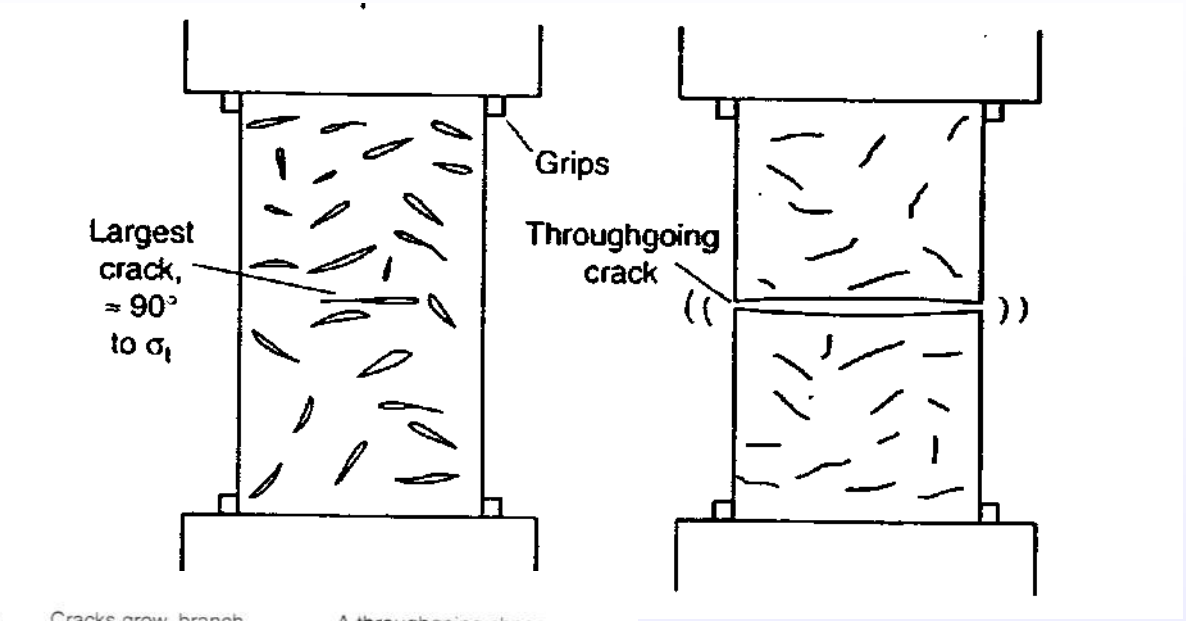
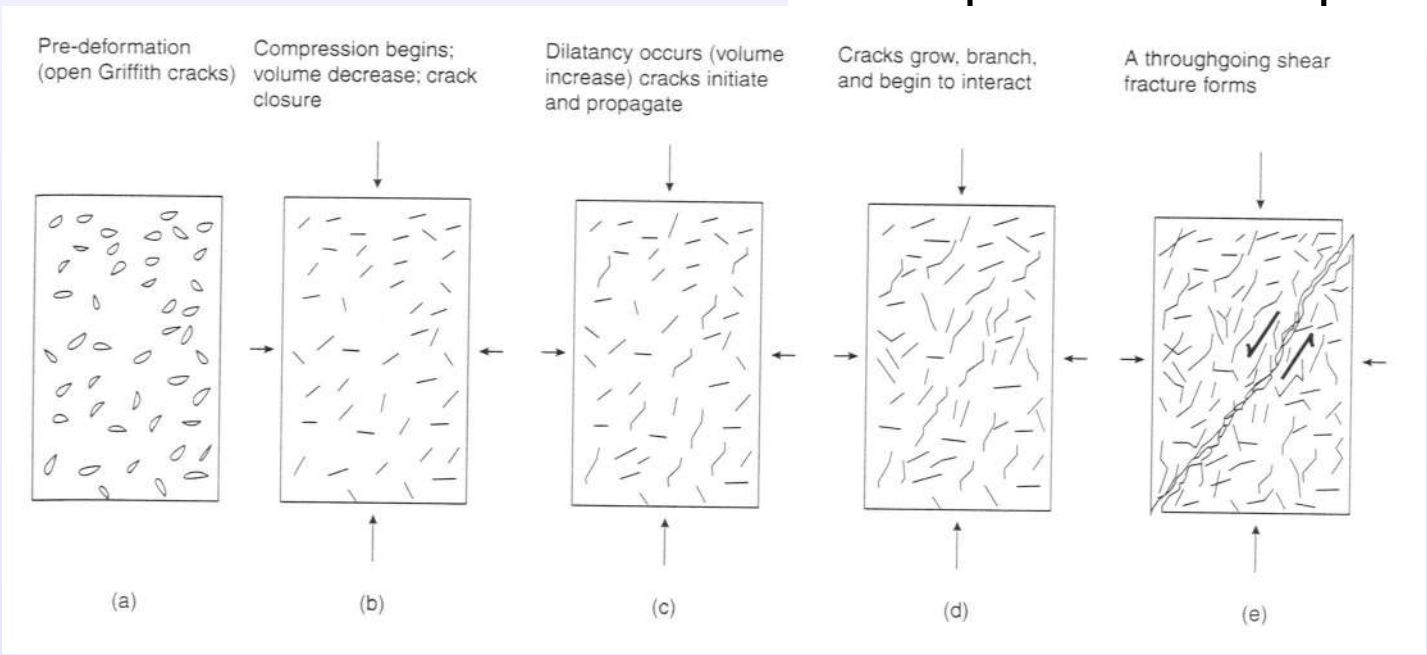
Géologie Stucturale

STU S3

Mécanismes de la déformation cassante

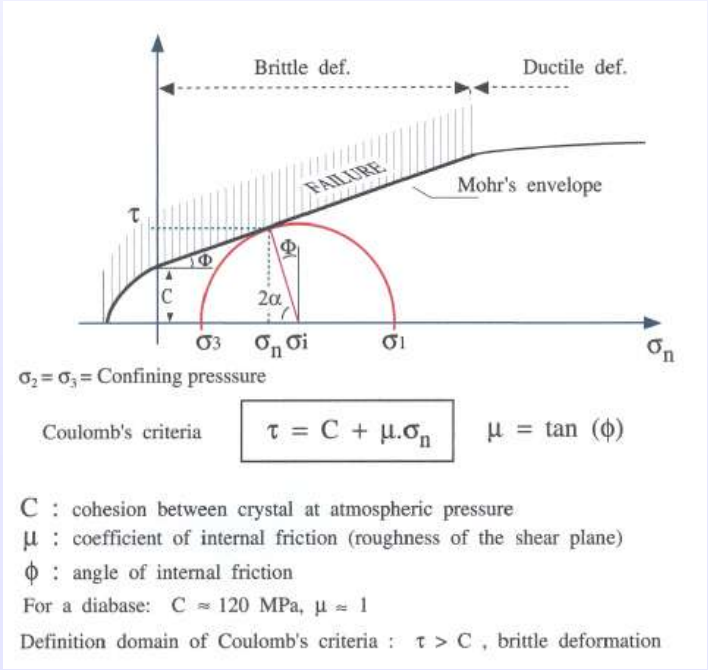
- Rupture des liaisons atomiques (!)
- Fentes de Griffith

