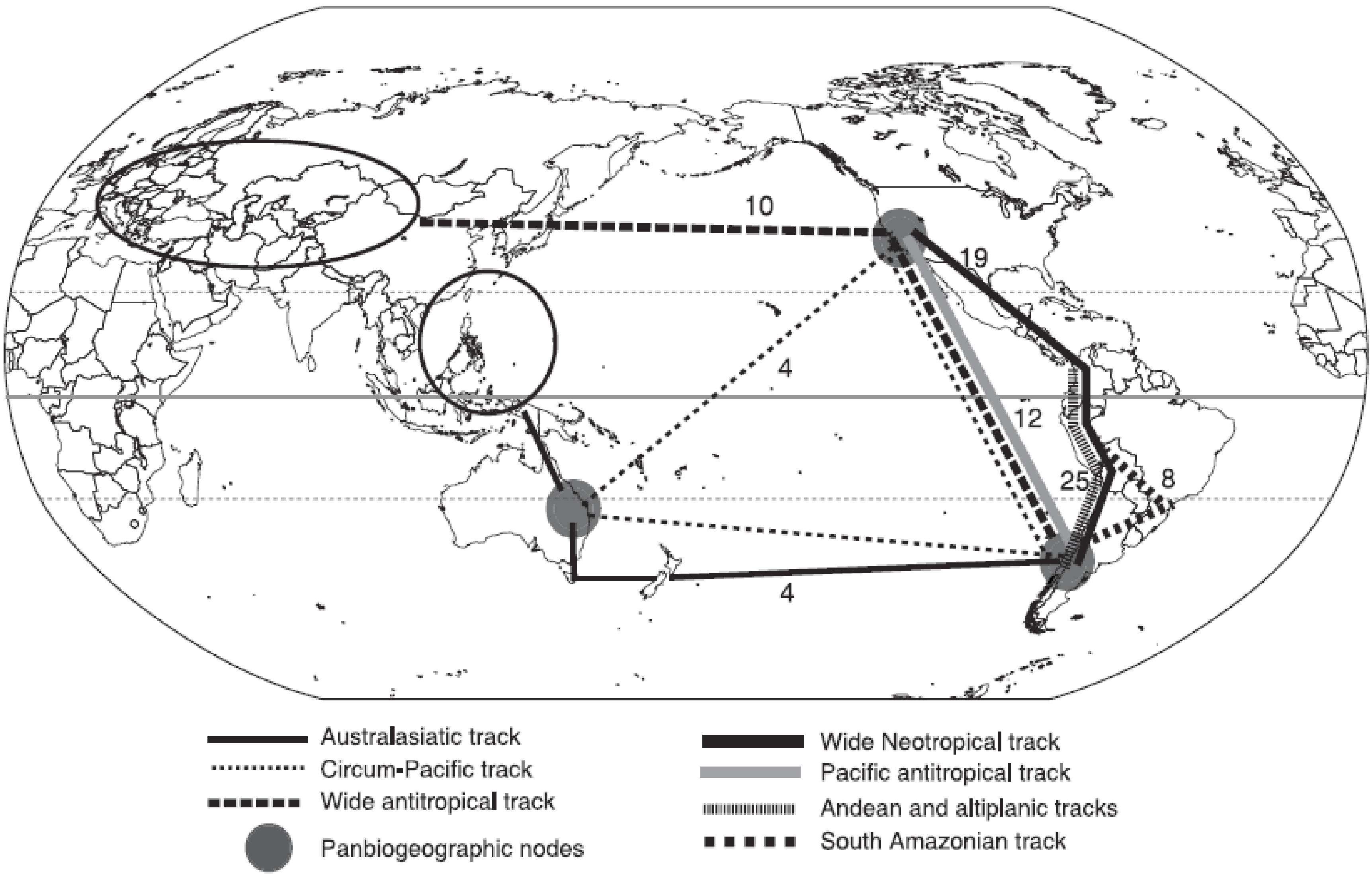


Figure 3 Generalized tracks of the Chilean Asteraceae. Possible panbiogeographical nodes (*sensu* Heads, 2004) in grey circles.

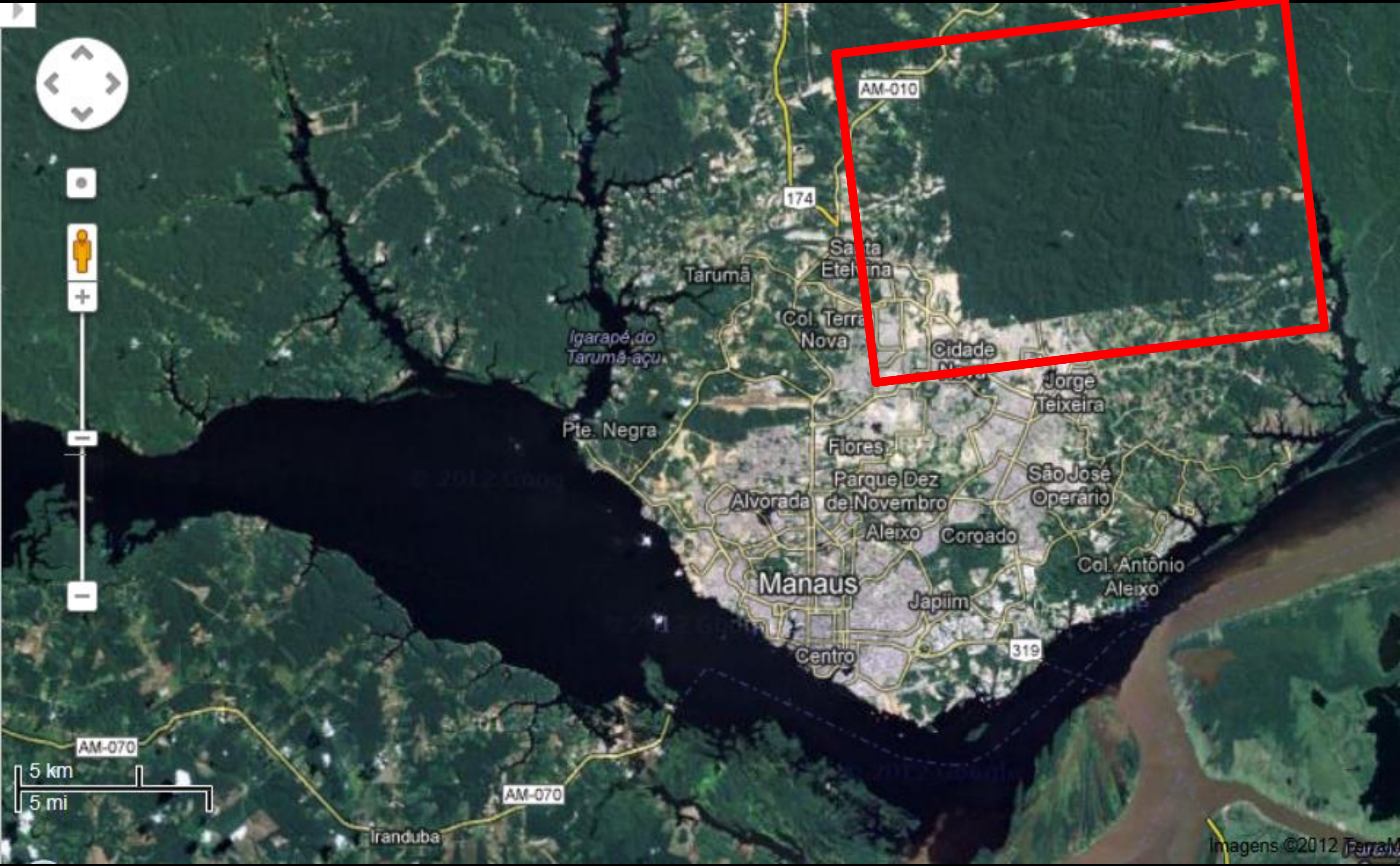
https://youtu.be/Aa9JzvoMhdw

Biogeografia Insular

É a parte da Biogeografia que estuda os seres vivos que vivem em ilhas ou em áreas que apresentam alguma "insularidade" ou isolamento.

Os continentes, cumes de montanhas, florestas rodeadas de campo ou por outro uso de solo (urbanização), populações homogêneas de determinada espécie, lagos, etc., também podem ser consideradas ilhas por esse aspecto de isolamento.

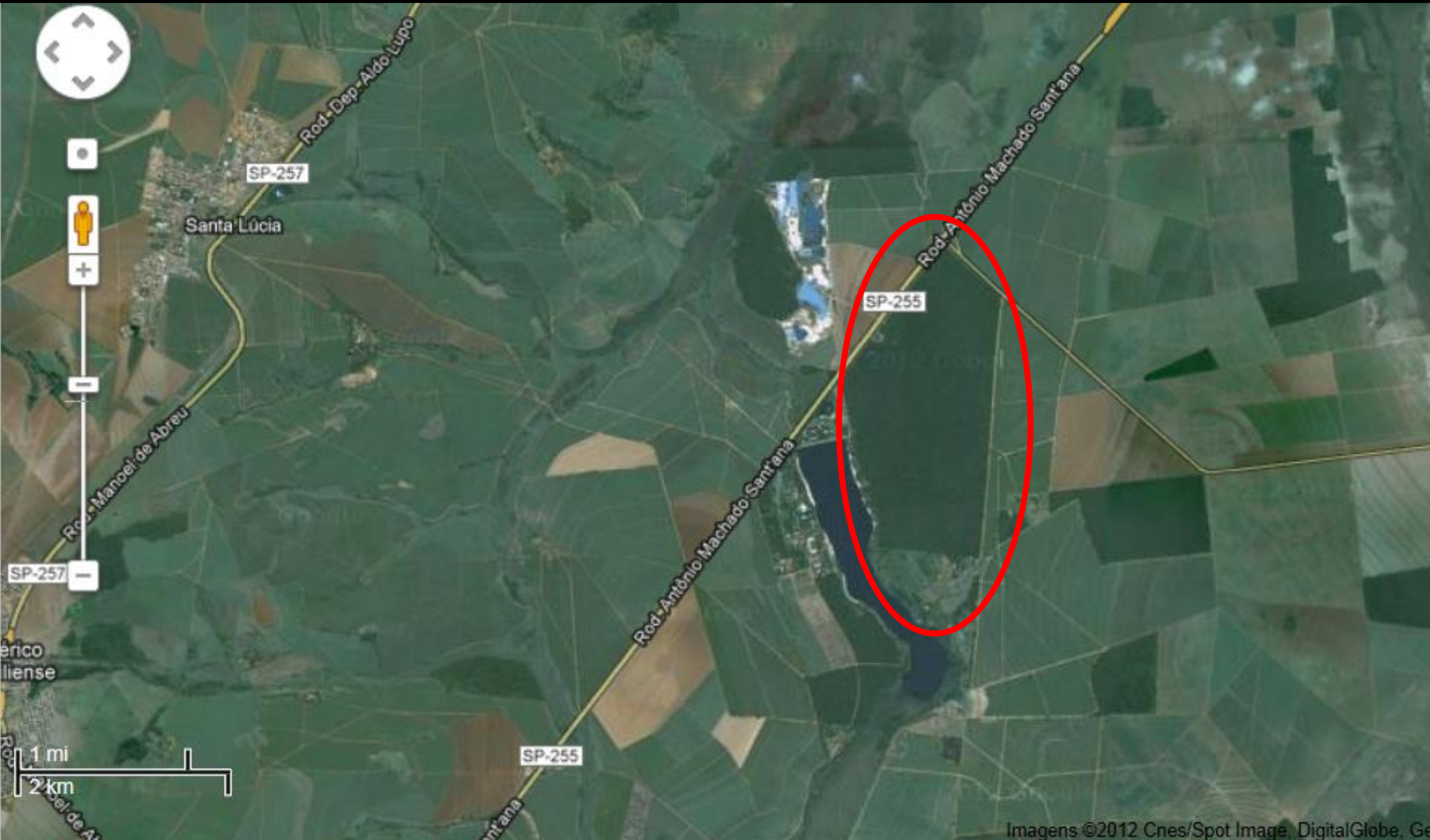
Parque Estadual Fontes do Ipiranga, São Paulo (SP)



Reserva Florestal Adolpho Ducke, Manaus (AM)

Morro da Viúva, Rio de Janeiro (RJ)

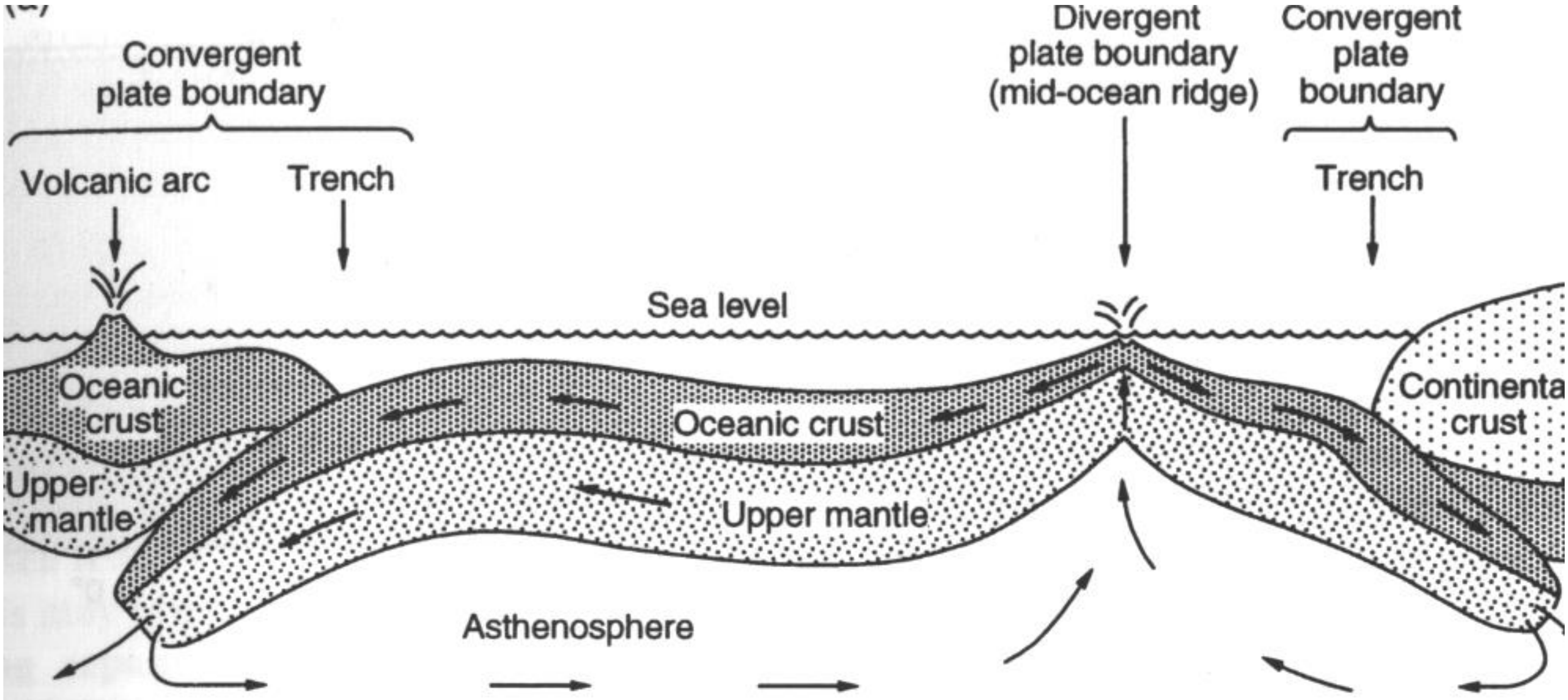
Morro da Viúva, Rio de Janeiro (RJ)



Cerradão, Américo Brasiliense (SP)

As ilhas, no sentido estrito, podem ser:

• oceânicas: são as ilhas que emergiram do fundo do mar e nunca entraram em contato com os continentes. Podem formar parte das placas oceânicas (Galápagos, Hawaii), estar associadas a zonas de subducção (Marianas, Antilhas Menores) ou formar parte das cadeias dorsais mesoceânicas (Açores, Santa Helena);



Ilhas oceânicas: placas e dorsal (Whittaker, 1998).

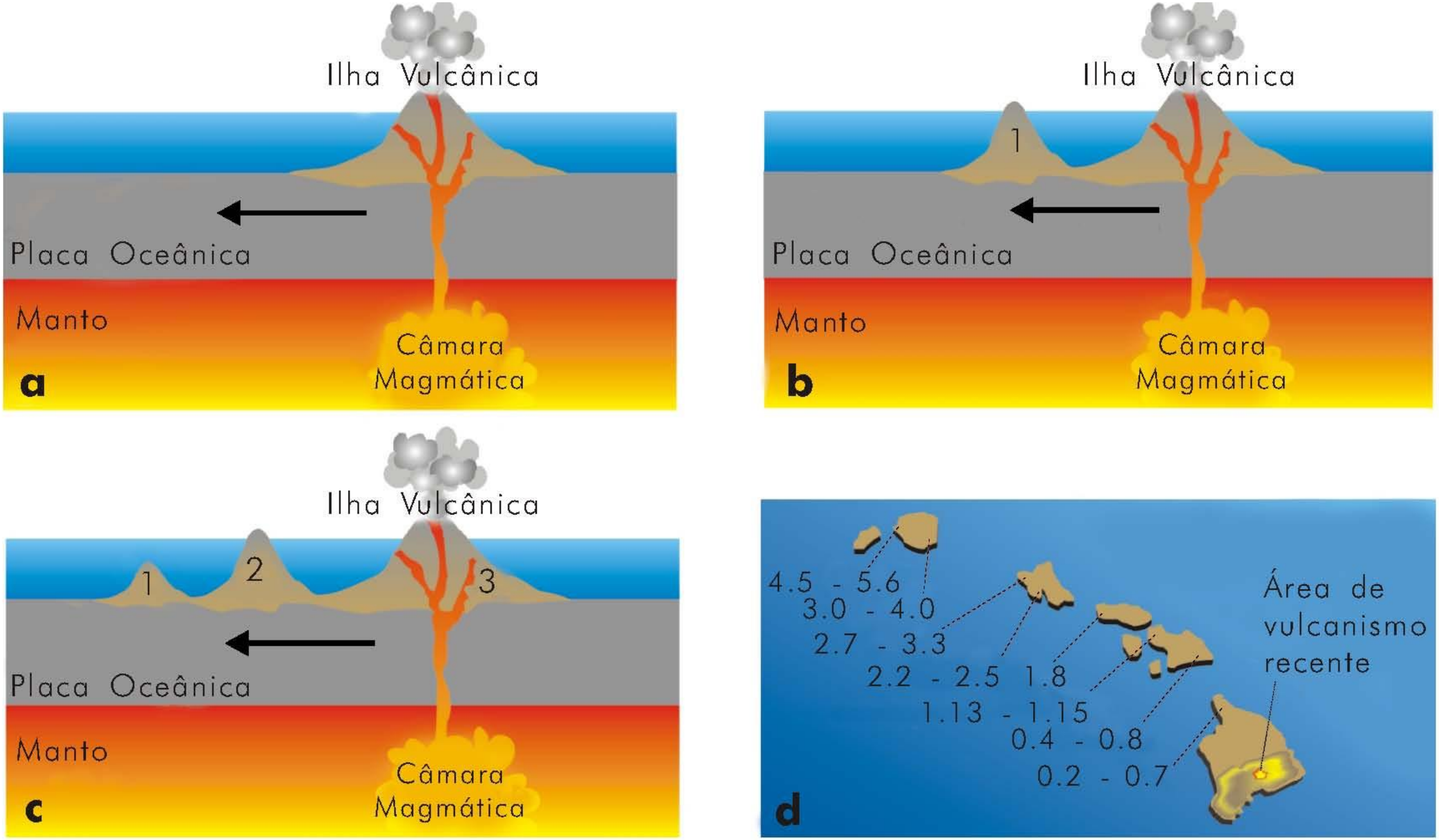
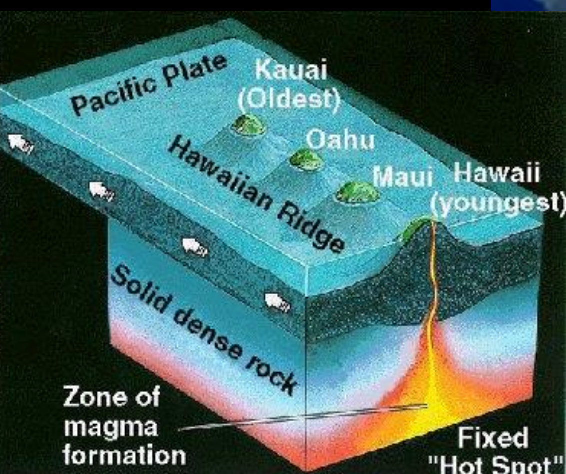
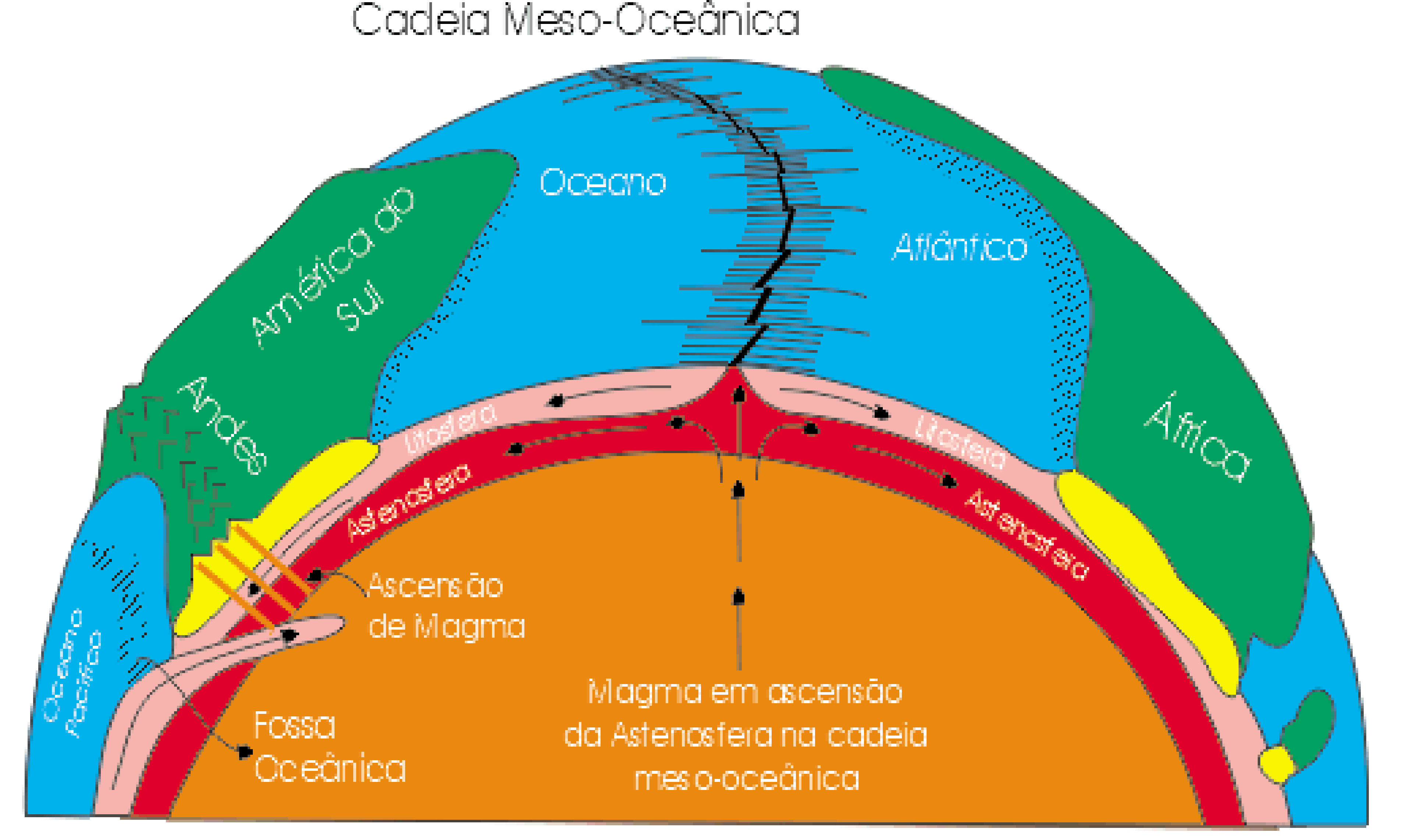


Fig. 6.9 **F**ormação de ilhas vulcânicas a partir de *Hot spots:* a) O *Hot Spot* produz a primeira Ilha Vulcânica; b) com o movimento da placa e o *Hot Spot* fixo a Ilha Vulcânica 2 irá se formar em outro lugar; c) as ilhas 1 e 2 se deslocam e a ilha vulcânica 3 se forma; d) Arquipélago do Havaí formado por ação de *Hot Spot* desde 5,6 milhões de anos atrás.

