Classificação de bacias sedimentares

Renato Paes de Almeida

1978

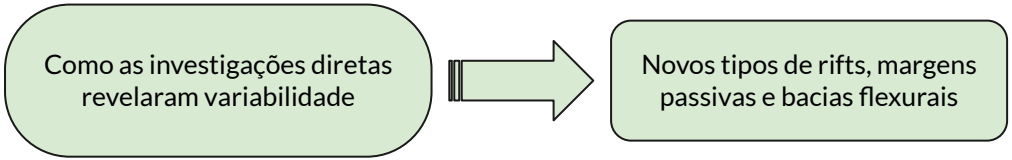
Earth-Science Reviews, 14 (1978) 1—34

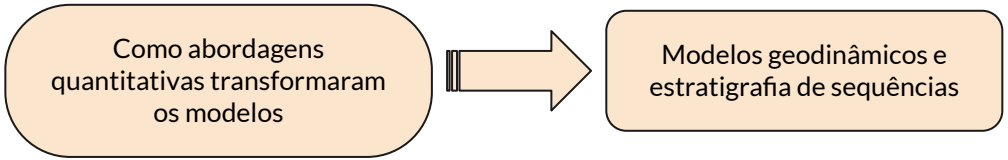
Tectonics and Sedimentation a Century Later

R.H. Dott, Jr.

"Agora que as distinções **genéticas** das classes geossinclinais estão claras, é questionável se sua nomenclatura serve ainda a algum propósito. De fato, há muitas razões para crer que essa nomenclatura mais confunde que esclarece, e que novos modelos para bacias sedimentares decorrentes da teoria das placas (Dickinson, 1974) serão mais produtivos"

45 anos depois



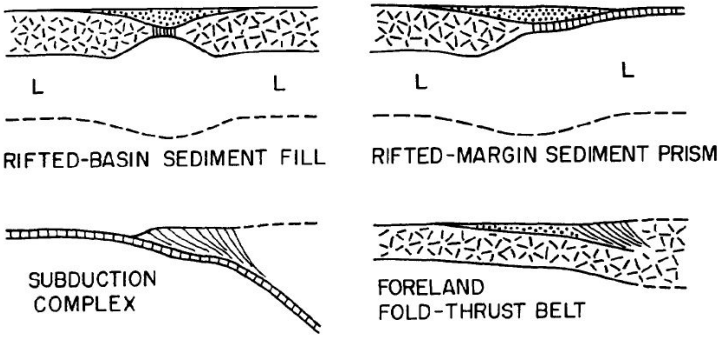


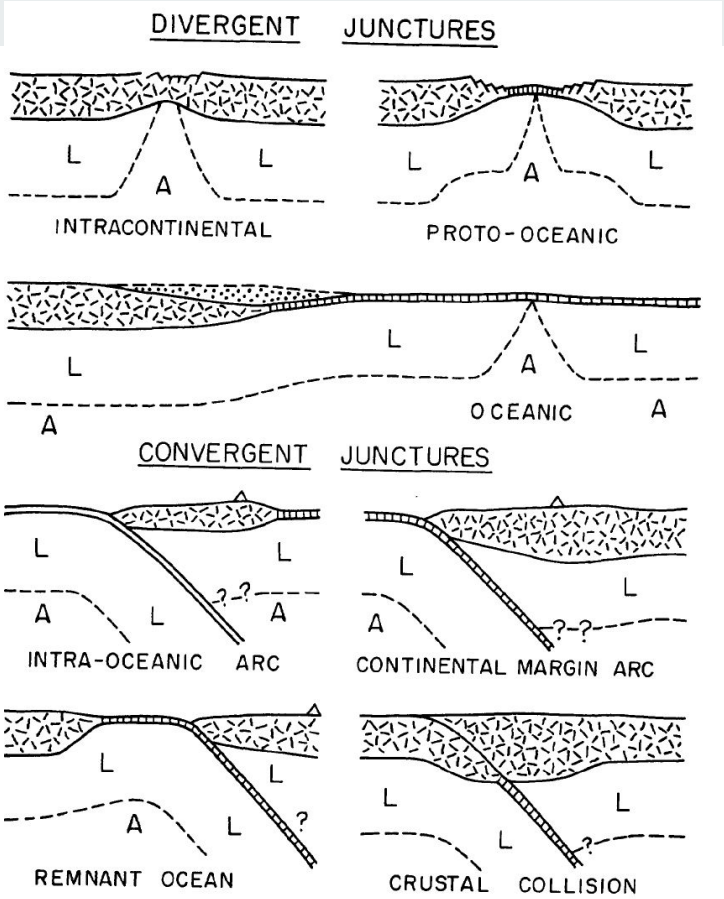
Classificação de bacias e Previsibilidade do preenchimento sedimentar

Dickinson, W.R. (1976) *AAPG Continuing Education Course Notes* **1**, 1-56.

1976

Gênese : contexto e correlação



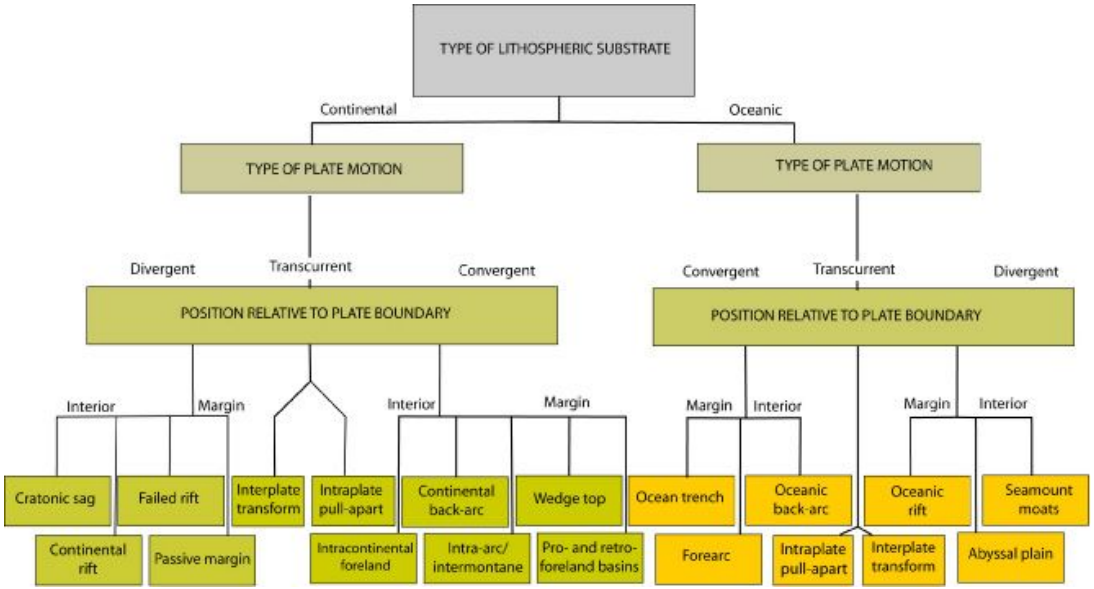


1974, Dickinson, W.R. (1974) *SEPM Special Paper* **22**, 1-26.

1983, Kingston, D.R. et al. (1983) *AAPG Bull.* **67**, 2175-2193.

1995, Ingersoll, R.V. & Busby, C. (1995) *in:* Busby & Ingersoll, *Tectonics of Sedimentary Basins*. 1-51.

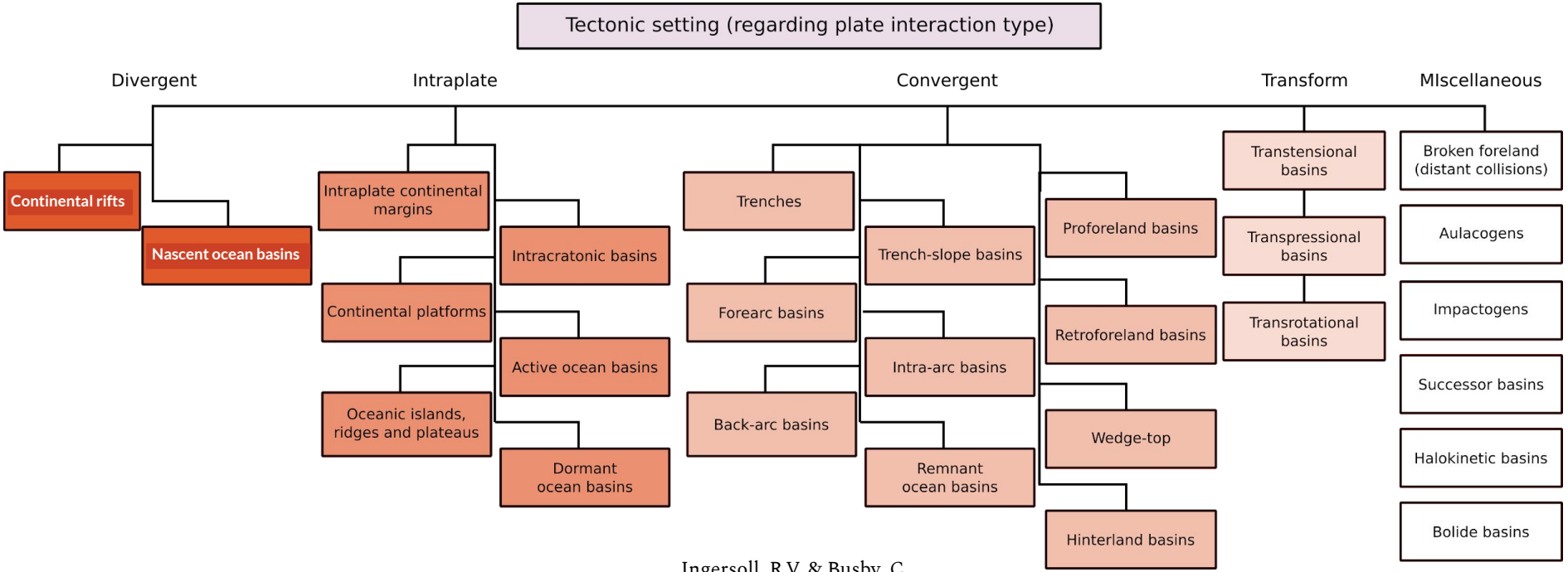
2013 Allen, P.A. & Allen, J.R. (2013) *Basin Analysis* 3rd ed. 632 p.



Dickinson, W.R. (1974) *SEPM Special Paper* **22**, 1-26.

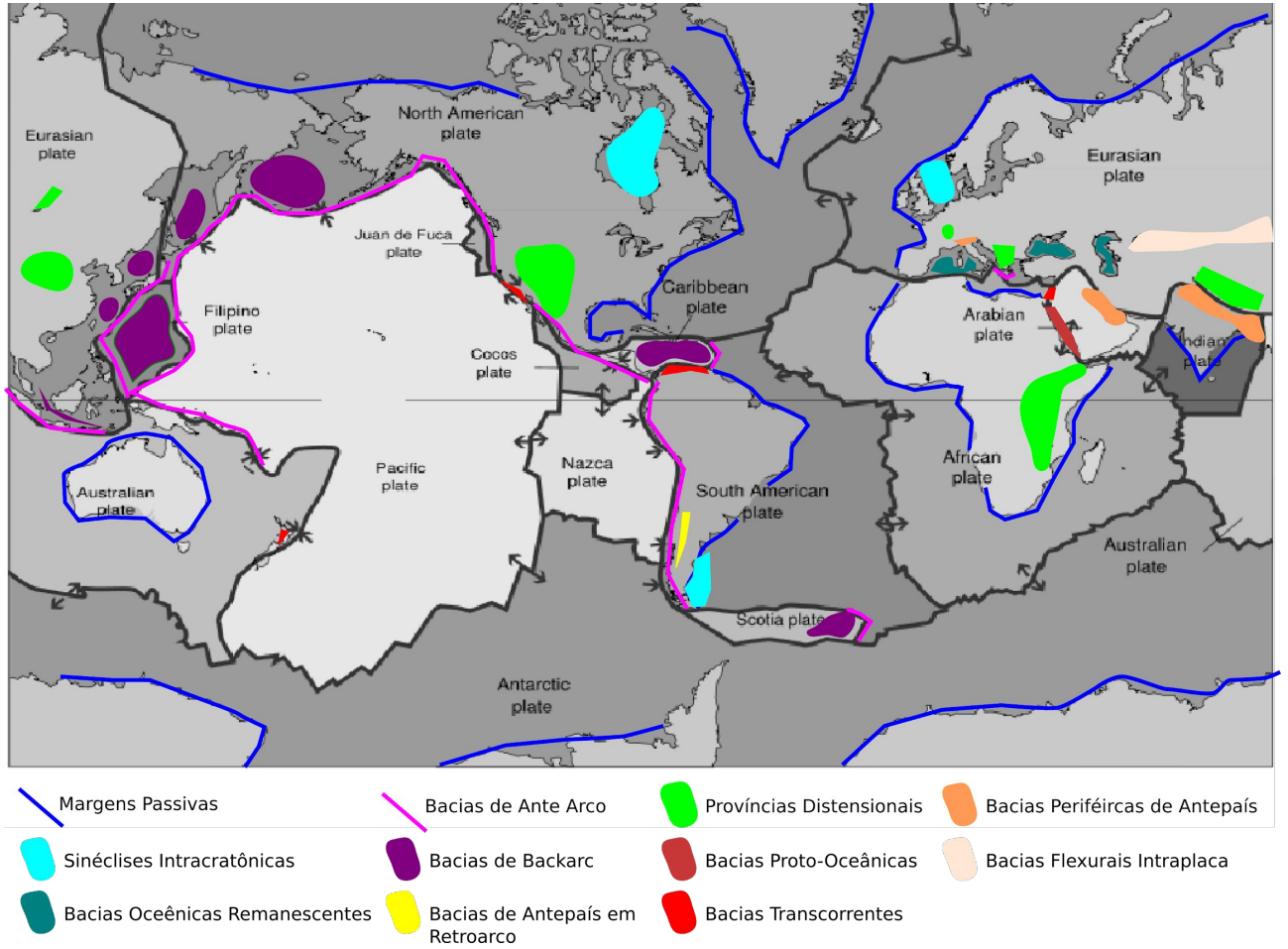
Allen, P.A. & Allen, J.R. (2013) *Basin Analysis* 3rd ed. 632 p.

Persistência dos critérios

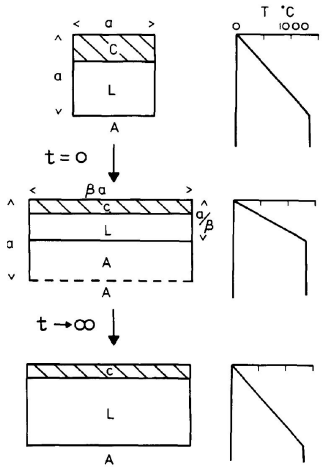


Ingersoll, R.V. & Busby, C. (1995) *in:* Busby & Ingersoll, *Tectonics of Sedimentary Basins*. 1-51.

Bacias e limites de placas



1978



Earth and Planetary Science Letters, 40 (1978) 25–32

[6]

SOME REMARKS ON THE DEVELOPMENT OF SEDIMENTARY BASINS

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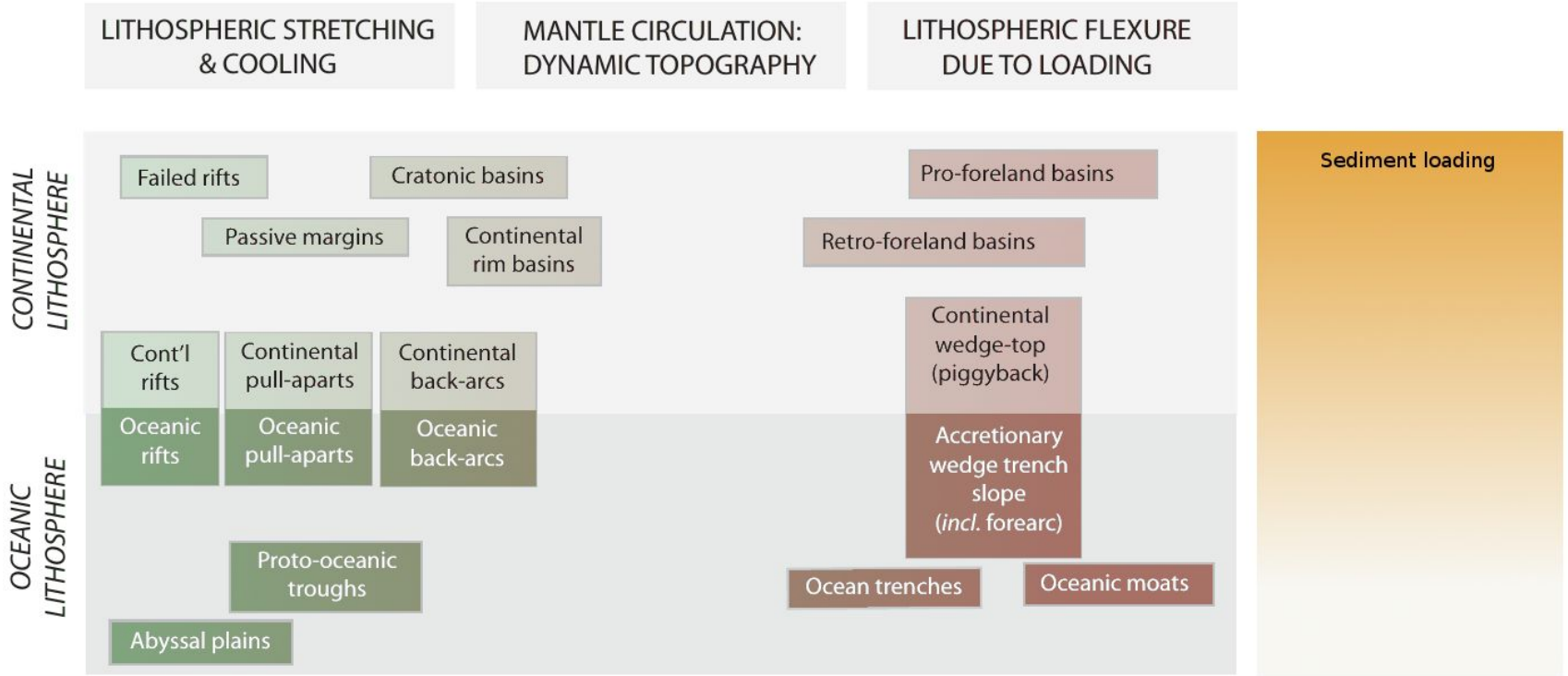
Department of Geodesy and Geophysics, Madingley Rise, Madingley Road, Cambridge (England)