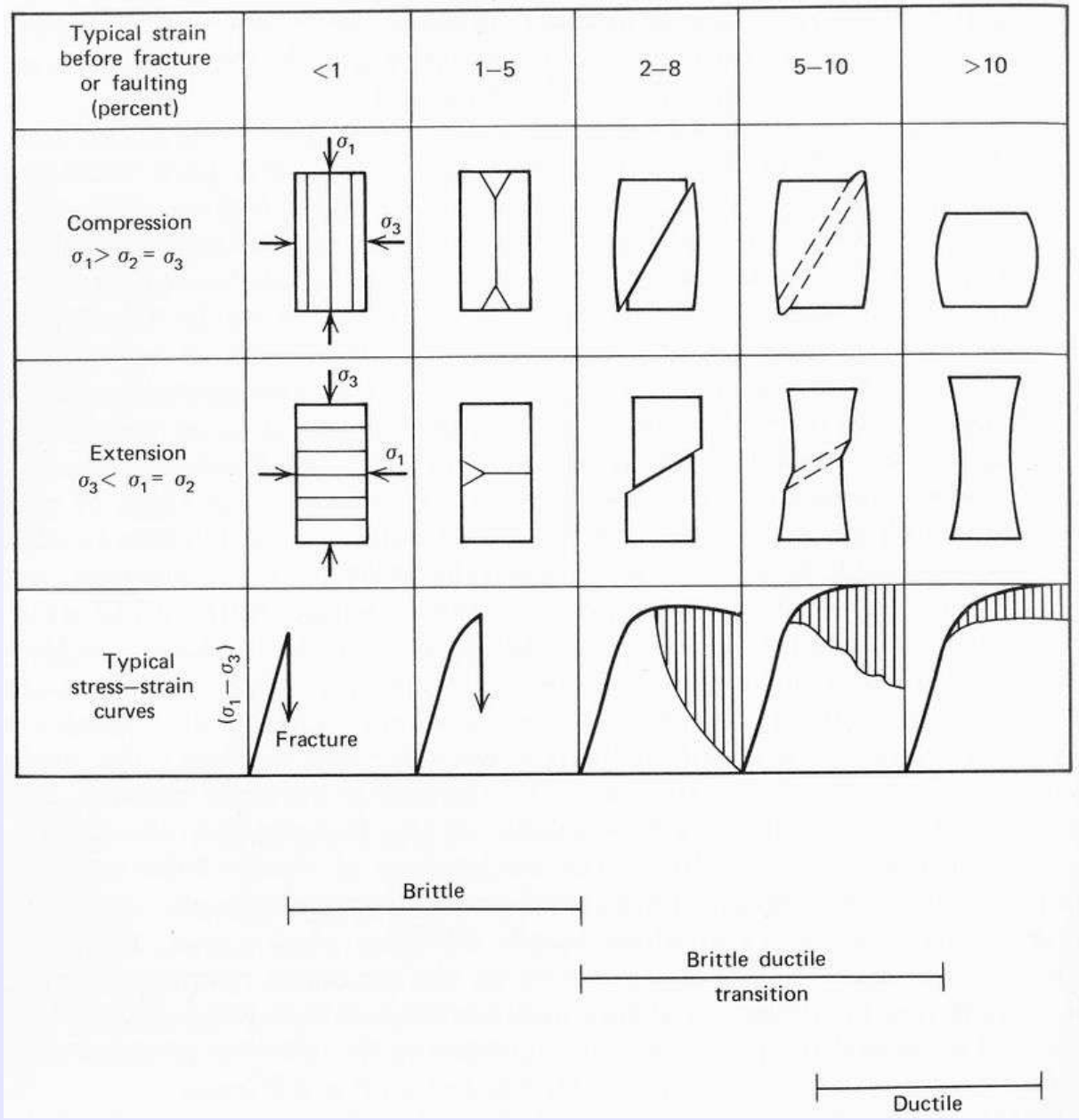




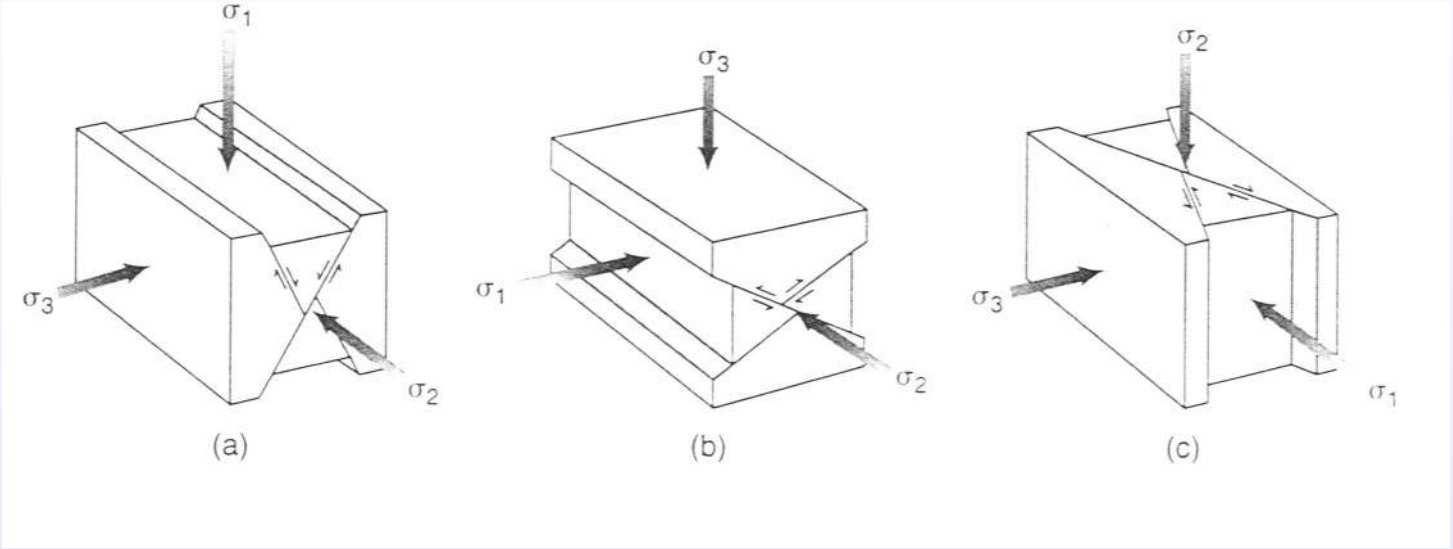
Orientation de la rupture

- Cf. TP Cercle de Mohr
- Failles conjuguées à 30° de σ_1

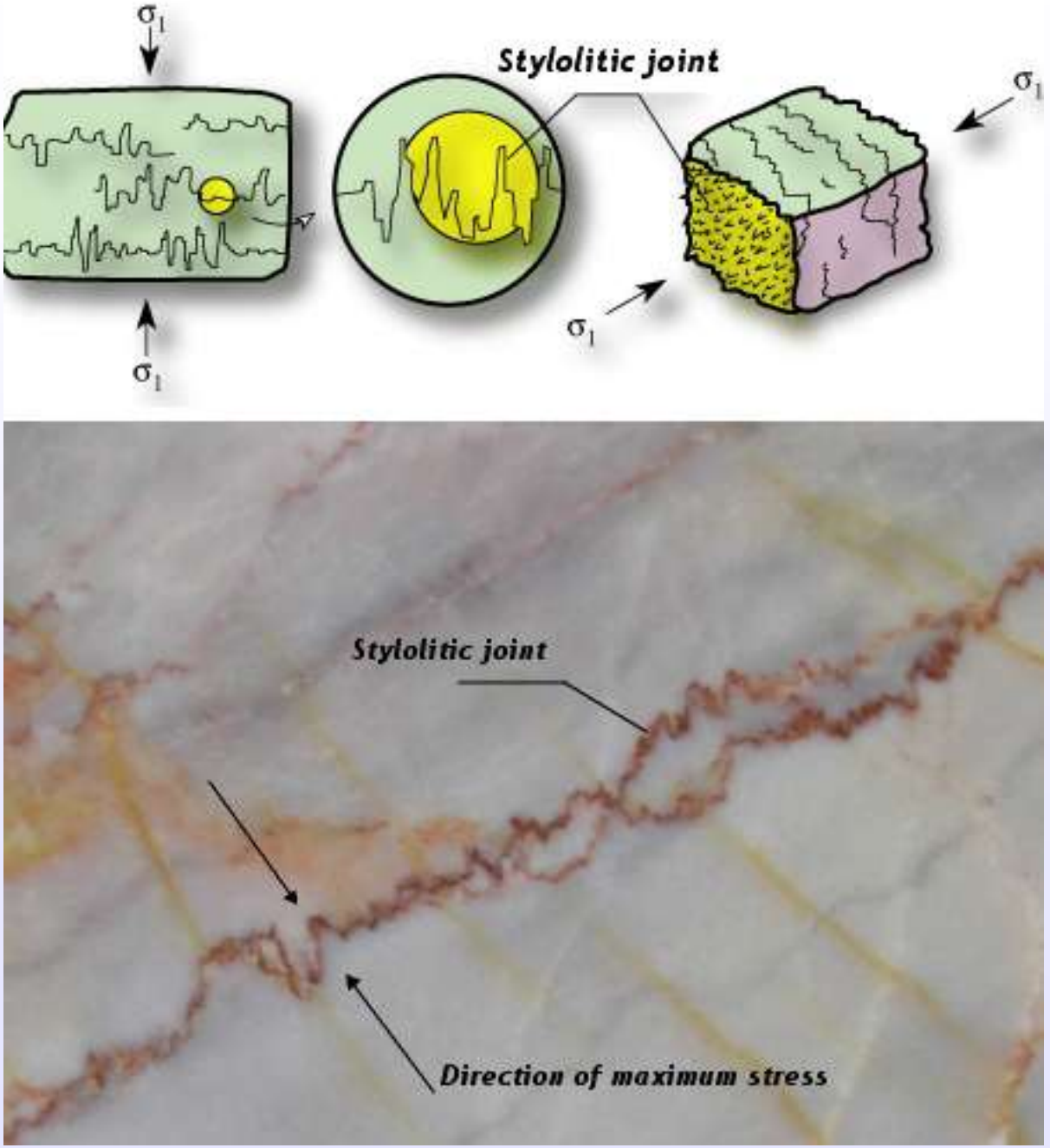




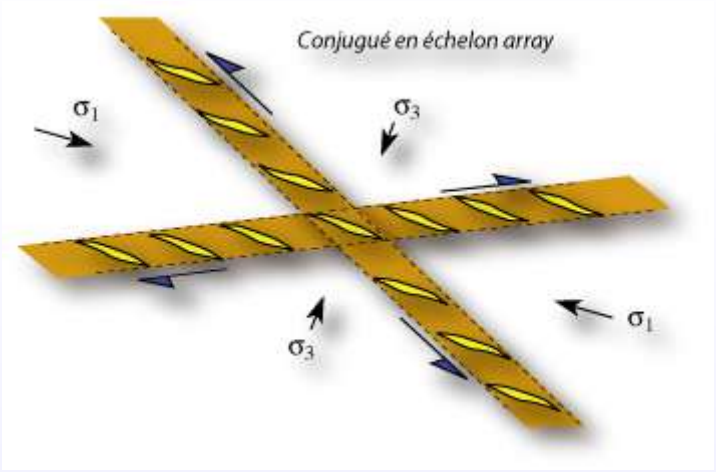
Failles conjuguées

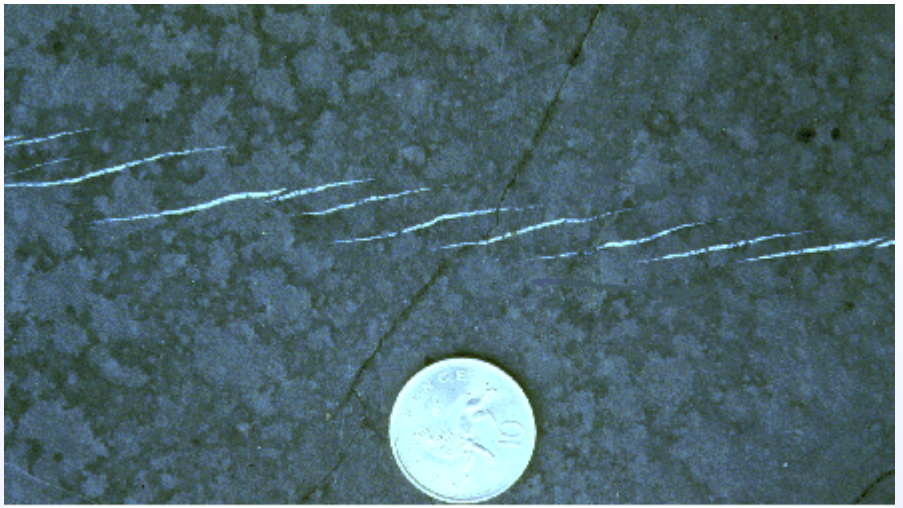


Joints stylolithiques

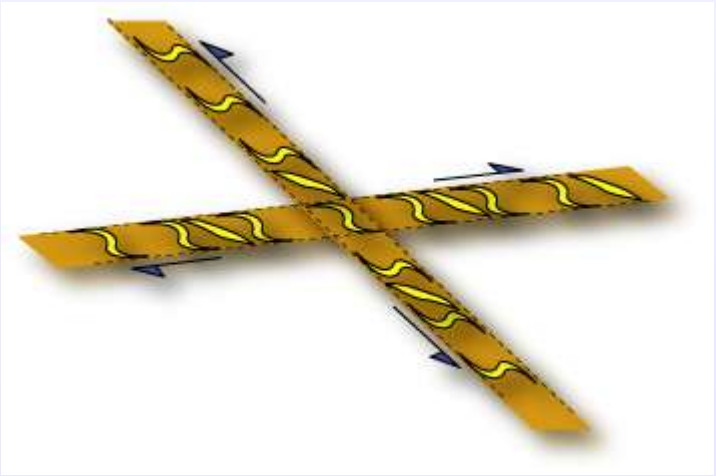


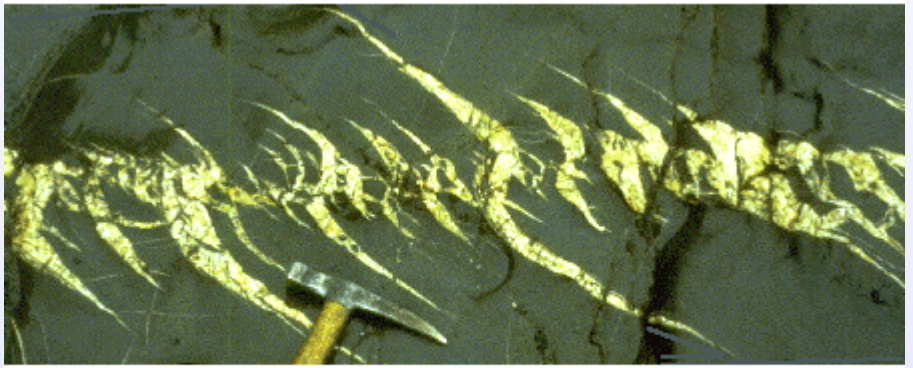
Fentes de tension



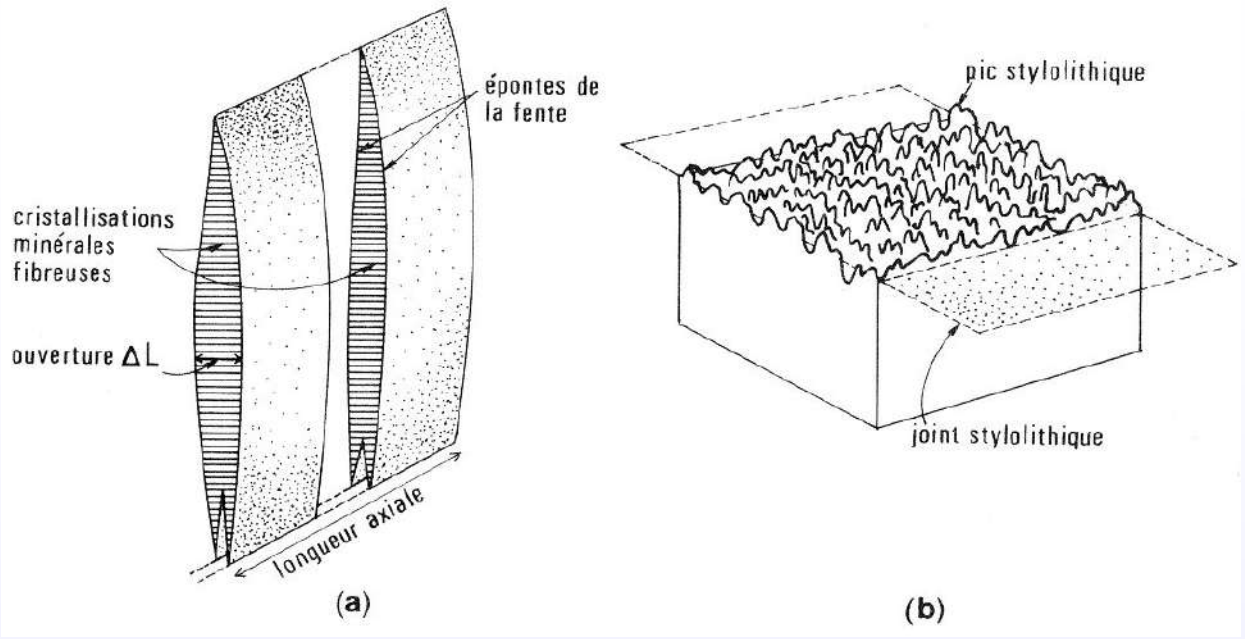


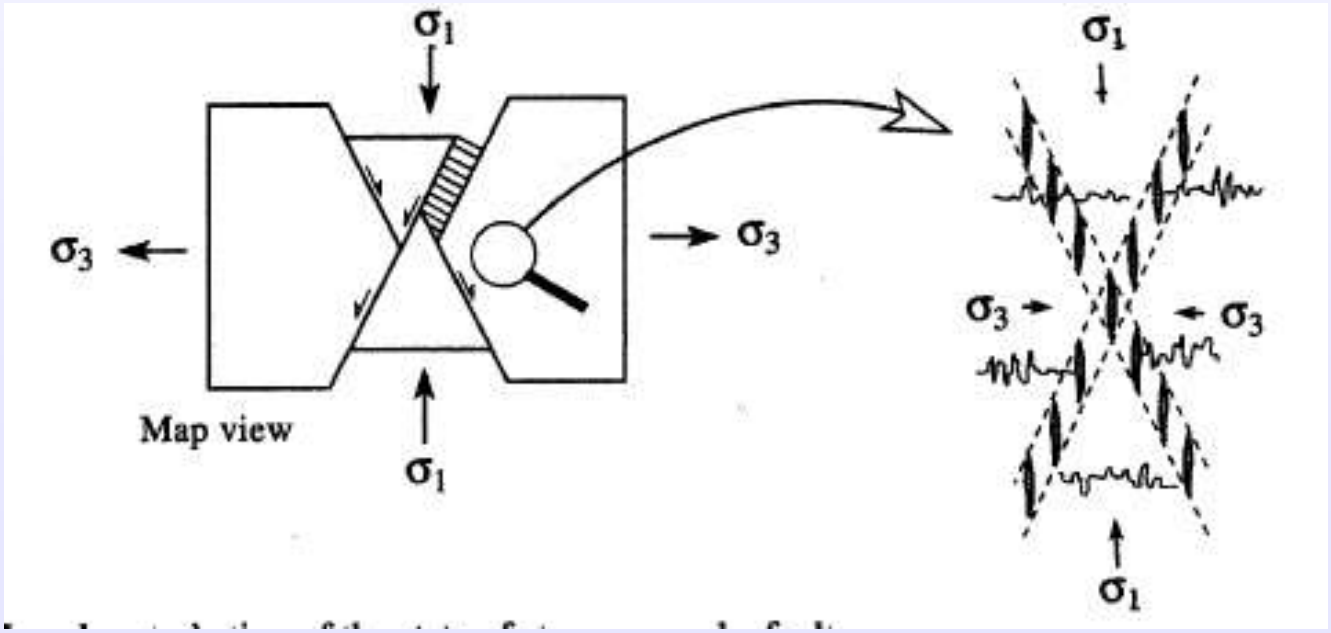
En échelon array of extensional fracture. The direction of maximum stress is parallel to the fractures which open in the direction of least stress.

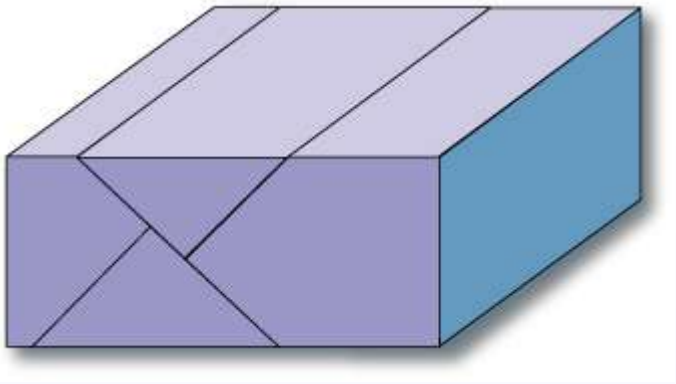


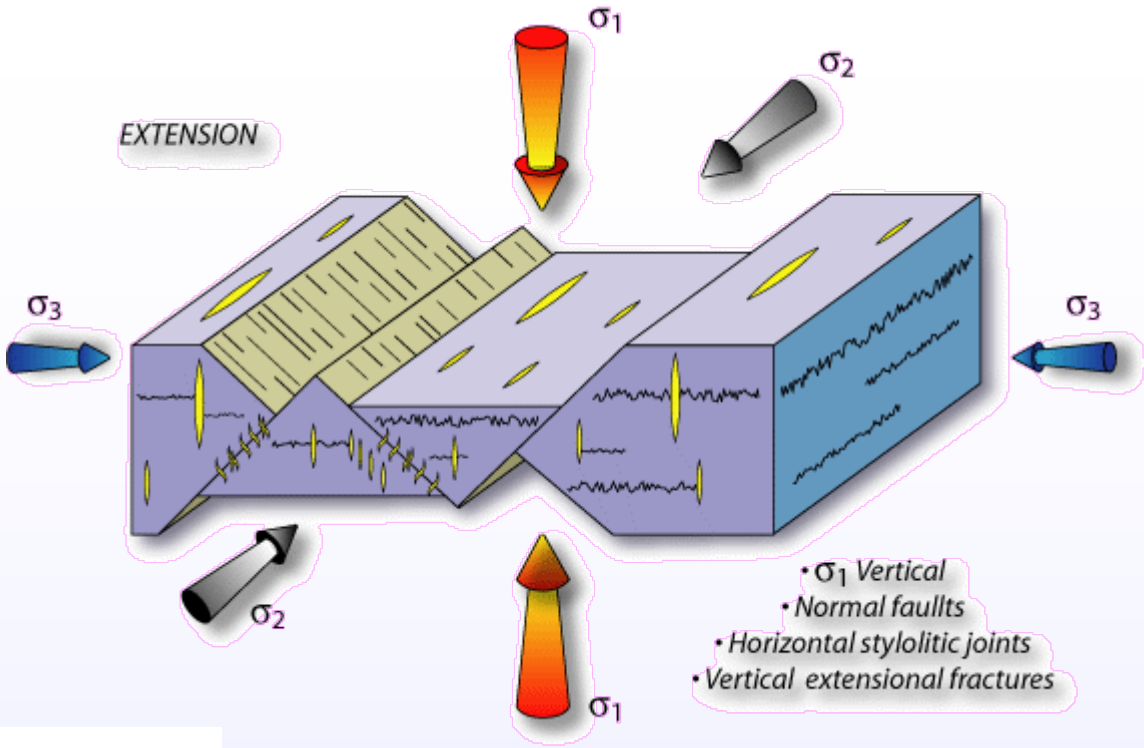


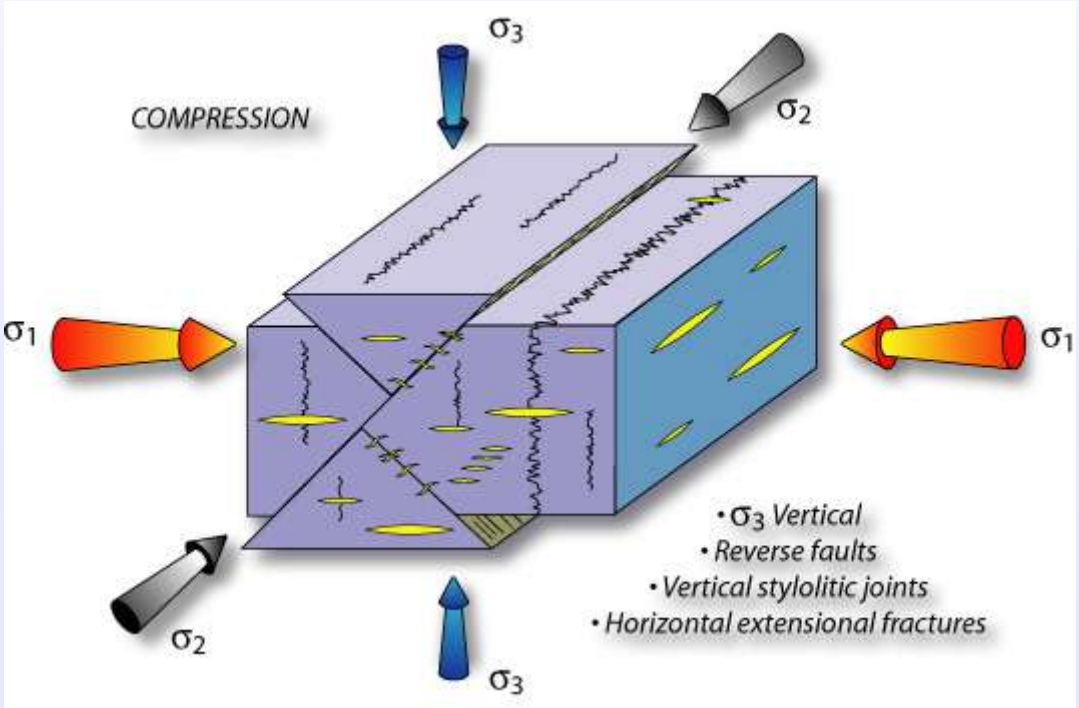
Sheared en échellon extensional fractures. Can you guess the kinematic of the shearing ?

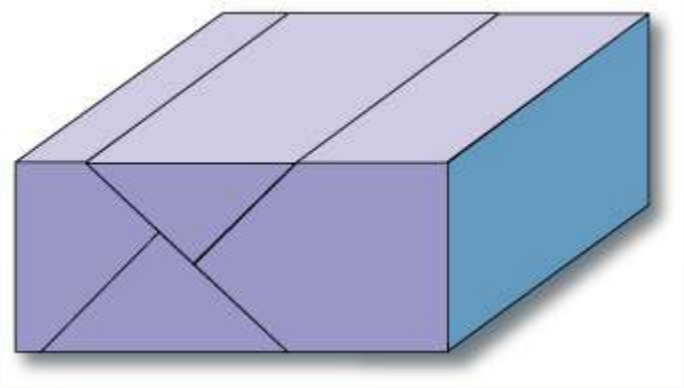

épontes de
la fente
cristallisations
minérales
fibreuses
ouverture ΔL
longueur axiale
(a)
pic stylolithique
joint stylolithique
(b)

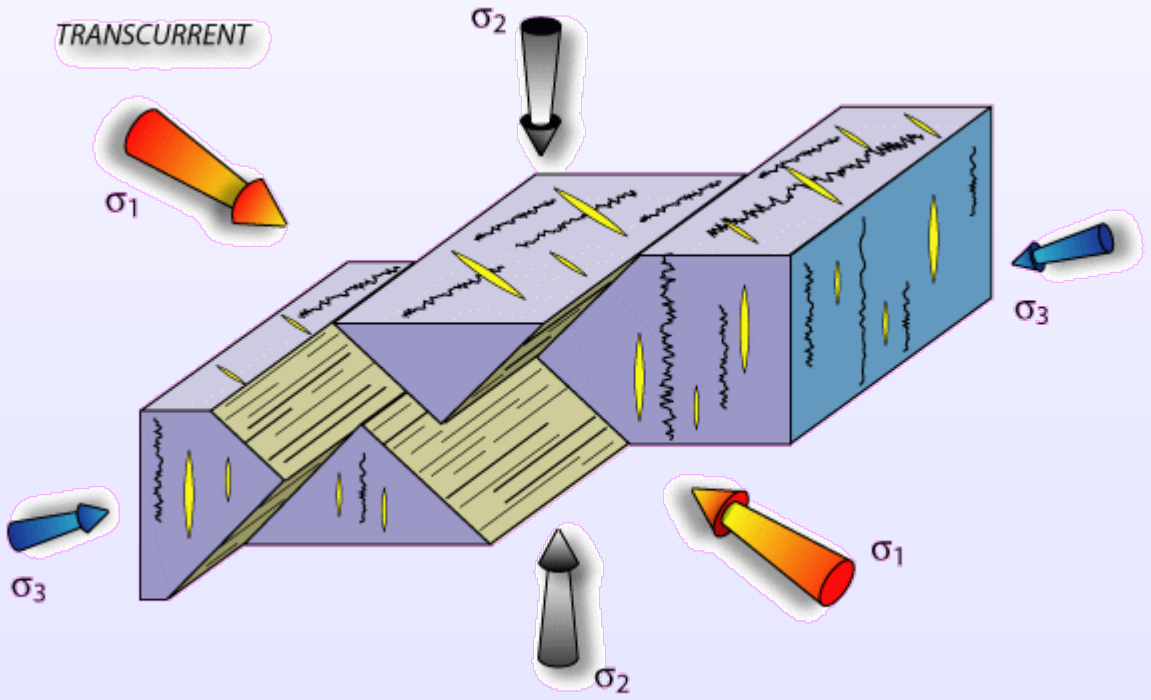

σ1
σ3
σ3
σ1
Map view
σ1
σ3
σ3
σ1



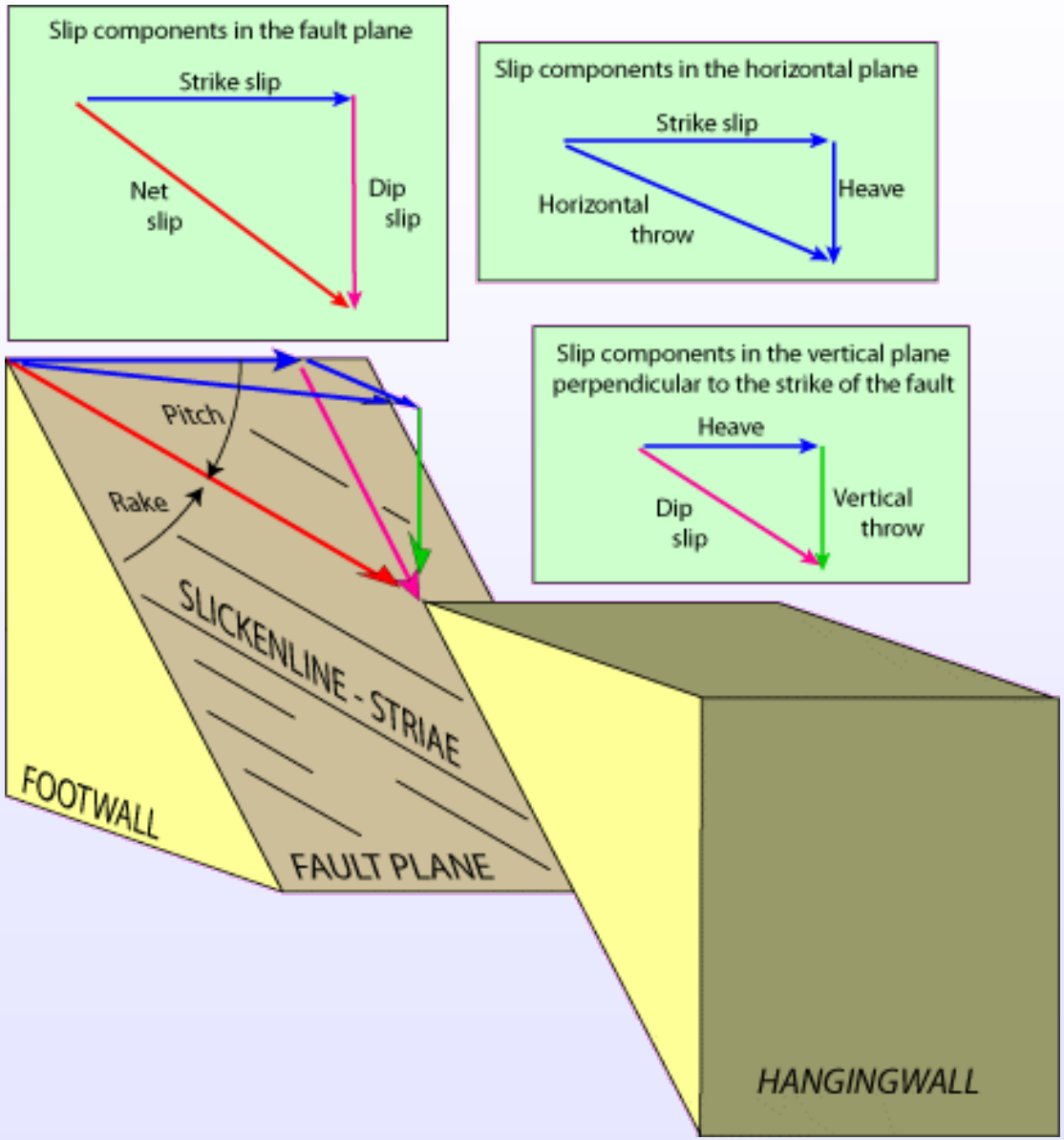

EXTENSION
σ1
σ2
σ3
σ3
σ2
σ1
• σ1 Vertical
• Normal faullts
• Horizontal stylolitic joints
• Vertical extensional fractures

