
Domos (Altos Estruturais) da Bacia do Paraná



Rômulo Machado

Curso de Licenciatura em Geociências e Educação Ambiental do
IGc-USP – Junho/2020

Conteúdo da Aula

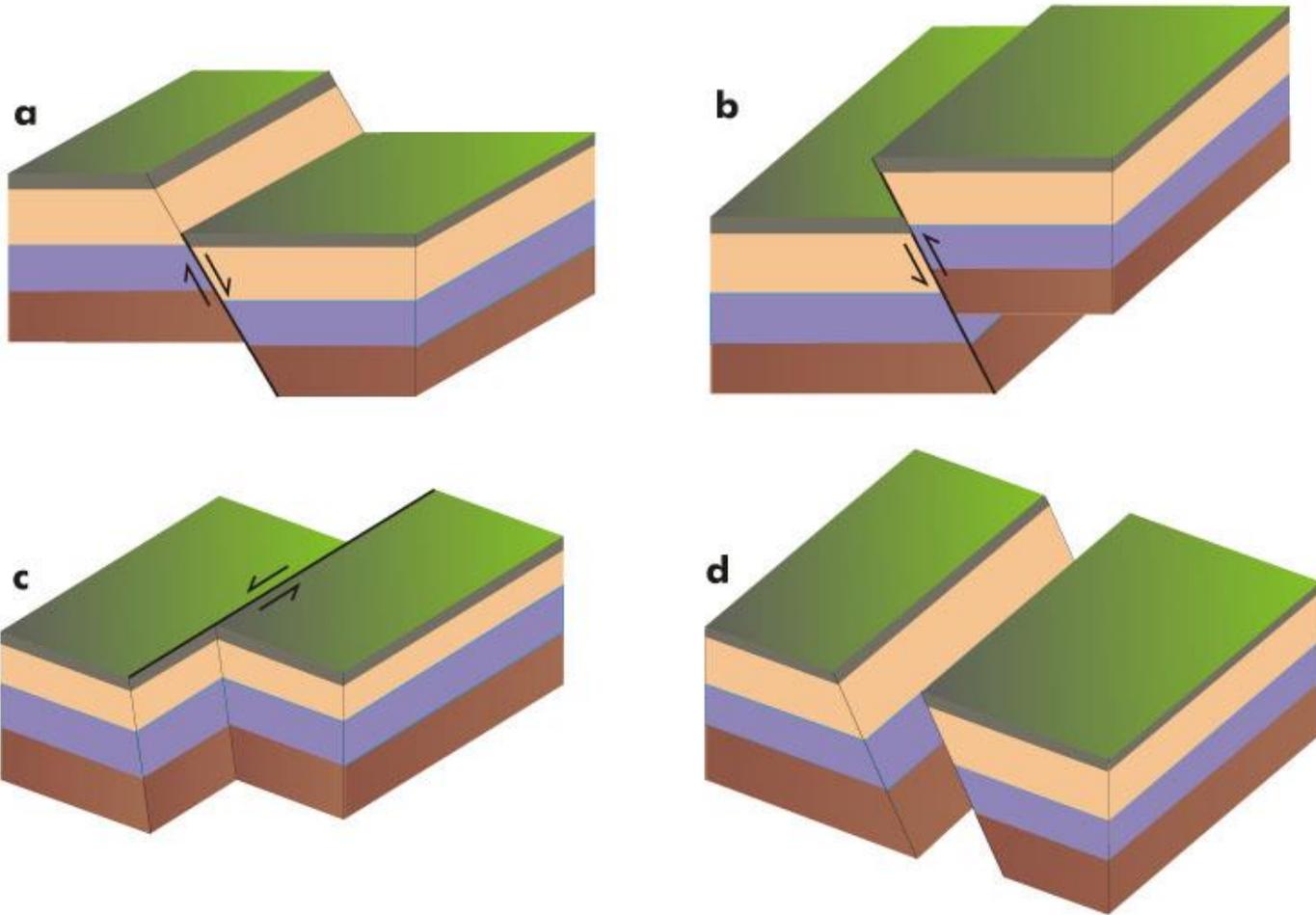
Parte I: Estilos tectônicos em bacias sedimentares

- ❑ Tipos de falhas: principais e particulares
- ❑ Transcorrências associadas com falhas normais e inversas
 - ❑ Grabens e Horsts e falhas associadas
 - ❑ Estruturas em flor (negativa e positivas)
- ❑ Modelagem em caixas de areia e computacional
- ❑ Estruturas dômicas associadas com intrusões ígneas
 - ❑ Reativação de falhas do embasamento

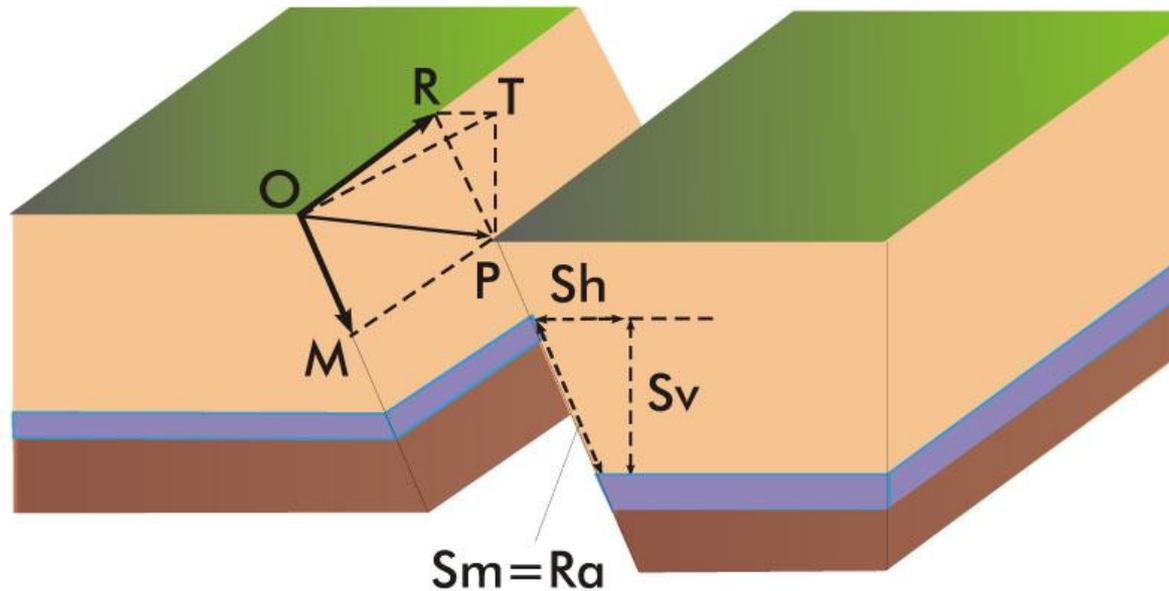
Parte II: Domos (Altos Estruturais)

- ❑ Características, idade, importância
- ❑ Exemplos na Bacia do Paraná
 - ❑ Assunção, Ponta Grossa, Rio Grande, Alto Garças..
- ❑ Lages, Quatiguá, Alegre, Casa de Pedra, Pitanga, Anhembi...
 - ❑ 'Sinclinal' de Torres

Principais tipos de falhas:

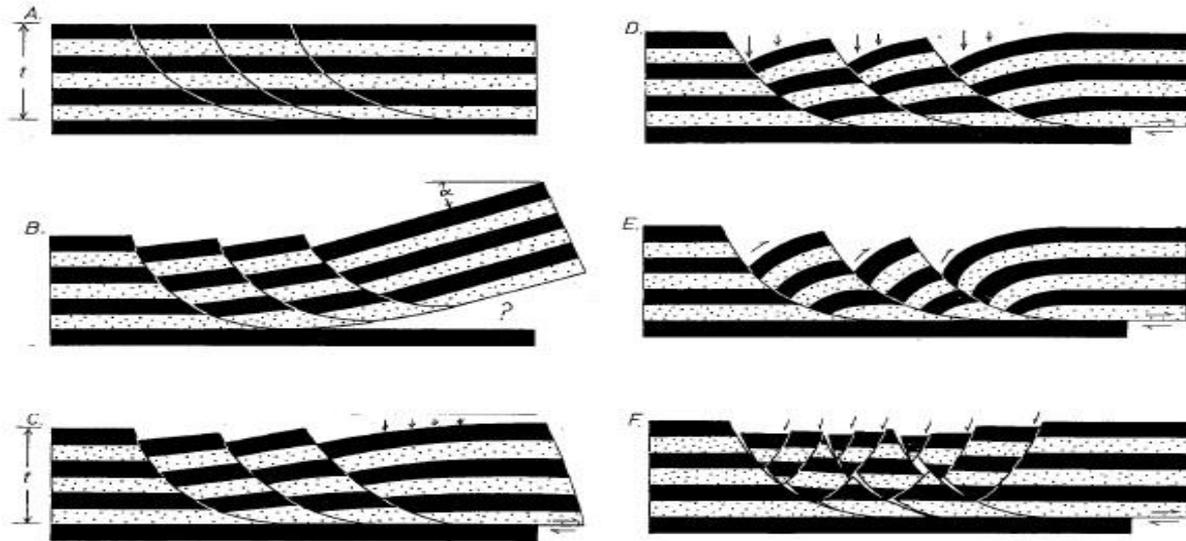


Componentes do rejeito e separação de uma falha:



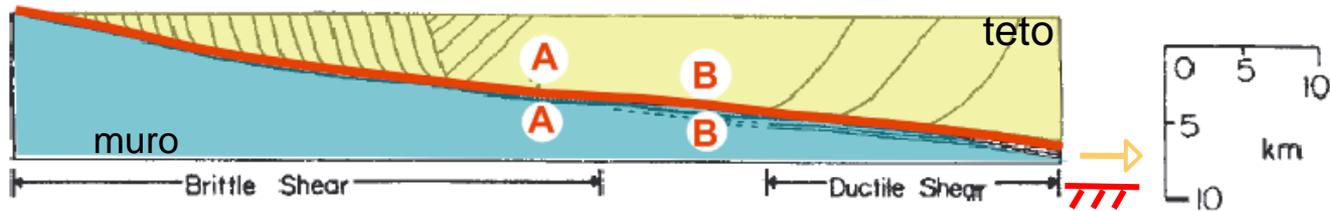
OP= rejeito total, OR=MP= rejeito direcional,
OM=RP= rejeito de mergulho, OT= rejeito horizontal,
PT= rejeito vertical, Sh= separação horizontal,
Sv= separação vertical, Sm= separação de mergulho,
Ra= Rejeito aparente.

Falhas lítricas

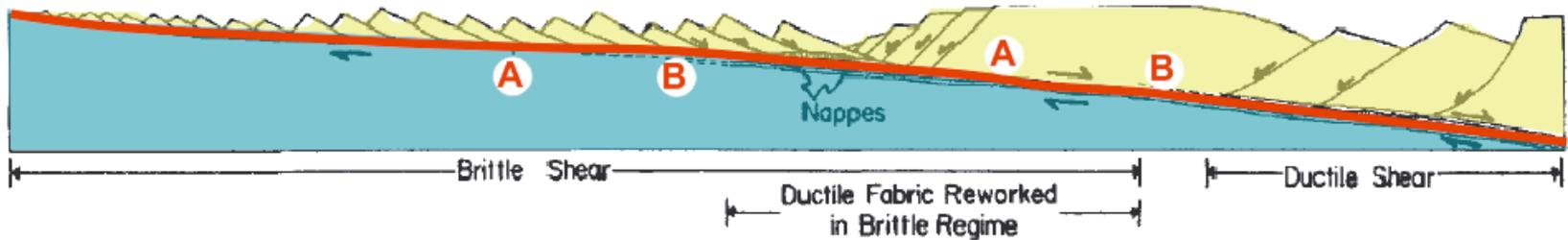


Estruturas extensionais

- *Detachment* e falhas associadas

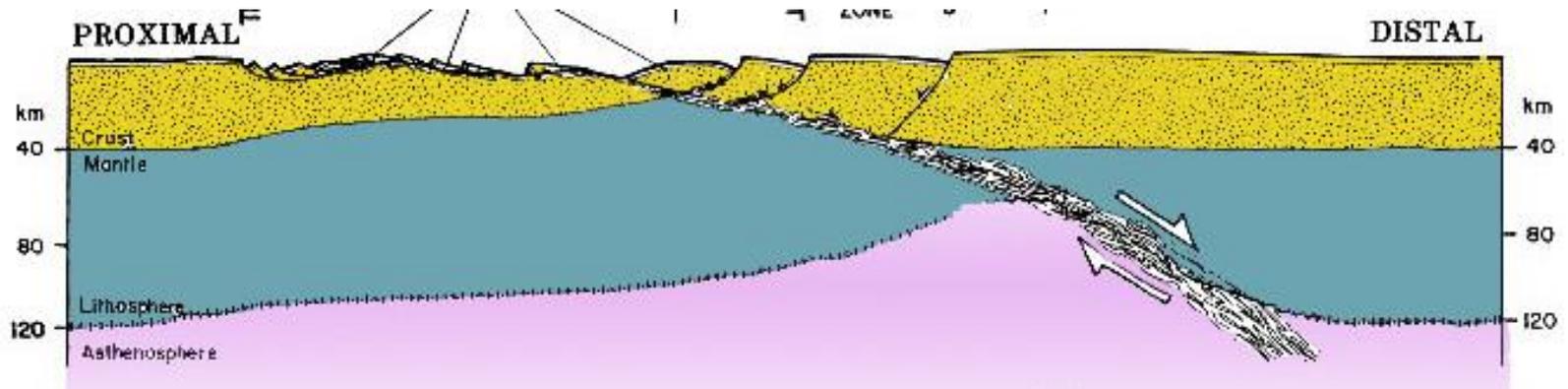


FALHAS



Estruturas extensionais

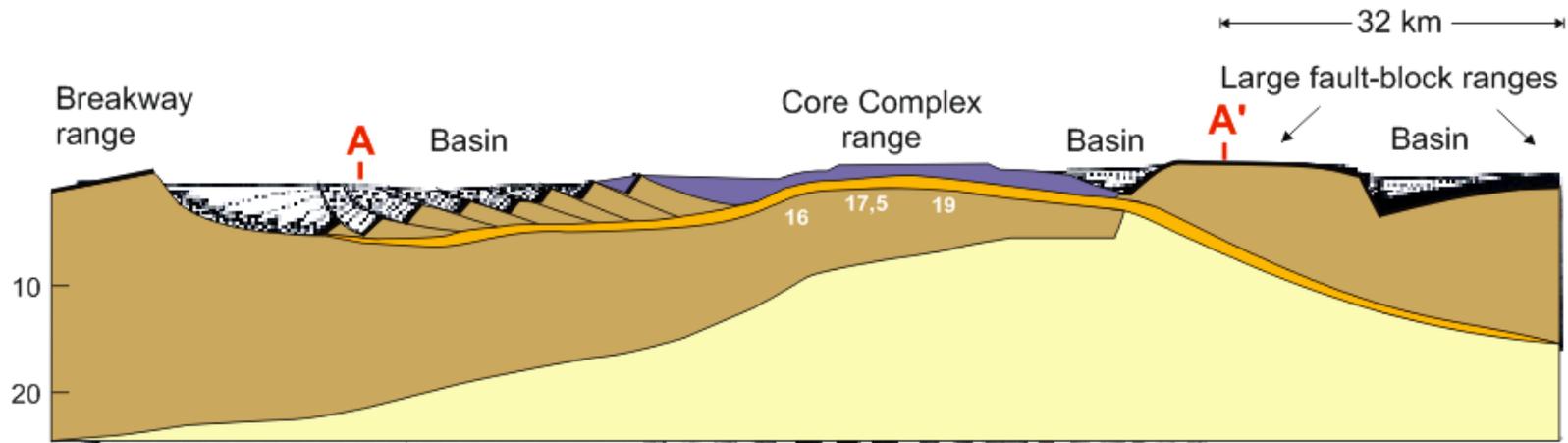
- Cisalhamento simples extensional até astenosfera



Estruturas extensionais

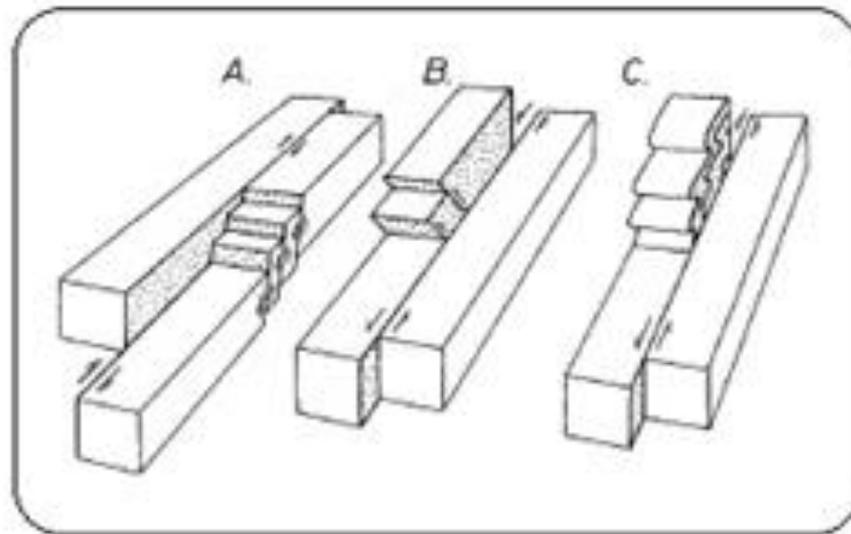
- Cisalhamento simples extensional
 - Crosta superior e média

"RAFT RIVER" STAGE

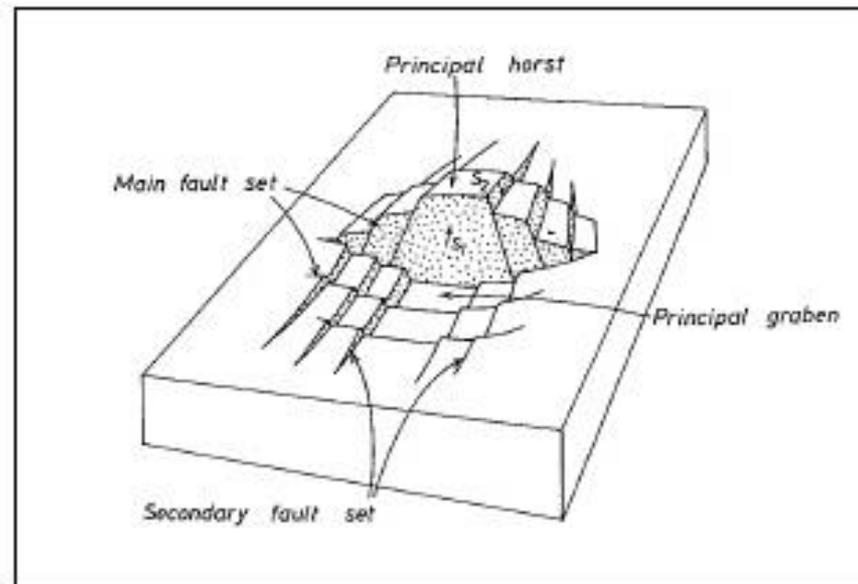


Extensão total (horizontal) = 72 km

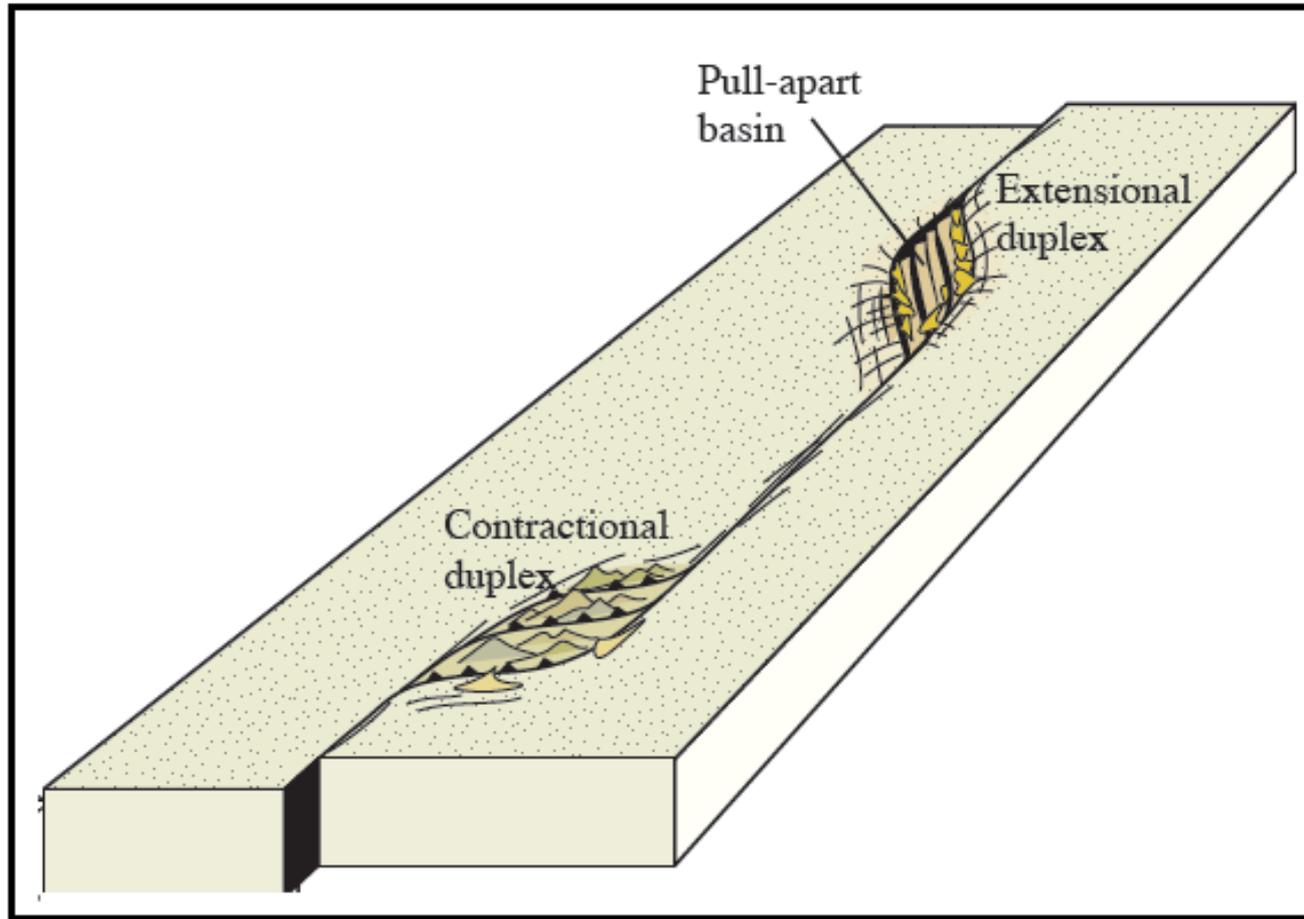
Falhas transcorrentes com falhas normais e inversas associadas



