



# SISTEMA OCEANO

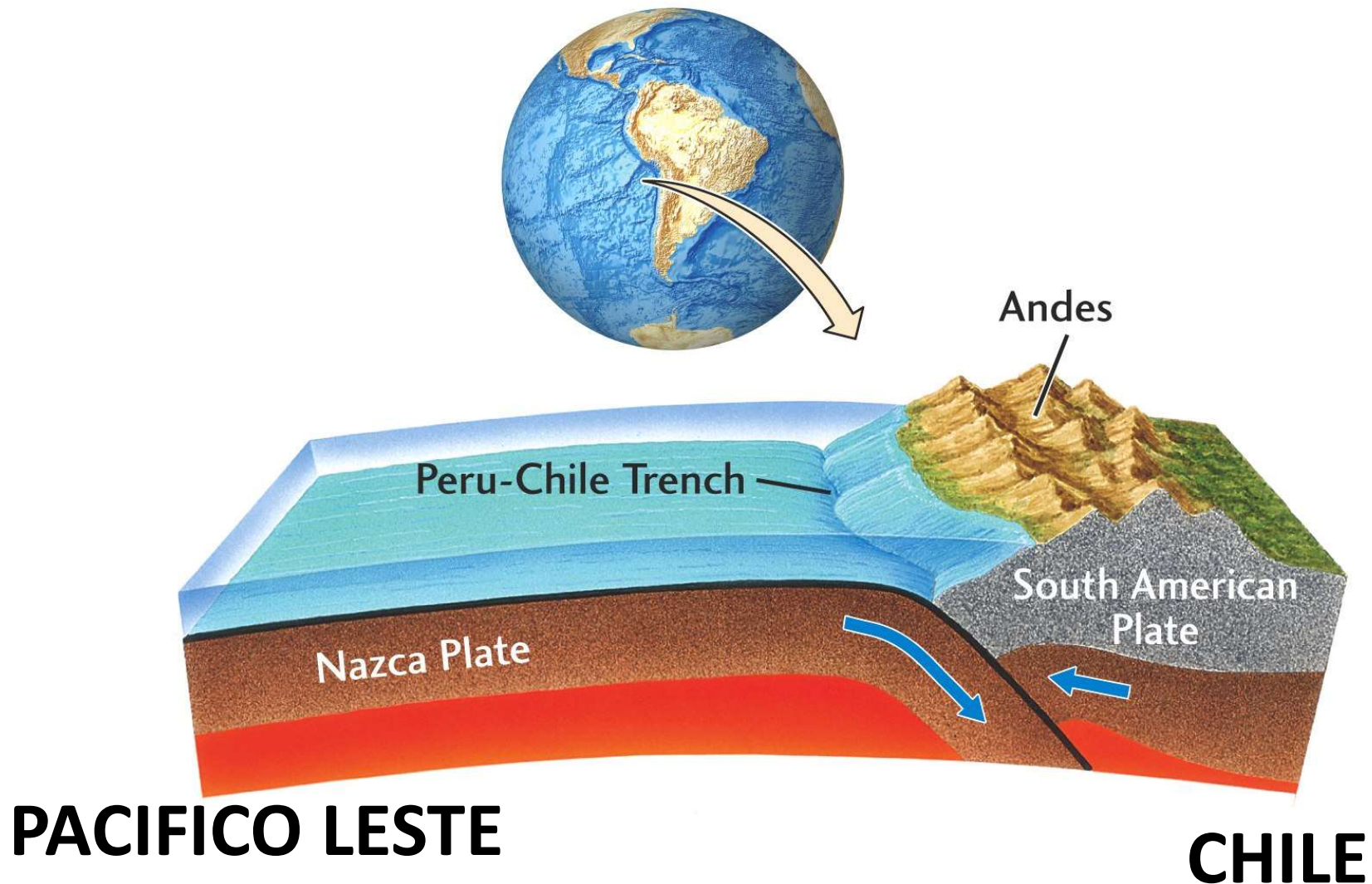
## Gênese e Evolução dos Fundos Marinhos

### Parte II

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Dep. de Oceanografia Geológica (IOUSP)  
26 de outubro de 2023  
([millo@usp.br](mailto:millo@usp.br))

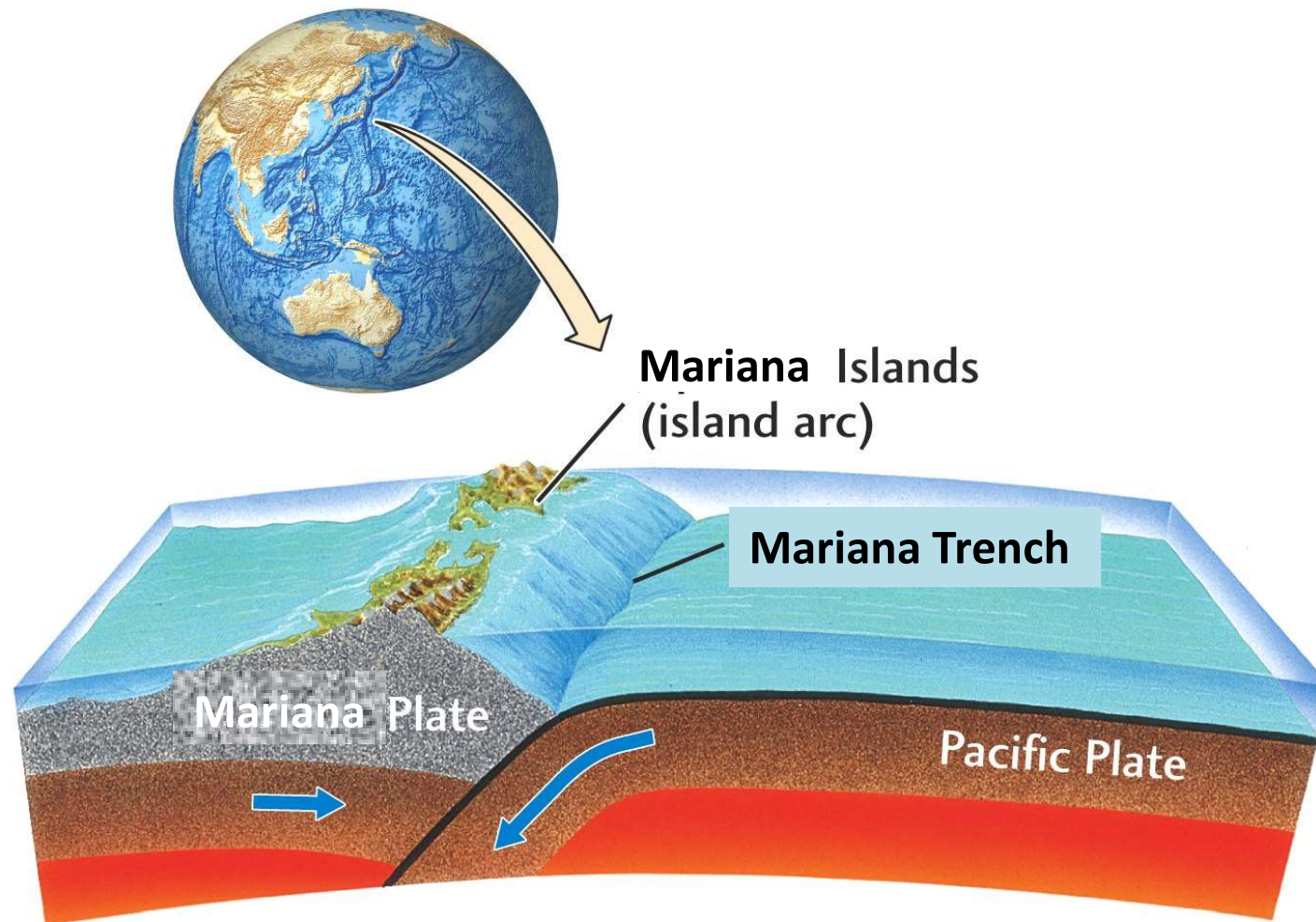
# Processos de Colisão

## 1) Placa oceânica – Placa Continental



# Processos de Colisão

2) Placa oceânica – Placa oceânica (por ex. Marianas)



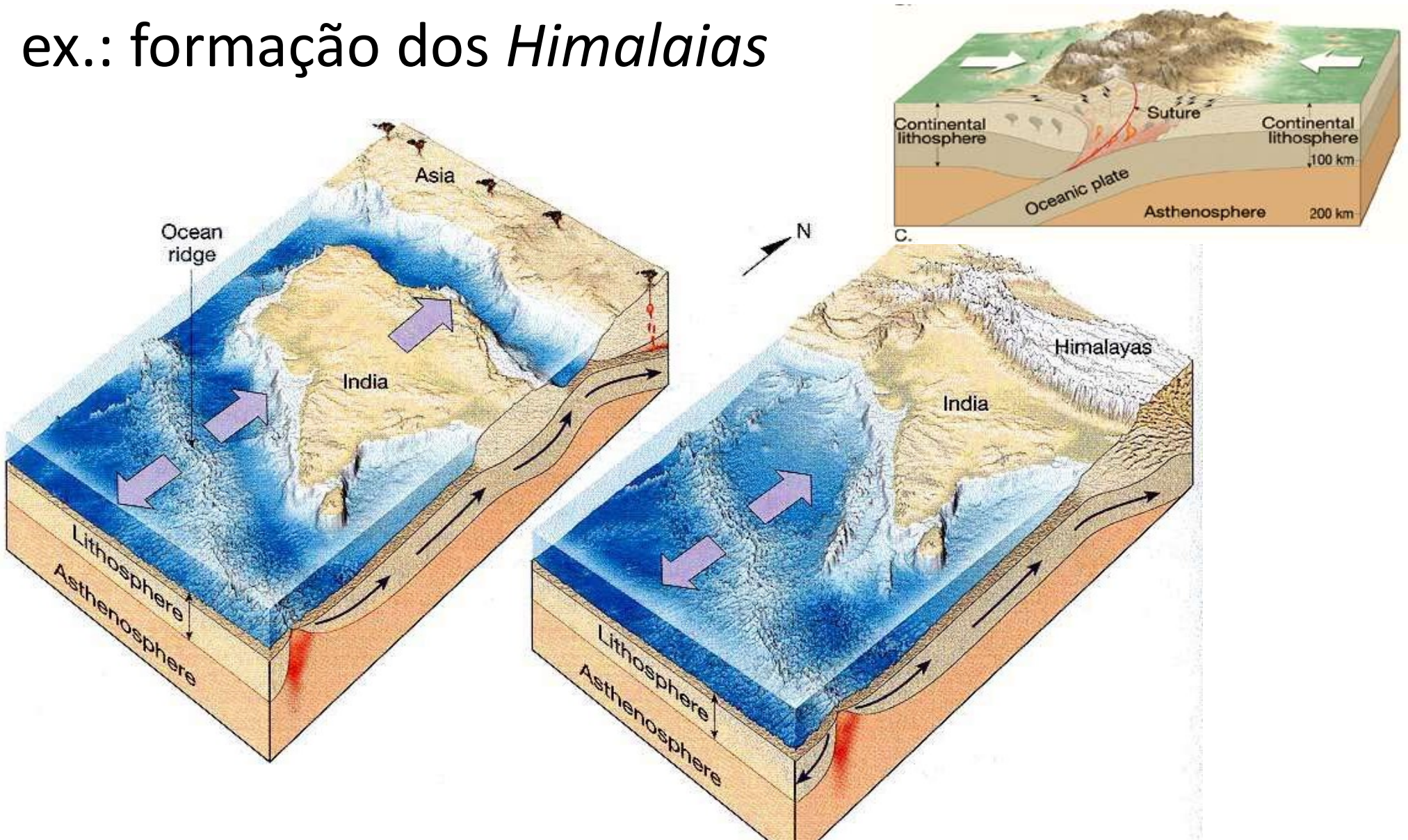
**MAR DAS FILIPINAS**

**PACIFICO OESTE**



# Processos de Colisão

3) Entre placas Continentais  
ex.: formação dos *Himalaias*





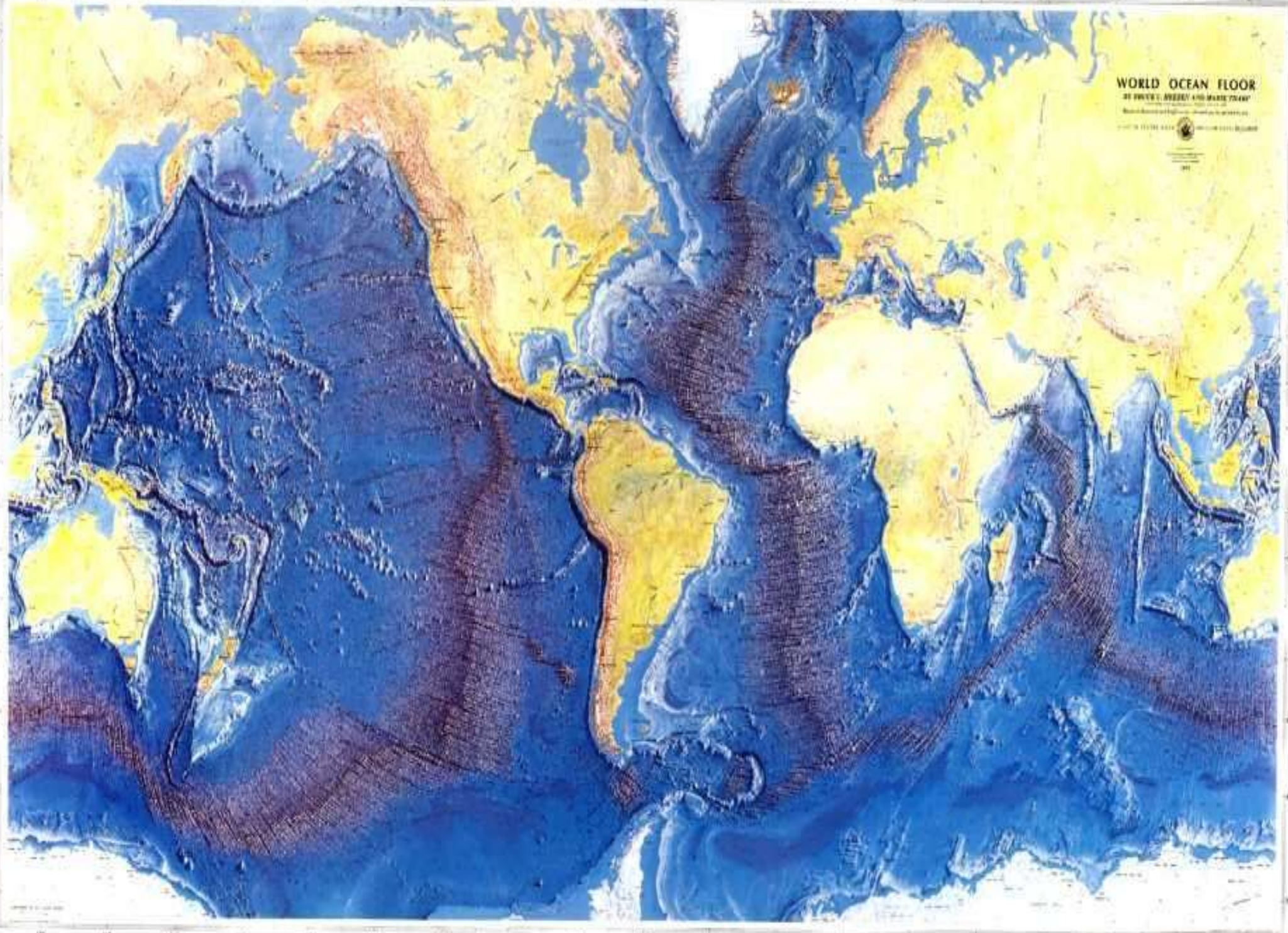
**WORLD OCEAN FLOOR**

BY PHILIP H. ABNEY AND MARIE THOMAS

Map of the World Ocean Floor

United States Geological Survey

1955



- Plataformas Continentais
- Fossas Oceânicas
- **Dorsais Oceânicas**
- Planícies Abissais
- Montes submarinos