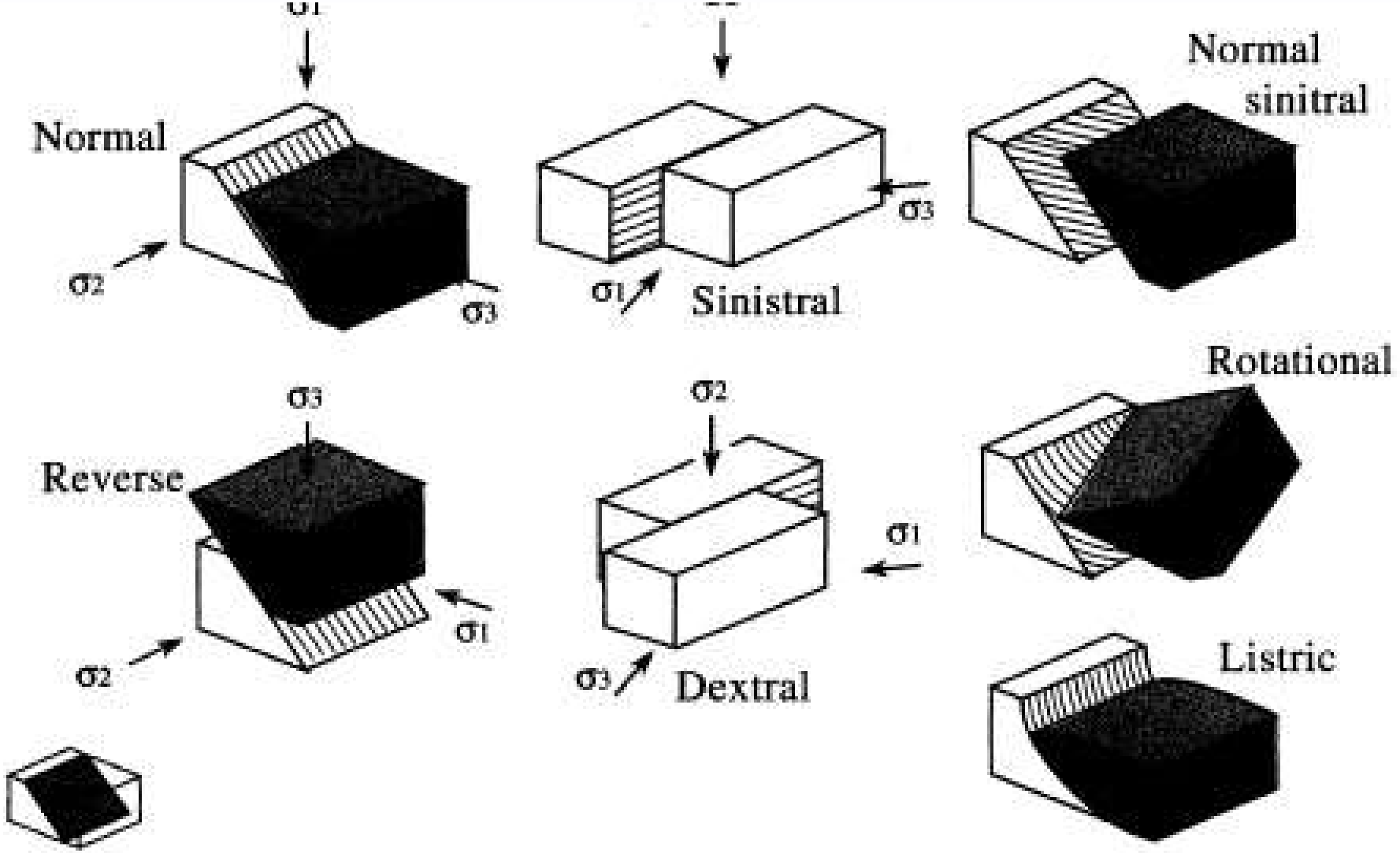

COMPRESSION
σ3
σ2
σ1
σ1
σ2
σ3
• σ3 Vertical
• Reverse faults
• Vertical stylolitic joints
• Horizontal extensional fractures



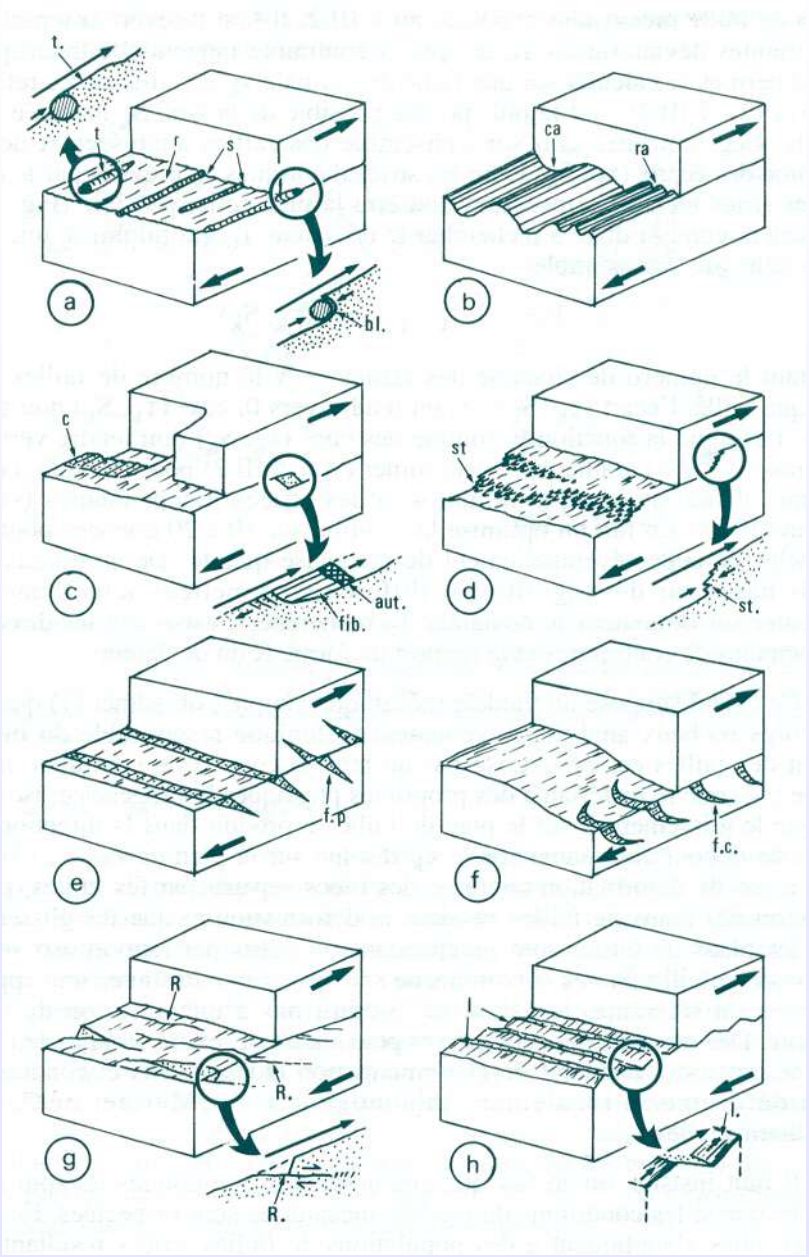

TRANSCURRENT
σ2
σ1
σ3
σ3
σ1
σ2

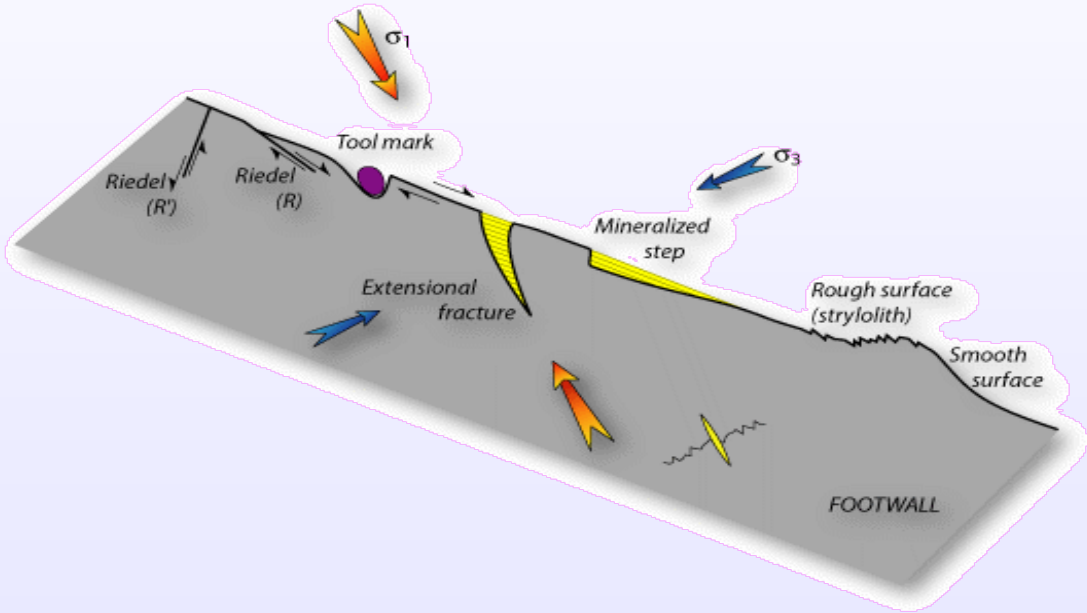
Déplacement sur une faille




Normal
σ2
σ3
σ1
Sinistral
σ3
Normal
sinitral
Reverse
σ3
σ2
σ1
σ2
σ3
Dextral
σ1
Rotational
Listric

Indices cinématiques

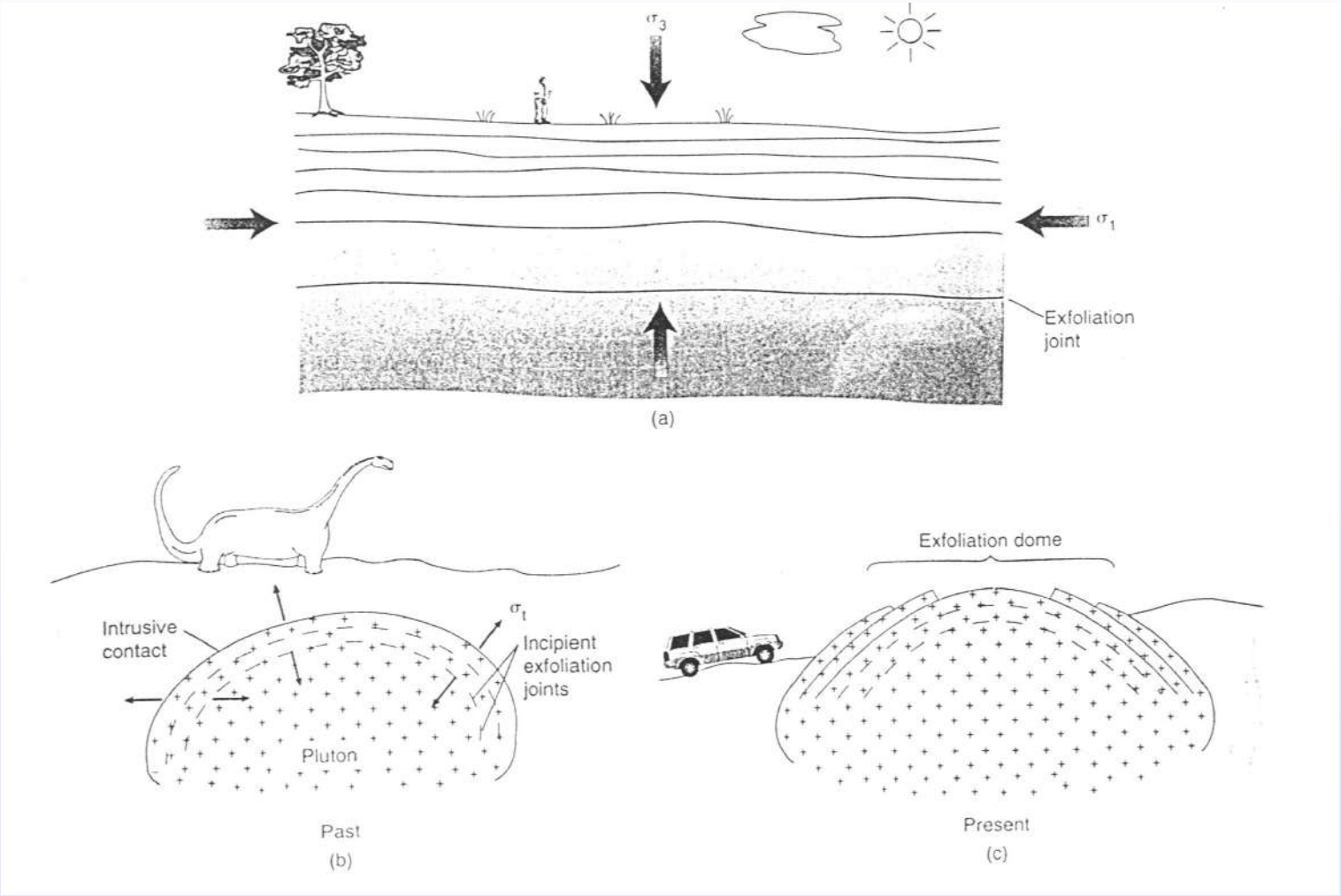




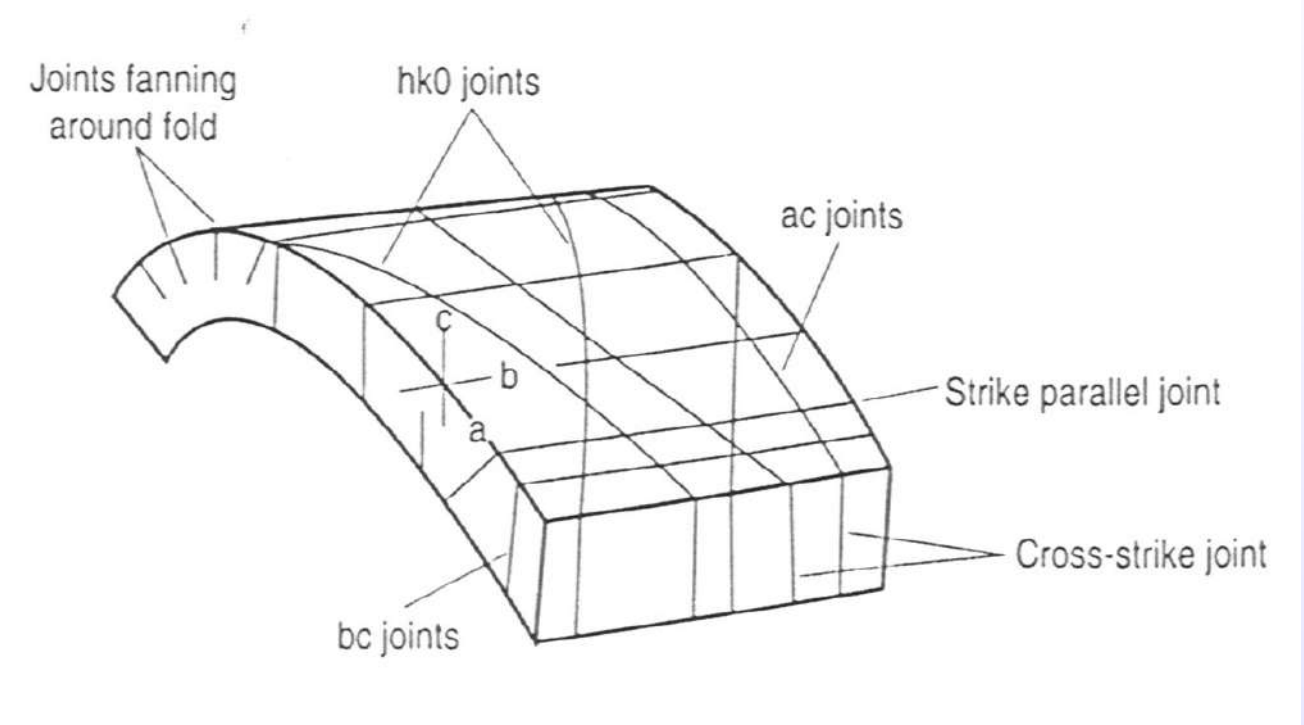
Fractures sans déplacement : les joints

- Contrôlent la forme de l'affleurement
- … la géomorphologie
- Aquifères
- Stabilité des roches
- Minéralisations

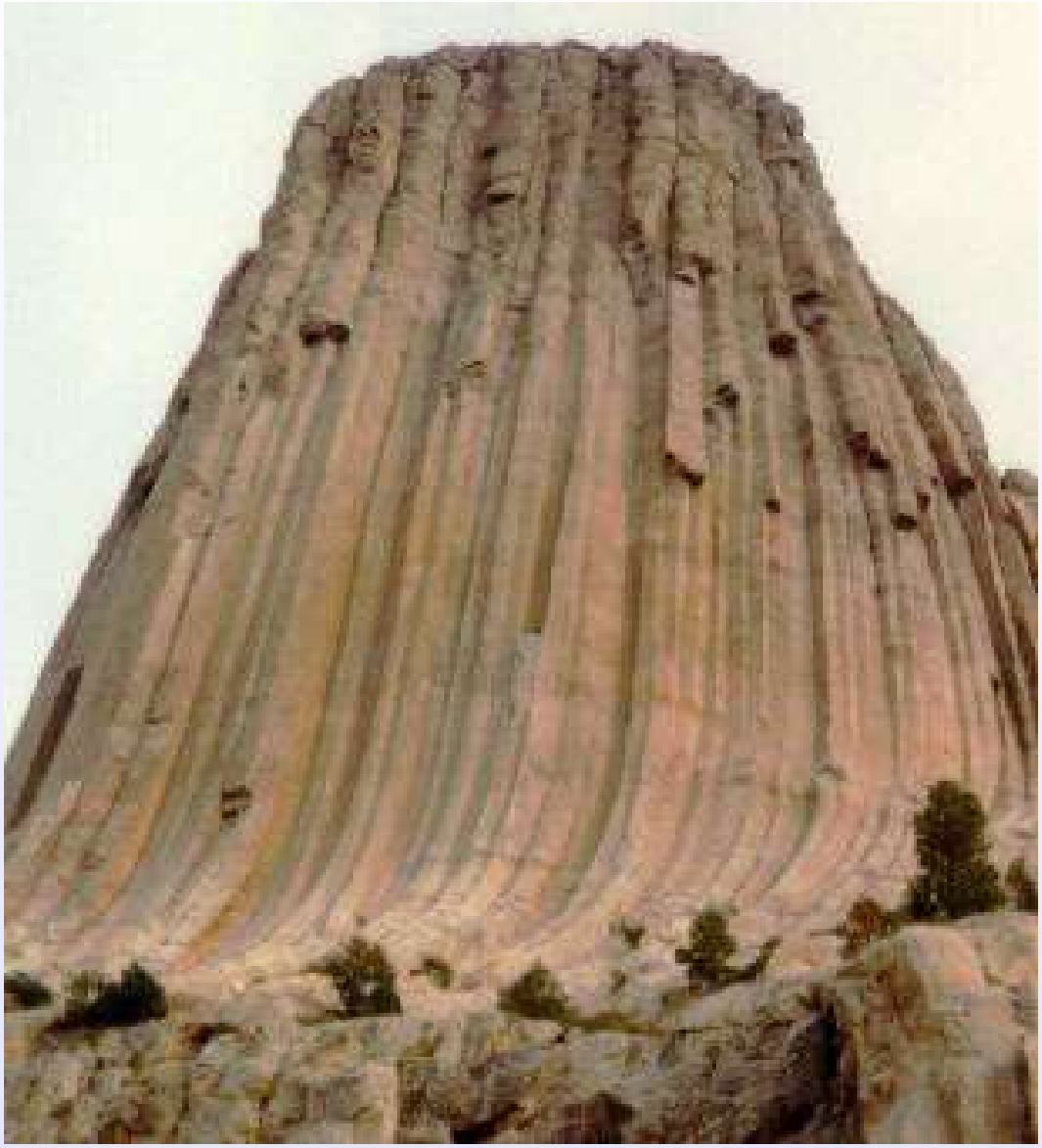
Exple: Exfoliation d'un pluton



Joints associés à des plis

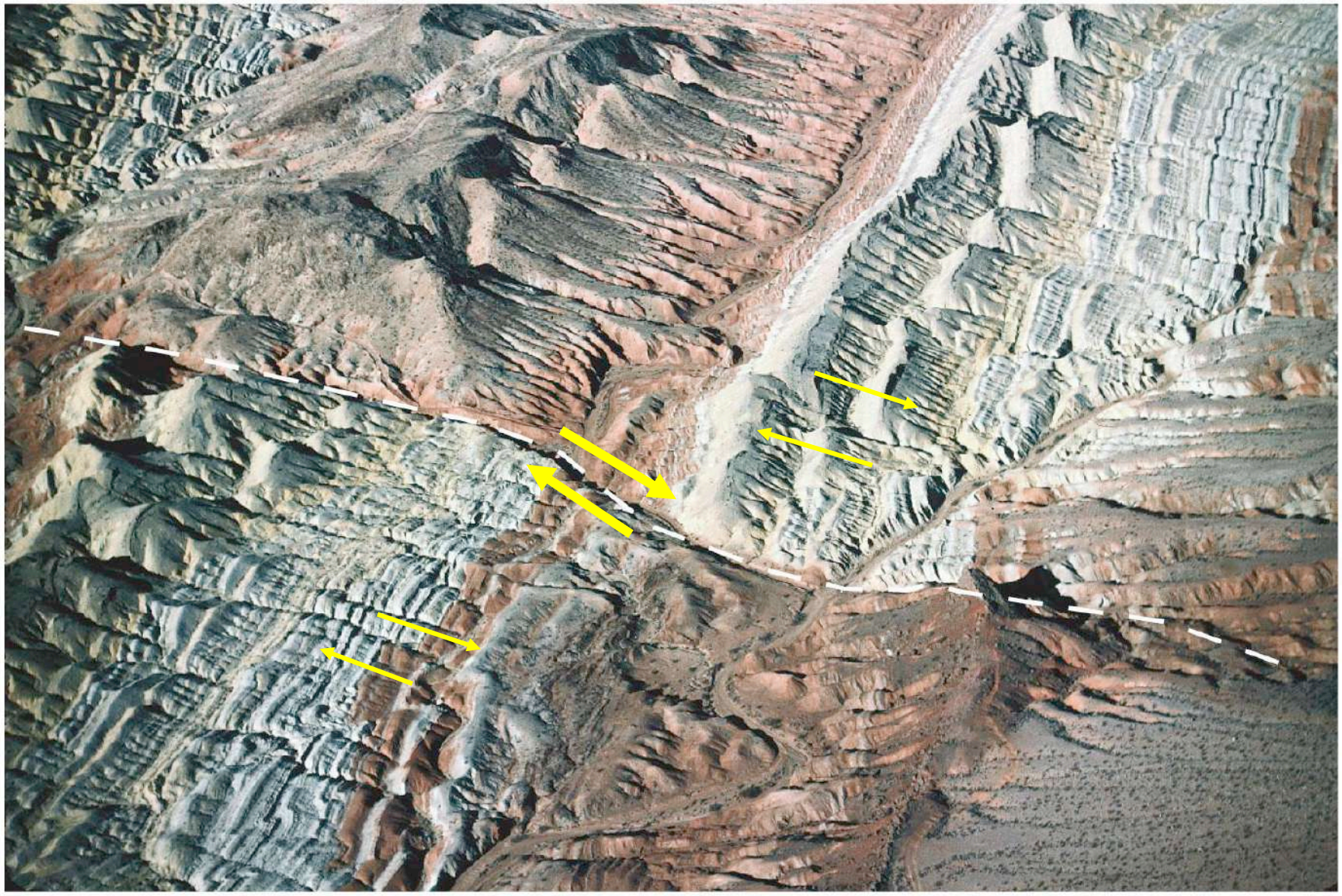


Prismation basaltique




N
Melkrivi
© 2008 Europa Technologies
Image © 2008 DigitalGlobe
© 2008 Cnes/Spot Image
©2007 Google™
Pointer 29°48'06.95" S 17°51'02.95" E elev 873 m
Streaming 100%
Eye alt 19.65 km