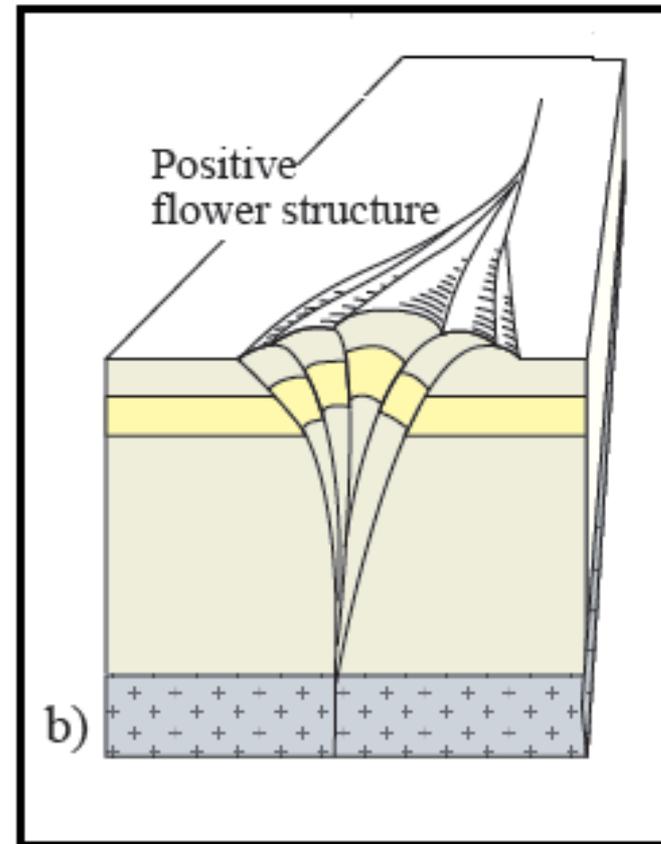
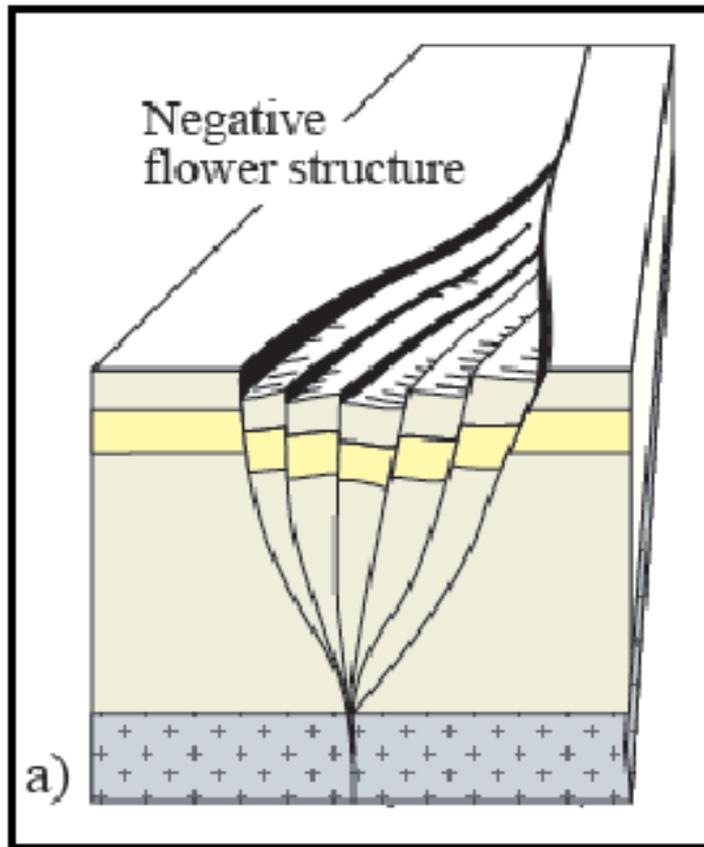
Grabens e horsts associados



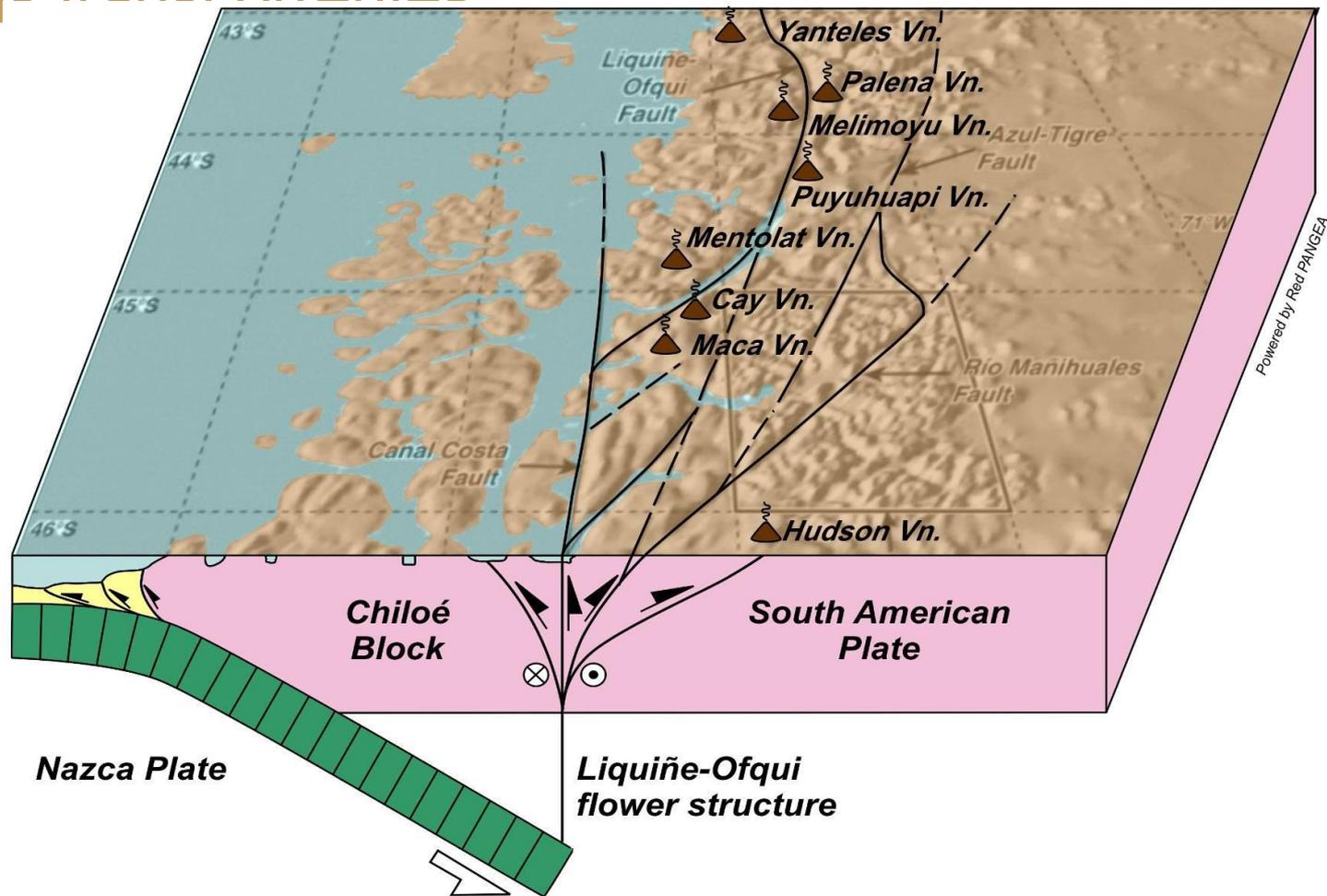
Falhas transcorrentes e estruturas associadas



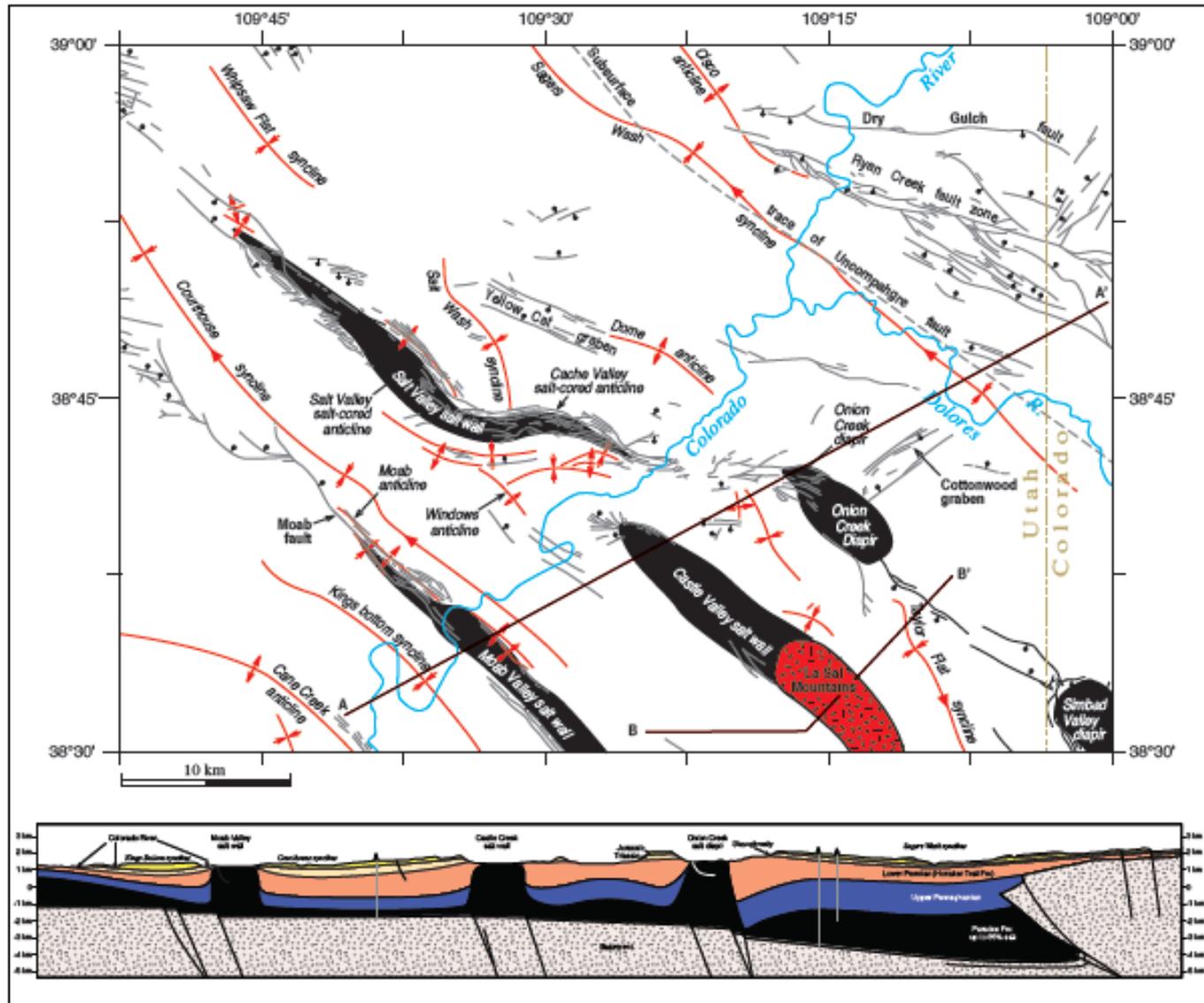
Estruturas em flor (negativa e positiva) associadas com falhas transcorrentes



Estruturas em flor (negativa e positiva) associadas falhas transcorrentes



Domos de sal na área de Moab, SE de Utah, EUA



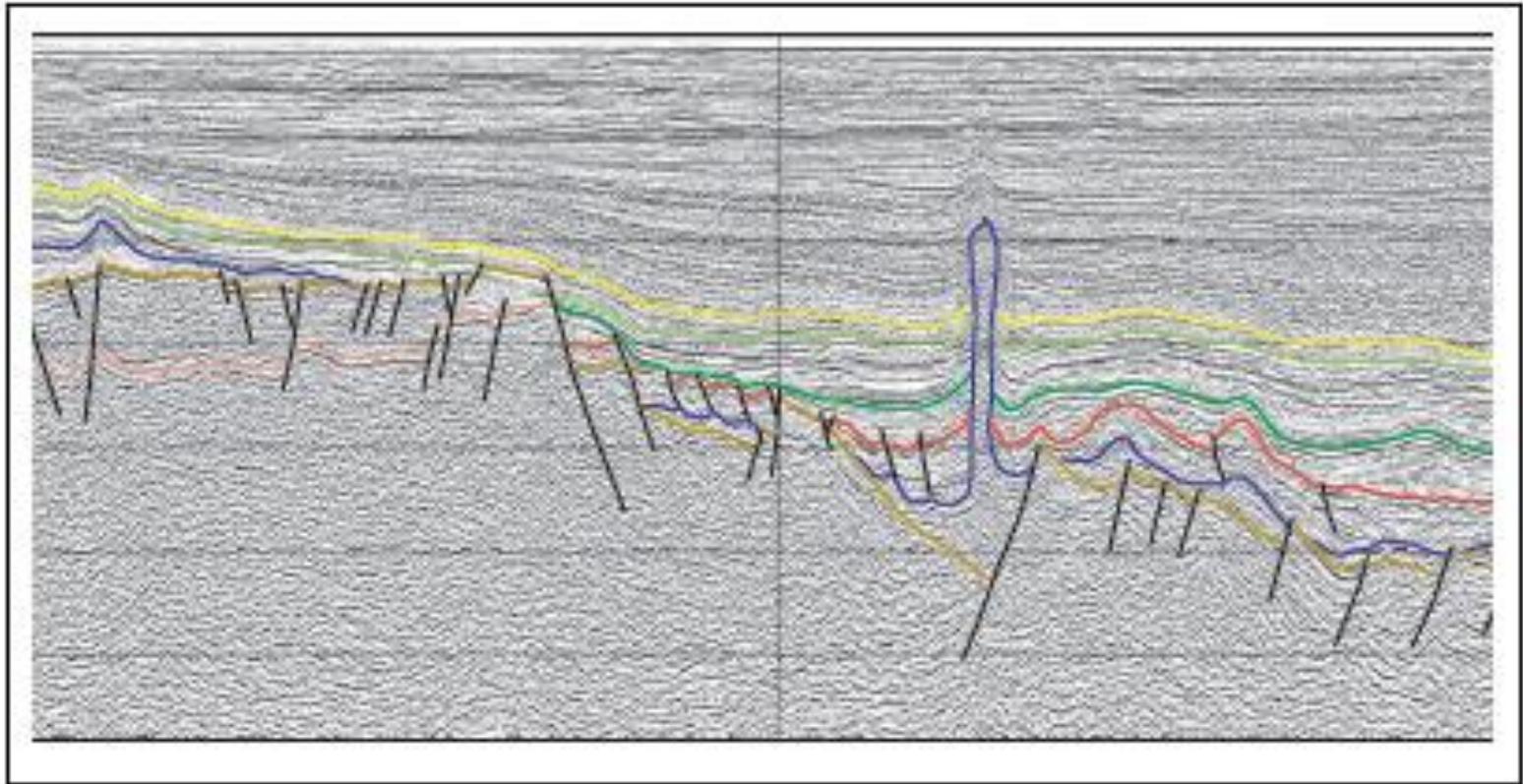
Reativação de estruturas do embasamento (Jacutinga)

NW

SE

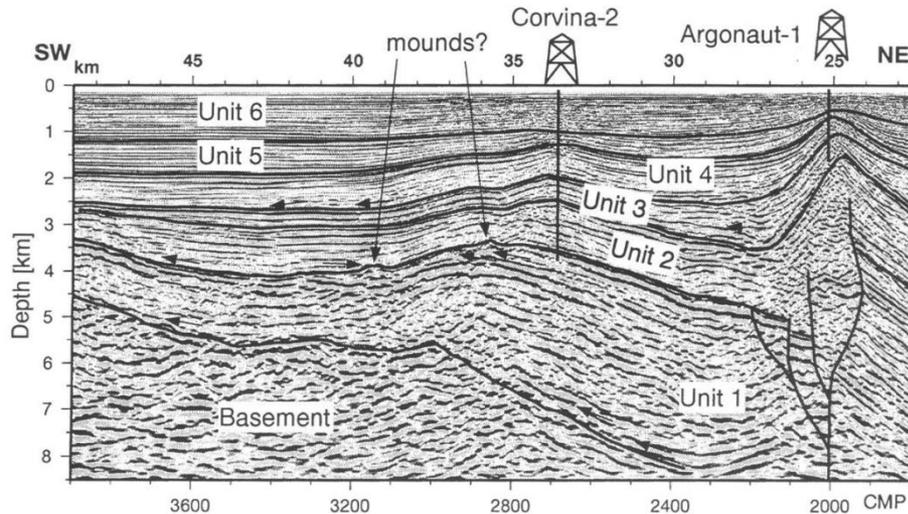
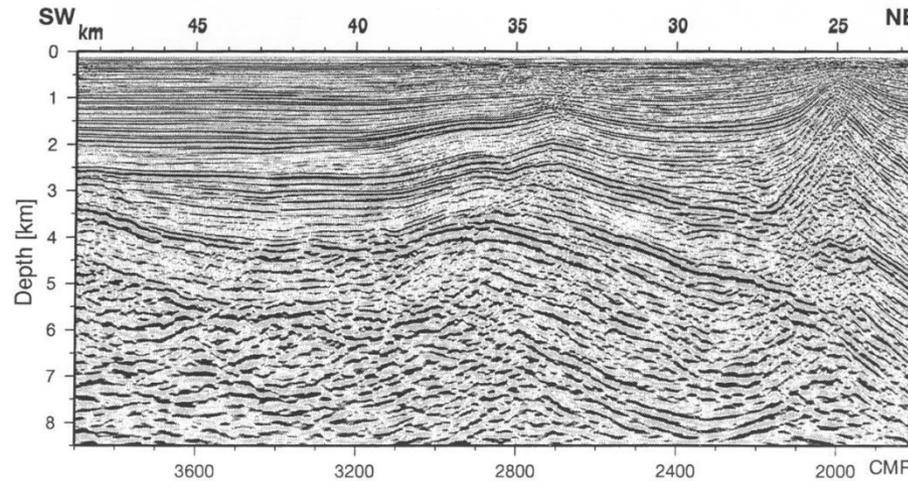


Reativação de falhas do embasamento



Falha em flor em seção sísmica

Bacia
Sandino,
Nicarágua













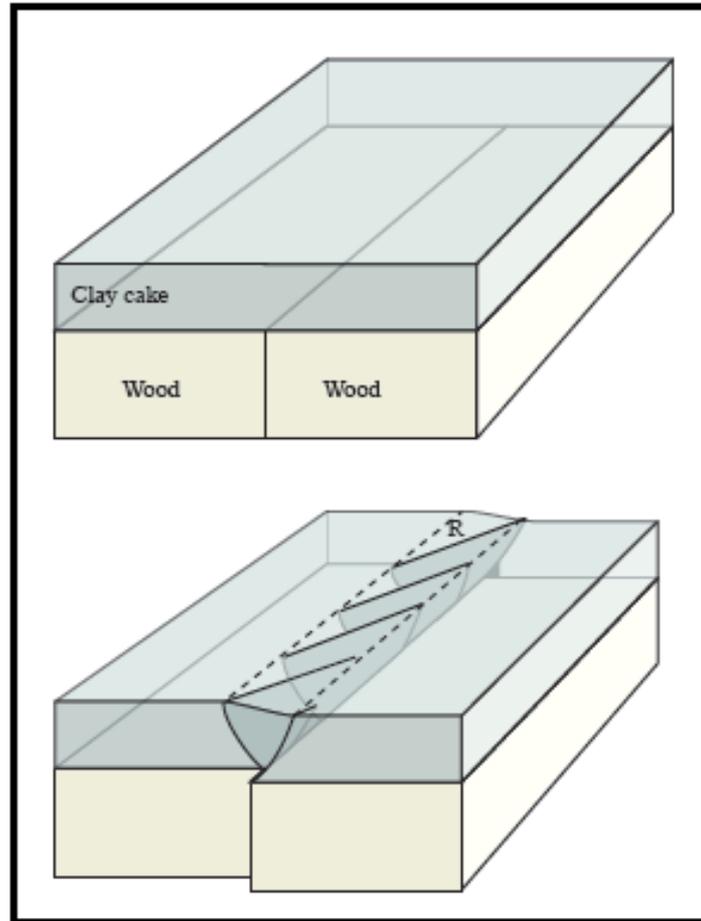






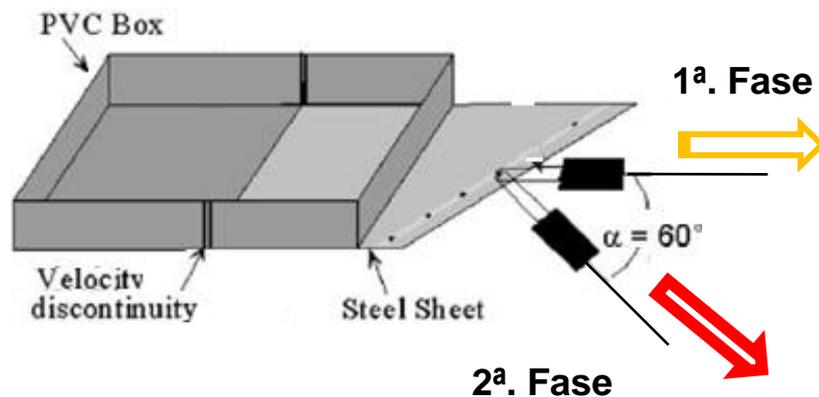


Modelos de deformação em caixa de areia

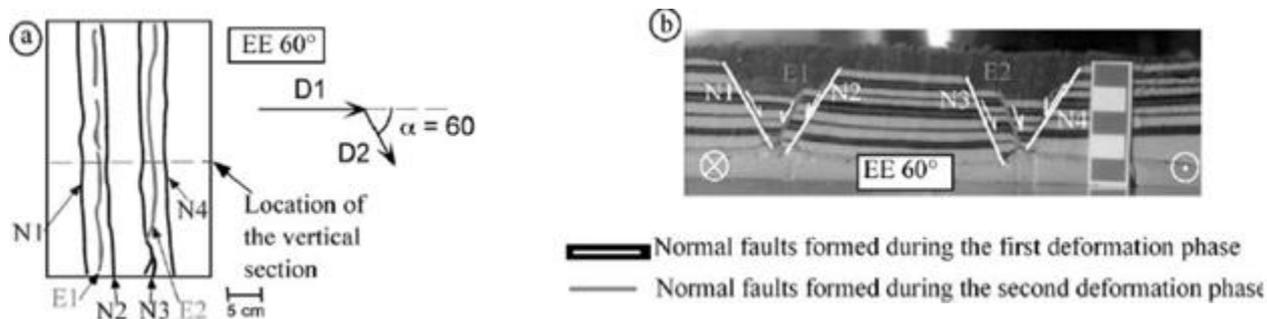


Modelos em caixa de areia: regime extensional e inversão tectônica

- Modelos análogos: extensão (normal e oblíqua)