# **TECTÔNICA DE PLACAS**



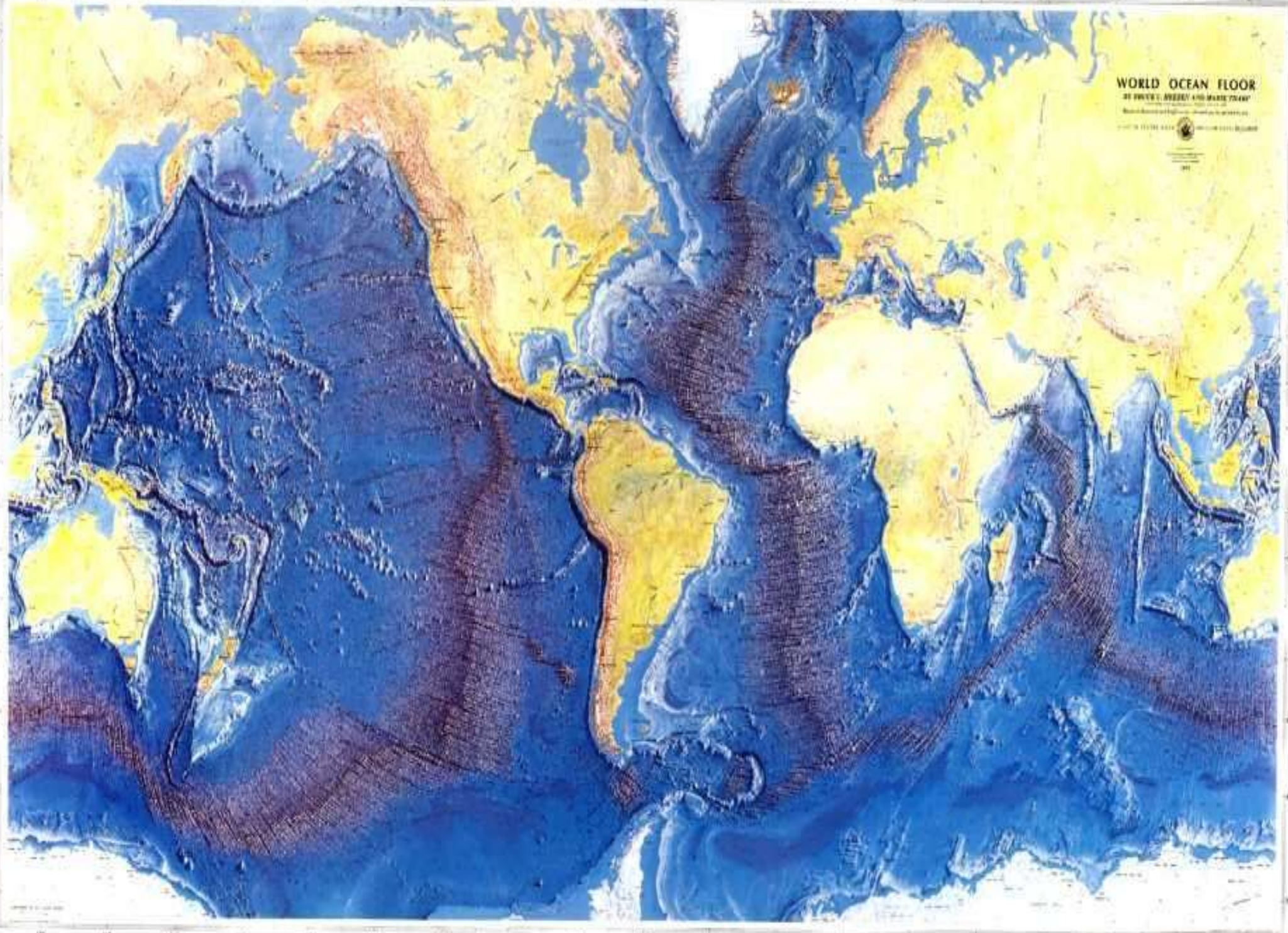
**WORLD OCEAN FLOOR**

BY PHILIP H. ABNEY AND MARIE THOMAS

Map of the World Ocean Floor

United States Geological Survey

1953





Dorsais Oceânicas:

Altitude: **2500 – 3000 m**

Comprimento: **75000 km**

WORLD OCEAN FLOOR

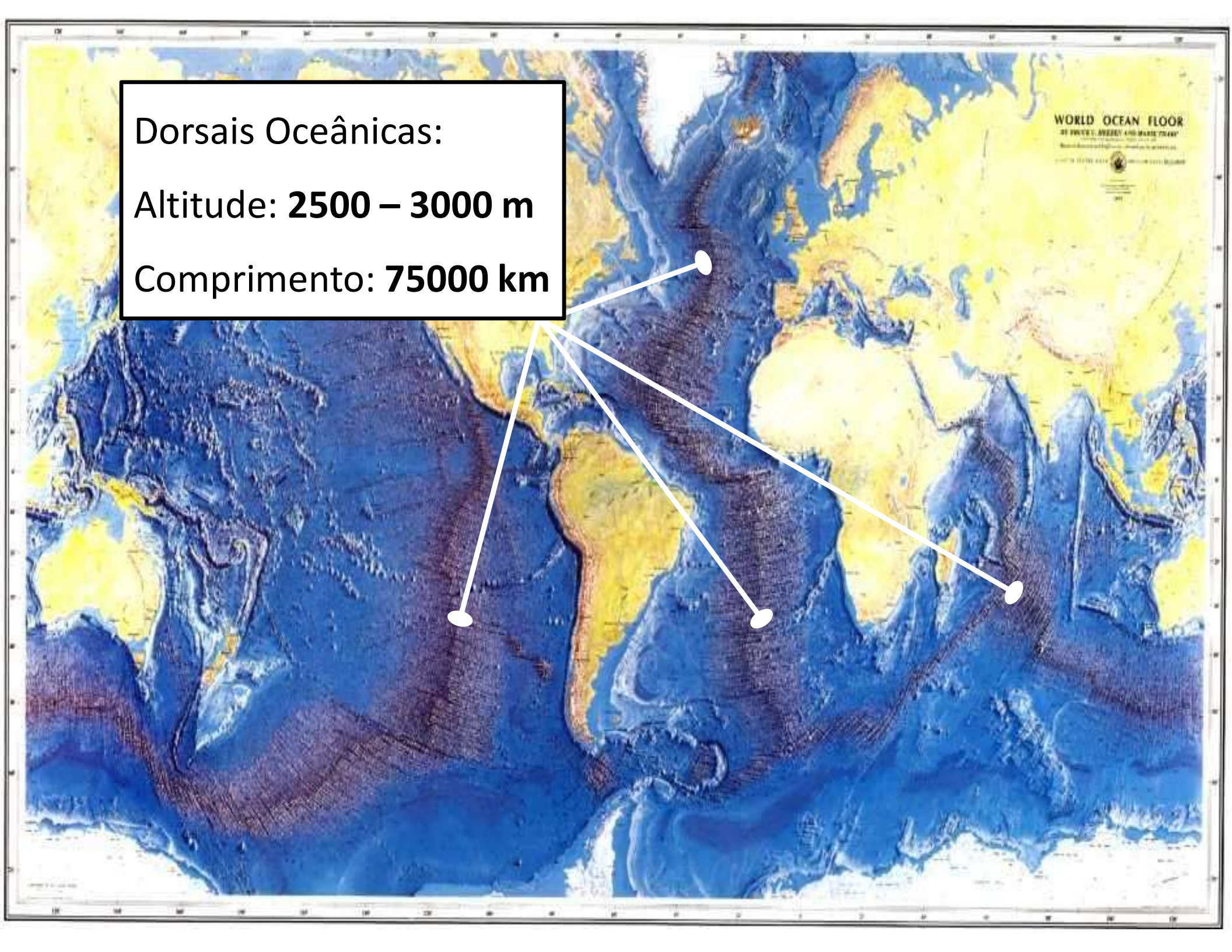
BY PHILIP H. ABNEY AND MARIE THOMPSON

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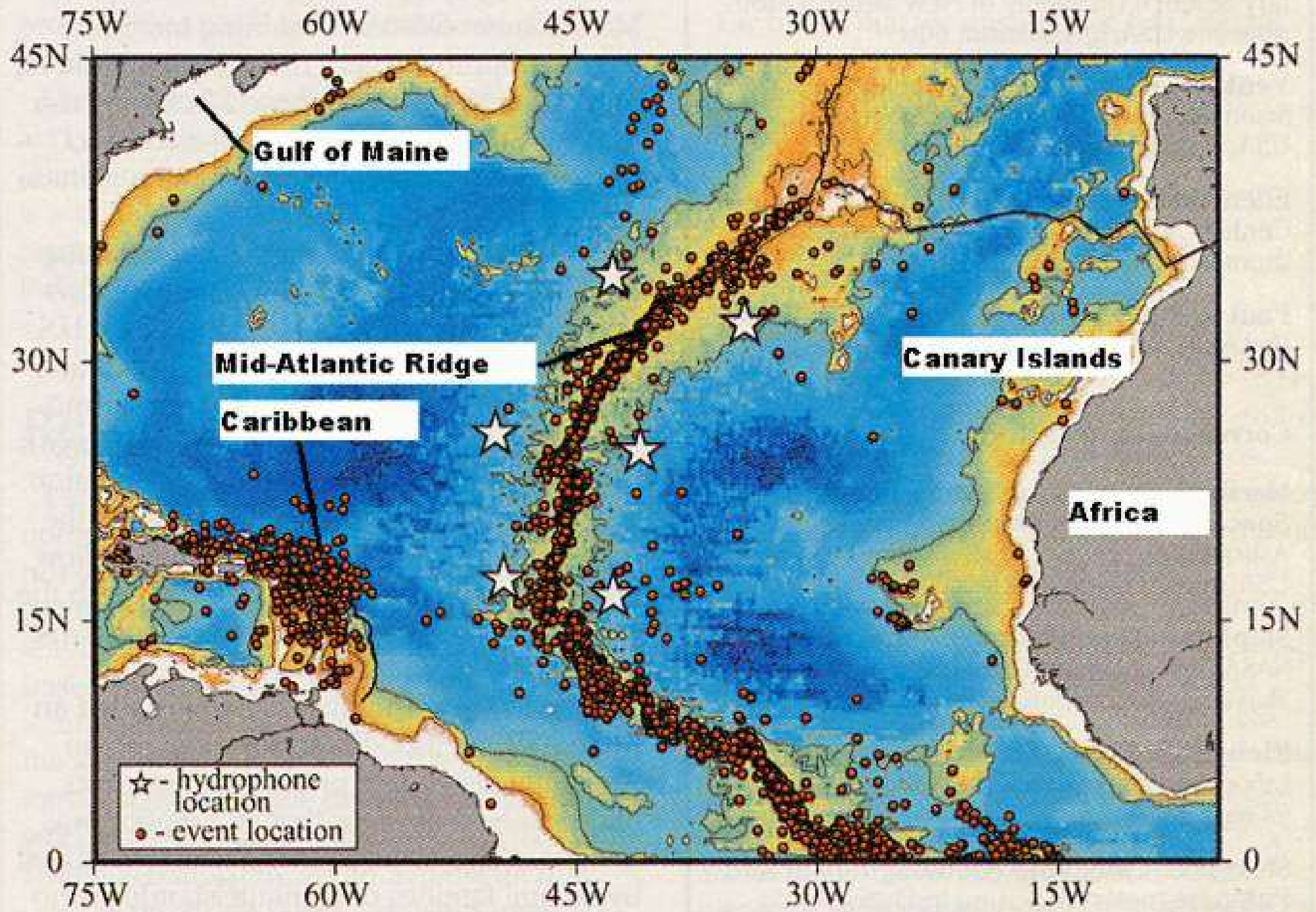
1971



1971









# LAVA EM ALMOFADA





# Formação de lava em almofada

pillow lava, ocean crust, croûte océanique, basalt.mp4



Reproduzir (k)

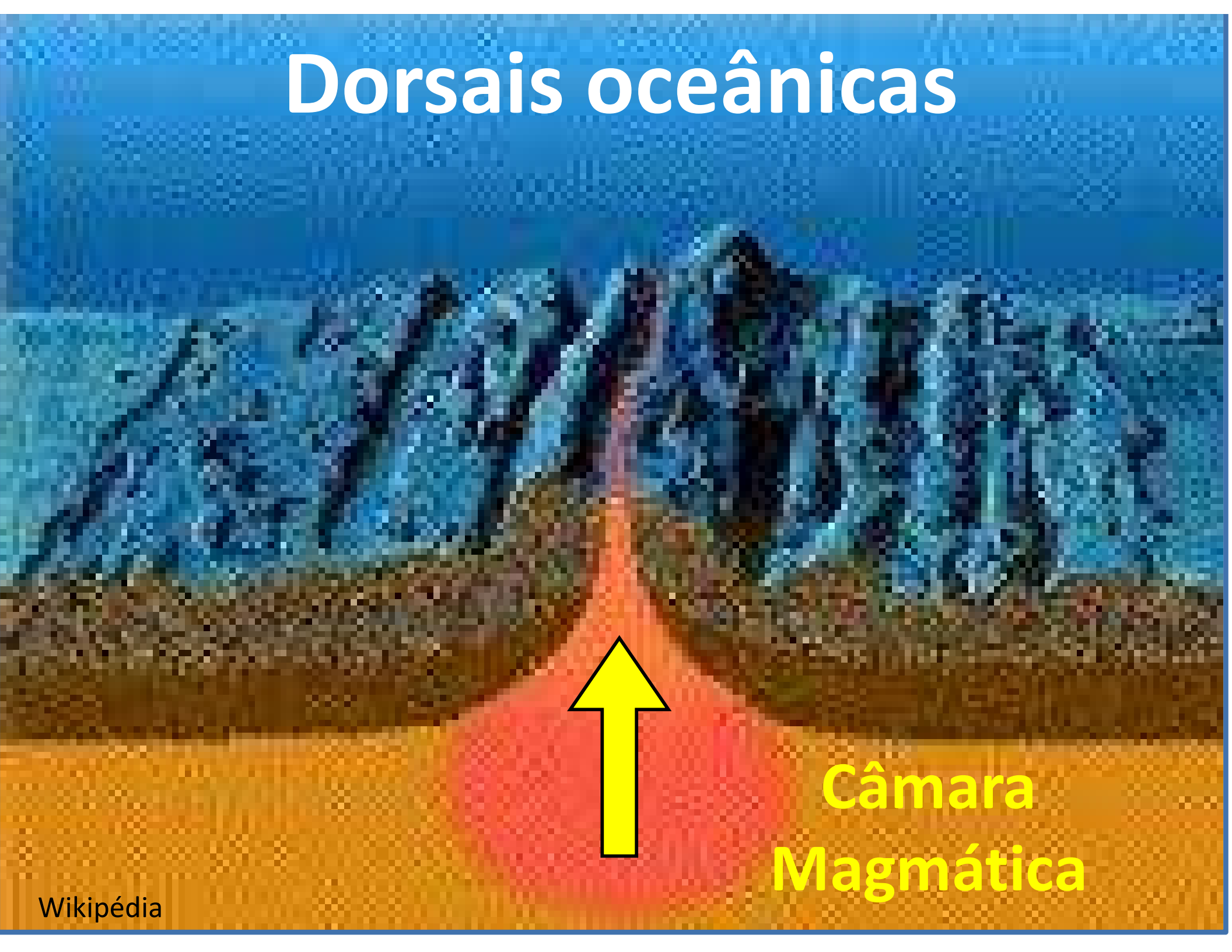
▶ ⏪ 🔊 0:16 / 0:48

⚙️ 📺 🏠

Crédito: [www.ronbleud.fr](http://www.ronbleud.fr) Walk on the core, Juan de Fuca, Joides Resolution, IODP, ODP.