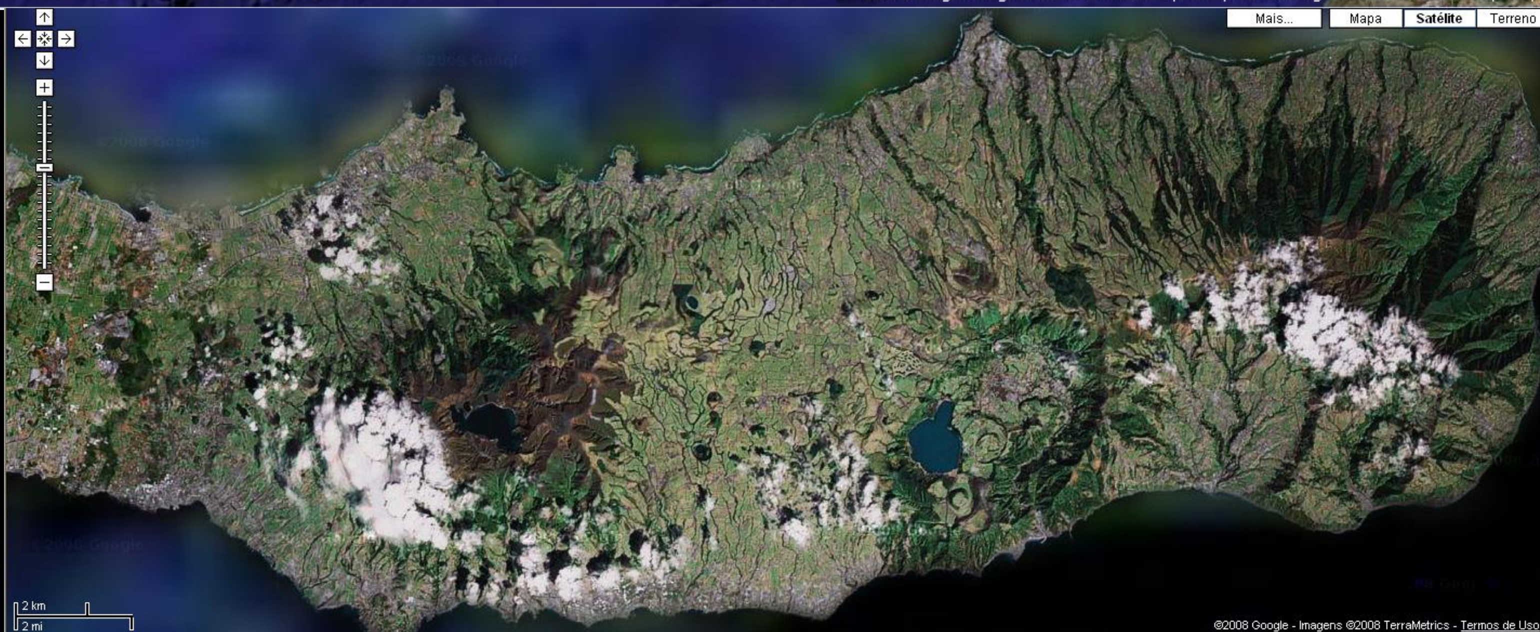
Hawaii

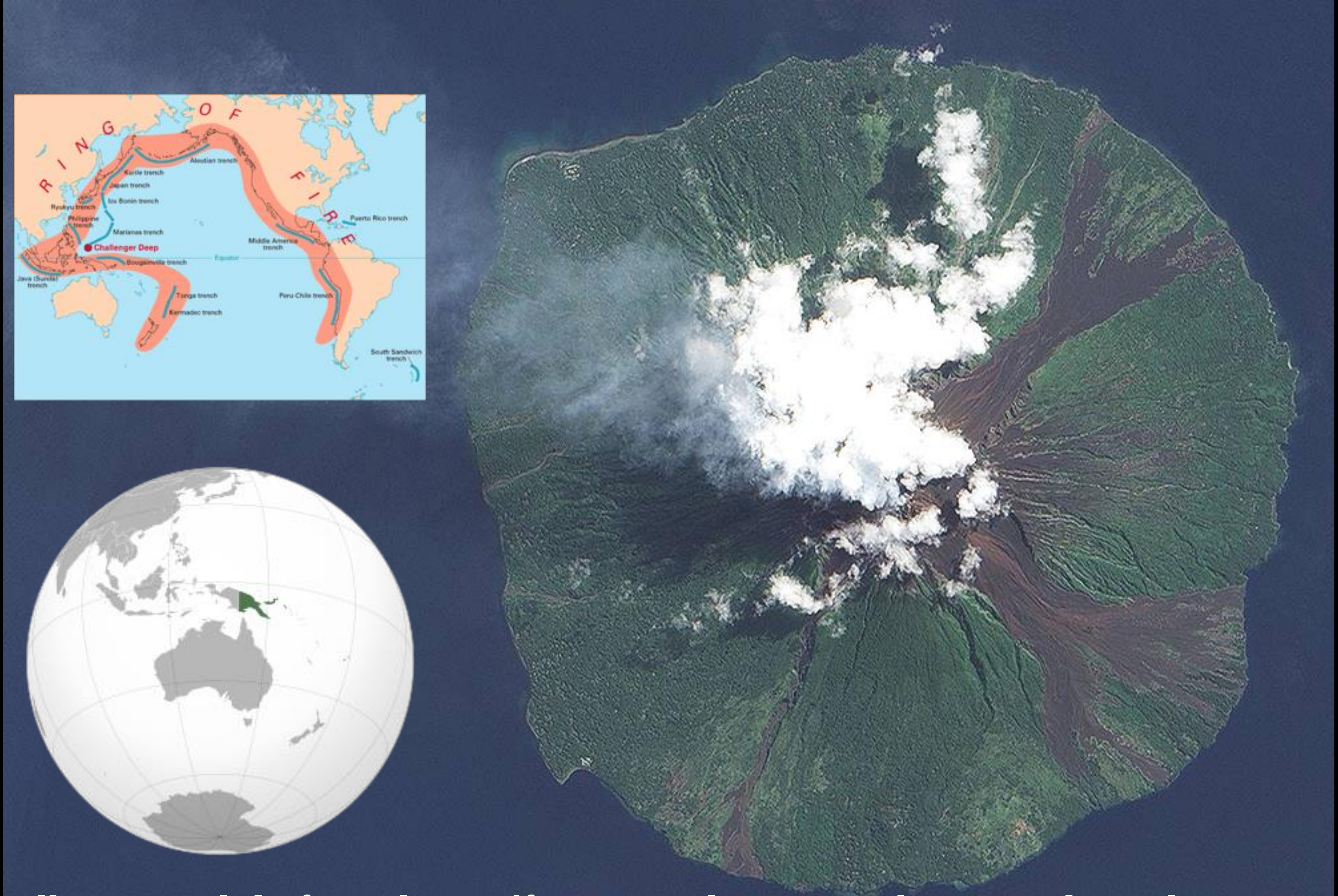

Pacific Plate
Kauai
(Oldest)
Oahu
Maui
Hawaii
(youngest)
Hawaiian Ridge
Solid dense rock
Zone of
magma
formation
Fixed
"Hot Spot"



Correntes de convecção na astenosfera e movimentos das placas litosféricas. O exemplo da abertura do Oceano Atlântico com a separação entre África e América do Sul, e a formação da Cordilheira dos Andes pela colisão da Placa Pacífica com a Placa Sulamericana (Fonte: Wyllie, 1976)

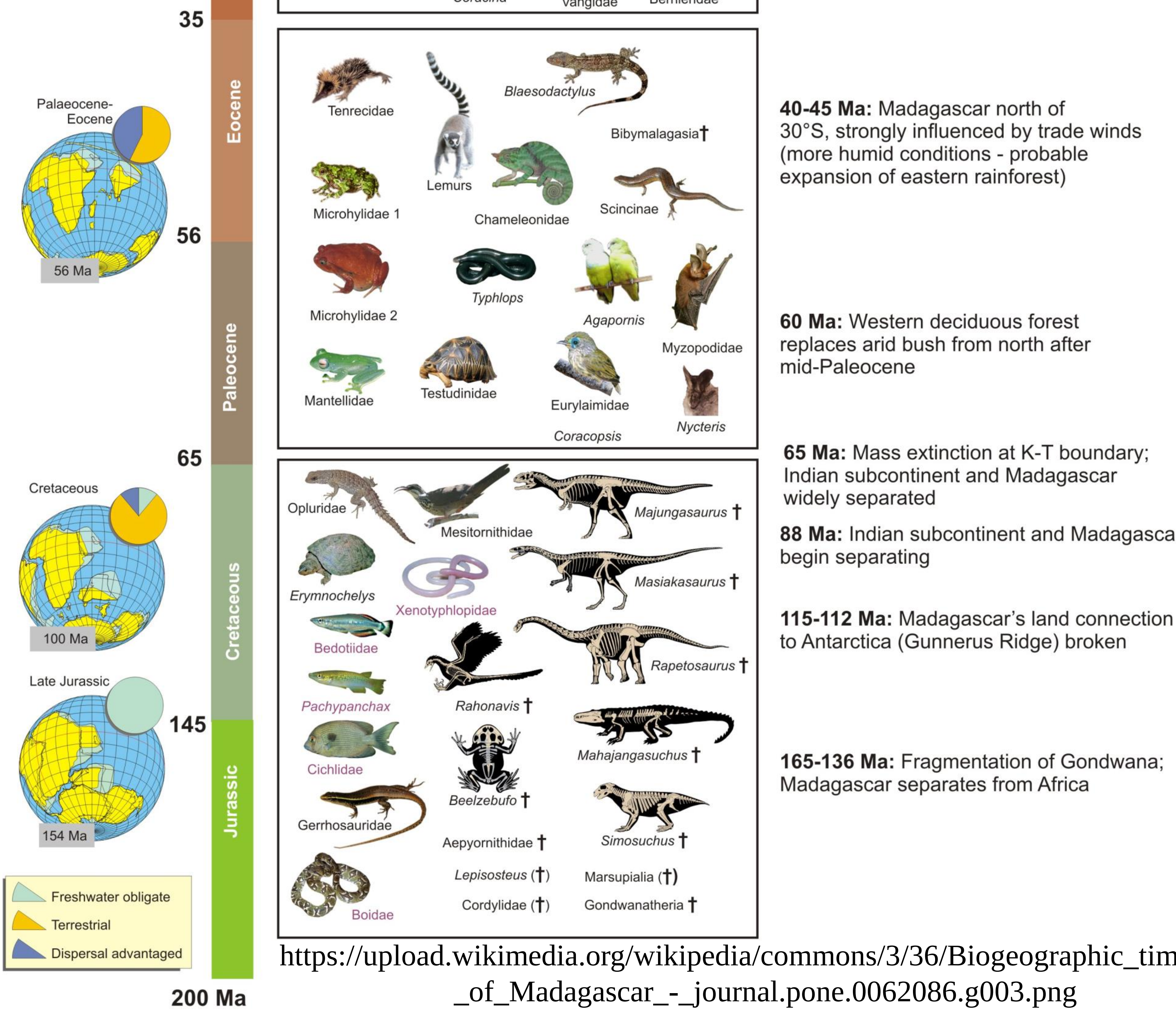

Vista da Rua
Mais...
Mapa
Satélite
Castelo
Braga
Amarante
Porto
Salamanca
Santa Maria
da Feira
Viseu
Coimbra
Madrid
Leiria
Portugal
Torres
Vedras
Alcobaça
España
Spain
Badajoz
Sintra
Lisboa
Córdoba
Jaén
Sevilla
Huelva
Granada
Cádiz
Málaga
Marbella
Gibraltar
Tanger
Tétouan
Rabat
Fès
Meknès
Dar-el-Beida
Jadida
200 km
100 mi
©2008 Google - Imagens ©2008 TerraMetrics, NASA, Dados cartográficos ©2008 Tele Atlas, AND, Europa Technologies
Corvo
Flores
Graciosa
São Jorge
Terceira
Faial
Pico
São Miguel
Santa Maria


Mais...
Mapa
Satélite
Terreno
2 km
2 mi
©2008 Google - Imagens ©2008 TerraMetrics - Termos de Uso

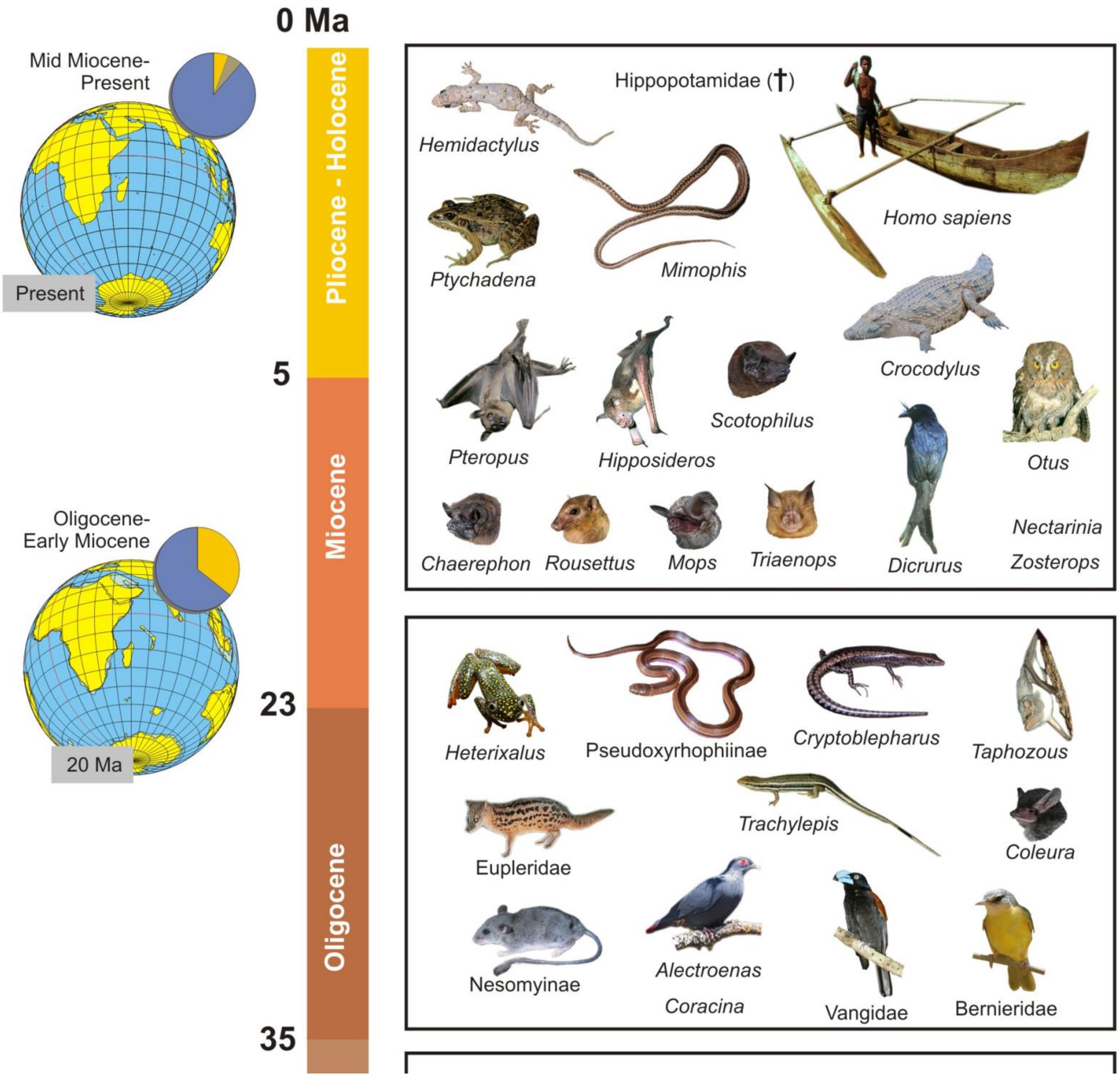


Ilha no anel de fogo do Pacífico, Mar de Bismarck, ao nordeste de Papua Nova Guiné, ao norte da Austrália. O Monte Manan é um dos mais ativos vulcões, tanto que levou à ilha ser desabitada desde 2004.

- continentais: são as ilhas que se originaram da fragmentação da margem da placa continental, que pode variar em extensão e ser provocada por vários fatores. Em suas histórias, algumas nunca retomaram contato com o continente do qual se separaram (Madagascar separou-se há 100 milhões de anos) e outras ilhas (Sri Lanka, Tasmânia, Malvinas) retomaram esse contato pelas glaciações do Pleistoceno (Zunino & Zullini, 2003).



https://upload.wikimedia.org/wikipedia/commons/3/36/Biogeographic_timetable_of_Madagascar_-_journal.pone.0062086.g003.png

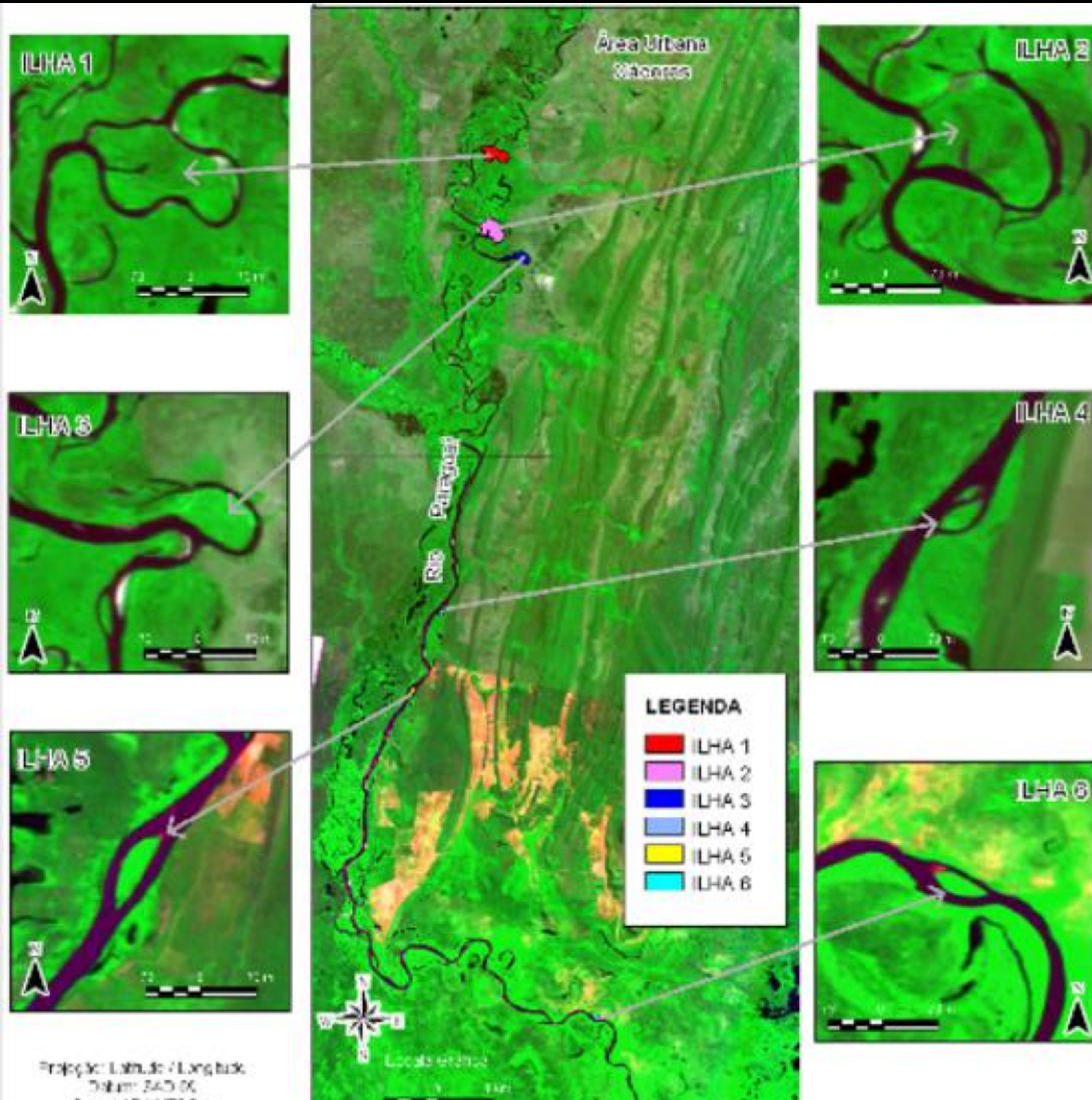


2000 ya: Arrival of humans and extinction of megafauna

8 Ma: Increase in intensity of monsoon systems

20-15 Ma: Tipping point for reversal of ocean currents, making Africa to Madagascar overseas dispersal very difficult

Ilha Anchieta, PE Ilha Anchieta, Ubatuba (SP)



http://dx.doi.org/10.1590/S0102-33062011000300021

ILHAS FLUVIAIS

Estudadas seis ilhas no rio Paraguai (Cáceres–MT), no Pantanal Matogrossense, Três primeiras (1, 2 e 3) são ilhas formadas a partir do rompimento do colo meandro do rio; as ilhas formadas por sedimentação são a 4, 5 e 6.

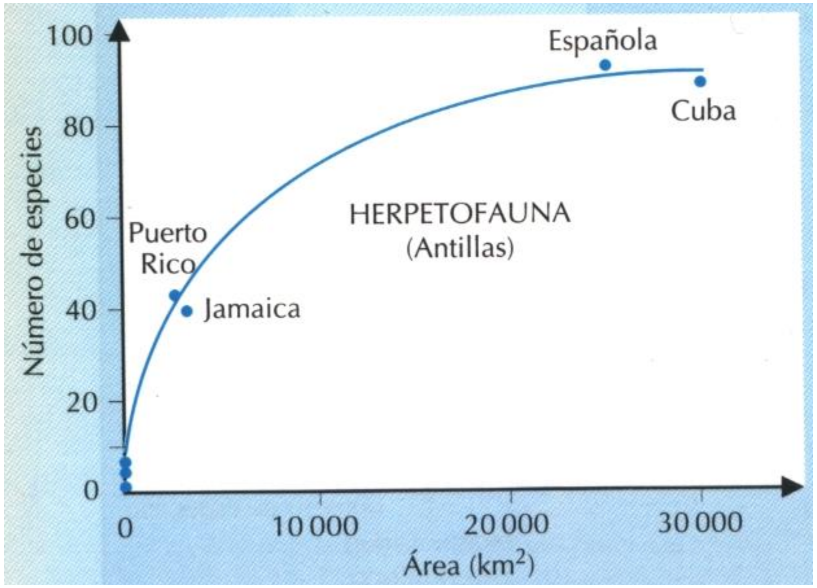
Teoria do equilíbrio dinâmico ou Teoria Insular

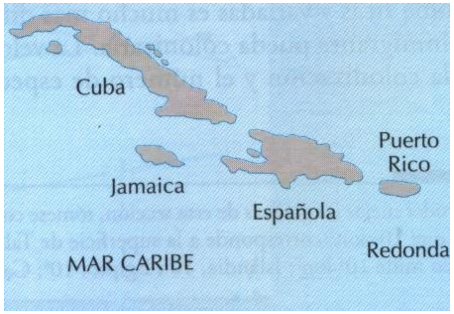
É uma teoria desenvolvida, inicialmente, pelos biogeógrafos R. H. MacArthur e E. O. Wilson na década de 1960.

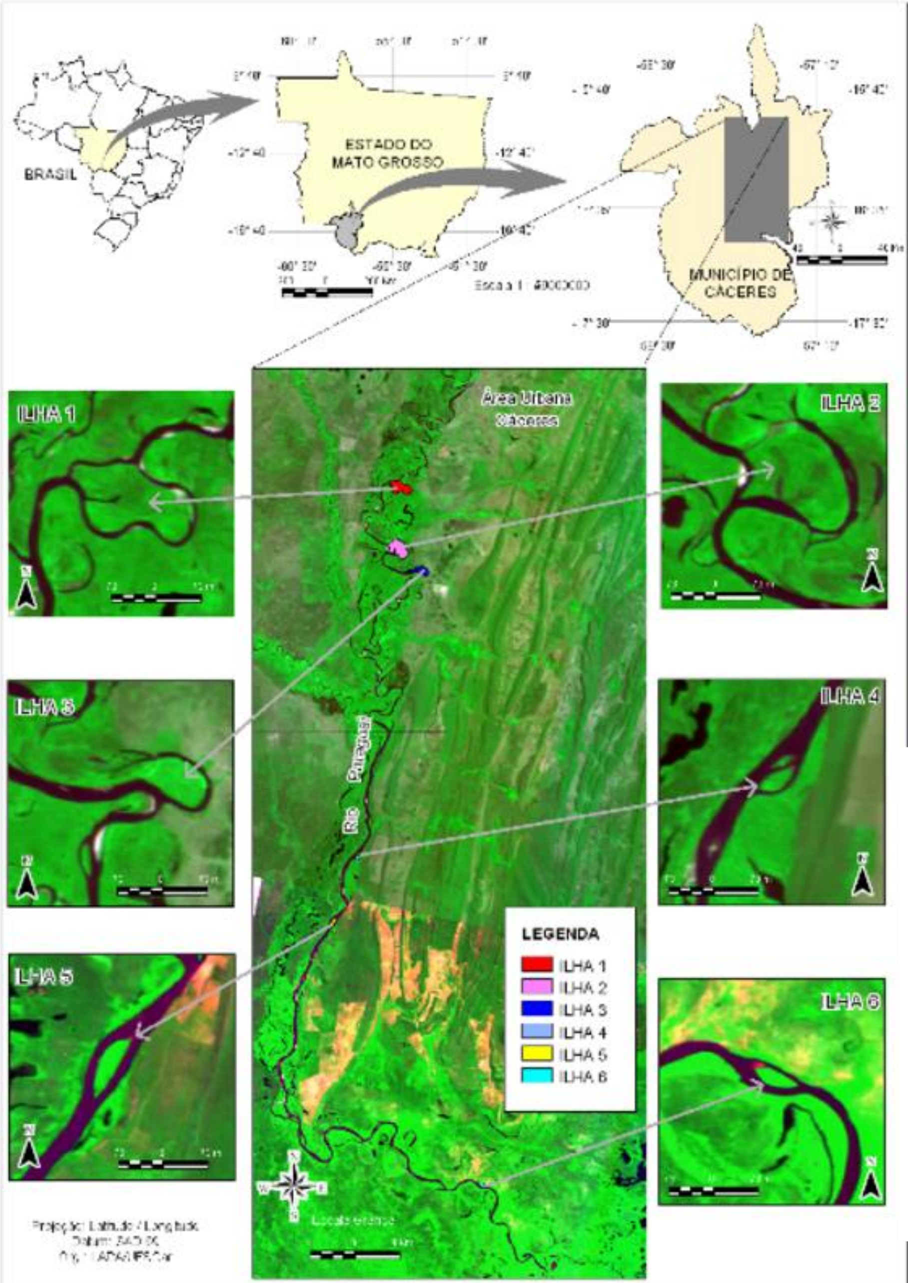
Eles partiram de um antigo conceito que evidencia uma certa proporção entre área da ilha e o número de espécies que vivem nela.

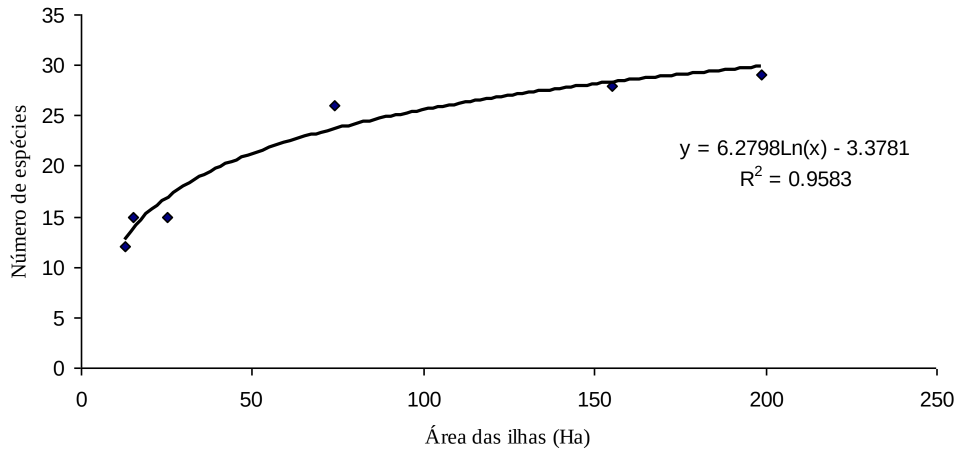
Vários fatores são responsáveis pela existência dessa relação:

Relação do número de cobras e o tamanho de ilhas caribenhas (Zunino & Zullini, 2003)