Received December 14, 1977
Revised version received March 27, 1978

Modelo analítico para origem de bacias de subsidência térmica

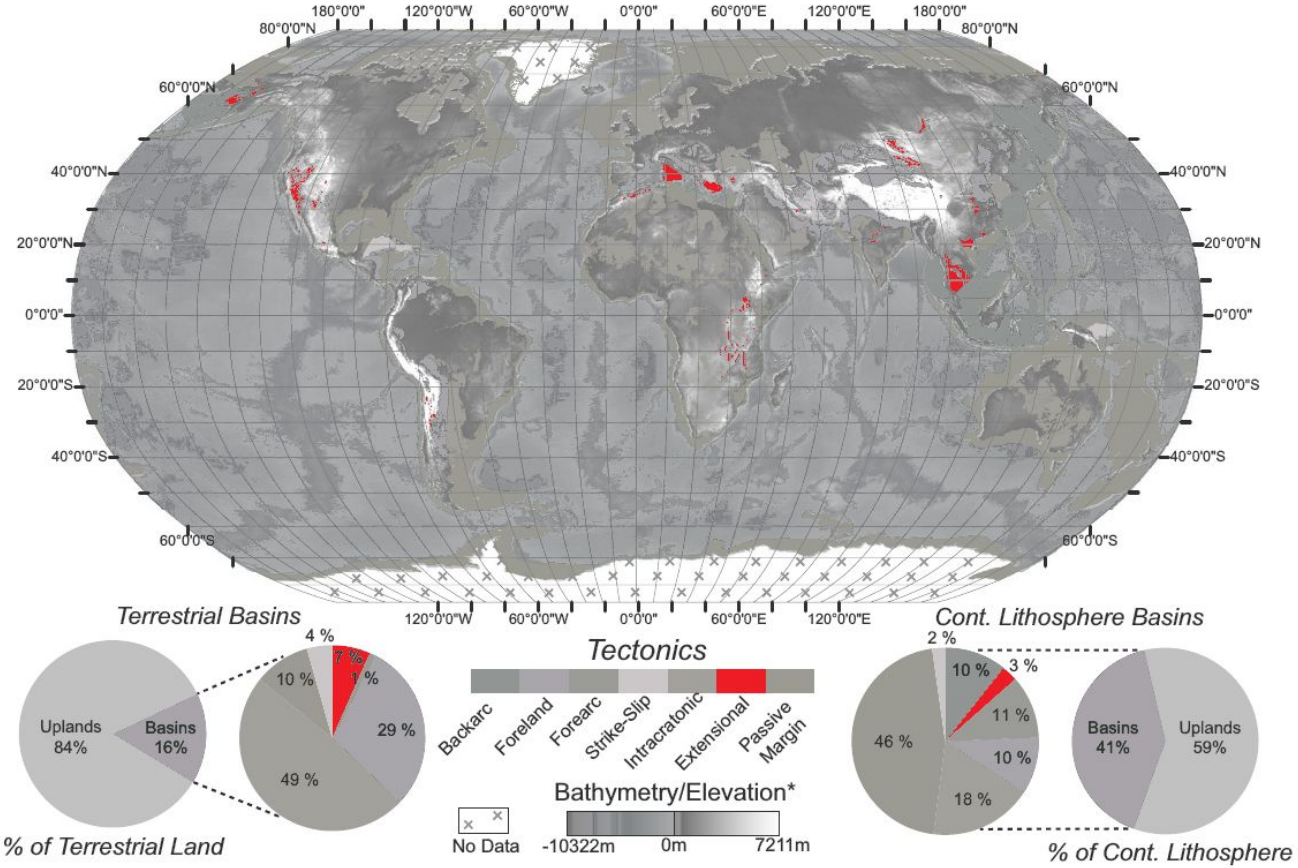
Mecanismos de subsidência



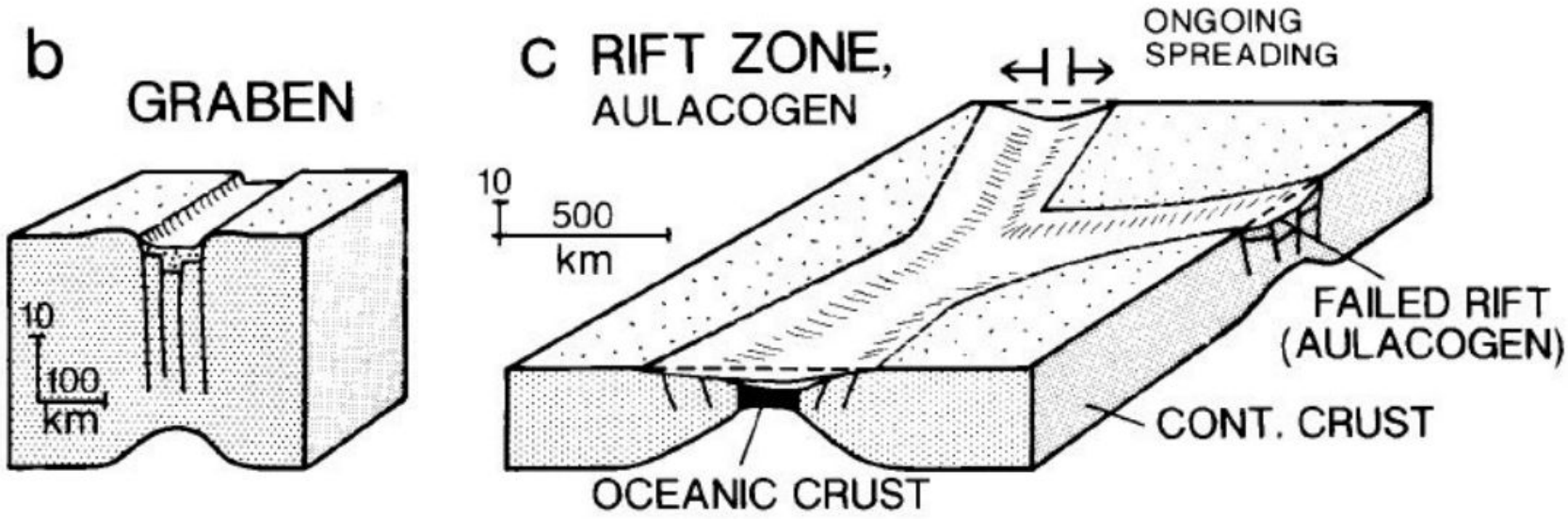
Allen, P.A. et al. (2015) *Geol. Soc. London Mem.* **43**, 5-28.

Bacias distensionais continentais

Modificado de:
Nyberg, B., Holwell, J.A. (2015)
Geology **43**, 643-646.



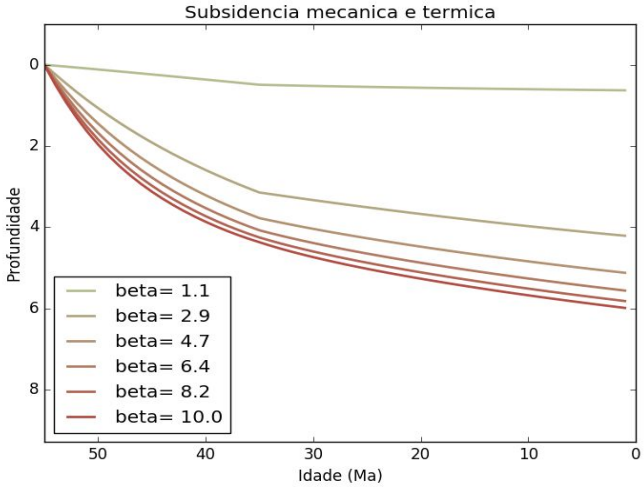
Bacias distensivas

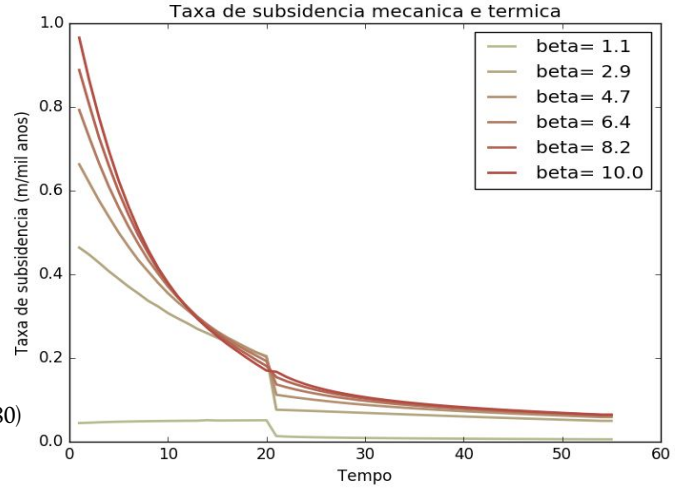


Einsele. G. 1992. Sedimentary Basins, Evolution Facies and Sediment Budget. 2 ed, Springer, 792 p.

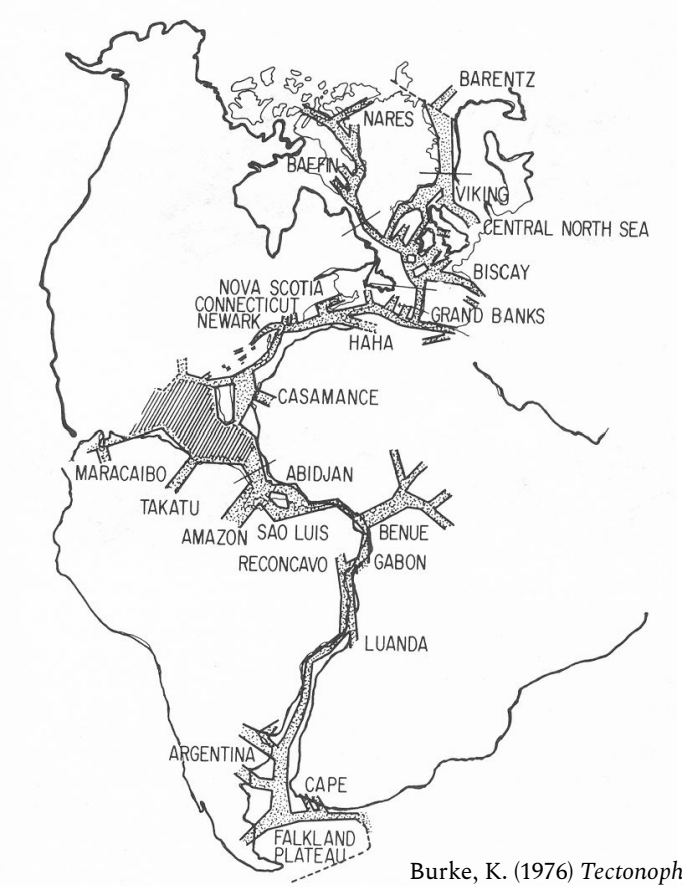
Subsidência mecânica e térmica

Modelo numérico baseado em:
Jarvis, G.T. & Mackenzie, D. P. (1980)
Earth Planet. Sci. Lett. **48**, 42-52.

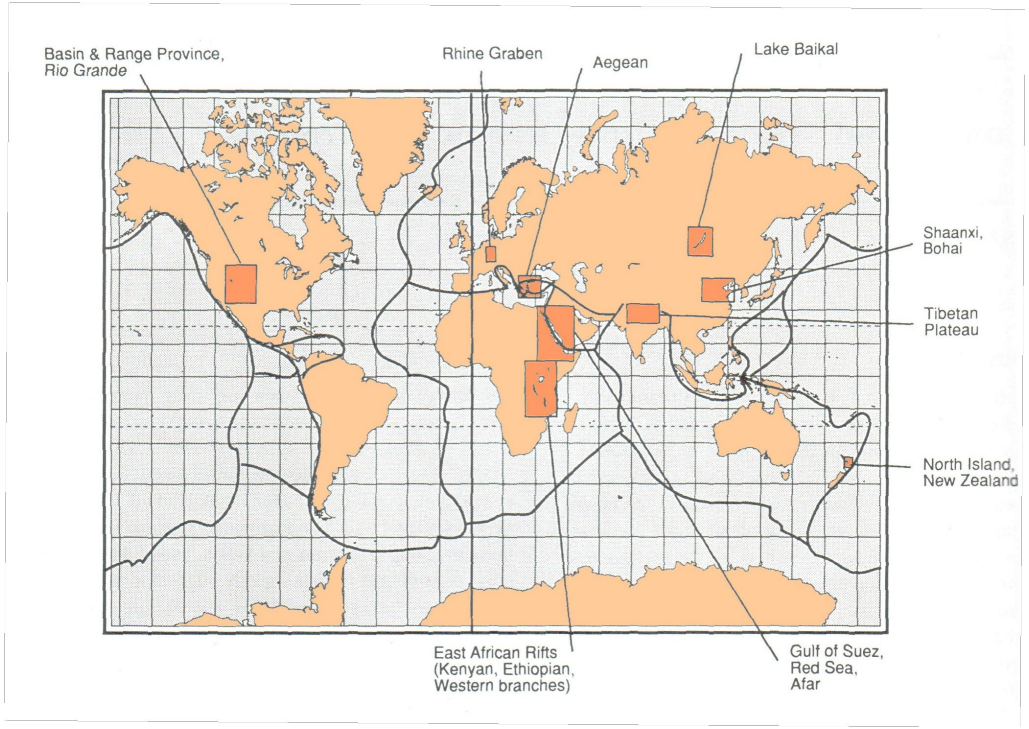




Rifts - limites divergentes?



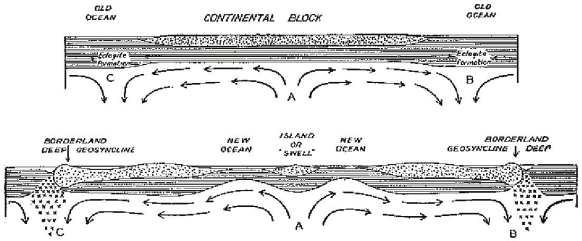
Burke, K. (1976) *Tectonophysics* **36**, 93-112.



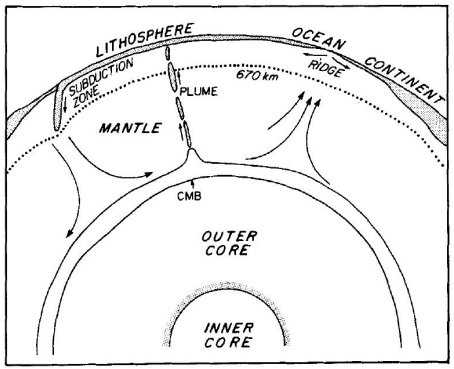
Sengor, A.M.C (1995), *in:* Busby & Ingersoll, *Tectonics of Sedimentary Basins,* 53-117.

Origem e magnitude dos esforços

Convexão Astenosférica



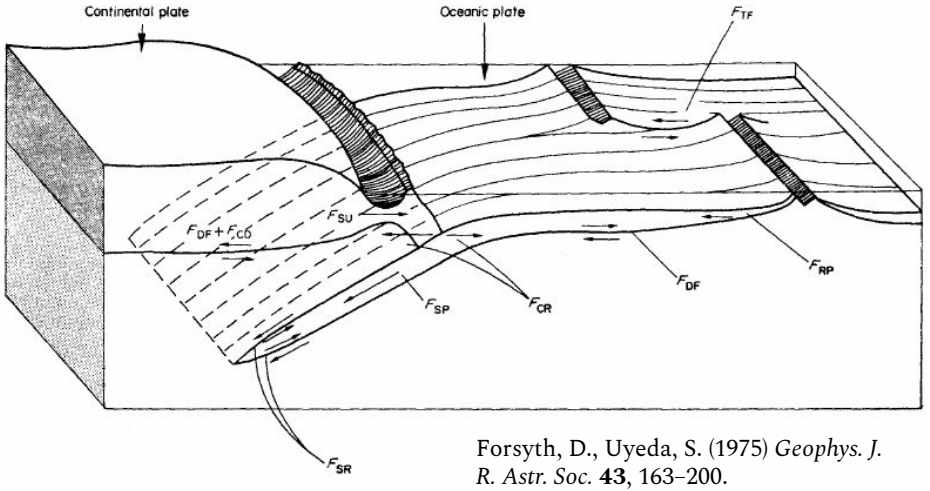
Holmes, A. (1929) *Transactions of the Geological Society of Glasgow* **18**, 559–606.



Lay, T. (1989) *Eos, Trans. Am. Geophys. Un.* **70**, 52–59.

Wilson, J.T. (1990) *Terra Nova* **2**, 519-538.

Forças gravitacionais geradas na litosfera



Forsyth, D., Uyeda, S. (1975) *Geophys. J. R. Astr. Soc.* **43**, 163–200.

Ridge push

2.5*10¹² N/m

30-40 MPa em 30 km de Litosfera elástica

Bott, M.H.P. (1991) *Tectonophysics.* **200**,17-32.

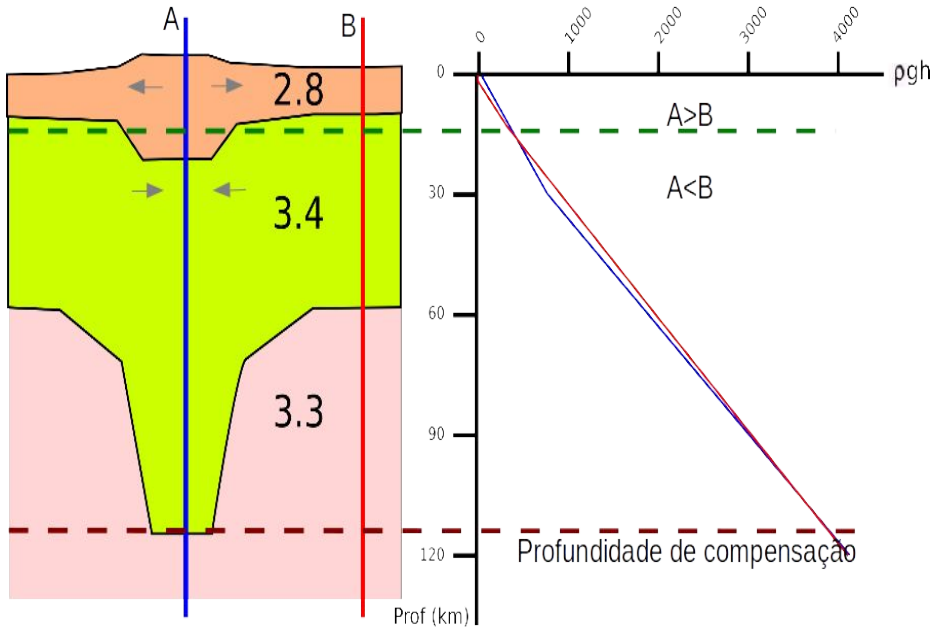
Slab pull

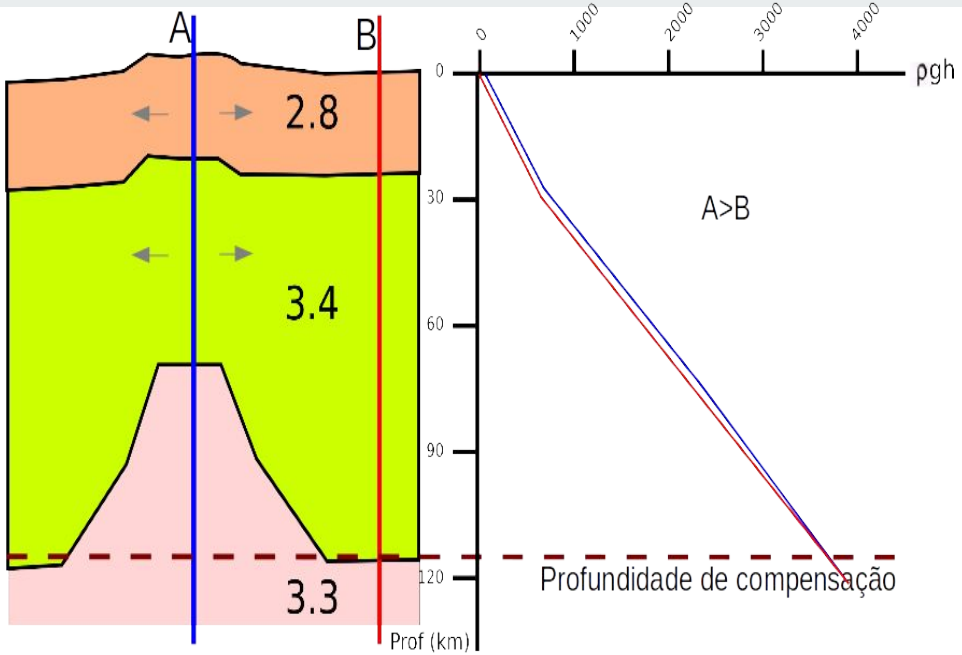
2. a 3*10¹² N/m

40-60 MPa em 100 km de Litosfera

Schellart, W.P. (2004) *Geohys. Res. Lett.* **31**, L07611, 1-5.

Esforços topográficos





$$\Gamma = g\rho_c h\left(S_0 + \left(\frac{\rho_m}{\rho_m - \rho_c}\right)\frac{h}{2}\right)$$

Turcotte,D.L. (1982) *in:* Hsu, K. (ed), *Mountain Building Processes*. 129-139.

$$\Gamma = g\rho Lh.$$

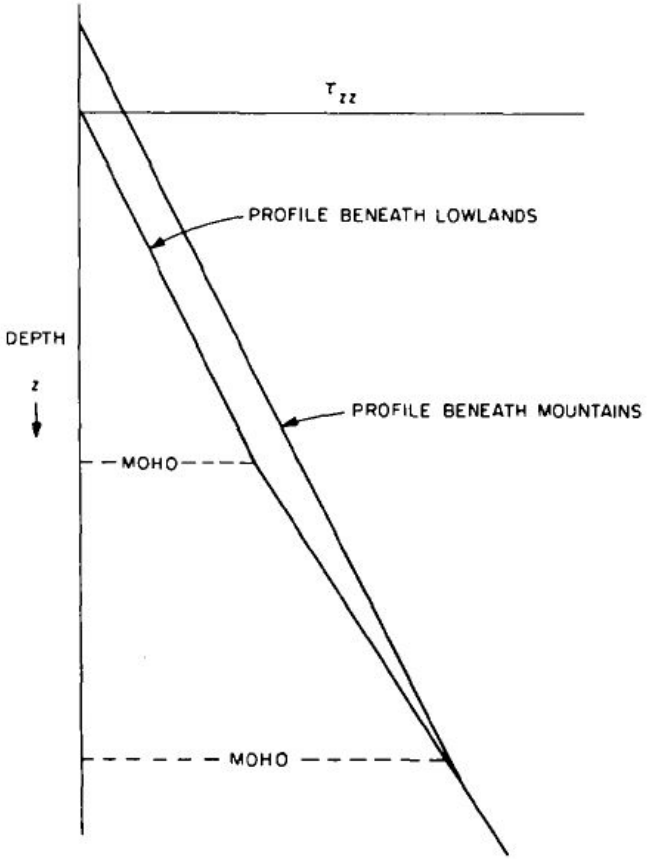
D' Agostino, N. (2014) *Earth Planet. Sci. Lett.* **397**, 121-132.

0.8*10¹² N/m
para cada km de sobrelevação

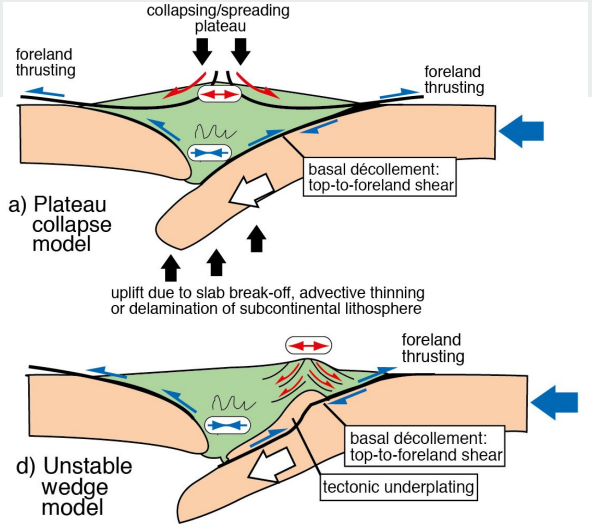
2.7*10¹² N/m
para cada km de sobrelevação

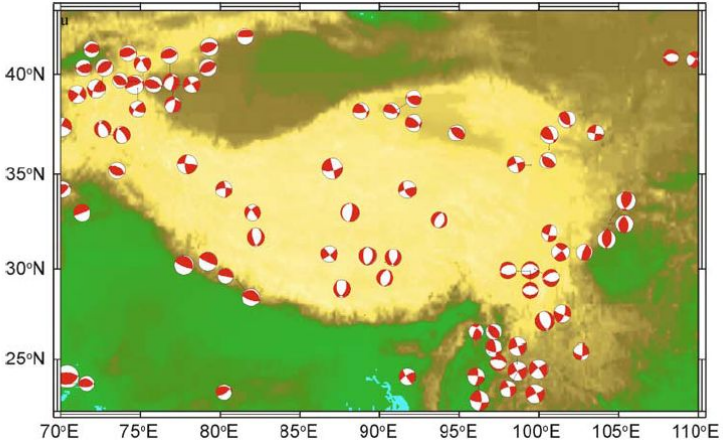
Esforços topográficos

Dalmayrac, B. & Molnar, P. (1981)
Earth Planet. Sci. Lett. **55**, 473-481.