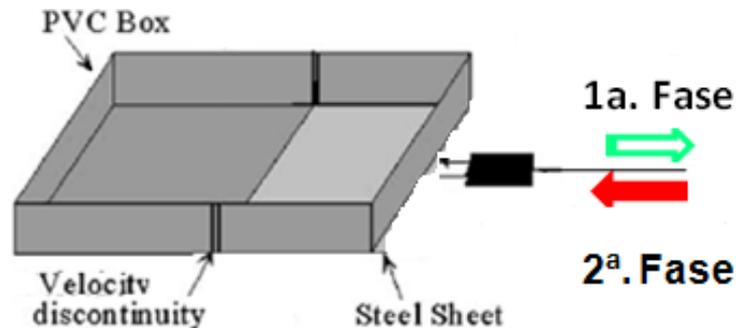


- Extensão normal (25%) e oblíqua (12,5%)

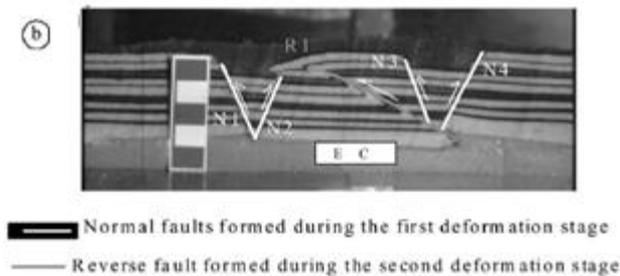
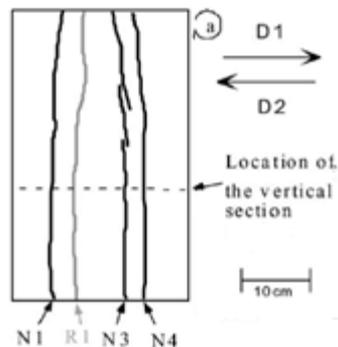


Modelos em caixa de areia: regime extensional e inversão tectônica

- Modelos análogos: extensão e compressão

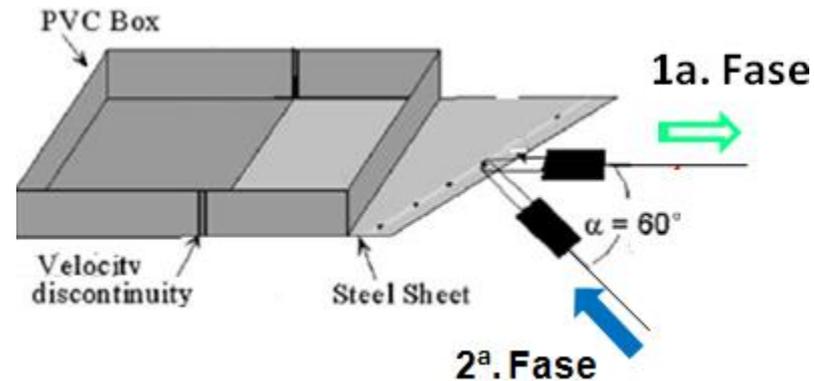


- Extensão (25%) e compressão normal (25%)

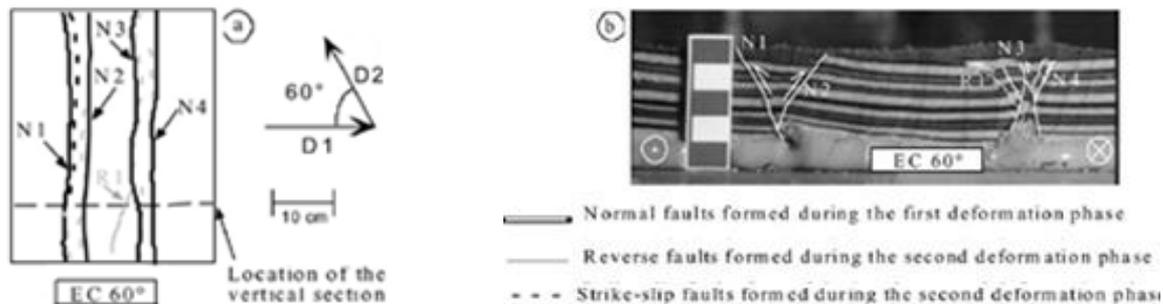


Modelos em caixa de areia: regime extensional e inversão tectônica

- Modelos análogos: extensão e compressão



- Extensão normal (25%) e compressão oblíqua (50%)



Regime extensional e inversão tectônica

■ Modelos análogos

□ Experimental

□ Computacional

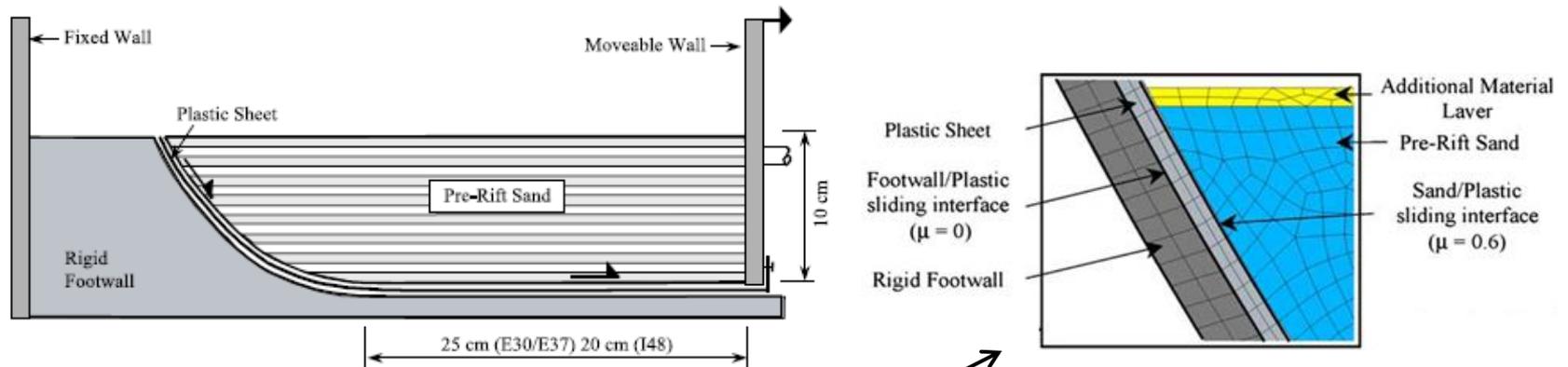
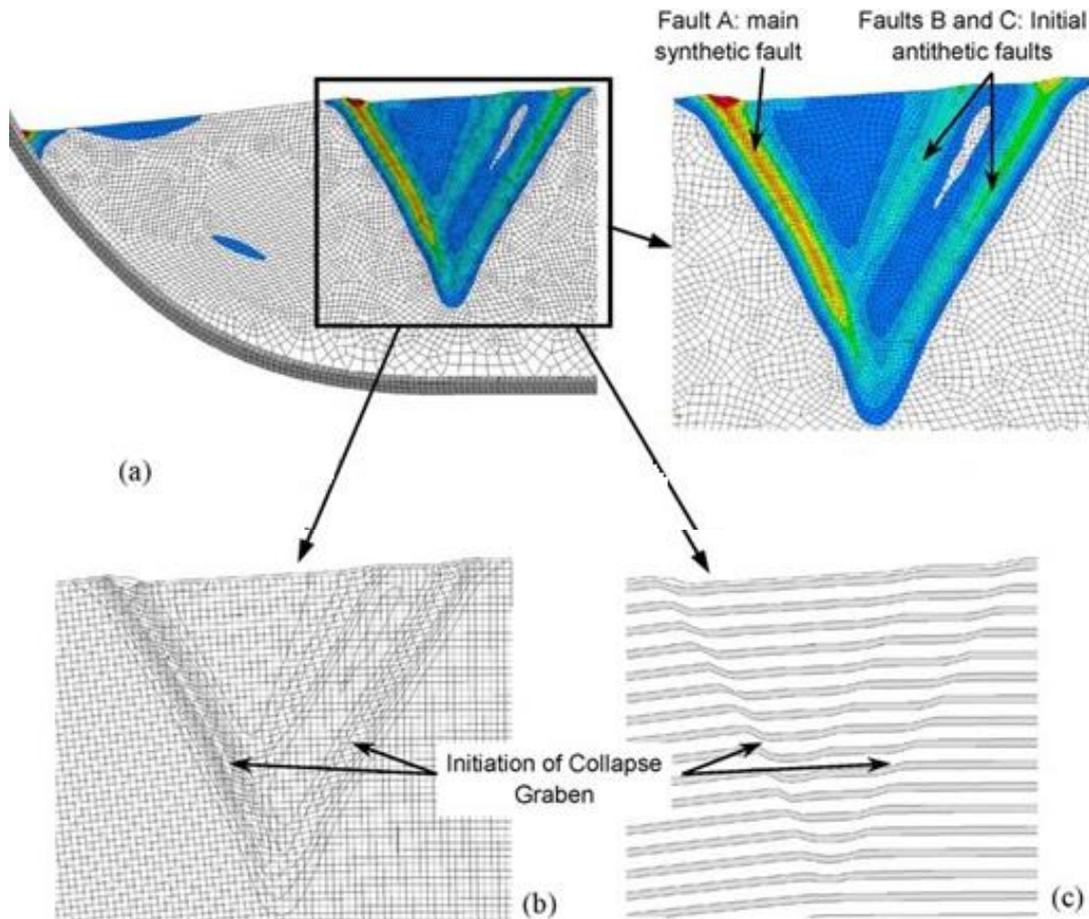


Fig. 2. Description of detachment geometry for experiments E37/E30 (McClay, 1990).



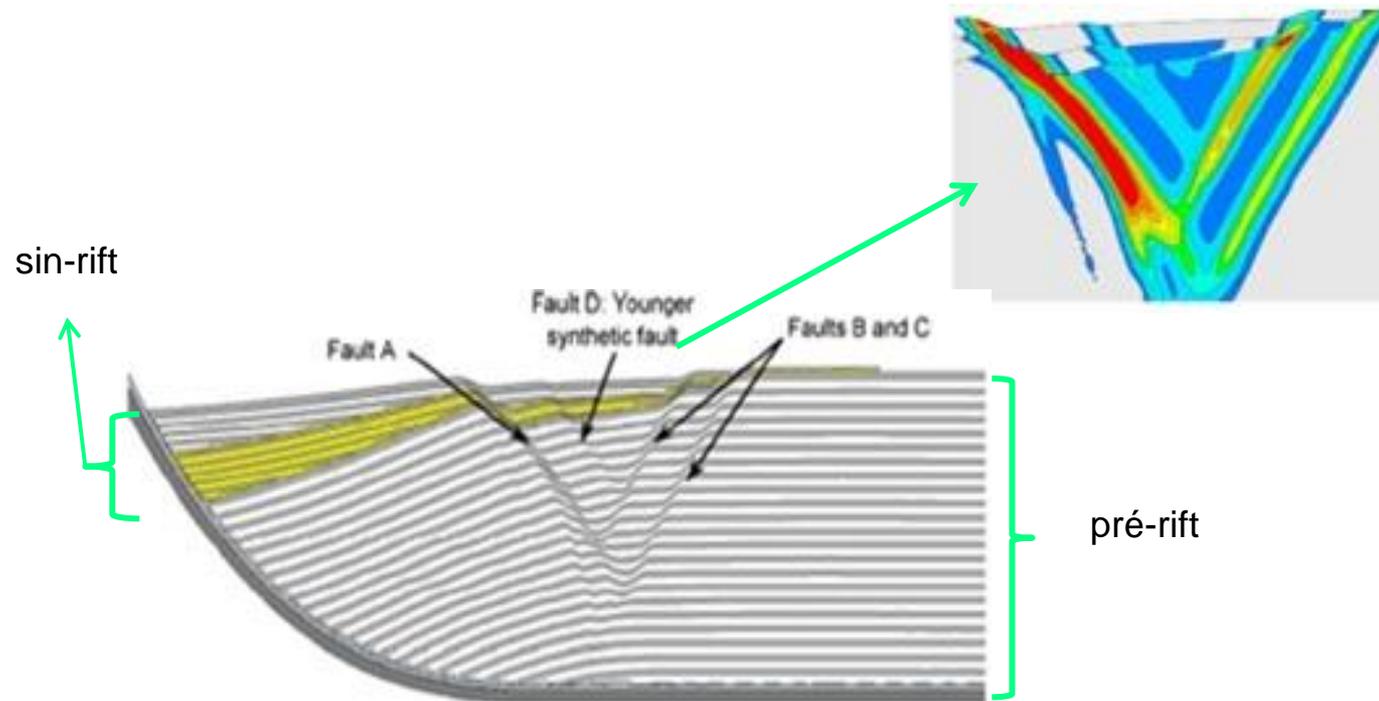
Regime extensional e inversão tectônica

- Nucleação das falhas: extensão de 6%



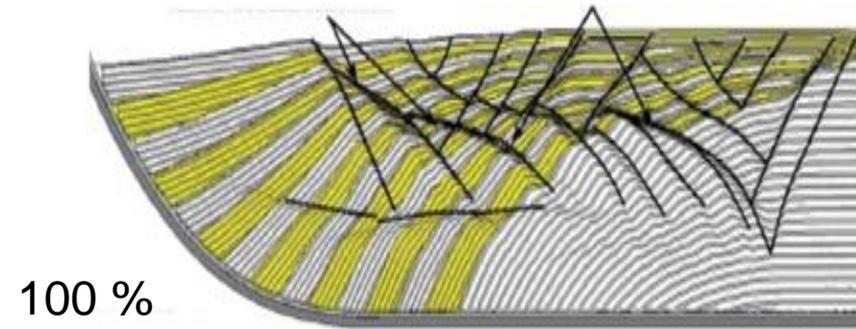
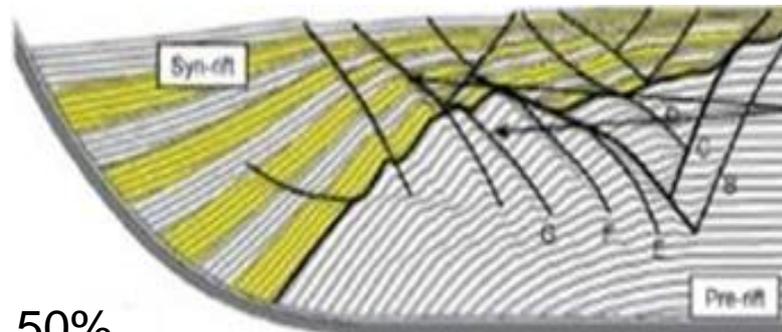
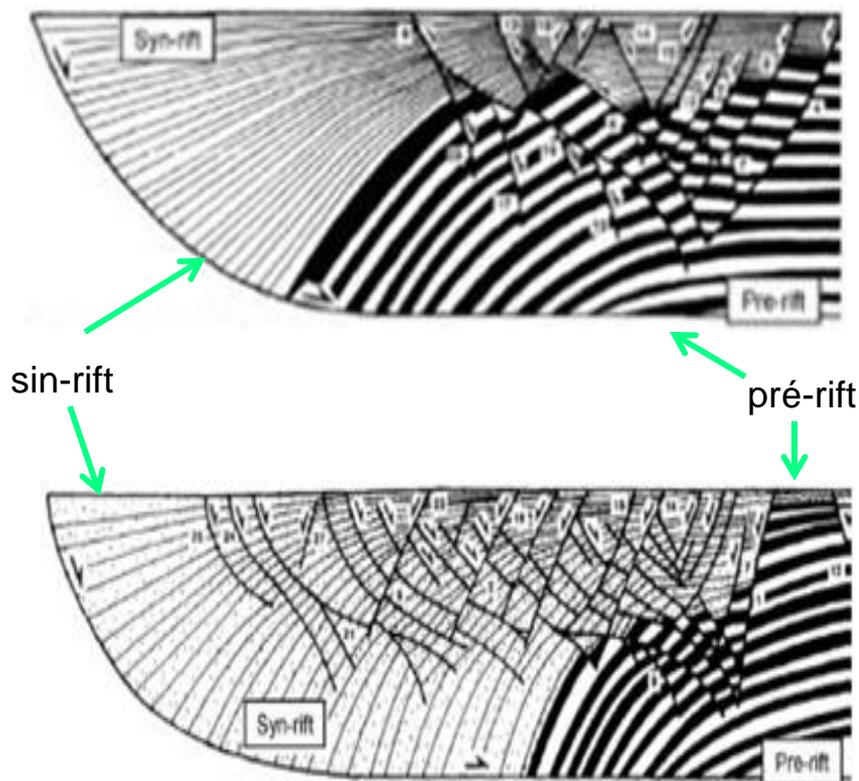
Regime extensional e inversão tectônica

- Extensão de 16 %



Regime extensional e inversão tectônica

- Extensão: 50 e 100%



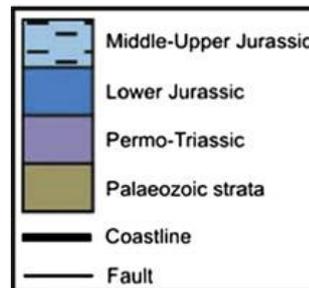
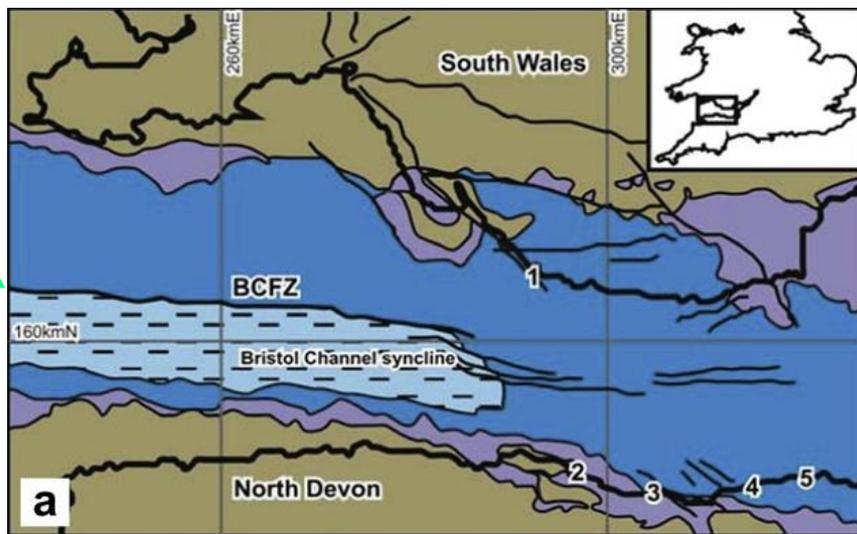
□ Experimental

□ Computacional

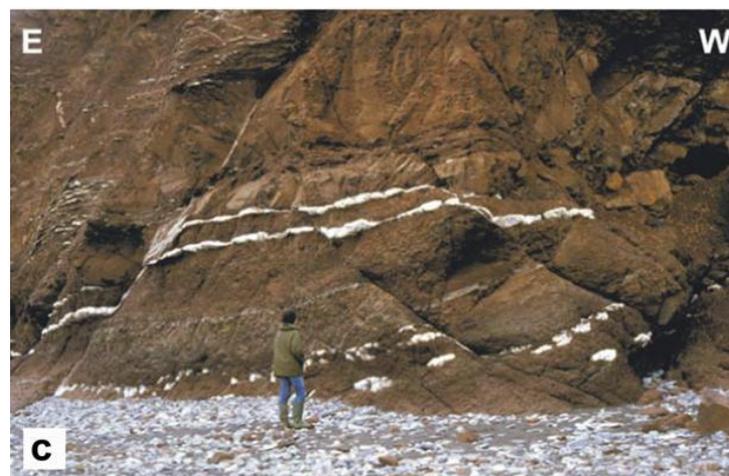
Regime extensional e inversão tectônica

■ Modelos análogos: Bacia de Bristol

Bristol Channel
Fault Zone
(BCFZ)



- 1 - Nash Point
- 2 - Blue Anchor Bay
- 3 - Watchet
- 4 - St. Audrie's Bay
- 5 - Kilve

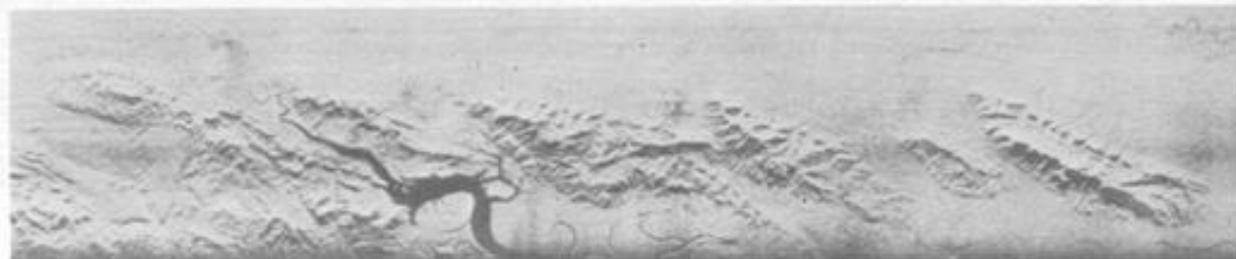
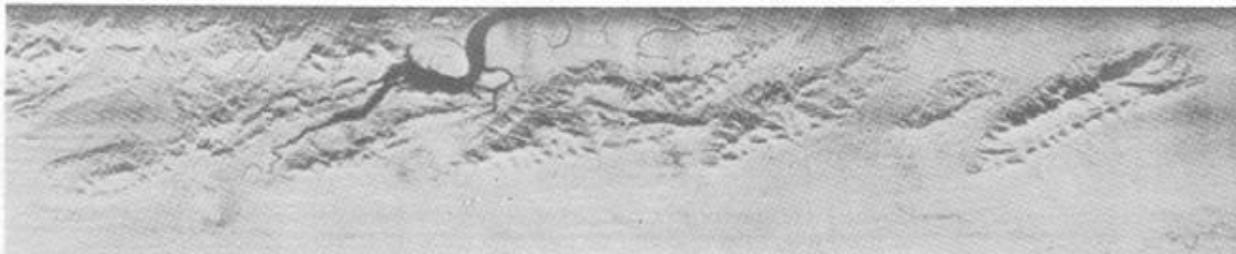
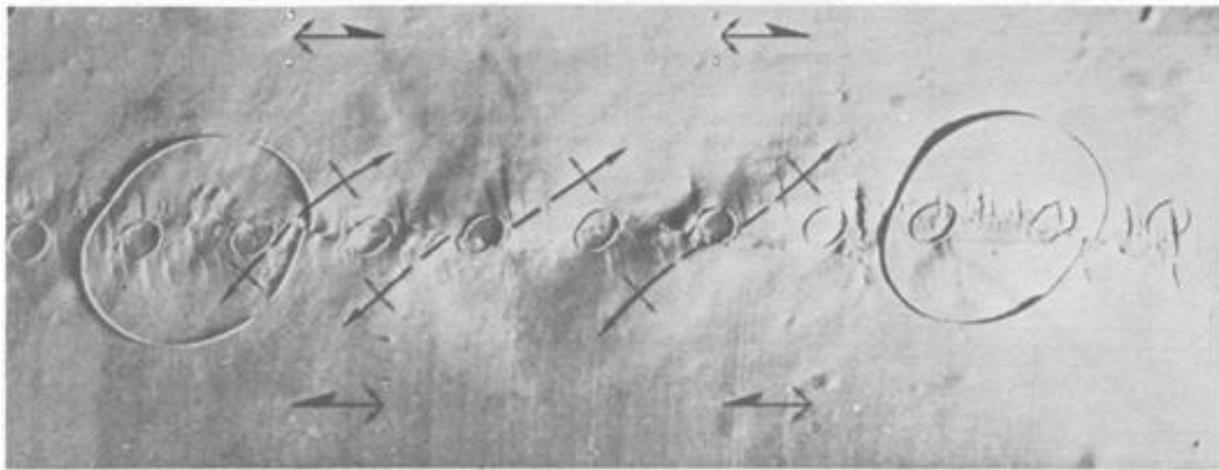