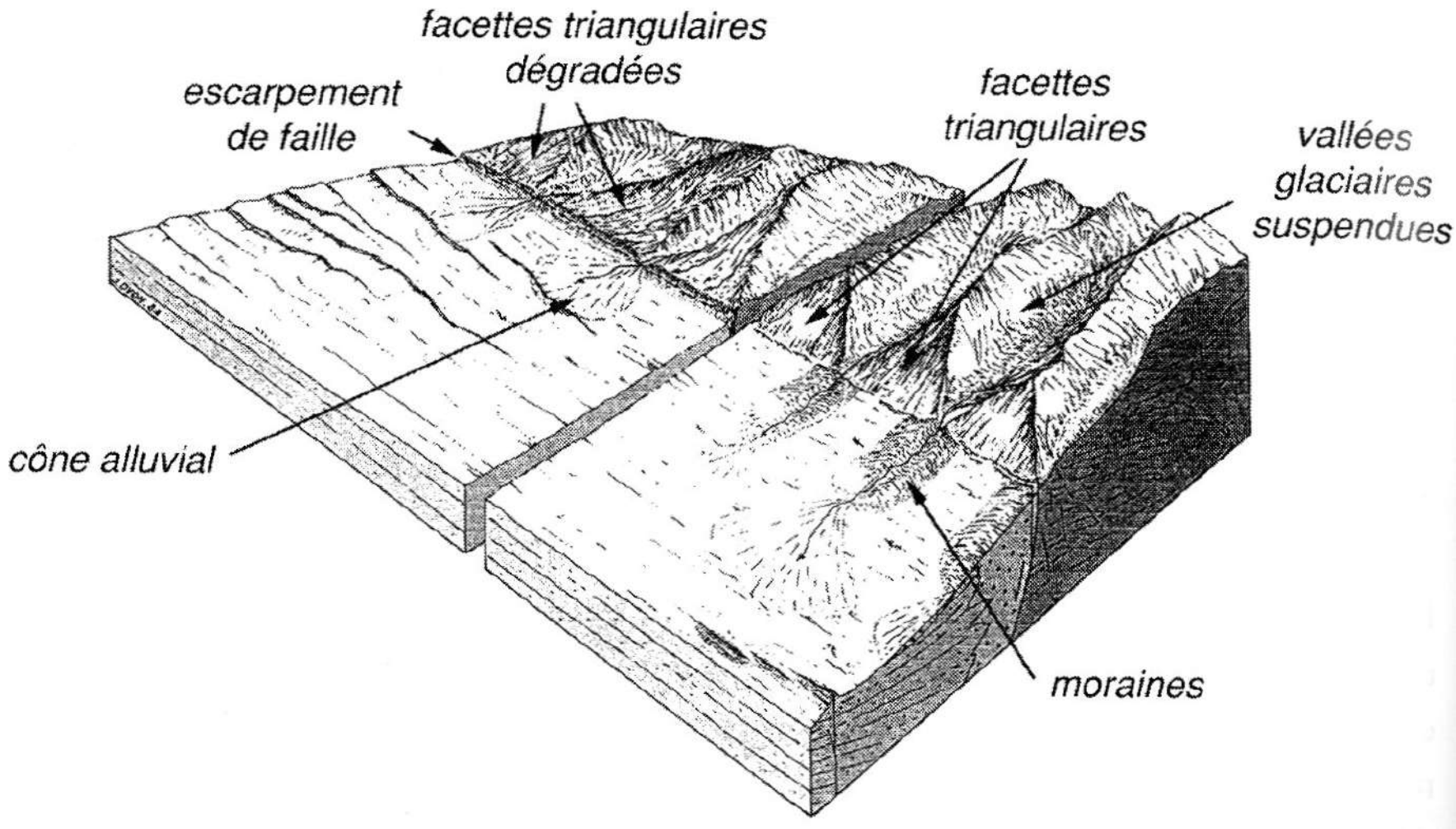
Strike-slip fault, Southern Nevada



1700 Ma basement gneisses (red) overlying 600 Ma marbles (light grey), Damara orogen, central Namibia

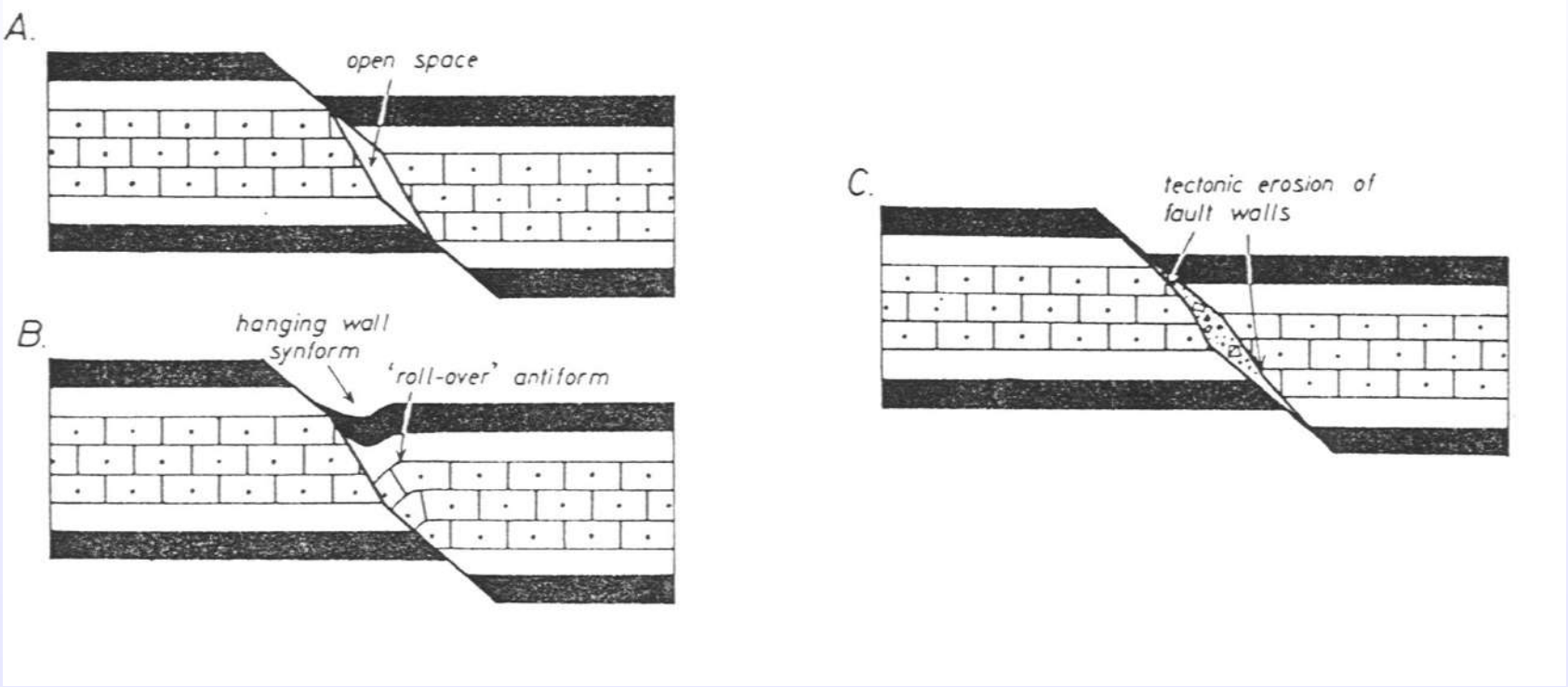

Pitch

Morphologie de faille

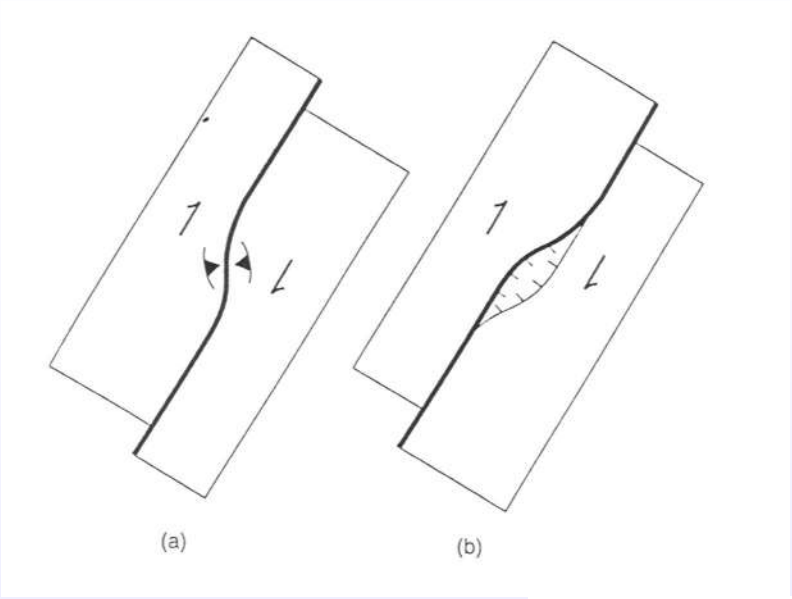


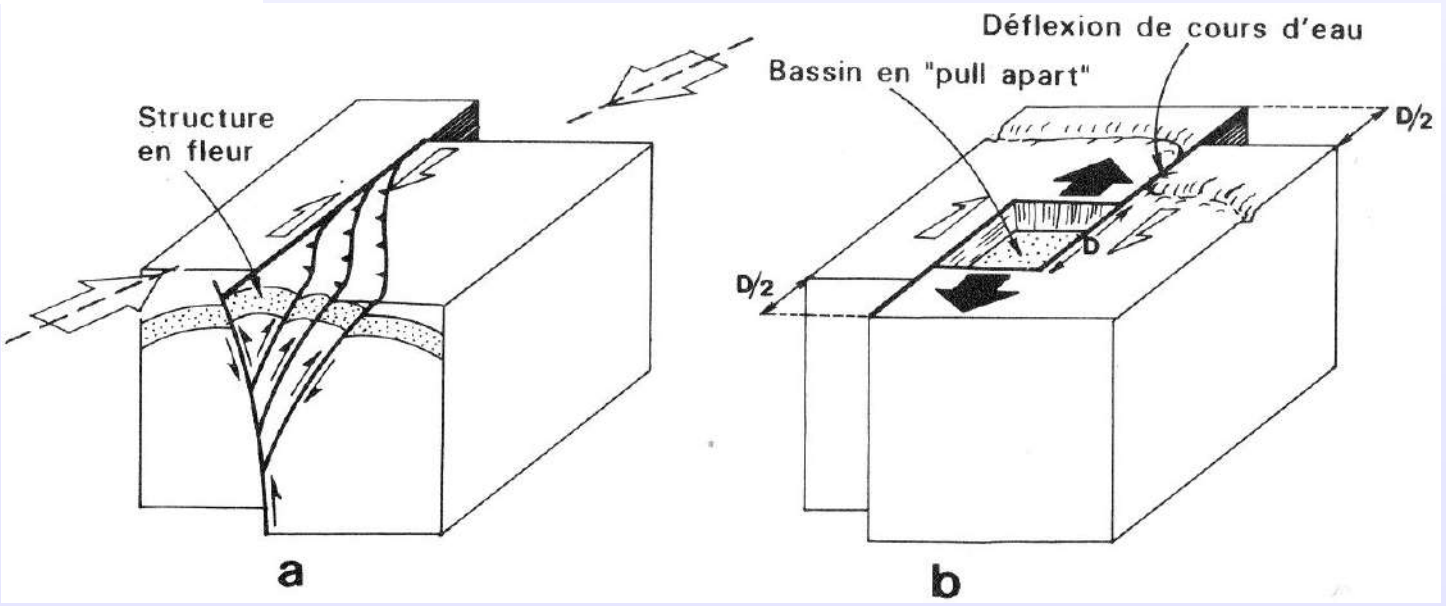
La réalité des failles...