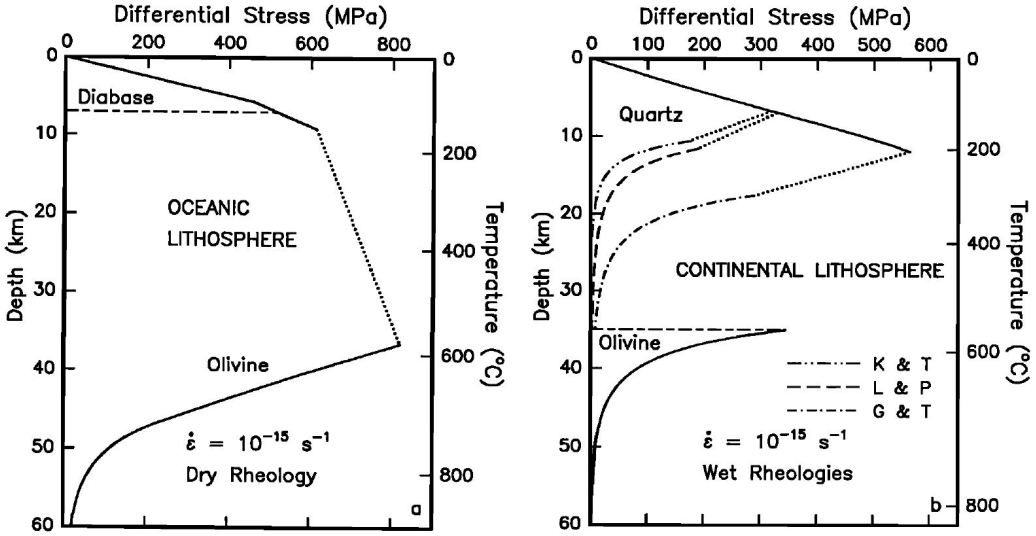
Fossen, H. (2000)
Tectonics **19**, 213-224.



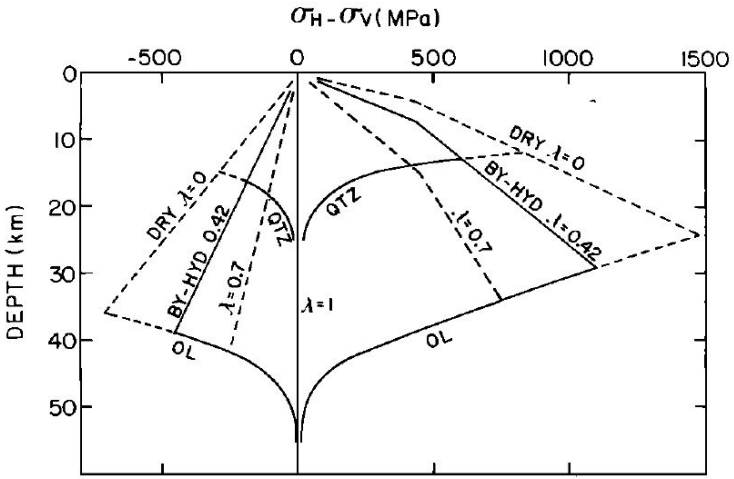


Liu, M. & Yang, Y.. (2003)
J. Geophys. Res. **108**(**8**), 2361.

Perfis de resistência



Kohlstedt., D.L. et al. (1995) *J. Geophys. Res.* **100**, 17587-17602.

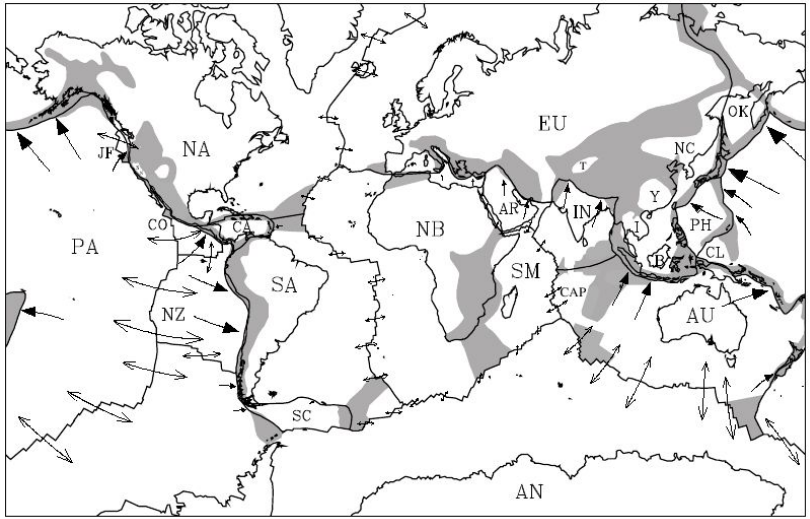


Brace, W.L. & Kohlstedt., D.L. (1980) *J. Geophys. Res.* **85**, 6248-6252.

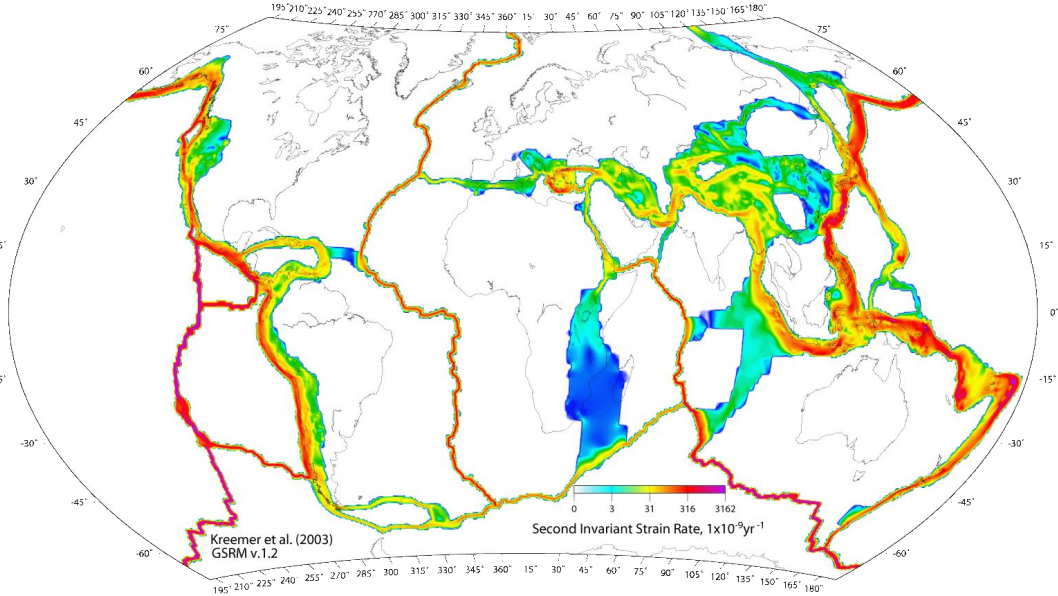
Molnar, P. (1988) *Nature* **335**, 131-137.

"Em resumo, a tectônica de placas é uma aproximação ruim para a tectônica de muitas regiões **continentais** posto que vastas porções da crosta e manto continentais não se movem juntas como parte de uma mesma placa rígida e coerente."

Deformação e limites de placas

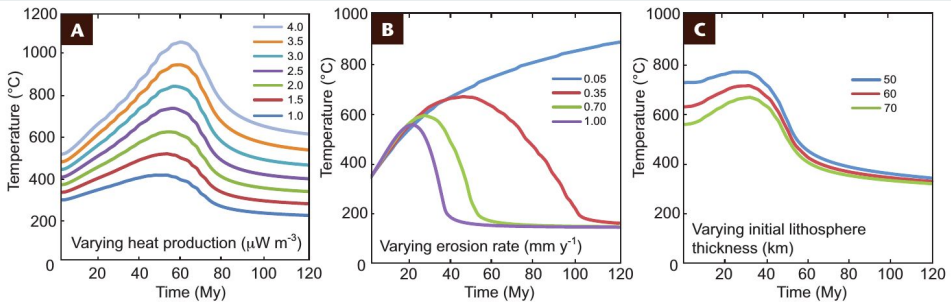


Gordon, R.G. (1998) *Annu. Rev. Earth Planet. Sci.* **26**, 615-642.



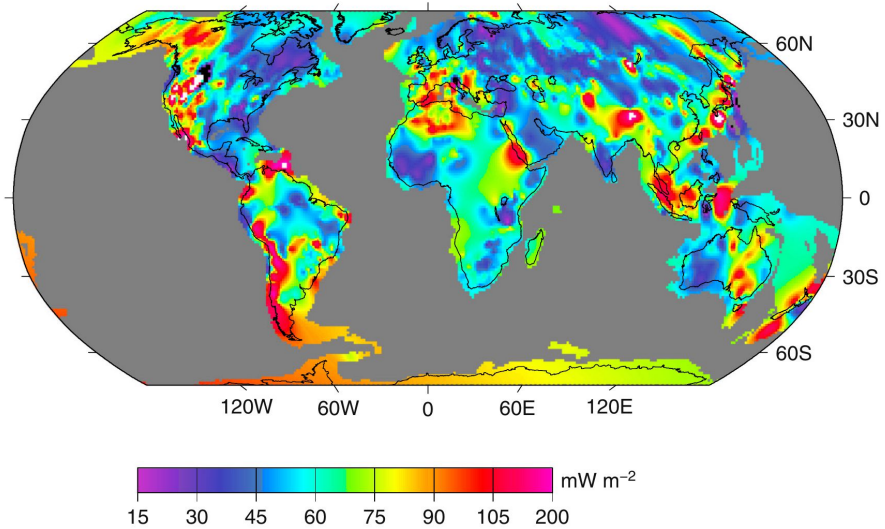
Kreemer, C. et al. (2003) *Geophys. J. Int.* **154**, 8-34.

Calor e resitência



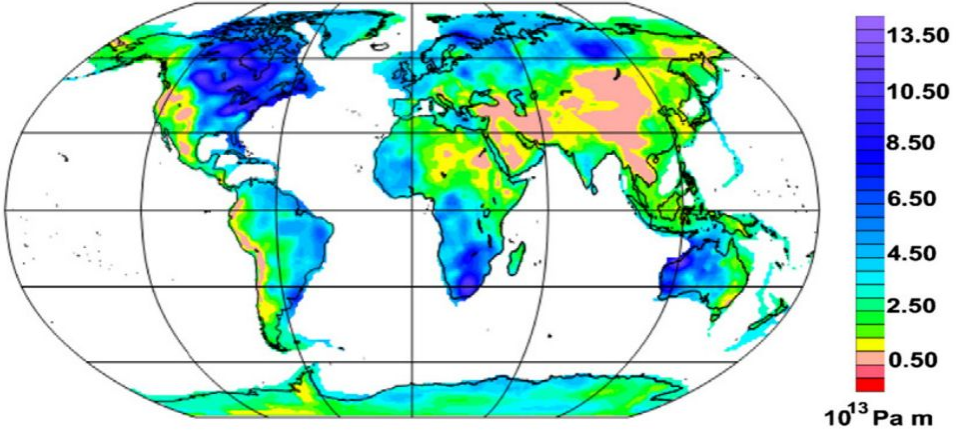
Clark, C. et al. (2011)
Elements **7**, 235-240.

Fluxo térmico



Jaupart, C. et al. (2016)
Lithos **262**, 398-427.

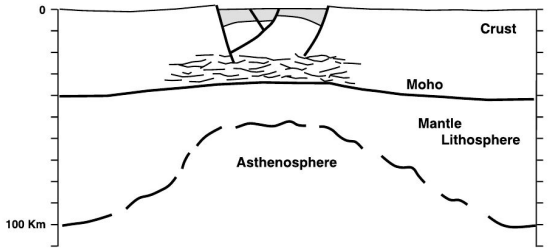
Resistência



Tesauro, M. et al. (2013)
Tectonophysics **602**, 78-86.

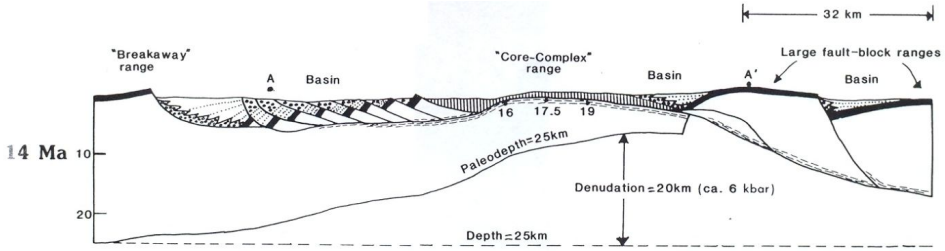
Rifts continentais

Afrotipo *sensu* Sengor (1995)



Morley, C.K. et al. (1999) *AAPG Studies in Geology.* **44**, 1-18.

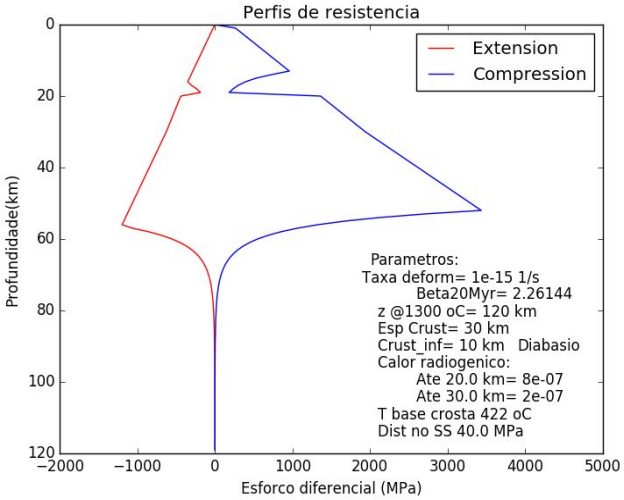
Amerotipo *sensu* Sengor (1995)



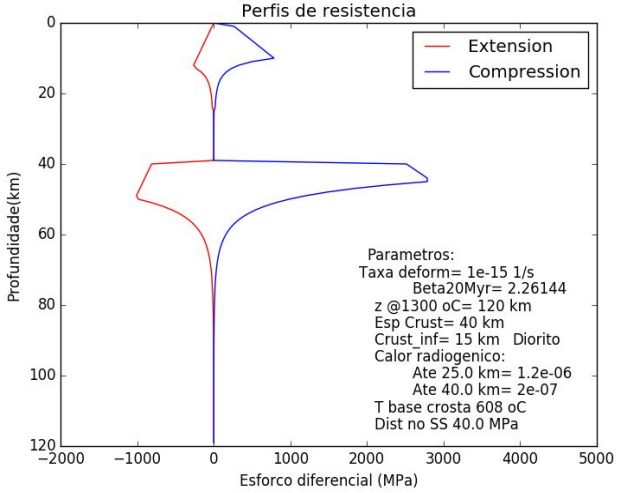
Wernicke, B. (1985) *Can. J. Earth Sci.* **22**, 108-125.

Reologia e estilo estrutural

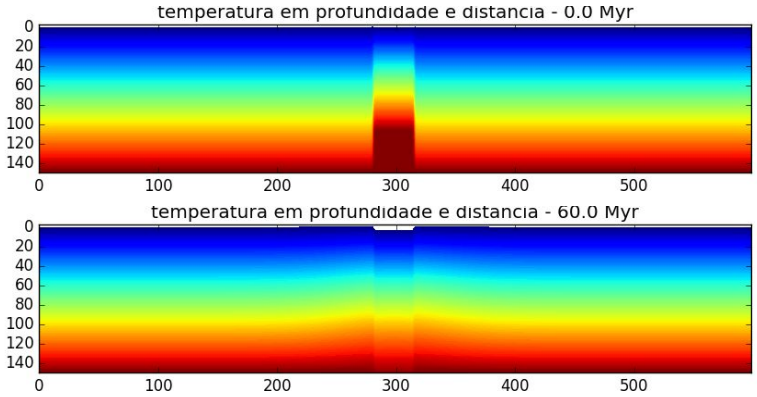
Afrotipo *sensu* Sengor (1995)

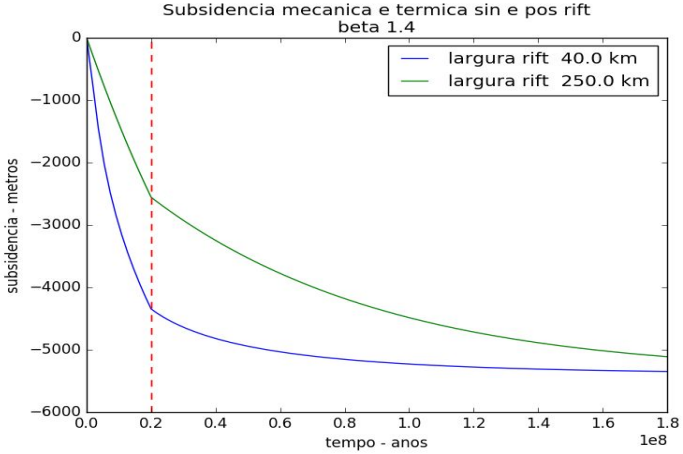


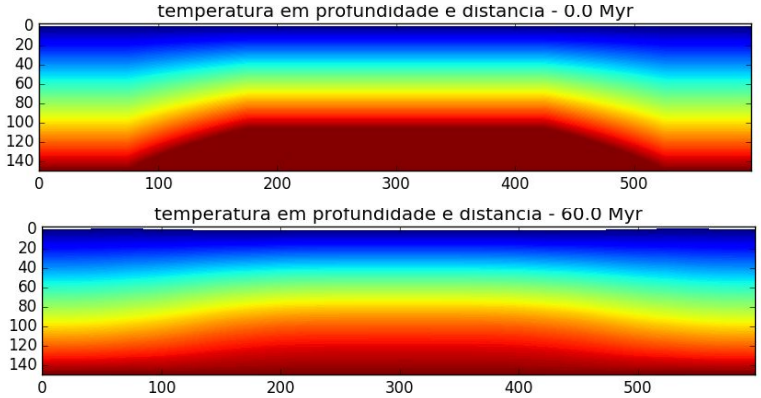
Amerotipo *sensu* Sengor (1995)