Regime distensivo e inversão tectônica

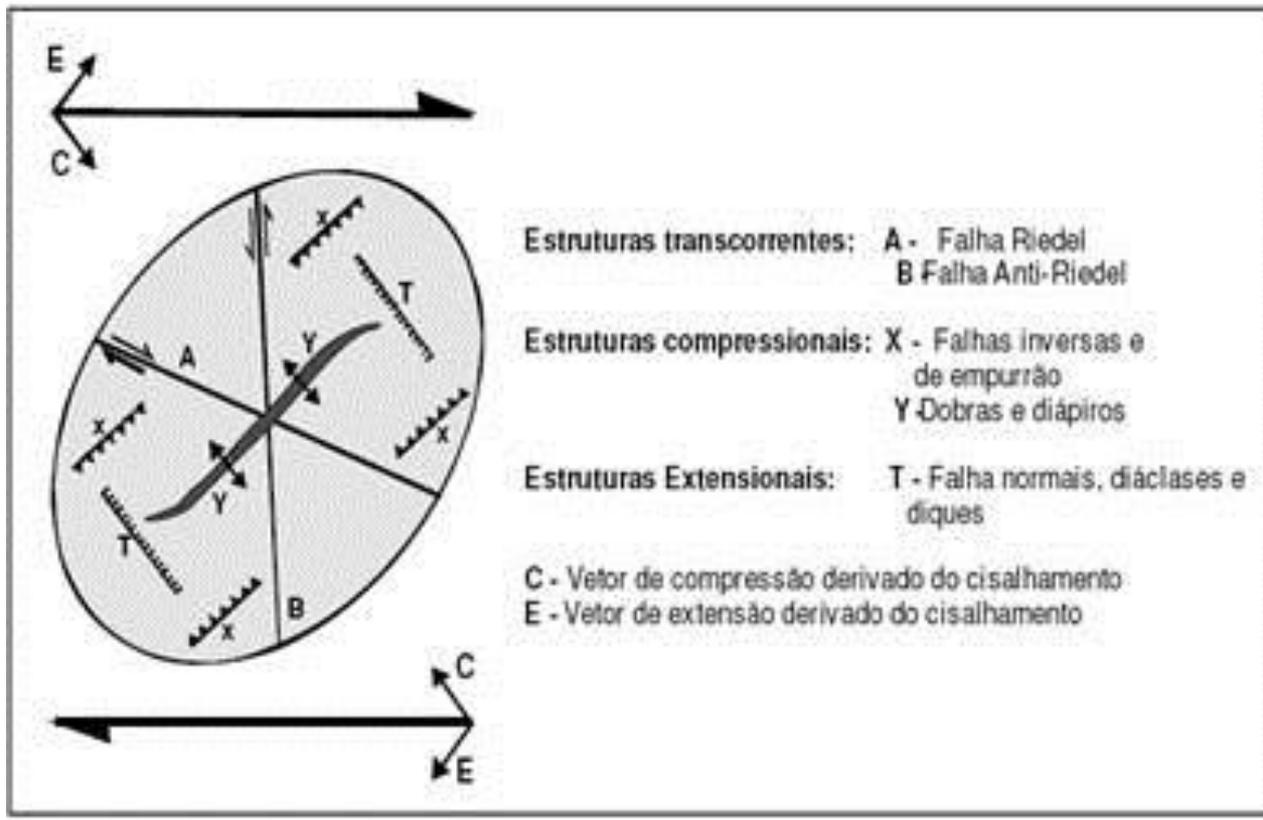
- Falhas inversas na bacia de Bristol



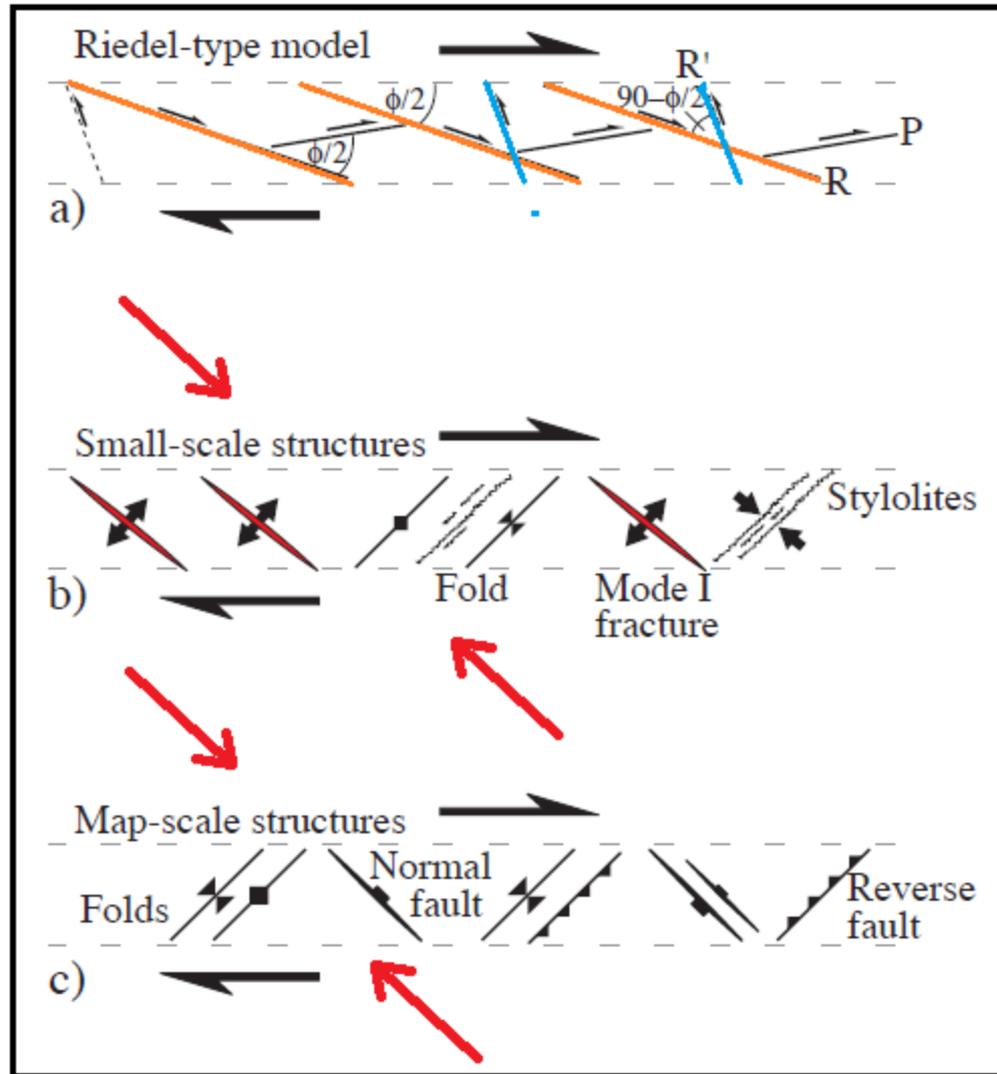
Modelo de Riedel



Modelo de Riedel

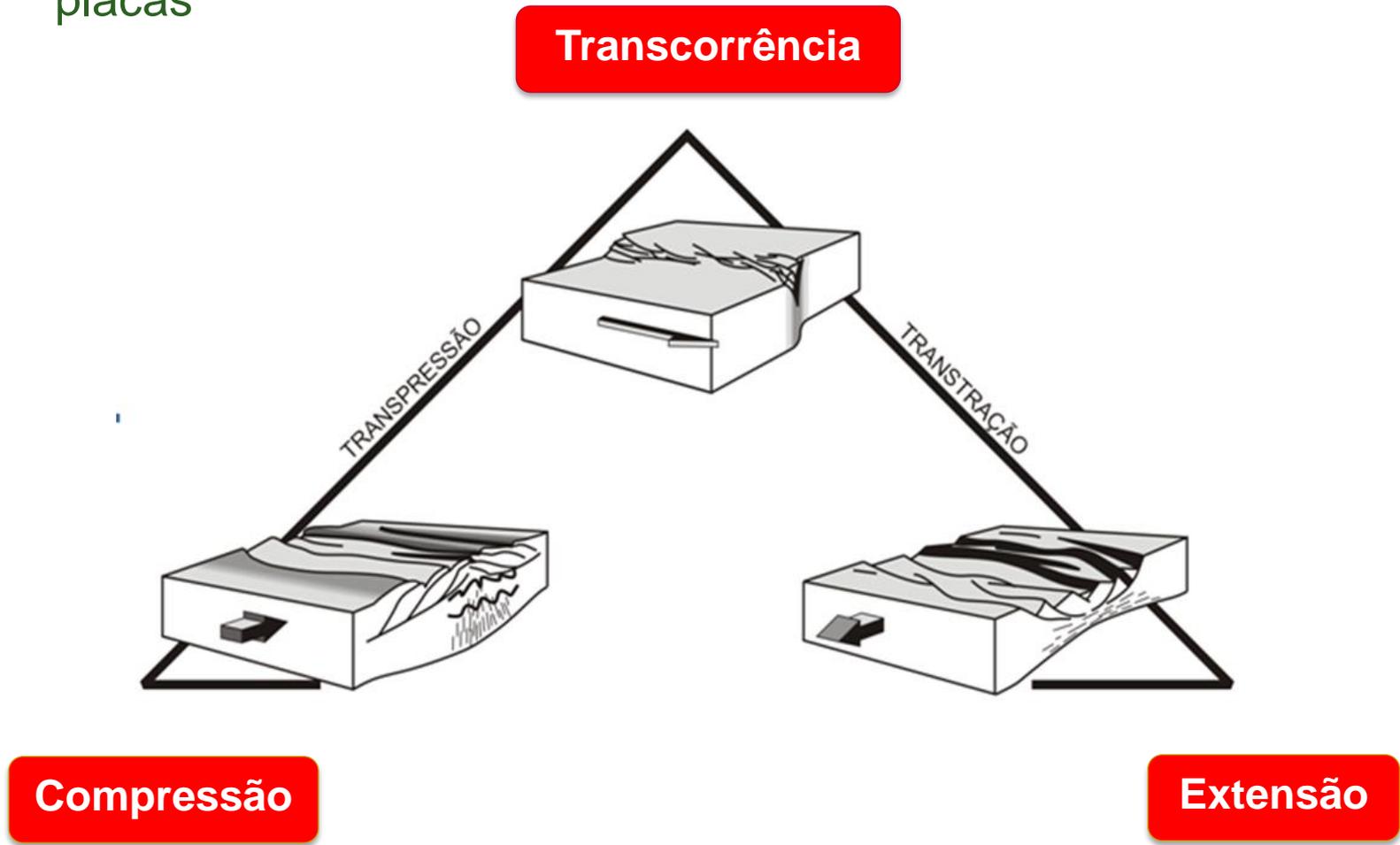


Modelo de Riedel

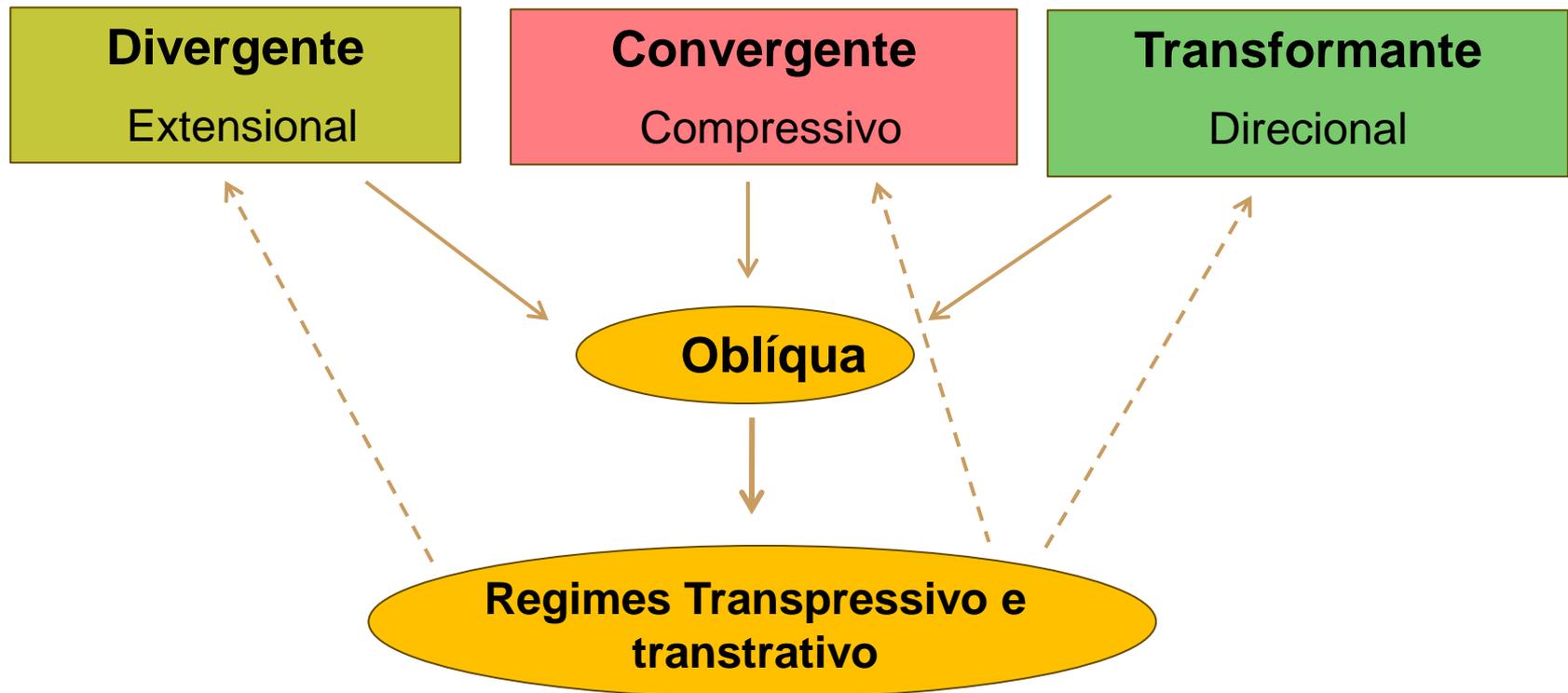


Regimes transpressivo e transtrativo

- Convergência e divergência oblíqua de placas

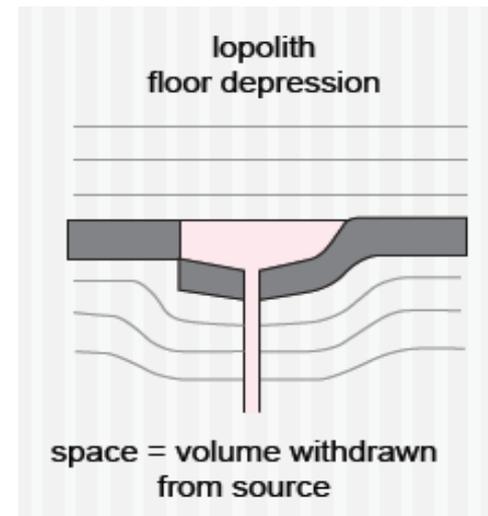
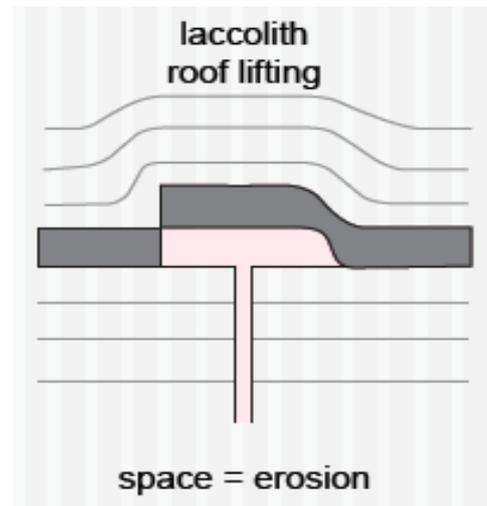
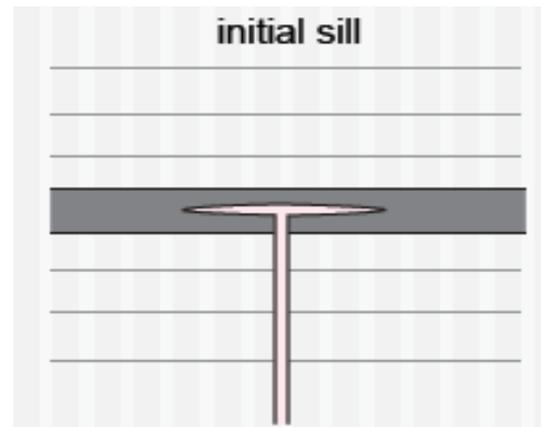