- Irrégularités sur le plan de faille

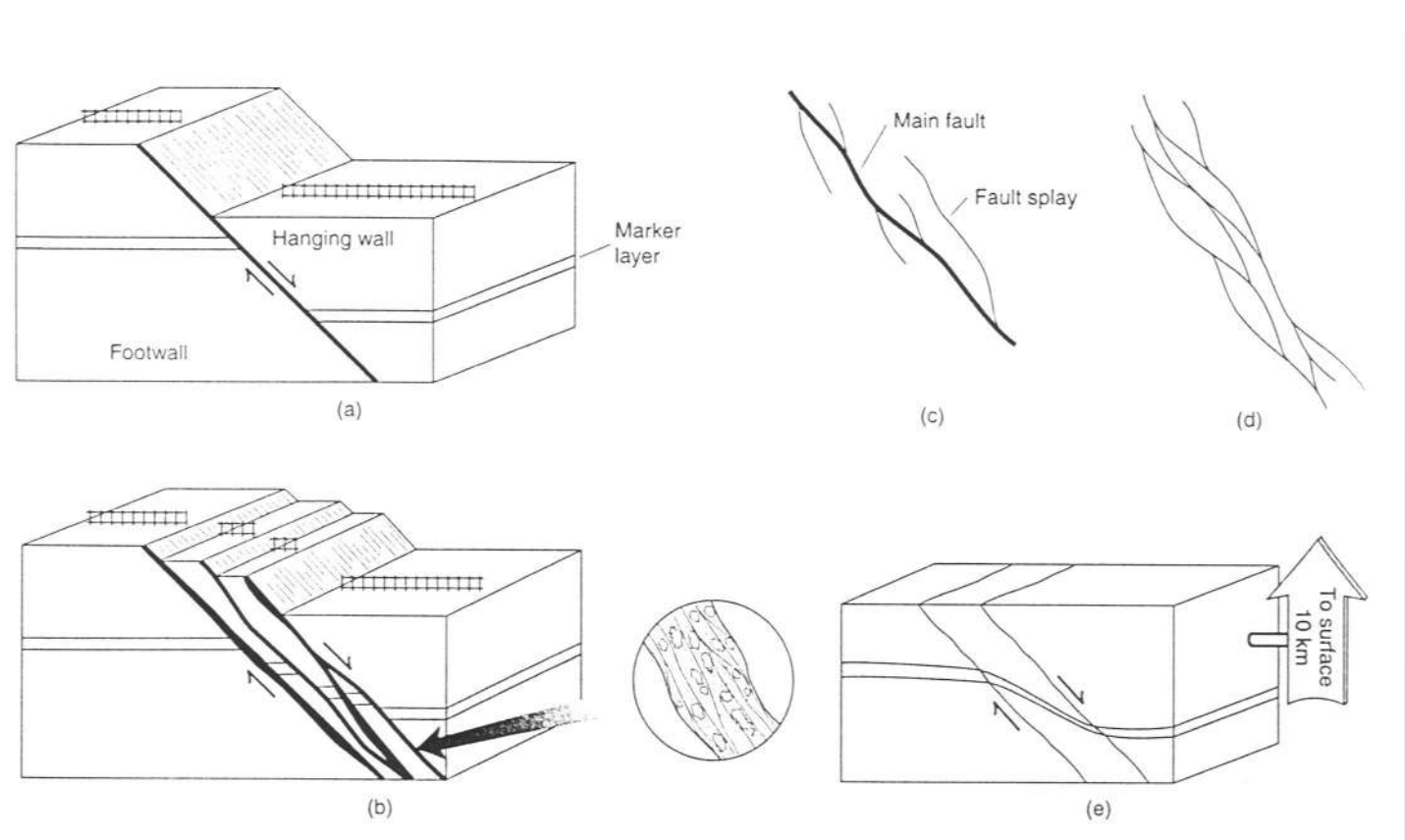


Pull aparts et relais compressifs

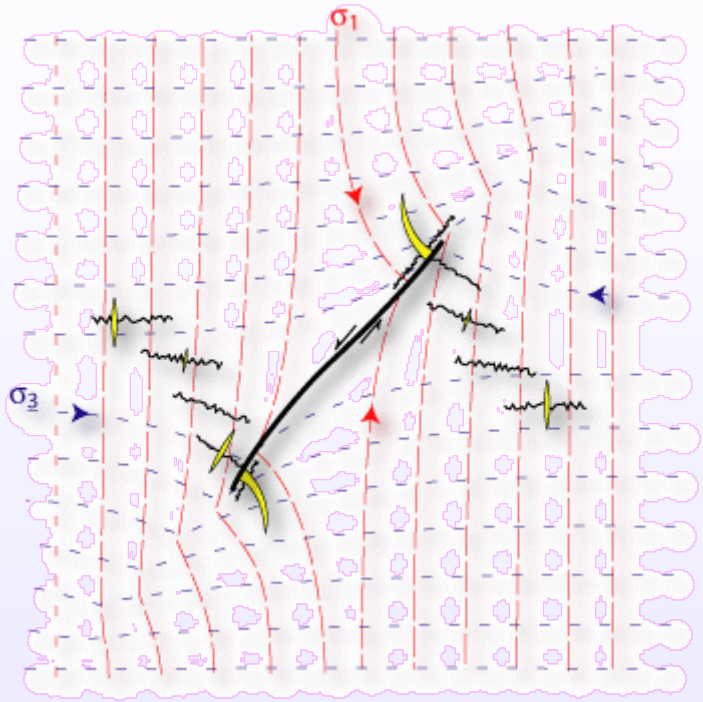


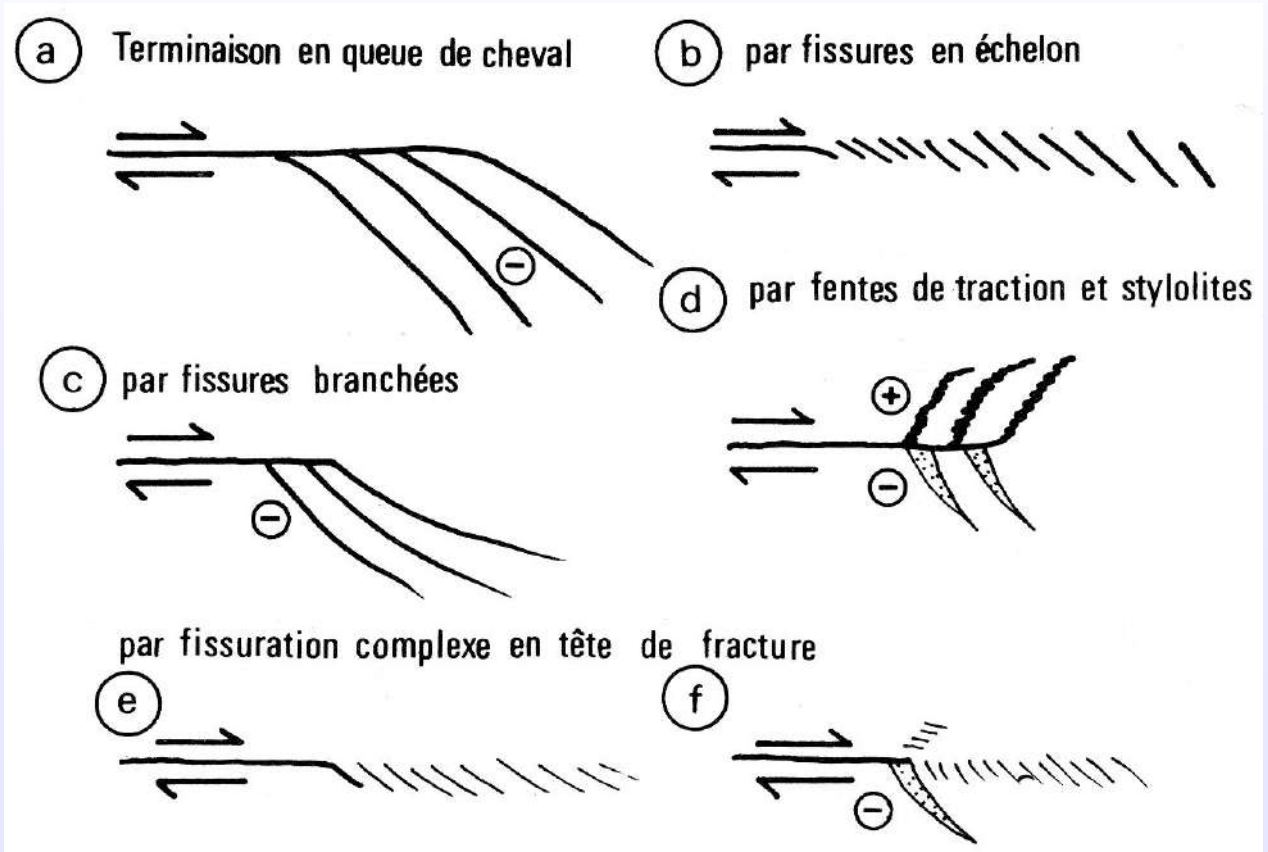


Multiples plans de rupture



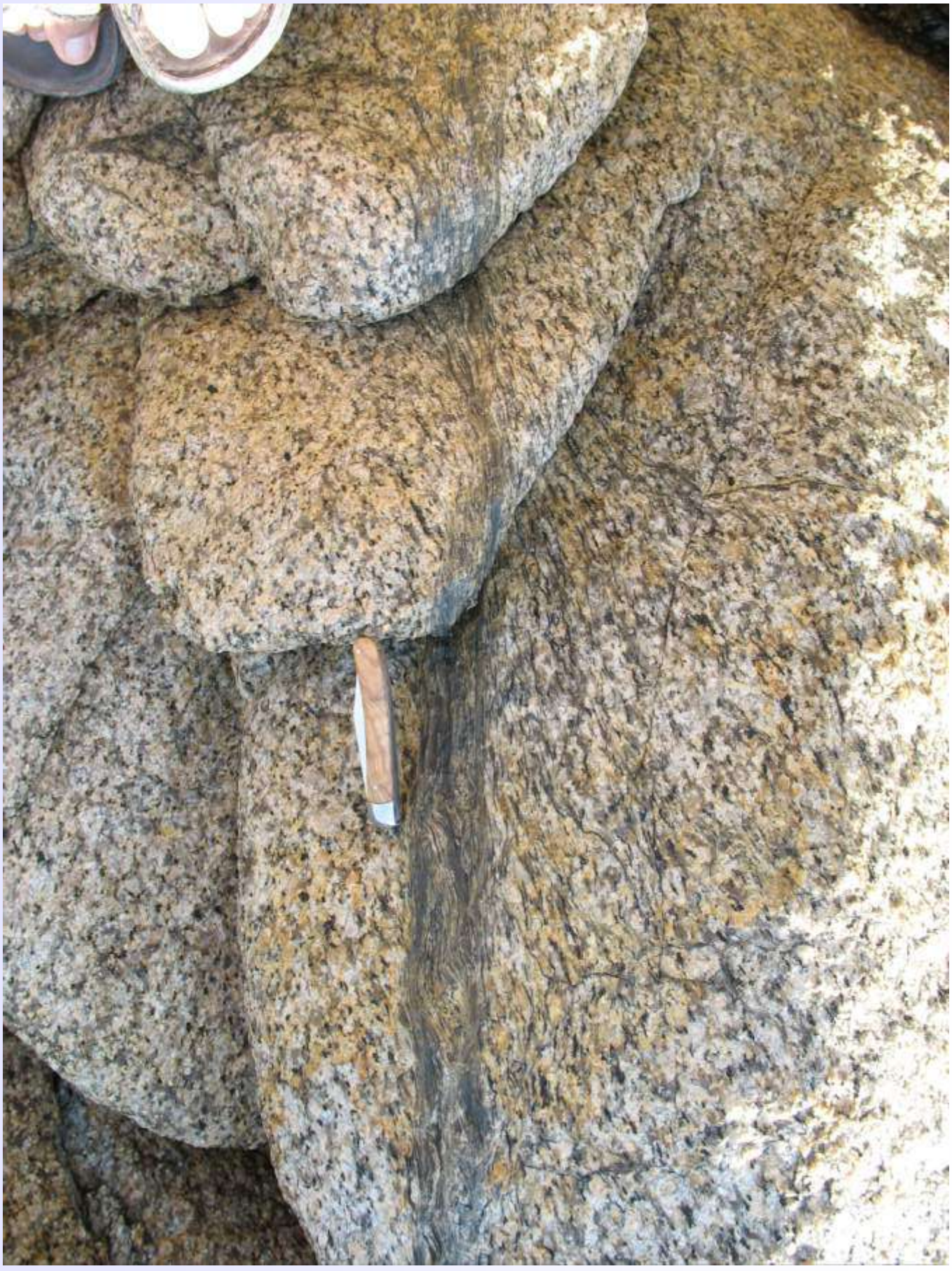
Terminaisons de failles

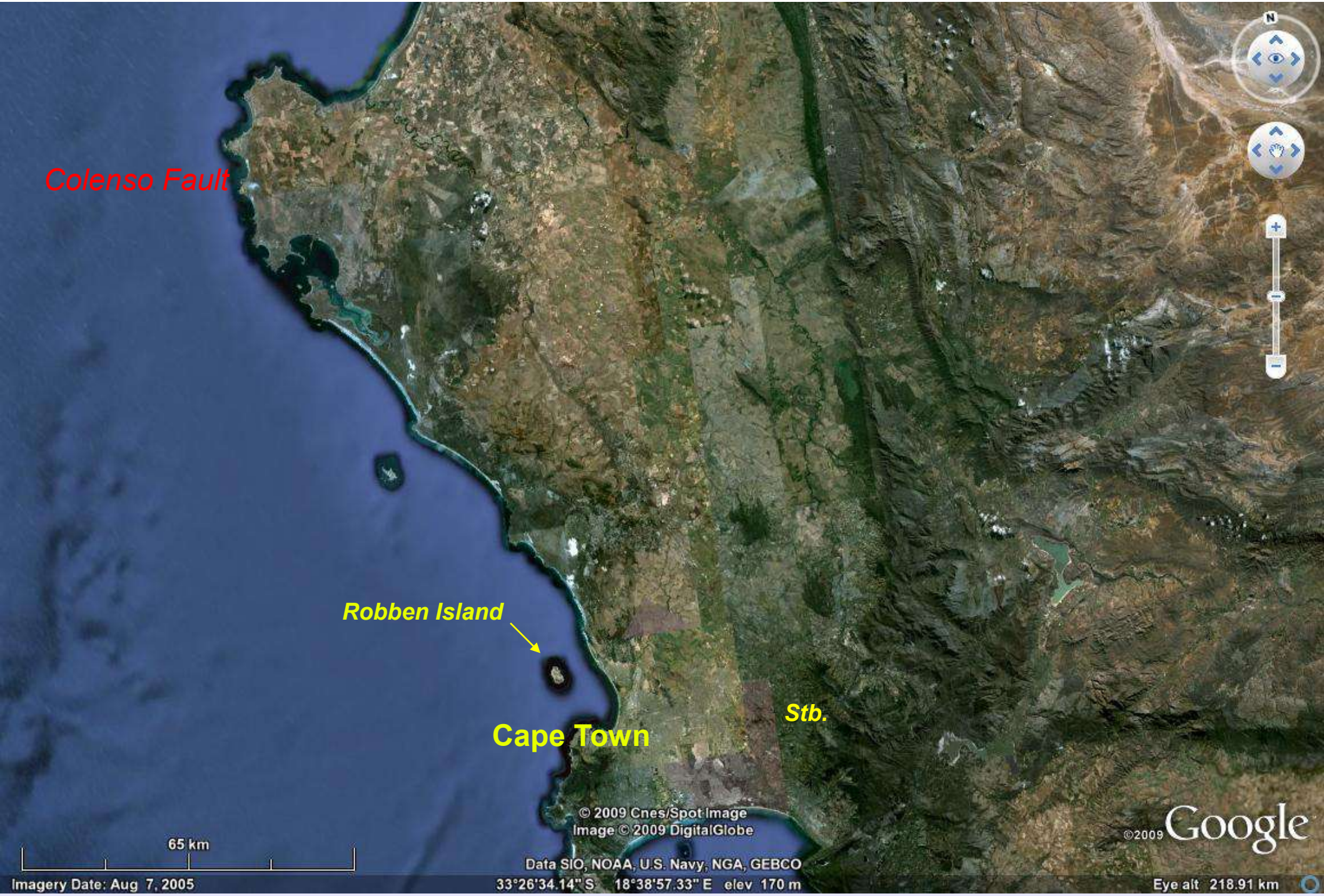




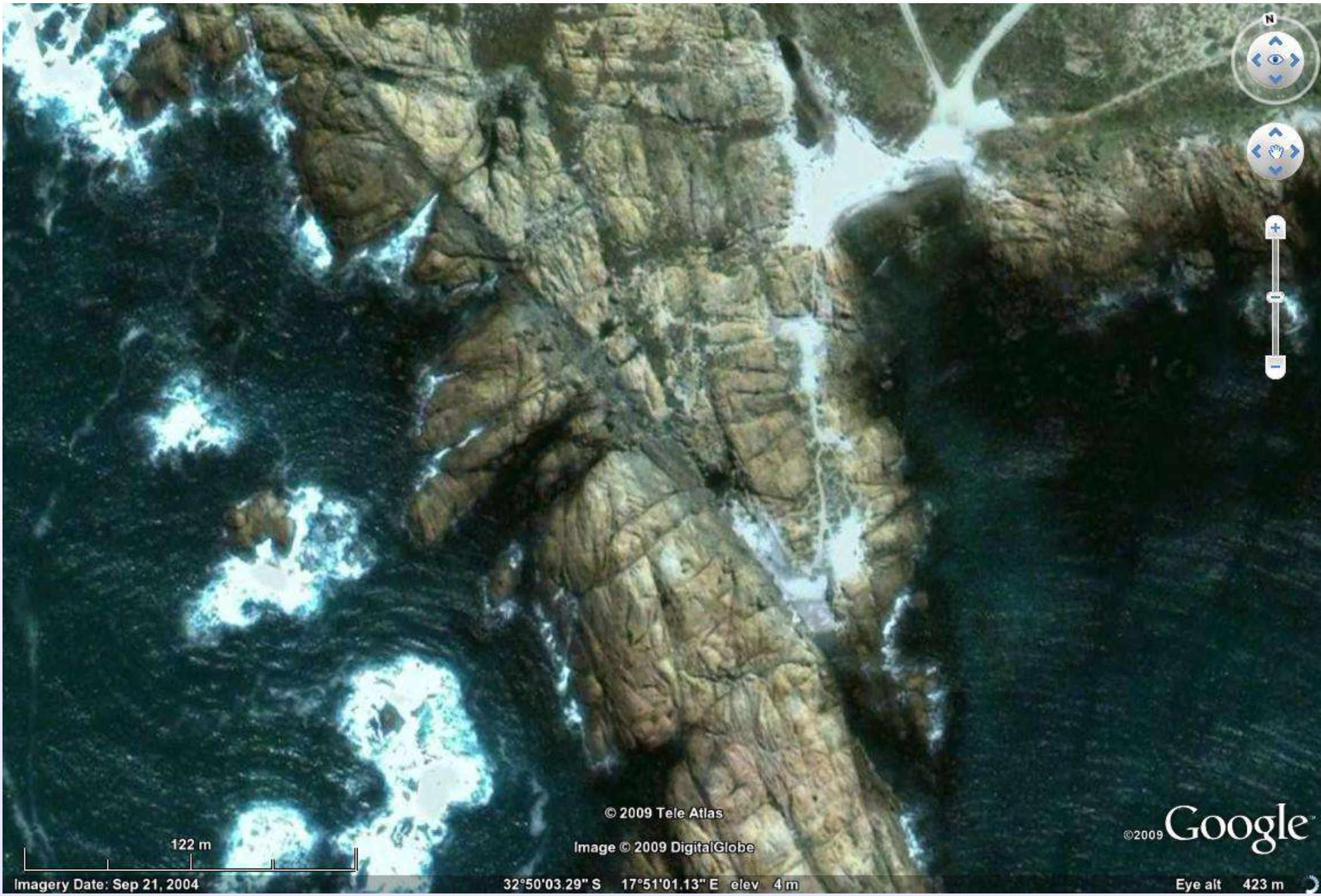
Roches de faille

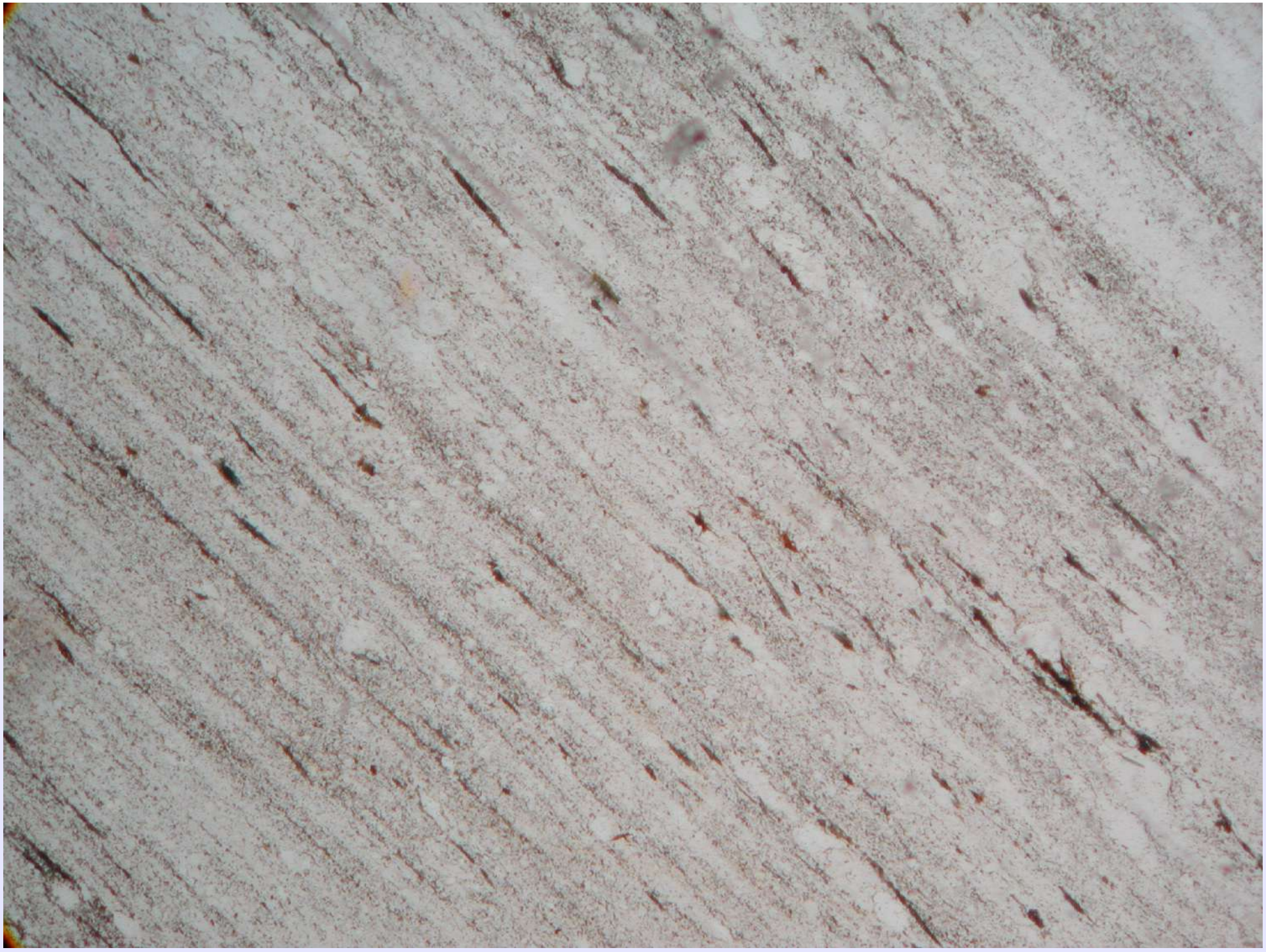
- Brèche
- Cataclasite
- Mylonite
- Pseudo-tachylites