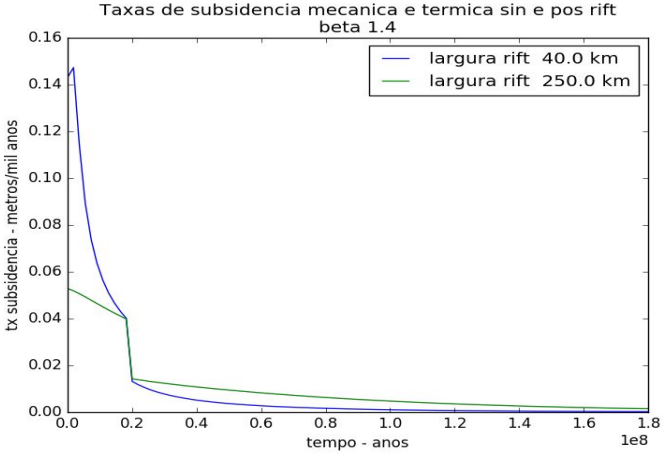


Reologia, estilo estrutural e subsidência









Bacias transcorrentes vs. rifts oblíquos

Modificado de:
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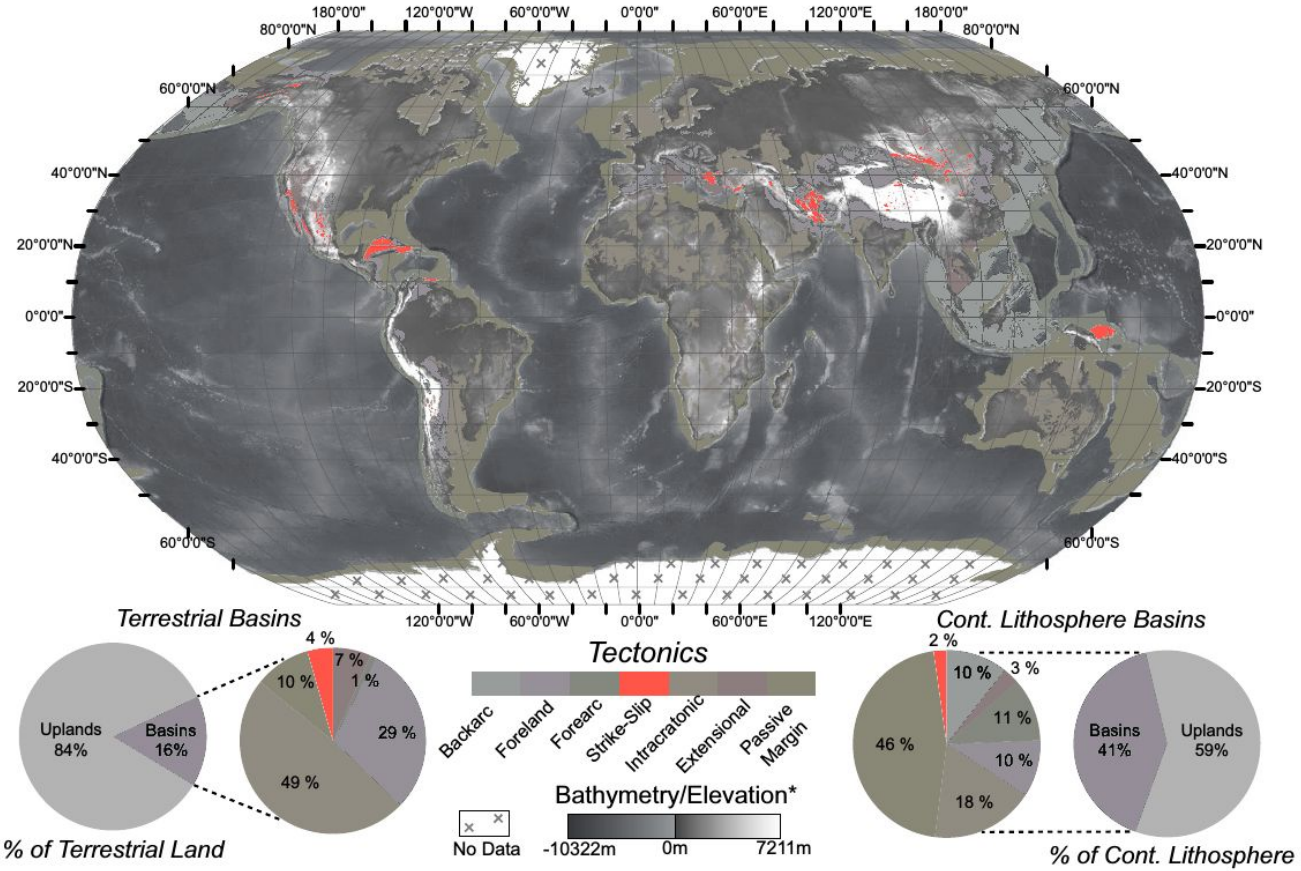
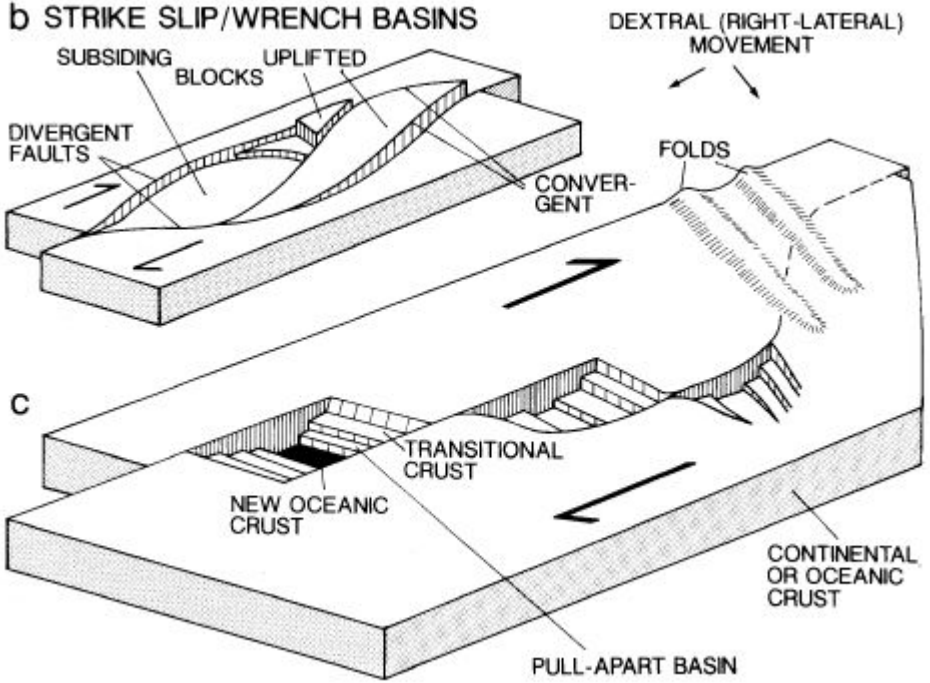
Geology **43**, 643-646.

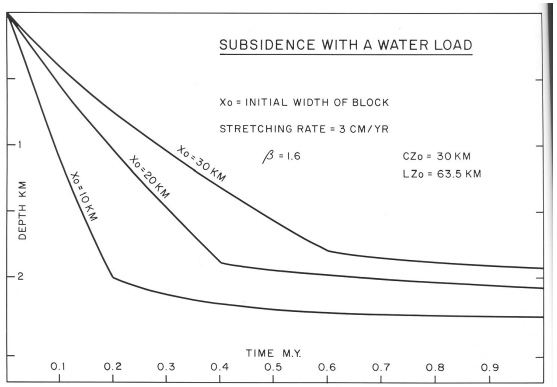


Bacias transcorrentes

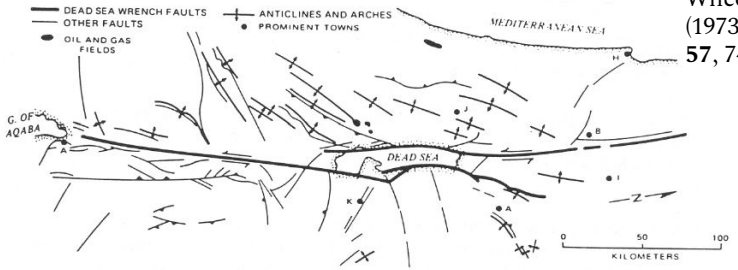


Einsele. G. 1992. Sedimentary Basins, Evolution Facies and Sediment Budget. 2 ed, Springer, 792 p.

Bacias transcorrentes

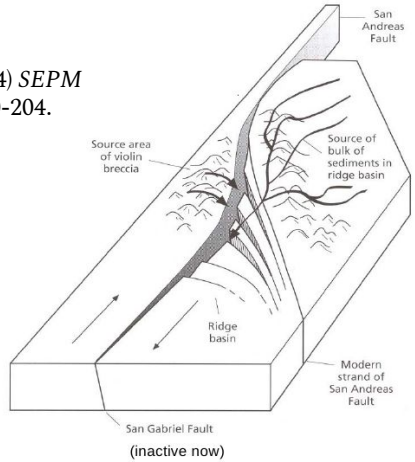


Pitman, W.C. & Andrews,J.A. (1985) *SEPM Spec. Publ.* **37**, 45-49.

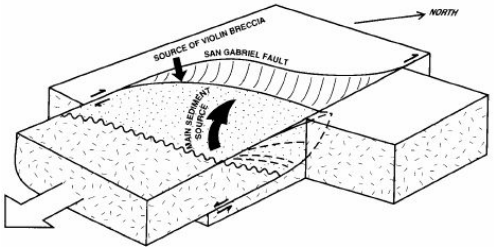


Wilcox, R.E. et al. (1973) *AAPG Bull.* **57**, 74-95.

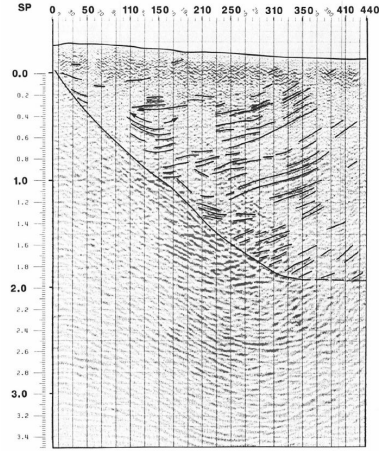
Crowell, J.C. (1974) *SEPM Spec. Publ.* **22**, 190-204.



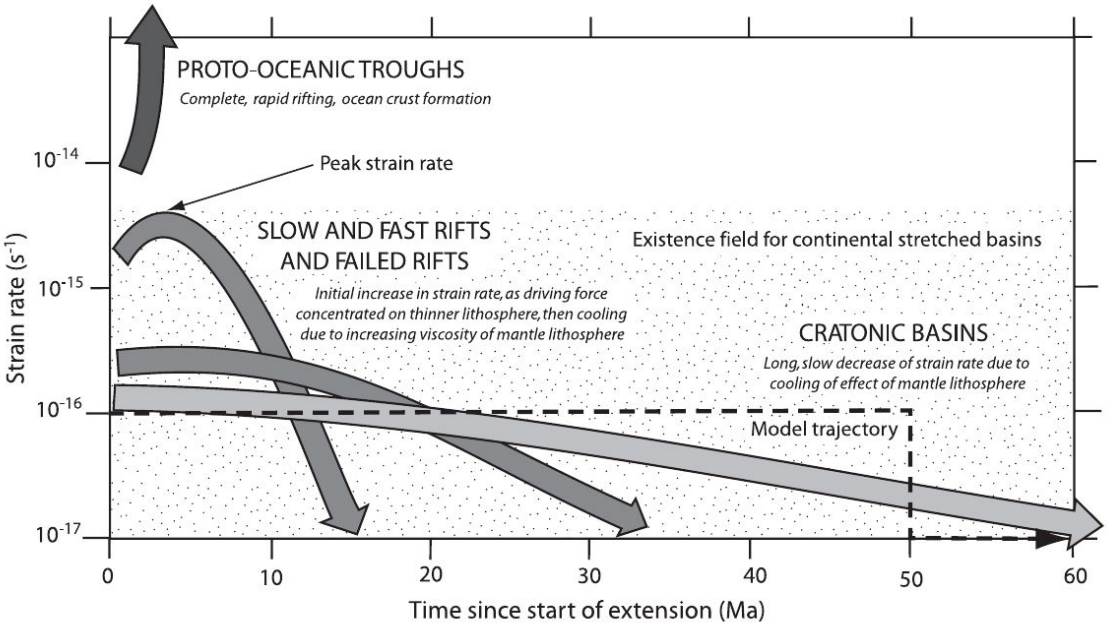
Ridge Basin



May, S.R. (1993) *GSA Bull.* **105**, 1357-1372.



Taxa de deformação e abertura de oceanos



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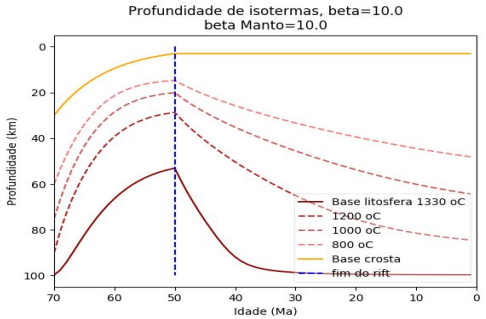
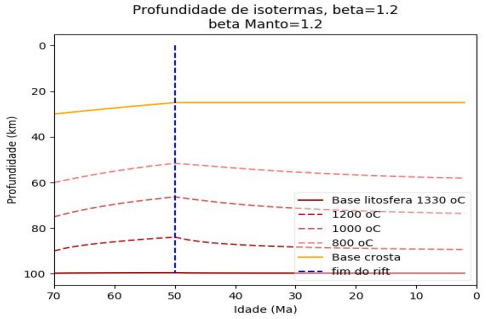
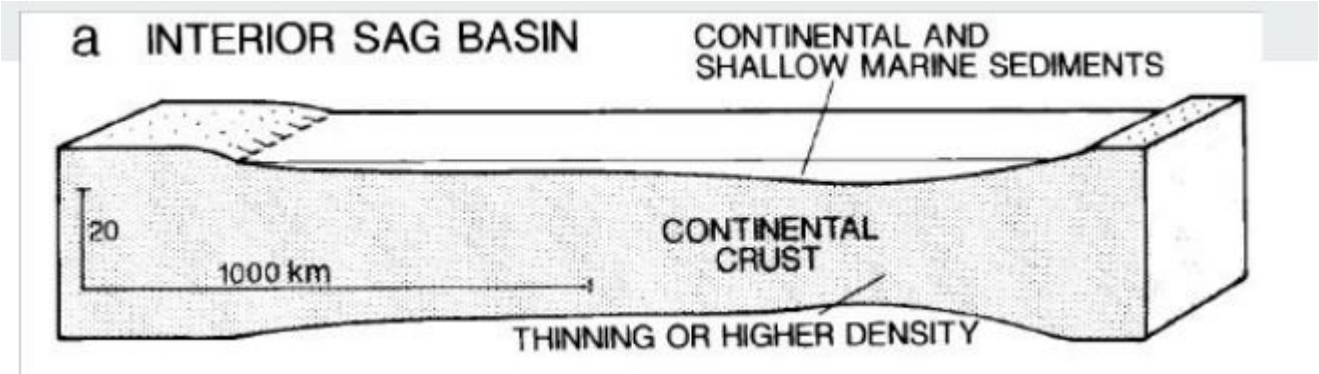
Taxa de deformação $10^{-14}\,s^{-1}$



Taxa de deformação $10^{-15}\,s^{-1}$



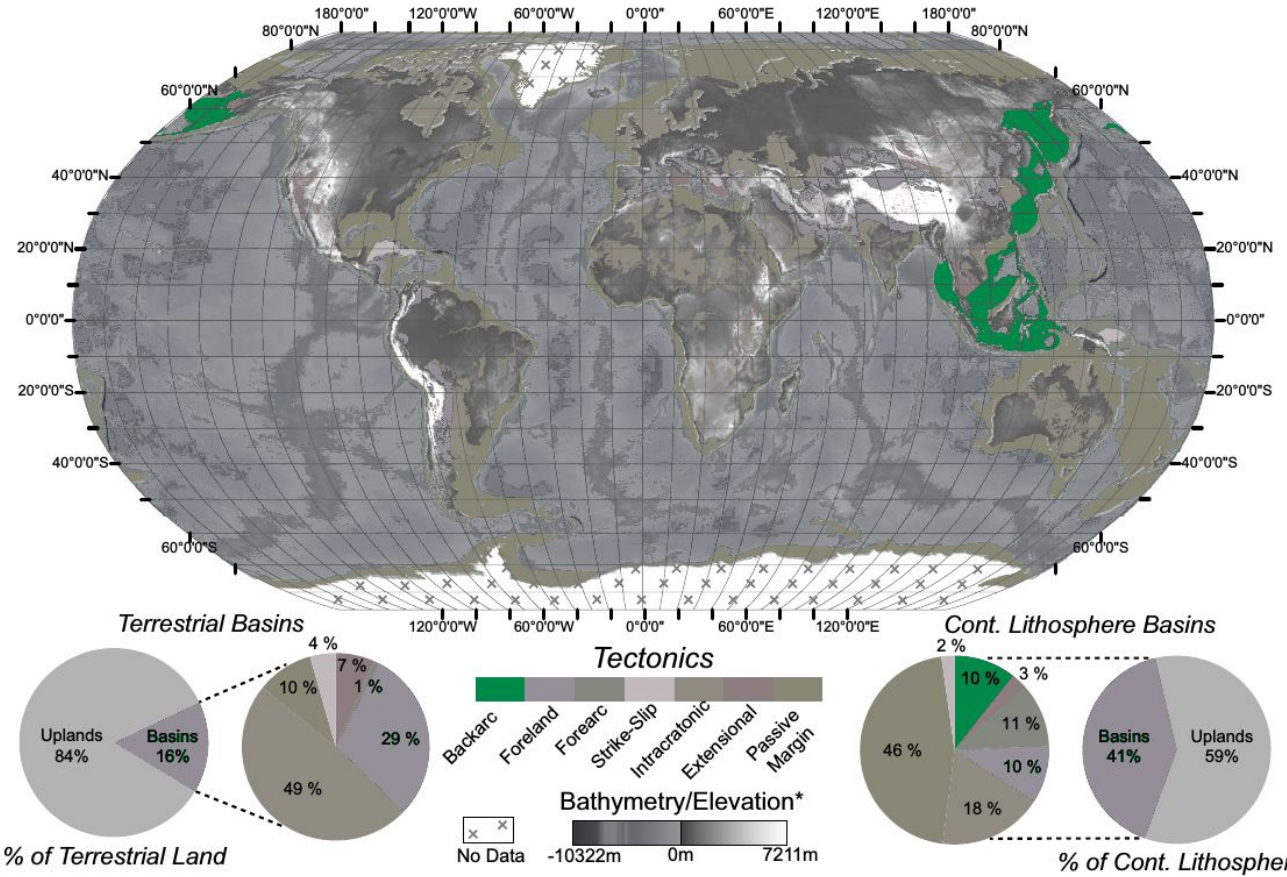
Sinéclises intraplaca



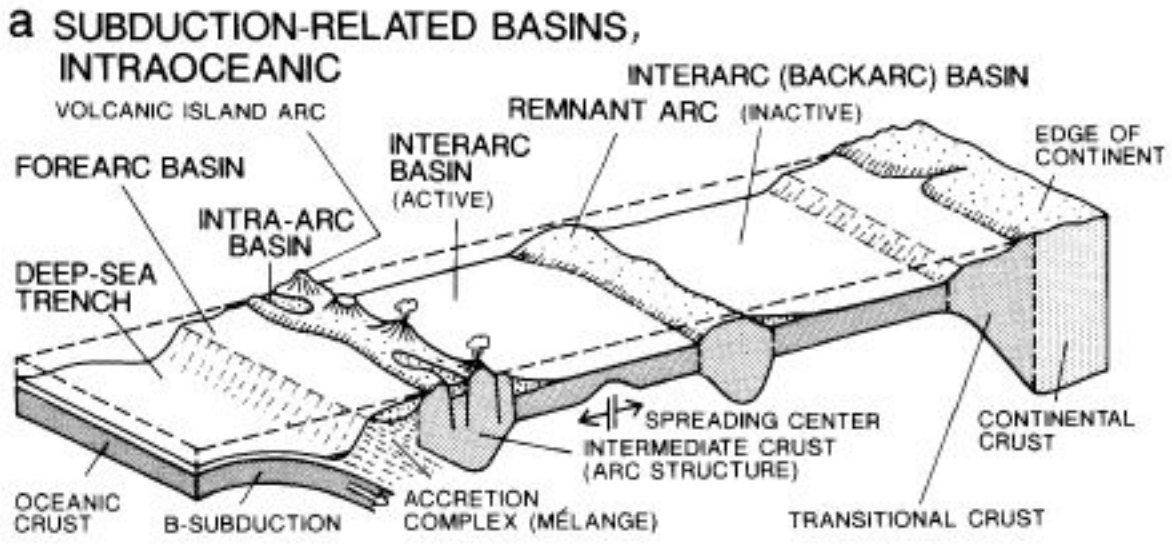
Einsele. G. 1992. Sedimentary Basins, Evolution Facies and Sediment Budget. 2 ed, Springer, 792 p.

Abertura de oceano em "backarc"

Modificado de:
Nyberg, B., Holwell, J.A. (2015)
Geology **43**, 643-646.

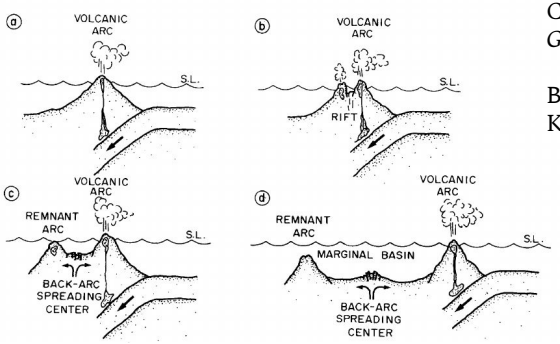


Bacias de Backarc



Einsele. G. 1992. Sedimentary Basins, Evolution Facies and Sediment Budget. 2 ed, Springer, 792 p.

Distensão intra-arco



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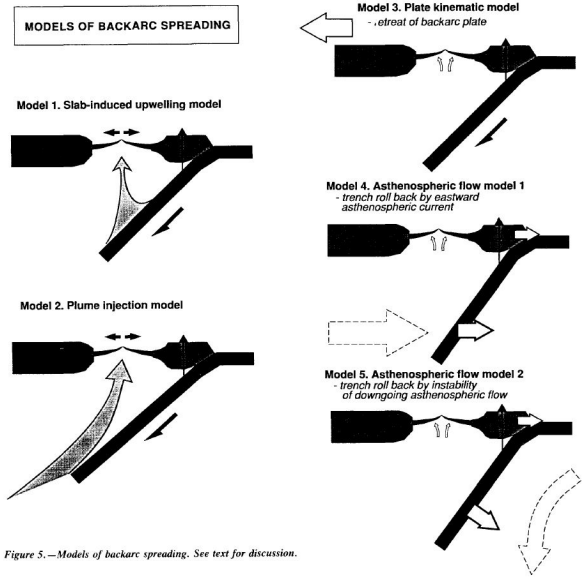

Figure 5.—Models of backarc spreading. See text for discussion.