Movimento relativo entre as placas e regimes tectônicos

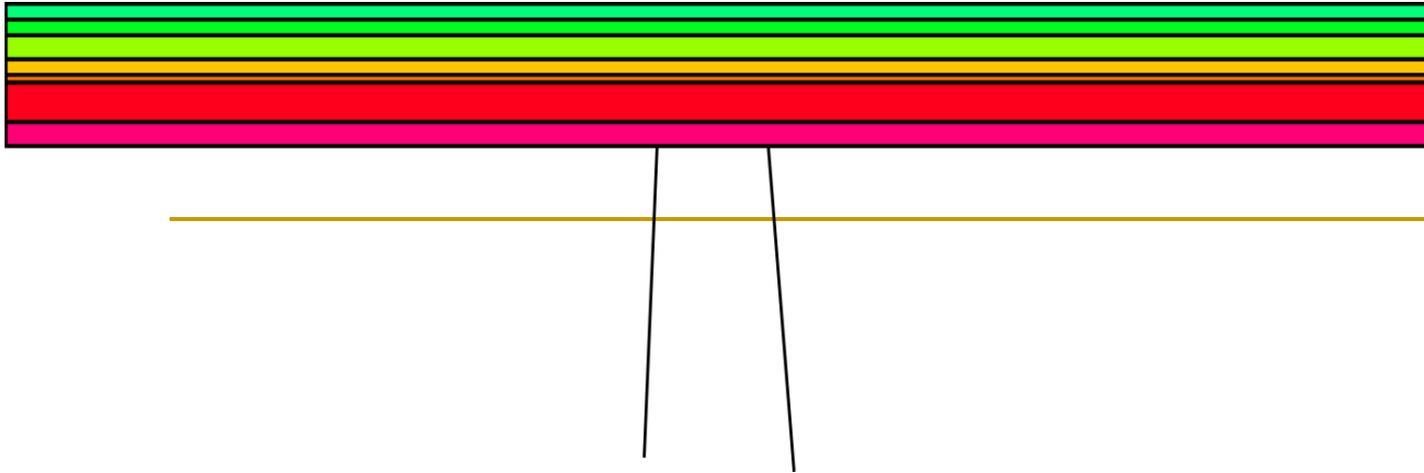


Colocação de plutons concordandes

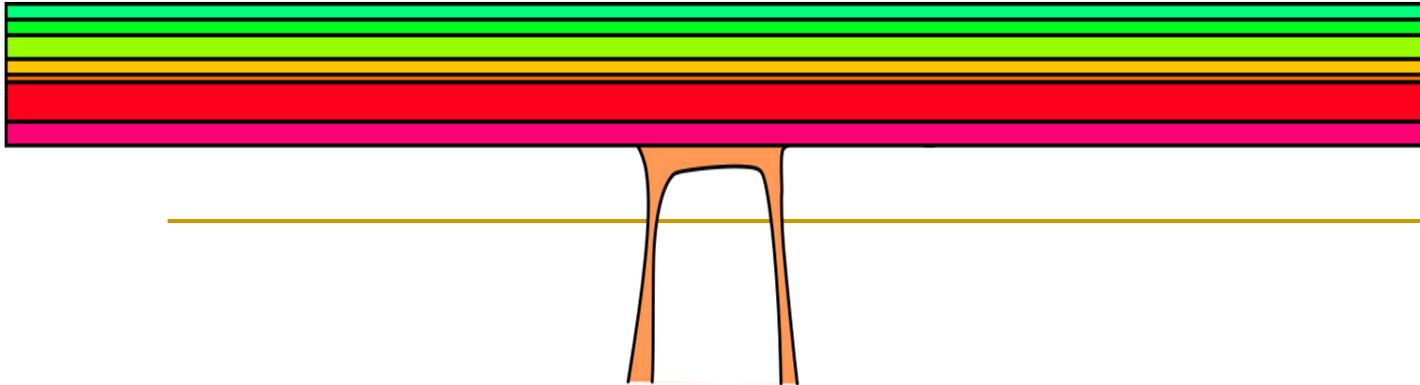
Crosta Superior



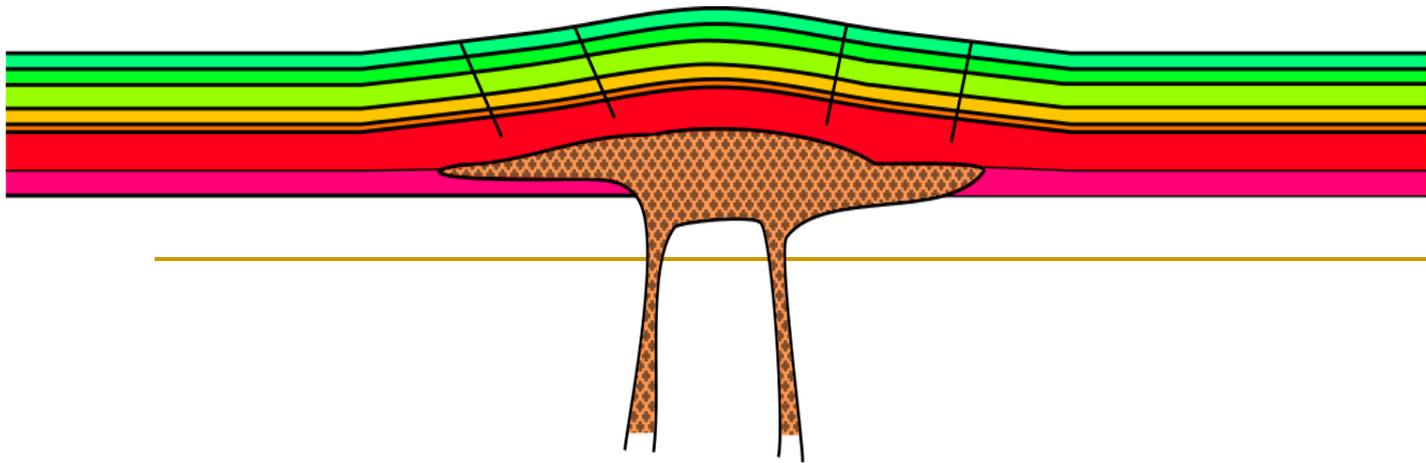
Estruturas dômicas : Corpos ígneos



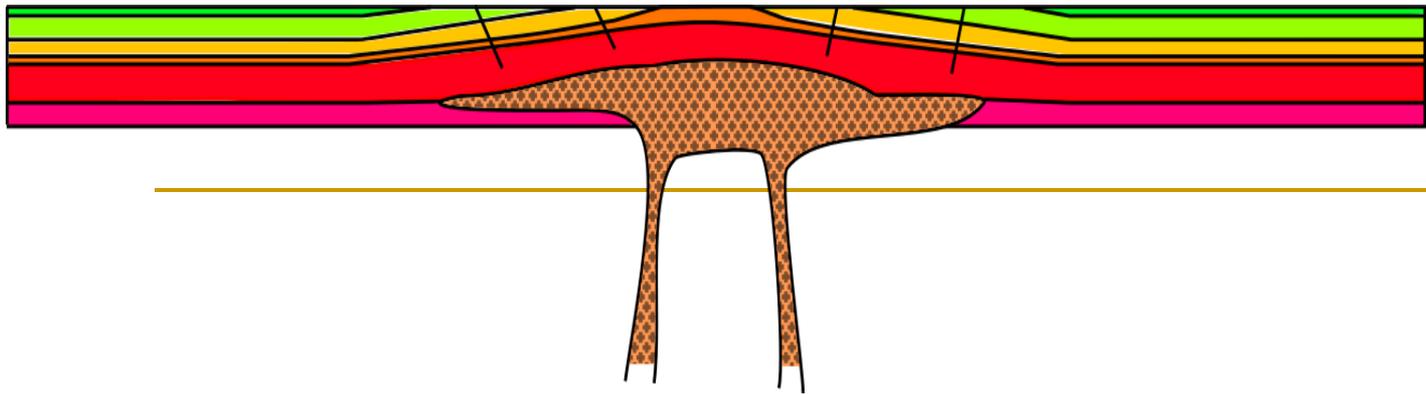
Estruturas dômicas : Corpos ígneos



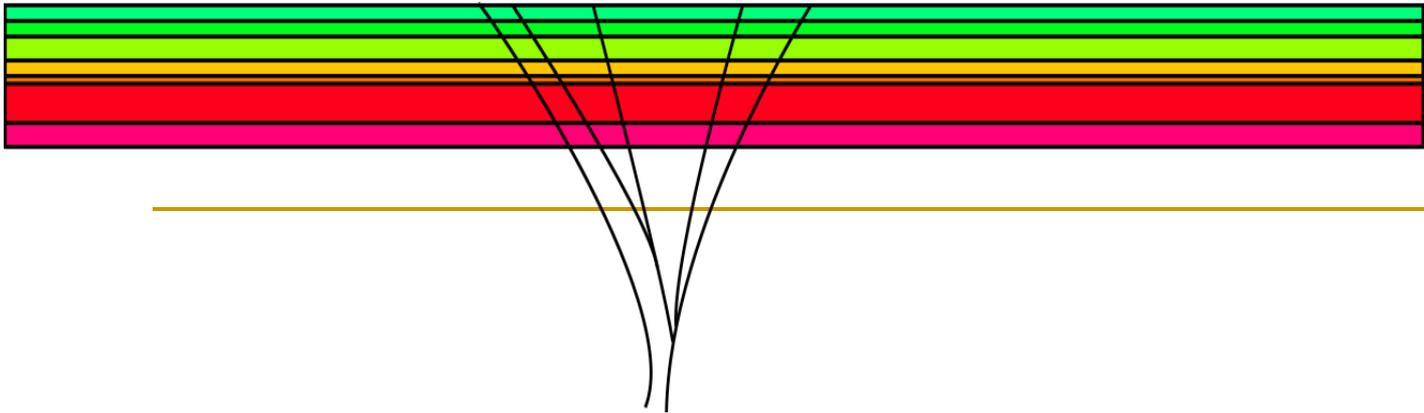
Estruturas dômicas : Corpos ígneos



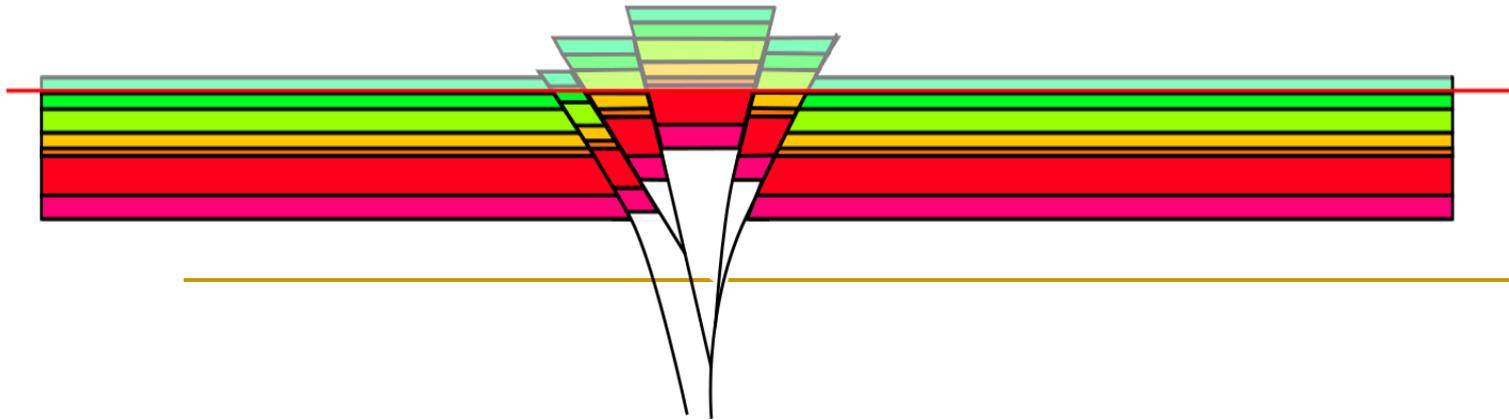
Estruturas dômicas : Corpos ígneos



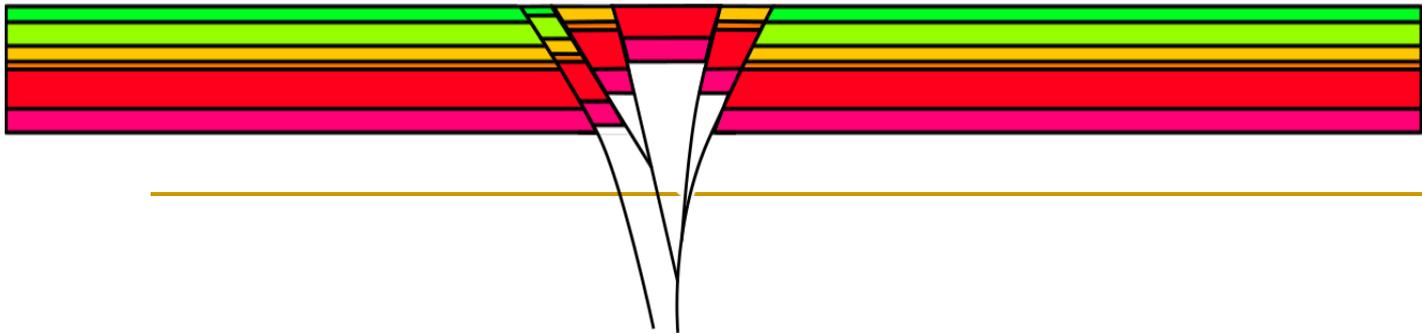
Estruturas dômicas : Estruturas em flor



Estruturas dômicas : Estruturas em flor



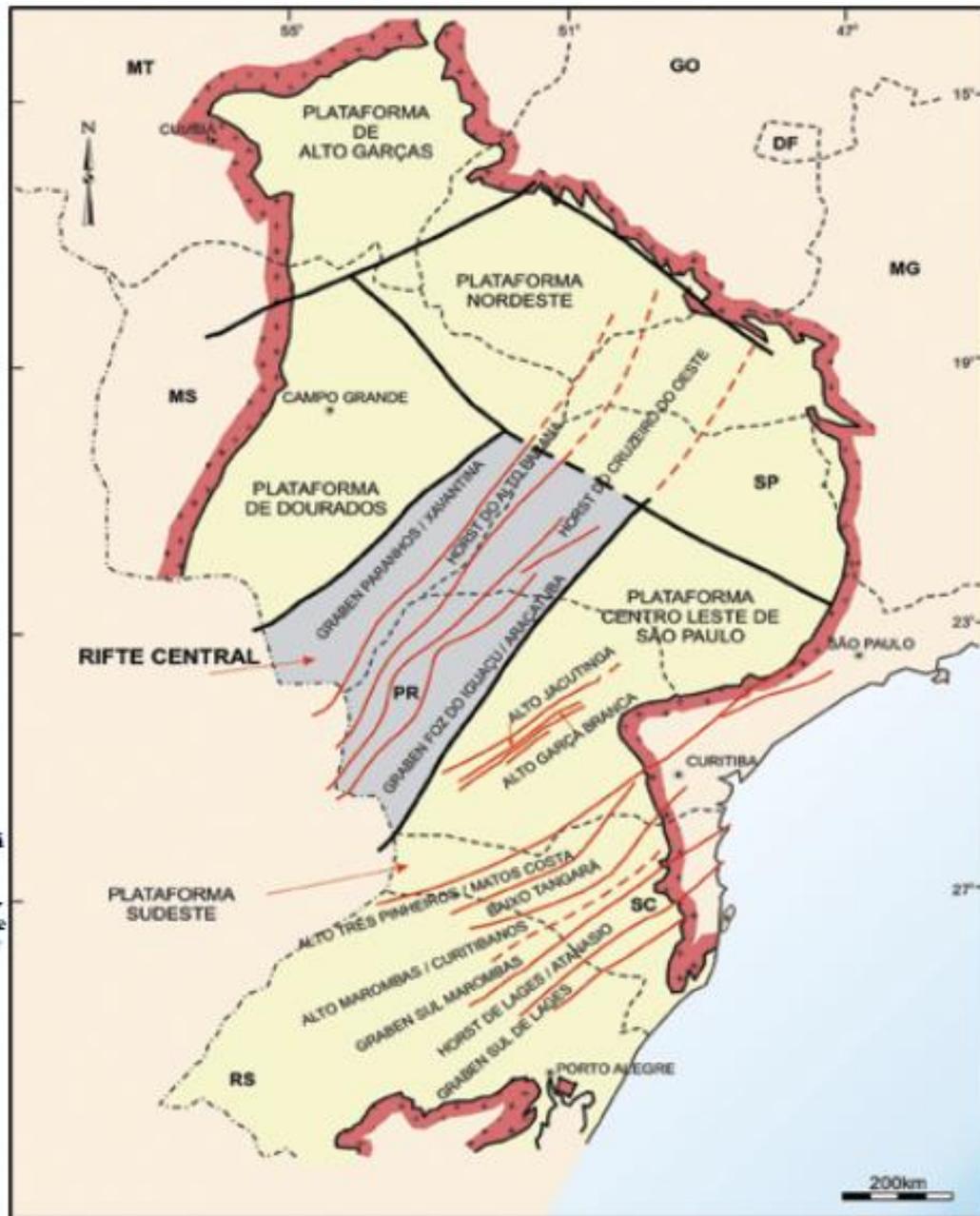
Estruturas dômicas : Estruturas em flor



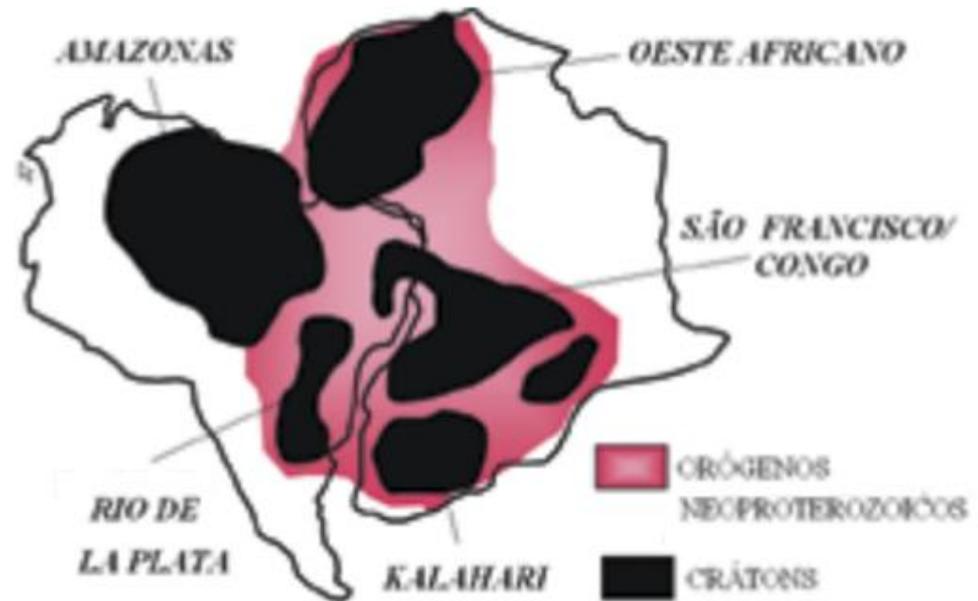
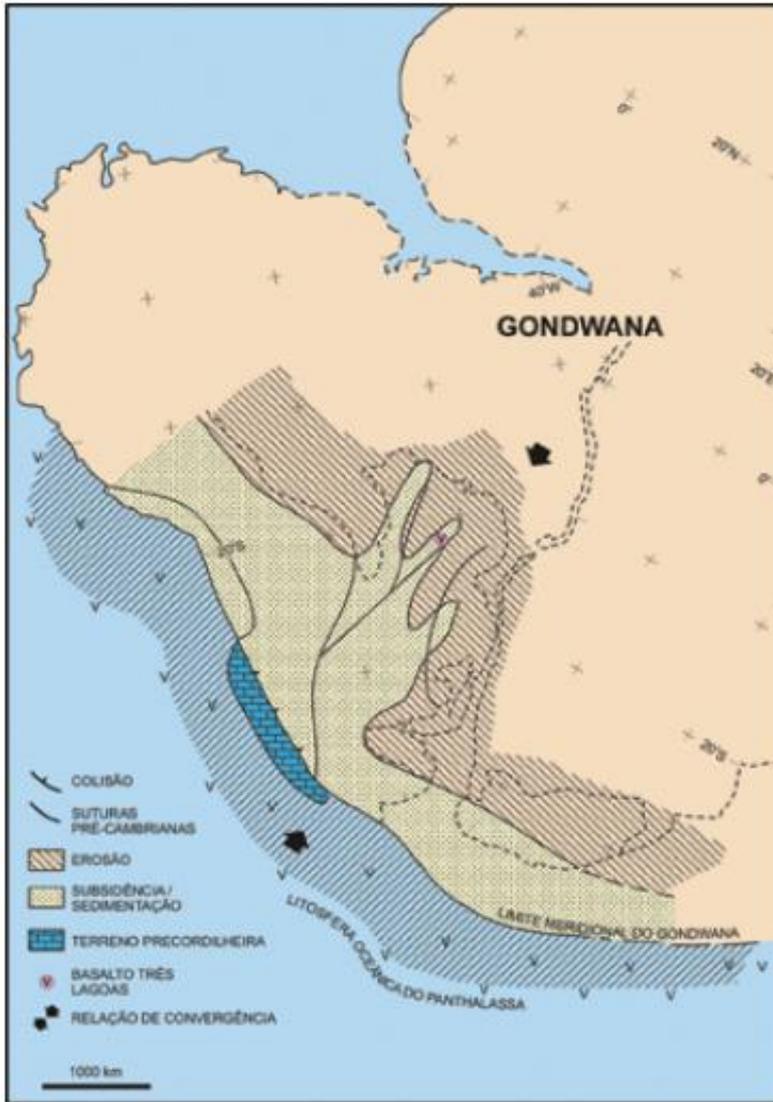
Bacia do Paraná

- Tipo de bacia: Intracratônica
- Forma → Ovalada
 - Eixo maior (NNE-SSW) ~ 2350 km
 - Eixo menor (WSW-ESE) ~ 900 km
- Área: > 1.500.000 km²
- Espessura: > 7000 m
- Ingressões Marinhas:
 - Carbonífero/Permiano → Orogenia Sanrafaélica (La Ventana- Cabo)
 - Devoniano (eo)
 - Ordoviciano/Siluriano → Orogenia Oclóyica (Milani 1977)

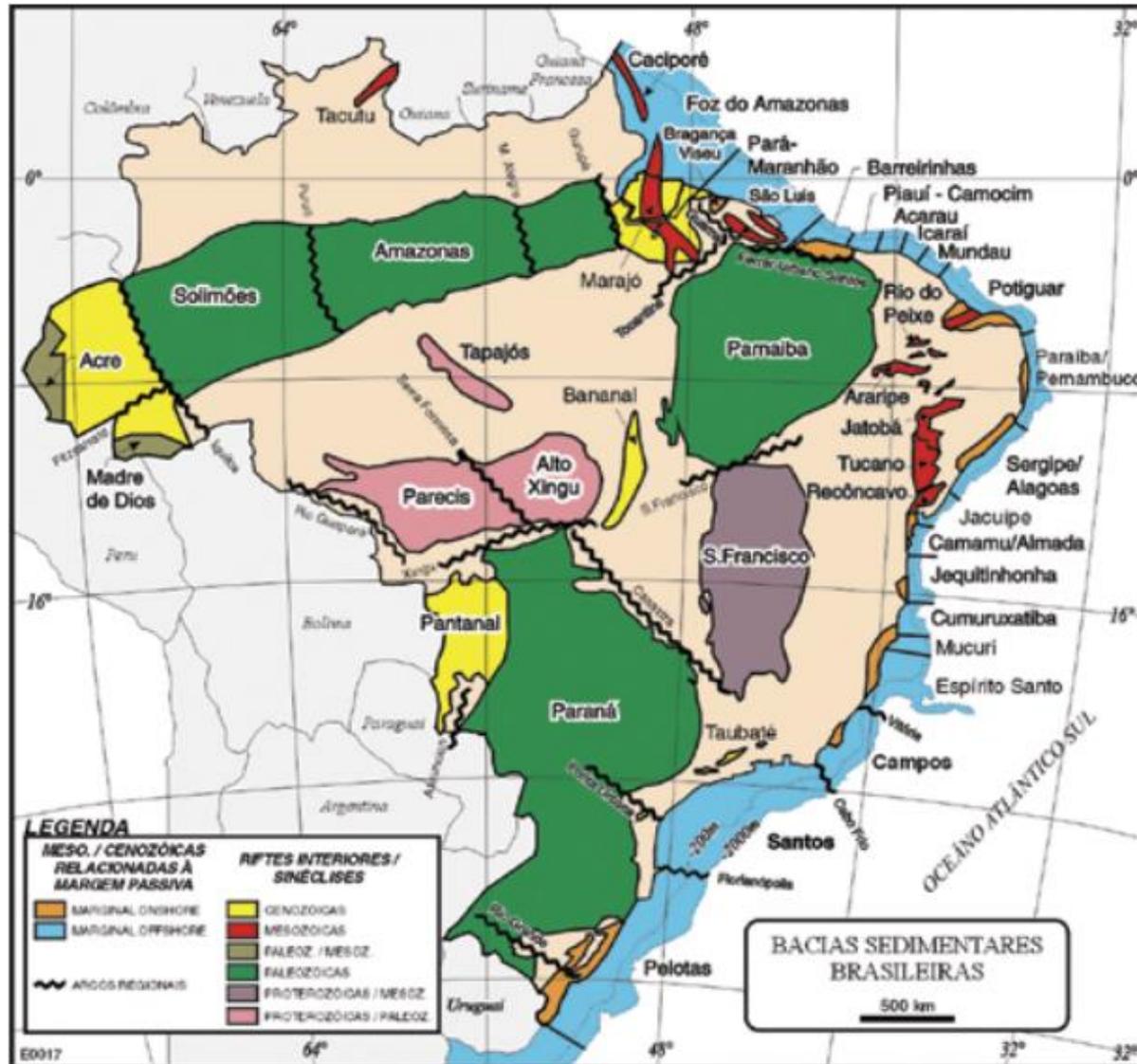
Principais Elementos Estruturais do Substrato da Bacia do Paraná



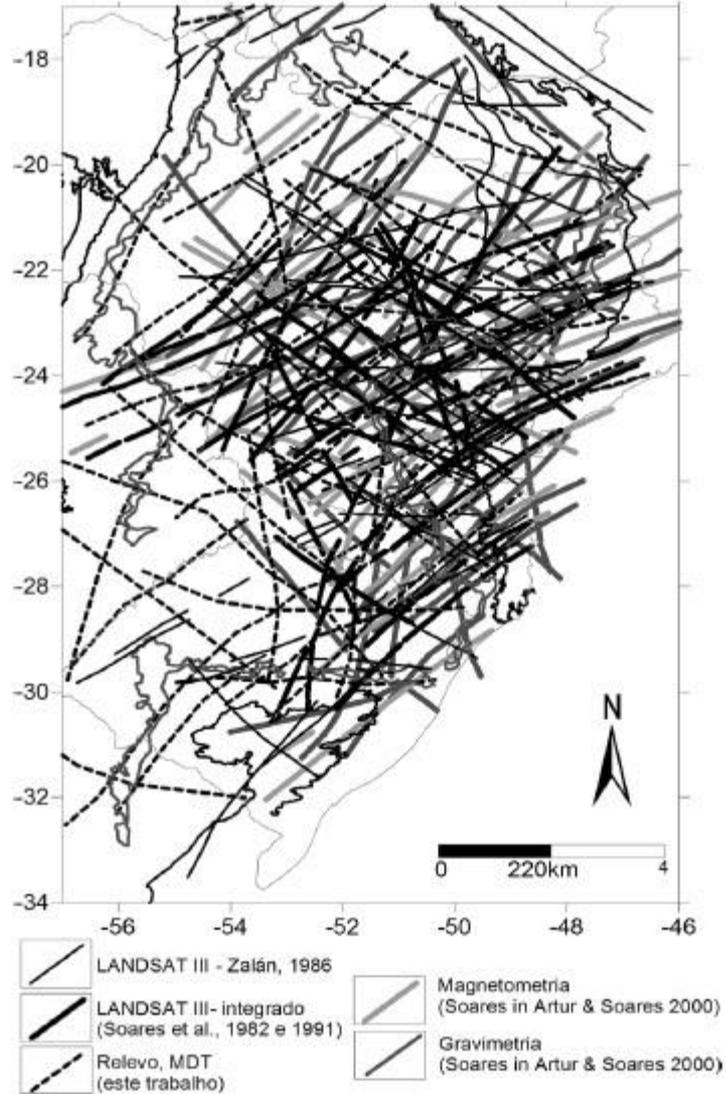
Gondwana Ocidental com os Crátons da América do Sul e África