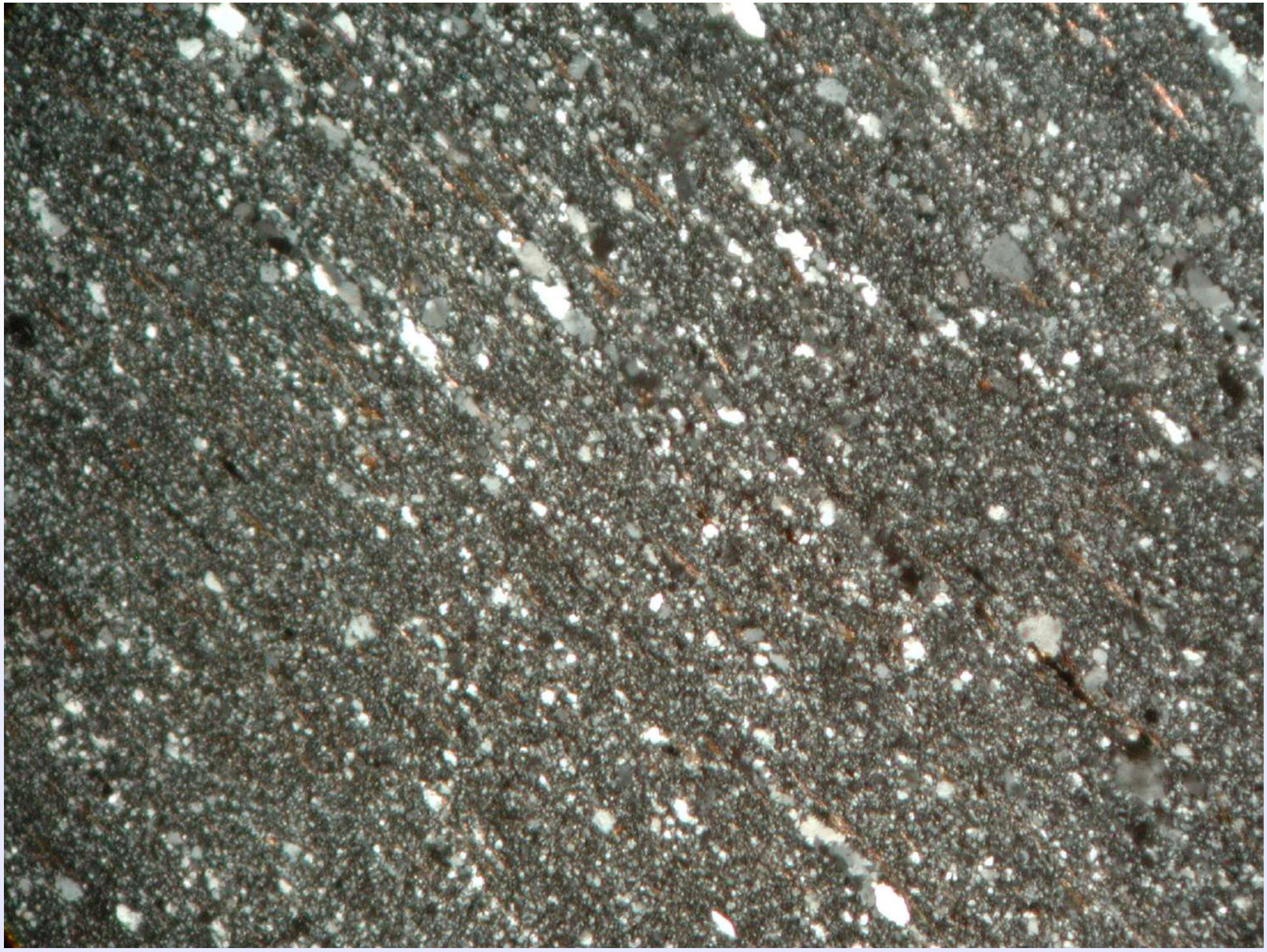


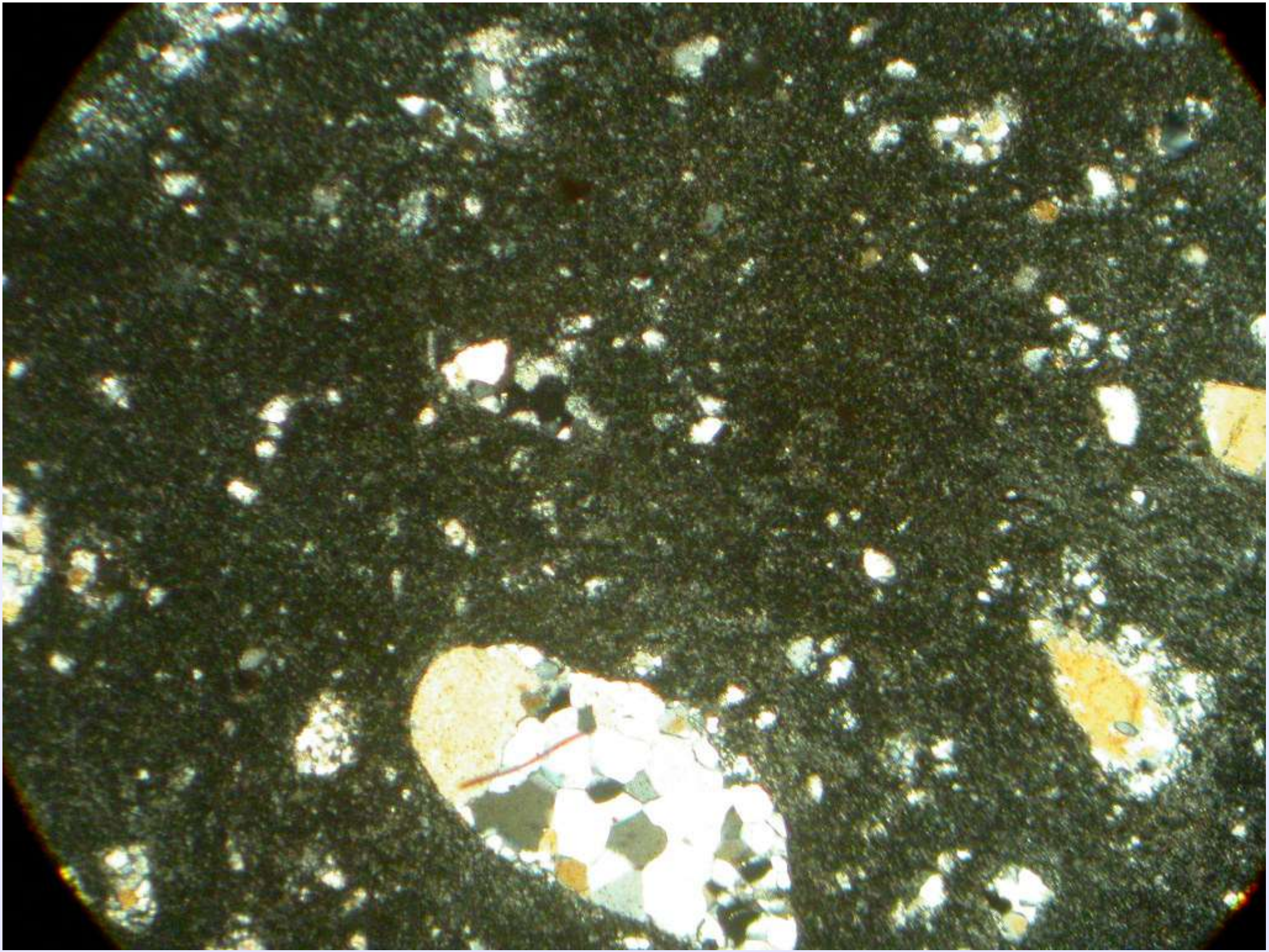

Colenso Fault
Robben Island
Cape Town
Stb.
© 2009 Cnes/Spot Image
Image © 2009 DigitalGlobe
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
65 km
Imagery Date: Aug 7, 2005
33°26'34.14" S 18°38'57.33" E elev 170 m
©2009 Google
Eye alt 218.91 km

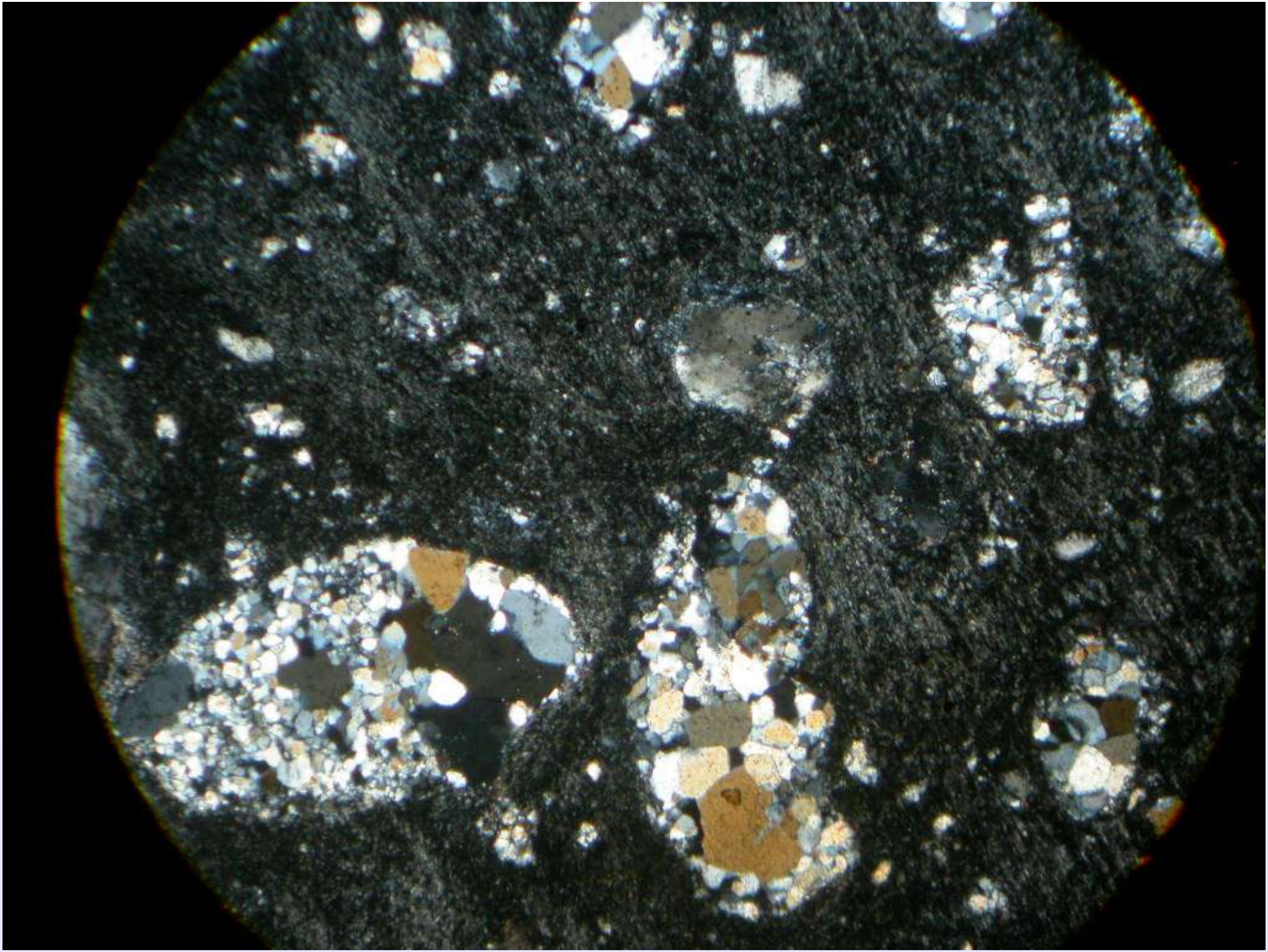

N
(gravel)
© 2009 Tele Atlas
Data © 2009 Tracks4Africa
Image © 2009 DigitalGlobe
© 2009 Cnes/Spot Image
325 m
©2009 Google
Imagery Dates: Jul 2002 - Aug 7, 2005
32°50'01.26" S 17°50'58.22" E elev 3 m
Eye alt 1.12 km

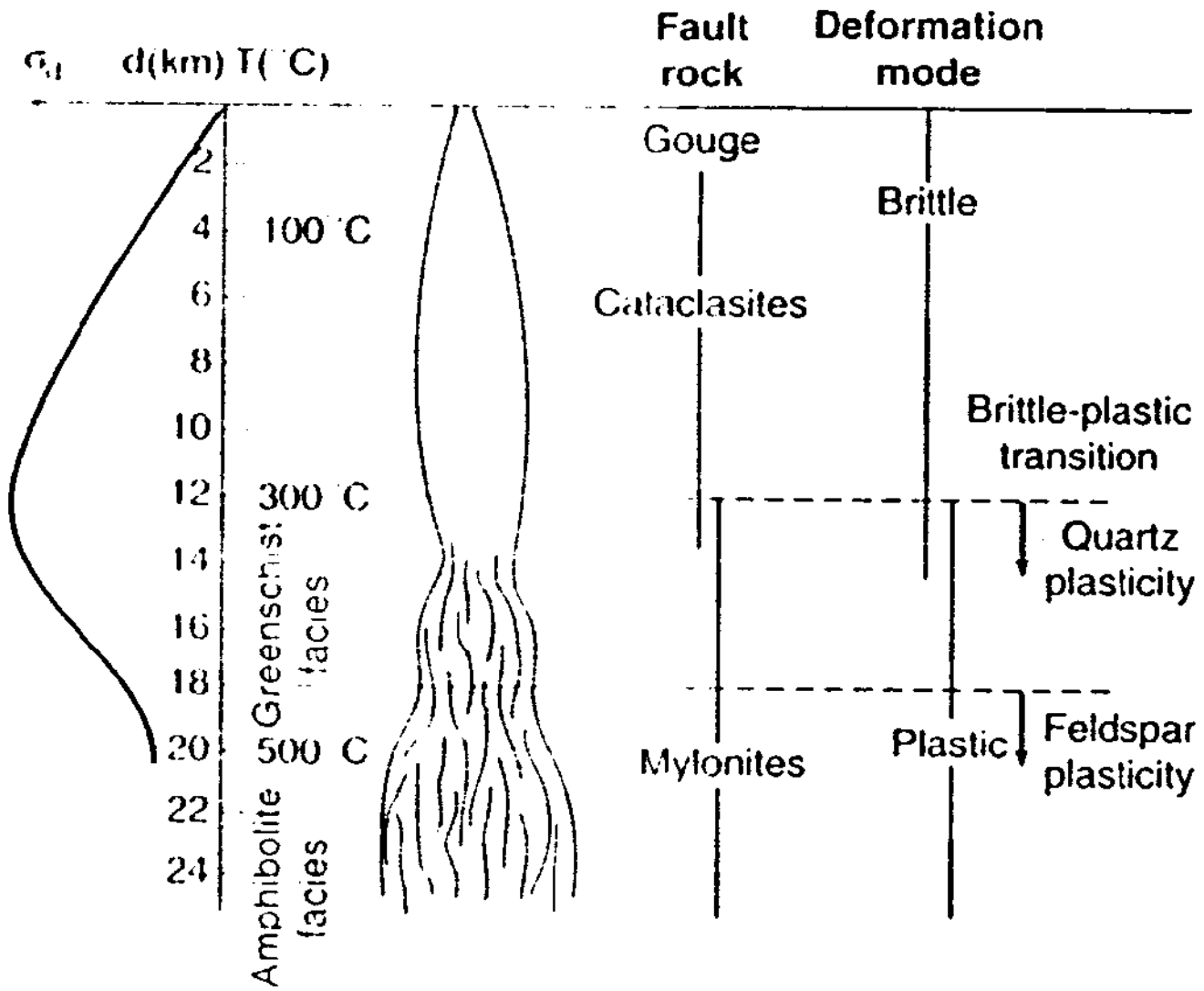

N
© 2009 Tele Atlas
Image © 2009 DigitalGlobe
©2009 Google
122 m
Imagery Date: Sep 21, 2004
32°50'03.29" S 17°51'01.13" E elev 4 m
Eye alt 423 m



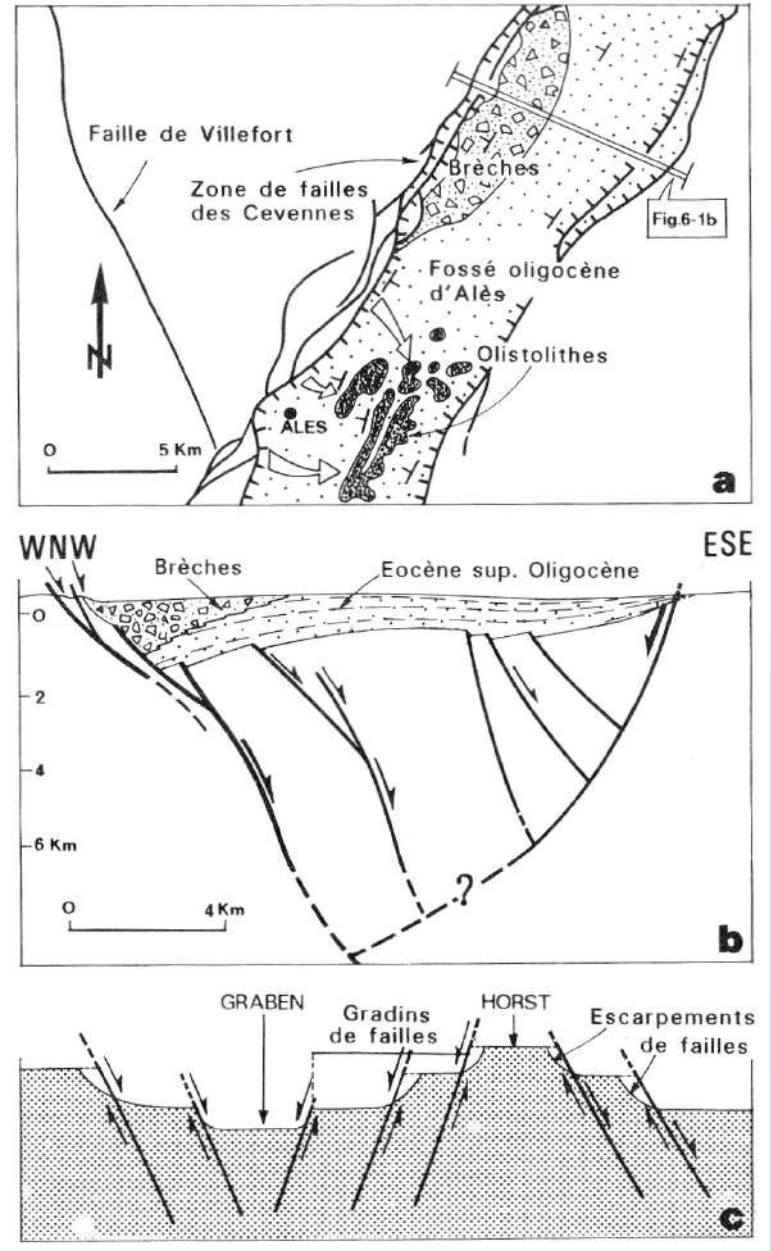




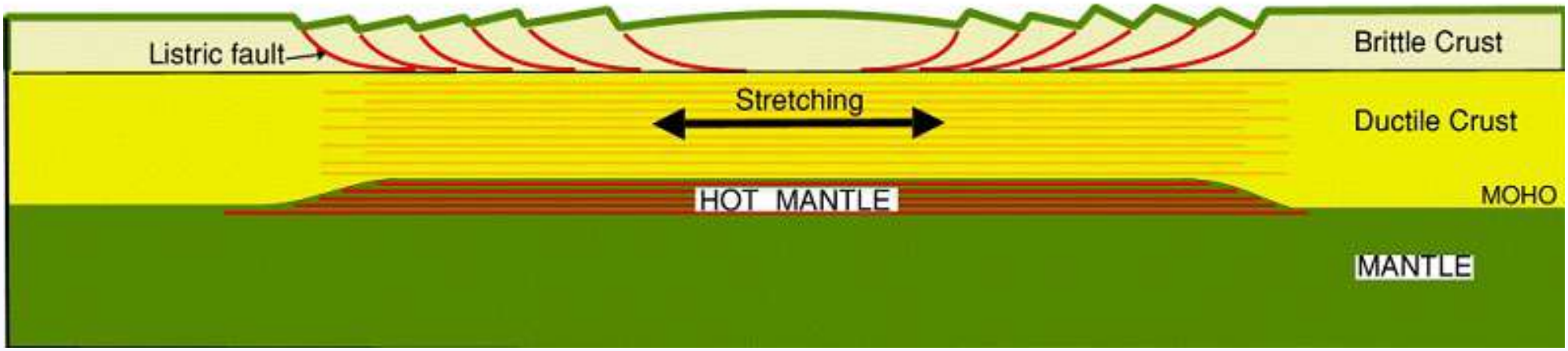



d(km) T(°C)
Fault rock
Deformation mode
Gouge
Brittle
Cataclasites
Brittle-plastic transition
Quartz plasticity
Mylonites
Plastic
Feldspar plasticity
2
4
6
8
10
12
14
16
18
20
22
24
100 °C
300 °C
500 °C
Greenschist facies
Amphibolite facies