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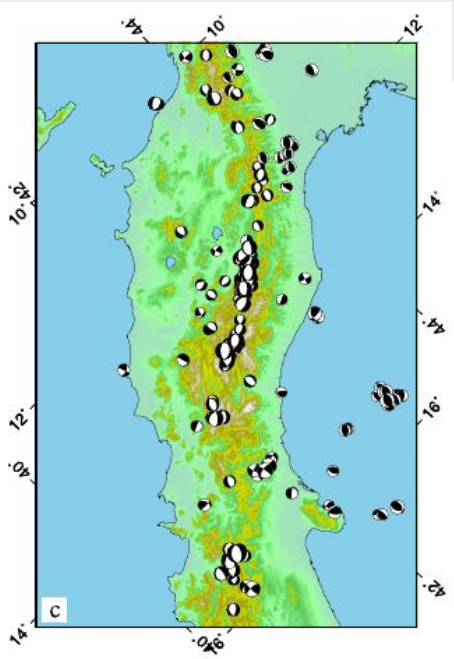

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Earth Planet. Sci. Lett. **397**, 121-132.

Margens tipo Atlântico

Modificado de:
Nyberg, B., Holwell, J.A. (2015)
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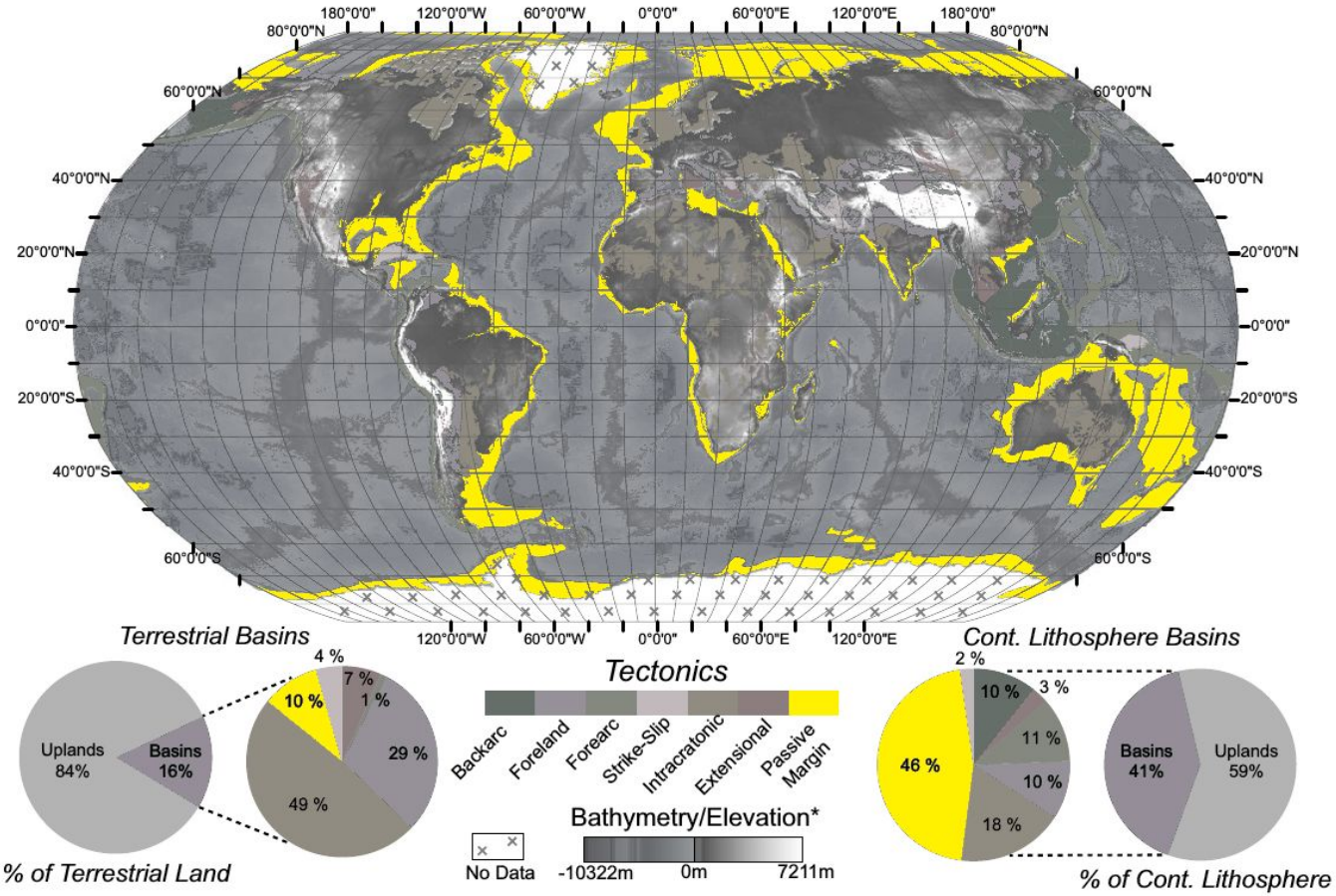
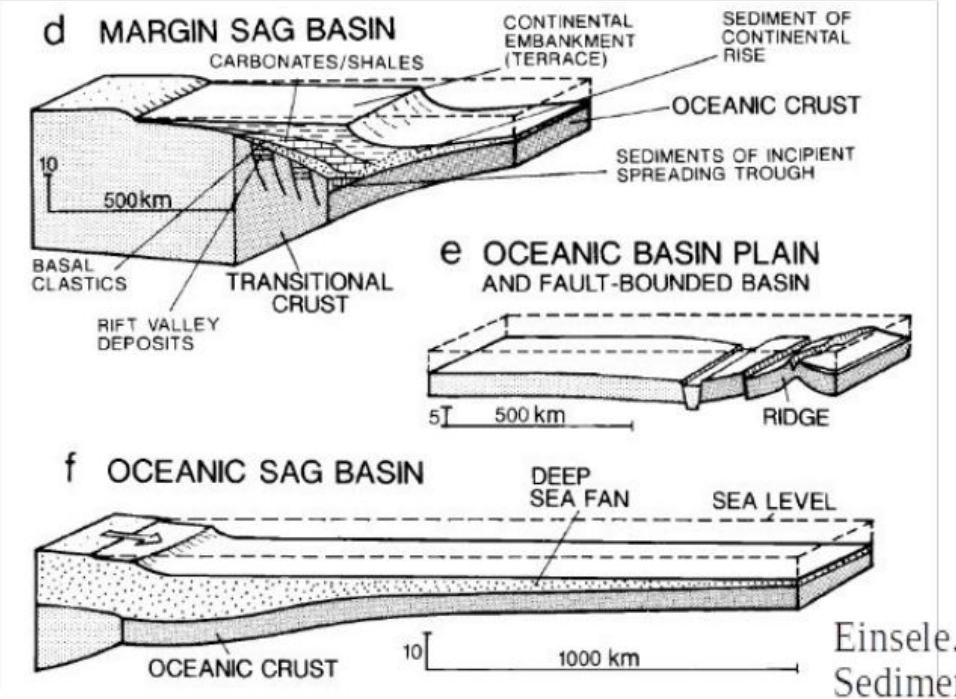


Margens distendidas



Einsele. G. 1992. Sedimentary Basins, Evolution Facies and Sediment Budget. 2 ed, Springer, 792 p.

A abertura de oceanos- hiperdistensão

Sag em crosta hiper-distendida

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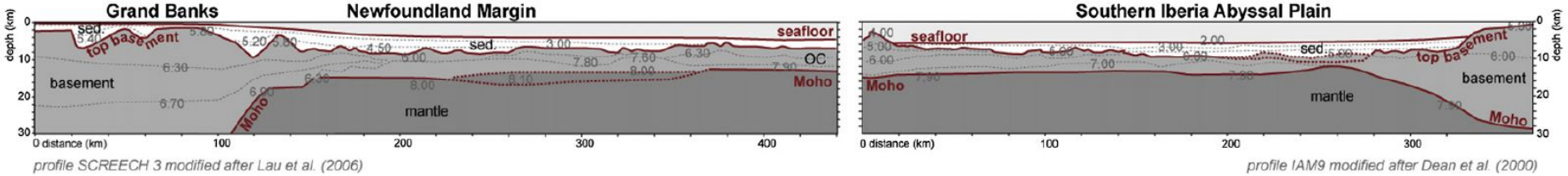

profile SCREECH 3 modified after Lau et al. (2006)

profile IAM9 modified after Dean et al. (2000)

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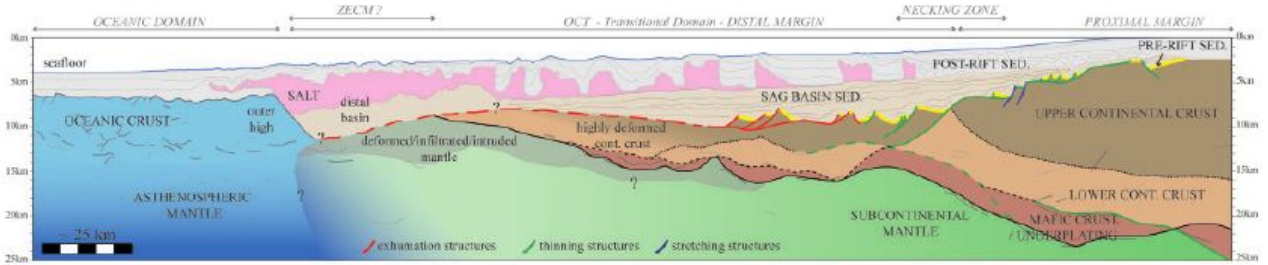

A abertura de oceanos- Reologia e geometria

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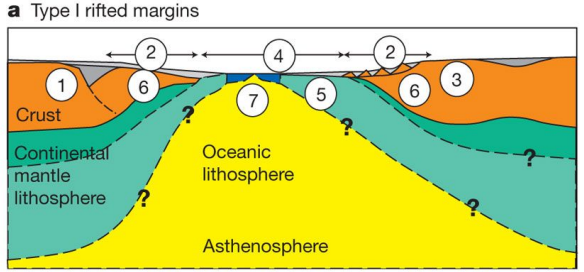
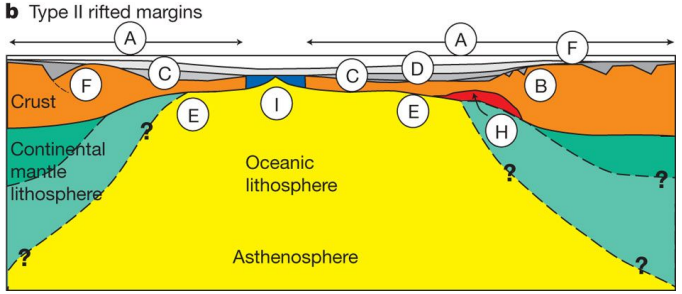
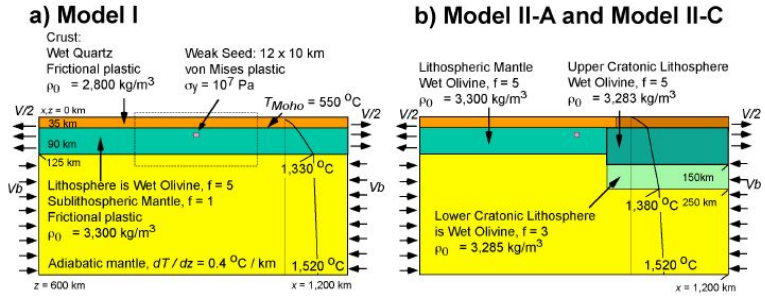
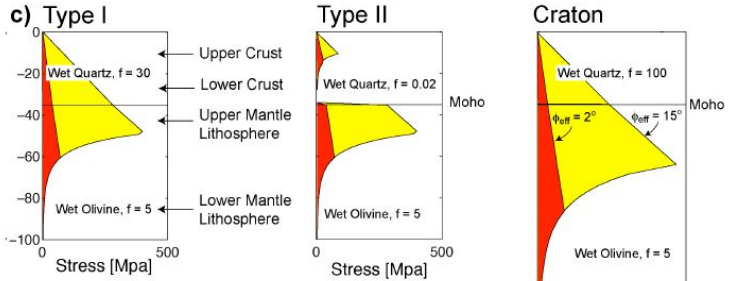
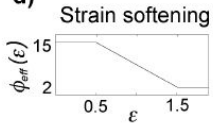
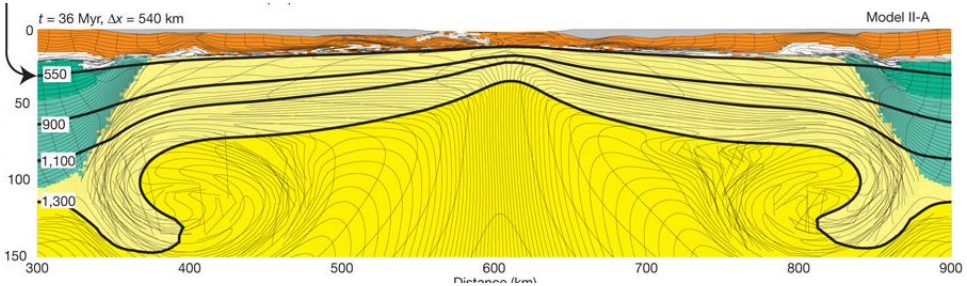




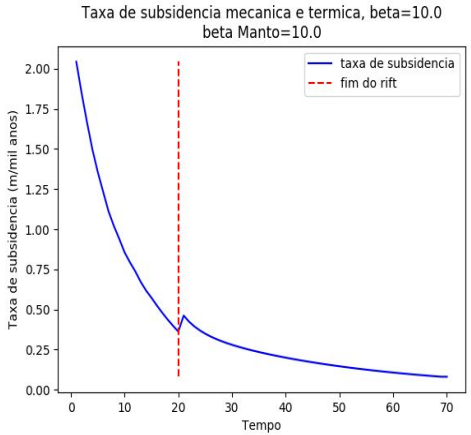


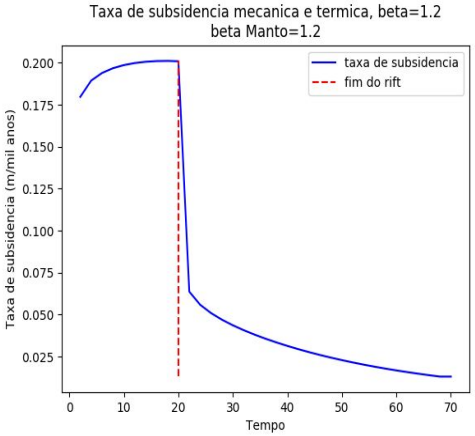


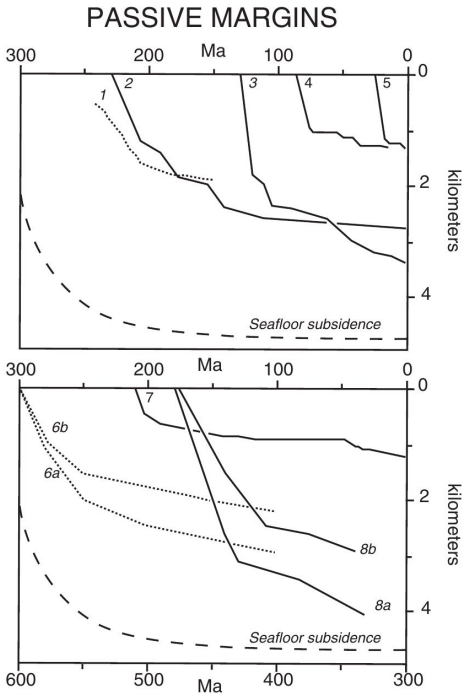




Hiperdistensão e subsidência







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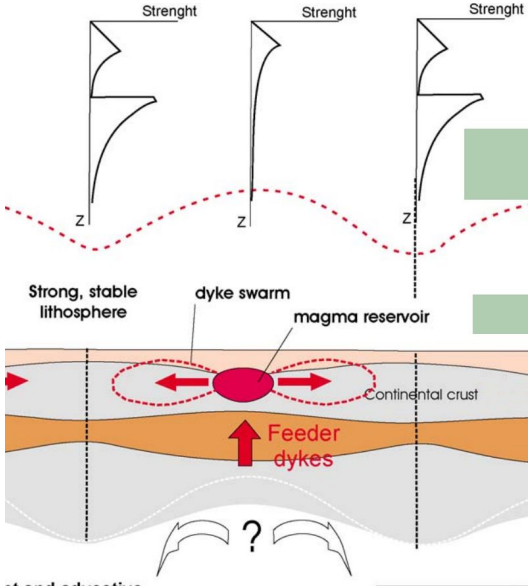
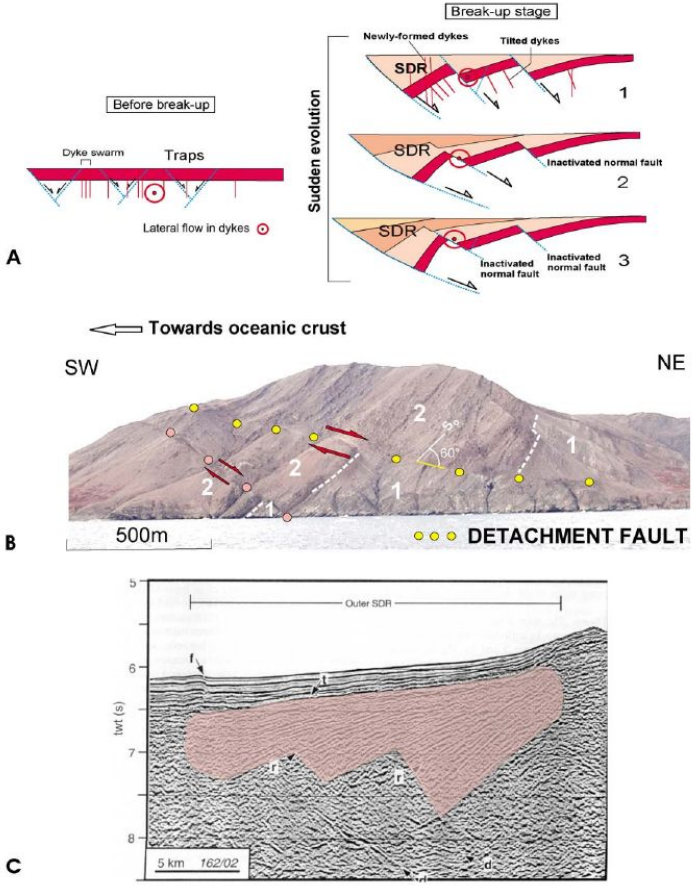
A abertura de oceanos - vulcanismo





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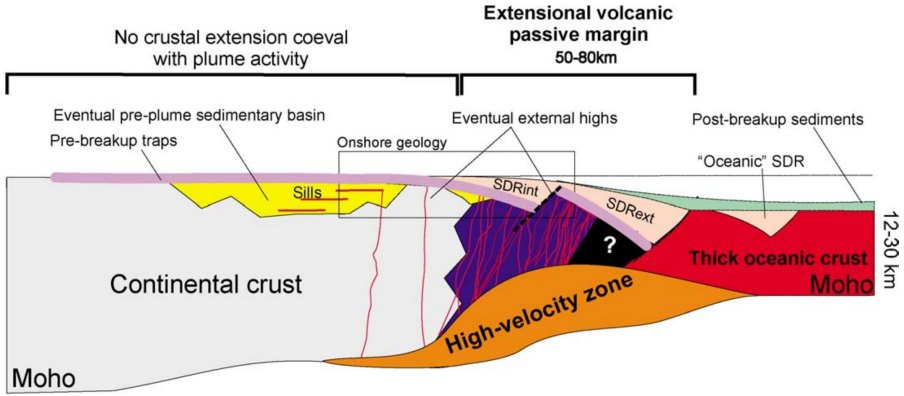
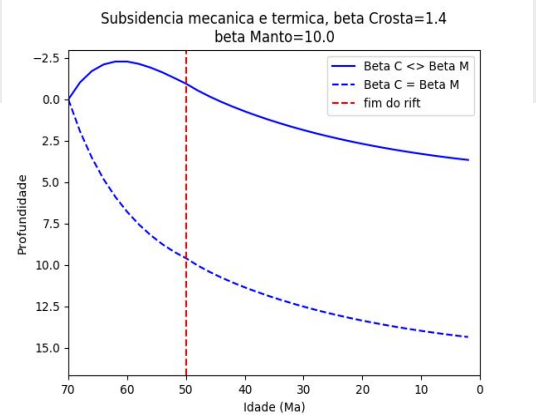
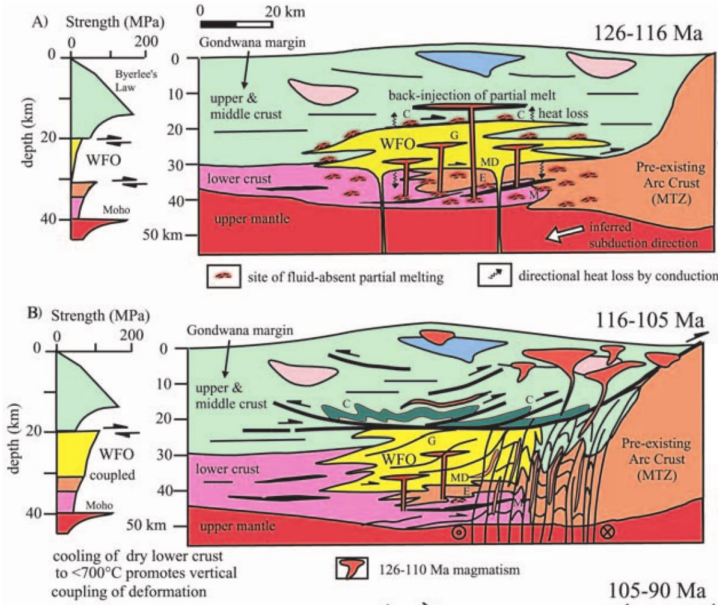
A abertura de oceanos - vulcanismo

Geoffroy, L. (2005) *Geoscience* **337**, 1395-1408.