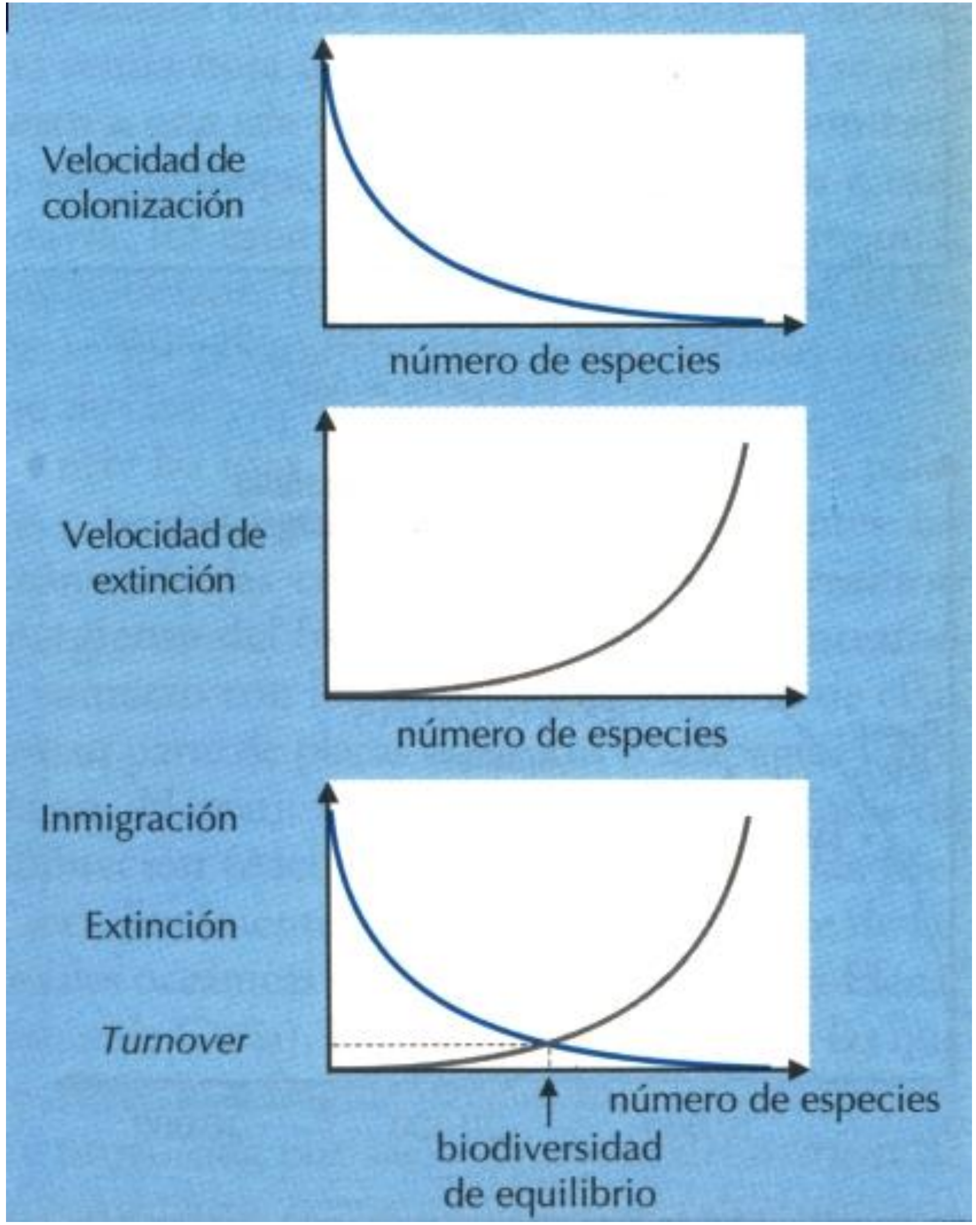




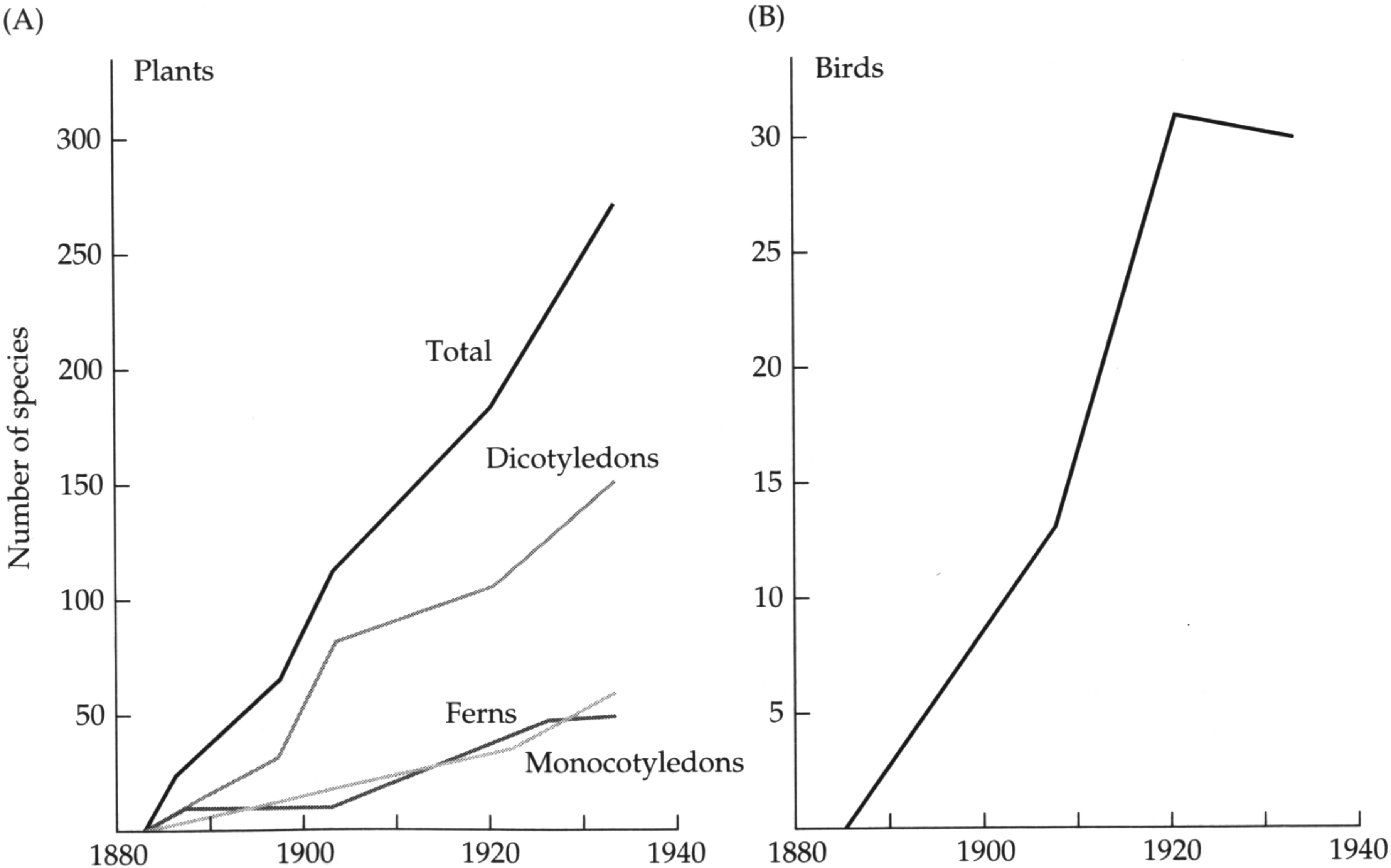


Avaliação da diversidade arbórea das ilhas do rio Paraguai, entre Cáceres e Estação Ecológica de Taiamã, Pantanal Matogrossense, Brasil. Solange Kimie Ikeda Castrillon

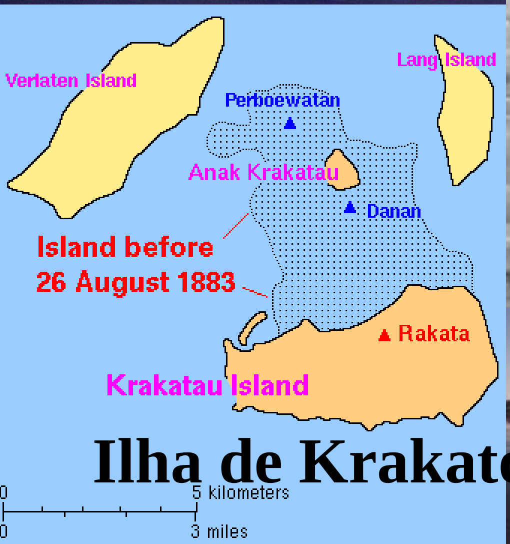
- efeito amostragem: num território homogêneo, o número de espécies encontradas é proporcional à área explorada (exemplo: quanto mais plantas, mais insetos fitófagos);
- efeito meio ambiente: quanto maior a ilha, maior a diversidade de ambientes e maior será o número de espécies;
- efeito população: a estabilidade das populações é proporcional ao seu tamanho (menor, mais suscetível à extinção (Zunino & Zullini, 2003).

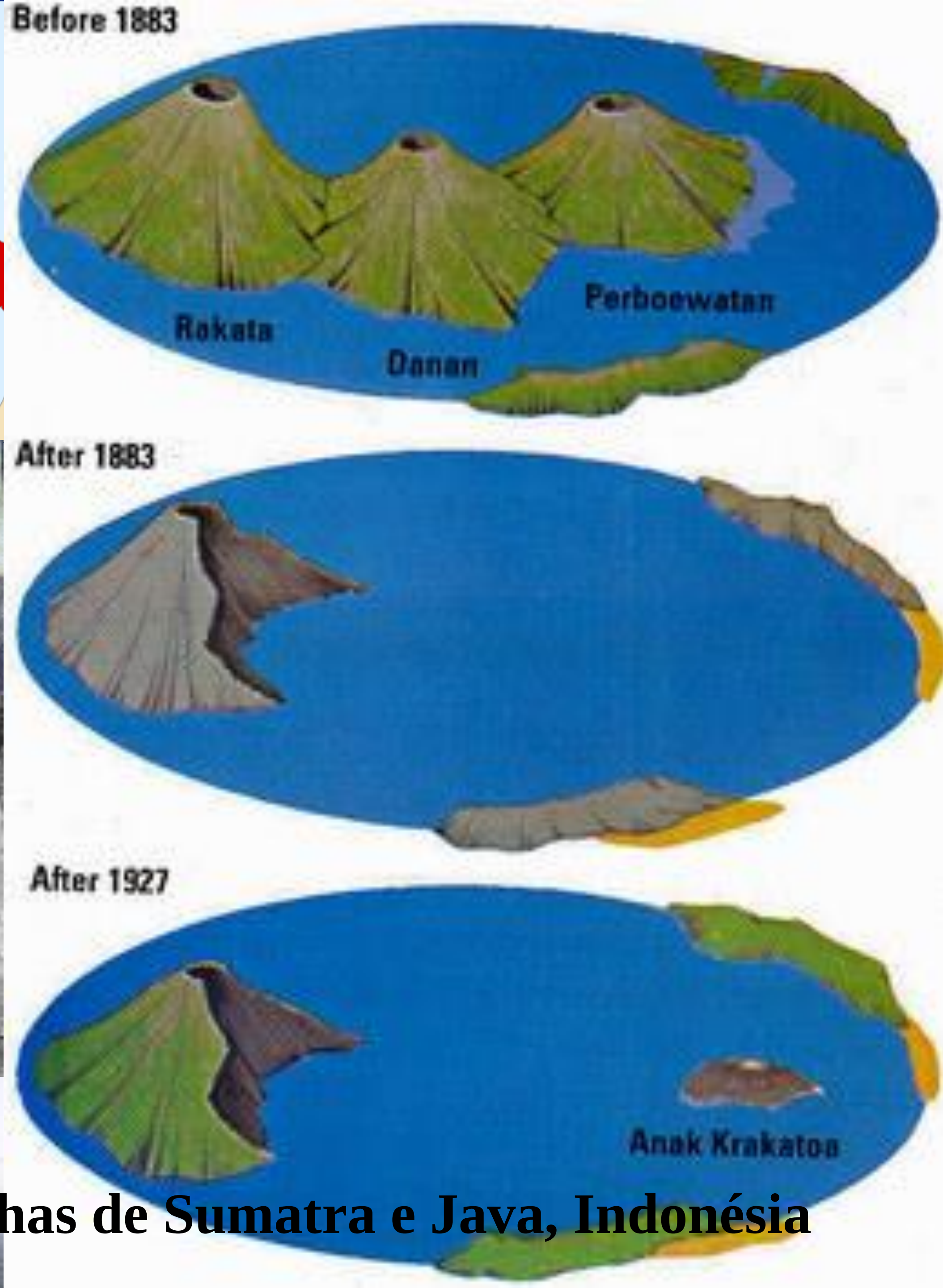


Velocidades de colonização e extinção numa ilha em função do número de espécies (Zunino & Zullini, 2003)



Dispersão rápida ou por salto (*jump dispersal*): está mais ligada ao deslocamento de poucos indivíduos. Exemplo de rápida recolonização da ilha de Krakatoa após a erupção de 1883; plantas e aves viajaram <u>+</u> 40km (MacArthur & Wilson, 1967).



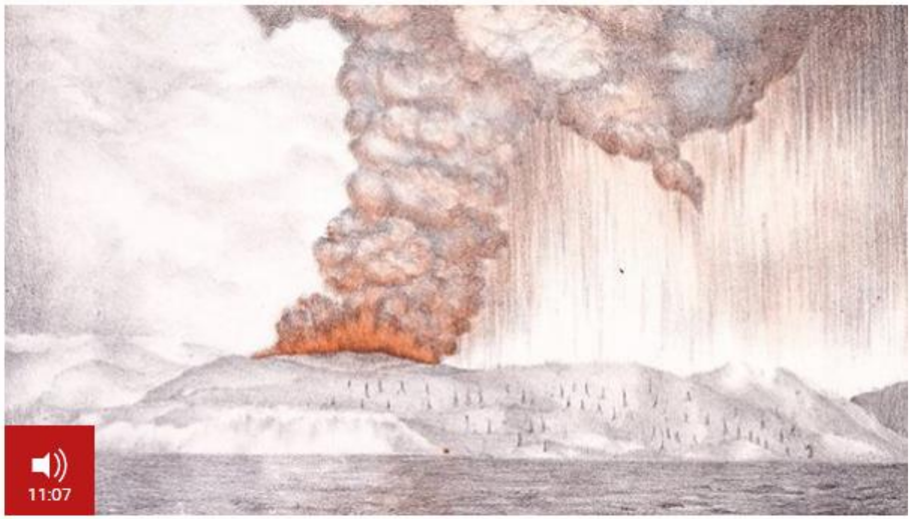


Ilha de Krakatoa, entre as ilhas de Sumatra e Java, Indonésia

Krakatoa, o inferno de Java: a erupção há 137 anos que foi sentida no planeta inteiro

24 janeiro 2020

https://www.bbc.com/portuguese/geral-50308295



Ouça o podcast 'Krakatoa: a erupção que o mundo inteiro sentiu'

Em 1883, o mundo presenciou um evento natural tão bombástico e violento que pôde ser notado de alguma forma por praticamente todos os habitantes do planeta.

A erupção do vulcão Krakatoa, na Indonésia, lançou detritos a até 100 km de altura, causou megatsunamis que mataram milhares de pessoas e foram percebidos até no Canal da Mancha. O fenômeno alterou o clima do planeta, mexeu com a luz, com o ar e até com as cores do crepúsculo em vários cantos da Terra. Além disso, teve grande — e talvez pouco conhecido — impacto no mundo das artes, das comunicações e da ciência.

A história desse extraordinário evento é contada em um podcast da série *Que História!*, da BBC Brasil, que traz, também, o depoimento de uma testemunha da erupção, encontrado nos arquivos da BBC.

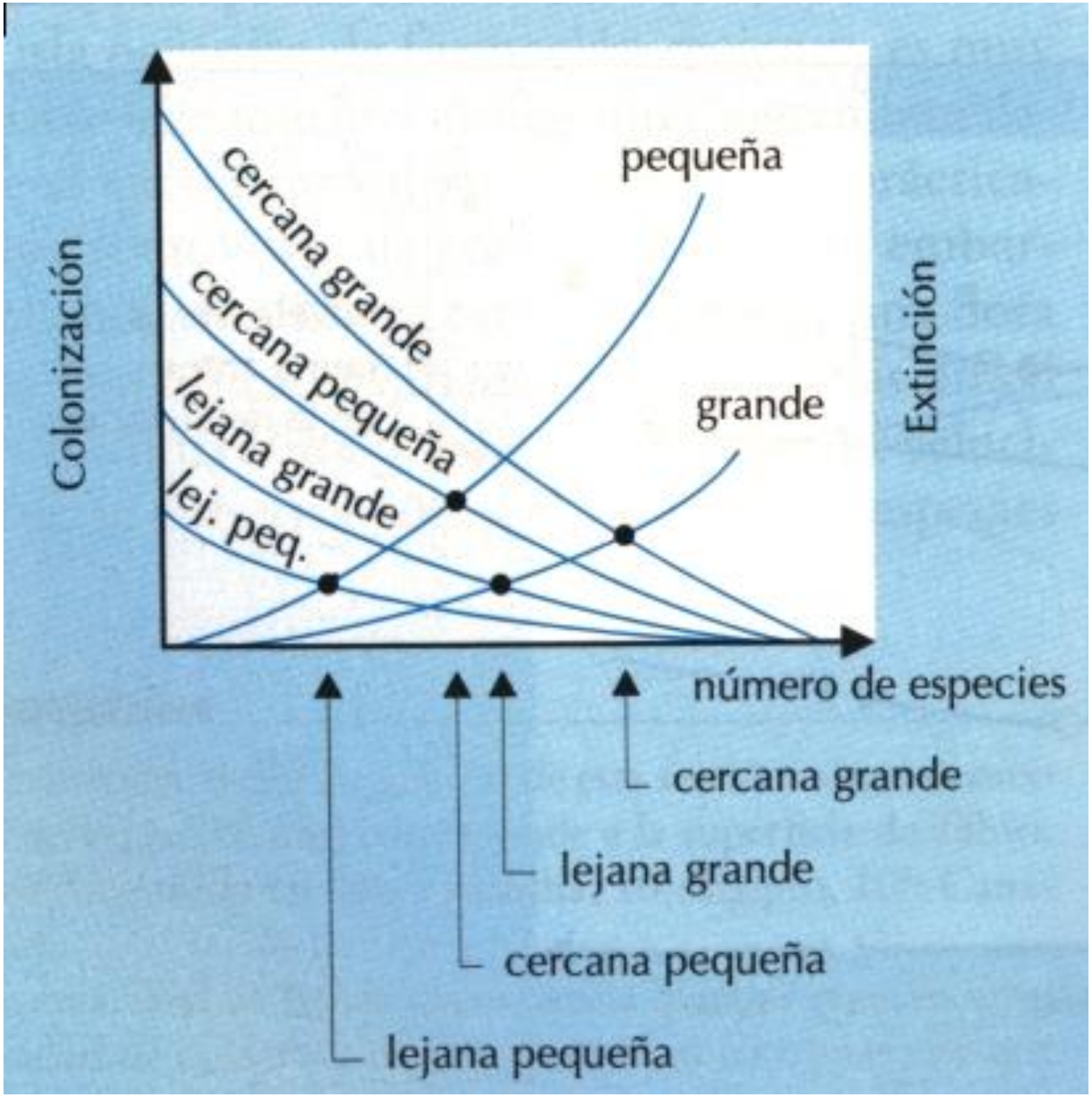
Anak Krakatoa: relembre a erupção vulcânica que provocou o tsunami na Indonésia

Em 2018, o vulcão foi o responsável por dar início a sequência que terminou na formação de uma grande onda que atingiu a Indonésia e deixou centenas de mortos e mais de mil feridos.

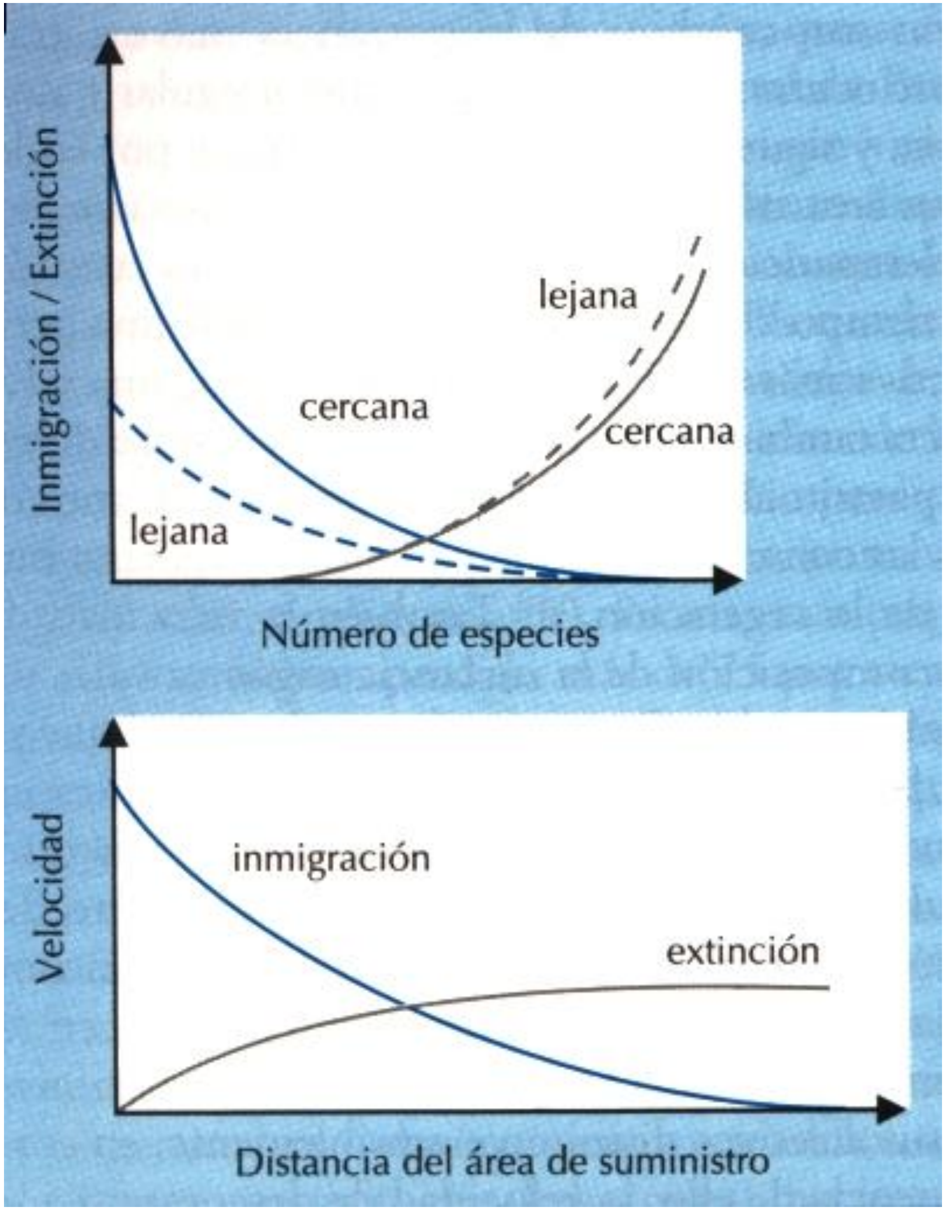
Por g1

21/09/2021 01h00 · Atualizado há um mês

https://g1.globo.com/mundo/noticia/2021/09/21/anak-krakatoa-relembre-a-erupcao-vulcanica-que-provocou-o-tsunami-na-indonesia.ghtml



Representação gráfica da Teoria de MacArthur e Wilson
(Zunino & Zullini, 2003)



Teoria de MacArthur e Wilson modificada (Zunino & Zullini, 2003)

Consequências da Teoria Insular

Podem ser feitas algumas generalizações a partir dessa teoria:

- com o passar do tempo, o número de espécies da ilha tende a um número constante, chegando a um estado de equilíbrio;
- esse estado é resultado do processo contínuo de colonização e extinção, o que implica numa renovação constante de espécies (*turnover*);

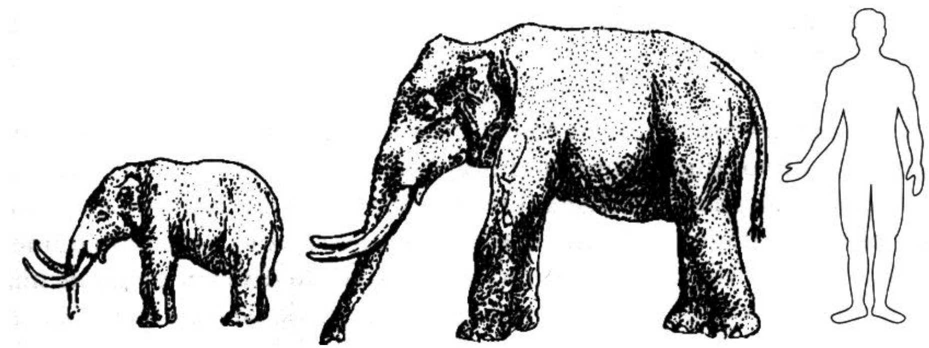
- espera-se que ilhas maiores estejam ocupadas por um número maior de espécies, quando comparada com ilhas menores;
- espera-se que ilhas mais isoladas de outras terras (ilhas ou continentes) estejam ocupadas por um número menor de espécies, quando comparada com ilhas mais próximas (Zunino & Zullini, 2003).

Peculiaridades das biotas insulares

Por causa de muitas mudanças que as espécies insulares sofreram em seus processos evolutivos, em reposta às condições ambientais insulares, caracterizando um processo chamado "síndrome de insularidade", os animais e as plantas apresentam características muito especiais.

São:

- baixa diversidade;



• nanismo insular de grandes mamíferos;

Elefantes pleistocenos que viveram na Sicília, Creta e Malta. Extintos 10-12 mil anos atrás (Bate, D.M.A. 1907. On Elephant Remains from Crete, with Description of *Elephas creticus* sp.n. Proc. zool. Soc. London: 238-250.)

1: Biol Lett. 2006 Sep 22;2(3):451-4.

Comment in:
Biol Lett. 2007 Feb 22;3(1):55-6; discussion 60-3.
Biol Lett. 2007 Feb 22;3(1):57-9; discussion 60-3.

Ancient DNA forces reconsideration of evolutionary history of Mediterranean pygmy elephantids.

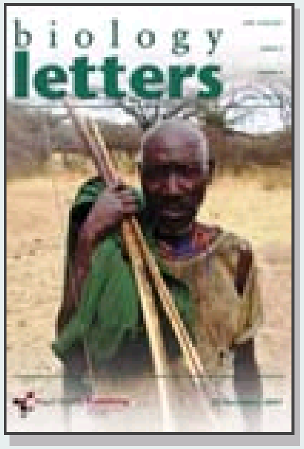
Poulakakis N, Parmakelis A, Lymberakis P, Mylonas M, Zouros E, Reese DS, Glaberman S, Caccone A.

Natural History Museum of Crete, University of Crete, PO Box 2208, 71409 Heraklion, Crete, Greece. poulakakis@nhmc.uoc.gr

During the Pleistocene pygmy elephantids, some only a quarter of their ancestors' size, were present on Mediterranean islands until about 10,000 years ago (y.a.). Using a new methodology for ancient DNA (aDNA) studies, the whole genomic multiple displacement amplification method, we were able to retrieve cytochrome b (cytb) DNA fragments from 4200 to 800,000 y.a. specimens from island and mainland samples, including pygmy and normal-sized forms. The short DNA sequence (43 bp) retrieved from the 800,000 y.a. sample is one of the oldest DNA fragment ever retrieved. Duplication of the experiments in two laboratories, the occurrence of three diagnostic sites and the results of the phylogenetic analyses strongly support its authenticity. Our results challenge the prevailing view that pygmy elephantids of the eastern Mediterranean originated exclusively from Elephas, suggesting independent histories of dwarfism and the presence of both pygmy mammoths and elephant-like taxa on these islands. Based on our molecular data, the origin of the Tilos and Cyprus elephantids from a lineage within the genus Elephas is confirmed, while the DNA sequence from the Cretan sample falls clearly within the mammoth clade. Thus, the name Mammuthus creticus rather than Elephas creticus, seems to be justified for this form. Our findings also suggest a need to re-evaluate the evolutionary history of the Sicilian/Maltese species, traditionally included in the genus Elephas.

PMID: 17148428 [PubMed - indexed for MEDLINE]

Journal Article



biology letters

Does the 43bp sequence from an 800000 year old Cretan dwarf elephantid really rewrite the textbook on mammoths?

Issue	Volume 3, Number 1 / February 22, 2007
Pages	57-59
Article Category	Molecular evolution
Article Type	Research-Article
DOI	10.1098/rsbl.2006.0536

Authors

Ludovic Orlando[1], Marie Pagés[1, 2], Sébastien Calvignac[1], Sandrine Hughes[1], Catherine Hänni[1]

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[2]Laboratoire de Paléontologie, Paléobiologie et Phylogénie, Institut des Sciences de l'Evolution, Université Montpellier II, Place Eugène Bataillon, 34095 Montpellier Cedex 05, France

Abstract

Pigmy elephants inhabited the islands from the Mediterranean region during the Pleistocene period but became extinct in the course of the Holocene. Despite striking distinctive anatomical characteristics related to insularity, some similarities with the lineage of extant

Channel Islands

National Park
California

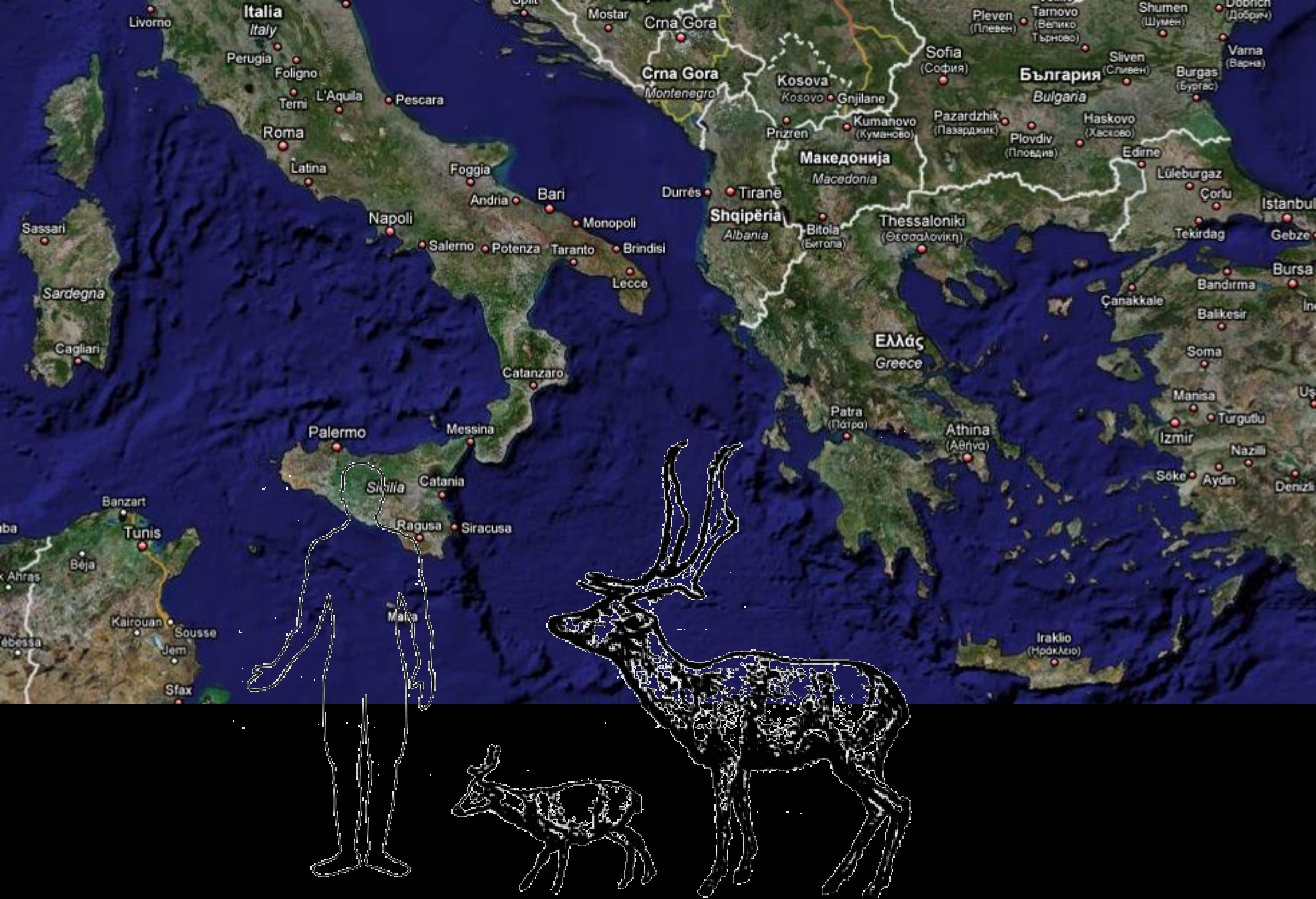
The Pygmy Mammoth

https://www.nps.gov/chis/learn/historyculture/pygmymammoth.htm

Paleontological Resource Inventory

Mammoths have always fascinated people. From the creators of the earliest known cave painting and carvings to 20th century practitioners of modern art and even to today's tourists, humans have tried to grasp the essence of this magnificent creature – its enormous size, strength and beauty and its coexistence with and importance to humans. In 1994, paleontologists made the remarkable discovery of a pygmy mammoth on Santa Rosa Island, the most complete collection of its kind in the world.