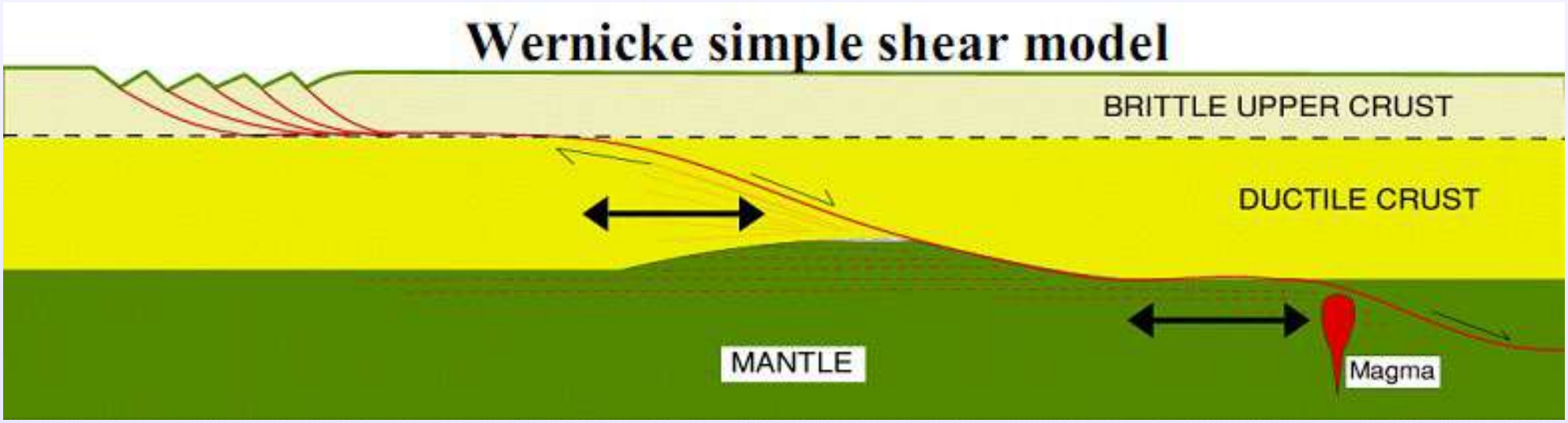
Associations régionales : extension



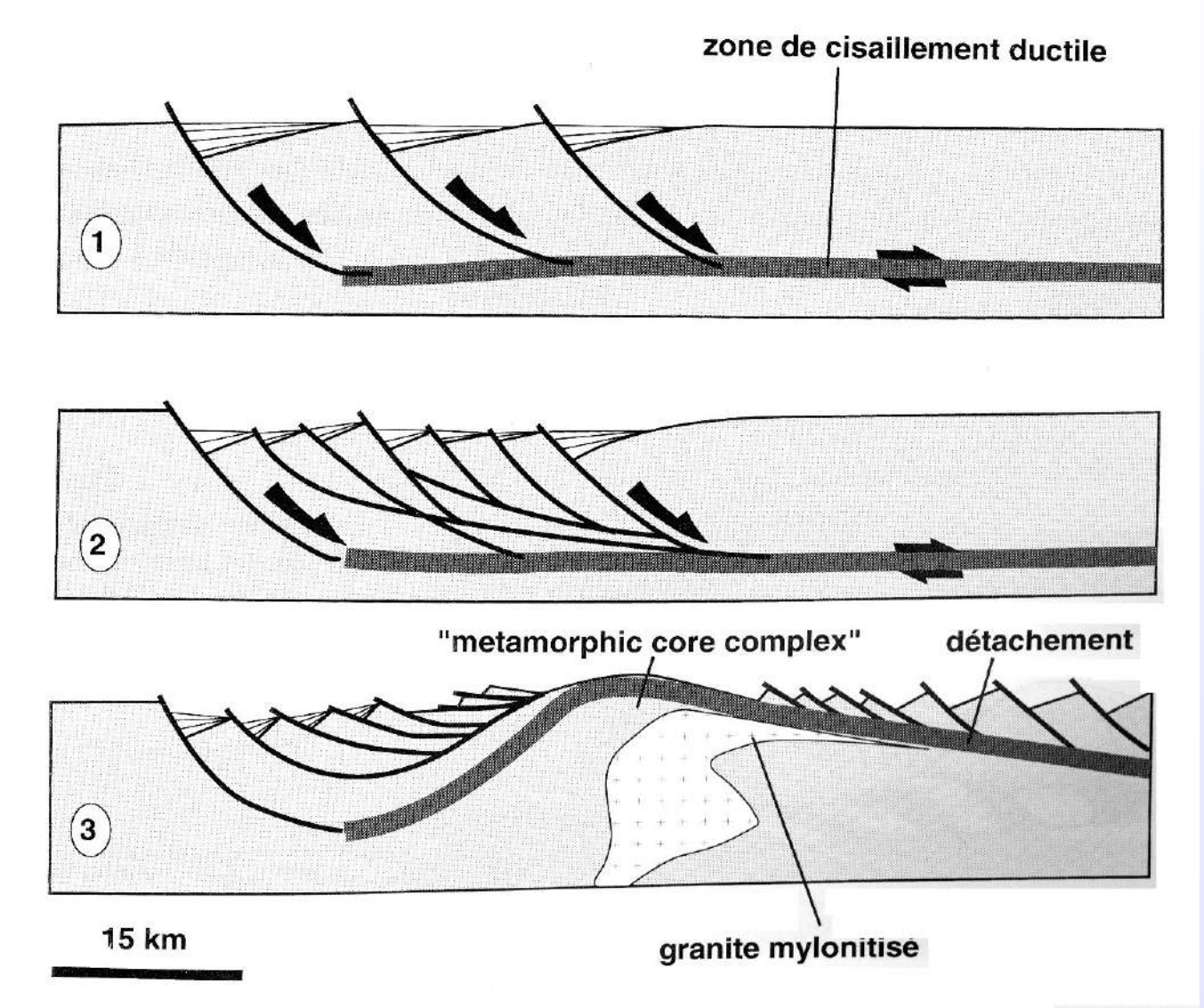
McKenzie Uniform Pure Shear Model



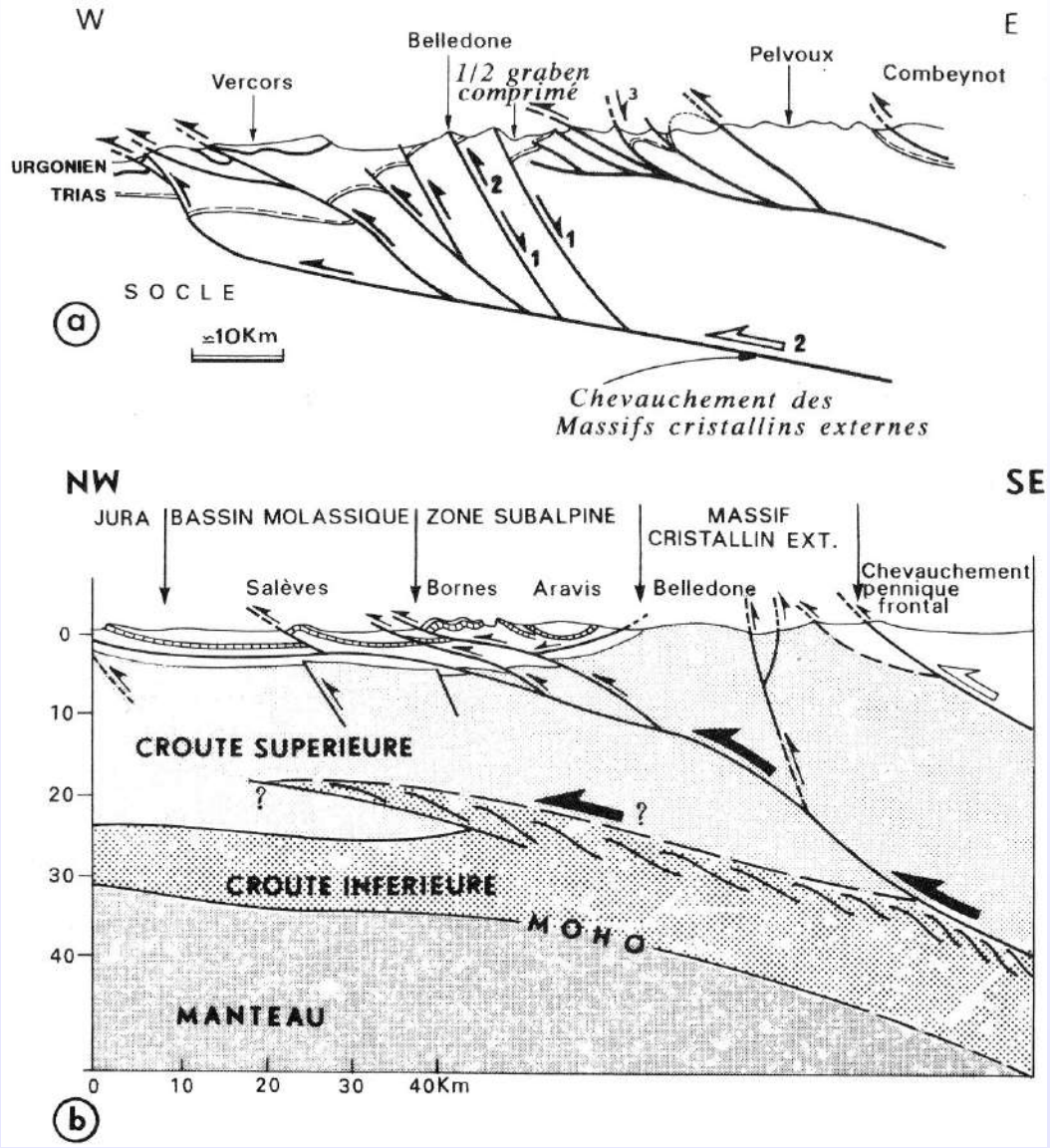
Wernicke simple shear model

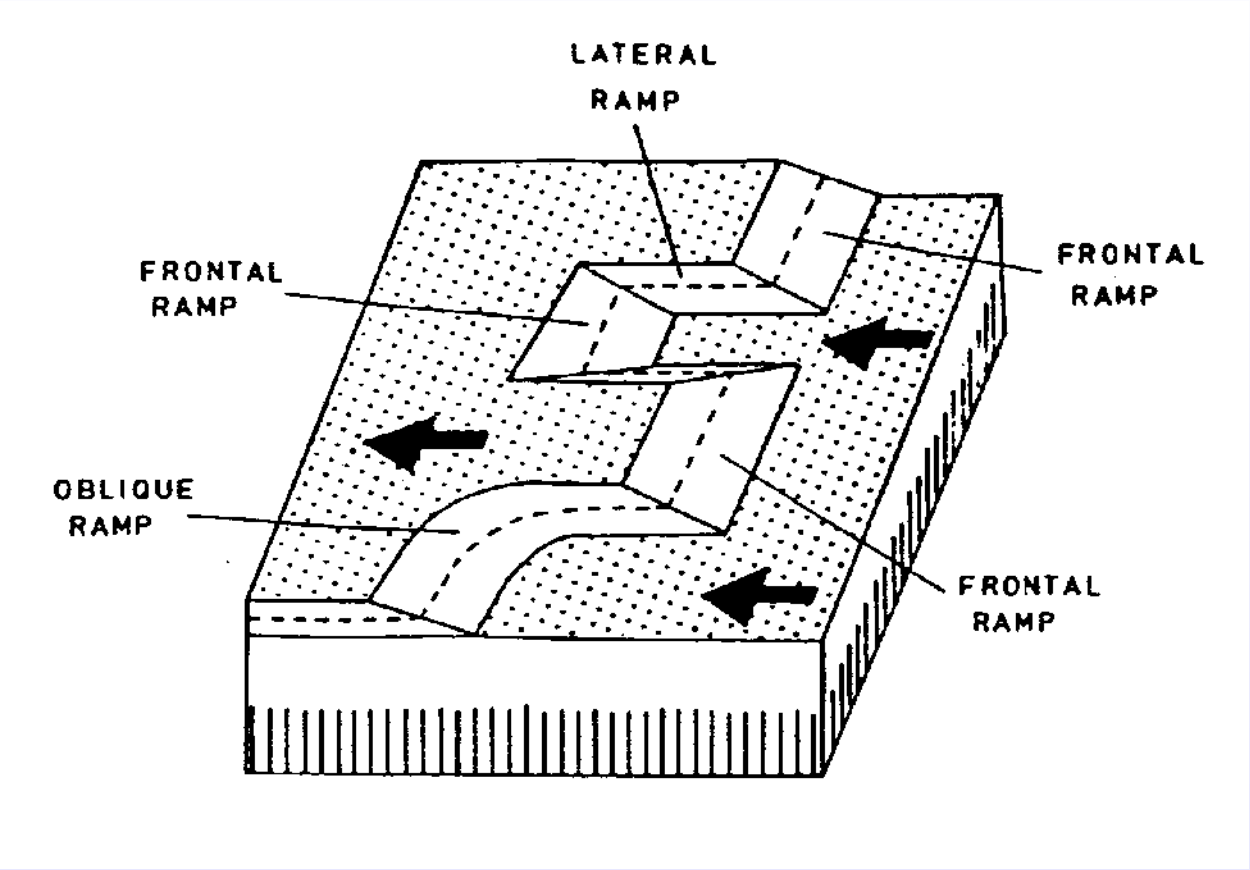


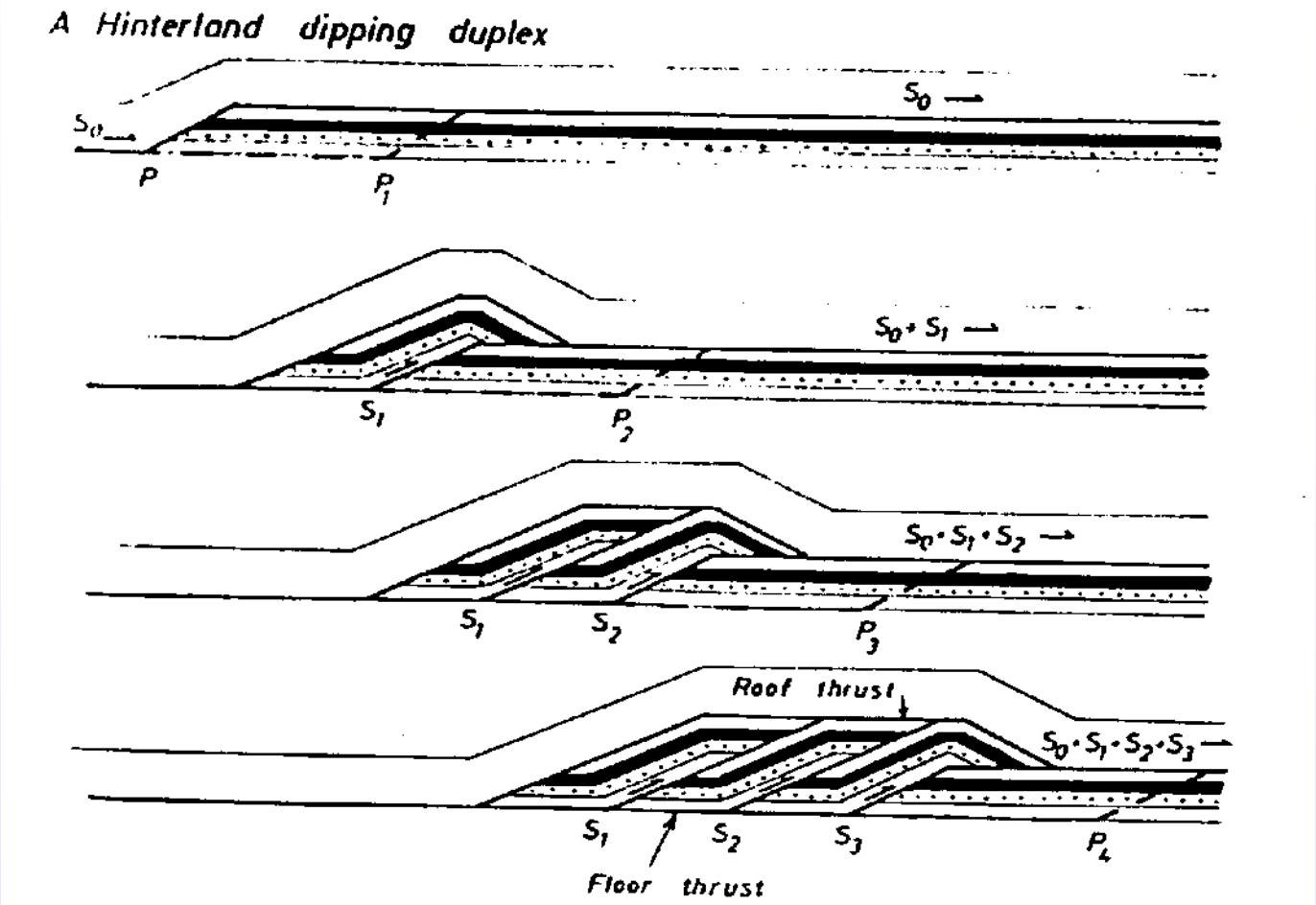
Metamorphic core complex



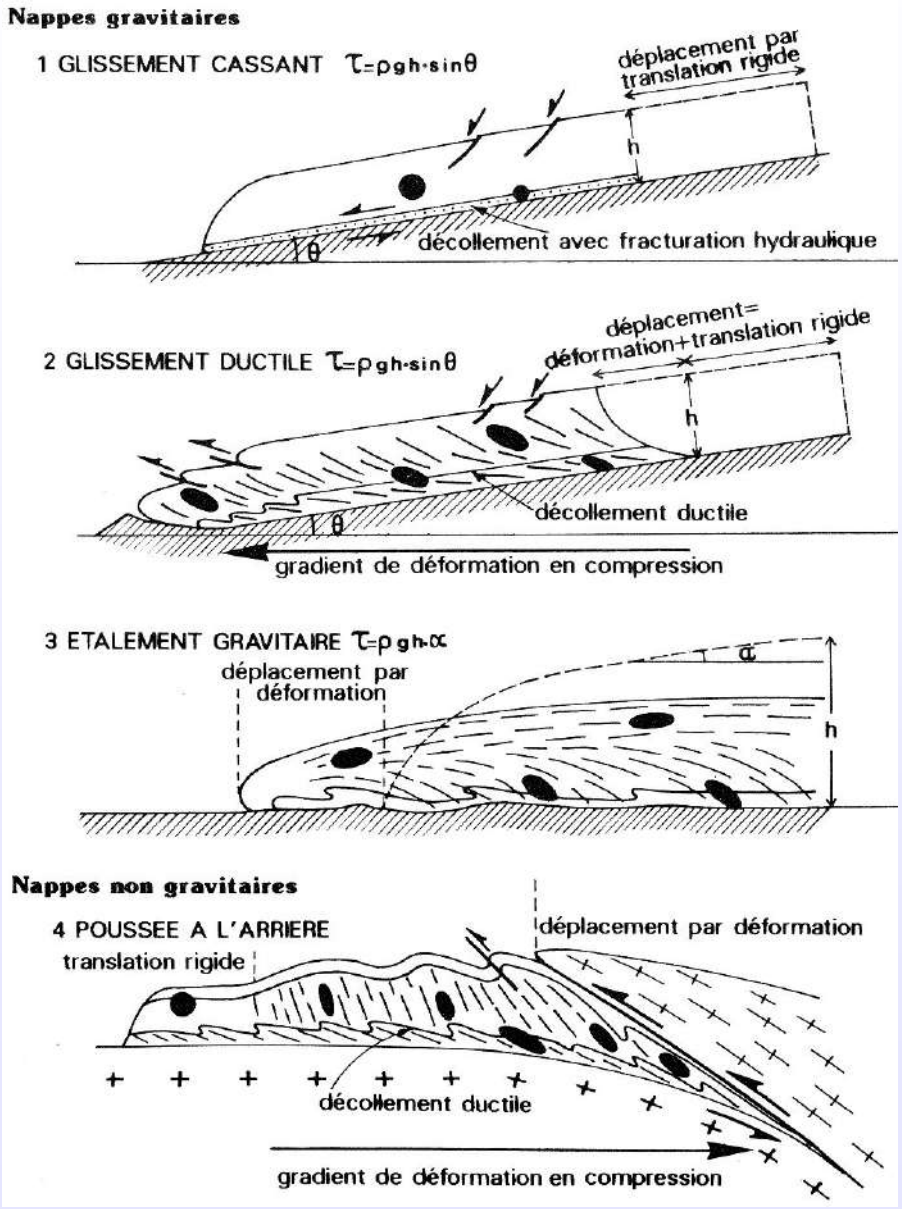
Compression



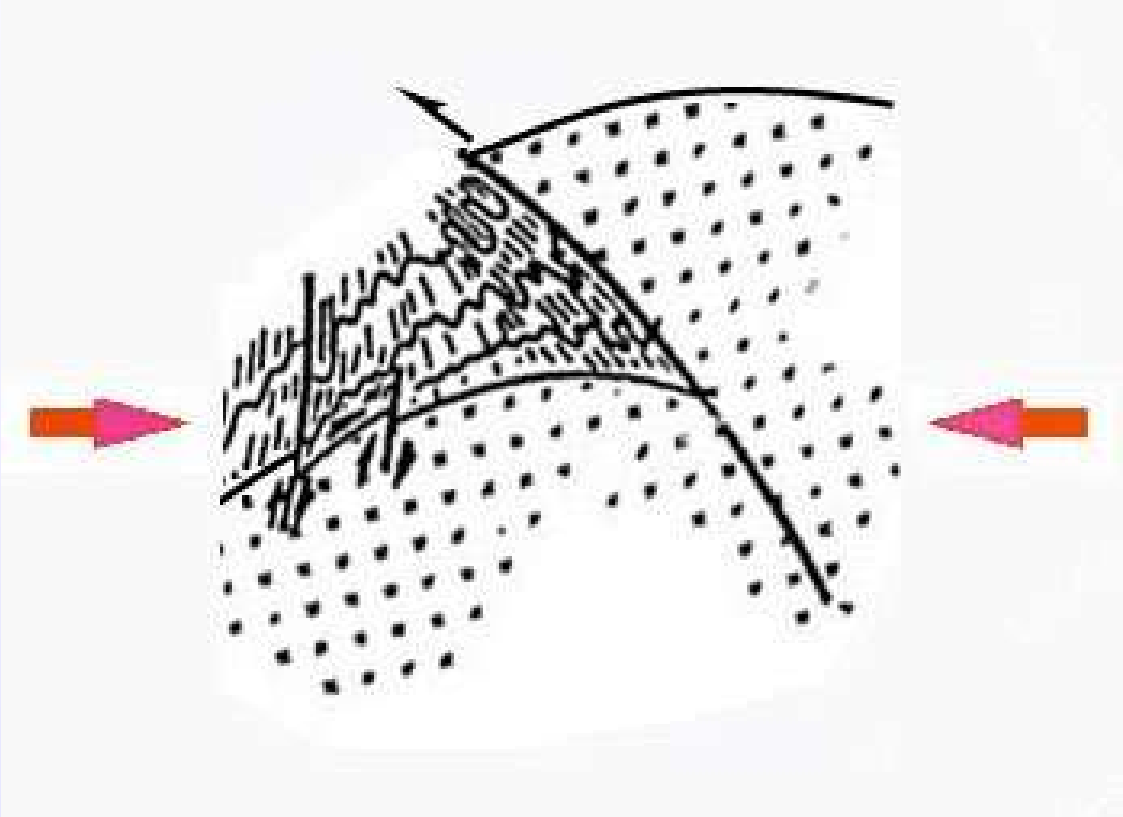

LATERAL
RAMP
FRONTAL
RAMP
FRONTAL
RAMP
OBLIQUE
RAMP
FRONTAL
RAMP


A Hinterland dipping duplex
S_0
S_0
P
P_1
$S_0 \cdot S_1$
S_1
P_2
$S_0 \cdot S_1 \cdot S_2$
S_1
S_2
P_3
Roof thrust
$S_0 \cdot S_1 \cdot S_2 \cdot S_3$
S_1
S_2
S_3
P_4
Floor thrust

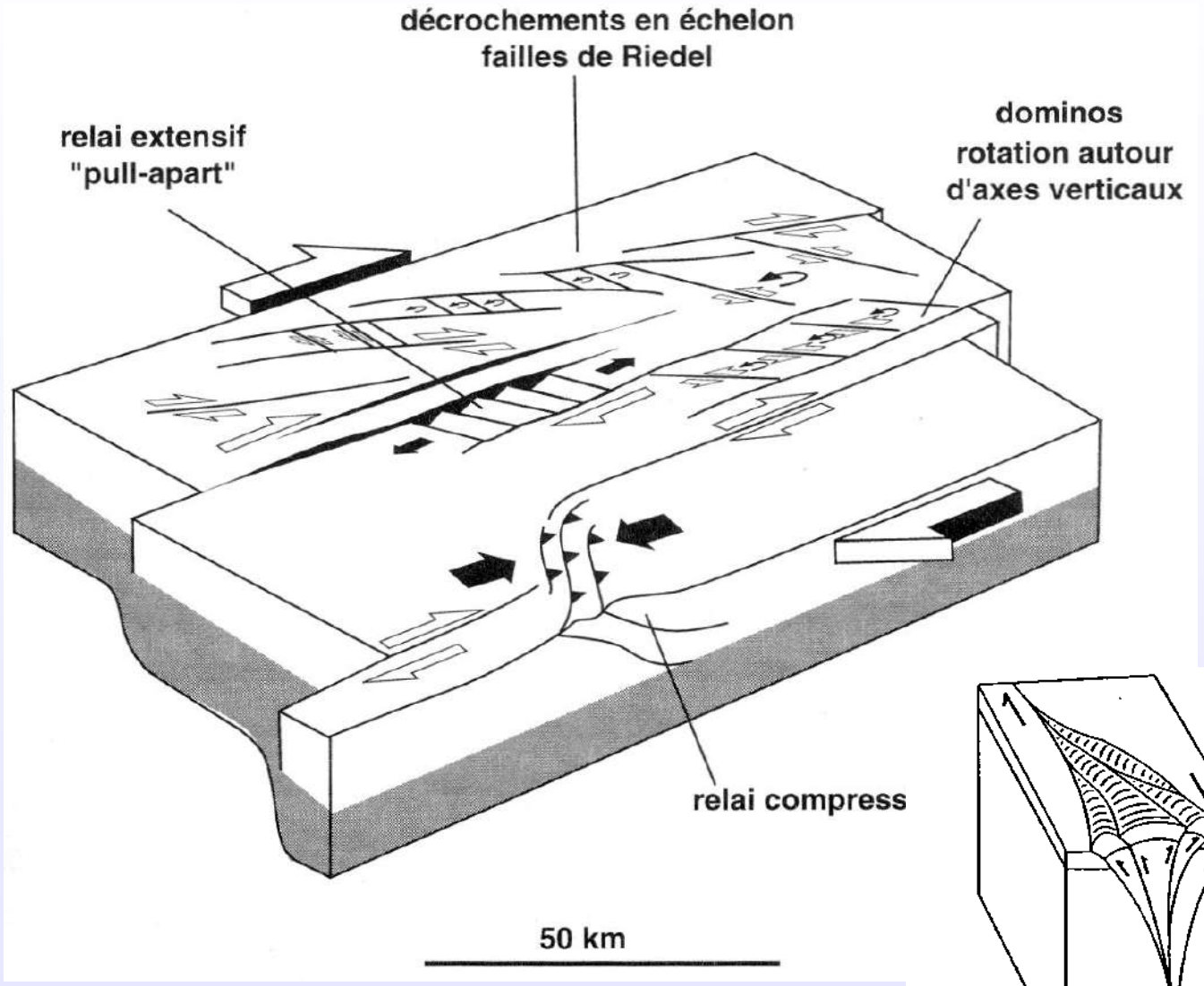
Mécanique des nappes ?