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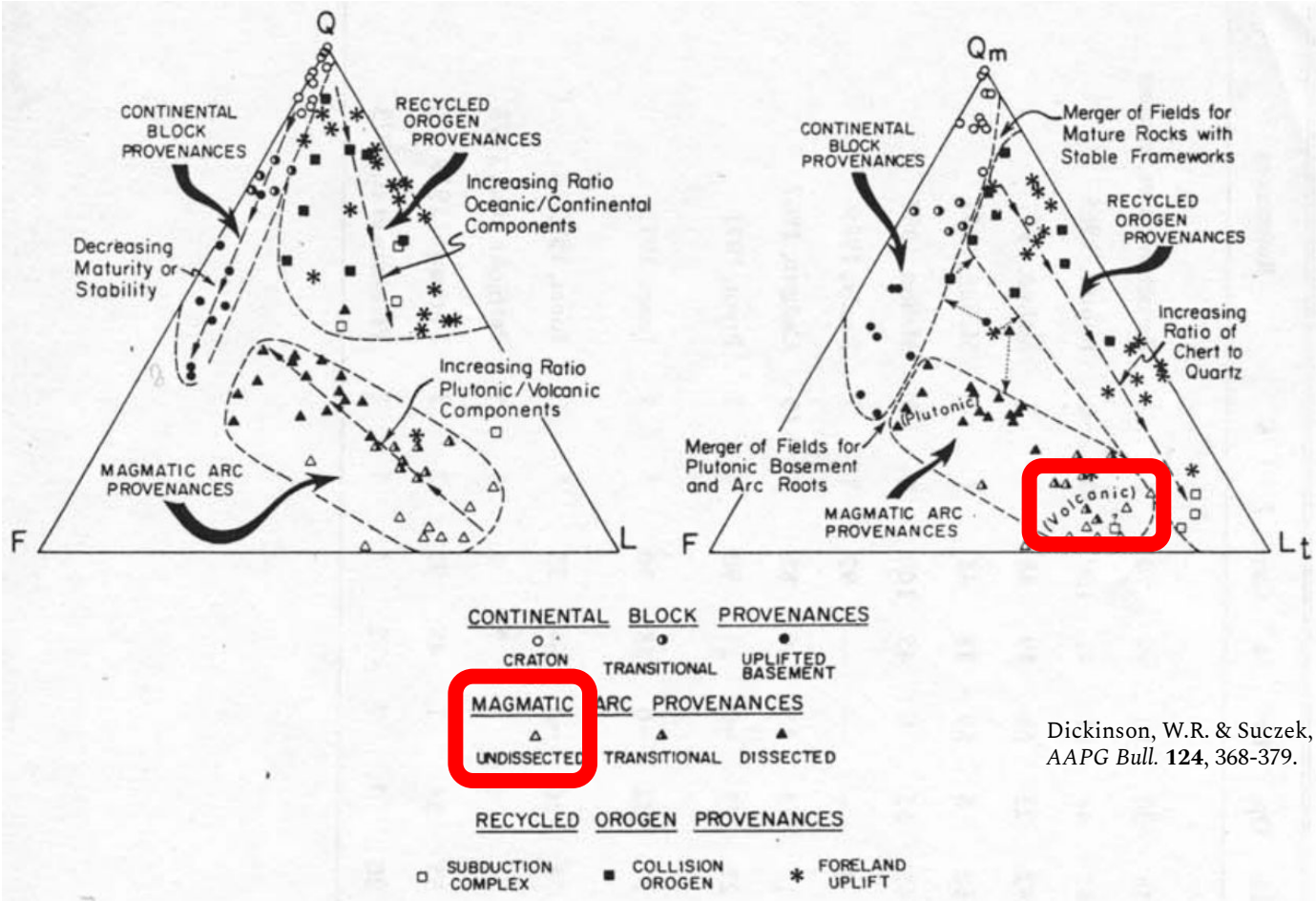
Implicações para proveniência



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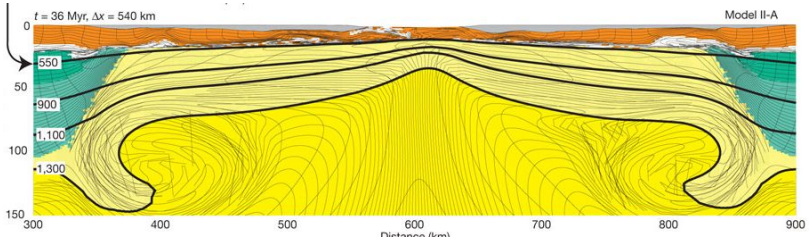

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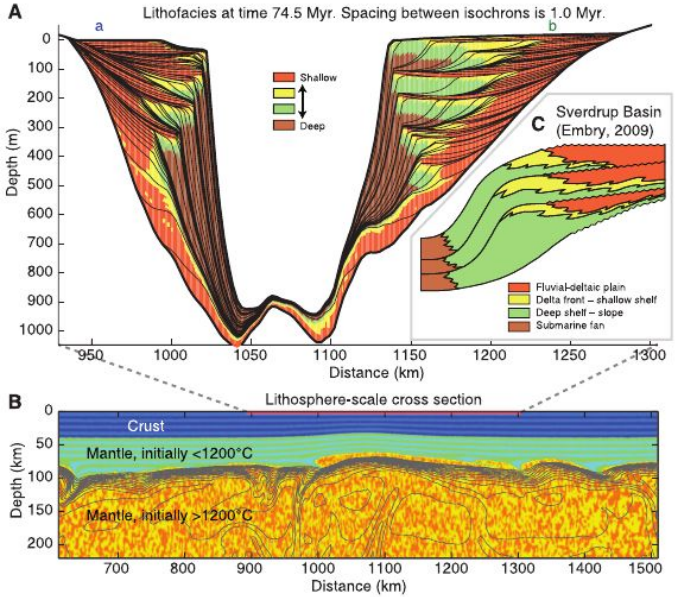

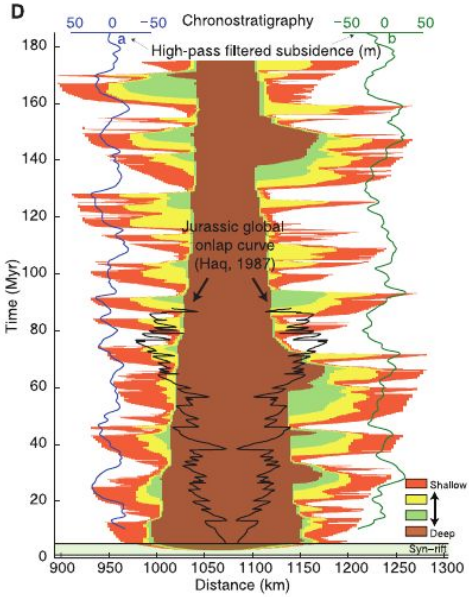

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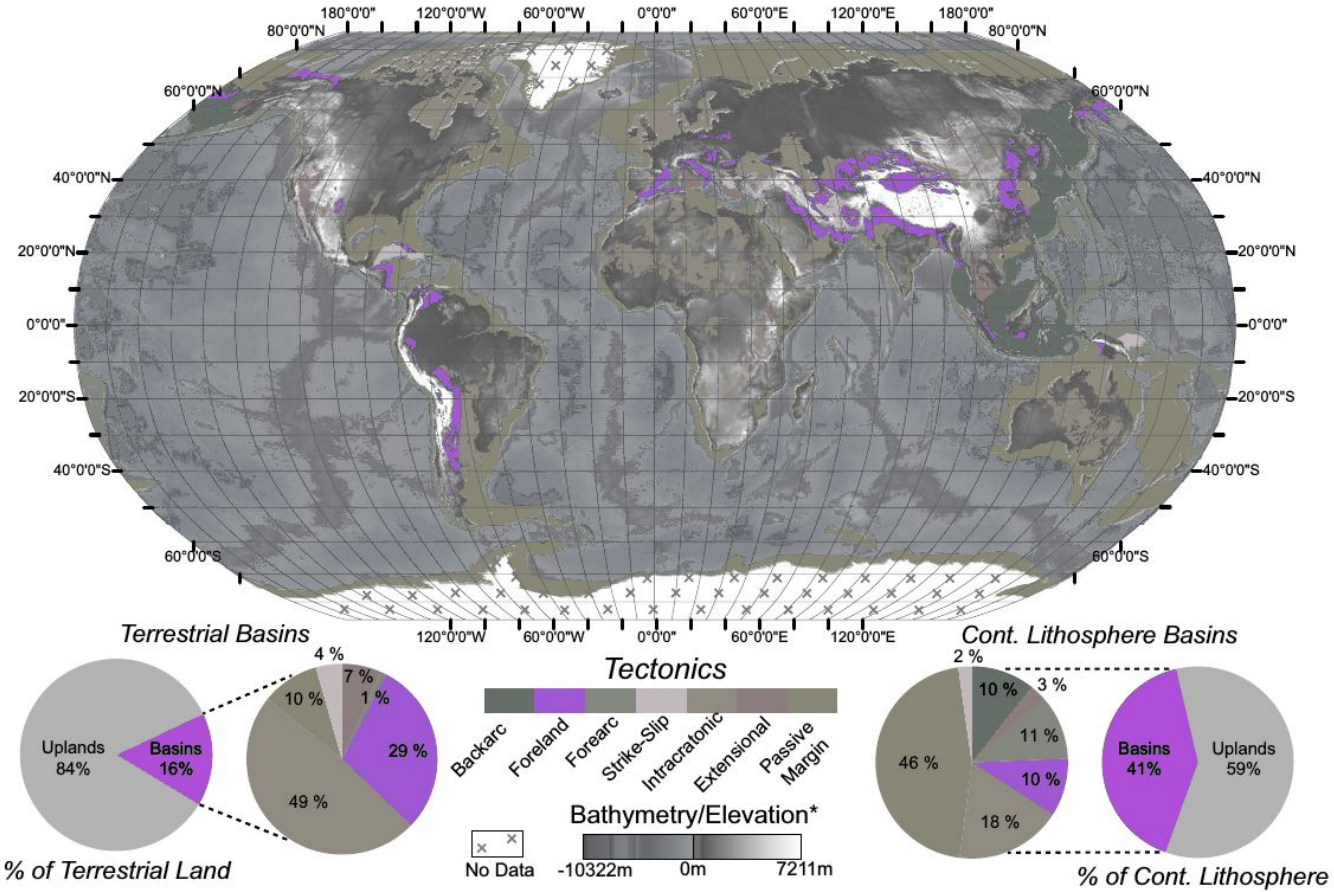
Bacias de antepaís

Modificado de:
Nyberg, B., Holwell, J.A. (2015)
Geology **43**, 643-646.



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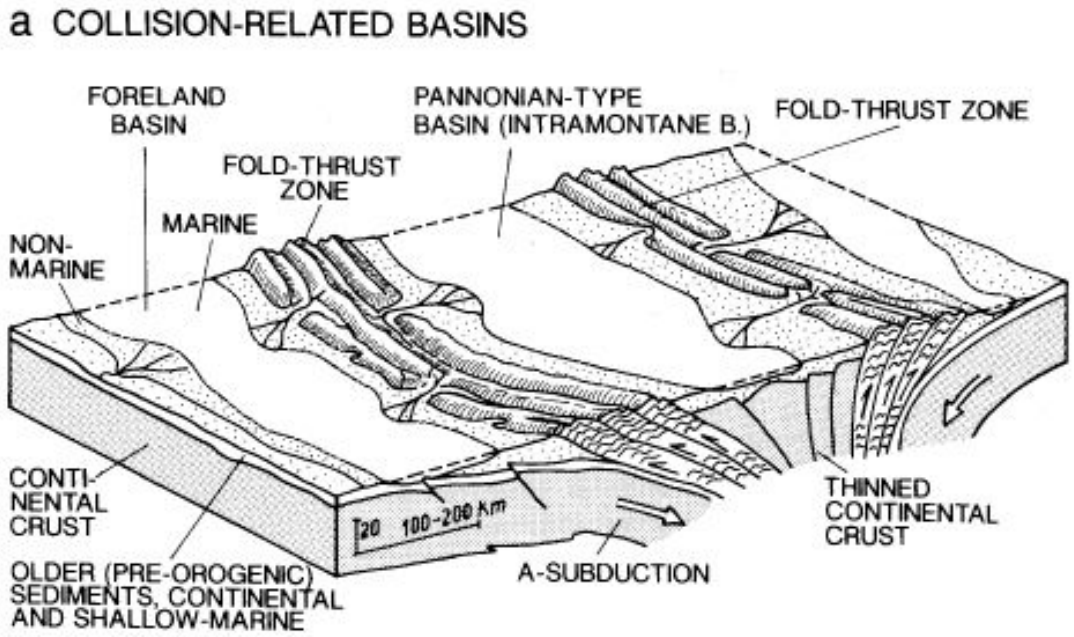
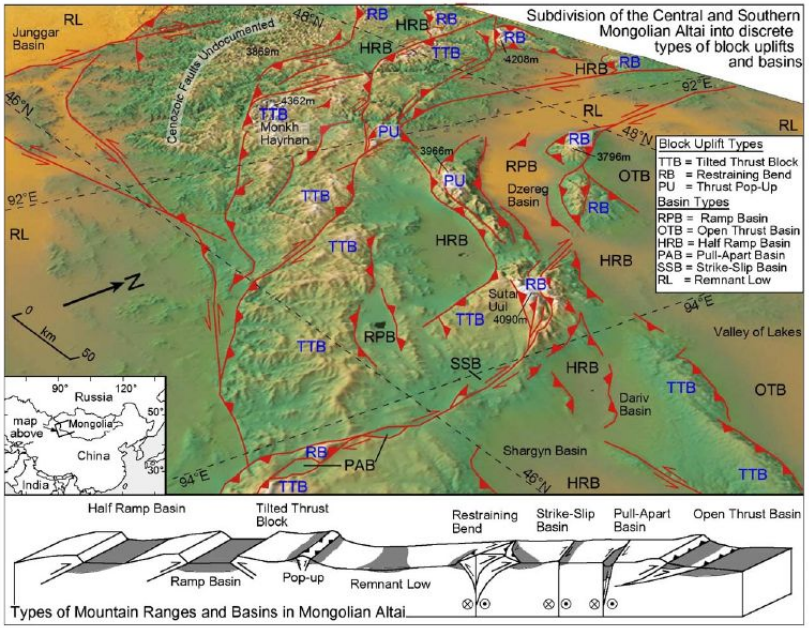
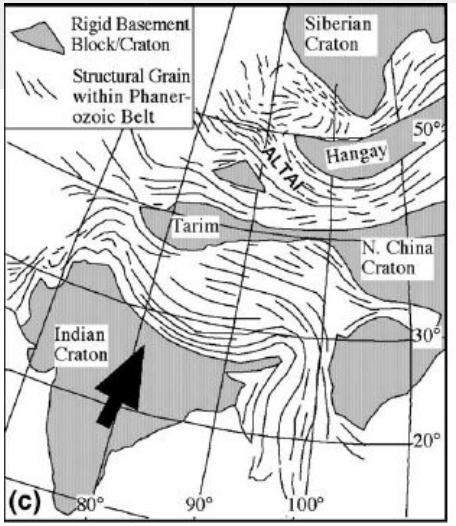


Einsele. G. 1992. Sedimentary Basins, Evolution Facies and Sediment Budget. 2 ed, Springer, 792 p.

Bacias flexurais intra-placa





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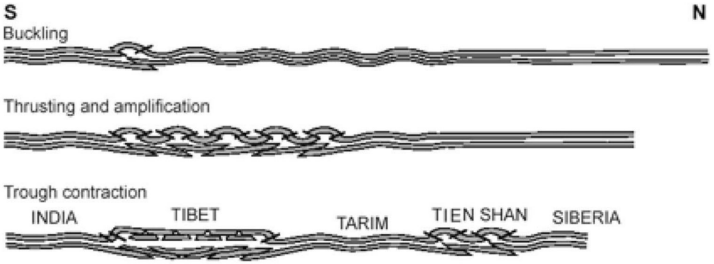

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Bacias de ante-arco

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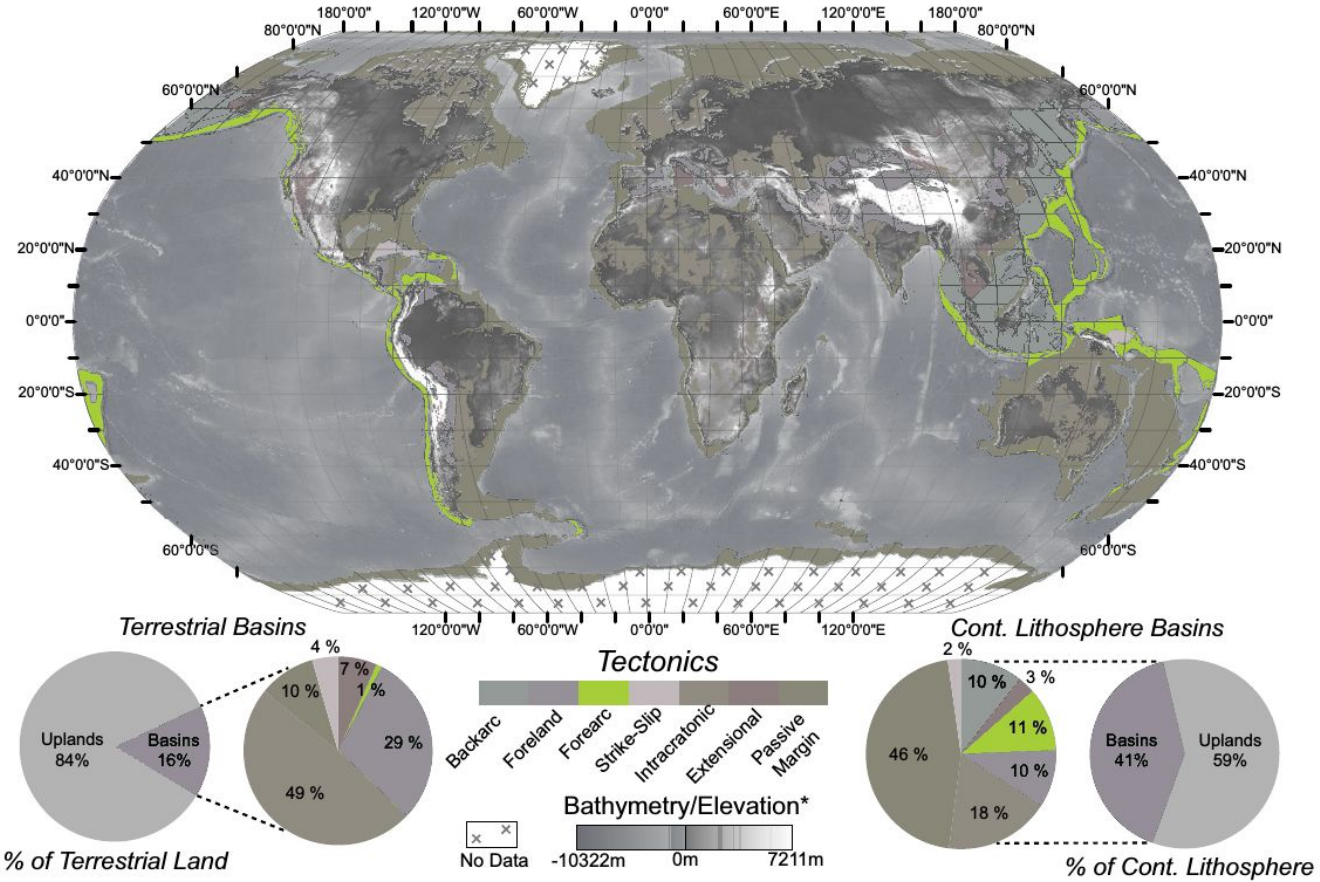

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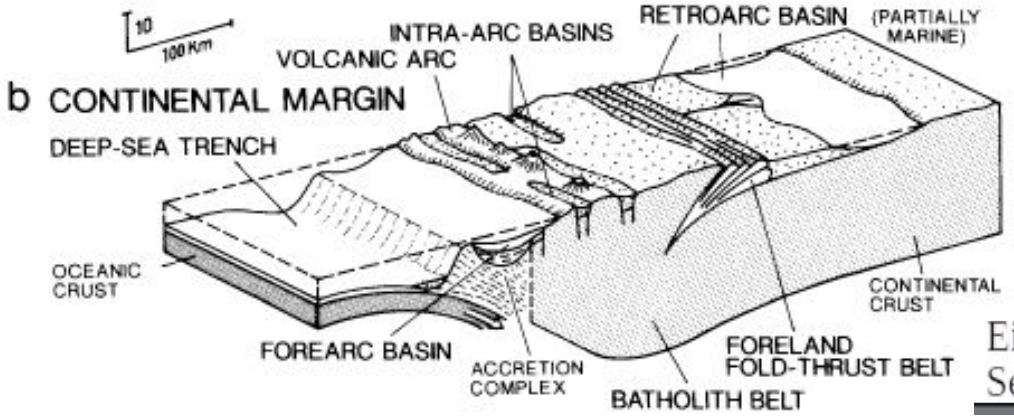
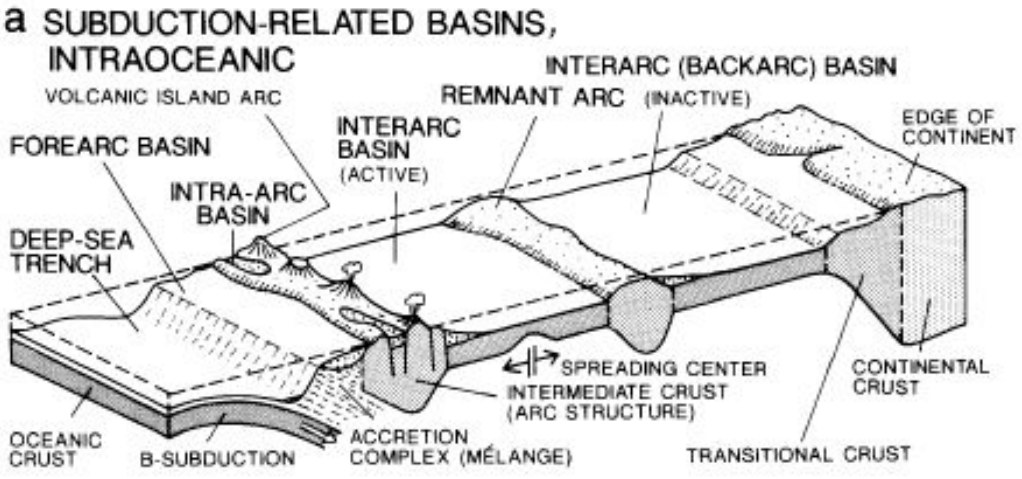


Einsele. G. 1992. Sedimentary Basins, Evolution Facies a
Sediment Budget. 2 ed, Springer, 792 p.