Found only on the California Channel Islands and nowhere else in the world, the pygmy mammoth was probably a small form of the Columbian mammoth found on the mainland. Pygmy mammoths varied from 4.5 to 7 feet high at the shoulders and may have weighed only about 2,000 pounds, compared to the 14-foot tall, 20,000 pound Columbian mammoth. In other respects, they were probably similar, with short fur, a typical mammoth body form, and a relatively large head



Cervídeos pleistocenos de Creta e Sardenha (Zunino & Zullini, 2003)

Geobios
Volume 28, Issue 2, 1995, Pages 247-258

Abstract | References | PDF (2509 K)

doi:10.1016/S0016-6995(95)80231-2 Cite or Link Using DOI

Functional aspects and ecologicalimplications in Pleistocene endemic cervids of Sardinia, Sicily and Crete

Les Cervidés endémiques du Pléistocène de Sardaigne, Sicile et Crète: morphologie fonctionnelle et paléoécologie

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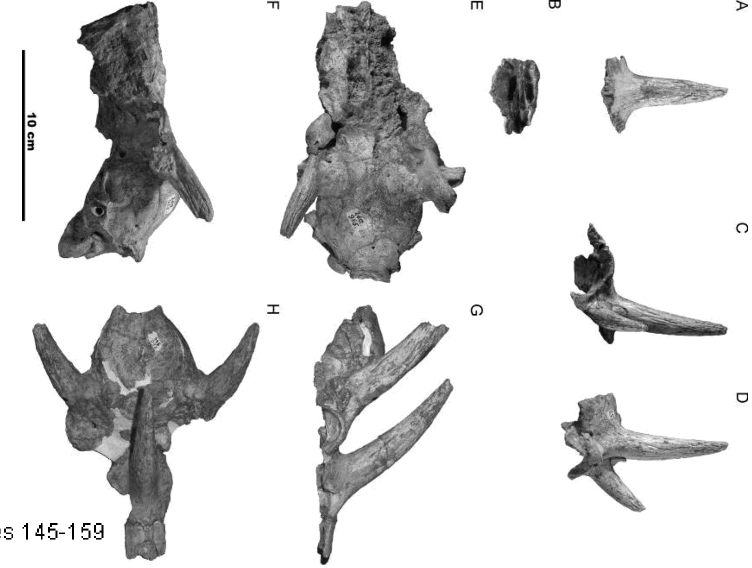
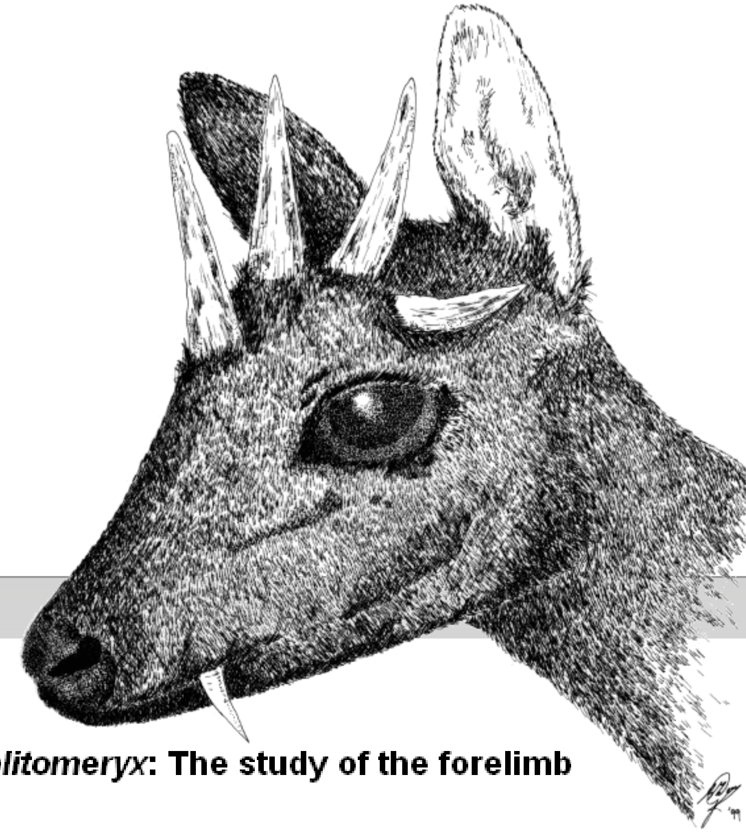
Received 11 October 1993; accepted 22 February 1994. Available online 28 April 2005.

Abstract

Some cranial and mandibular characters, that are considered distinctive between grazers and browsers, are examined. Their analysis allows to recognize the exploiting of different feeding habits for every cervid. Attitude for grazing characterize the megacerine from Sardinia and the cervine from Sicily, while the megacerine from Sicily must have a browser diet. The feeding "niche" of the megacerine from Crete are difficult to identify. Analysis of the functional mophology of carpus, tarsus and phalanges put in evidence that the cervine from Sicily and the megacerine from Sardinia are adapted to agile and fast locomotion on prevalently hard and even grounds., while the megacerine from Sicily was characterized by a locomotion on the soft grounds of woody environments. The megacerines from Crete could move on hard and uneven grounds, but with scarse agility. The great cervines from Crete moved with stiff movements and their locomotion must have been slow and rigid. They may have eaten the top of shrubs or of trees at different heights.





Quaternary International
Volume 182, Issue 1, May 2008, Pages 145-159
Insularity and its Effects

doi:10.1016/j.quaint.2007.09.021 Cite or Link Using DOI

The effect of insularity on the Eastern Mediterranean early cervoid *Hoplitomeryx*: The study of the forelimb

Alexandra Van der Geer[a]

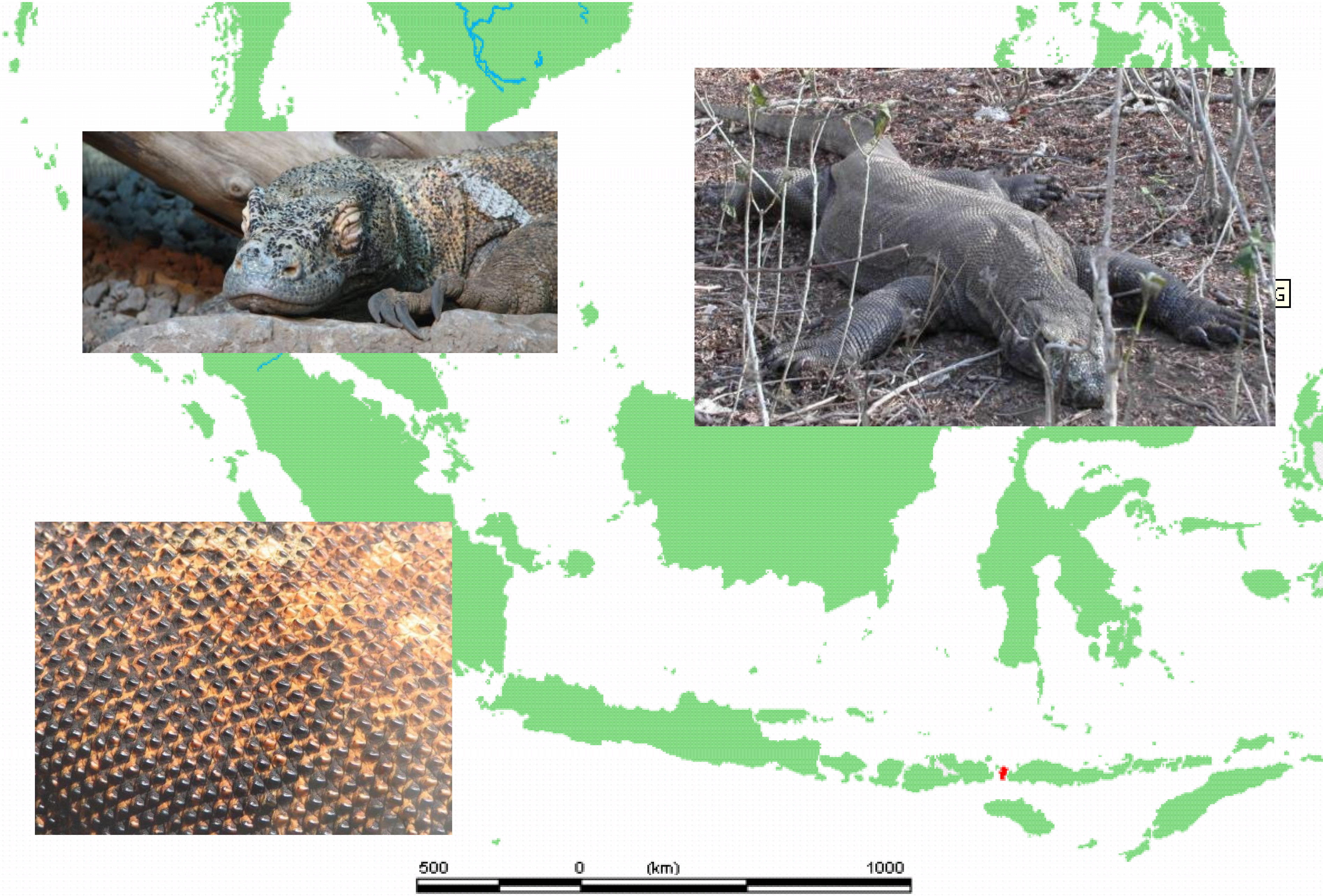
[a]Museum of Paleontology and Geology, Faculty of Geology, National and Kapodistrian University of Athens, Panepistimiopolis, 15784 Zografou, Greece
Available online 19 September 2007.

Abstract

Island studies increase our understanding of the effects of habitat fragmentation. The study of the Tertiary paleo-island Gargano is an important contribution, because of the long-term isolation under less fluctuating climatic conditions, free from anthropogenic influences; such a situation does not exist in the Quaternary period nor in the Holocene period. This makes the Gargano a unique case to study the effects of insularity in isolation. Here, a highly endemic, unbalanced vertebrate fauna evolved including the five-horned deer *Hoplitomeryx*. Its post-cranial material contains four size groups, based on the metapodals. In this study, the humerus and radius are described. The question whether the morphotypes are chronomorphs or ecomorphs is addressed. Sexual dimorphism is ruled out as the underlying principle of size separation in this case, based upon body mass estimations and data from living deer. Chronomorphs is the best explanation for the *Megaloceros cazioti* lineage (Pleistocene, Sardinia) and the *Myotragus balearicus* lineage (Pliocene–Holocene, Mallorca). Ecomorphs are a better explanation for the size groups of *Candiacervus* (Pleistocene, Crete) and *Cervus astylodon* (Pleistocene, Ryukyu Islands). An adaptive radiation into several trophic types took place, promoted by the ecological meltdown of the ancestral niche. The drive behind this speciation is increased interspecific competition. For *Hoplitomeryx*, although the hypothesis of chronomorphs cannot be discarded, that of ecomorphs seems most likely, based upon the coexistence of two or more size groups per fissure, and upon the presence of a huge morphotype, larger than mainland species, in the younger fissures.

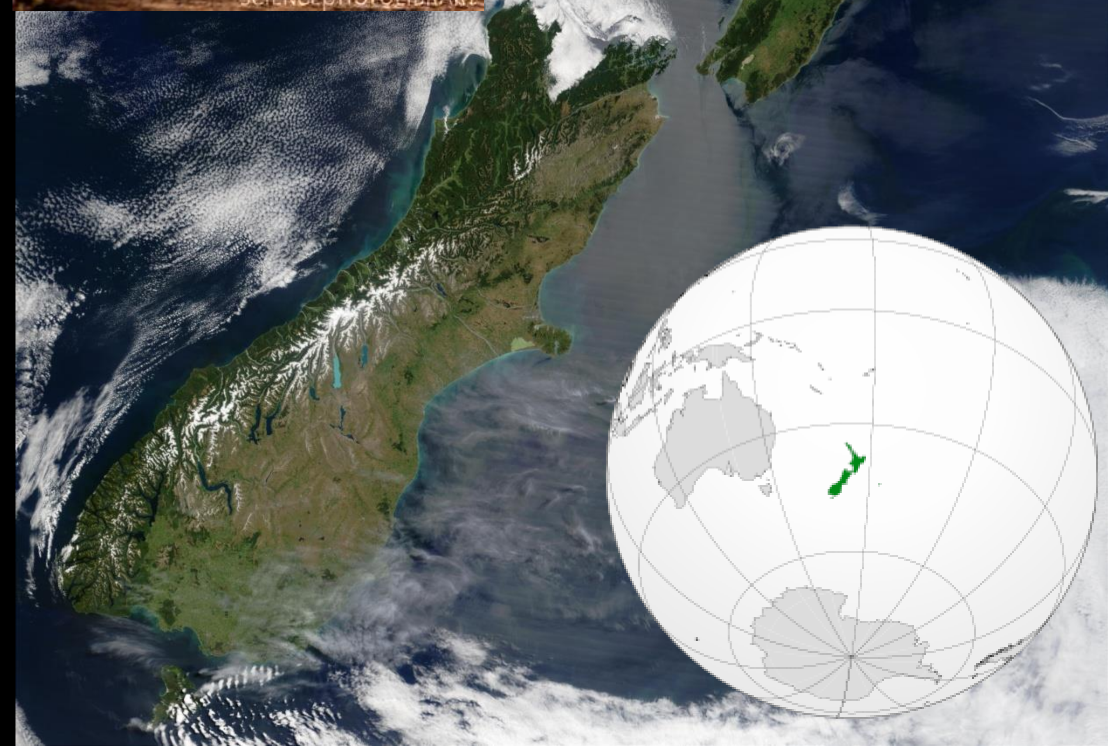
- gigantismo de pequenos mamíferos,

répteis (Dragão de Komodo e tartarugas de Galápagos) e de aves de rapina;



Dragão de Komodo (*Varanus komodoensis*), na ilha da Indonésia.

Weta, grilo gigante da Nova Zelândia (*Deinacrida heteracantha)*, com até 10 centímetros de comprimento e de cerca de 20 a 30 g (grilos continentais têm, em média, metade do tamanho e do peso).



Tartaruga de Galápagos
(*Geochelone nigra*)

25/06/2012 08h21 - Atualizado em 25/06/2012 12h43

BBC BRASIL

Tartaruga gigante morre sem deixar herdeiros, e espécie deve ser extinta

George, o Solitário, viveu durante cem anos em Galápagos.
O corpo do animal será submetido a uma autópsia e será embalsamado.

Da BBC

Tweetar 258 Recomendar 3,7 mi
114 comentários

Lonesome George, em foto de arquivo (Foto: Reuters)

A tartaruga gigante George, o Solitário, o último exemplar de sua subespécie, morreu neste domingo nas Ilhas Galápagos.

O animal viveu por cem anos, mas não foi capaz de procriar. Com isso, sua subespécie deve ficar extinta.

Fausto Llerena, funcionário do Parque Nacional de Galápagos que cuidou de George durante 40 anos, diz que foi pego de surpresa pela morte da tartaruga, já que ela parecia estar bem de saúde.

O corpo do animal será submetido a uma autópsia e, depois, será embalsamado.

Segundo Edwin Naula, diretor do parque de Galápagos, o objetivo é preservar George para as próximas gerações e manter viva a mensagem de preservação do meio ambiente.

Morte de George Solitário não extinguiu tartaruga de Galápagos 4

AFP

Em Quito (Equador) 23/11/2012 18h50

Email | g+1 2 | Tweetar 14 | Recomendar 78 | Imprimir | Comunicar erro

A morte de "George Solitário" há cinco meses não extinguiu a espécie das tartarugas gigante das ilhas Galápagos (*Chelonoidis abingdonii*), segundo estudo da direção da reserva natural equatoriana. A morte do quelônio, em 24 de junho, "não representa o fim da espécie de tartarugas gigantes da ilha Pinta", de onde era originário George, destacou a Direção do Parque Nacional de Galápagos em comunicado.

http://g1.globo.com/mundo/noticia/2012/06/tartaruga-gigante-morre-sem-deixar-herdeiros-especie-deve-ser-extinta.html

http://noticias.uol.com.br/meio-ambiente/ultimas-noticias/redacao/2012/11/23/morte-de-george-solitario-nao-extinguiu-tartaruga-de-galapagos.htm#fotoNav=73

DNA tests show Lonesome George may not have been last of his species

By Bill Hathaway

November 15, 2012

DNA analysis discovered 17 hybrid tortoises which can trace ancestry to Chelonoidis abingdoni, the species thought to have gone extinct with the death of Lonesome George this summer. The age of some of the hybrids found on a remote island in the Galapagos suggests that there may be purebred individuals still alive on a remote part of Isabela Island.

When the giant tortoise Lonesome George died this summer, conservationists from around the world mourned the extinction his species. However, a genetic analysis by Yale University researchers of tortoises living in a remote area of a Galapagos Island suggests individuals of the same tortoise species may still be alive — perhaps ancestors of tortoises thrown overboard by 19th century sailors.

The study was published in the journal Biological Conservation.

On the remote northern tip of Isabella Island, the Yale team collected DNA from more than 1,600 giant tortoises and discovered that 17 were ancestors of the species *Chelonoidis abingdoni*, native to Pinta Island of which Lonesome George was the last known survivor. The 17 tortoises are hybrids, but evidence suggested a few might be the offspring of a purebred *C. abingdoni* parent. Five of these tortoises are juveniles, which suggested to researchers that purebred individuals of the species may still live on the rocky cliffs of Isabella in an area called Volcano Wolf.

http://news.yale.edu/2012/11/15/dna-tests-show-lonesome-george-may-not-have-been-last-his-species

New Species of Galapagos Tortoise Found on Santa Cruz Island

The newly recognized reptile was thought to be part of a more populous species of tortoise sharing the island

Chelonoidis donfaustoi was named after Ecuador's oldest park ranger. (Washington Tapia)

http://www.smithsonianmag.com/science-nature/new-species-galapagos-tortoise-found-santa-cruz-island-180957004/?no-ist

http://www.bbc.com/portuguese/videos_e_fotos 2015/10/151022_galapagos_descoberta_hb

Descoberta nova espécie de tartaruga gigante nas ilhas Galápagos

22 outubro 2015 Atualizado pela última vez 08:57 BRST 10:57 GMT

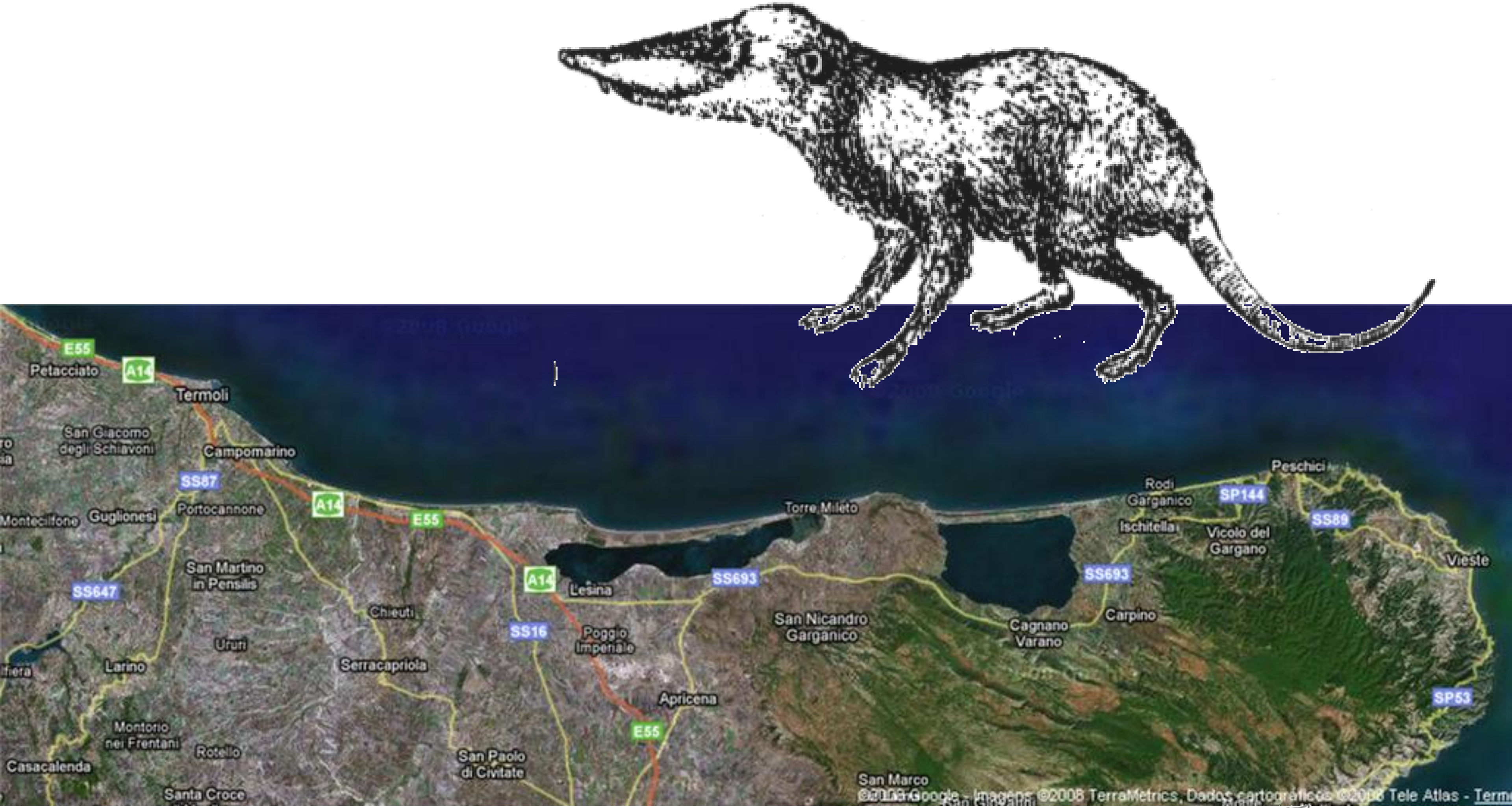
Cientistas disseram ter identificado uma nova espécie de tartaruga gigante nas ilhas Galápagos, no Equador.

Há apenas 250 animais da nova espécie, que recebeu o nome científico de *Chelonoidis donfaustoi*.

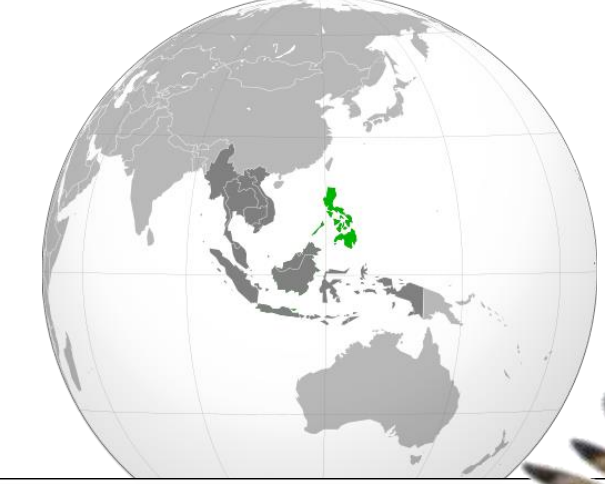
A nova espécie identificada vive numa área de 40km² no oeste da ilha de Santa Cruz e é diferente geneticamente de outras espécies gigantes na ilha e de outras ilhas.

Pesquisadores acreditavam que todas as tartarugas gigantes da ilha eram da mesma espécie. Há, agora, 15 espécies diferentes de tartarugas gigantes.

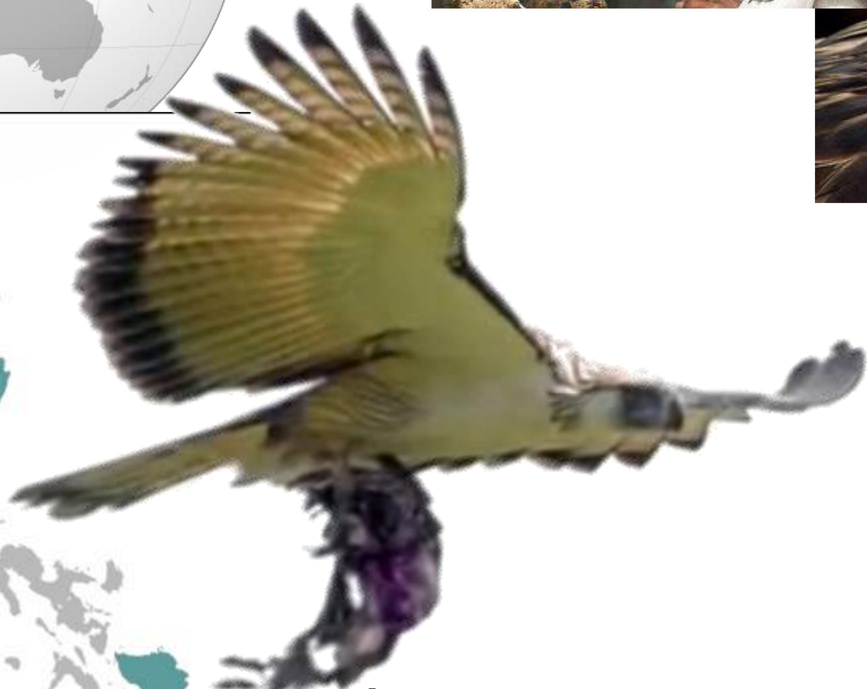
O Parque Nacional de Galápagos divulgou o vídeo na quarta-feira, mas as imagens foram feitas em agosto.