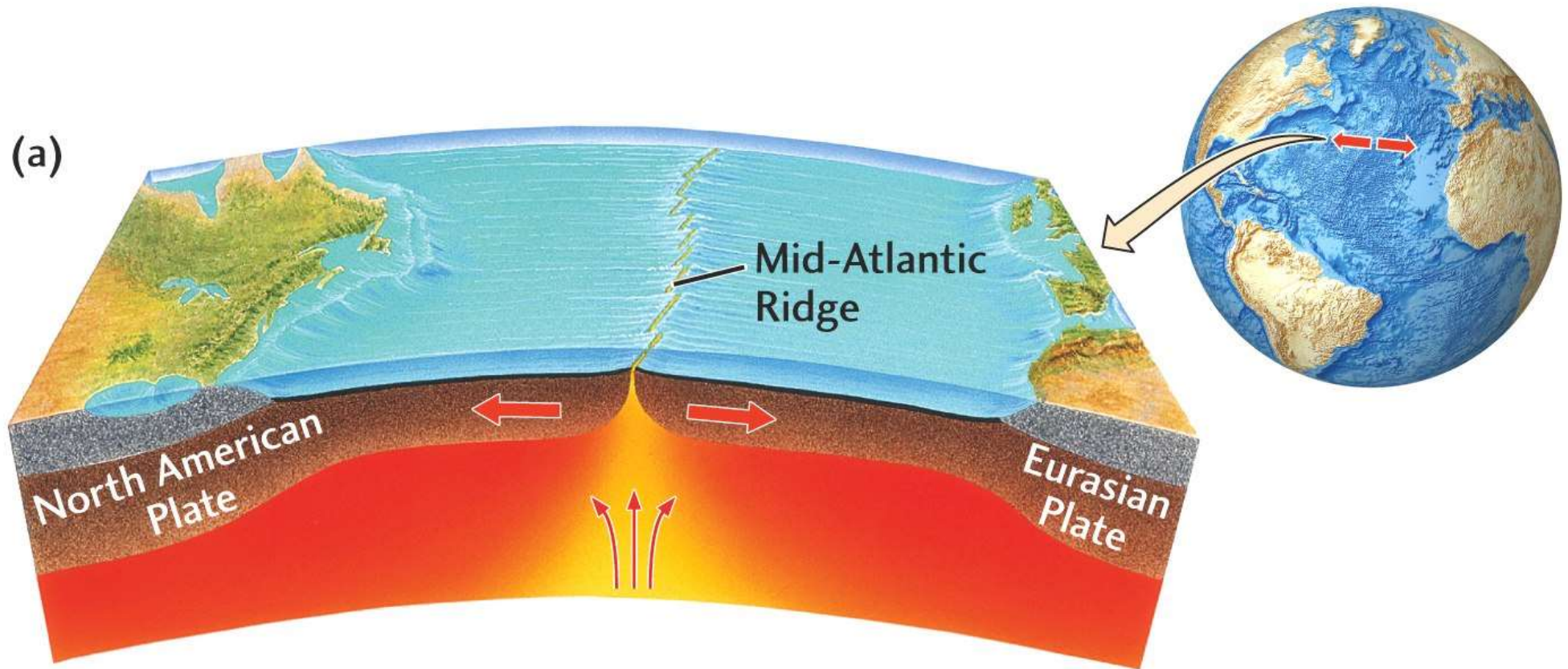


# Dorsais oceânicas



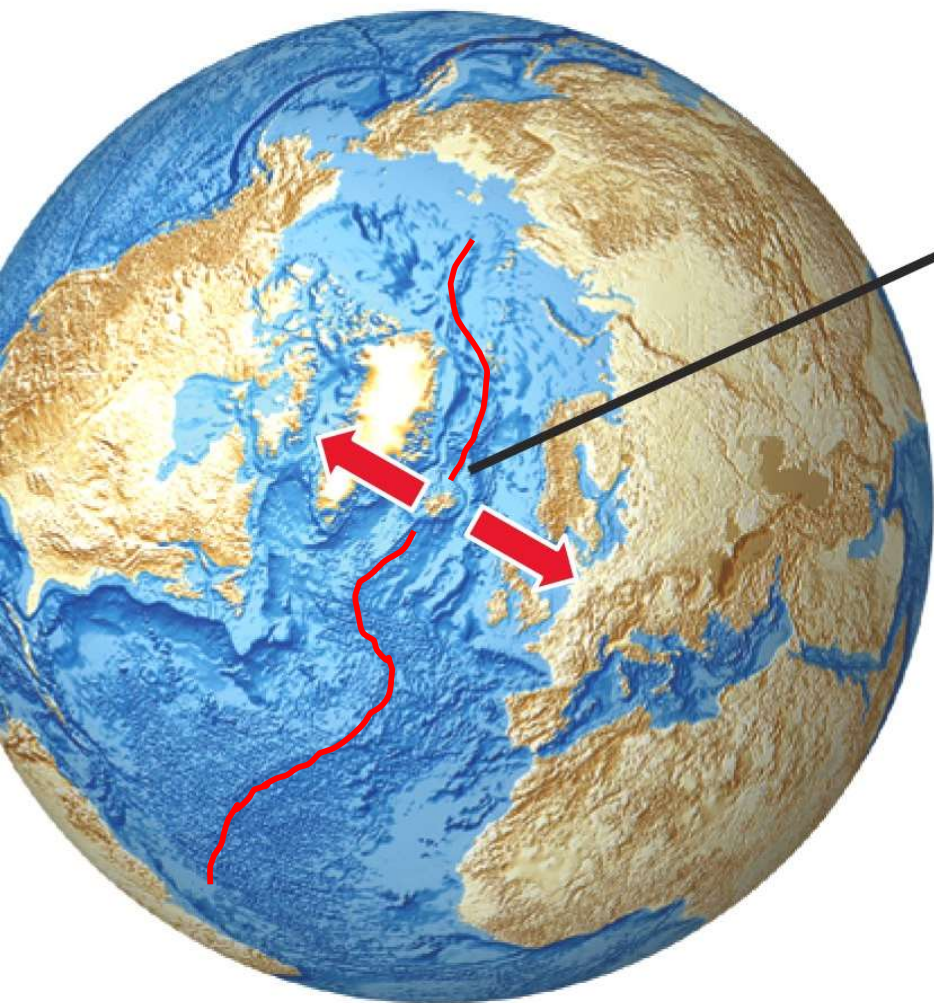
Câmara  
Magmática

# Limites de Placas Divergentes





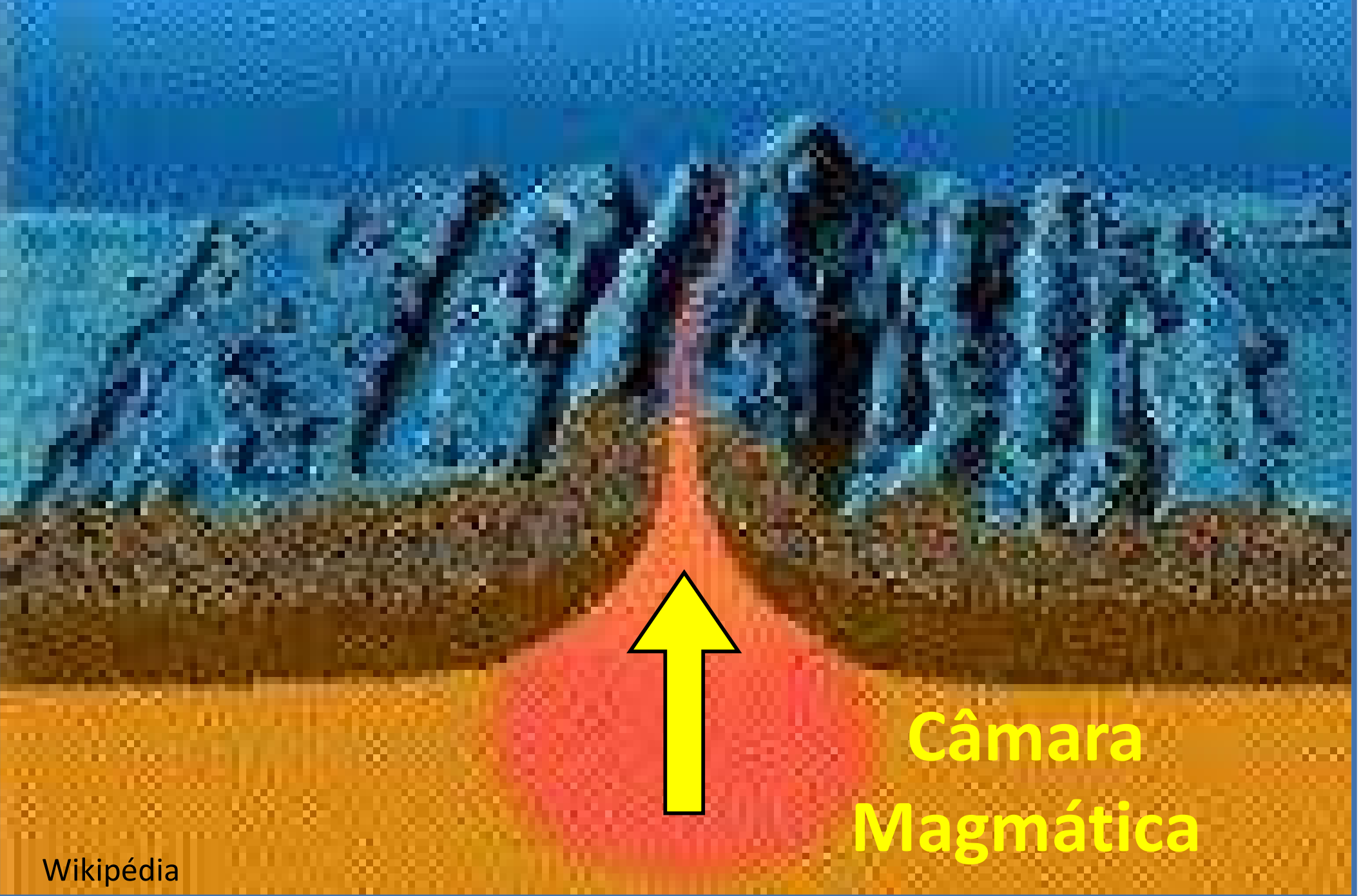
**Islândia**







# Dorsais oceânicas

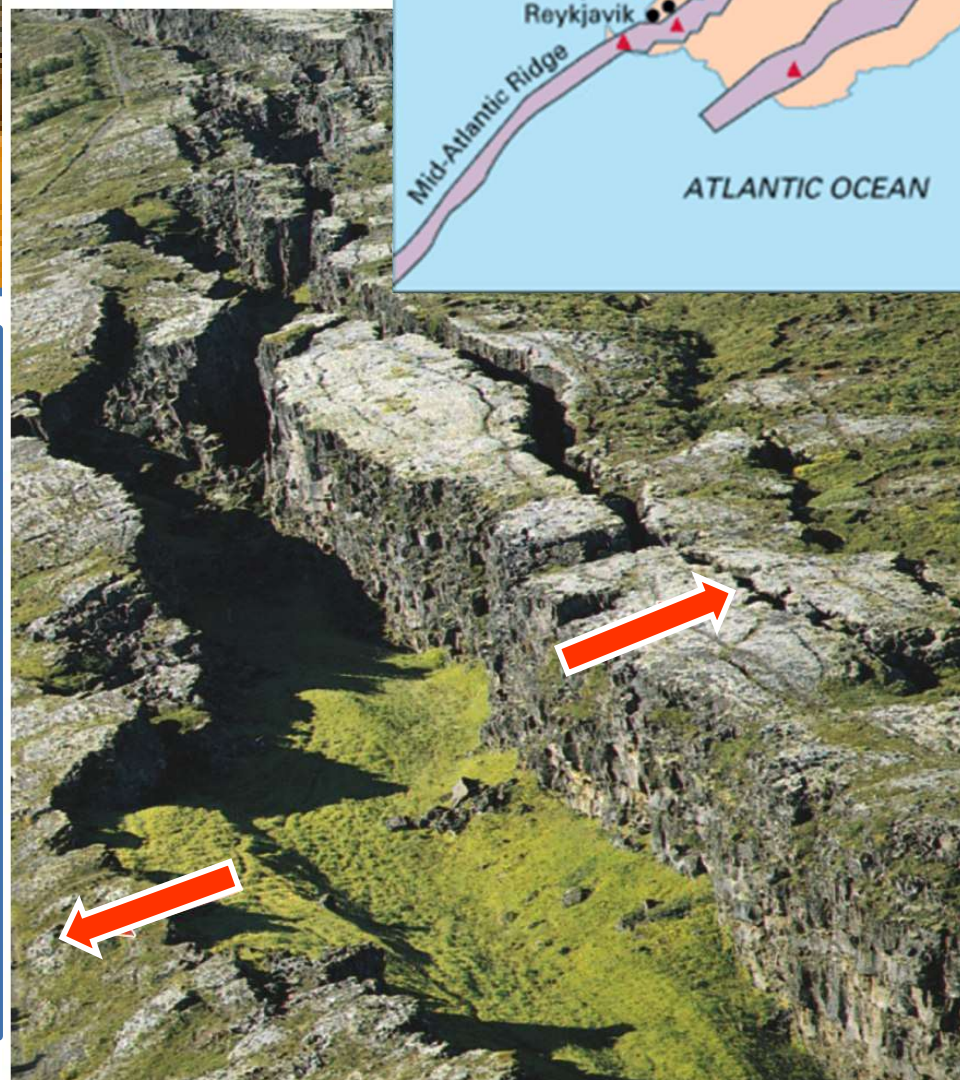
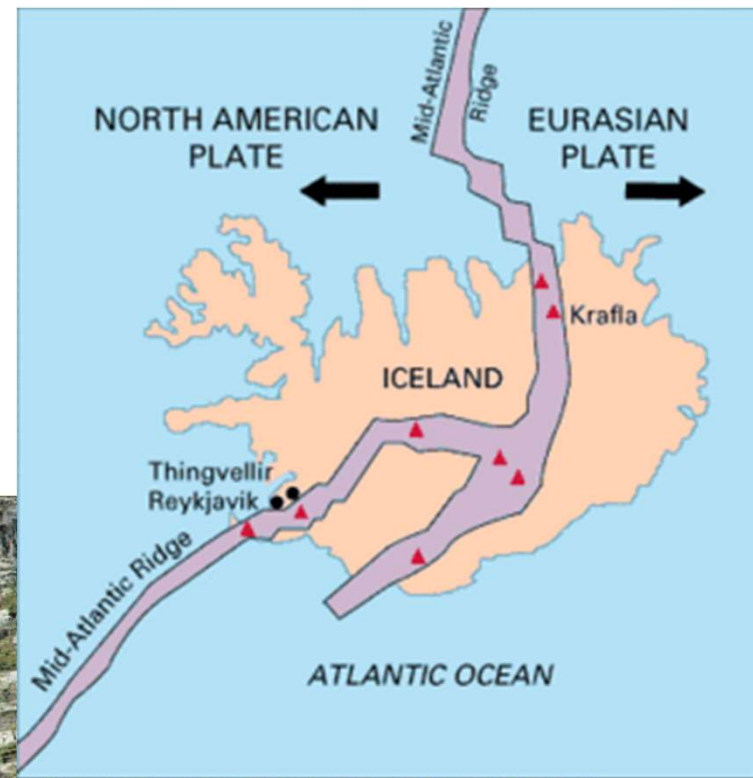
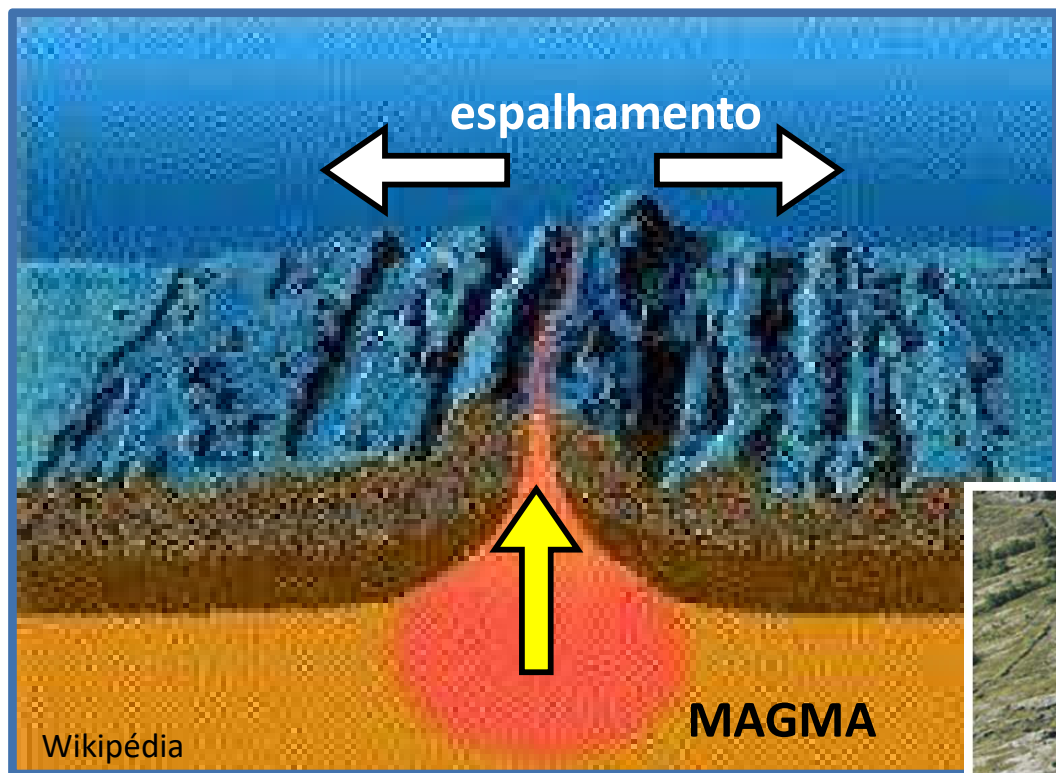