Processos geodinâmicos

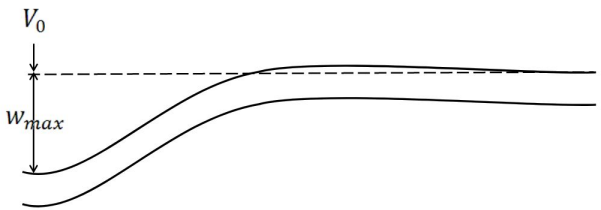
$$D = \frac{E\,T_e^3}{12\,(1-\nu^2)}$$

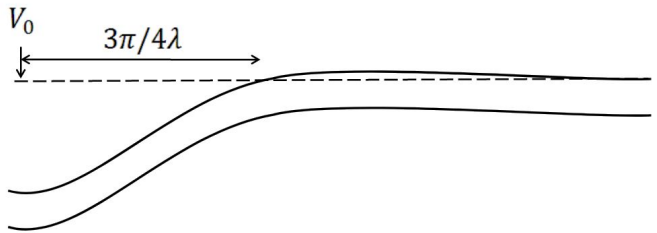
$$\lambda = \left[\frac{(\rho_m - \rho_r)g}{4D}\right]^{1/4}$$

D = rigidez flexural
ϱ_m = densidade do manto
ϱ_r = densidade do preenchimento
E = módulo de Young
Te = espessura elástica
ν = coeficiente de Poissons

$$w = \frac{V_0\lambda}{2(\rho_m - \rho_r)g}\,e^{-\lambda x}(\cos\lambda x + \sin\lambda x)$$

$$x = 0, \quad w = w_{max} = \frac{V_0\lambda}{2(\rho_m - \rho_r)g}$$





Cálculos baseados em:

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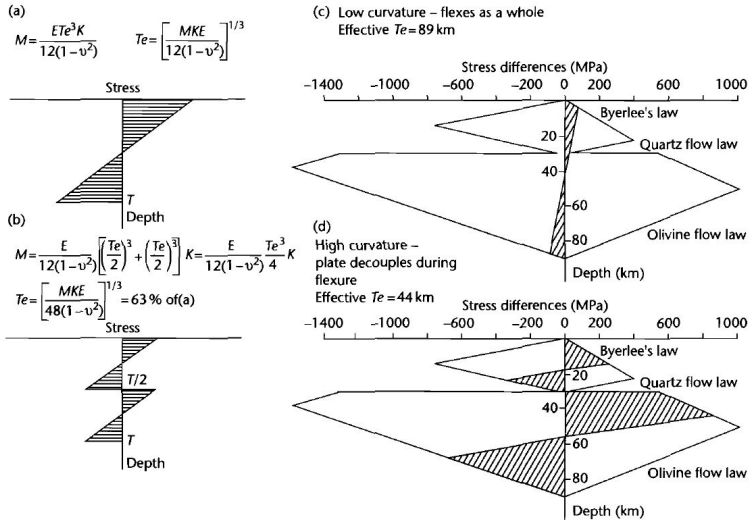
Rigidez flexural e resistência



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J. Geophys. Res. **93**, 8825-8838.

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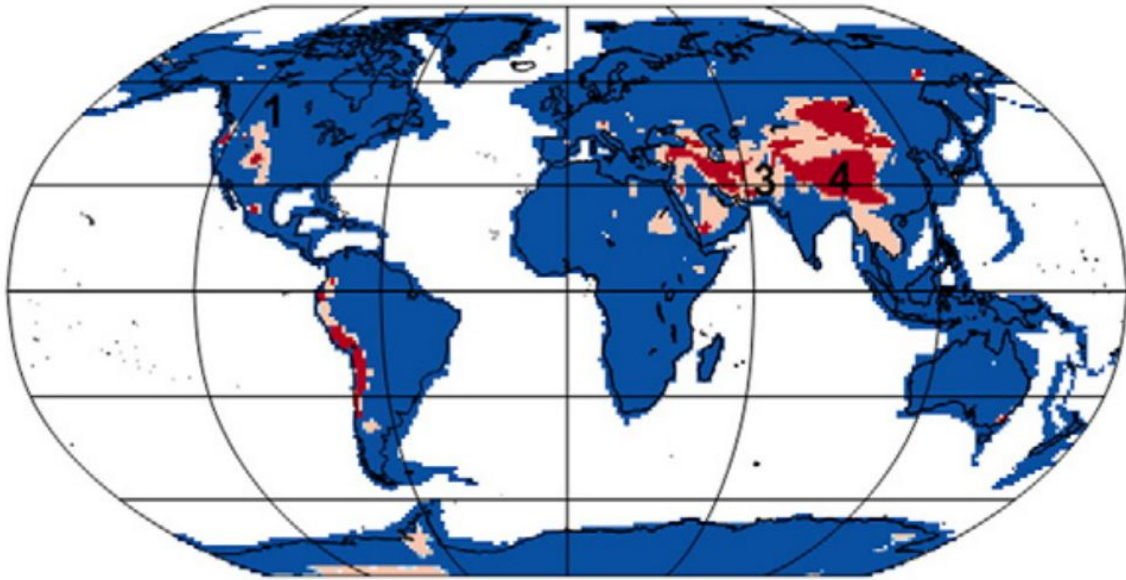
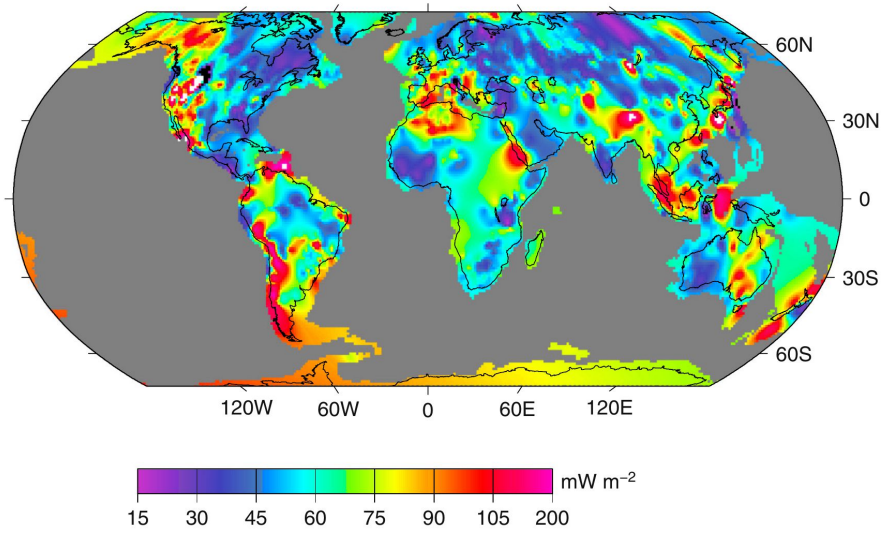
Crosta acoplada (azul) e desacoplada (vermelho)



Tesauro, M. et al. (2013)
Tectonophysics **602**, 78-86.

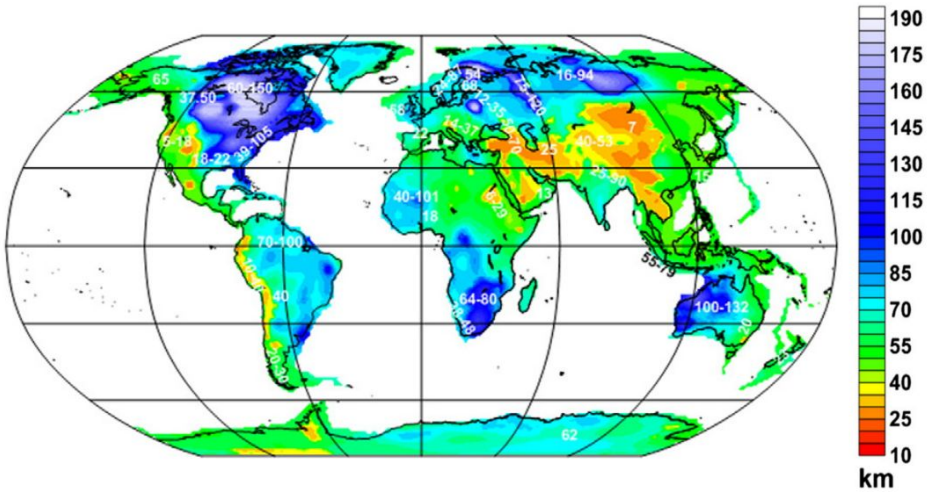
Rigidez flexural e temperatura

Fluxo térmico



Jaupart, C. et al. (2016)
Lithos **262**, 398-427.

Rigidez flexural



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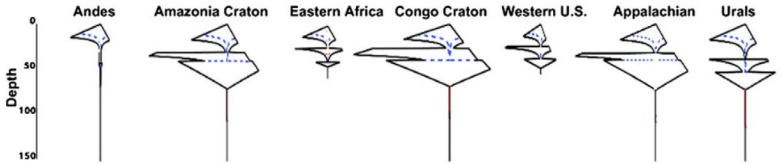
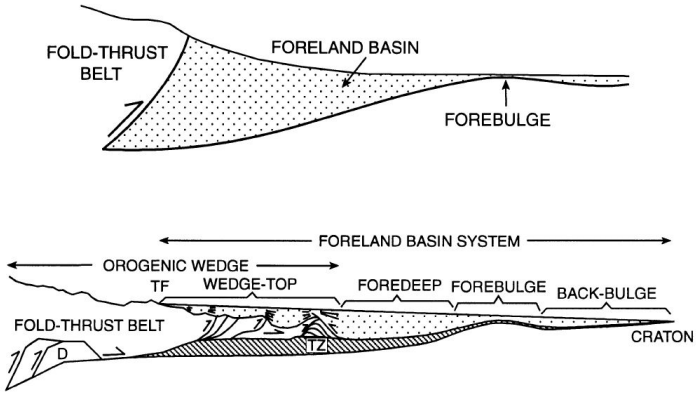
Tectonophysics **602**, 78-86.



Flexura e falhas



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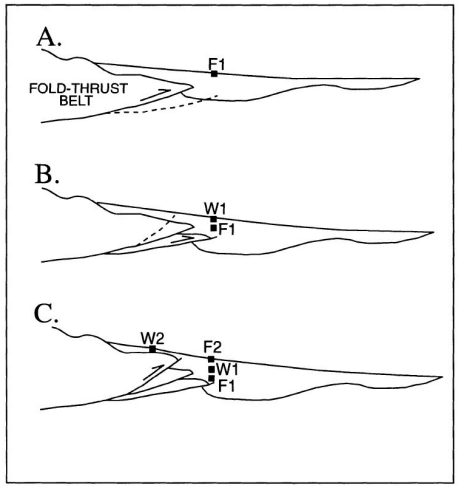

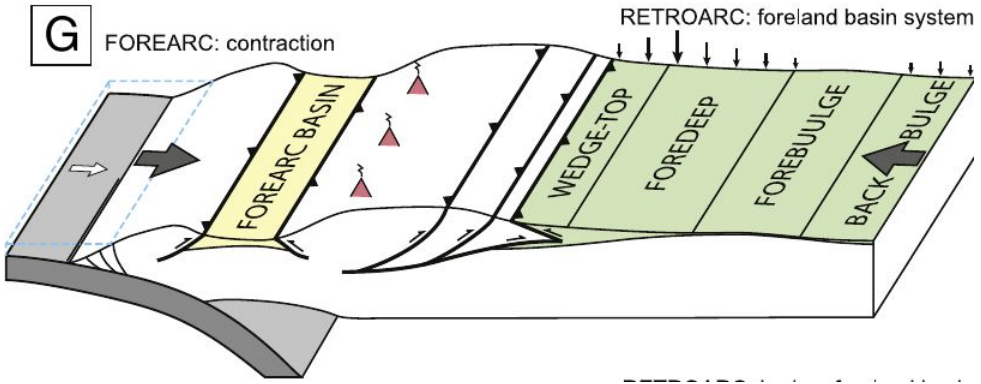

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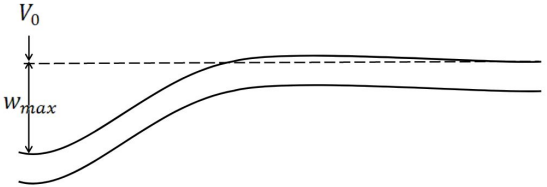
"Compressão do ante-arco gera bacias relacionadas a cavalgamentos ou **falhas inversas que induzem subsidência flexural**"

Rigidez flexural e topografia

$$w = \frac{V_0 \lambda}{2(\rho_m - \rho_r)g} e^{-\lambda x}(\cos \lambda x + \sin \lambda x)$$

$$x = 0, \quad w = w_{max} = \frac{V_0 \lambda}{2(\rho_m - \rho_r)g}$$



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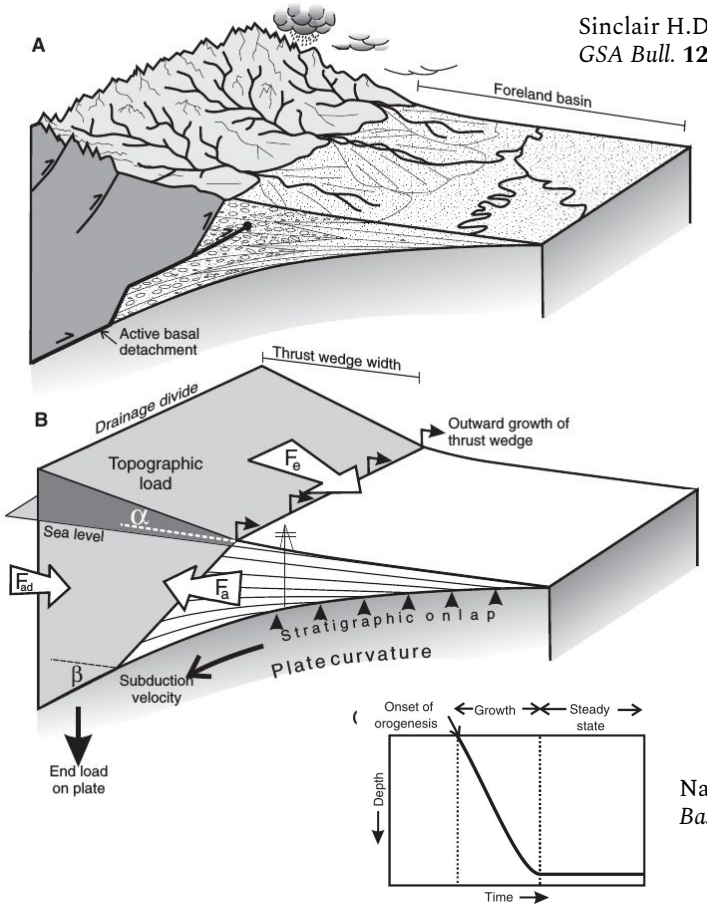

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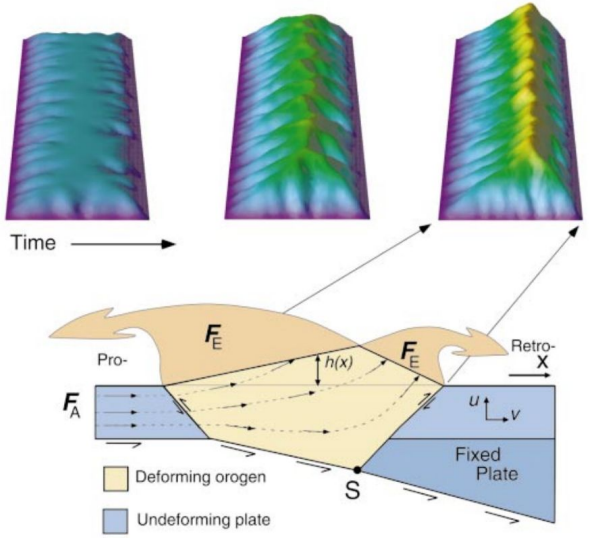
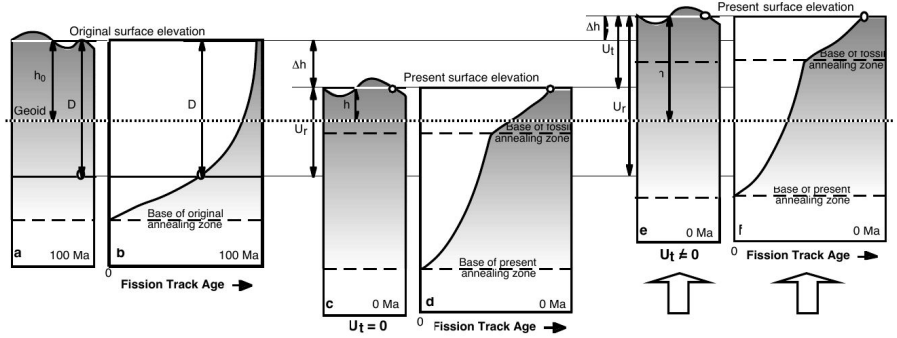


Denudação

Termocronologia



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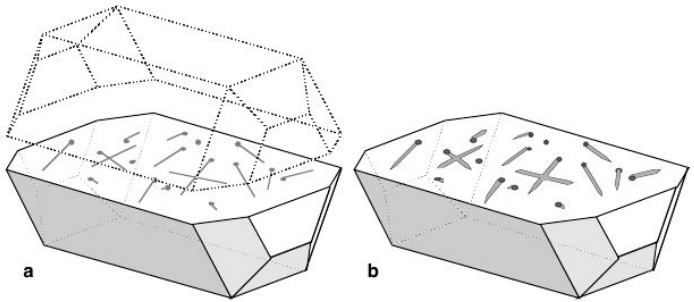
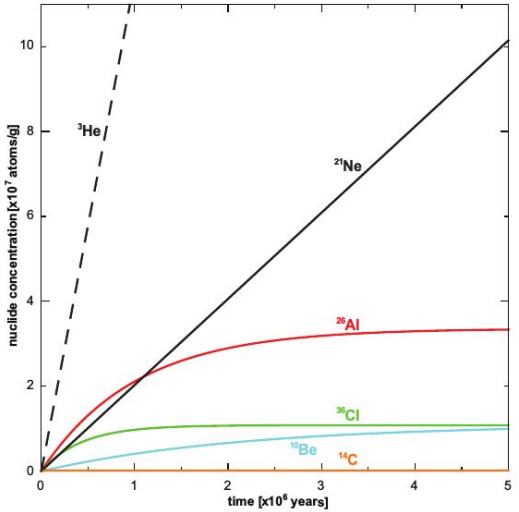


Nuclídeos cosmogênicos e datação de superfícies



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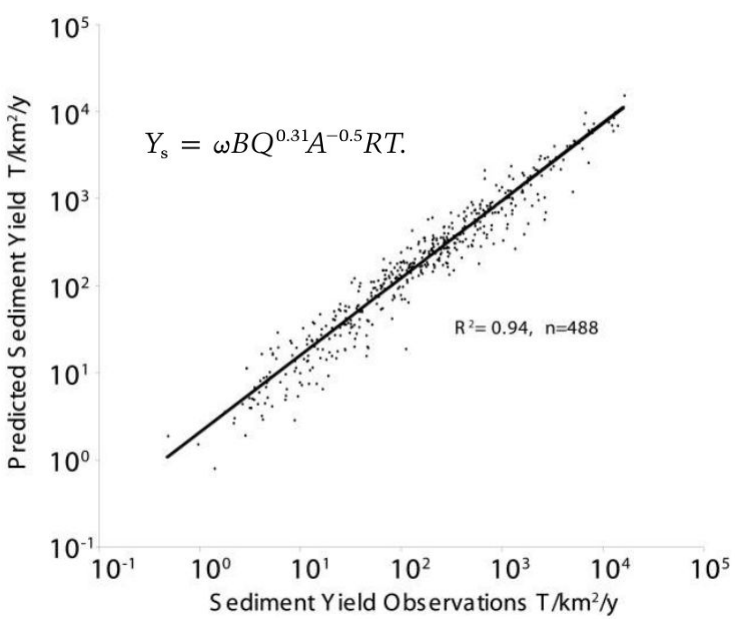
Produção sedimentar