Gigantismo: insetívoro gigante do gênero *Stertomys* do Plioceno (4 a 12 milhões de anos atrás) extinto, da antiga ilha de Gargano, sul da Itália (Zunino & Zullini, 2003)

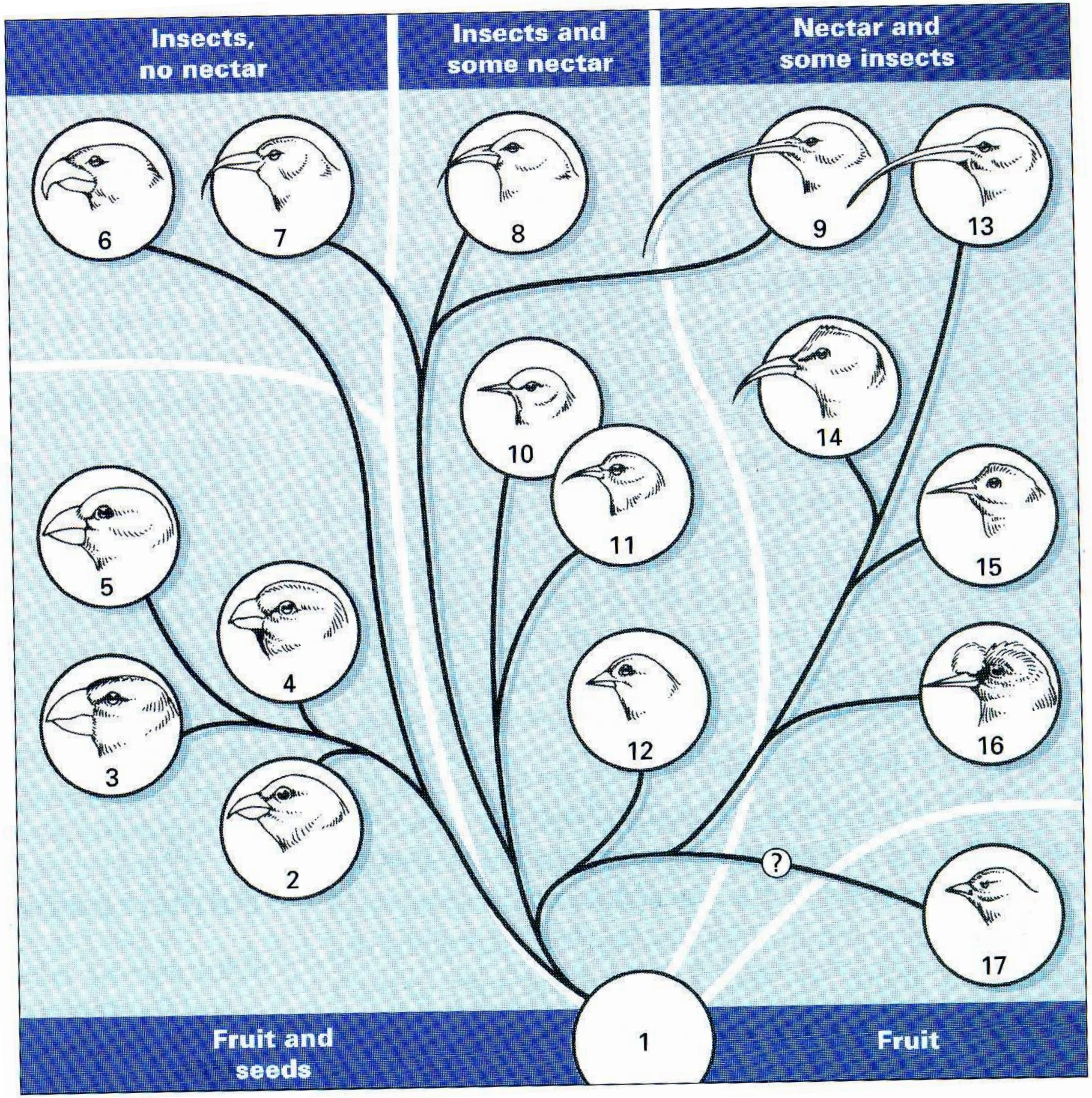




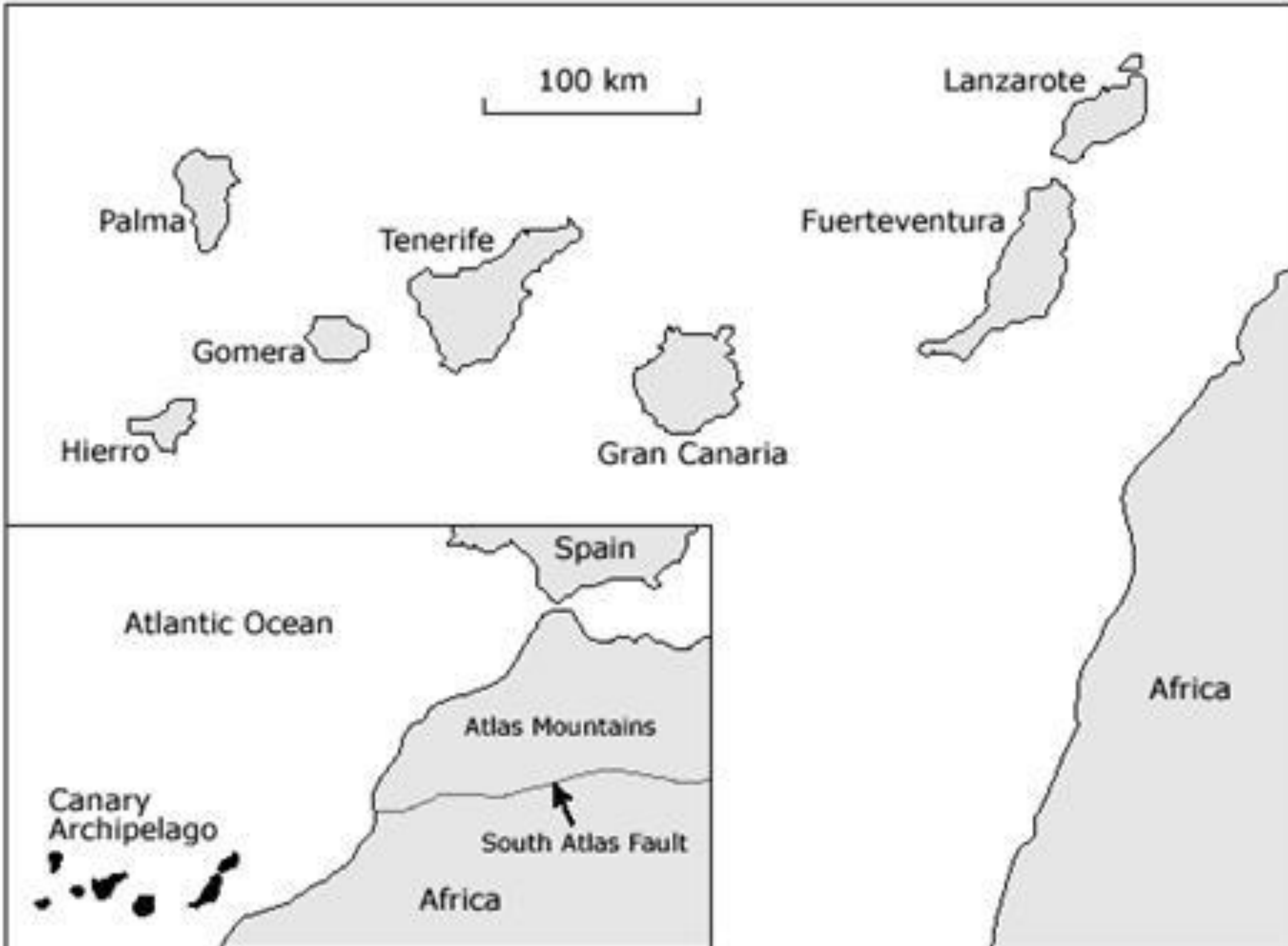



Águia das Filipinas, *Pithecophaga jefferyi*, é a maior águia do mundo. Ave de rapina é endêmica de florestas das Filipinas, onde é a ave nacional. Está criticamente ameaçada de extinção.

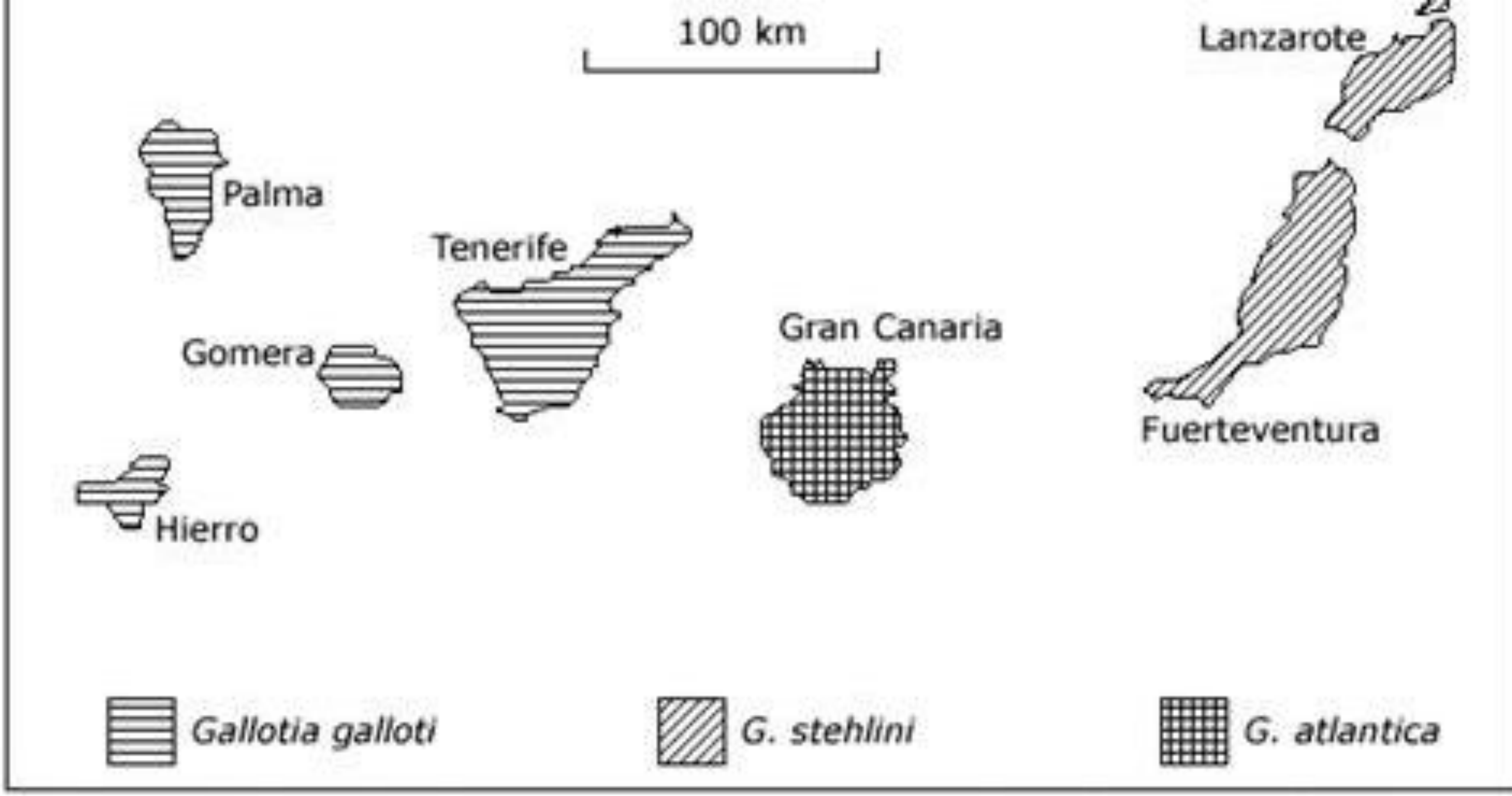
- morfologia particular;
- endemismo;
- pequena especialização trófica;
- vulnerabilidade;
- ausência de árvores.



A evolução da dieta e dos bicos de aves de ilhas do Hawaii (Cox & Moore, 2000).



Map 1. The Canary Islands Archipelago. (Redrawn from Anguita et al., 1986)



Map 2. Distribution of *Gallotia atlantica*, *G. stehlini*, and *G. galloti*. *G. galloti* has colonized the four westernmost islands and each population is morphologically distinct from the others. (Redrawn from Thorpe et al., 1993)



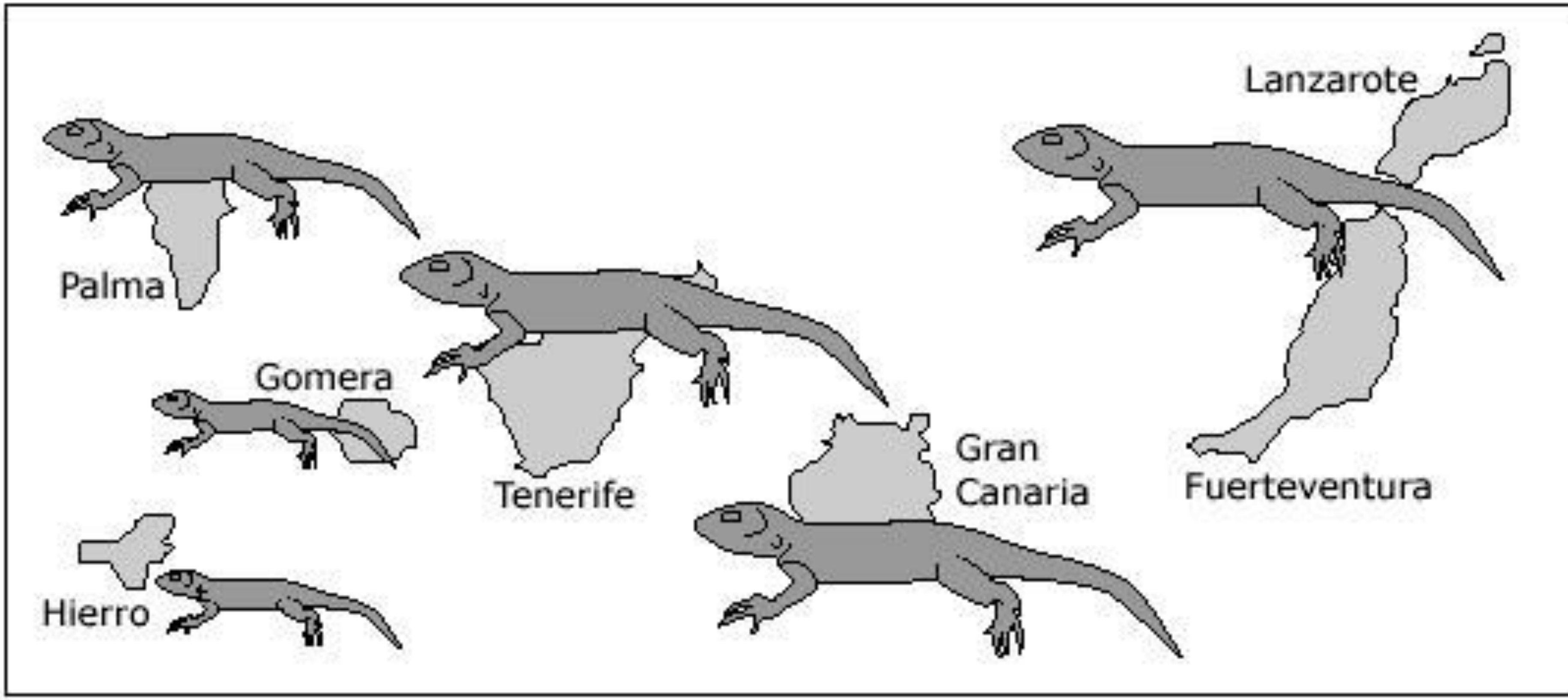
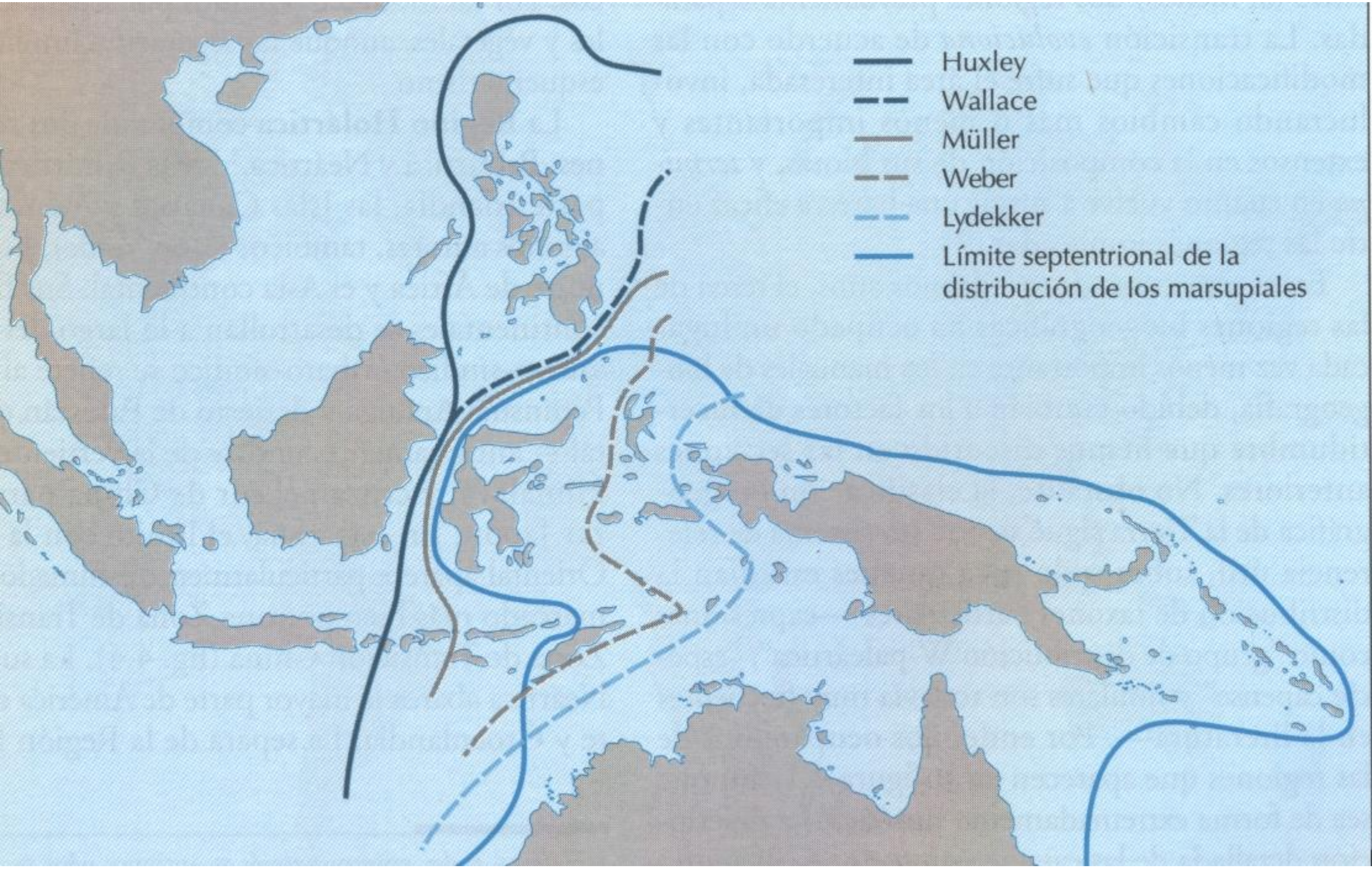


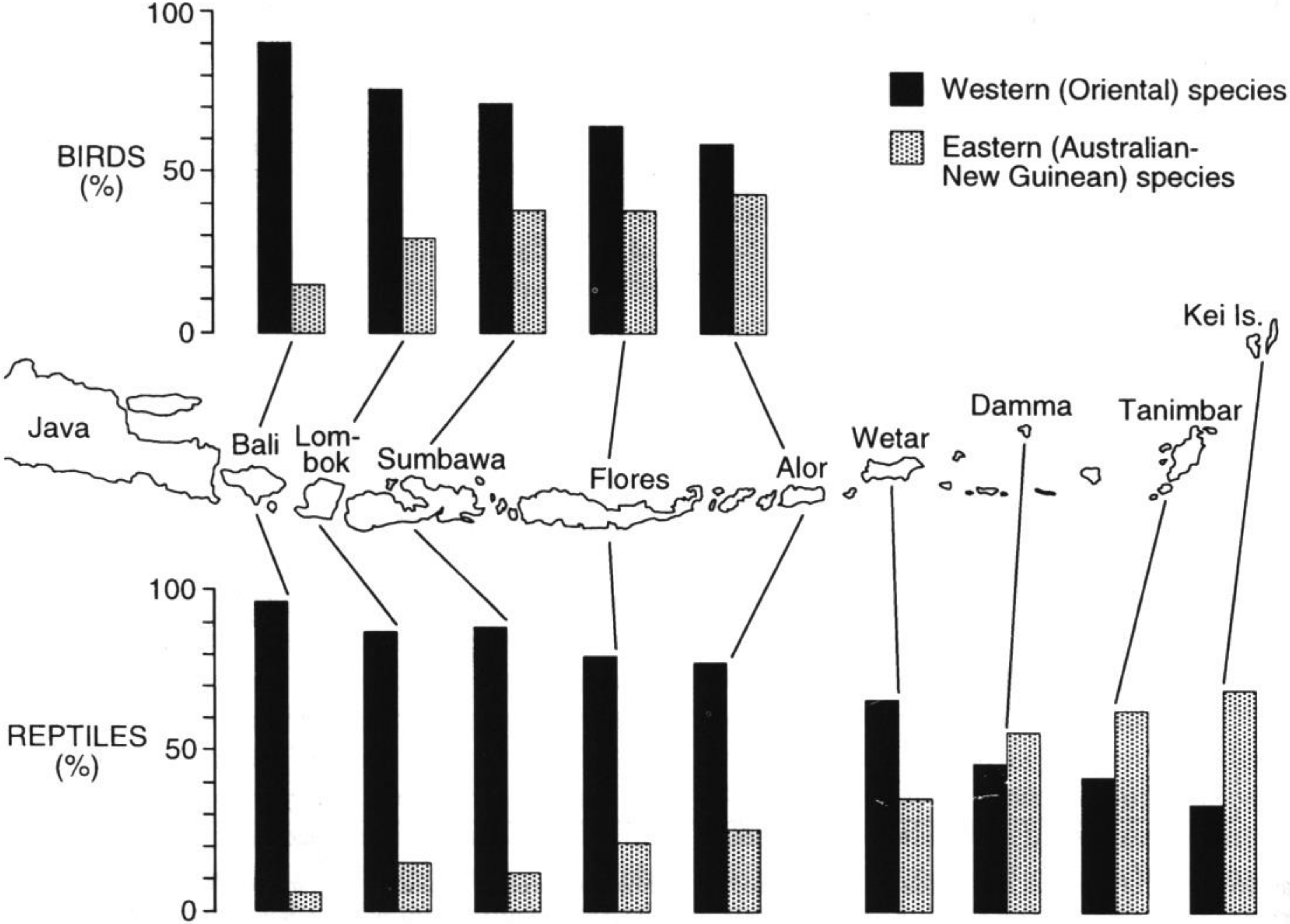
Figure 2. The relative sizes of typical lizards from each population are shown. (Redrawn from Thorpe et al., 1994)

Padrões de distribuição neoártico (azul) e neotropical (cinza) na Zona de Transição Mexicana (Zunino & Zullini, 2003).



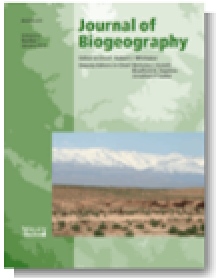
Fronteiras entre a Região Oriental e a Região Australiana segundo vários autores; Linha Wallacea (Zunino & Zullini, 2003).

Mar de China Meridional
Filipinas
Océano Pacífico
Mar de Célebes
Línea de Wallace
Sumatra
Borneo
Islas Talaud
Estrecho de Macasar
Mar de Java
Malucas
Célebes
Java
Océano índico
Mar de Banda
Flores
Ecuador
Timor
Mar de Timor
Nueva Guinea
Australia



Répteis e aves na zona de transição de Wallace, entre as regiões Oriental e Australiana (Whittaker, 1998).

Journal of Biogeography



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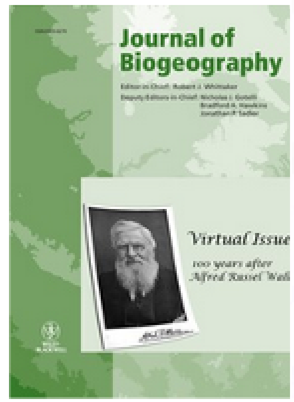
Online ISSN: 1365-2699

Associated Title(s): Diversity and Distributions, Global Ecology and Biogeograph

100 years after Alfred Russel Wallace



This selection of papers highlights the enduring legacy of Alfred Russel Wallace to biogeography 100 years after his death in November 1913. Wallace is perhaps best known for his co-discovery, alongside Charles Darwin, of the theory of evolution, but he is also recognized as a key founding father of zoogeography. Wallace regarded the delimitation and acceptance of the major zoogeographical regions of the world as being a crucial step in the study of the laws of distribution. In this virtual issue of the *Journal of Biogeography* we have therefore assembled a set of papers spanning 1983 to 2013 that focus, for the most part, on the problem of regionalization, providing illustration of the abiding relevance of Wallace's work today both for pure and applied biogeography.

Whittaker, R.J., Riddle, B.R., Hawkins, B.A. & Ladle, R.J. (2013) **The geographical distribution of life and the problem of regionalization: 100 years after A.R. Wallace**
Journal of Biogeography, **40**, 2209–2214

Smith, C.H. (1983a) **A system of world mammal faunal regions. I. Logical and statistical derivation of the regions**
Journal of Biogeography, **10**, 455–466.

Smith, C.H. (1983b) **A system of world mammal faunal regions II. The distance decay effect upon inter-regional affinities**
Journal of Biogeography, **10**, 467–482.


Journal of Biogeography (*J. Biogeogr.*) (2013) **40**, 2209–2214

EDITORIAL

The geographical distribution of life and the problem of regionalization: 100 years after Alfred Russel Wallace

This editorial marks the collation of a set of papers published in the *Journal of Biogeography* between 1983 and 2013 into a virtual issue highlighting the enduring legacy of Alfred Russel Wallace (1823–1913) within biogeography. Widely regarded as one of the founding fathers of biogeography, Wallace died in Dorset, England, on 7 November 1913, in a house he designed and built himself (Beccaloni, 2011). By the time of his death Wallace had a global reputation that went far beyond his fame as the co-discoverer of evolution by natural selection (http://people.wku.edu/charles.smith/index1.htm). His popularity during his lifetime derived from a vast breadth of interests, including his core scientific work in evolutionary biology, biogeography and glaciology, but also the more eccentric and difficult to appreciate interests in astrobiology, spiritualism and land reform (Smith, 2011). He was a prolific writer, and several of his fundamental contributions to biogeography were also accessible to an educated public, resulting in books such as *The Malay Archipelago* (Wallace, 1869), *The Geographical Distribution of Animals* (Wallace, 1876) and *Island Life* (Wallace, 1880) becoming popular and broadly read. Revolutionary technical scientific papers included the 'Sarawak' paper on speciation (Wallace, 1855) and the 'Ternate' paper on natural selection (Wallace, 1858). A vast array of additional insights into Wallace's thinking is to be found scattered within his many letters, essays and book reviews spanning from 1843 until his death (see http://people.wku.edu/charles.smith/index1.htm).

Some commentators feel that history has not been particularly kind to Wallace's legacy – relegating him to the role of Darwin's less inspired co-founder of the theory of natural selection (Gould, 2002) – perhaps a consequence of his turn towards teleological thinking and more metaphysical interests in his later years (Bira, 1998). Nevertheless, over the past decade or so, many scholars have attempted to resurrect Wallace's reputation as a leading Victorian scientist (Shermer, 2002; Smith, 2005; Smith & Beccaloni, 2011). The centenary of his passing has been marked by a number of commentaries (e.g. Heaney, 2013; Knapp, 2013) and by the publication of two new analyses of global zoogeographical regions that have explicitly paid tribute to Wallace's legacy as the creator of the first widely adopted map of global regions (Holt *et al.*, 2013; Rueda *et al.*, 2013).

Rather than attempting a comprehensive overview of Wallace as a scientist and activist, here we highlight his enduring contribution to the modern science of biogeography. We do so by introducing a virtual issue of the *Journal of Biogeography* in which we have gathered a series of key contributions published between 1983 and 2013 on a matter to which he devoted much attention – the problem of regionalization. These papers illustrate the enduring debt we still owe to the foundational work of Wallace and his contemporaries. With the extraordinary growth of scientific data and publications in recent decades, much of this legacy of knowledge and ideas is no longer routinely attributed back to 19th century (or even earlier) foundations. However, it can often be salutary to spend time browsing the back catalogue to rediscover not only the forgotten gems and insights (e.g. Hooker, 1867; Brown *et al.*, 2004) but also the many blind alleys.

Wallace was both a highly original thinker and a great synthesizer and promoter of scientific understanding through books such as *The Malay Archipelago* (1869), *The Geographical Distribution of Animals* (1876) and *Island Life* (1880). To complete the set of papers highlighting his legacy we therefore include a few papers that are not primarily focused on the problem of regionalization. Reading sections of Wallace's books can lead to a rather surprising realization that many of his insights have a distinctly modern ring to them (see summary in Box 2.1 in Lomolino *et al.*, 2010). Yet, he has been criticized retrospectively by several more recent biogeographers, notably Leon Croizat and the late 20th century vicariance biogeographers, as having been nothing more than a non-relevant old-school dispersalist (Michaux, 2011). In this context it is important to note that Wallace had no access to many of the foundational concepts (e.g. plate tectonics, Hennigian phylogenetics, phylogeography) or analytical tools (e.g. molecular systematics, stable isotopes, satellite imaging, geographical information systems, advanced statistics or mechanistic modeling) that we depend on today. It is thus intriguing to ask not only how relevant does his work remain to framing modern biogeographical scholarship, but also to what extent did his biogeographical syntheses and ideas withstand the test of time?