Câmara  
Magmática











# Formação de novos oceanos

# Oceanos em formação

Exemplo: Mar Vermelho e  
o Vale do Rift Africano



# RIFT VALLEY





# RIFT VALLEYS

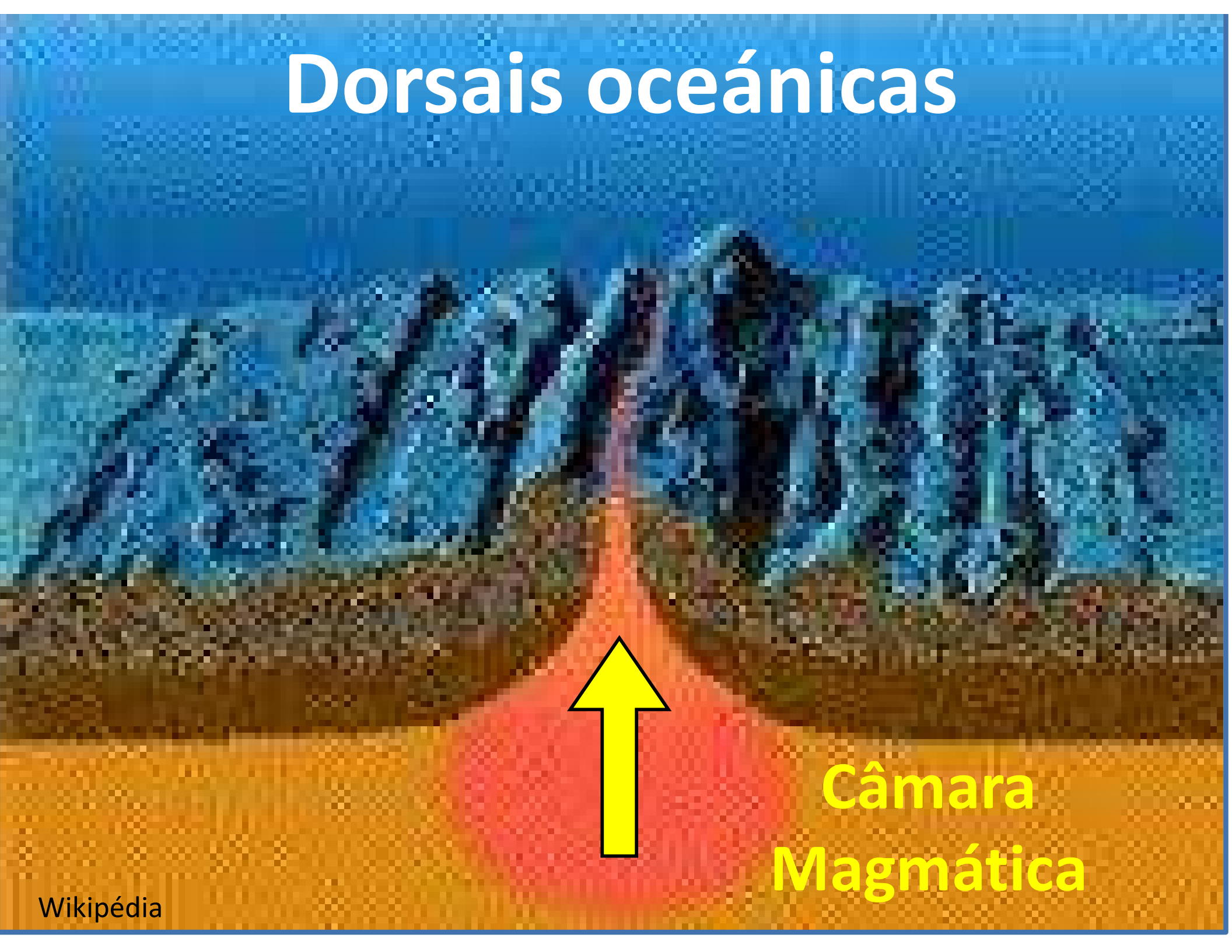




# RIFT VALLEY

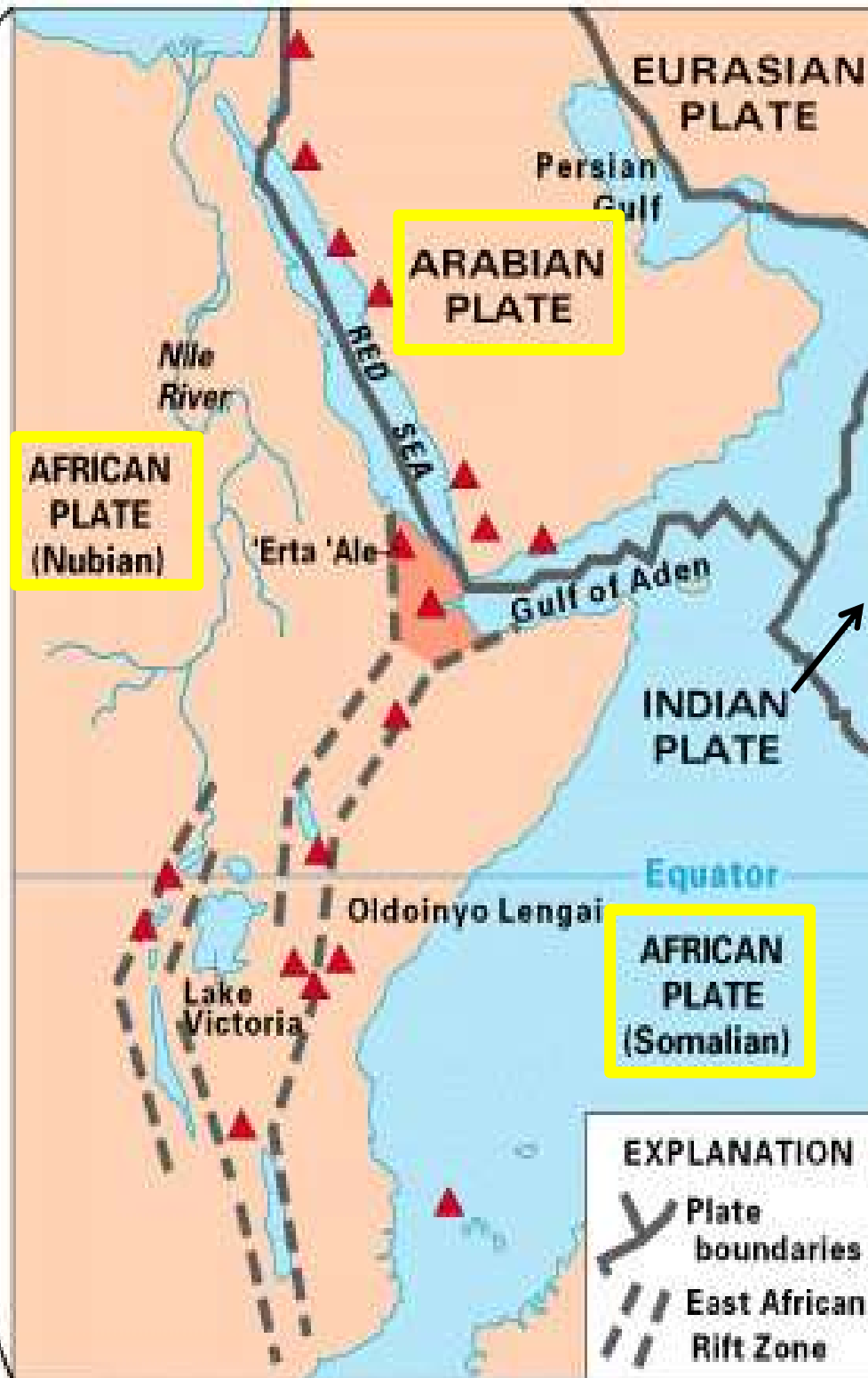


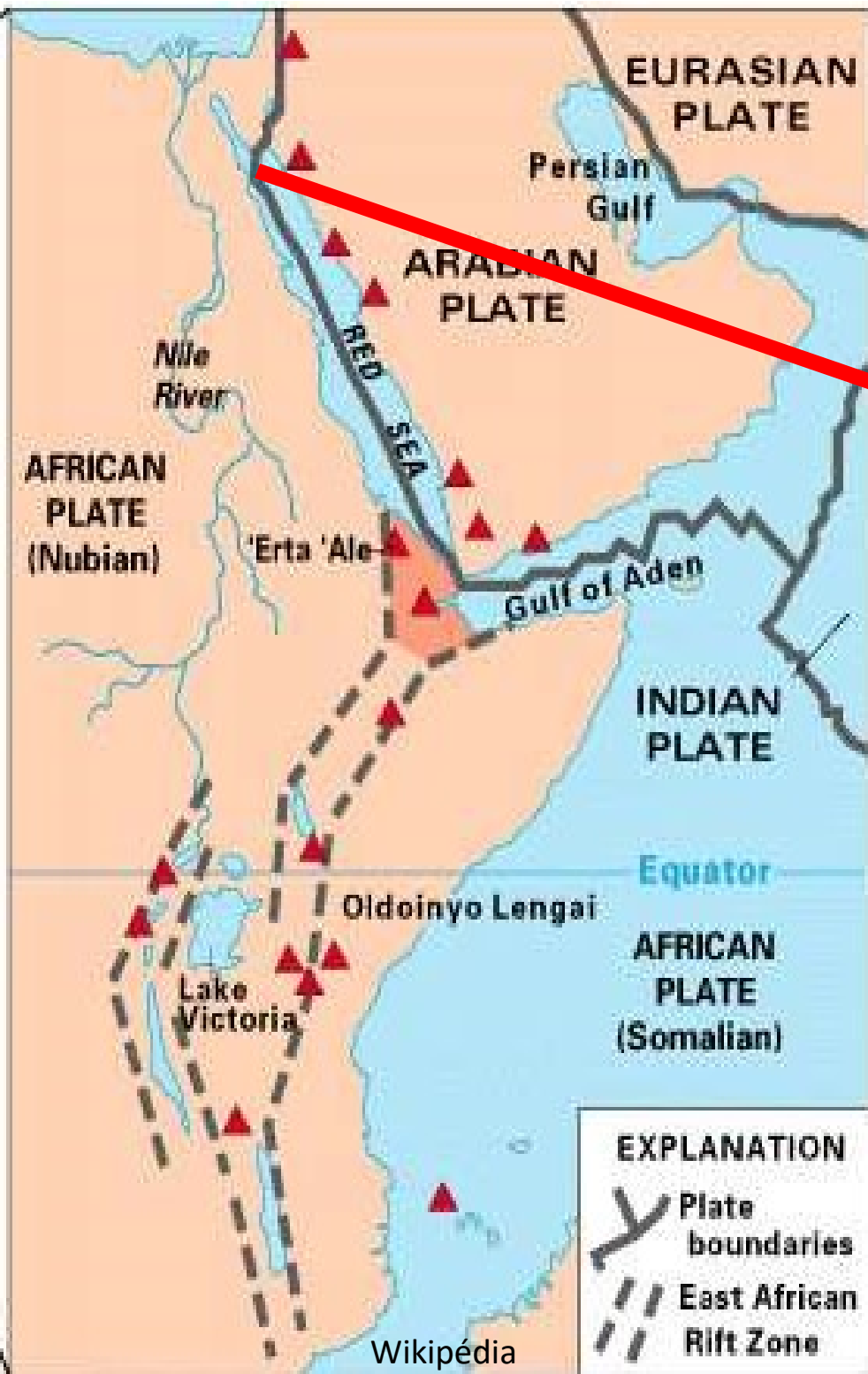
# Dorsais oceánicas



Câmara  
Magmática



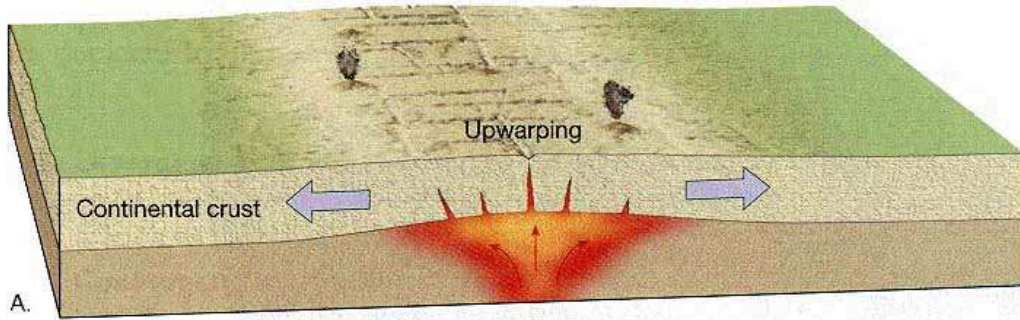




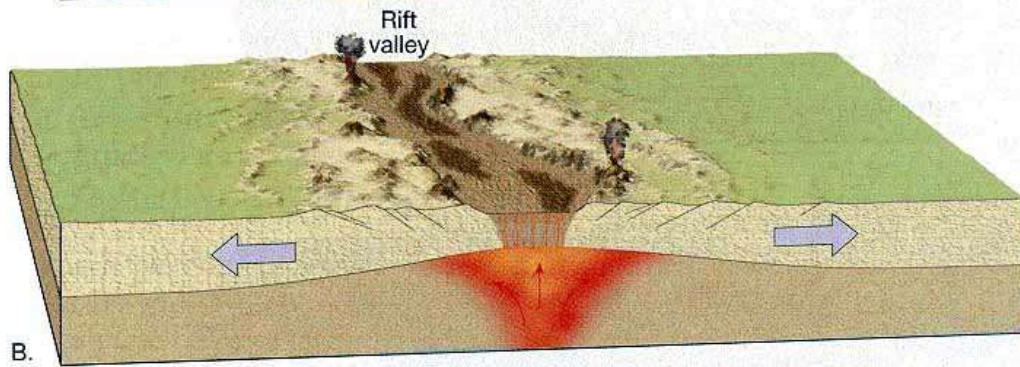
Fonte: NASA



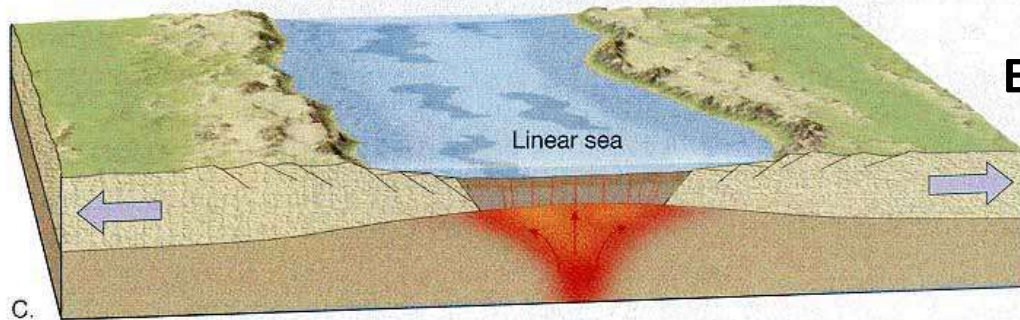
# Etapas de formação de um oceano



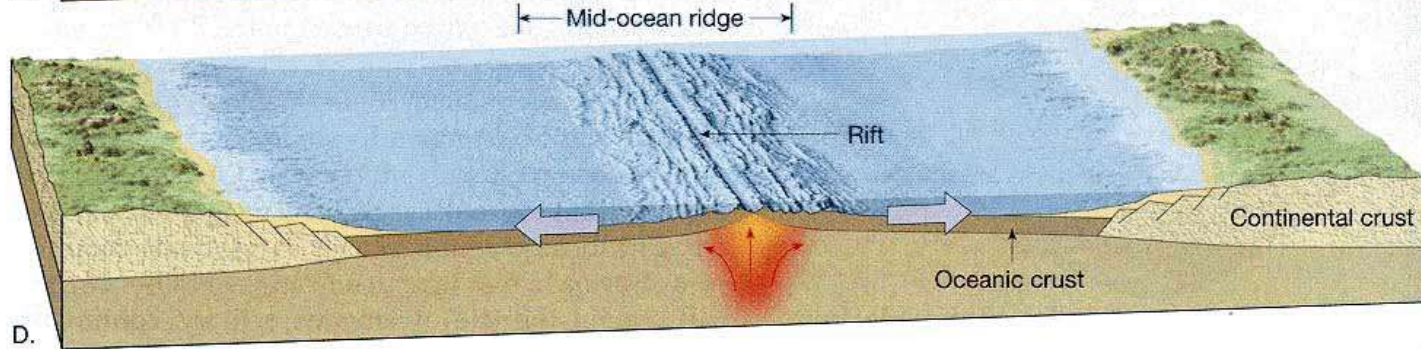
A.



B.



C.

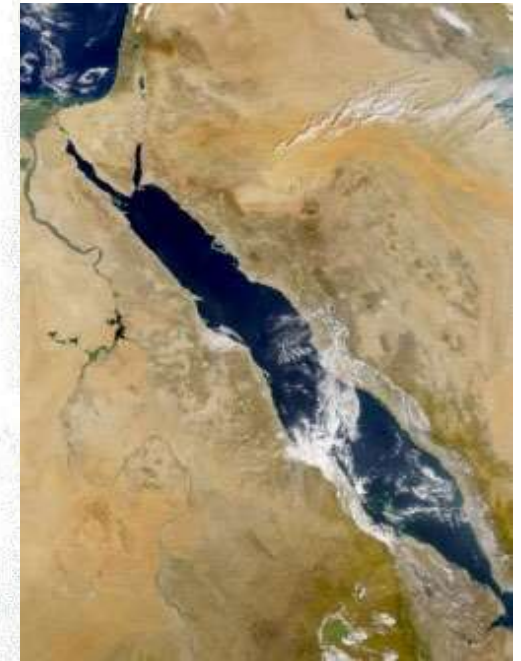


D.

Rift Valley



Ex. Mar Vermelho



Ex. Oceano Atlântico

- Plataformas Continentais
- Fossas Oceânicas
- Dorsais Oceânicas
- **Planícies Abissais**
- Montes submarinos

# **TECTÔNICA DE PLACAS**



**WORLD OCEAN FLOOR**

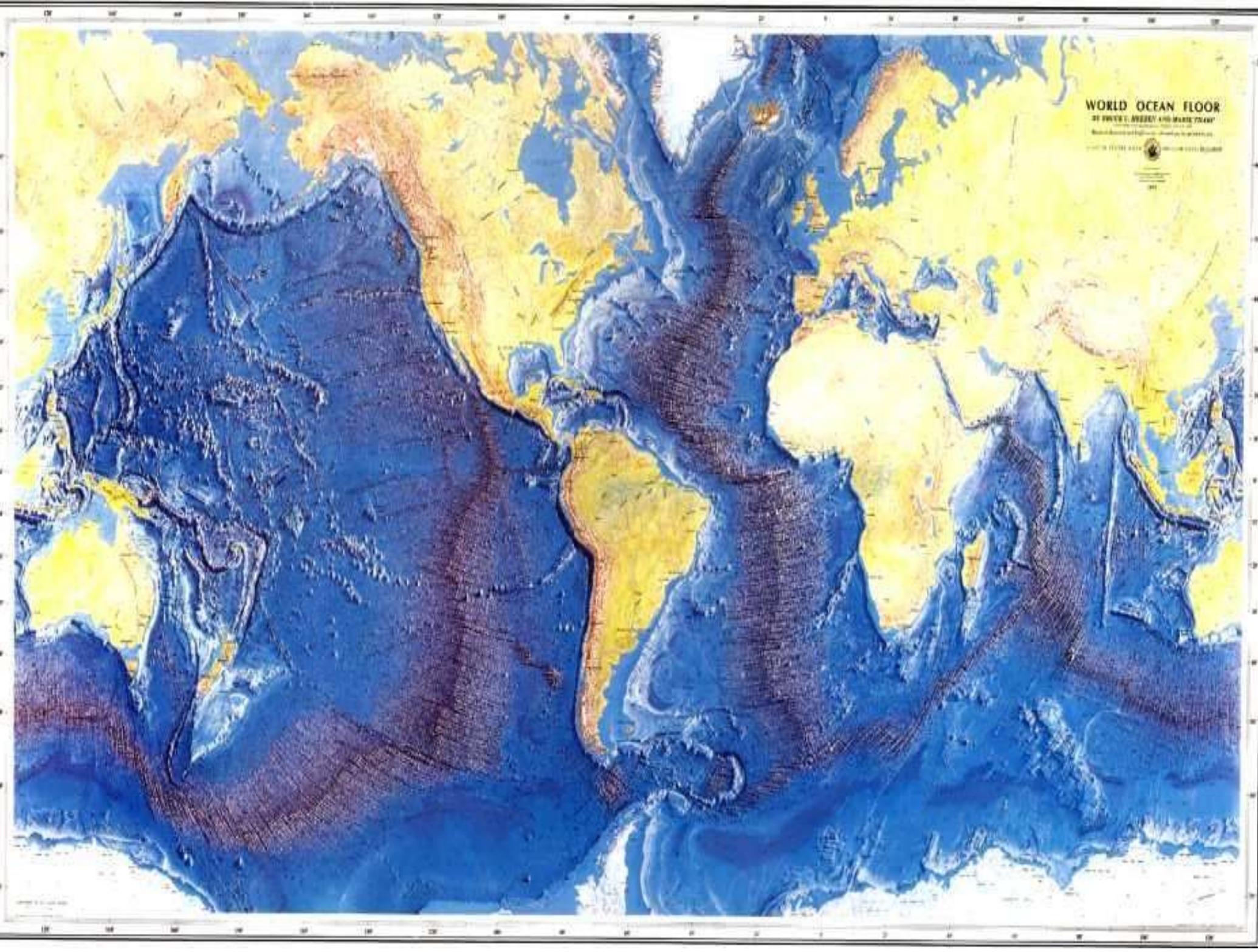