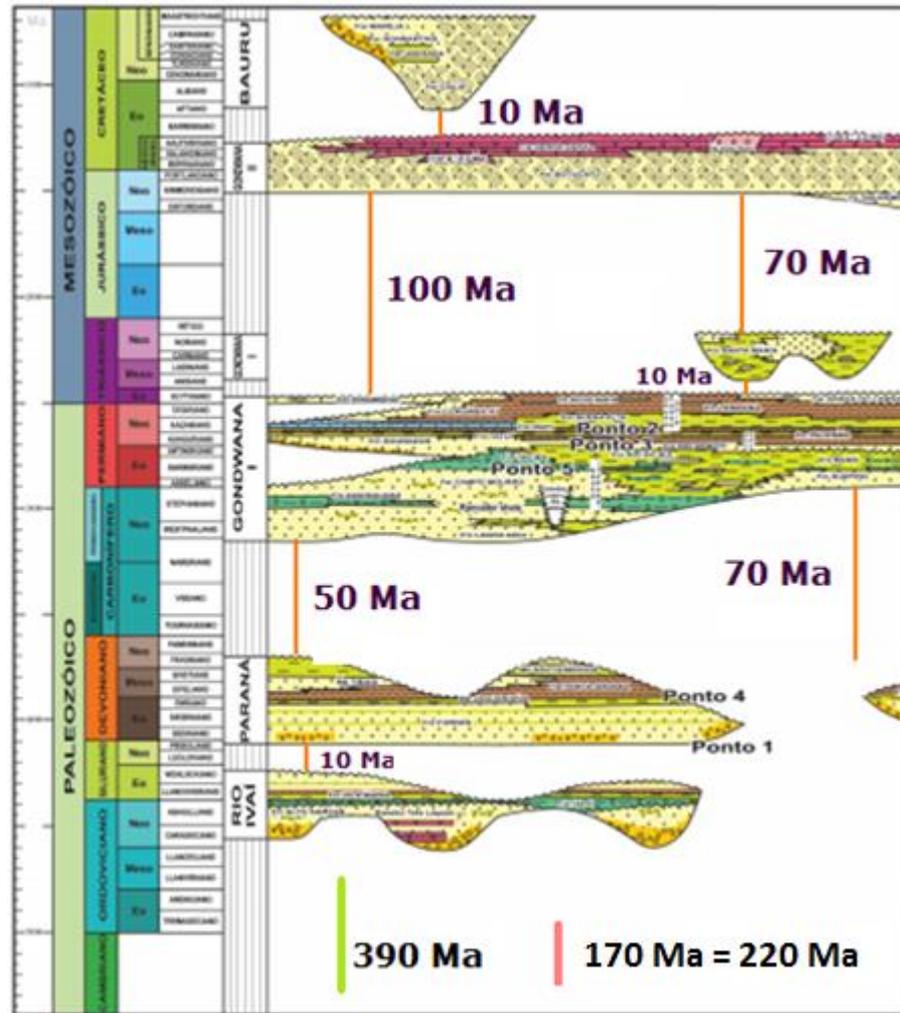
Bacias Sedimentares Brasileiras

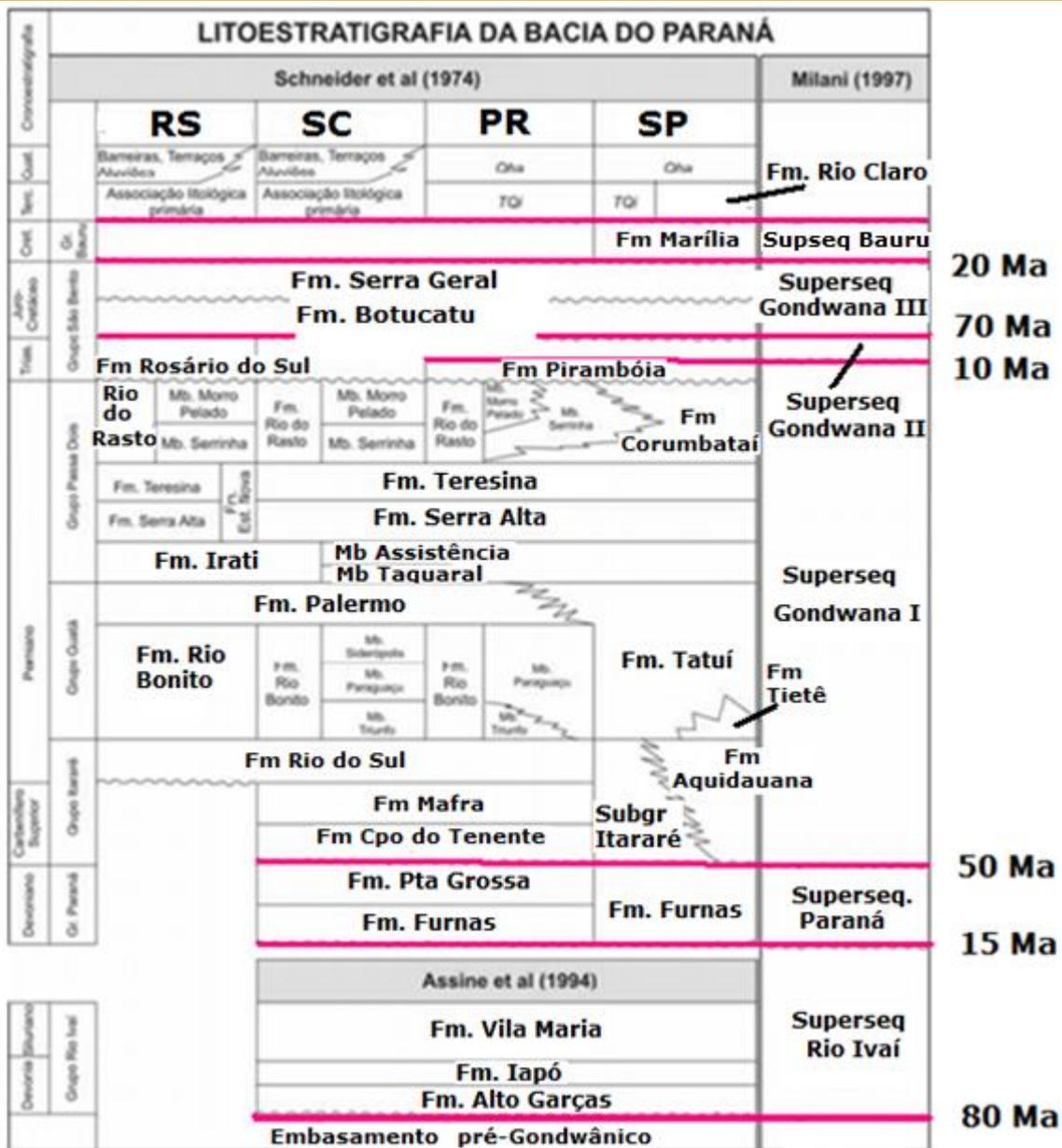


Mapa de lineamentos Estruturais da Bacia do Paraná: integração de várias fontes



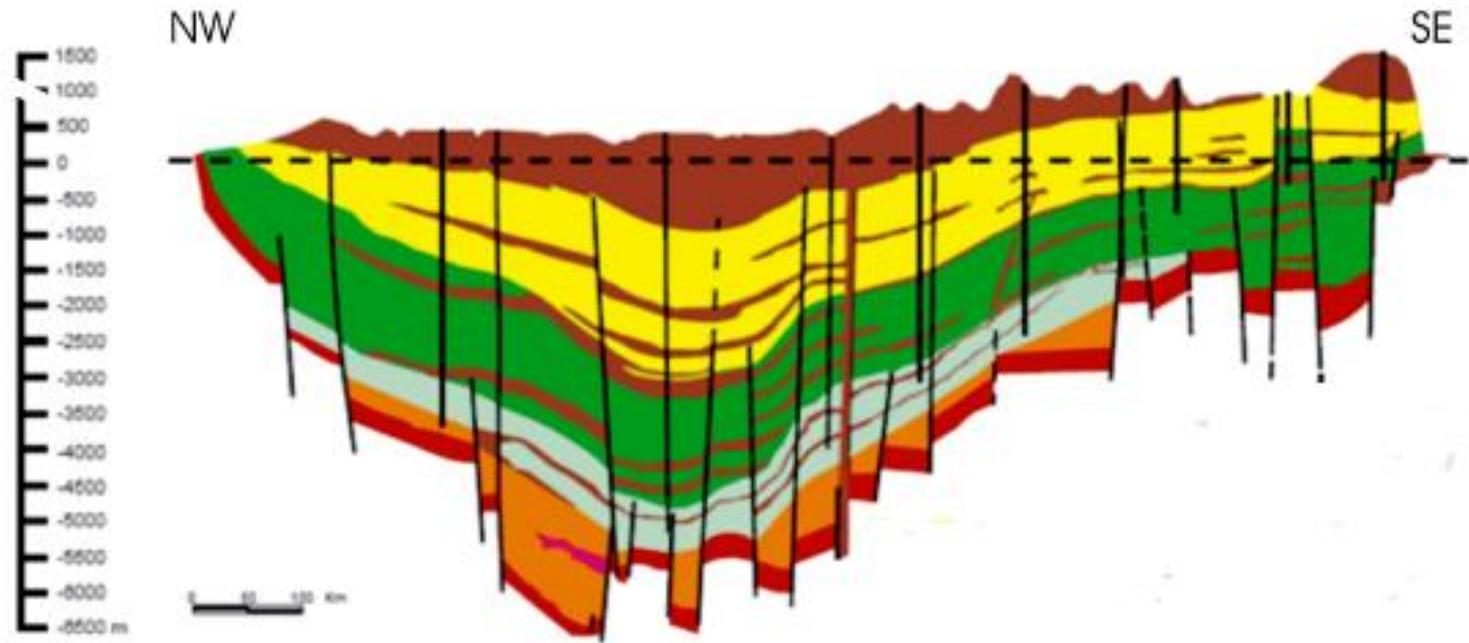
Carta Estratigráfica da Bacia do Paraná





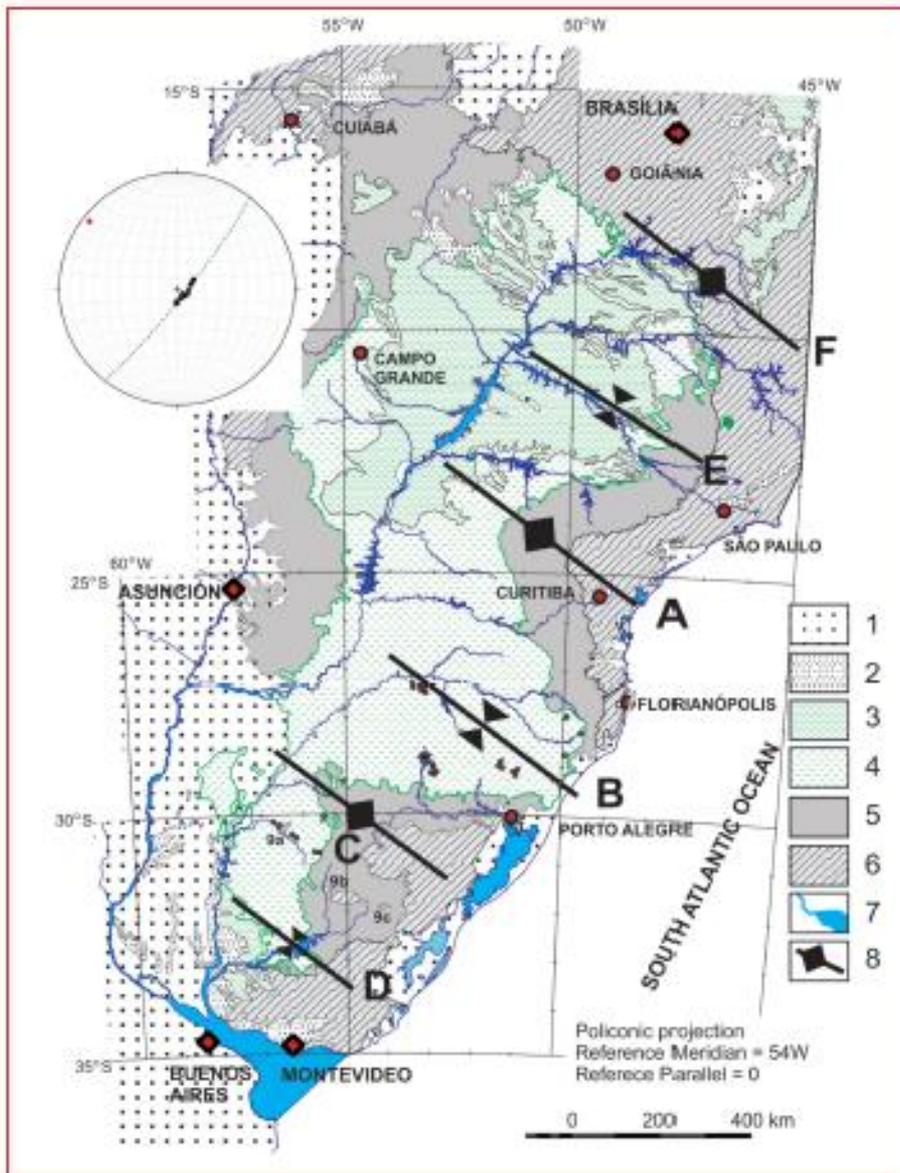
Coluna Estratigráfica adaptada de Schneider et al. 1974.

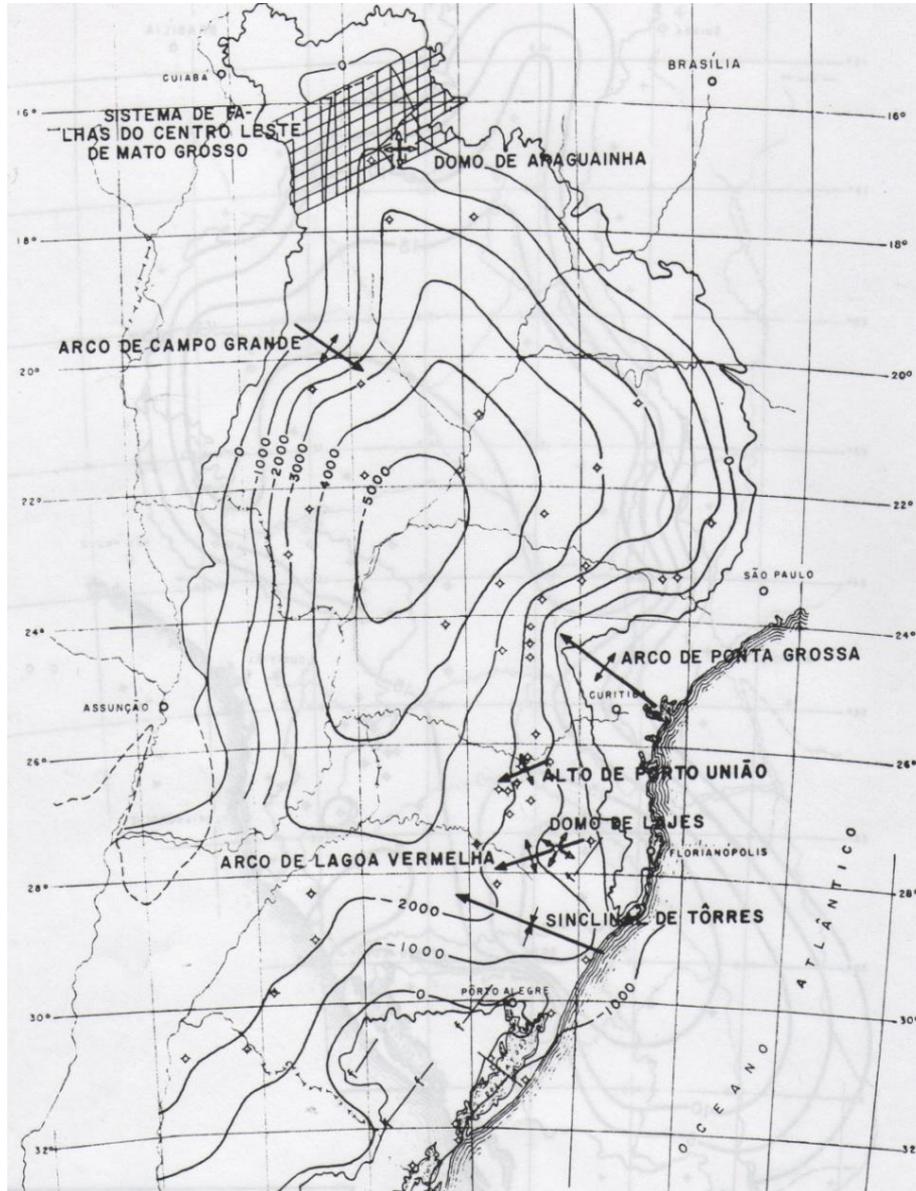
Seção Geológica da Bacia do Paraná



- | | |
|--|--|
|  Fm. Serral |  Gr. Rio Ivaí |
|  Fm. Pirambóia/ Fm. Rosário do Sul/ Gr. São Bento |  Basalto Três Lagos |
|  Gr. Itararé/ Gr. Guatá/ Gr. Passa Dois |  Embasamento |
|  Gr. Paraná | |

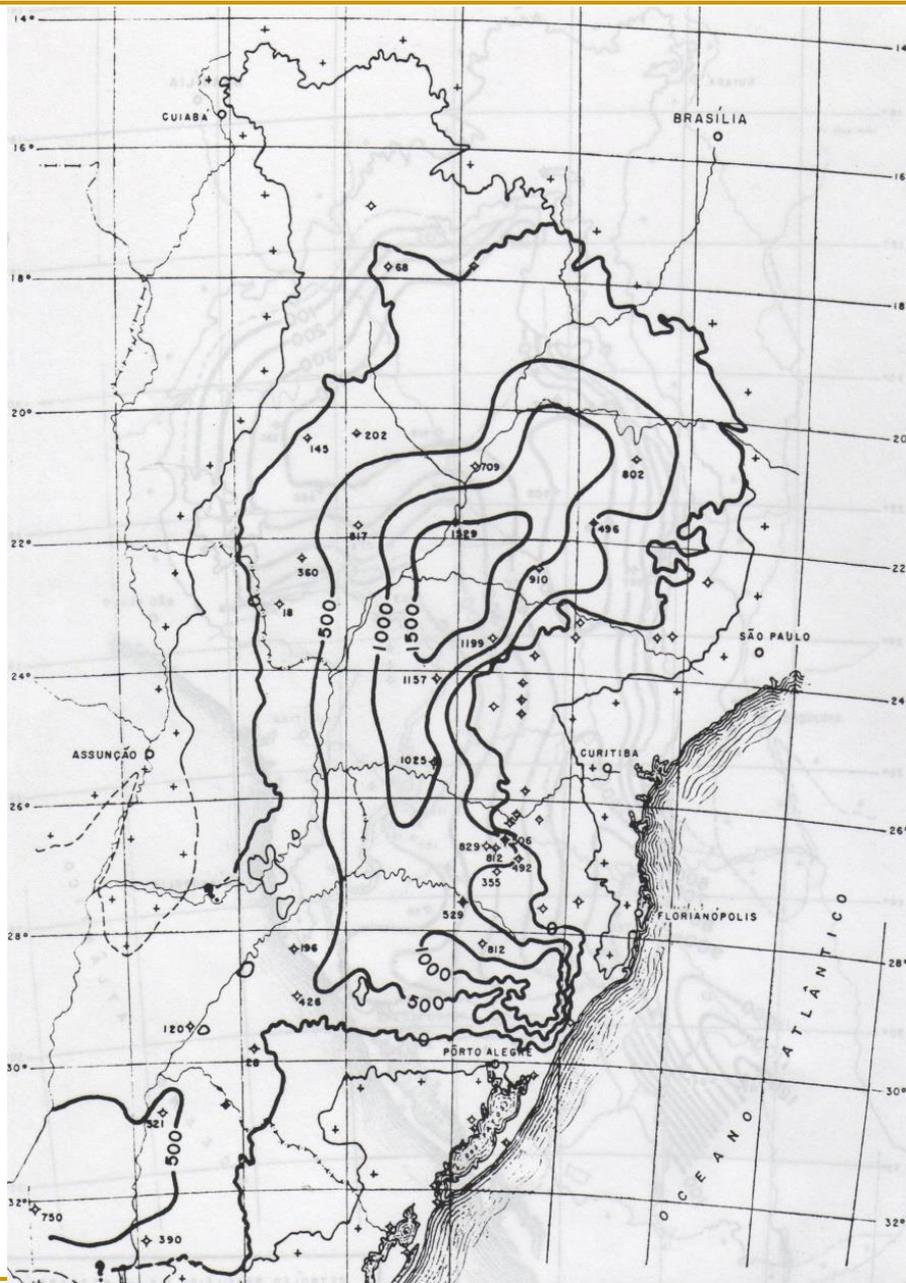
Domos/Altos e bacias estruturais da Bacia do Paraná