Wallace was not the inventor of the idea of zoogeographical regions, nor was he the first to publish a global map of the regions. Rather, he built upon a pioneering scheme by Philip Lutely Sclater (1858), who subdivided the world into six regions based upon the distribution of birds. Wallace, however, played a key role in developing the analysis of regions, promoting their use as an organizing principle of zoogeographical analysis (Wallace, 1876). He defended Sclater's initial efforts (Wallace, 1894) while popularizing the regions, not least through using them as an organizing framework in his books (e.g. Wallace, 1880). In his 1894 article *What are zoological regions?* Wallace wrote:

> Zoological regions are those primary divisions of the earth's surface of approximately continental extent, which are characterised by distinct assemblages of animal types. Though strictly natural... they have no absolute character as equal independent existences, since they may have been different in past ages, but are more or less conventional, being established solely for the purpose of facilitating the study of the existing geographical

http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291365-2699/homepage/100_years_after_alfred_russel_wallace.htm?campaign=dartwol|36957170

Journal of Biogeography (*J. Biogeogr.*) (2010) **37**, 2054–2066

SYNTHESIS

Integrating phylogenetic and taxonomic evidence illuminates complex biogeographic patterns along Huxley's modification of Wallace's Line

Jacob A. Esselstyn[1]*, Carl H. Oliveros[1], Robert G. Moyle[1], A. Townsend Peterson[1], Jimmy A. McGuire[2] and Rafe M. Brown[1]

[1]*Biodiversity Institute and Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence, KS 66045, USA,* [2]*Museum of Vertebrate Zoology, University of California, Berkeley, CA 94720, USA*

ABSTRACT

Aim Nearly 150 years ago, T. H. Huxley modified Wallace's Line, including the island of Palawan as a component of the Asian biogeographic realm and separating it from the oceanic Philippines. Although Huxley recognized some characteristics of a transition between the regions, Palawan has since been regarded primarily as a peripheral component of the Sunda Shelf. However, several recent phylogenetic studies of Southeast Asian lineages document populations on Palawan to be closely related to taxa from the oceanic Philippines, apparently contradicting the biogeographic association of Palawan with the Sunda Shelf. In the light of recent evidence, we evaluate taxonomic and phylogenetic data in an attempt to identify the origin(s) of Palawan's terrestrial vertebrate fauna.

Location The Sunda Shelf and the Philippines.

http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2699.2010.02378.x/pdf

Figure 1 Map of Southeast Asia showing the traditional view of the Sunda Shelf, which includes Palawan. Modern islands are shown in medium grey and the continental shelf is indicated by light grey. Delineation of the shelf approximates the 120 m isobath. However, the narrow, slightly deeper channel (*c*. 140 m) between Palawan and Borneo is included as part of the shelf in this depiction. Modified from Voris (2000). East of the Sunda Shelf lie the oceanic islands of Wallacea and the Sahul Shelf (Australia and New Guinea). Huxley's modification of Wallace's Line delineates the extent of Sundaland.

http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2699.2010.02378.x/pdf

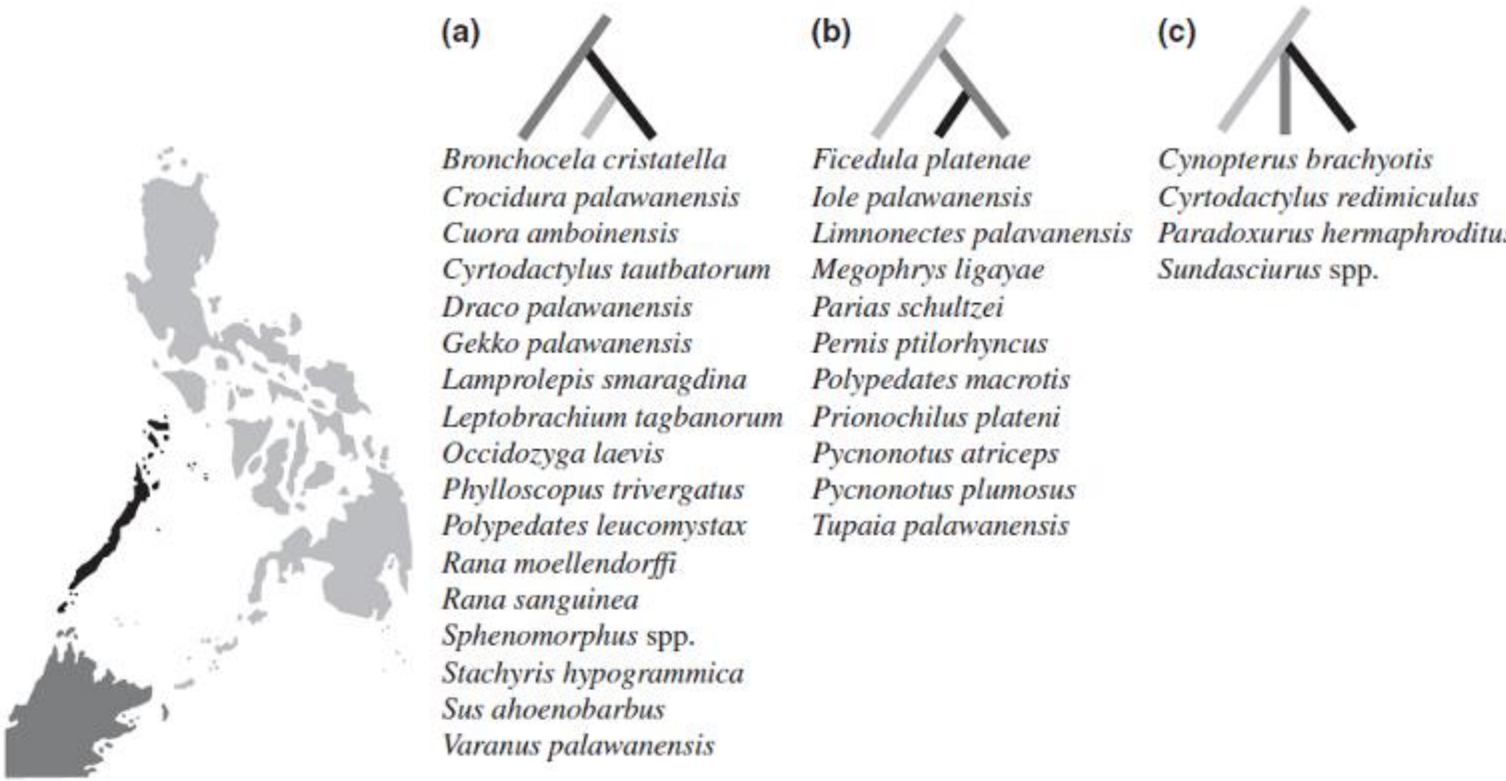
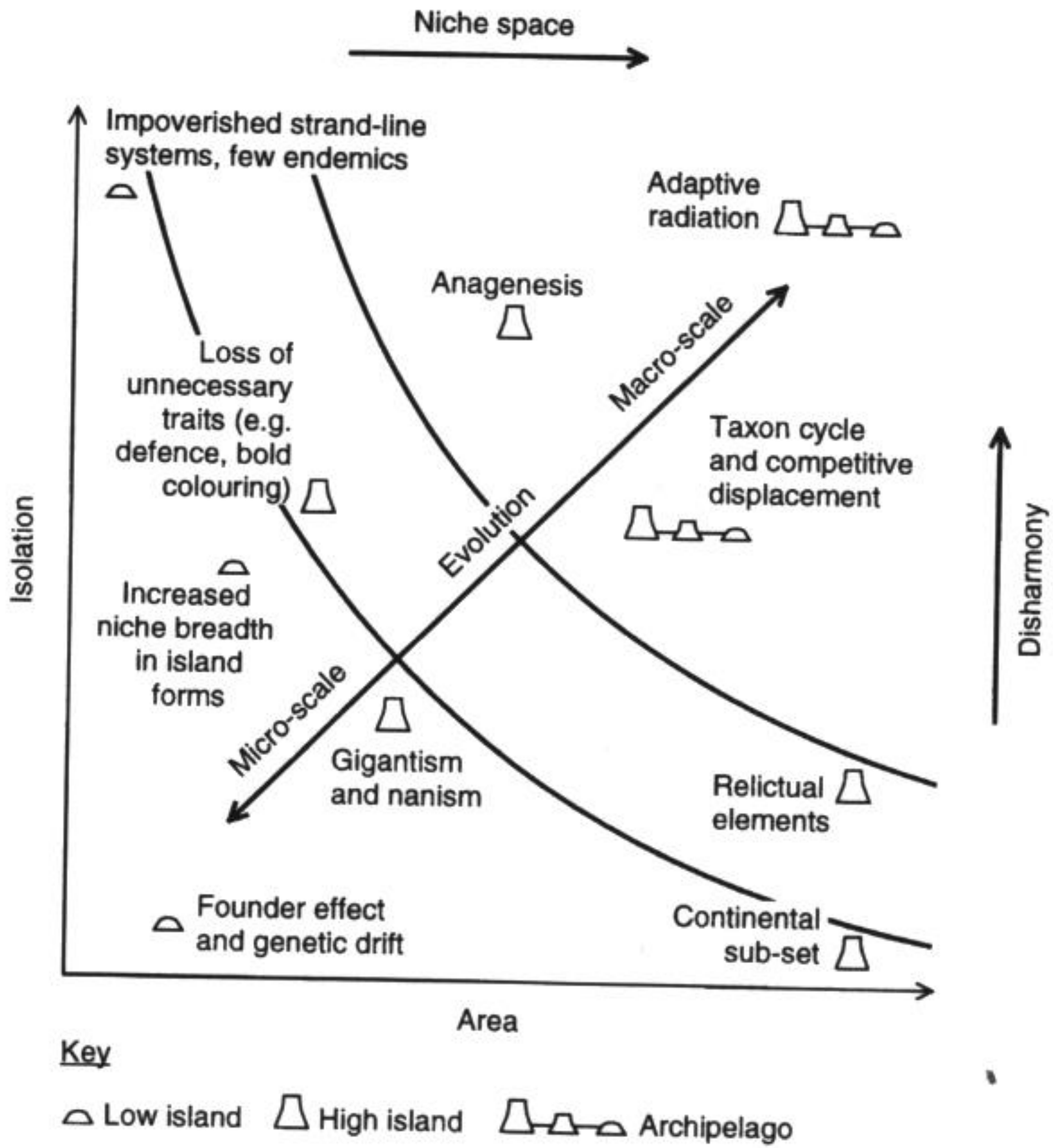
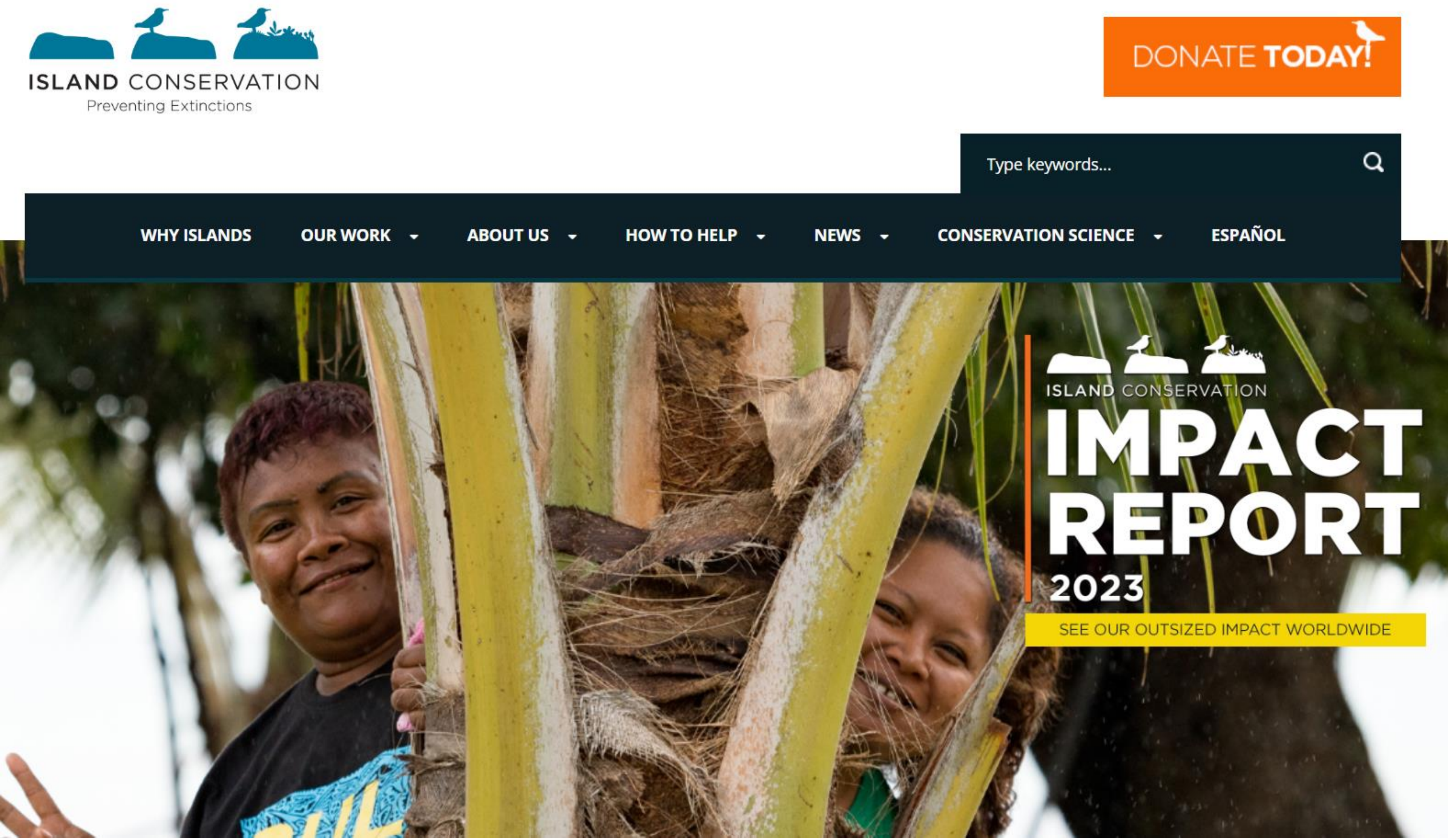


Figure 4 Map of the Philippines and northern Borneo alongside three common phylogenetic patterns where Palawan species are (a) sister to taxa from the oceanic Philippines, (b) sister to taxa from the Sunda Shelf or (c) have either ambiguous or undifferentiated relationships. Taxa fitting each pattern are listed below the schematic phylogeny. Species revealing other relationships (e.g. sister to Sulawesi populations) are not included. References are listed in Table 1.

http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2699.2010.02378.x/pdf



Modelo de evolução insular (Whittaker, 1998).



http://www.islandconservation.org/

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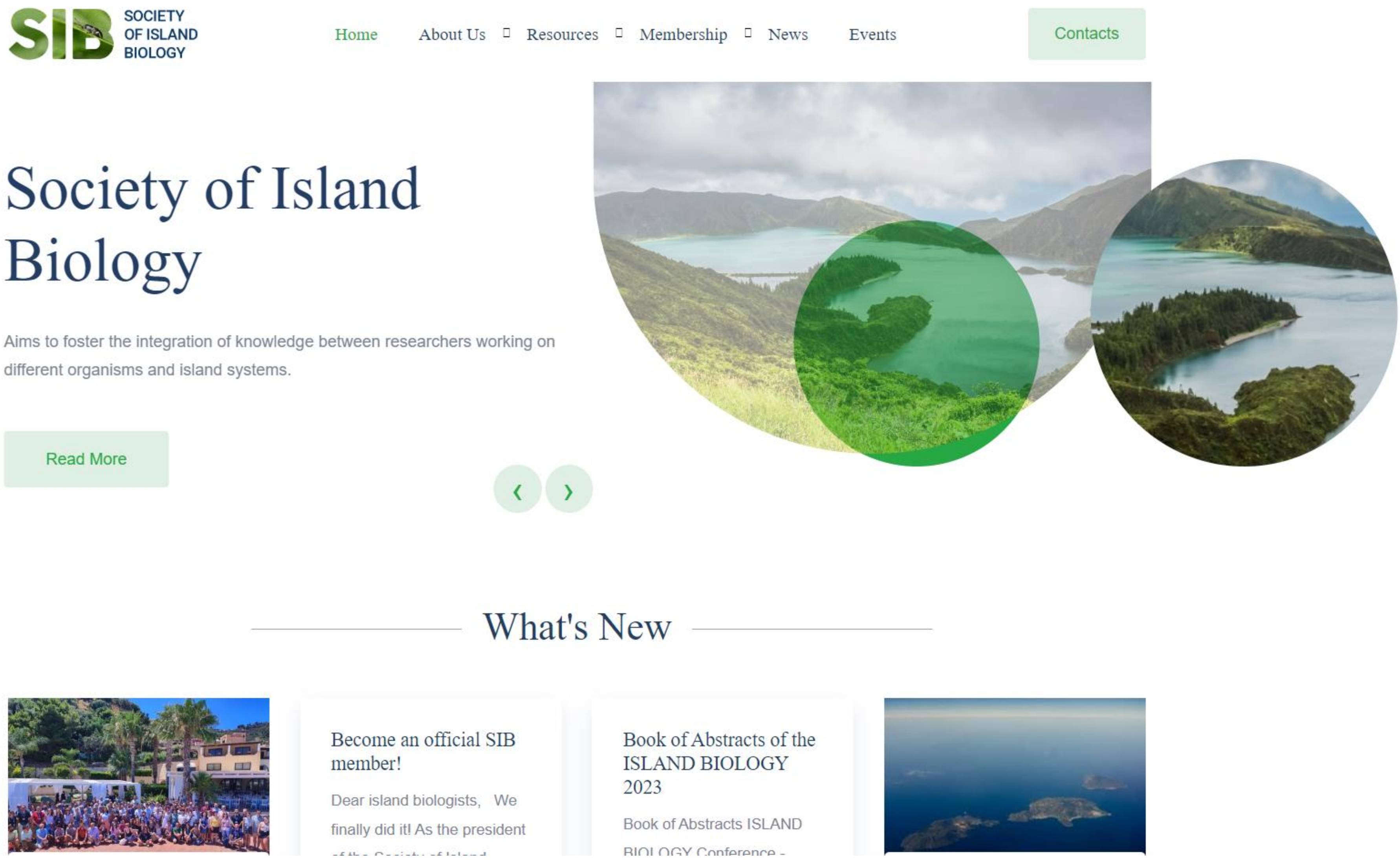
NEW Island Biology Virtual Issue

NEW Island Biology Virtual Issue

Prompted by the occasion of the Island Biology 2014 conference held at the University of Hawaii at Mānoa campus from 7 to 11 July 2014, we have selected a set of fourteen papers published in *Journal of Biogeography* and *Botanical Journal of the Linnean Society* between 2008 and 2014 to highlight topics currently gaining significant attention from our readership. The papers featured in this virtual issue illustrate the breadth and vitality of recent advances in island biogeography. The subject matter spans ecological networks within islands, macroecological patterns of species richness, biogeographical and evolutionary structure across archipelagos, and long-term reconstructions of island environments and how their dynamics interplay with their evolutionary biogeography. The selection also includes articles representing some of the most actively and productively researched archipelagos in the world, namely, Hawaii, Galapagos, Macaronesia, Wallacea and the West Indies. We hope you will enjoy browsing through these papers.

Guest Edited by Michael F. Fay and Robert J. Whittaker.

http://onlinelibrary.wiley.com/subject/code/000046/homepage/new_island_biology_virtual_issue.htm?campaign=wlytk-41856.2182523148



http://www.islandbiology.com


Instituto de Productos Naturales y Agrobiología

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Inicio » Investigación » Ciencias de la Vida y de la Tierra » Ecología y Evolución en Islas

MINISTERIO DE CIENCIA E INNOVACIÓN CSIC

Ciencias de la Vida y de la Tierra

Ecología y Evolución en Islas

Ecología y Evolución en Islas utiliza el modelo de las islas para cuantificar los patrones de diversidad biológica e identificar los procesos ecológicos y evolutivos que explicarían su origen, evolución y mantenimiento.

Perfil del grupo de Ecología y Evolución en Islas en Digital.CSIC.

Presentación | Líneas de investigación | Formación | Financiación | Personal | Publicaciones

Las investigaciones que se llevan a cabo en el Grupo de Ecología y Evolución en Islas (GEEI) se desarrollan en un contexto amplio. Éstas abarcan desde estudios a nivel individual, poblacional, y comunidades, incluyendo además estudios sobre sus redes de interacción, ya sean tróficas o mutualistas. Debido a que las islas están caracterizadas por prese... preguntas fundamentales de la ecología y la evolución intentando abordar, además, aspectos de la biología de

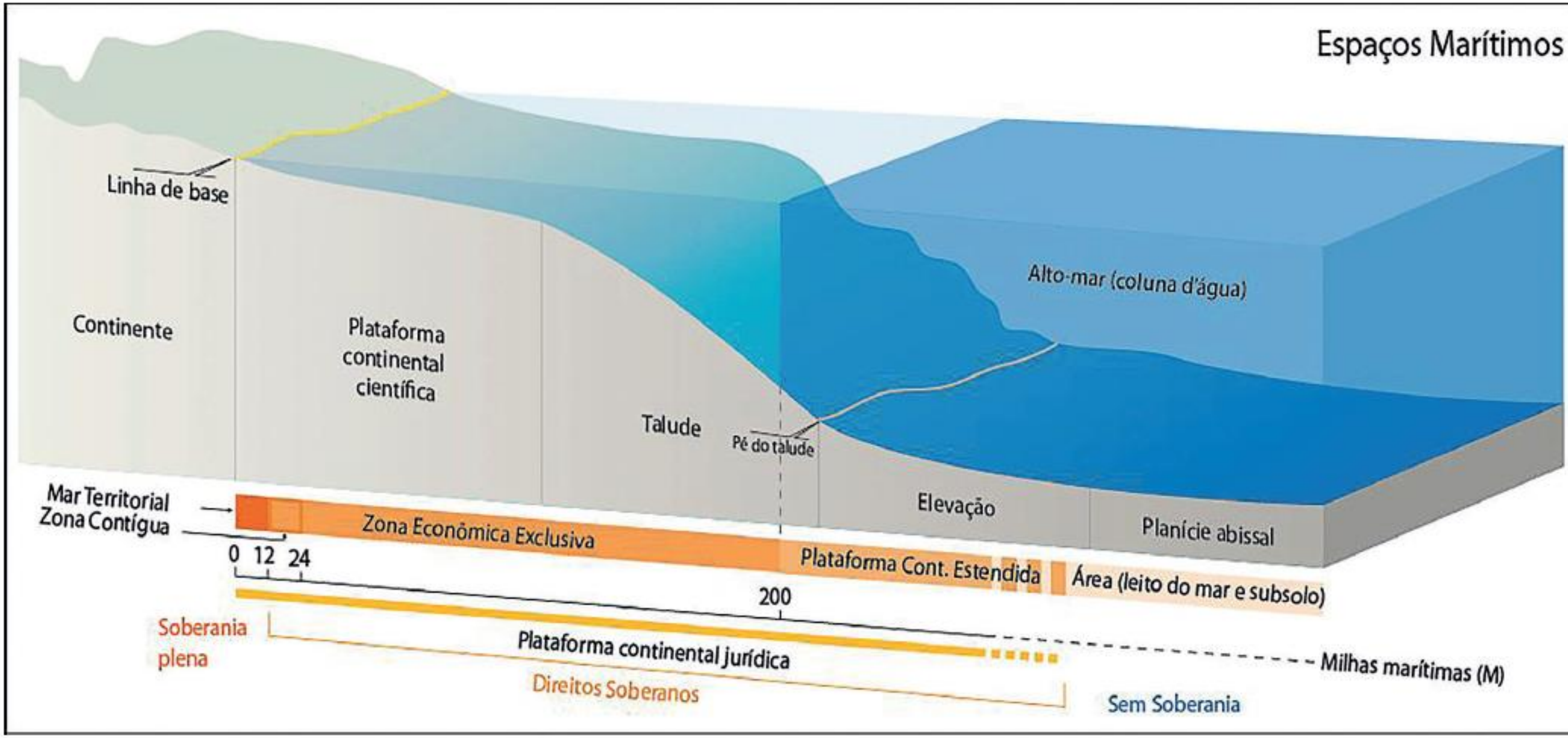
Brent C. Emerson

Ecología y Evolución en Islas

https://www.ipna.csic.es/grupo-de-investigacion/ecologia-y-evolucion-en-islas

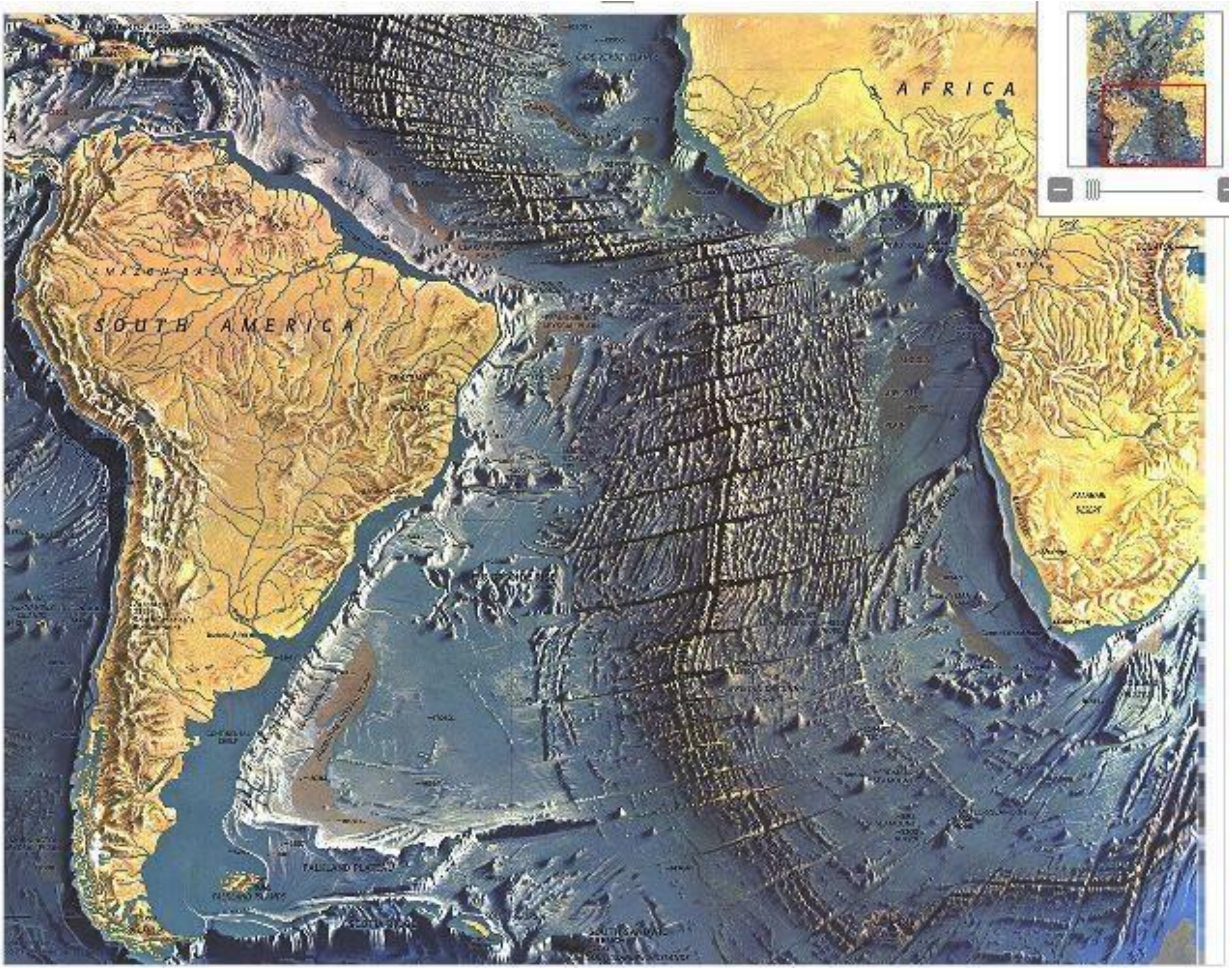
Convenção das Nações Unidas sobre o Direito do Mar (CNUDM)
UNCLOS (*United Nations Convention on the Law of the Sea*)

http://www.un.org/depts/los/



Fonte: UNEP/GRID-Arendal. *Maritime Zones.* (Adaptado)

http://funag.gov.br/loja/download/1100-Limites_exteriores_da_plataforma_continental_do_Brasil_conforme_o_Direito_do_Mar.pdf


AFRICA
SOUTH AMERICA

PART VI

CONTINENTAL SHELF

Article76

Definition of the continental shelf

1. The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.

2. The continental shelf of a coastal State shall not extend beyond the limits provided for in paragraphs 4 to 6.

3. The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.

4. (a) For the purposes of this Convention, the coastal State shall establish the outer edge of the continental margin wherever the margin extends beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured, by either:

(i) a line delineated in accordance with paragraph 7 by reference to the outermost fixed points at each of which the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of the continental slope; or

(ii) a line delineated in accordance with paragraph 7 by reference to fixed points not more than 60 nautical miles from the foot of the continental slope.