BY PHILIP H. ABNEY AND MARIE THOMPSON

Map of the World Ocean Floor, showing the bathymetry of the world's oceans and seas. The map is color-coded to show depth, with yellow representing shallow waters and deep blues representing the deepest parts of the ocean floor. The map includes labels for major ocean basins, tectonic plates, and various oceanographic features such as trenches, ridges, and seamounts.

Map of the World Ocean Floor, showing the bathymetry of the world's oceans and seas. The map is color-coded to show depth, with yellow representing shallow waters and deep blues representing the deepest parts of the ocean floor. The map includes labels for major ocean basins, tectonic plates, and various oceanographic features such as trenches, ridges, and seamounts.

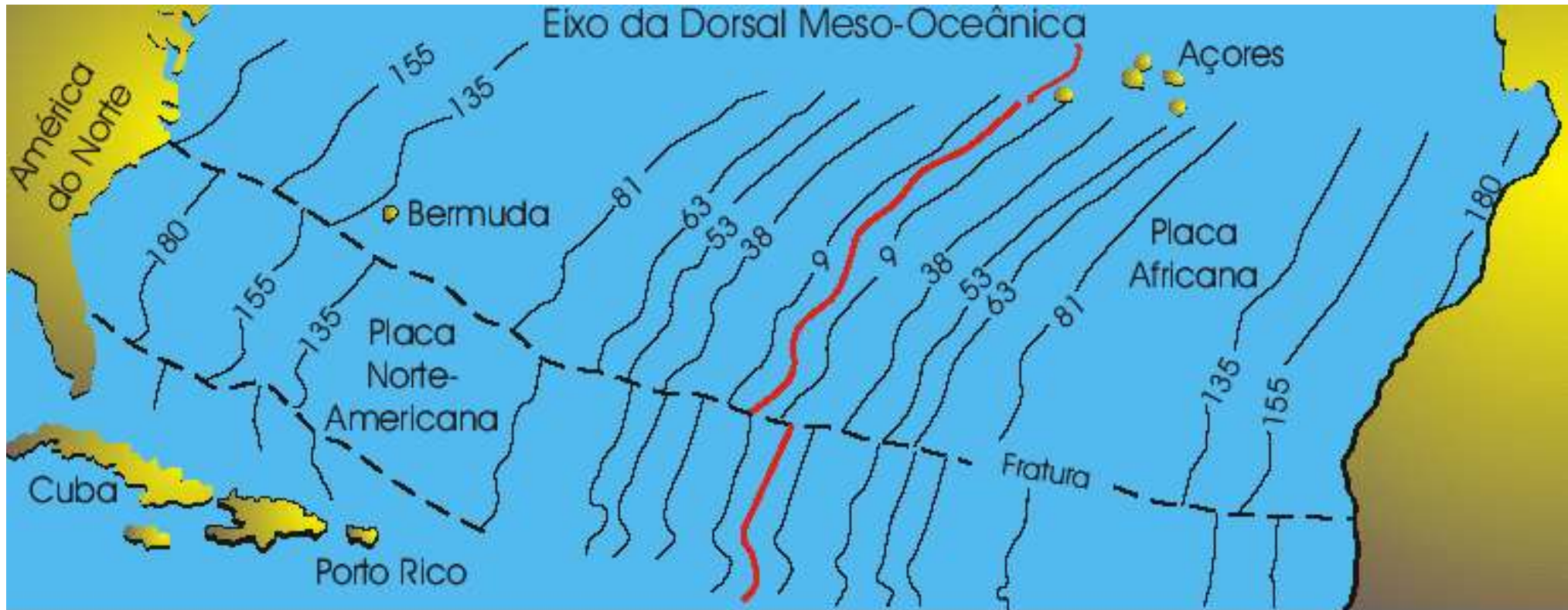


1961



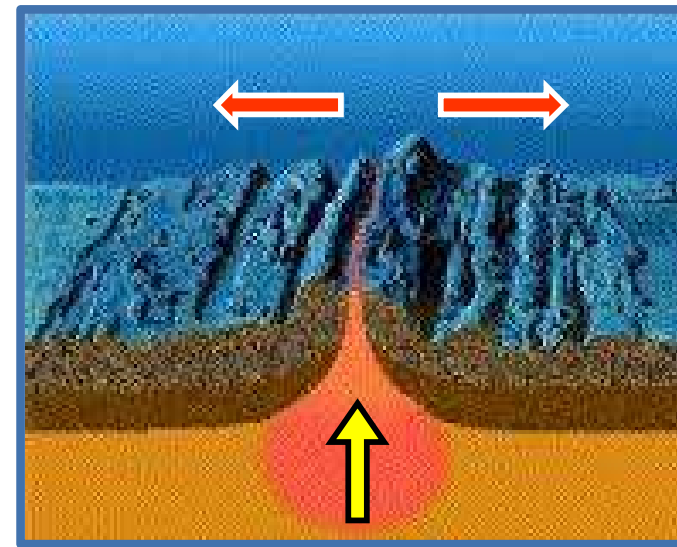
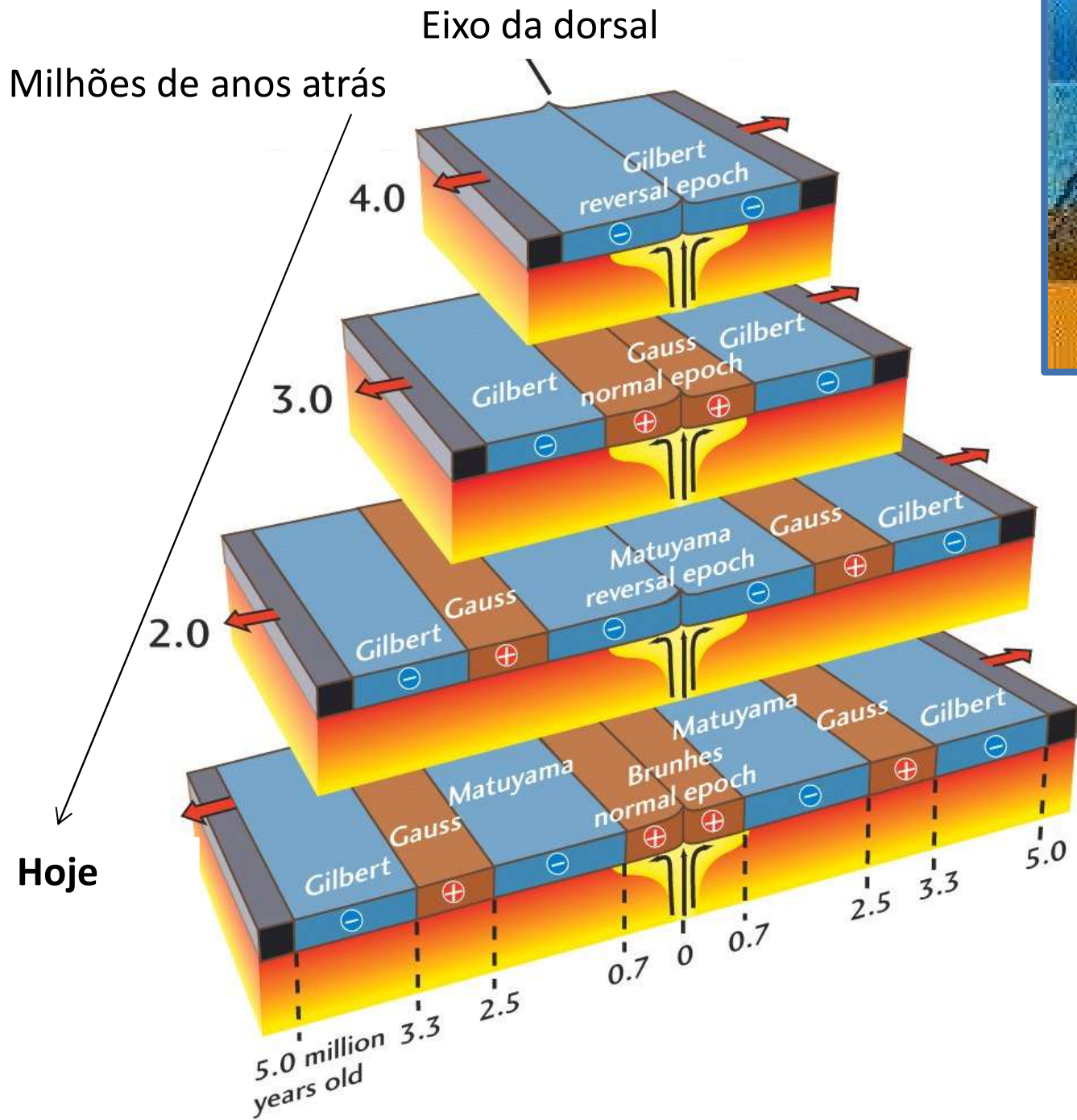