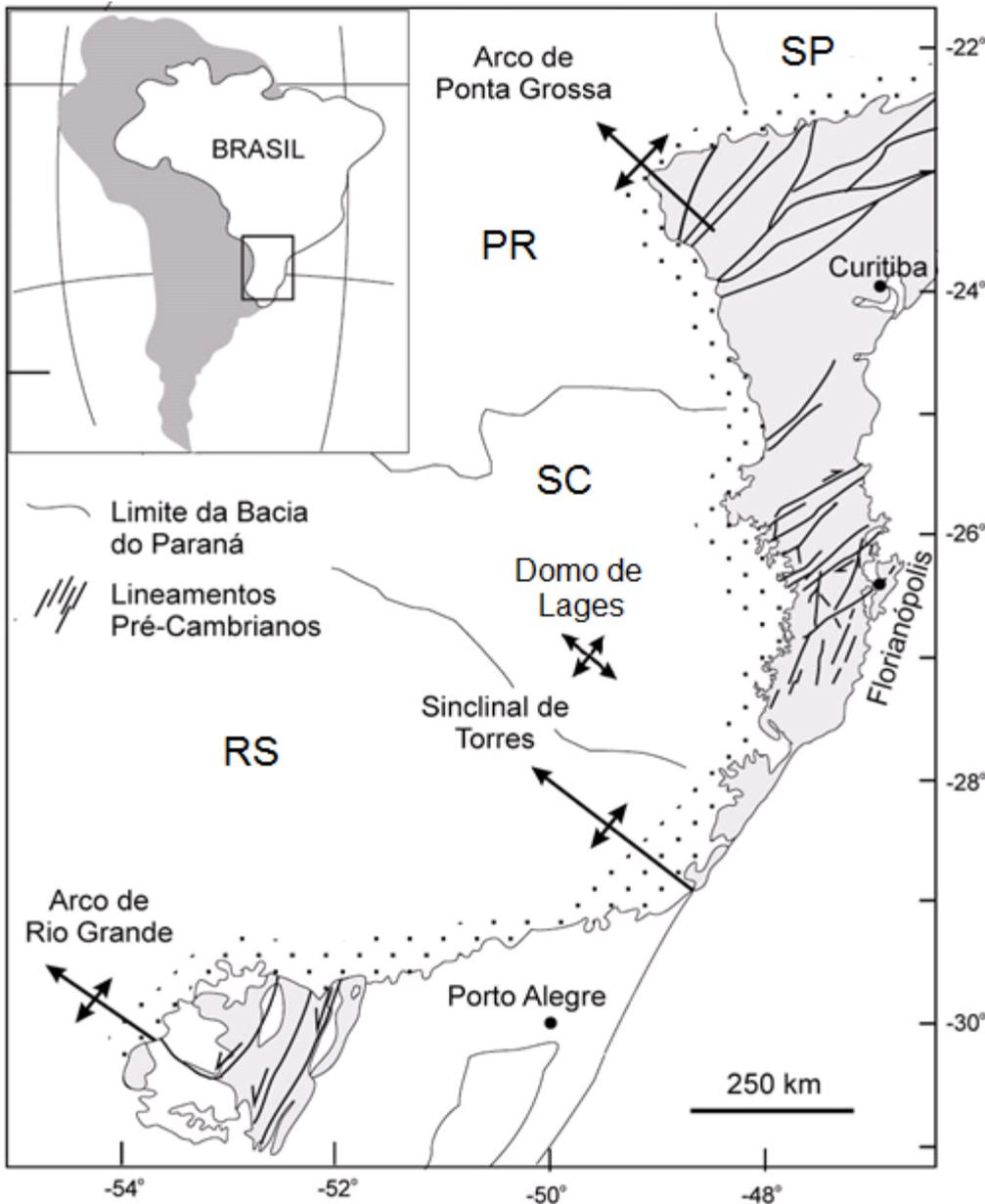


Mapa de Isópacas do Embasamento

Mapa de Isópacas da Formação Serra Geral

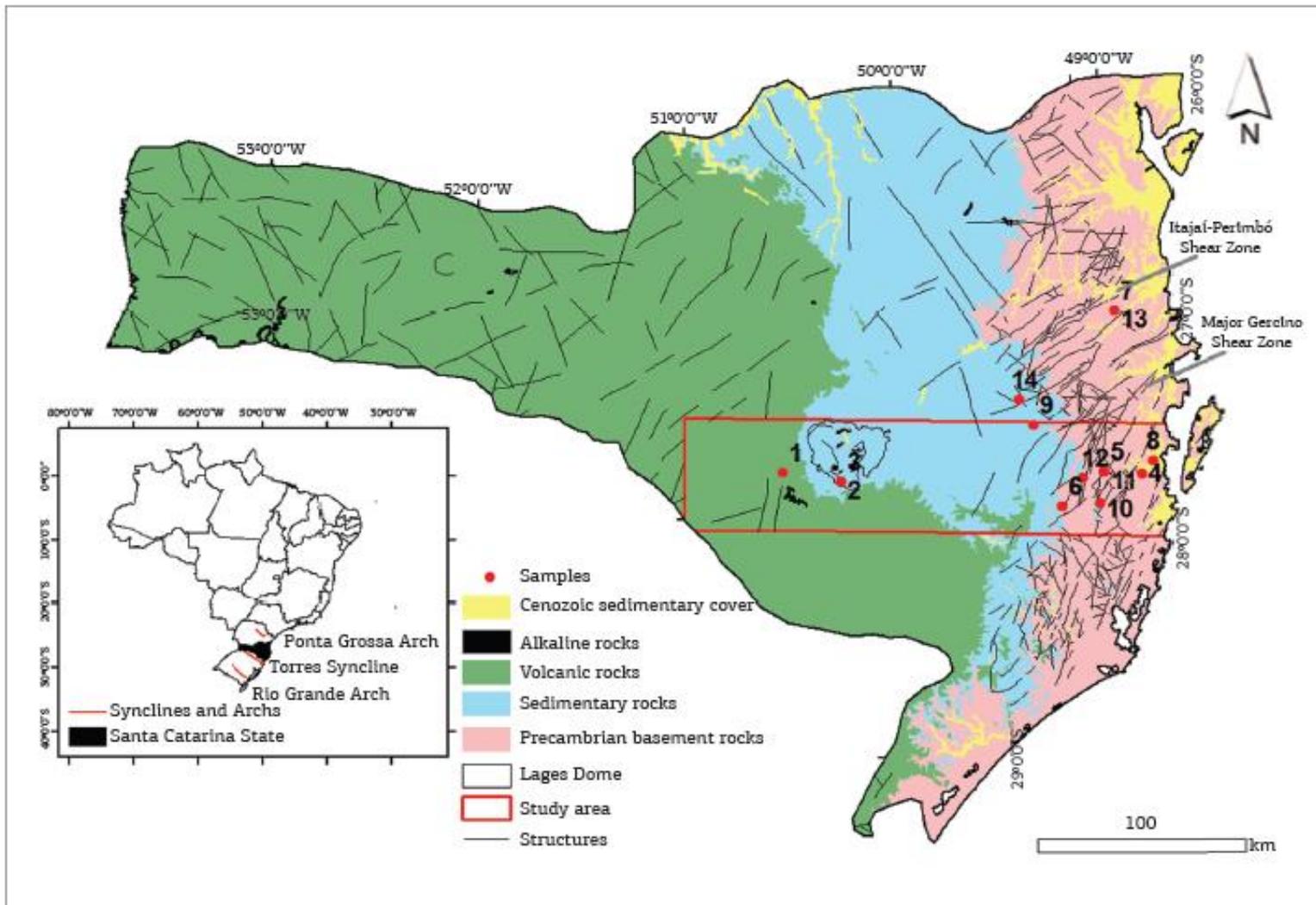


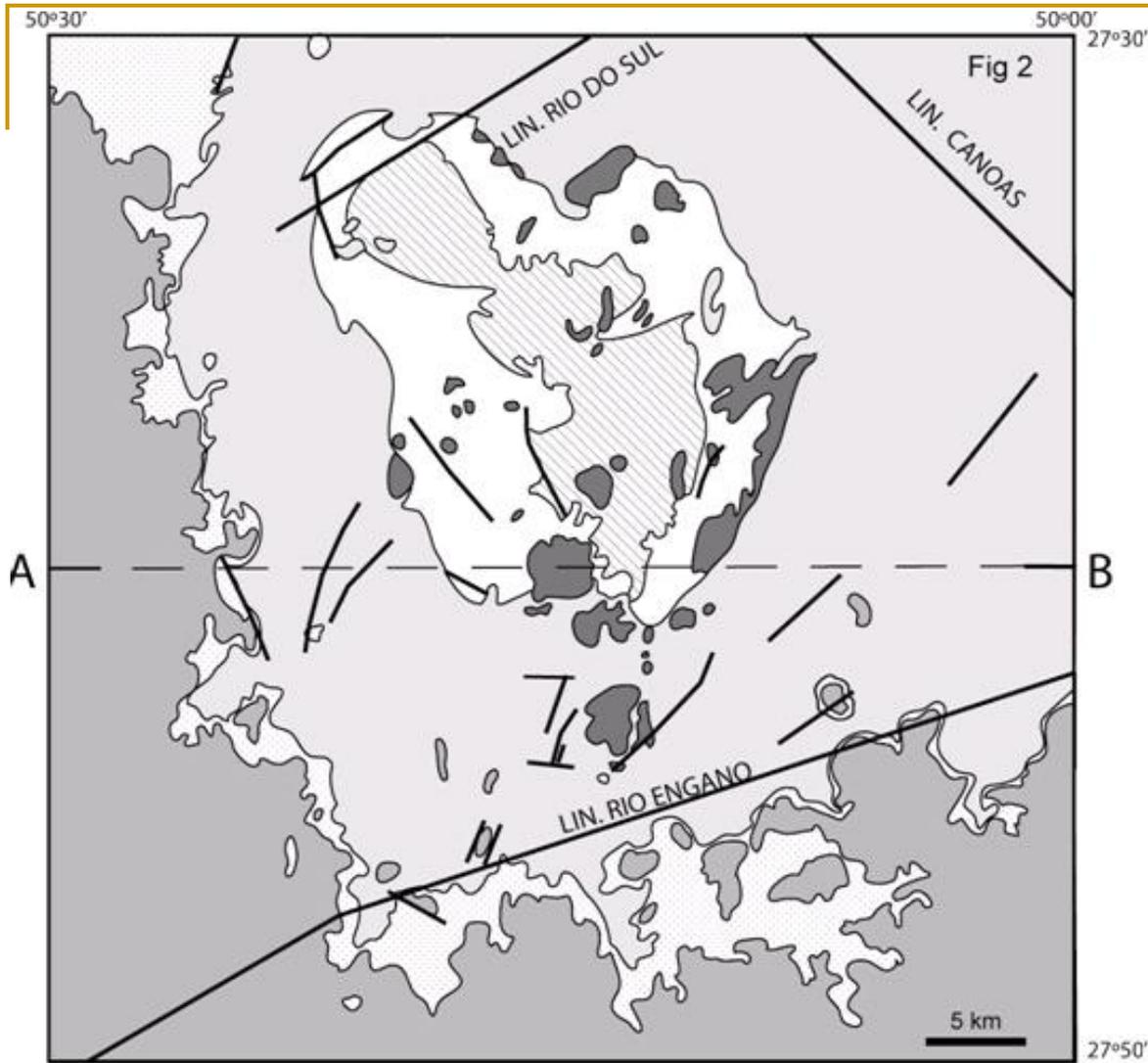
Fonte: Northfleet et al. 1969.



Padrão Estrutural do embasamento na borda leste da Bacia do Paraná no Sul e Sudeste do Brasil e os altos estruturais de Ponta Grossa, Lages, Rio Grande e 'Sinclinal' de Torres

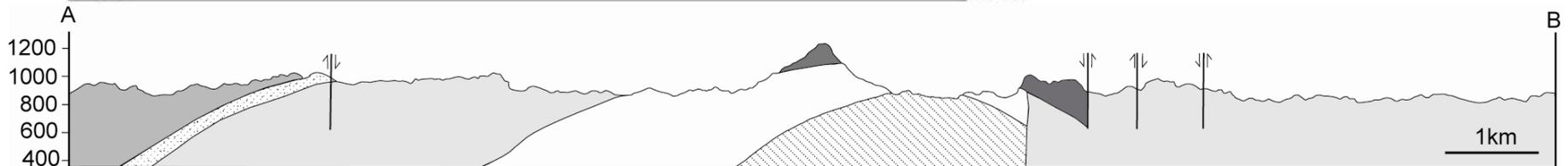
Borda da Bacia do Paraná e o Domo de Lages, SC

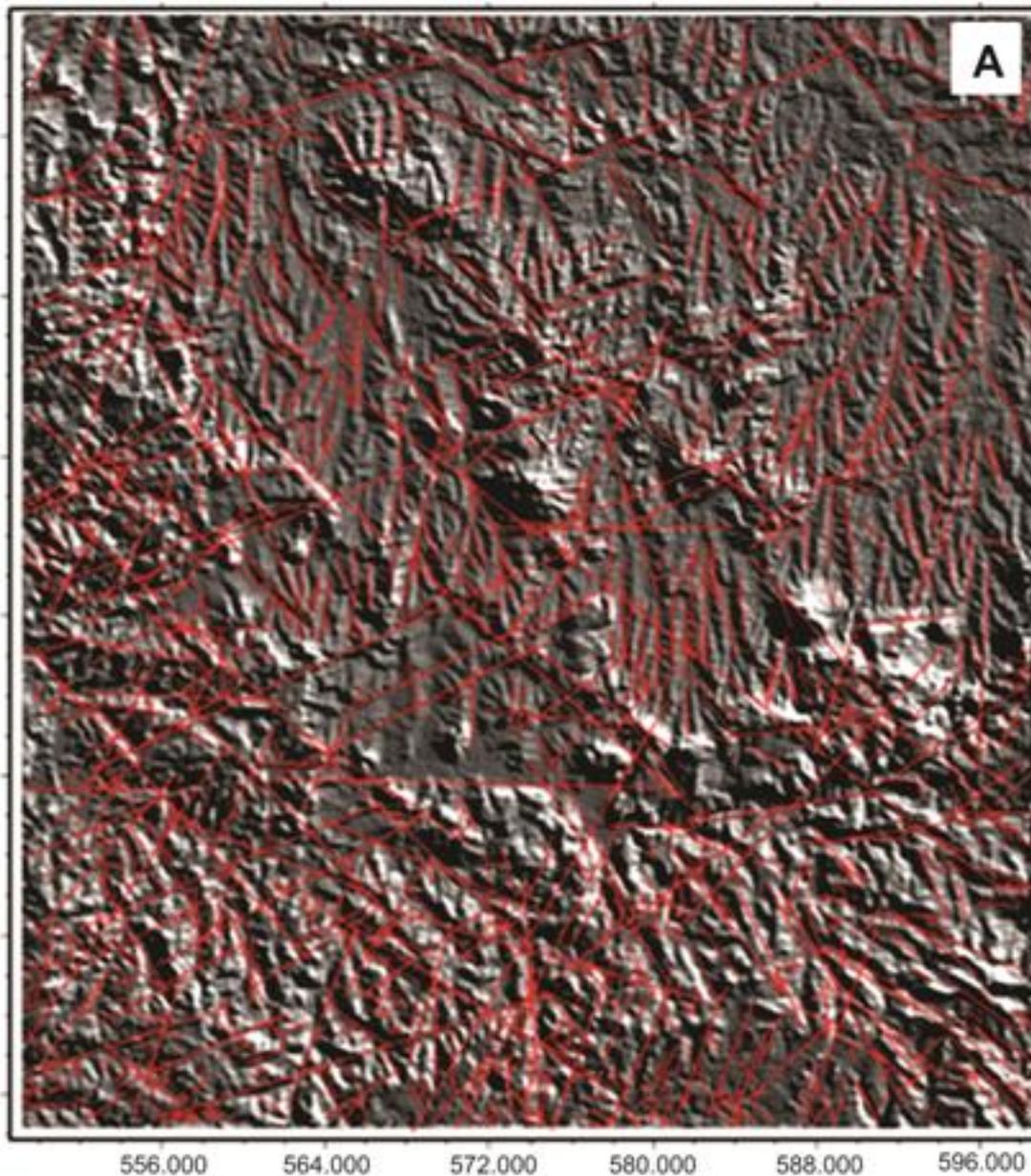




Domo de Lages, SC

-  Rochas alcalinas
-  Fm. Serra Geral
-  Fm. Piramboia
-  Grupo Passa Dois
-  Grupo Guatá
-  Subgrupo Itararé





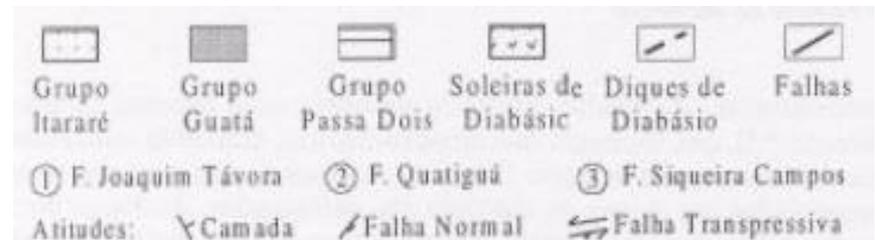
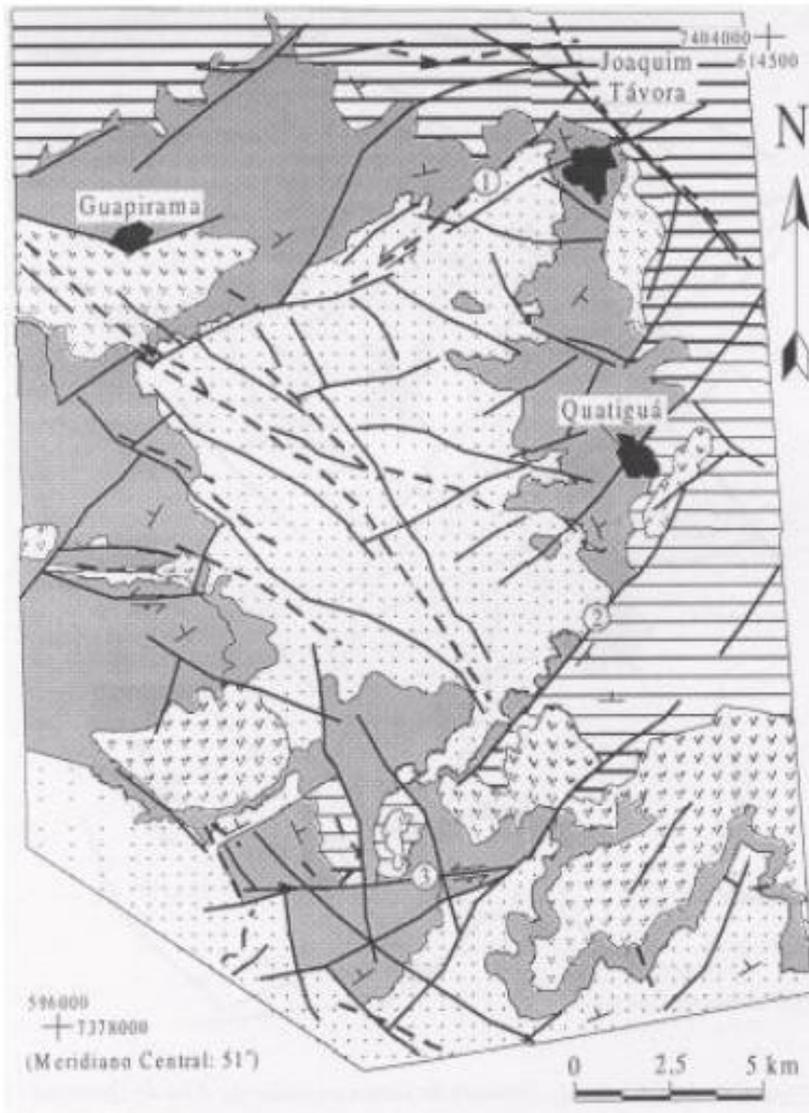
Lineamentos estruturais extraídos de Imagens Landsat e SRTM da região do Domo de Lages, SC