(b) In the absence of evidence to the contrary, the foot of the continental slope shall be determined as the point of maximum change in the gradient at its base.

5. The fixed points comprising the line of the outer limits of the continental shelf on the seabed, drawn in accordance with paragraph 4 (a)(i) and (ii), either shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured or shall not exceed 100 nautical miles from the 2,500 metre isobath, which is a line connecting the depth of 2,500 metres.

6. Notwithstanding the provisions of paragraph 5, on submarine ridges, the outer limit of the continental shelf shall not exceed 350 nautical miles from the baselines from which the breadth of the territorial sea is measured. This paragraph does not apply to submarine elevations that are natural components of the continental margin, such as its plateaux, rises, caps, banks and spurs.

http://www.un.org/depts/los/convention_agreements/texts/unclos/part6.htm

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DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA

Commission on the Limits of the Continental Shelf (CLCS)

1997-2017 - Twentieth anniversary of the establishment of the Commission on the Limits of the Continental Shelf

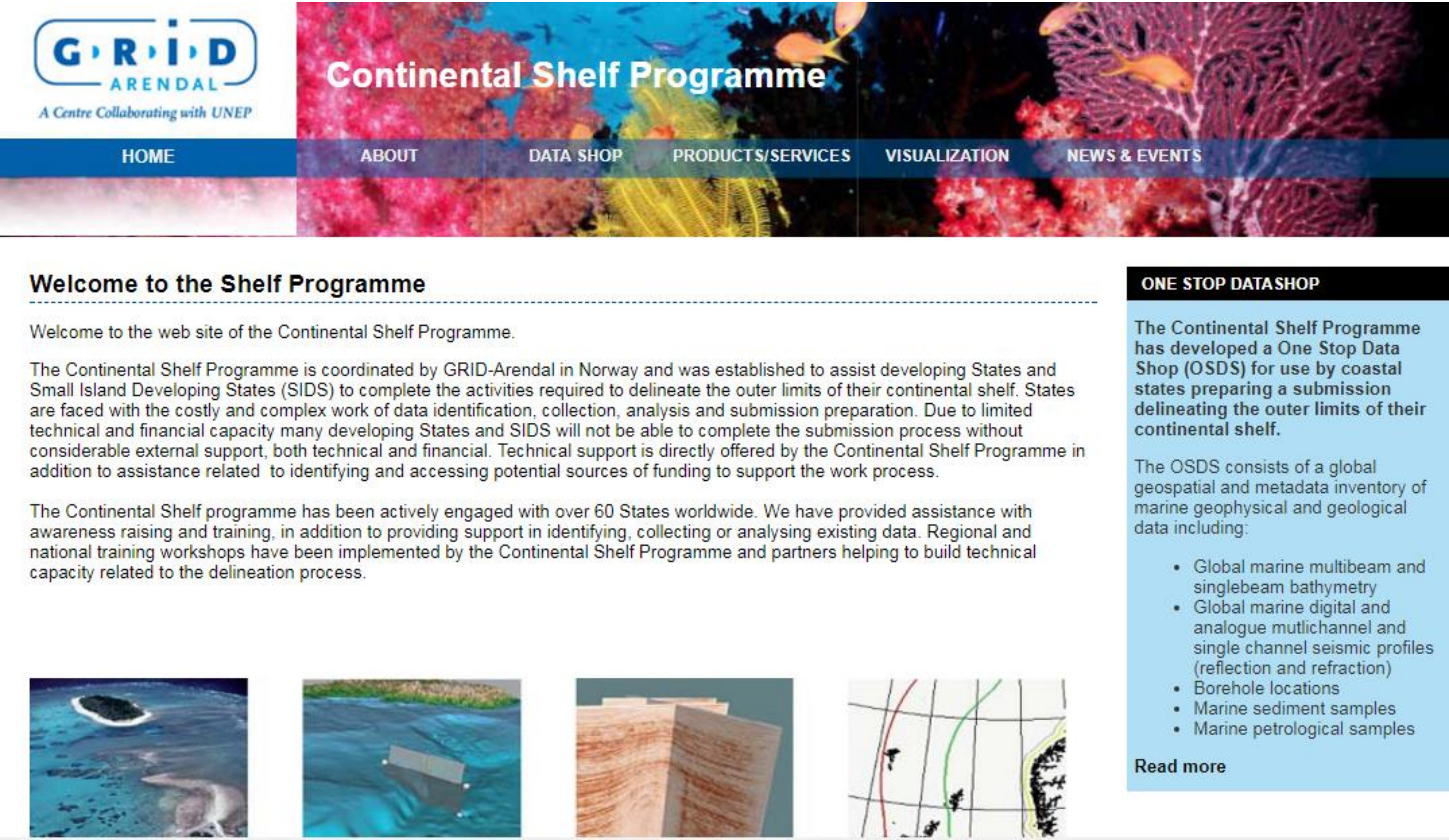
Last updated: 17 March 2017

THE COMMISSION, ITS PURPOSE AND FUNCTIONS

MEMBERS OF THE COMMISSION	OFFICERS OF THE COMMISSION	SUBSIDIARY BODIES	PRIVILEGES AND IMMUNITIES OF THE MEMBERS OF THE COMMISSION	SECRETARIAT

THE CONTINENTAL SHELF BEYOND 200 NAUTICAL MILES	DOCUMENTS OF THE COMMISSION	SUBMISSIONS AND RECOMMENDATIONS	ADVICE AND ASSISTANCE TO STATES	VOLUNTARY TRUST FUNDS
The definition and criteria for the establishment of the outer limits of the continental shelf beyond 200 nautical miles	Rules of Procedure of the Commission	Submissions and Recommendations	General Information	Actions taken at the 55th and 58th sessions of the General Assembly in 2000 and 2003
Issues with respect to article 4 of Annex II	Scientific and Technical Guidelines	Preliminary Information	Lists of websites for accessing data and information that may be relevant to the preparation of submissions	Trust fund for the purpose of facilitating the preparation of submissions - Terms of

http://www.un.org/depts/los/clcs_new/clcs_home.htm



GRID ARENDAL
A Centre Collaborating with UNEP

Continental Shelf Programme

HOME | ABOUT | DATA SHOP | PRODUCTS/SERVICES | VISUALIZATION | NEWS & EVENTS

Welcome to the Shelf Programme

Welcome to the web site of the Continental Shelf Programme.

The Continental Shelf Programme is coordinated by GRID-Arendal in Norway and was established to assist developing States and Small Island Developing States (SIDS) to complete the activities required to delineate the outer limits of their continental shelf. States are faced with the costly and complex work of data identification, collection, analysis and submission preparation. Due to limited technical and financial capacity many developing States and SIDS will not be able to complete the submission process without considerable external support, both technical and financial. Technical support is directly offered by the Continental Shelf Programme in addition to assistance related to identifying and accessing potential sources of funding to support the work process.

The Continental Shelf programme has been actively engaged with over 60 States worldwide. We have provided assistance with awareness raising and training, in addition to providing support in identifying, collecting or analysing existing data. Regional and national training workshops have been implemented by the Continental Shelf Programme and partners helping to build technical capacity related to the delineation process.

ONE STOP DATASHOP

The Continental Shelf Programme has developed a One Stop Data Shop (OSDS) for use by coastal states preparing a submission delineating the outer limits of their continental shelf.

The OSDS consists of a global geospatial and metadata inventory of marine geophysical and geological data including:

- Global marine multibeam and singlebeam bathymetry
- Global marine digital and analogue mutlichannel and single channel seismic profiles (reflection and refraction)
- Borehole locations
- Marine sediment samples
- Marine petrological samples

Read more

http://www.continentalshelf.org

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HOME | ABOUT | DATA SHOP | PRODUCTS/SERVICES | VISUALIZATION | NEWS & EVENTS

- Introduction
- Access to data
- Delineation workflow
- Data types/sources
- Technical spesifications of The OSDS
- Cost of using it
- Requesting data
- Presentations
- ECS Shapefile Downloads

Introduction

The Continental Shelf Programme has developed a One Stop Data Shop (OSDS) for use by coastal states preparing a submission delineating the outer limits of their continental shelf.

The OSDS consists of a global geospatial and metadata inventory of marine geophysical and geological data including:

- Global marine multibeam and singlebeam bathymetry
- Global marine digital and analogue mutlichannel and single channel seismic profiles (reflection and refraction)
- Borehole locations
- Marine sediment samples
- Marine petrological samples

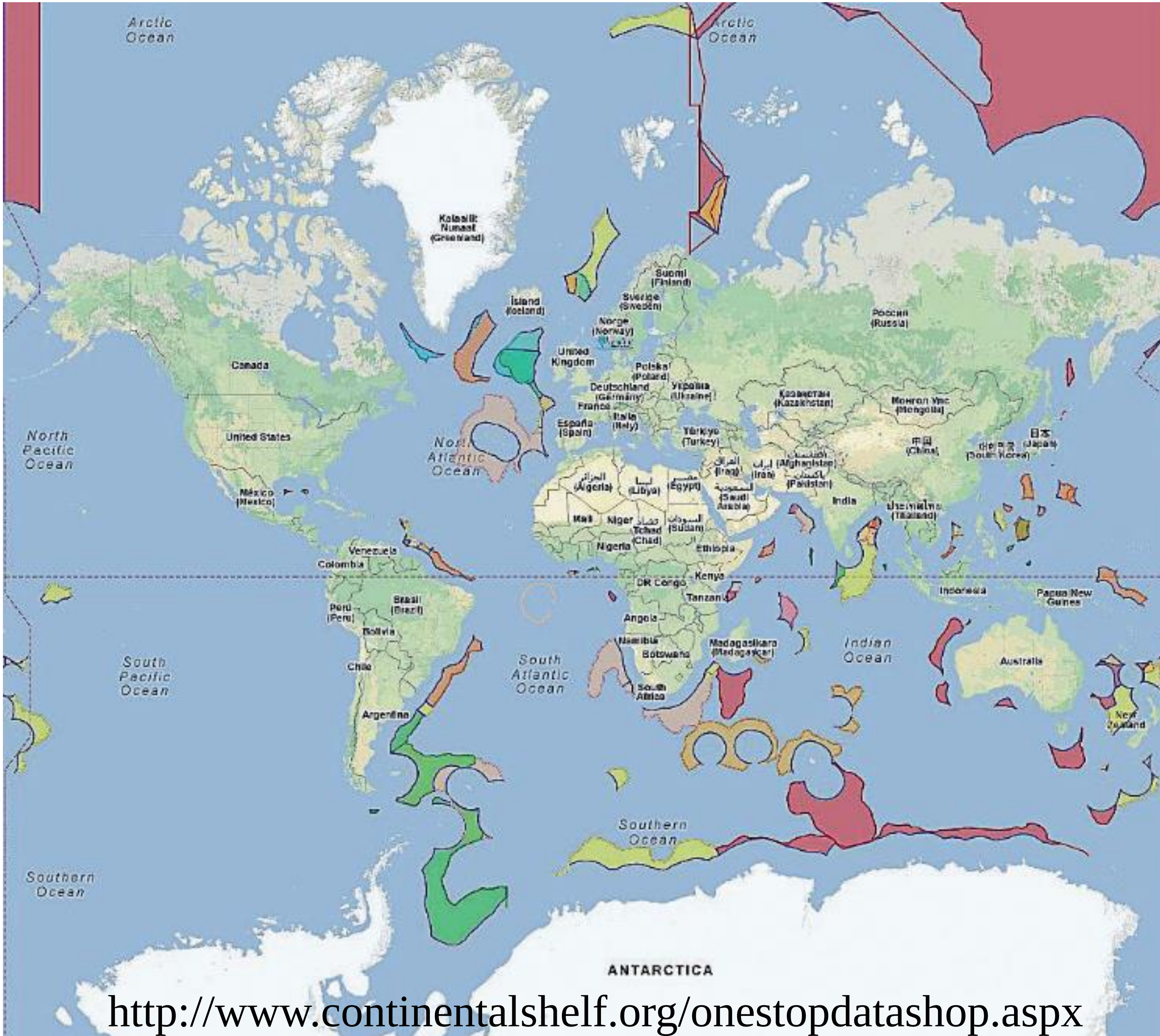
In addition to providing users with a single web-based portal that allows for the analysis of public marine geoscientific data available in a specific area of interest, agreements with participating institutions allow for distribution of data to eligible states on a request basis. The OSDS collects inventories of digital and analogue marine data including:

Updated Extended Continental Shelf Areas

View in Google Maps or in Google Earth

Data Inventory Map (ArcGIS Mapserver version)

http://www.continentalshelf.org/onestopdatashop.aspx



http://www.continentalshelf.org/onestopdatashop.aspx

Environmental Conservation

Island ecology and evolution: challenges in the Anthropocene

Part of: Humans and Island Environments

Published online by Cambridge University Press: **27 June 2017**

NATALIE R. GRAHAM, DANIEL S. GRUNER, JUN Y. LIM and ROSEMARY G. GILLESPIE

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Article contents

Summary

Islands are widely considered to be model systems for studying fundamental questions in ecology and evolutionary biology. The fundamental state factors that vary among island systems – geologic history, size, isolation and age – form the basis of mature phenomenological and predictive theory. In this review, we first highlight classic lines of inquiry that exemplify the historical and continuing importance of islands. We then show how the conceptual power of islands as 'natural laboratories' can be improved through functional classifications of both the biological properties of, and human impact on, insular systems. We highlight how global environmental change has been accentuated on islands, expressly because of their unique insular properties. We review five categories of environmental perturbation: climate change, habitat modification, direct exploitation, invasion and disease. Using an analysis of taxonomic checklists for the arthropod biotas of three well-studied island archipelagos, we show how taxonomists are meeting the challenge of biodiversity assessment before the biodiversity disappears. Our aim is to promote discussion on the tight correlations of the environmental health of insular systems to their continued importance as singular venues for discovery in ecology and evolutionary biology, as well as to their conservation significance as hotspots of endemism.

https://www.cambridge.org/core/journals/environmental-conservation/article/island-ecology-and-evolution-challenges-in-the-anthropocene/ED544F1DC261A1F7B9DD9DCF1C51C9F5/core-reader

THE COMING OF AGE OF ISLAND STUDIES

GODFREY BALDACCHINO

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Received: August 2003; revised November 2003

ABSTRACT
This paper presents insights into the emerging academic field of 'island studies', defined as the interdisciplinary study of islands on their own terms. This exposé is undertaken in two ways: conceptually, by means of a critical and judicious review of the literature across a number of disciplines; and analytically in relation to what is probably the most popular scholarly piece of non-fiction based on an island society written to date – *Coming of Age in Samoa* by Margaret Mead.

Key words: Island studies, Margaret Mead, Samoa, identity, externality, islandness

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https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1467-9663.2004.00307.x

Global Ecology and Biogeography, (Global Ecol. Biogeogr.) (2016) **25**, 751–768

SPECIAL ISSUE

New directions in island biogeography

Ana M. C. Santos[1,2]*, Richard Field[3] and Robert E. Ricklefs[4]

[1]Department of Biogeography and Global Change, Museo Nacional de Ciencias Naturales (CSIC), 28006 Madrid, Spain, [2]Centre for Ecology, Evolution and Environmental Changes (cE3c)/Azorean Biodiversity Group, Azores and Lisbon, Portugal, [3]School of Geography, University of Nottingham, Nottingham NG7 2RD, UK, [4]Department of Biology, University of Missouri at St Louis, One University Boulevard, St Louis, MO 63121, USA

ABSTRACT

Aim Much of our current understanding of ecological and evolutionary processes comes from island research. With the increasing availability of data on distributions and phylogenetic relationships and new analytical approaches to understanding the processes that shape species distributions and interactions, a re-evaluation of this ever-interesting topic is timely.

Location Islands globally.

Methods We start by arguing that the reasons why island research has achieved so much in the past also apply to the future. We then critically assess the current state of island biogeography, focusing on recent changes in emphasis, including research featured in this special issue of *Global Ecology and Biogeography*. Finally, we suggest promising themes for the future. We cover both ecological and evolutionary topics, although the greater emphasis on island ecology reflects our own backgrounds and interests.

Results Much ecological theory has been directly or indirectly influenced by research on island biotas. Currently, island biogeography is renascent, with

https://onlinelibrary.wiley.com/doi/epdf/10.1111/geb.12477

Journal of Biogeography (J. Biogeogr.) (2017) **44**, 963–983

SPECIAL PAPER

A roadmap for island biology: 50 fundamental questions after 50 years of *The Theory of Island Biogeography*

Jairo Patiño[1,2]*, Robert J. Whittaker[3,4], Paulo A.V. Borges[2], José María Fernández-Palacios[5], Claudine Ah-Peng[6], Miguel B. Araújo[4,7,8], Sergio P. Ávila[9], Pedro Cardoso[2,10], Josselin Cornuault[11], Erik J. de Boer[12], Lea de Nascimento[5], Artur Gil[2], Aarón González-Castro[1], Daniel S. Gruner[13], Ruben Heleno[14], Joaquín Hortal[8,15], Juan Carlos Illera[16], Christopher N. Kaiser-Bunbury[17], Thomas J. Matthews[2,18], Anna Papadopoulou[19], Nathalie Pettorelli[20], Jonathan P. Price[21], Ana M. C. Santos[2,8,22], Manuel J. Steinbauer[23], Kostas A. Triantis[2,24], Luis Valente[25], Pablo Vargas[26], Patrick Weigelt[27] and Brent C. Emerson[1,28]

[1]Island Ecology and Evolution Research Group, Instituto de Productos Naturales y Agrobiología, (IPNA-CSIC), La Laguna, Tenerife, Canary Islands, Spain, [2]Centre for Ecology, Evolution and Environmental Changes (cE3c)/Azorean Biodiversity Group, University of the Azores, Angra do Heroísmo and Ponta Delgada, Azores, Portugal, [3]School

ABSTRACT

Aims The 50th anniversary of the publication of the seminal book, *The Theory of Island Biogeography*, by Robert H. MacArthur and Edward O. Wilson, is a timely moment to review and identify key research foci that could advance island biology. Here, we take a collaborative horizon-scanning approach to identify 50 fundamental questions for the continued development of the field.

Location Worldwide.

https://onlinelibrary.wiley.com/doi/epdf/10.1111/jbi.12986

SPECIAL PAPER

A realignment of marine biogeographic provinces with particular reference to fish distributions

John C. Briggs[1]* and Brian W. Bowen[2]

[1]*Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR 97331, USA,* [2]*Hawaii Institute of Marine Biology, University of Hawaii, Kaneohe, HI 96744, USA*

ABSTRACT

Marine provinces, founded on contrasting floras or faunas, have been recognized for more than 150 years but were not consistently defined by endemism until 1974. At that time, provinces were based on at least a 10% endemism and nested within biogeographic regions that covered large geographic areas with contrasting biotic characteristics. Over time, some minor adjustments were made but the overall arrangement remained essentially unaltered. In many provinces, data on endemism were still not available, or were available only for the most widely studied vertebrates (fishes), a problem that is ongoing. In this report we propose a realignment for three reasons. First, recent works have provided new information to modify or redefine the various divisions and to describe new ones, including the Mid-Atlantic Ridge, Southern Ocean, Tropical East Pacific and Northeast Pacific. Second, phylogeographic studies have demonstrated genetic subdivisions within and between species that generally corroborated provinces based on taxonomic partitions, with a notable exception at the Indian–Pacific oceanic boundary. Third, the original separation of the warm-temperate provinces from the adjoining tropical ones has distracted from their close phylogenetic relationships. Here we propose uniting warm-temperate and tropical regions into a single warm region within each ocean basin, while still recognizing provinces within the warm-temperate and tropical zones. These biogeographic subdivisions are based primarily on fish distribution but utilize other marine groups for comparison. They are intended to demonstrate the evolutionary relationships of the living marine biota, and to serve as a framework for the establishment of smaller ecological units in a conservation context.

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E-mail: clingfishes@yahoo.com

Keywords

Endemism, evolution, fishes, marine biogeography, phylogeography, provinces, regions, speciation, zoogeography.

http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2699.2011.02613.x/pdf

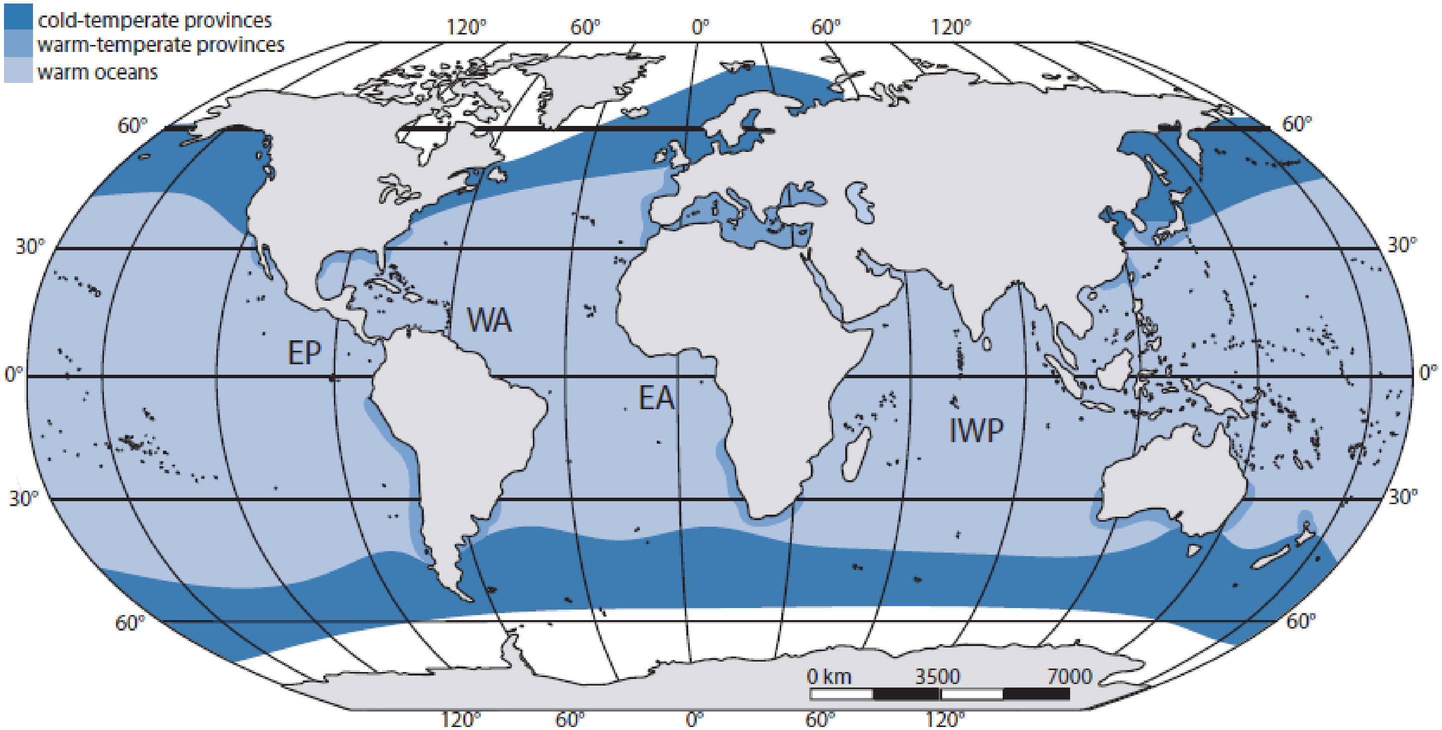


Figure 1 The realignment of marine biogeographic provinces eliminates the distinction between tropical and warm-temperate regions, and between cold and cold-temperate regions. Cold regions (Arctic and Antarctic) are depicted in white, and cold-temperate regions are depicted in dark blue. Warm-temperate provinces are depicted along the shore lines in medium blue, including Carolina and Argentinian provinces in the West Atlantic (WA); Lusitania, Black Sea, Caspian, Aral, and Benguela provinces in the East Atlantic (EA) and Mediterranean; Sino-Japanese, Auckland, Kermadec, Southeastern Australian and Southwestern Australian provinces in the Indo-West Pacific (IWP); California and Peru-Chilean provinces in the East Pacific (EP). See text for precise geographic boundaries and additional warm-temperate provinces at oceanic islands.

http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2699.2011.02613.x/pdf

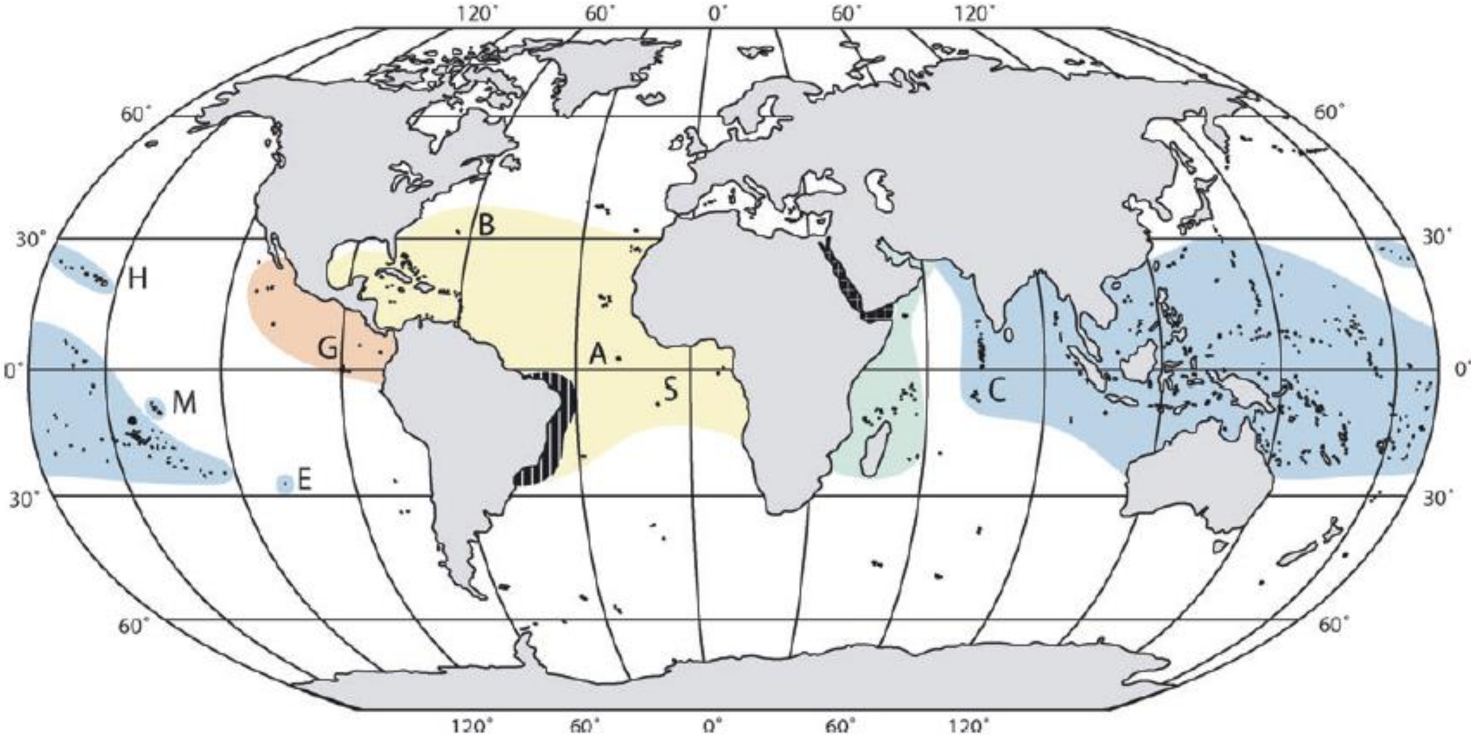


Figure 2 Tropical regions and provinces, including the Indo-Polynesian, Hawaiian, Marquesas and Easter Island provinces (blue), the East Pacific Region (orange), the East and West Atlantic regions (yellow), and the Western Indian Ocean Province (green). Vertical bars indicate the Brazilian Province, and crosshatching indicates the Red Sea Province. Selected islands and archipelagos are indicated with the following abbreviations: H, Hawaii; M, Marquesas; E, Easter; G, Galapagos; B, Bermuda; A, Ascension; S, St Helena; C, Chagos. The Chagos is depicted here as part of the Indo-Polynesian Province, but has faunal affinities with both the Indo-Polynesian Province and the Western Indian Ocean Province (Winterbottom & Anderson, 1997; Gaither *et al.*, 2011).

http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2699.2011.02613.x/pdf

Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas

DATE:

THIS PUBLICATION RELATES TO:

Science Oceans

https://www.worldwildlife.org/publications/marine-ecoregions-of-the-world-a-bioregionalization-of-coastal-and-shelf-areas

Marine Ecoregions of the World (MEOW) is a biogeographic classification of the world's coasts and shelves. It is the first ever comprehensive marine classification system with clearly defined boundaries and definitions and was developed to closely link to existing regional systems. The ecoregions nest within the broader biogeographic tiers of Realms and Provinces.