# Idade da crosta oceânica (em milhões de anos)

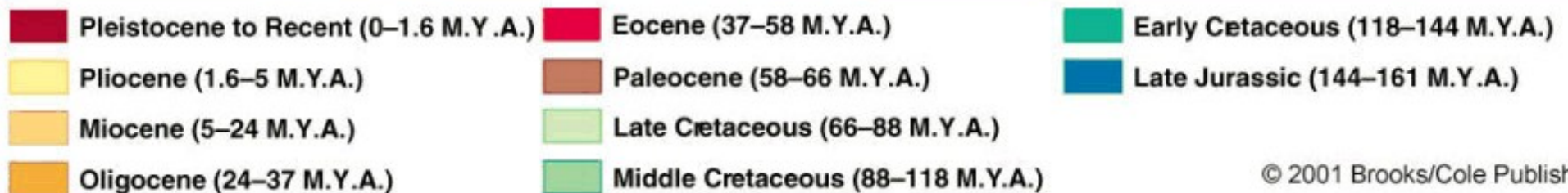
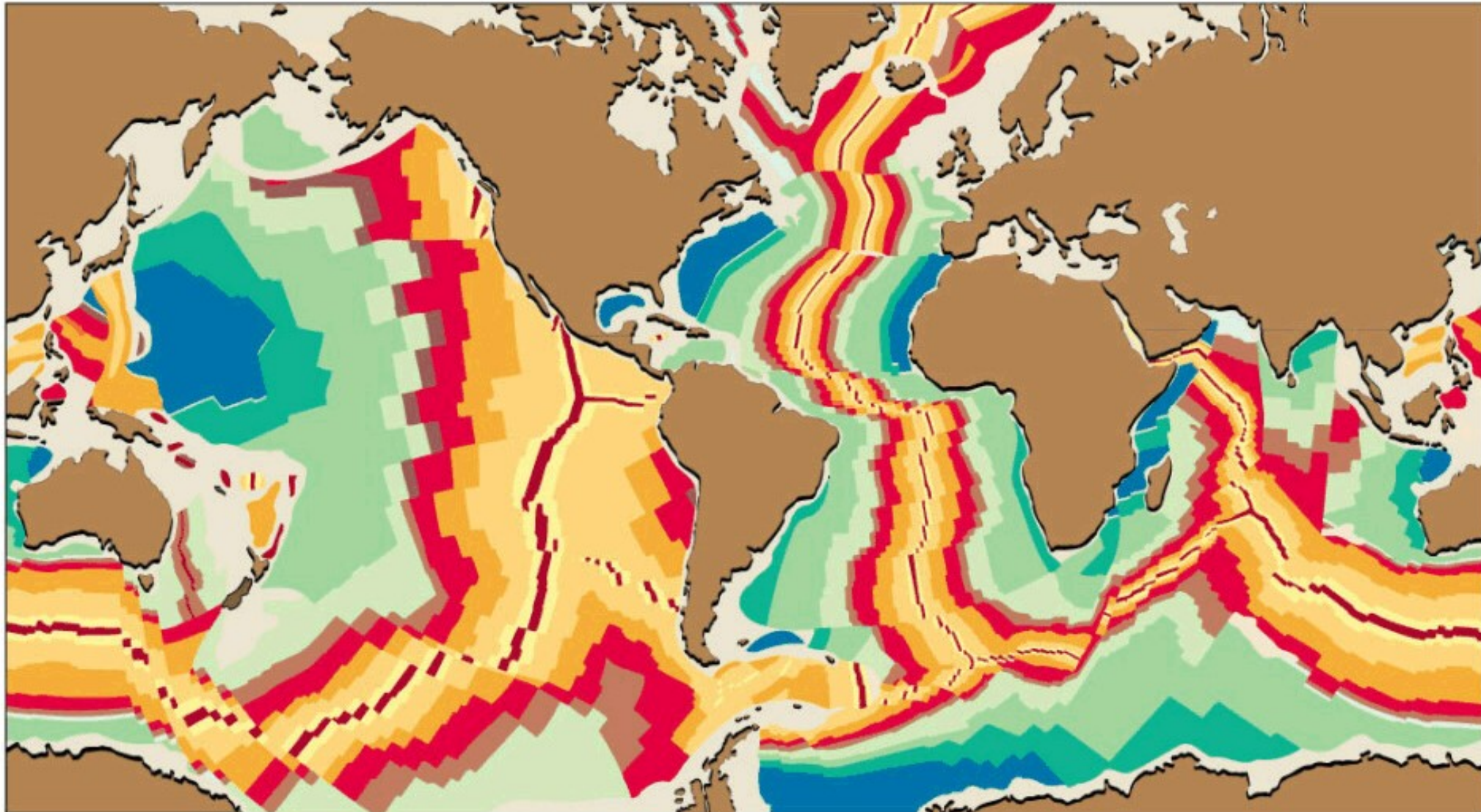


**Fig. 6.3** Distribuição das idades geocronológicas do fundo oceânico do Atlântico Norte, onde se observam as idades (em Ma) mais jovens próximas à dorsal meso-oceânica.





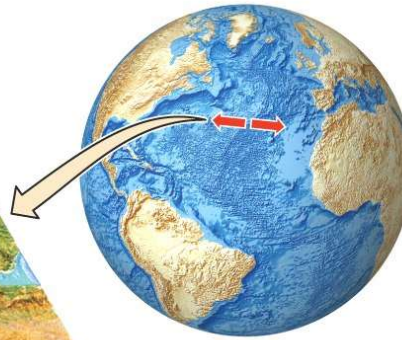
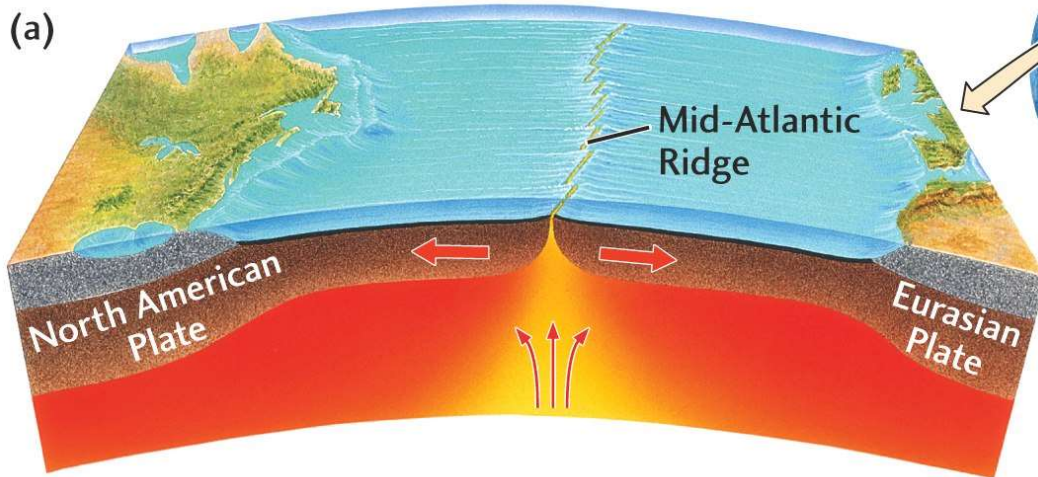
# Idade das Bacias Oceânicas