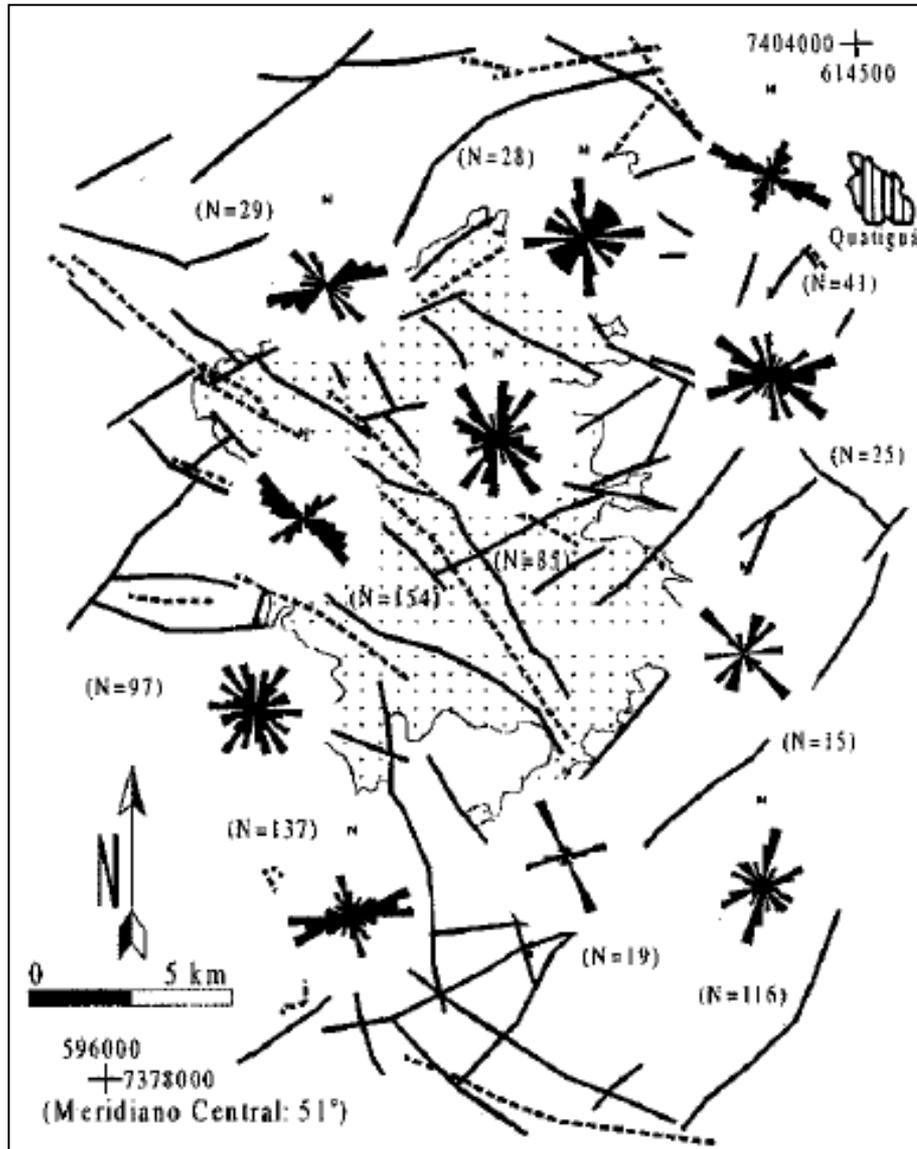
Domo Quatiguá, PR: Localização



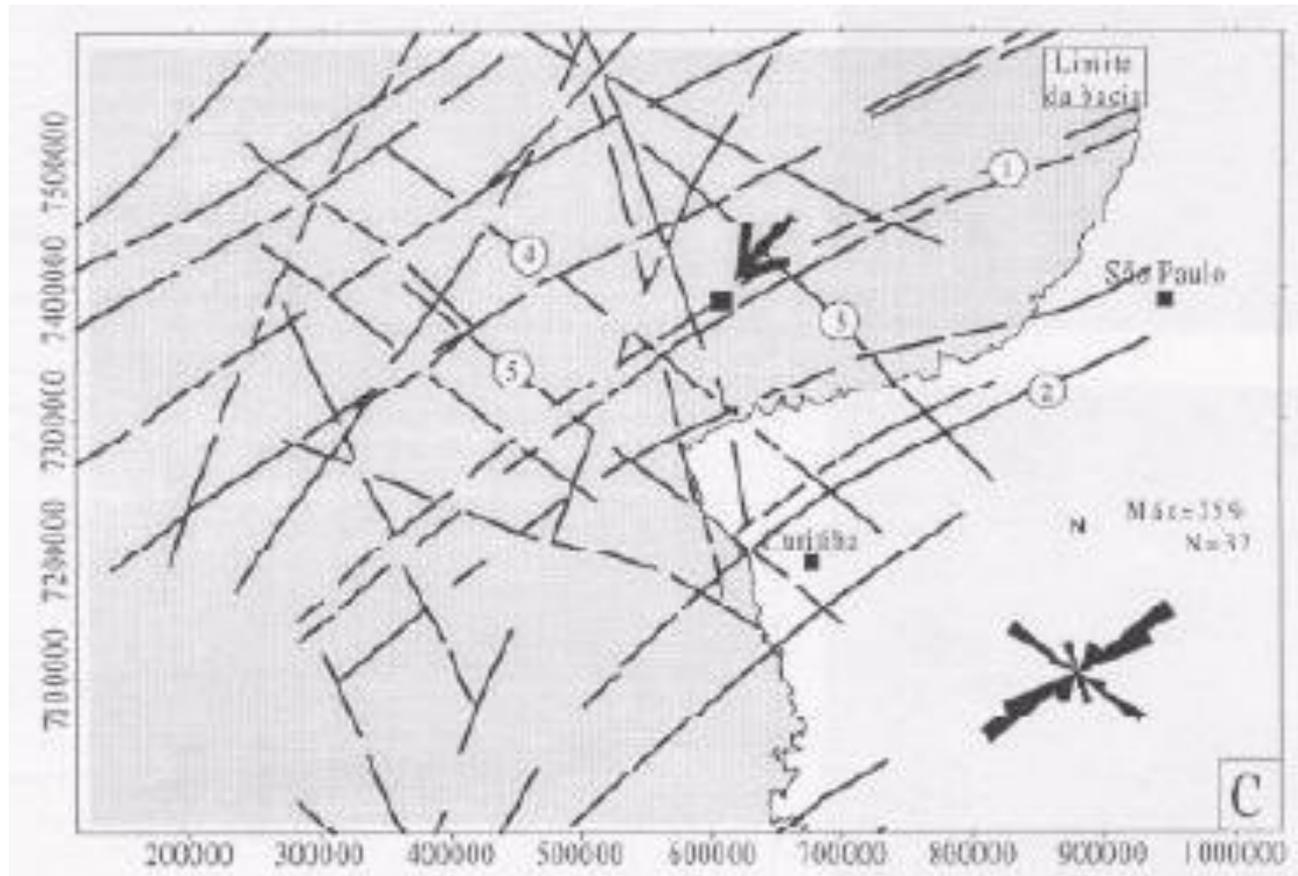
Mapa Geológico do Domo de Quatiguá, PR



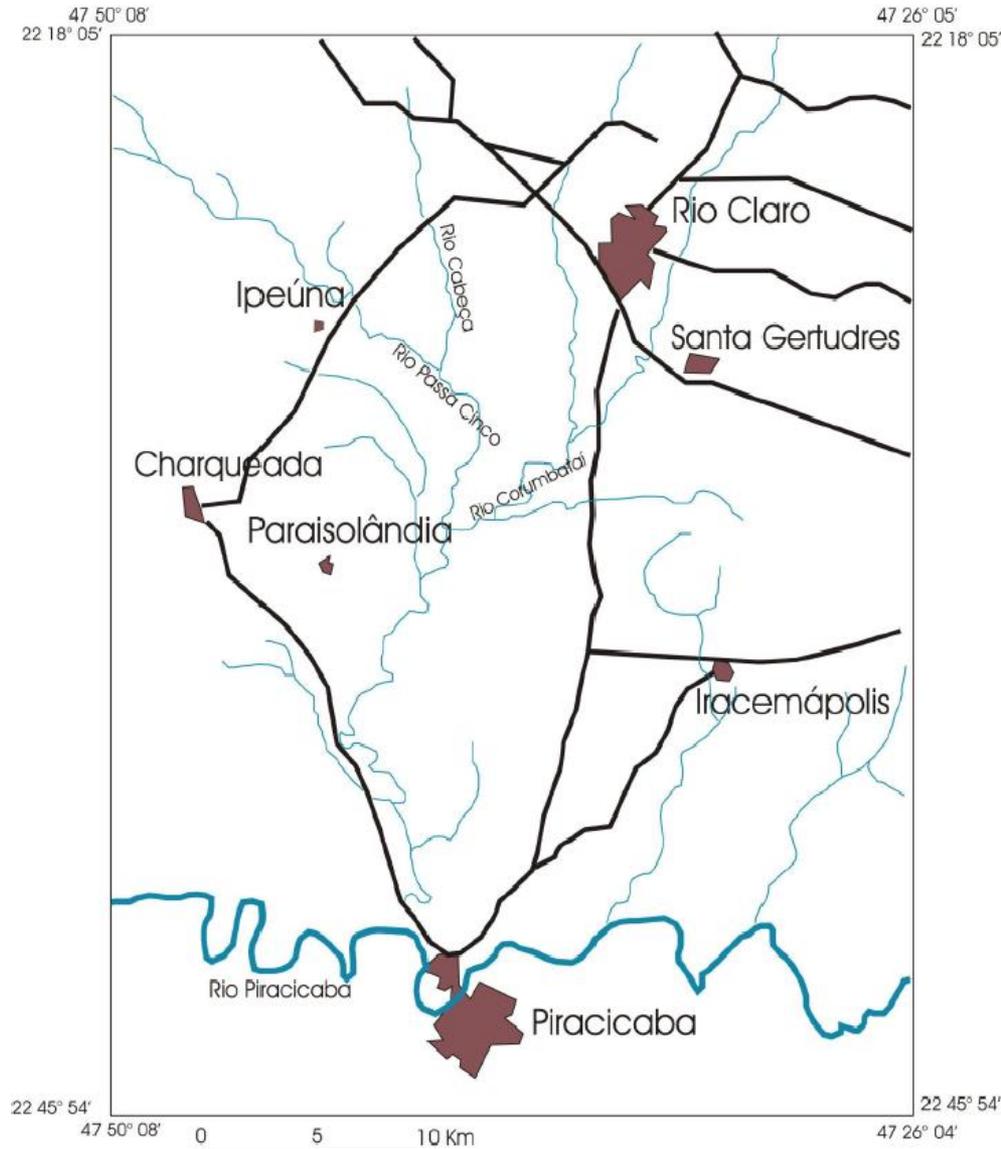
Diagramas de Roseta do Domo de Quatiguá, PR

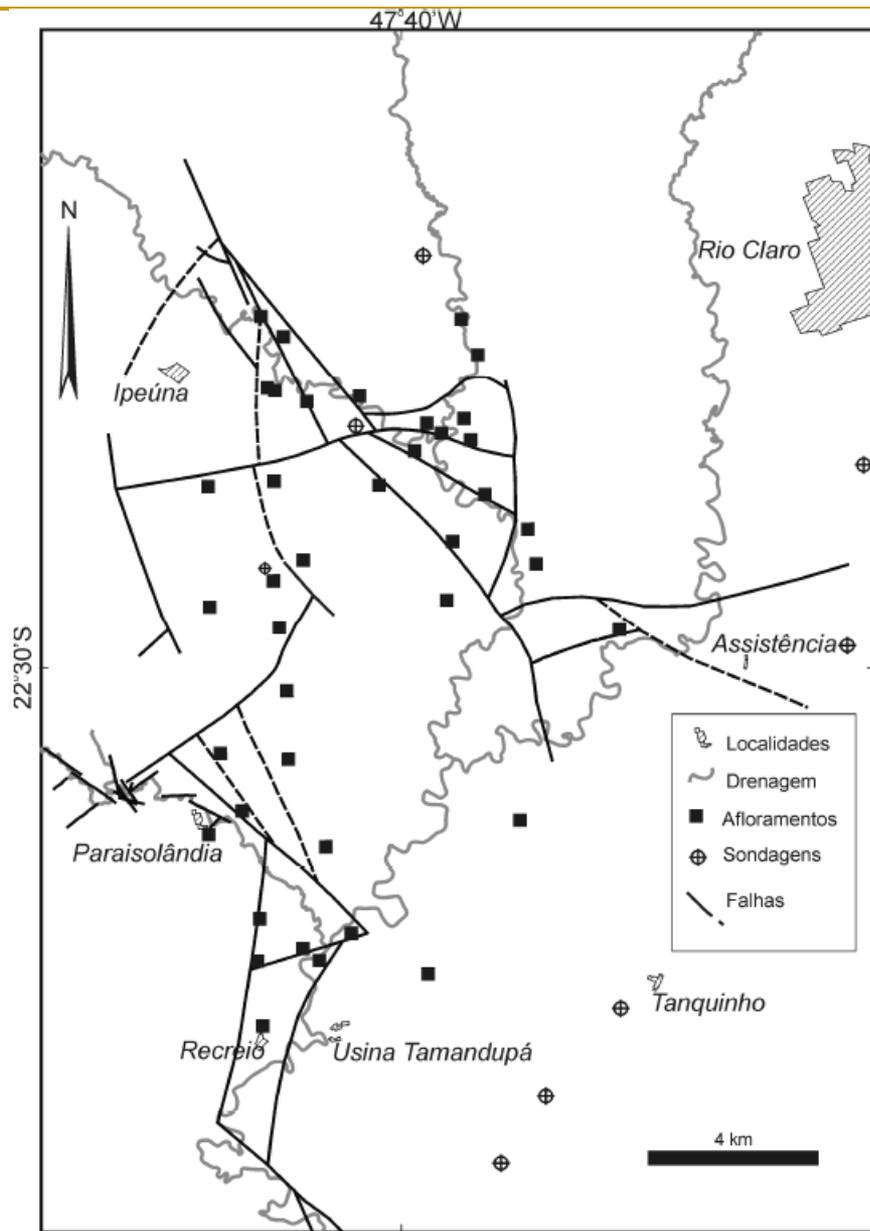


Mapa dos Lineamentos do Domo de Quatiguá, PR

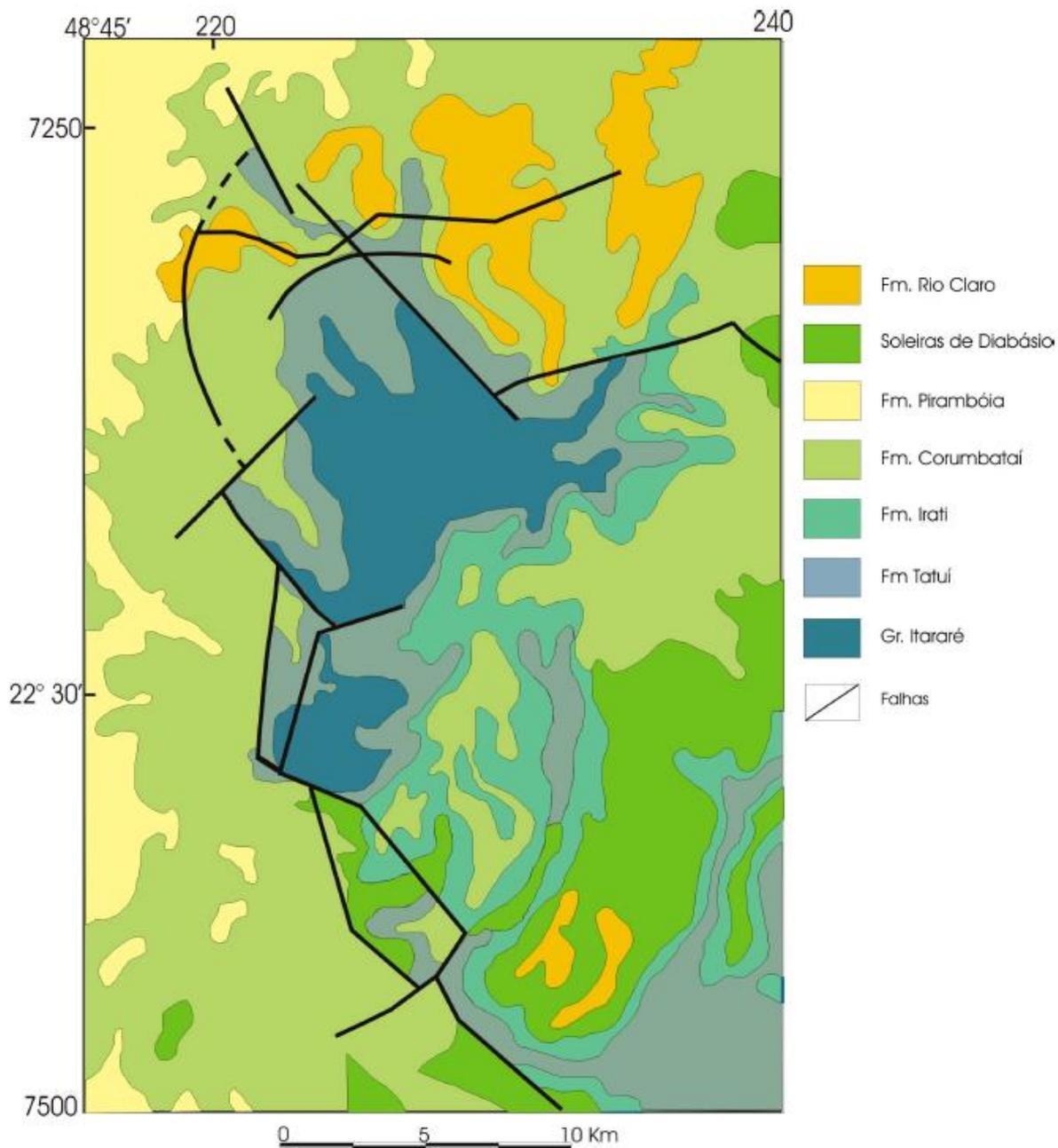


Mapa de Localização do Alto Estrutural/Domo de Pitanga

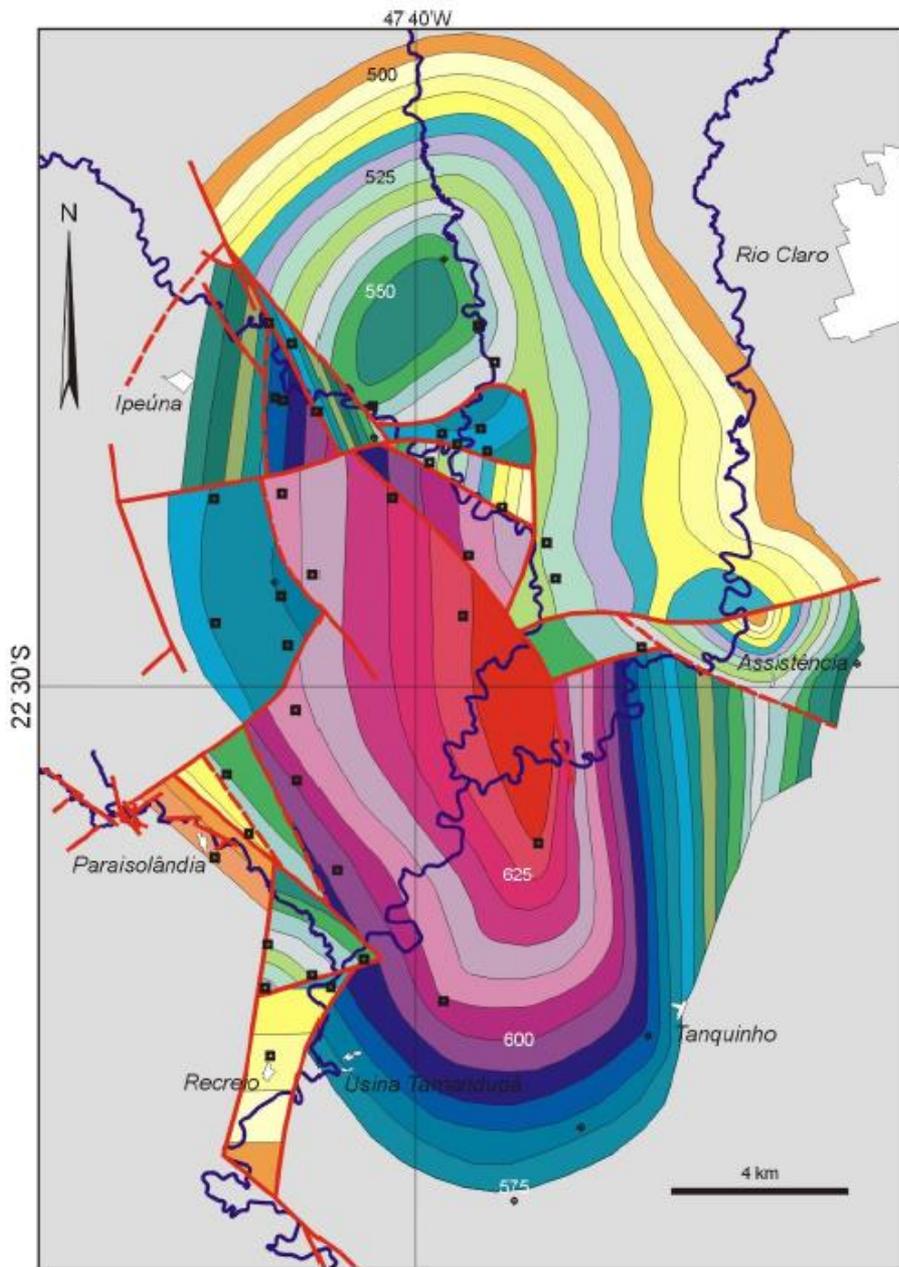




Mapa com a localização dos afloramentos da Camada Ibicatu, entre o topo da Fm. Tatuí e a base da Fm. Irati

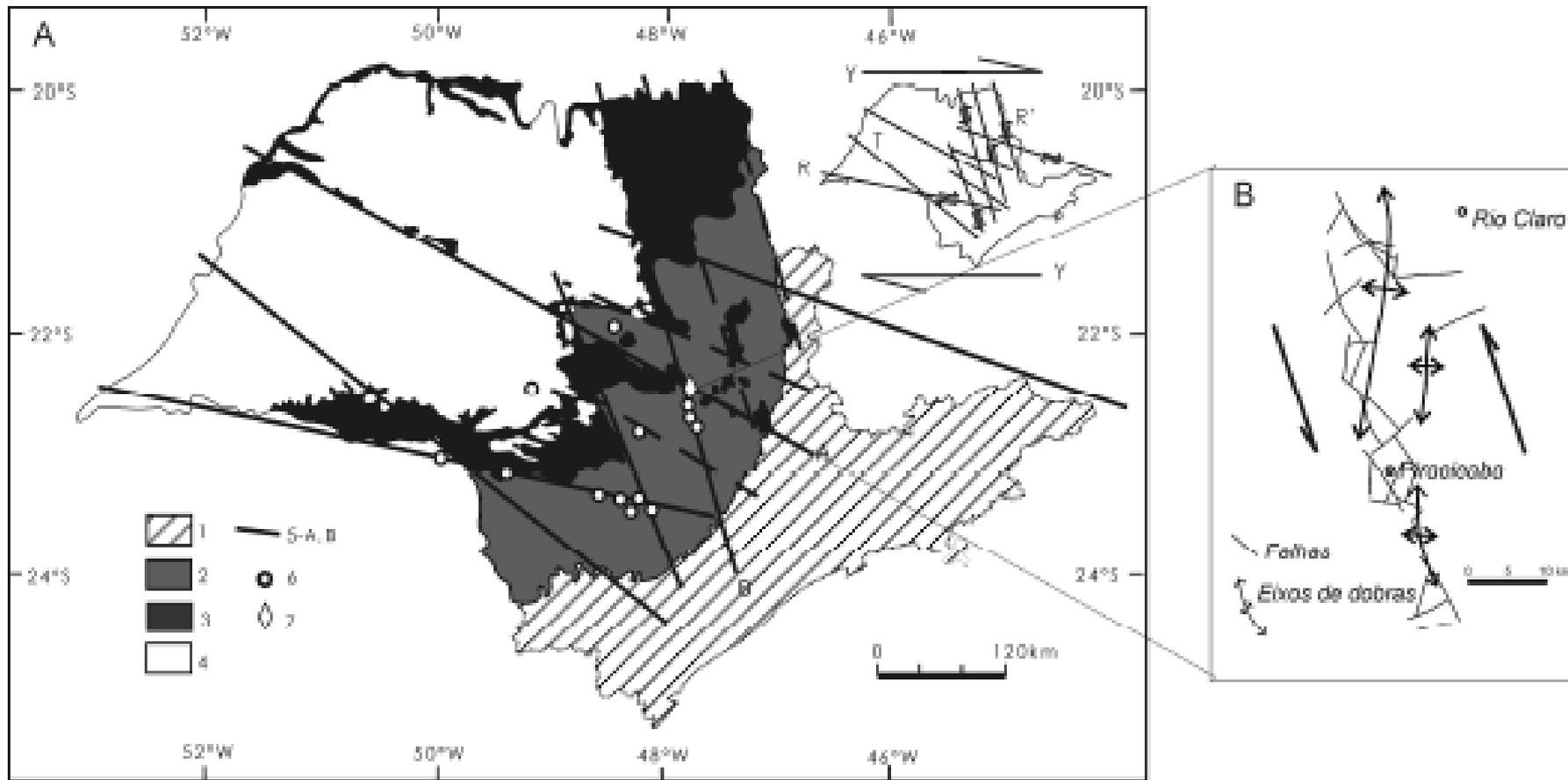


Mapa Geológico do Alto Estrutural de Pitanga

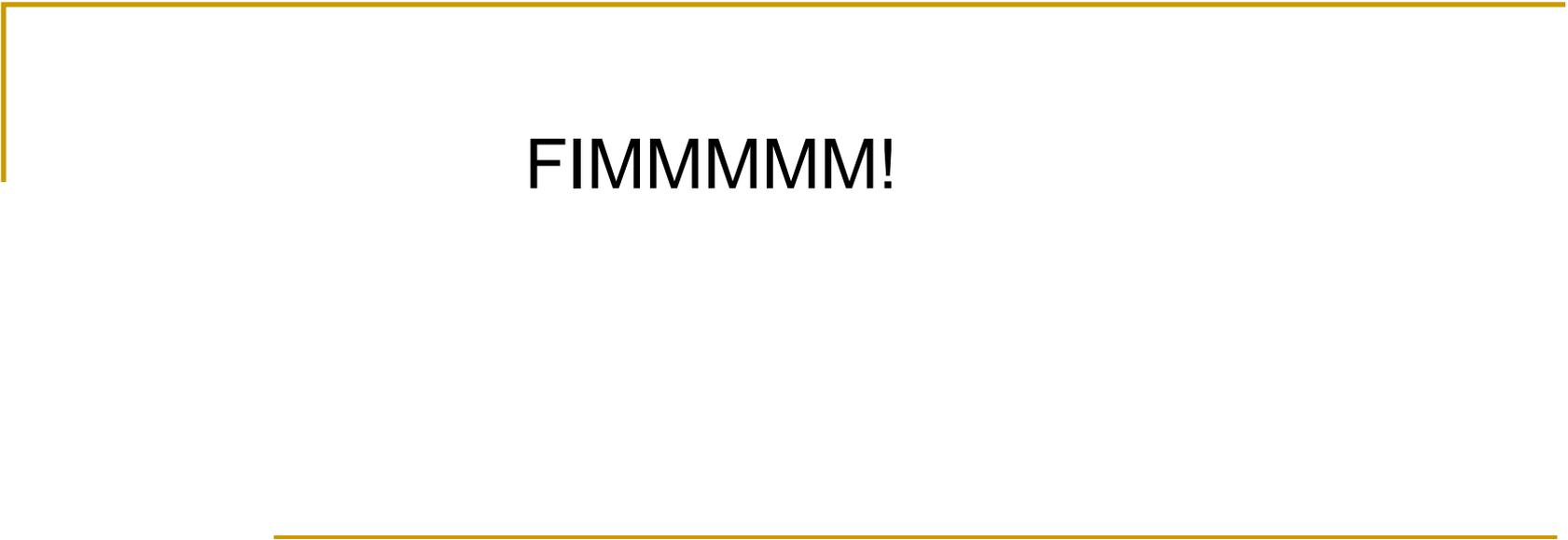


Mapa de contorno
estrutural do Alto
Estrutural de
Pitanga
Cotas: 480 a 635 m

Modelo de geração do Alto Estrutural de Pitanga



1. Embasamento pré-cambriano; 2. Rochas paleozoicas e mesozoicas da Bacia do Paraná;
3. Rochas vulcânicas da Form. Serra Geral e Soleiras de diabásio; 4. Rochas Cenozoicas da Bacia Bauru (grupos Caiuá e Bauru indivisos).



FIMMMMM!