Bacias de drenagem



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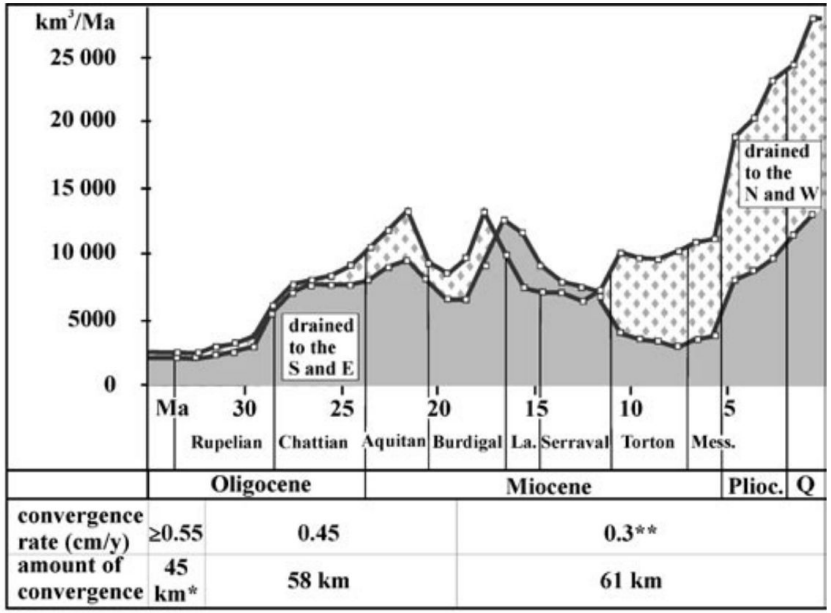

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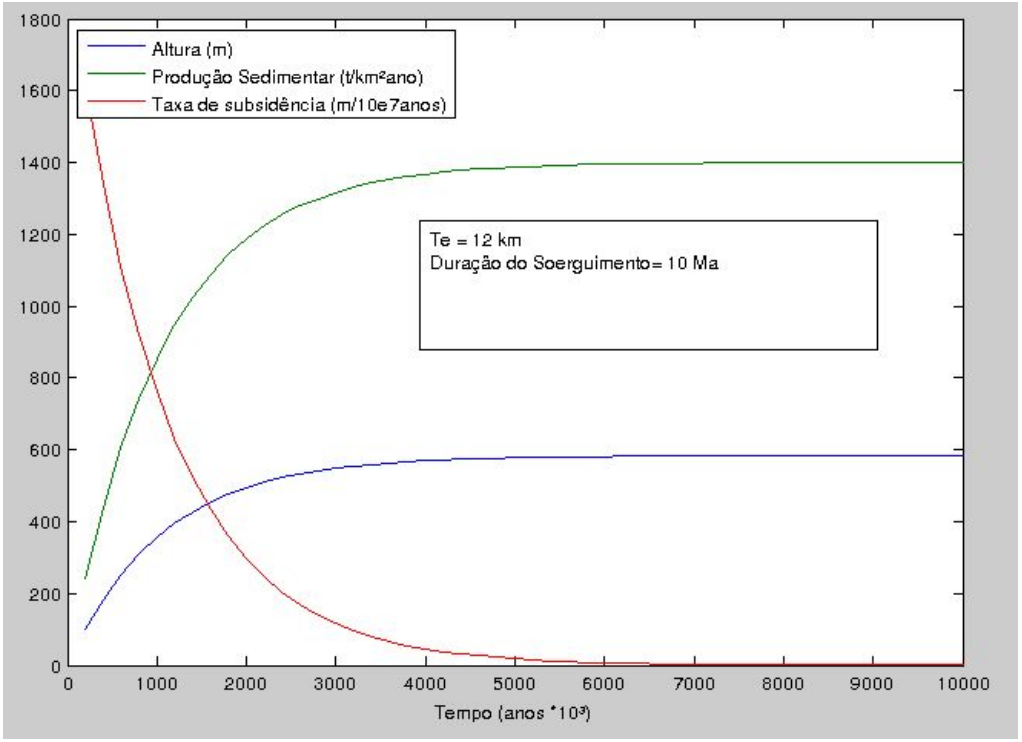

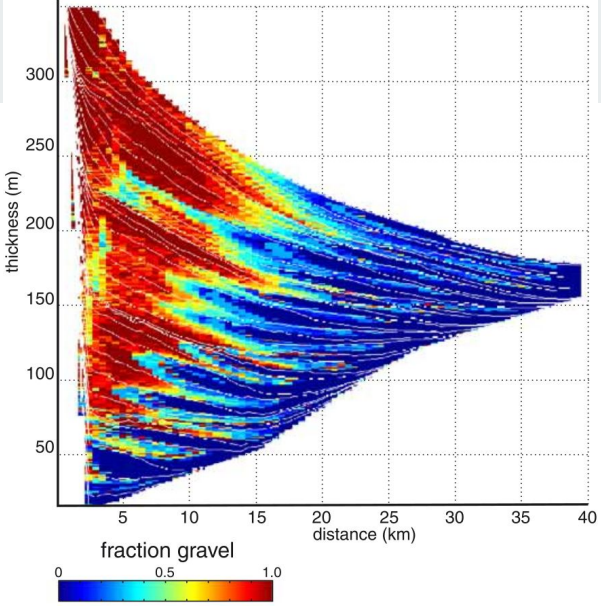

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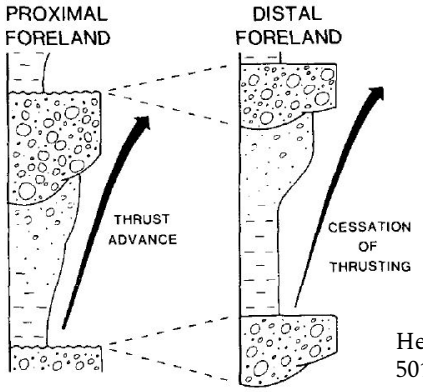

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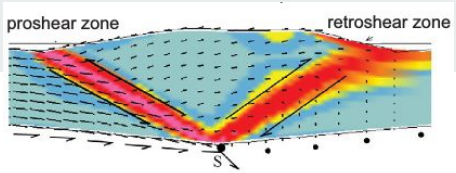
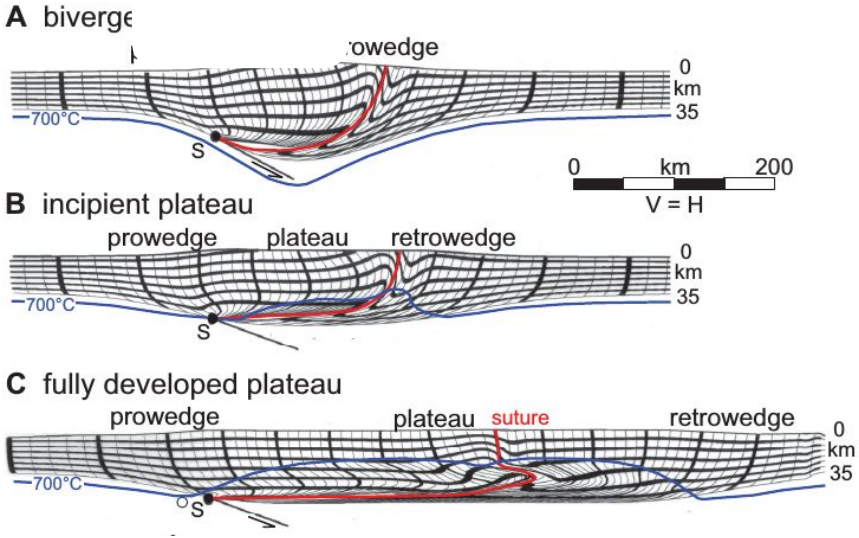
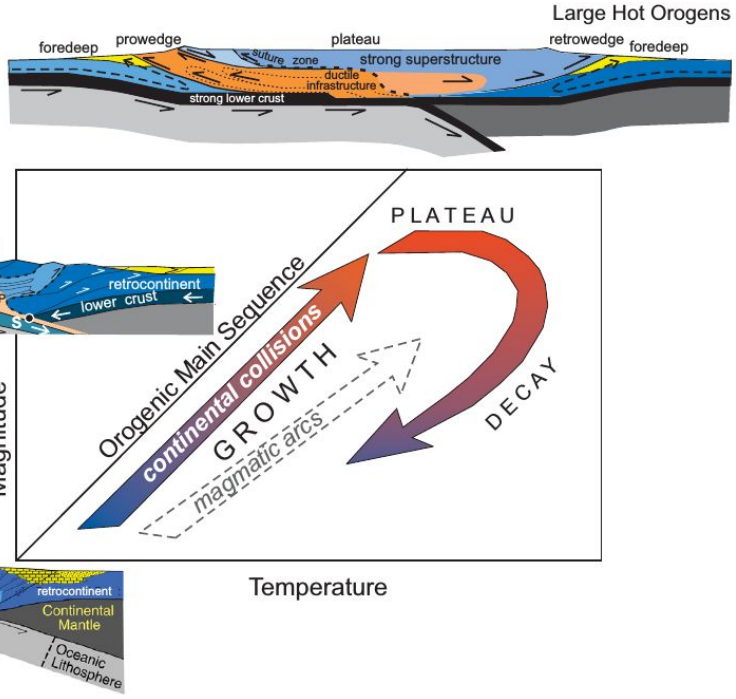
1- Evolução da cunha orogênica







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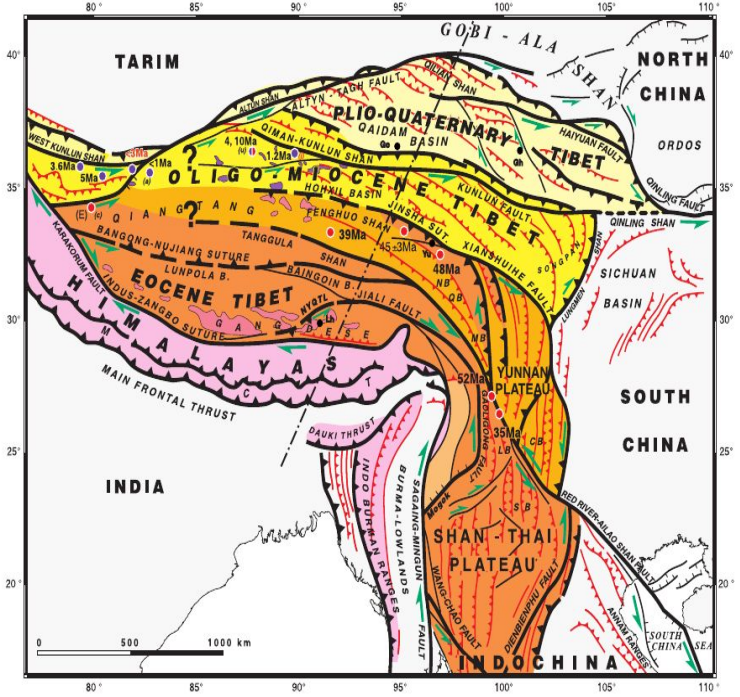
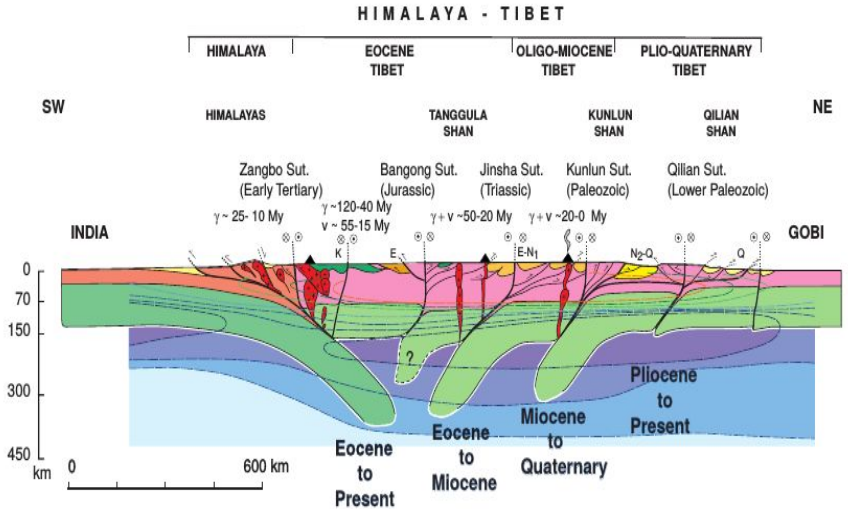
Evolução do antepaís - Orógenos quentes





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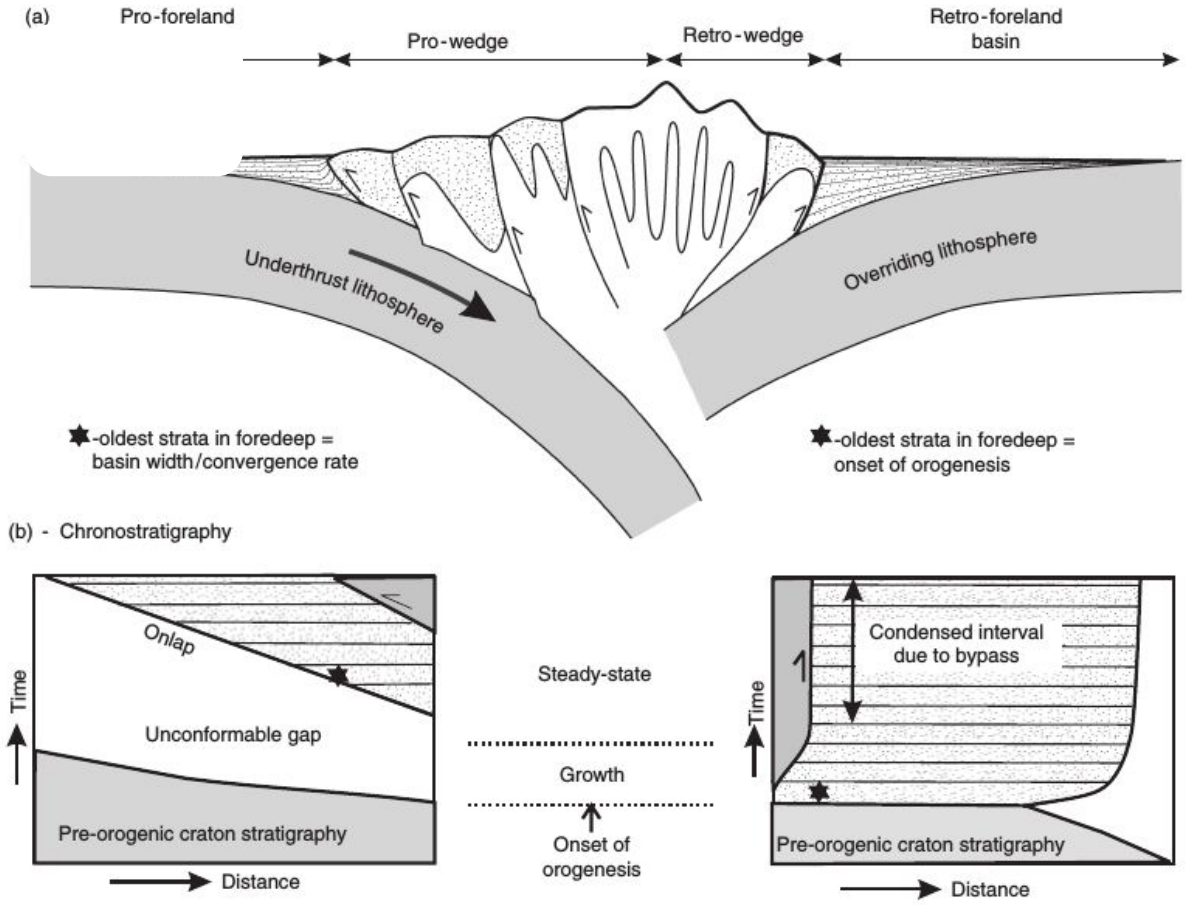

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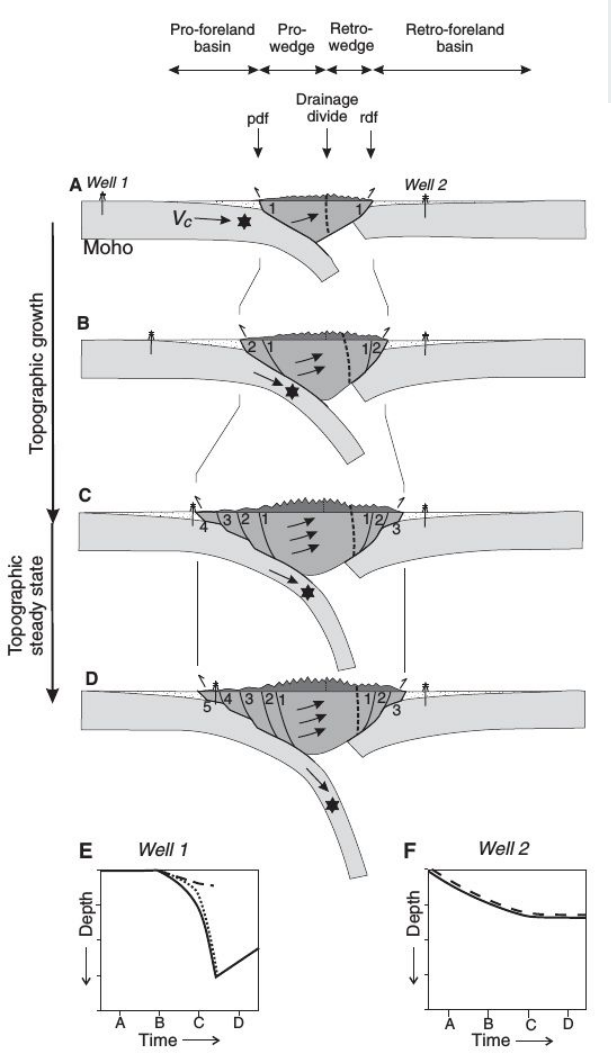
2- Infra-carga de subducção



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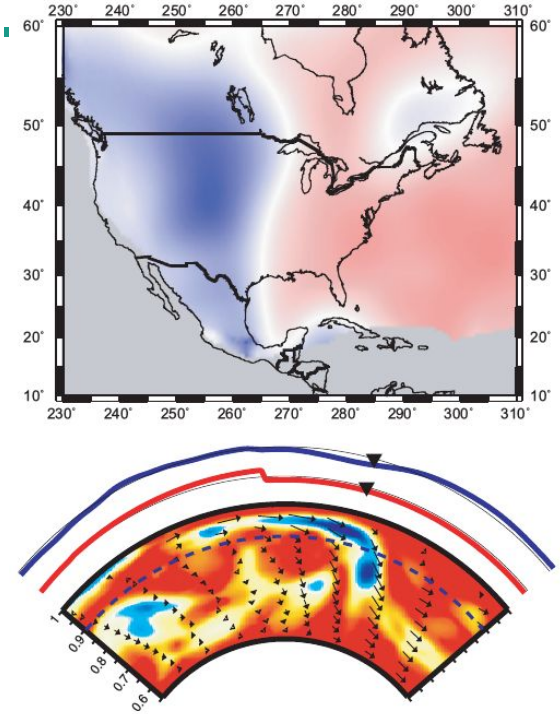
3- Topografia dinâmica

70 Ma



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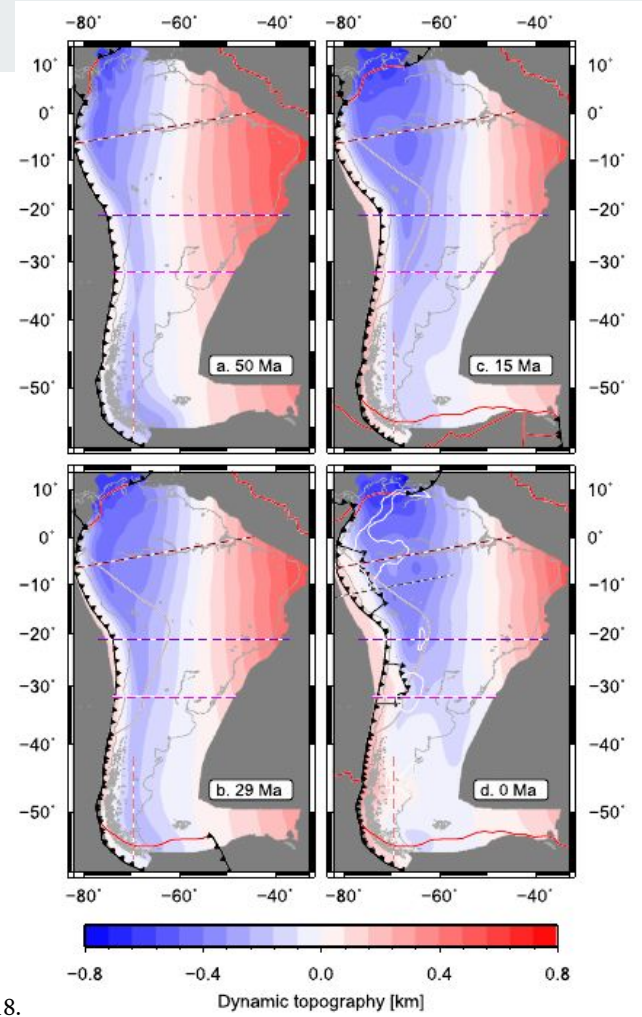

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