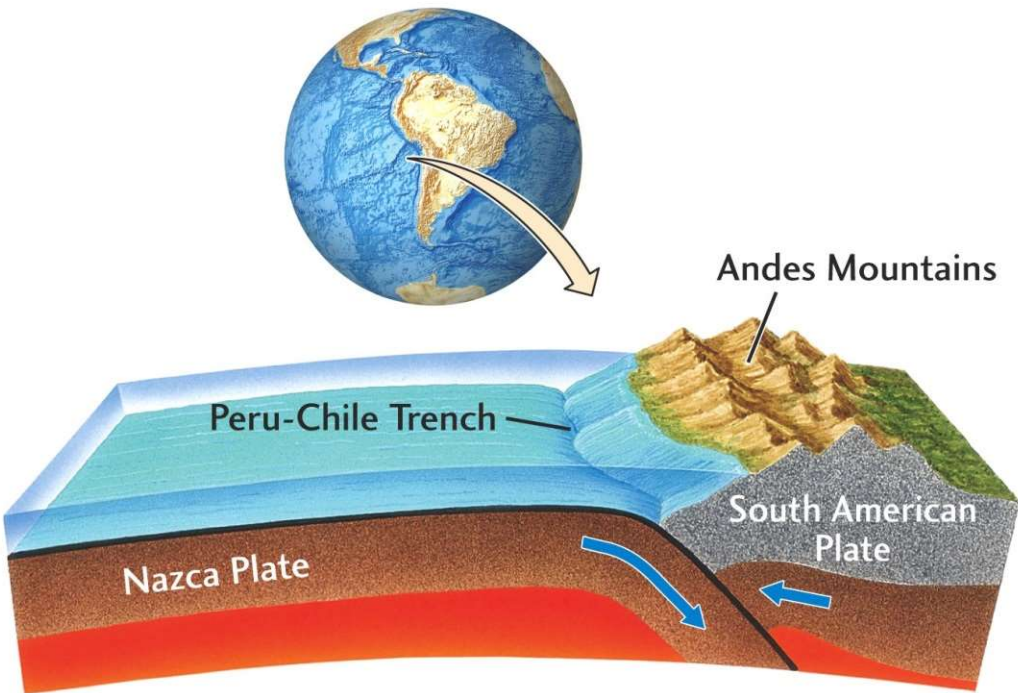
# Resumo



# Resumo



**DORSAIS:**  
formação de  
nova crosta oceânica



**FOSSAS:**  
destruição de  
crosta (antiga)

**Existe equilíbrio entre**  
**formação de nova crosta oceânica**  
**nas dorsais**

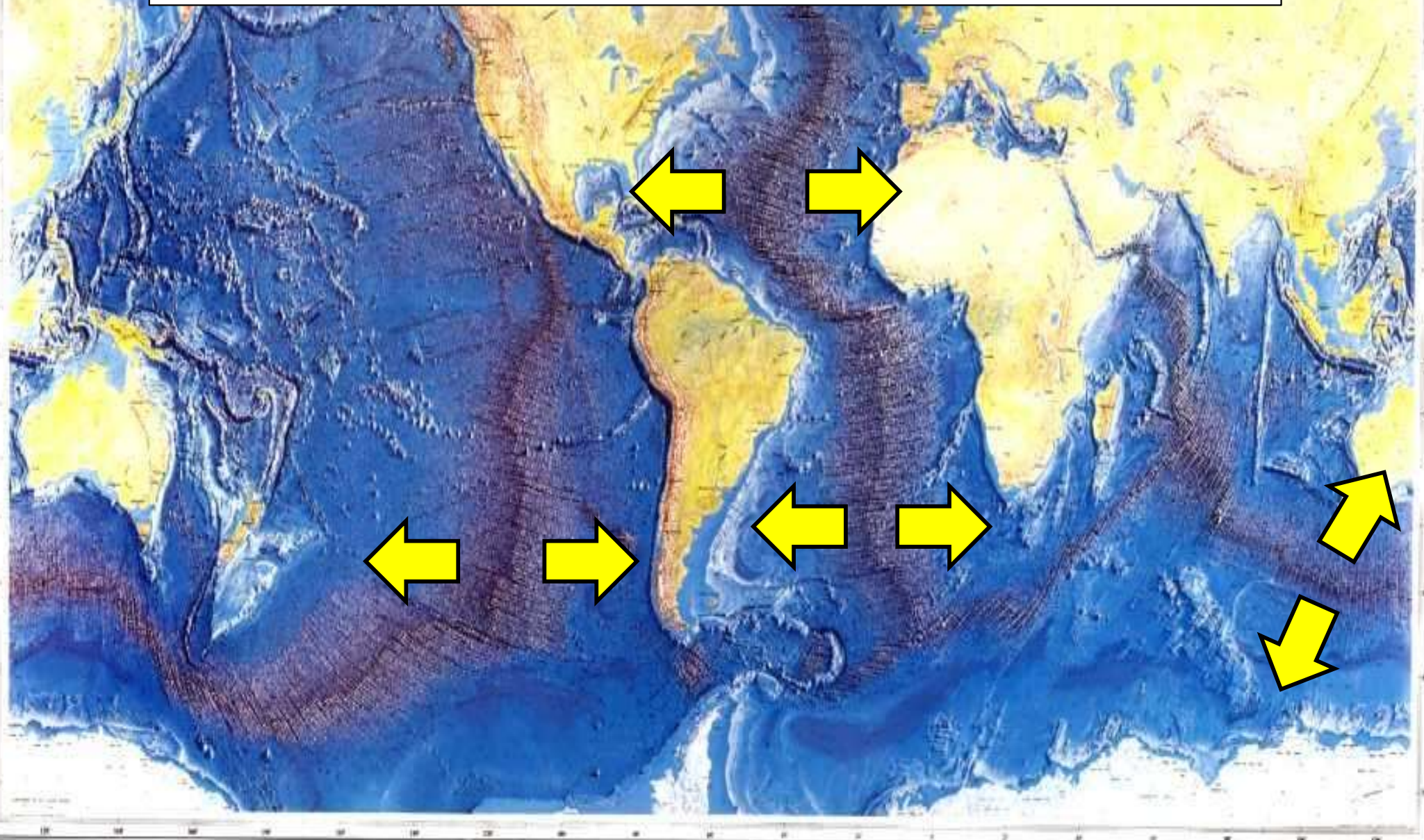
**e**

**destruição de crosta oceânica**  
**antiga por subducção**  
**(a subducção forma ás fossas)**



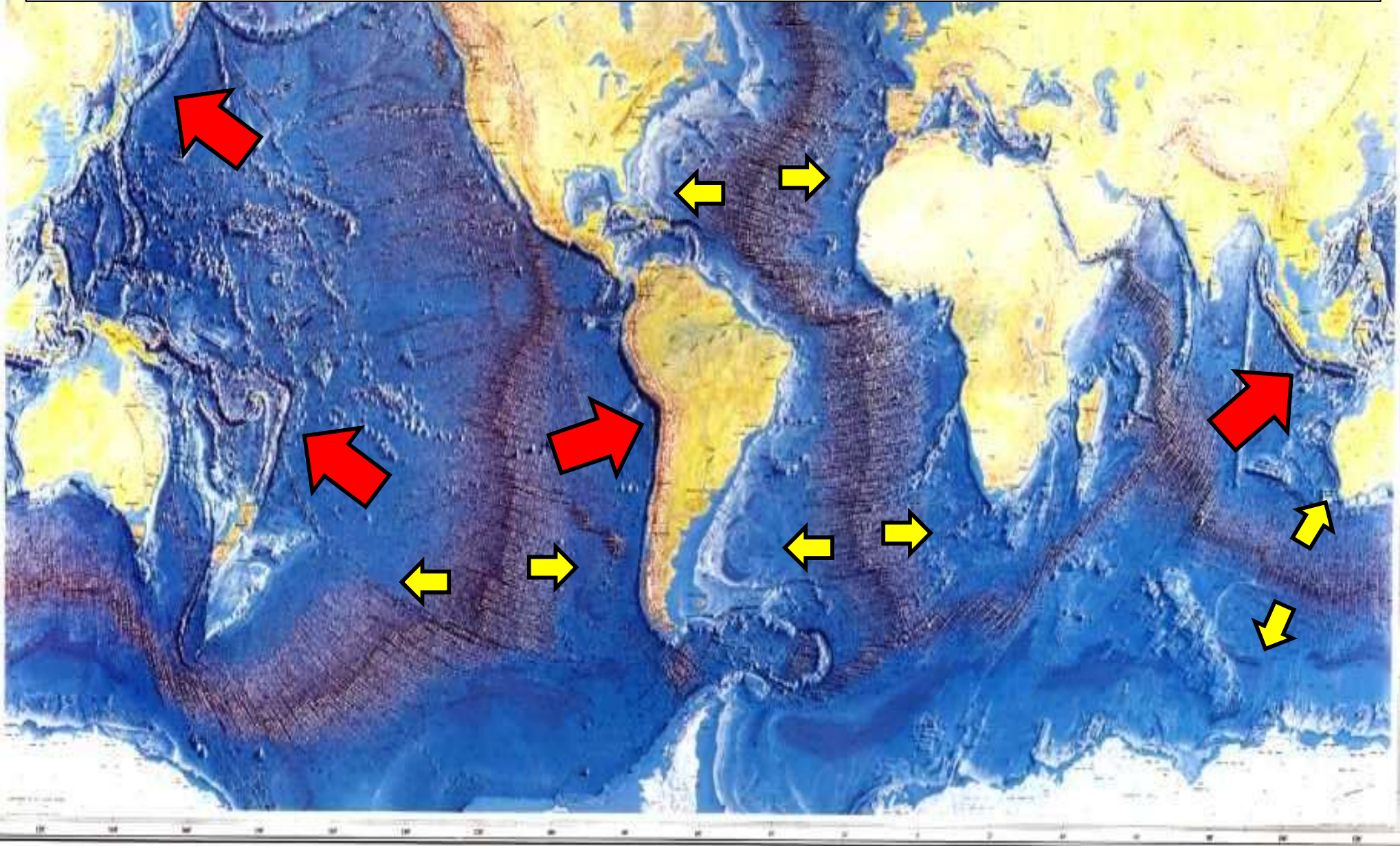
# Dorsais oceânicas: formação de nova crosta oceânica

OCEAN FLOOR  
BREEZY AND WINDY





Zonas de subducção (fossas):  
destruição de **crosta oceânica** (antiga)



# **Tectônica de Placas**



# PLANISFÉRIO

# FÍSICO



Altitude (em metros)	Profundidade (em metros)
2000	0
500	200
200	4000
0	
Depressão	▲ Picos

ESCALA 1:180.000.000  
0 1800 3200 km  
(no Equador)





Era um único continente?

Altitude (em metros)	Profundidade (em metros)
2000	0
500	200
200	4000
0	Picos ▲
Depressão	

ESCALA 1:180.000.000  
0 1800 3200 km  
(no Equador)