MEOW represents broad-scale patterns of species and communities in the ocean, and was designed as a tool for planning conservation across a range of scales and assessing conservation efforts and gaps worldwide. The current system focuses on coast and shelf areas and does not consider realms in pelagic or deep benthic environment. It is hoped that parallel but distinct systems for pelagic and deep benthic biotas will be devised in the near future.

The project was led by WWF and The Nature Conservancy, with broad input from a working group representing key NGO, academic and intergovernmental conservation partners.

Download (982 KB)

Marine Ecoregions of the World

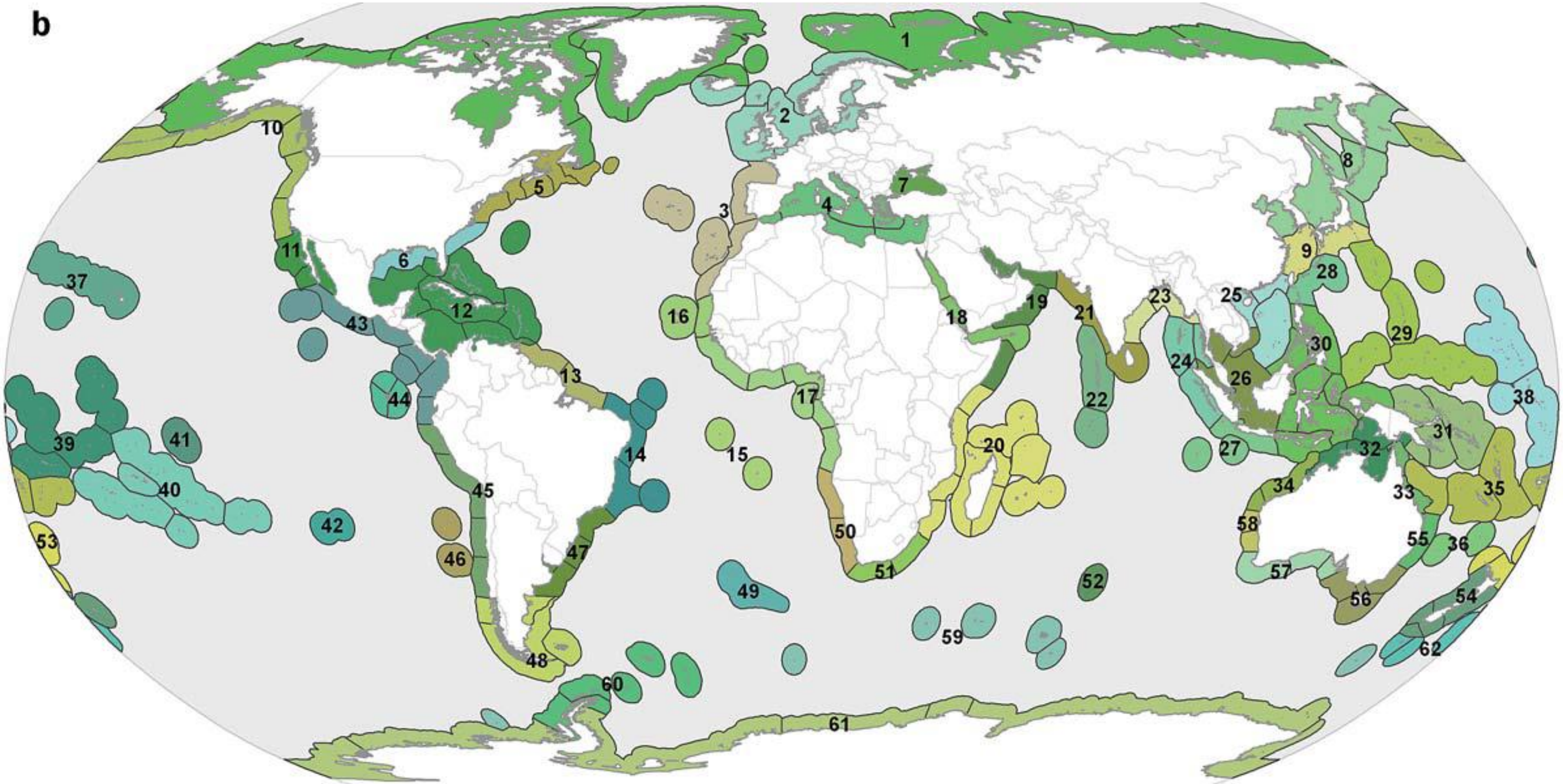
https://www.conservationgateway.org/ConservationPractices/Marine/Documents/Spalding%20et%20al%20MEOW.pdf

A nested, biogeography of marine ecosytems, made up of the following units (as defined in Spalding et al. 2007):

Realm: "Very large regions of coastal, benthic, or pelagic ocean across which biotas are internally coherent at higher taxonomic levels, as a result of a shared and unique evolutionary history. Realms have high levels of endemism, including unique taxa at generic and family levels in some groups. Driving factors behind the development of such unique biotas include water temperature, historical and broadscale isolation, and the proximity of the benthos."

Provinces: "Large areas defined by the presence of distinct biotas that have at least some cohesion over evolutionary time frames. Provinces will hold some level of endemism, principally at the level of species. Although historical isolation will play a role, many of these distinct biotas have arisen as a result of distinctive abiotic features that circumscribe their boundaries. These may include geomorphological features (isolated island and shelf systems, semienclosed seas); hydrographic features (currents, upwellings, ice dynamics); or geochemical influences (broadest-scale elements of nutrient supply and salinity)."

Ecoregions: "Areas of relatively homogeneous species composition, clearly distinct from adjacent systems. The species composition is likely to be determined by the predominance of a small number of ecosystems and/or a distinct suite of oceanographic or topographic features. The dominant biogeographic forcing agents defining the ecoregions vary from location to location but may include isolation, upwelling, nutrient inputs, freshwater influx, temperature regimes, ice regimes, exposure, sediments, currents, and bathymetric or coastal complexity."



(b) Provinces with ecoregions outlined.

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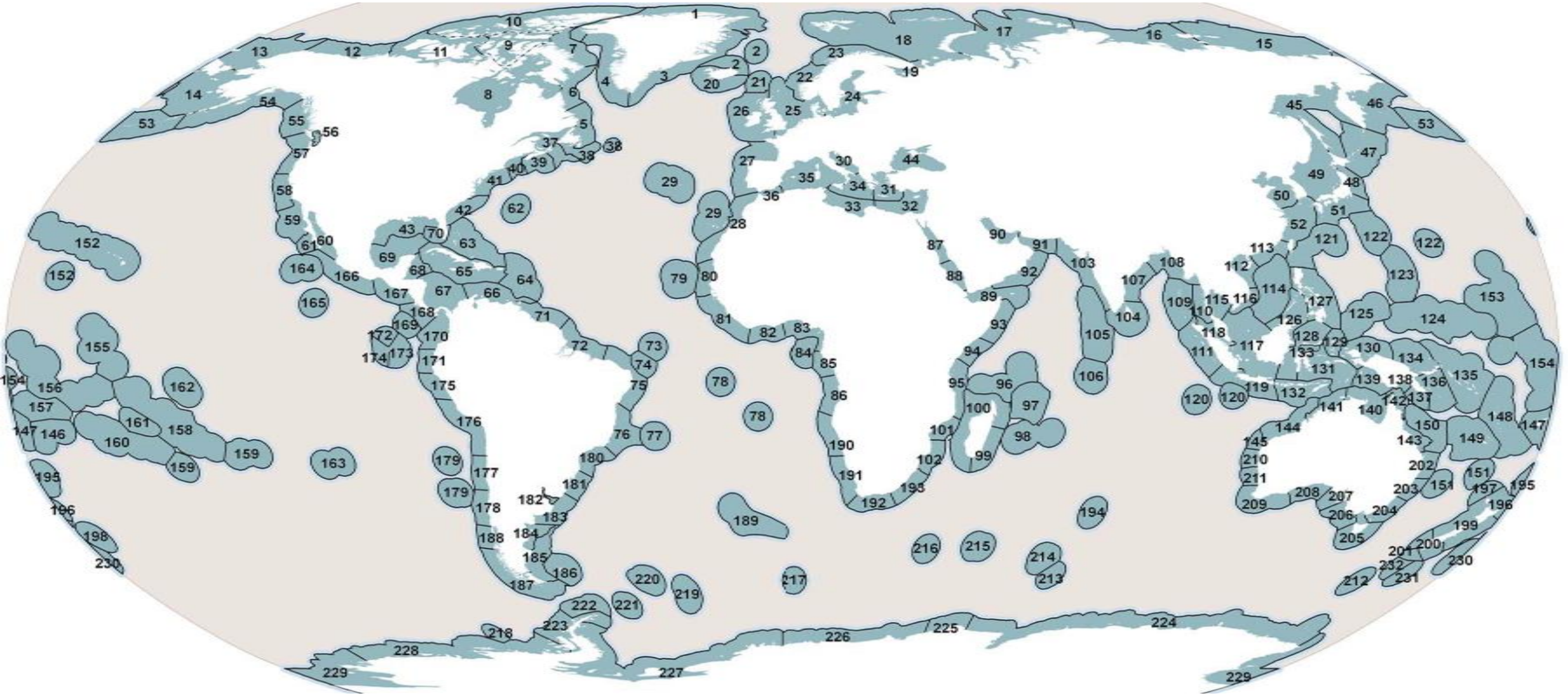

Final biogeographic framework, showing ecoregions.

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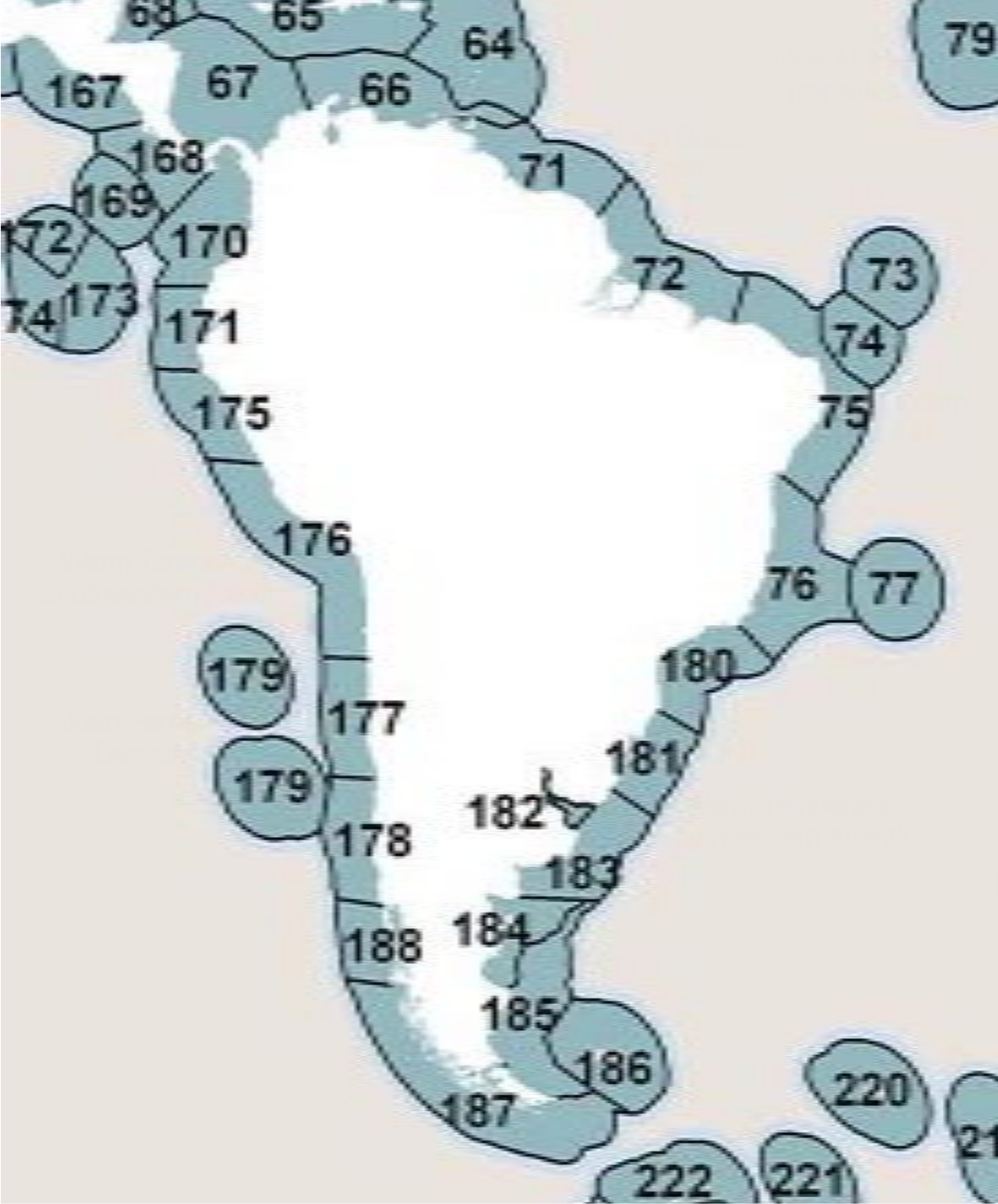

Marine Ecoregions of the World provinces (labeled) and their ecoregion subdivision boundaries

https://academic.oup.com/bioscience/article/57/7/573/238419?searchresult=1

DATA BASIN

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Marine Ecoregions of the World

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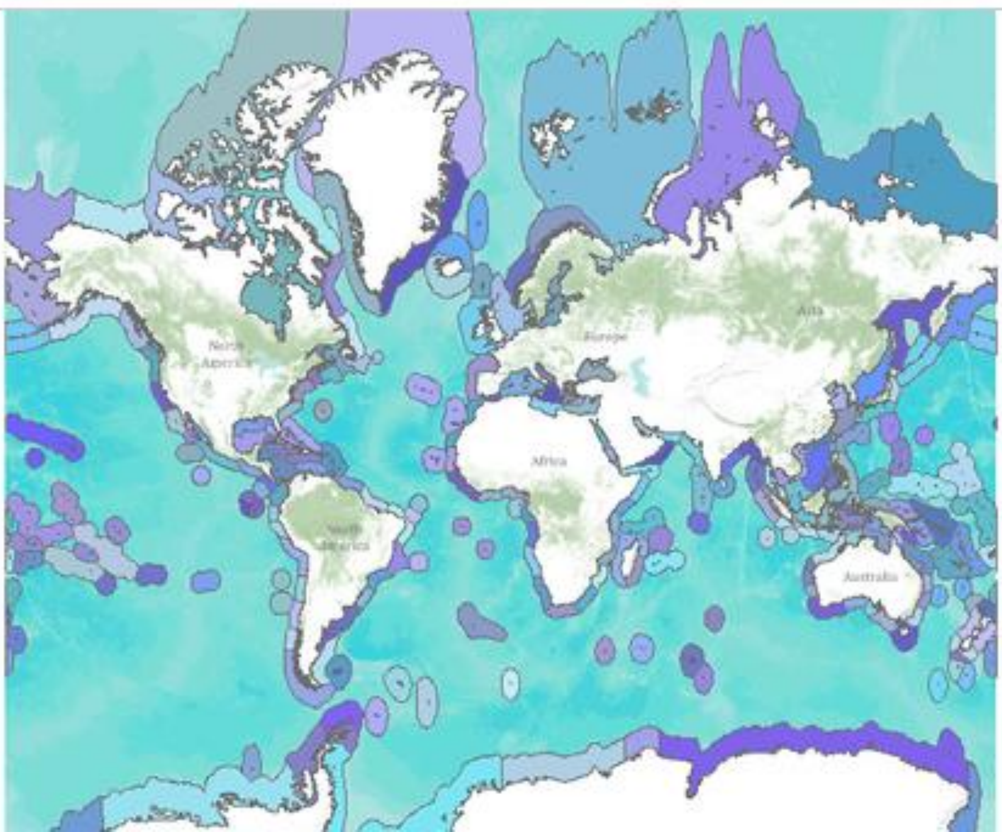

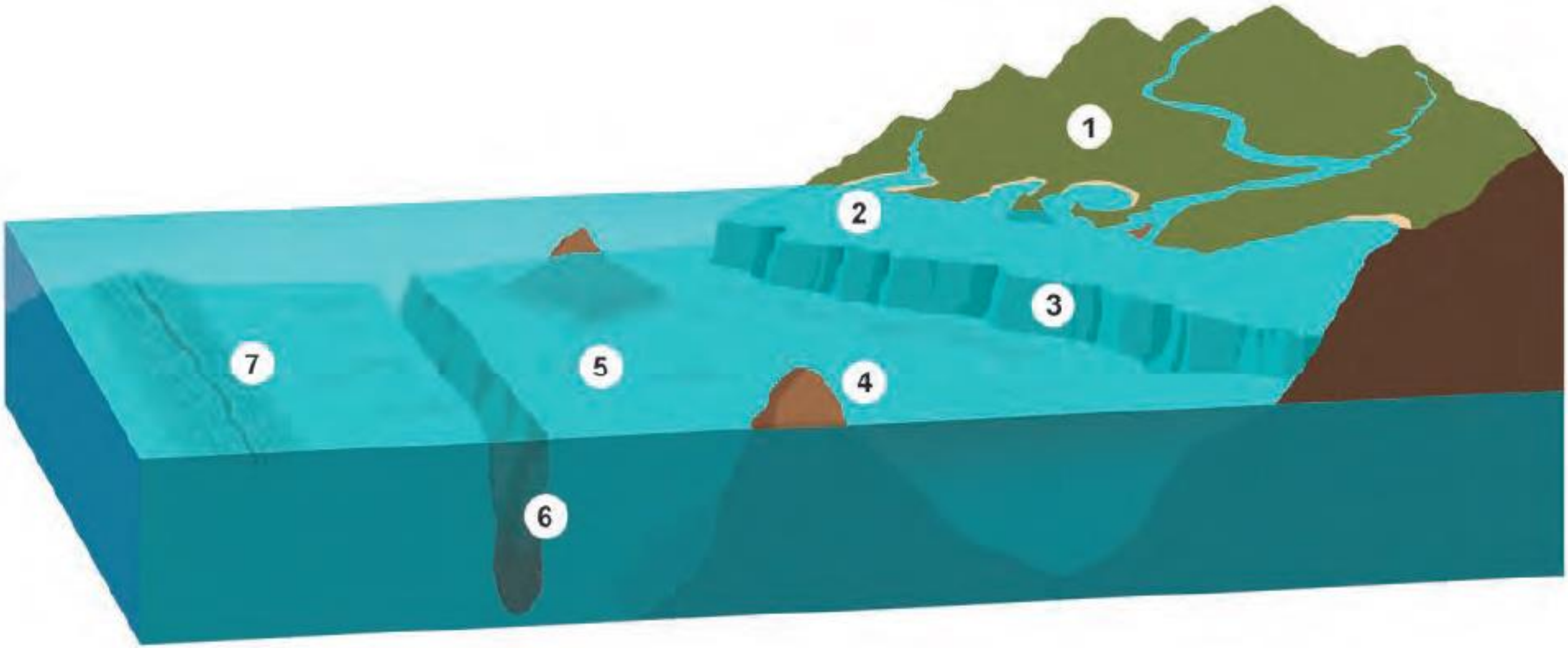

1 - Continente
2 - Plataforma continental
3 - Talude
4 - Ilha
5 - Planície abissal
6 - Fossa abissal
7 - Dorsal oceânica

CONHEÇA OS ECOSSISTEMAS COSTEIROS

O Projeto Ecossistemas Costeiros acredita que à partir do conhecimento, pode-se desenvolver um sentimento de responsabilidade e, através deste vínculo afetivo, a vontade de cuidar e preservar.

Clique sobre um dos ambientes e boa navegação!

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- COSTÃO ROCHOSO
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- MATA ATLÂNTICA

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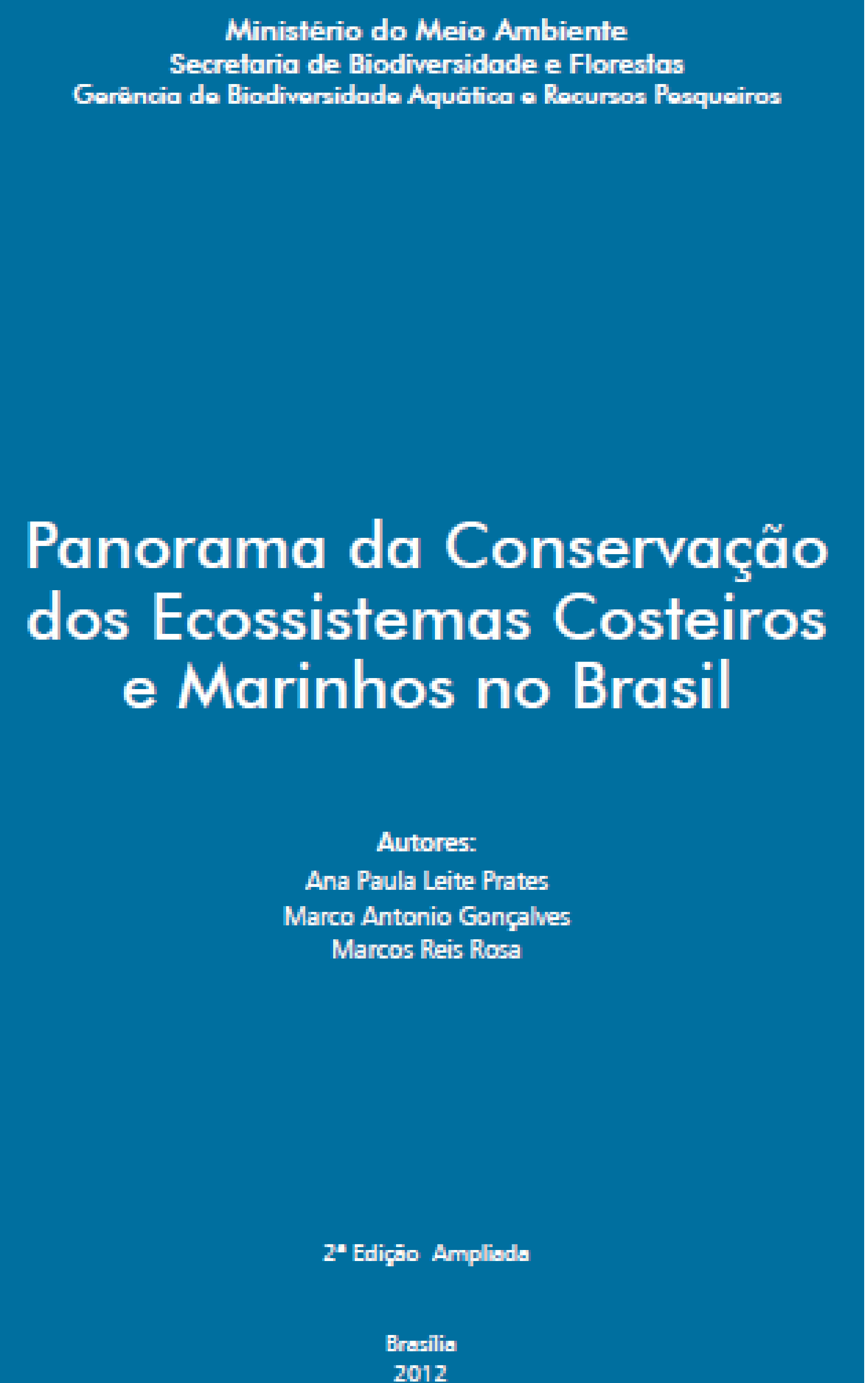

Ministério do Meio Ambiente
Secretaria de Biodiversidade e Florestas
Gerência de Biodiversidade Aquática e Recursos Pesqueiros

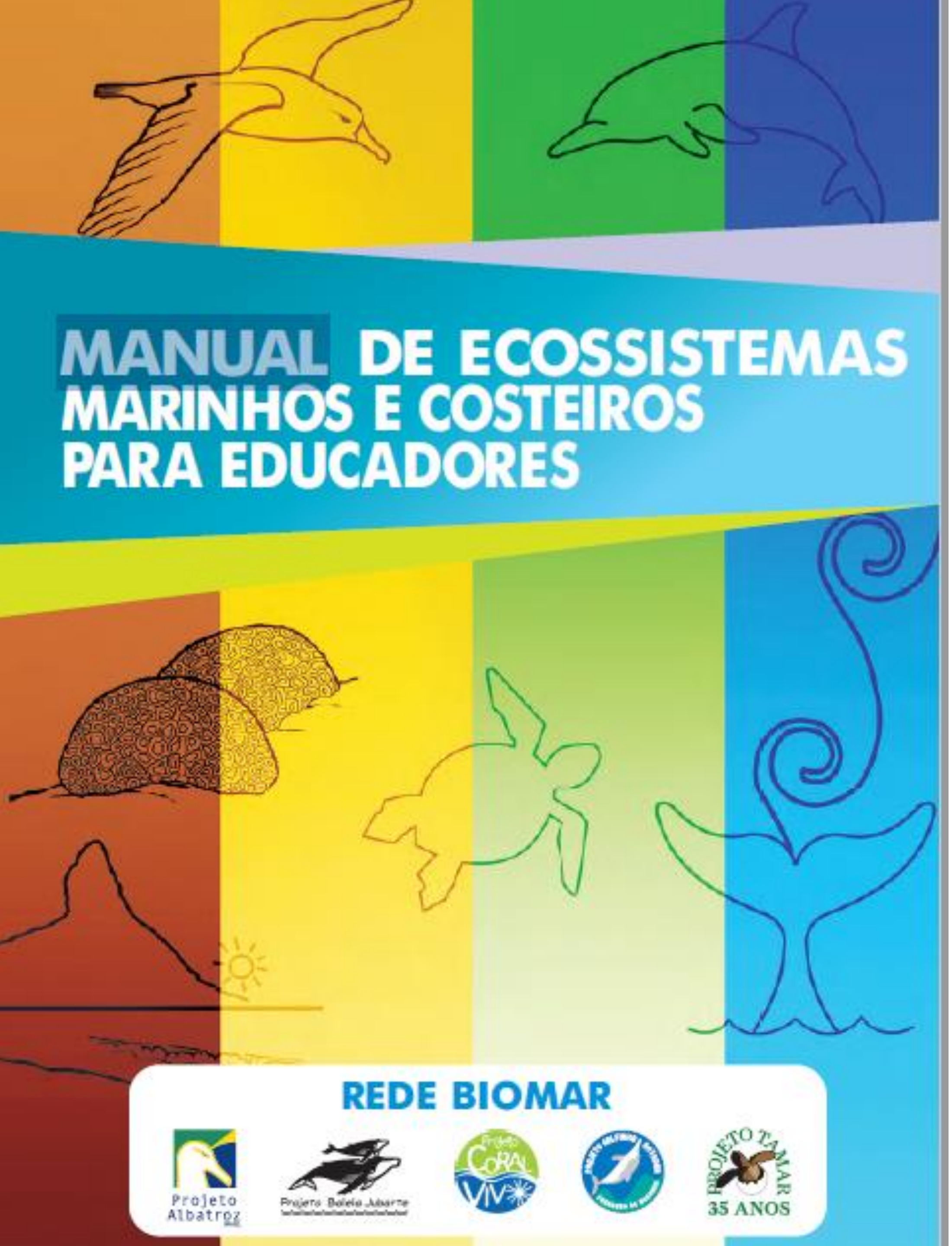
Panorama da Conservação dos Ecossistemas Costeiros e Marinhos no Brasil

Autores:
Ana Paula Leite Prates
Marco Antonio Gonçalves
Marcos Reis Rosa

2ª Edição Ampliada

Brasília
2012

https://www.google.com.br/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiVv_i8q4zXAhUFPiYKHYDCCVAQFggqMAA&url=http%3A%2F%2Fwww.mma.gov.br%2Fpublicacoes%2Fbiodiversidade%2Fcategory%2F53-biodiversidade-aquatica%3Fdownload%3D21%3Apanorama-da-conservacao-dos-ecossistemas-costeiros-e-marinhos-no-brasil&usg=AOvVaw3LQgjNzoenR-Dek4AeI0br



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ECOSSISTEMAS COSTEIROS E MARINHOS: AMEAÇAS E LEGISLAÇÃO NACIONAL APLICÁVEL

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Cultura - 09/10/2017

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Por Luiz Prado - Editorias: Cultura

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Amazônia Azul é a "ampla área de espelho d'água, leito e subsolo marítimos sobre a qual incidem direitos econômicos do Brasil" – Foto: Marcos Santos/USP Imagens

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