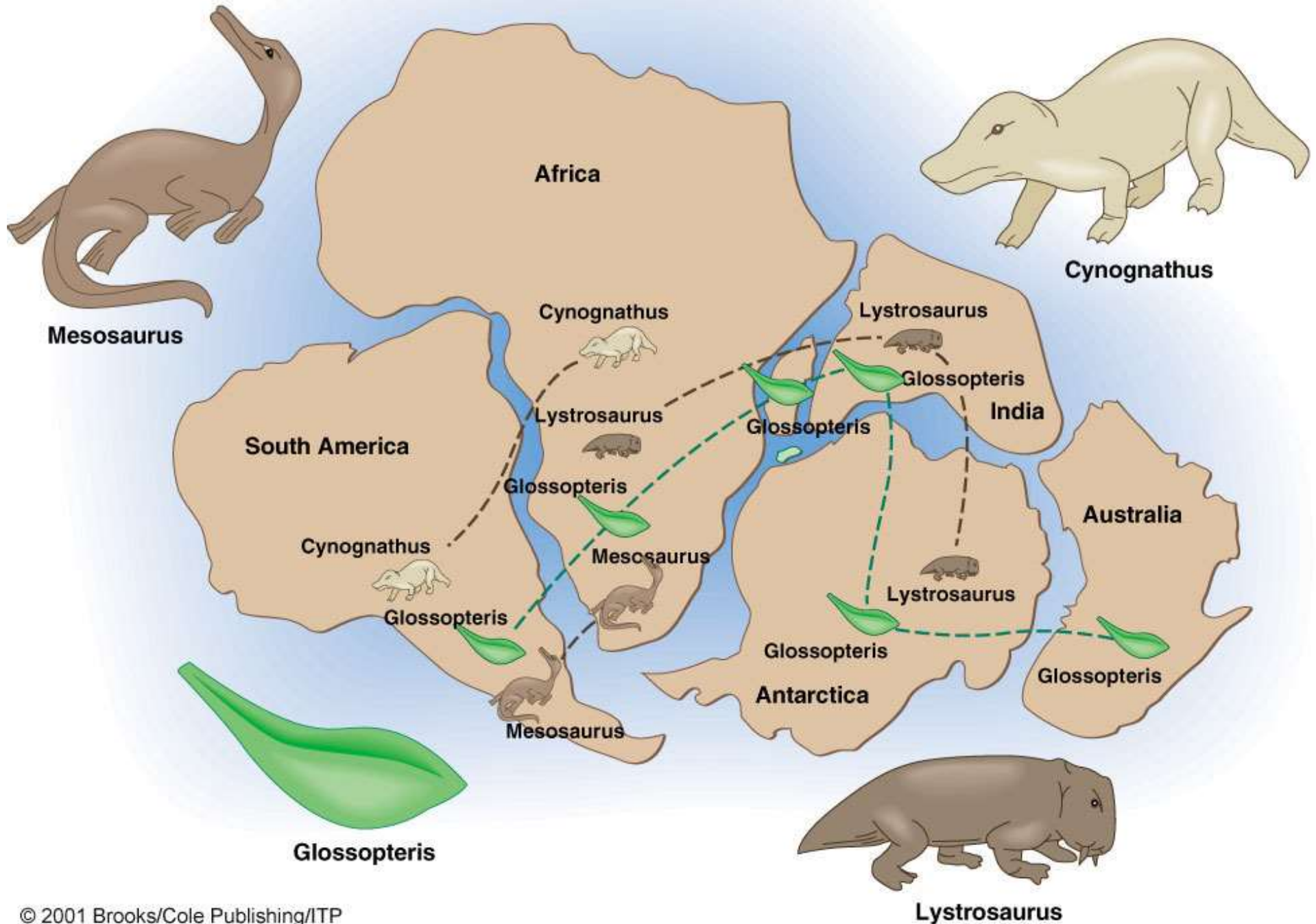


# Evidências geográficas

linhas da costa  
de alguns continentes  
encaixam perfeitamente



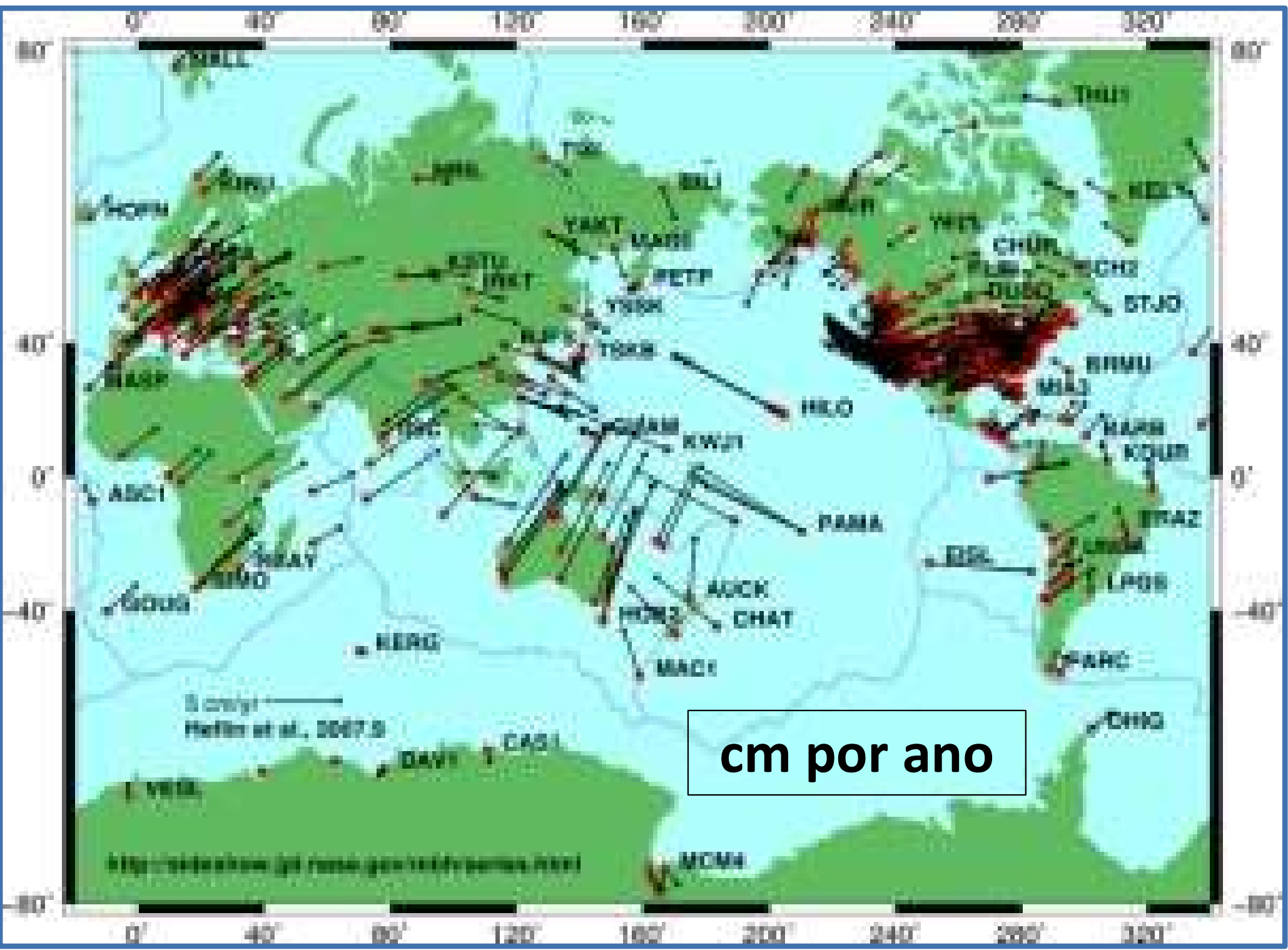
# Combinação Fóssil



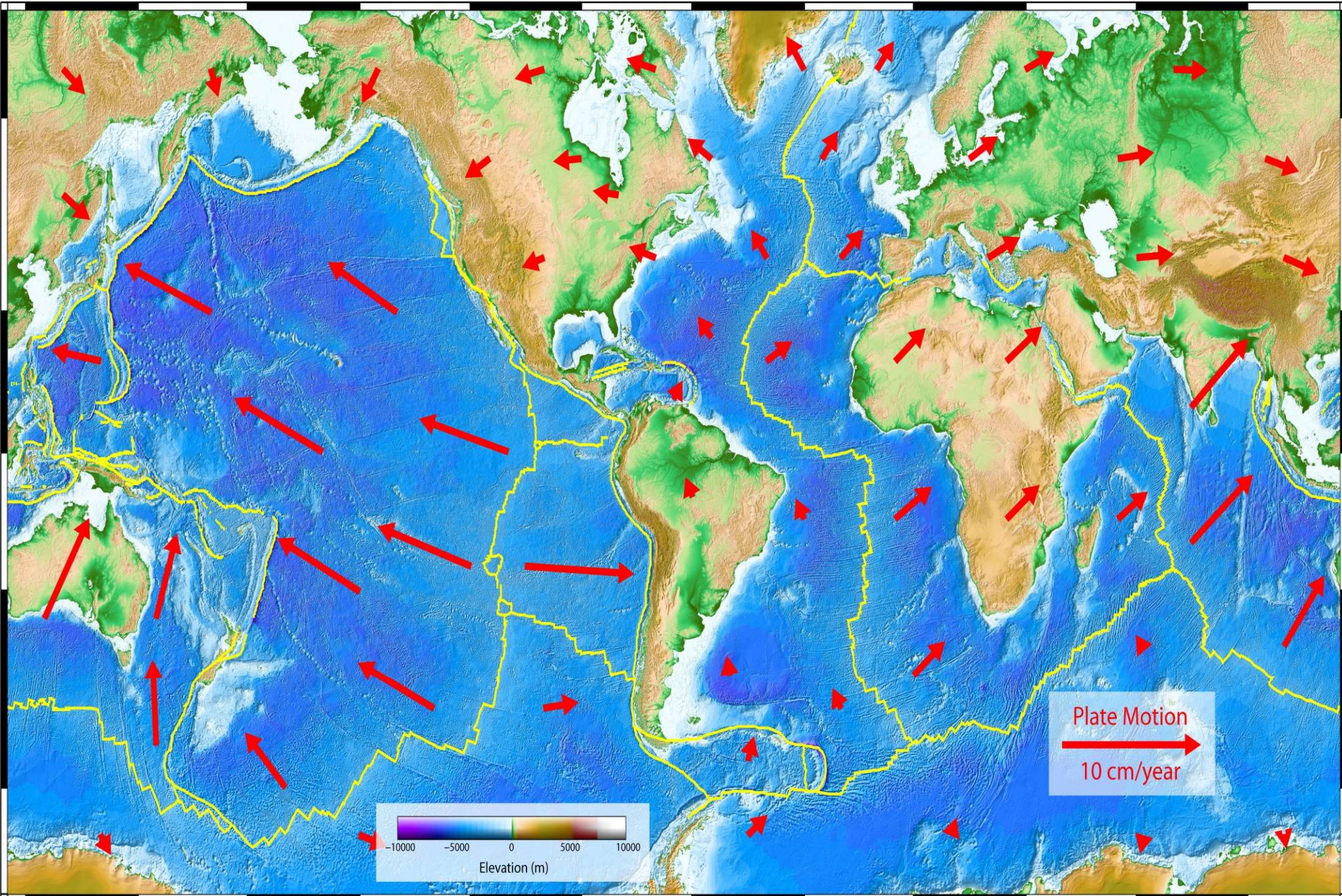


# **Tectônica de Placas**

## Evidências Direitas







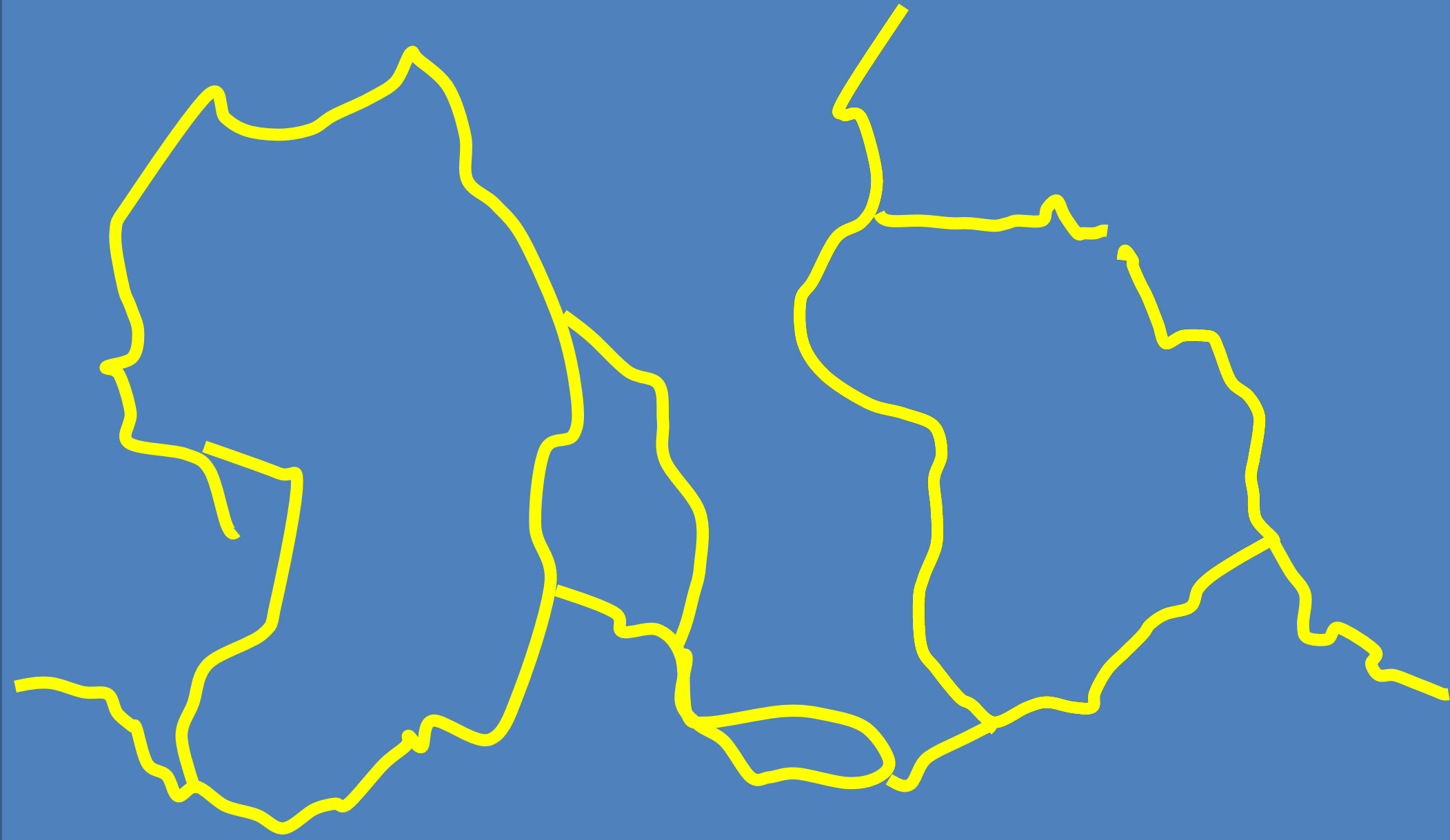


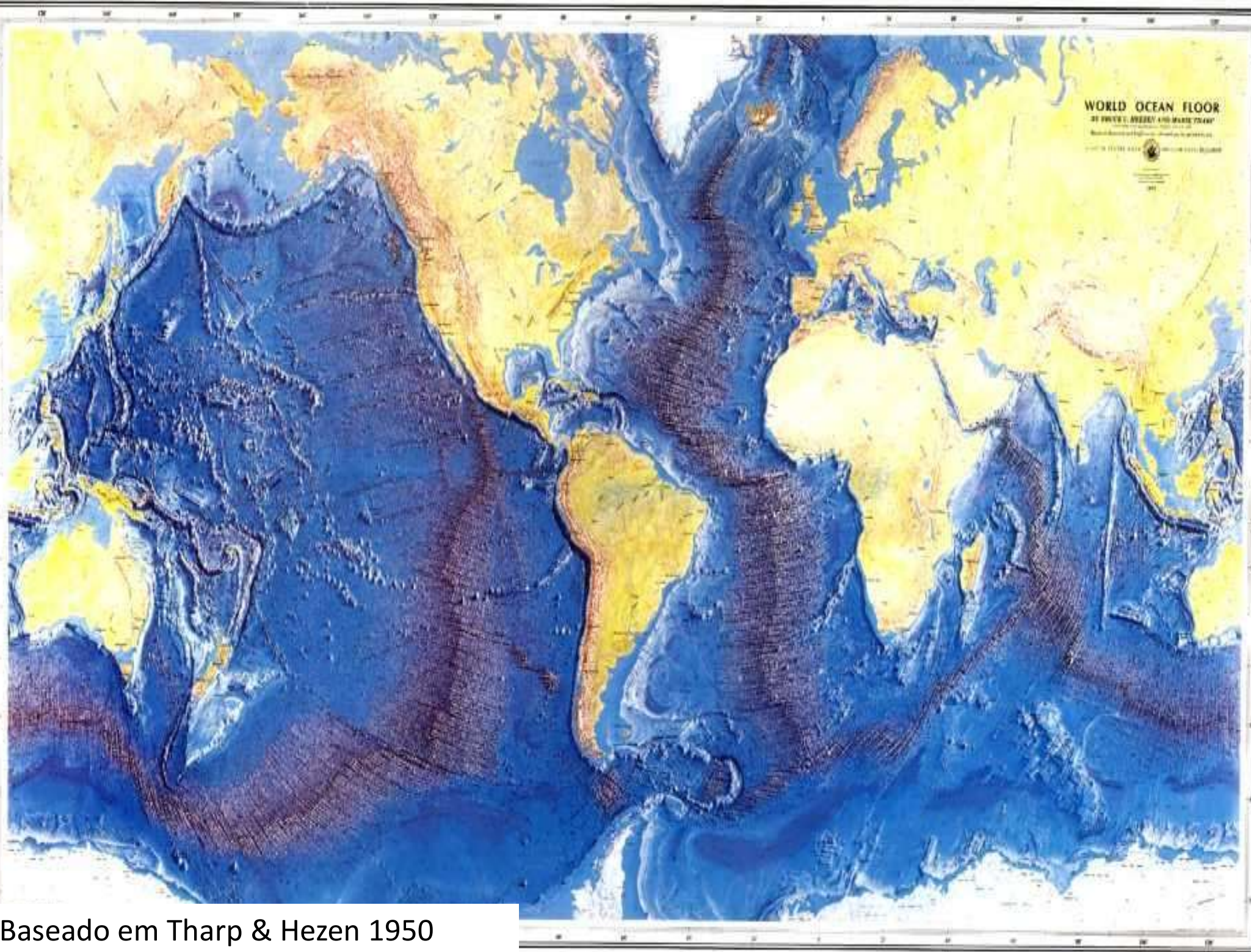
# As placas tectônicas





# Limites das placas tectônicas





WORLD OCEAN FLOOR

BY FRANK R. THARP AND HEZEN

UNITED STATES GOVERNMENT PRINTING OFFICE

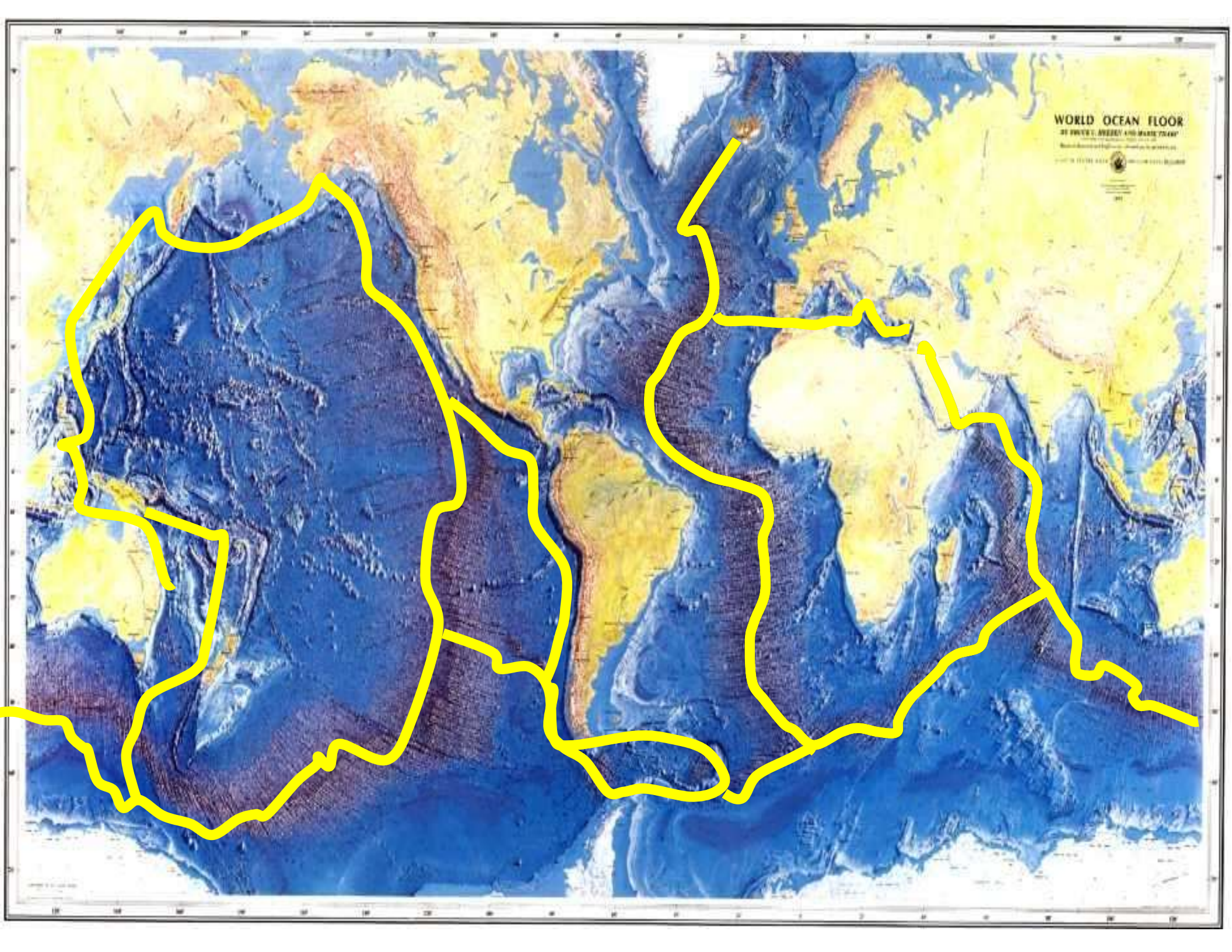
Baseado em Tharp & Hezen 1950



**WORLD OCEAN FLOOR**

BY PHILIP H. ABNEY AND MARIE TOUHY

United States Geological Survey, Washington, D. C.



**IMPORTANTE:**

as fossas e as dorsais estão  
localizadas nos **limites das**  
**Placas Tectônicas**



**IMPORTANTE:**

**Fossas: limites convergentes**

**Dorsais: limites divergentes**

Porque existe  
a tectônica de placas:

# **Teoria da Tectônica Global**



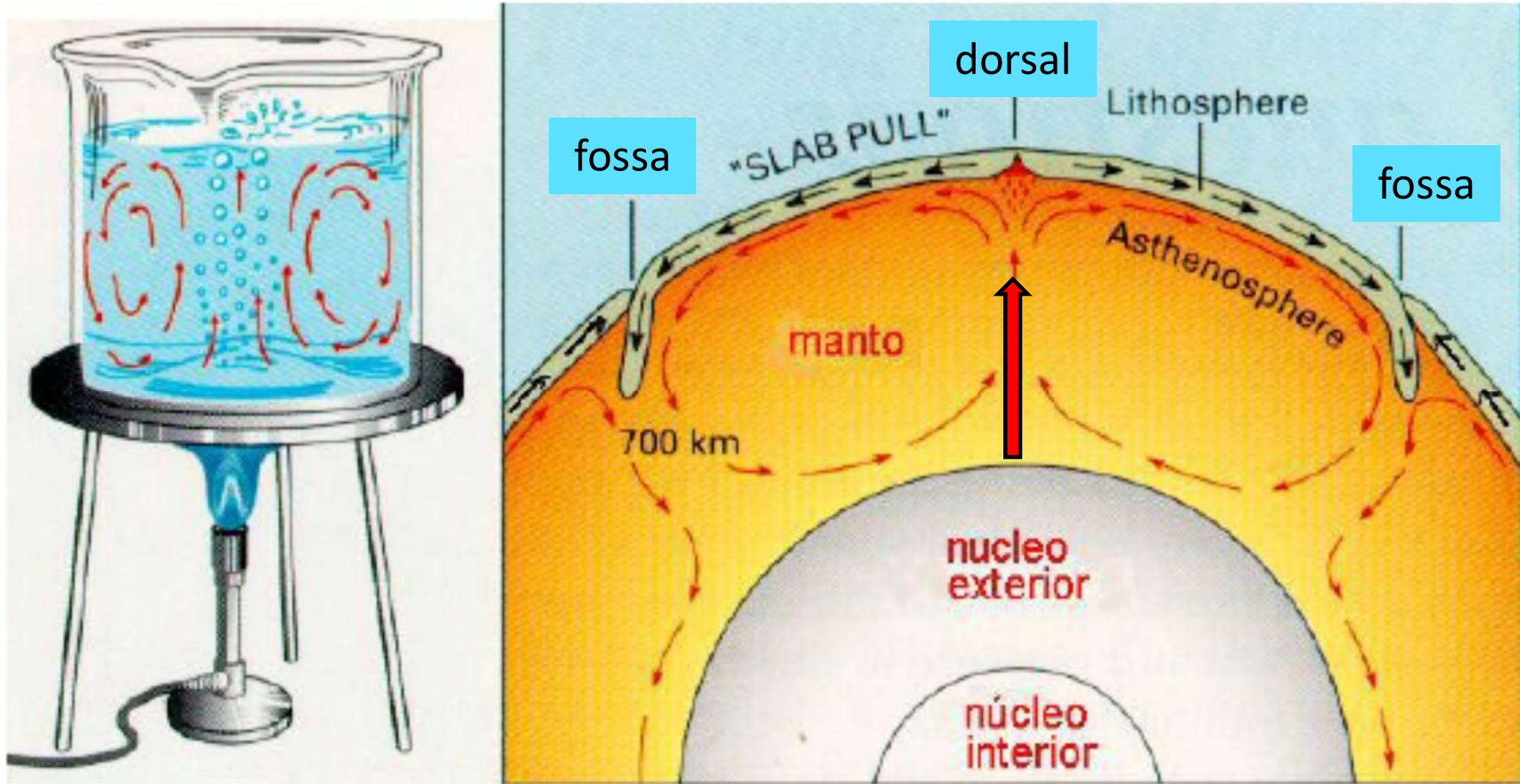
# **A Tectônica Global**

**Explica a ligação entre**

**expansão dos fundos oceânicos nas dorsais**

**e subducção (que forma as fossas)**

# Motor da Tectônica Global



- **Correntes convectivas no manto**



# Teoria da Tectônica Global (Harry H. Hess, 1960)