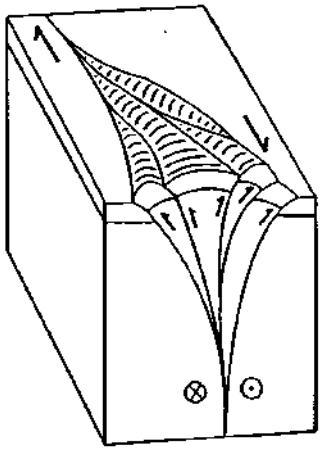


Inversion

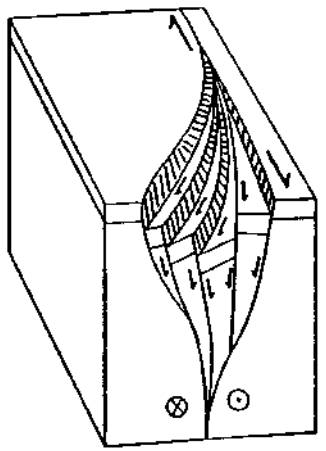


Décrochements



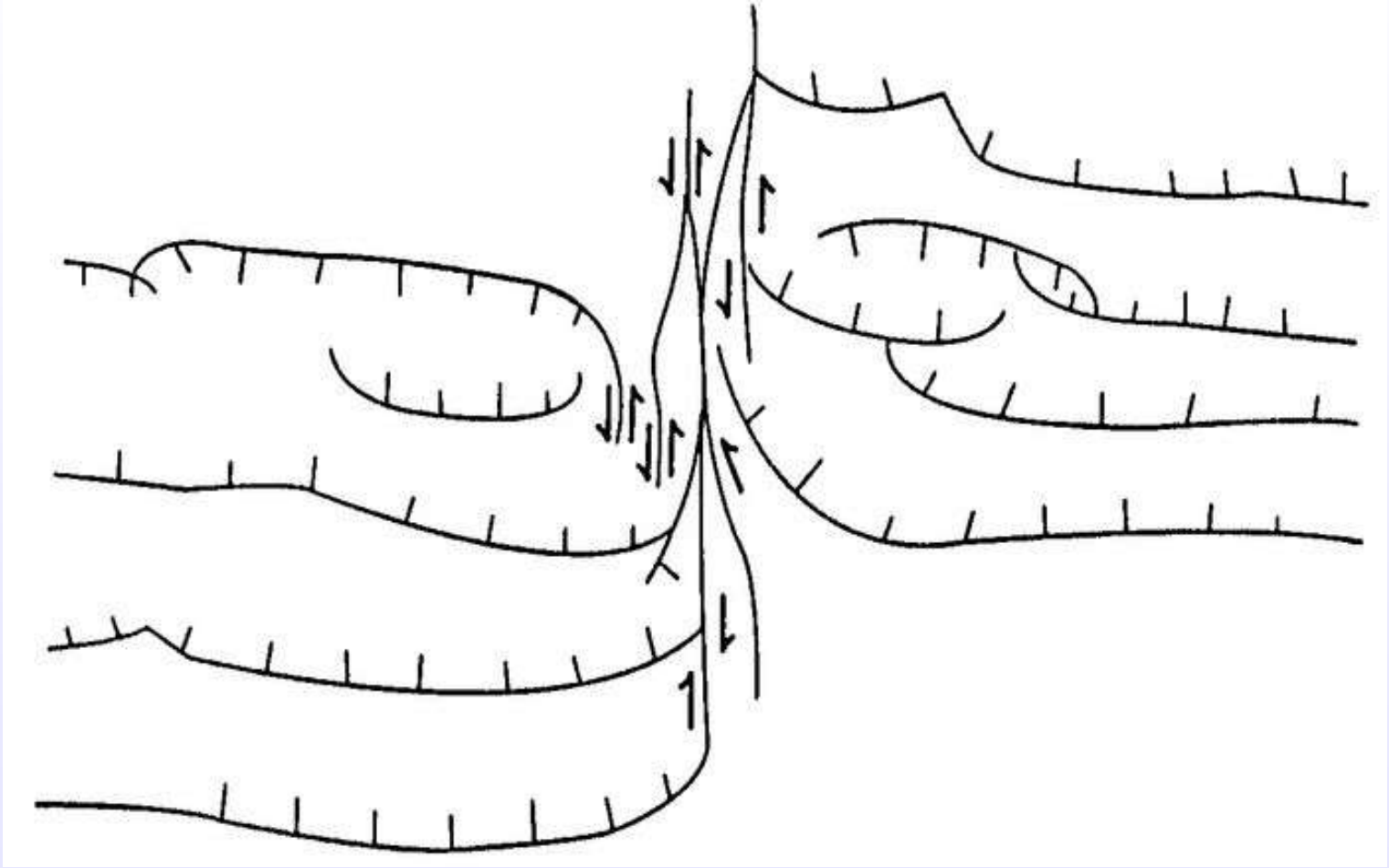


(a)

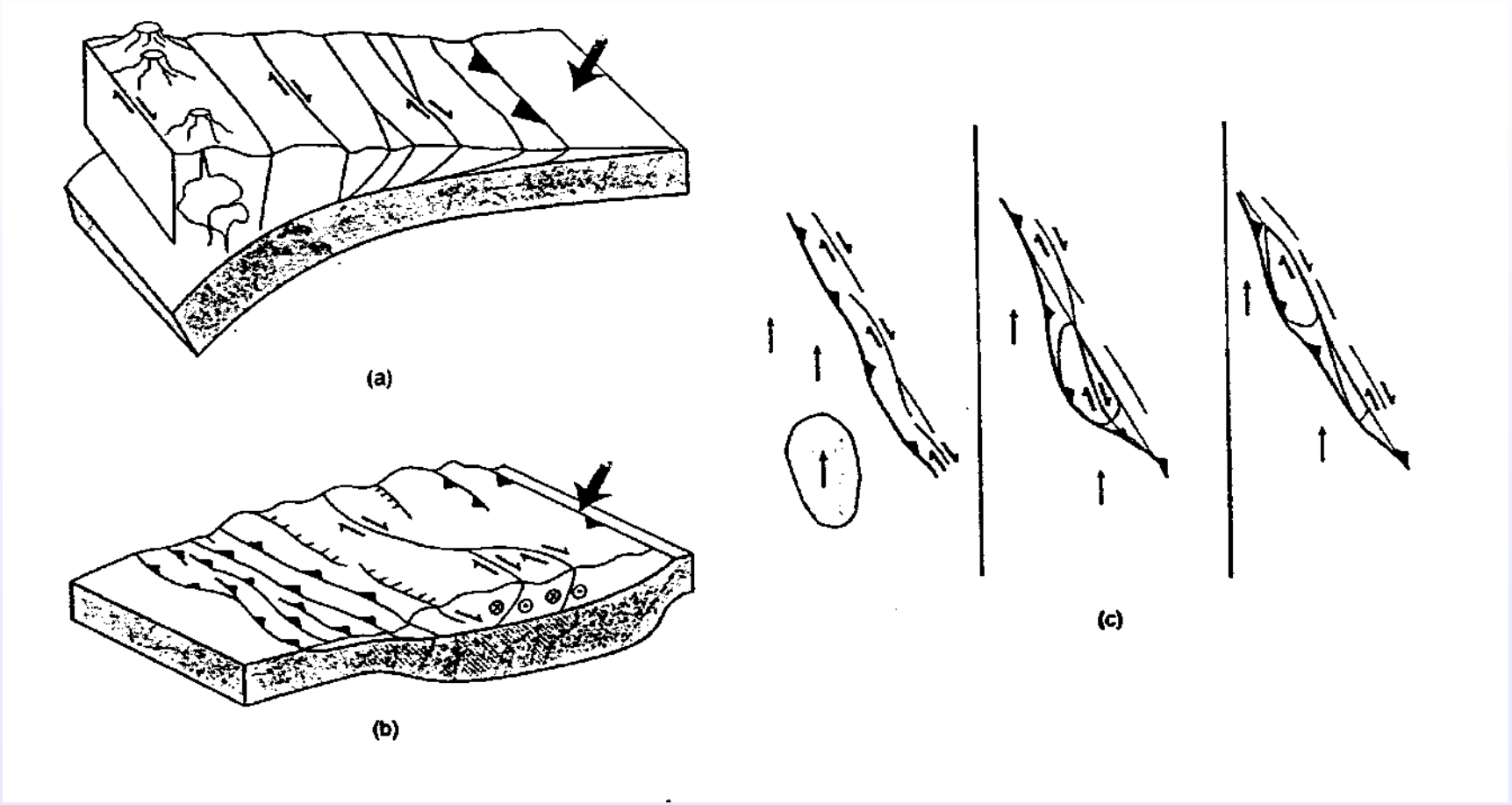


(b)

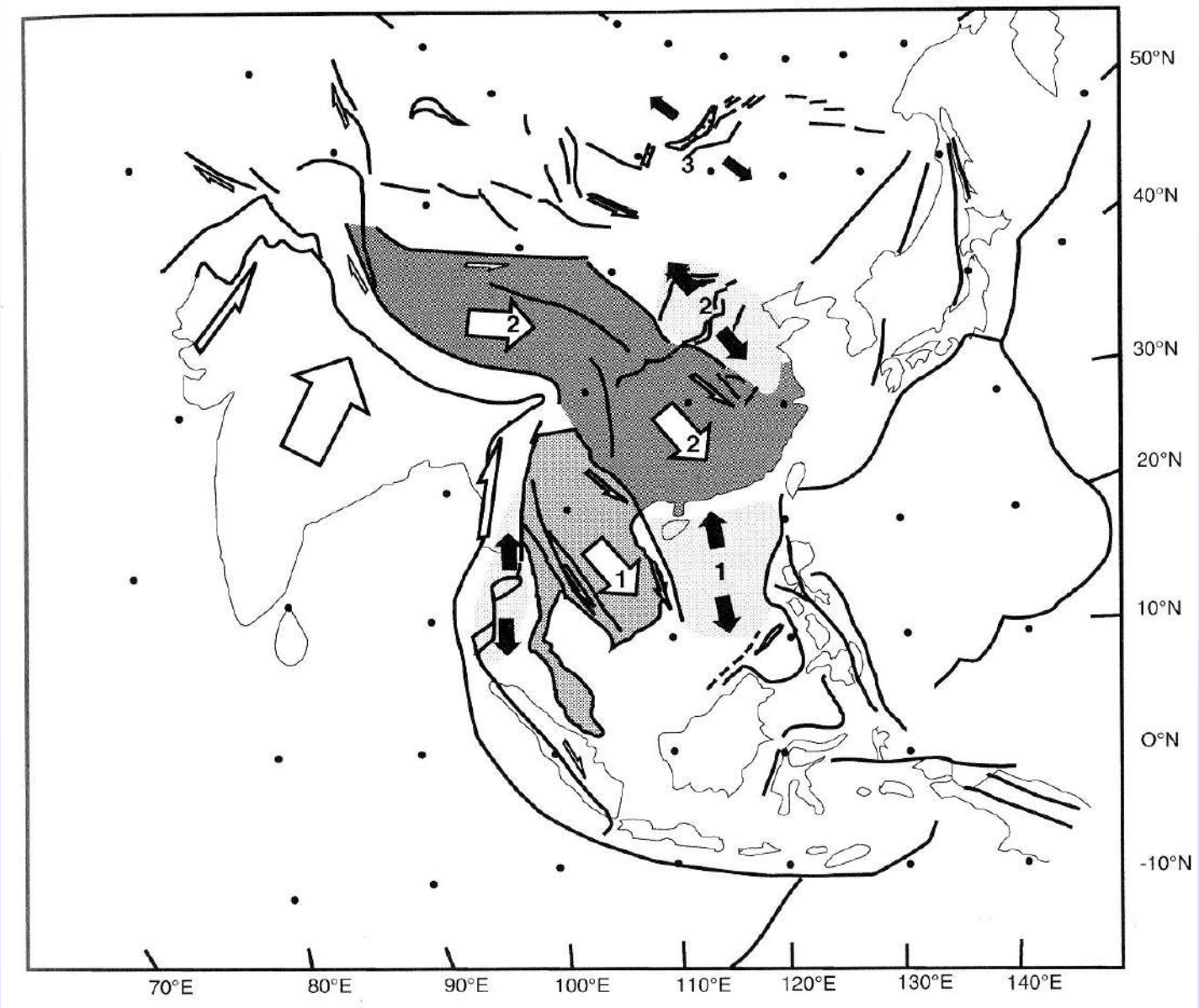
Relais décrochants



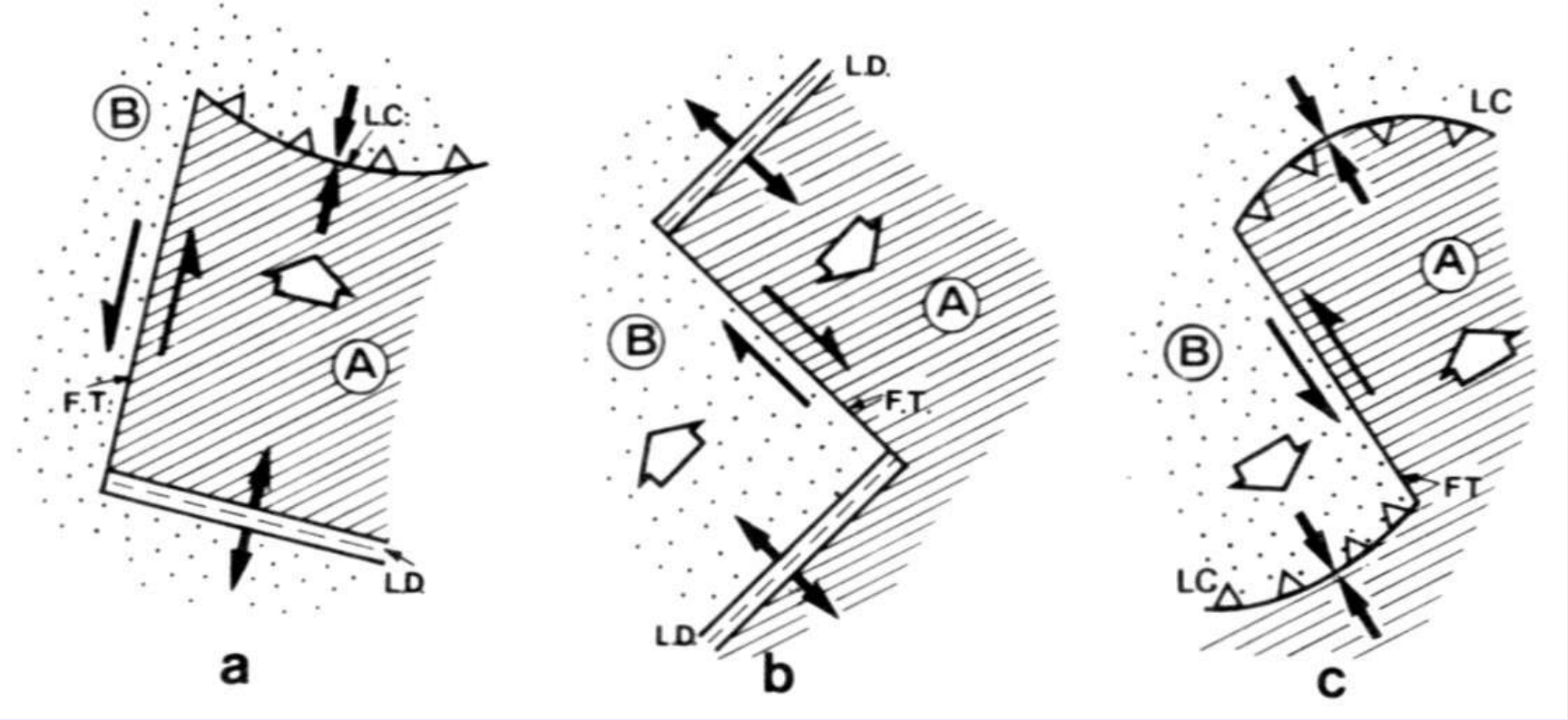
Partitionement de la déformation



Extrusion continentale



Failles transformantes



- Attention, une limite de plaque n'est *pas* un marqueur passif !

Mécanismes au foyer

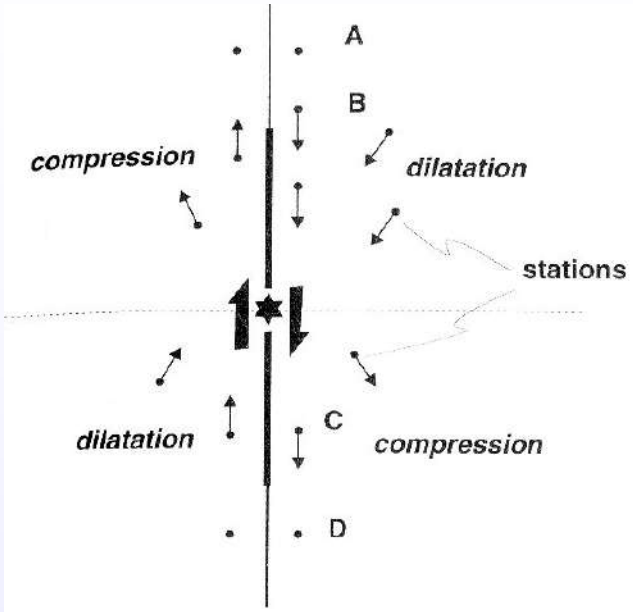
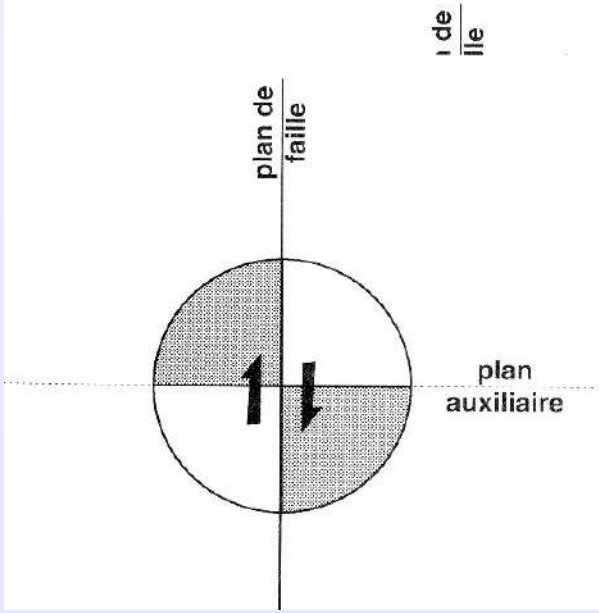
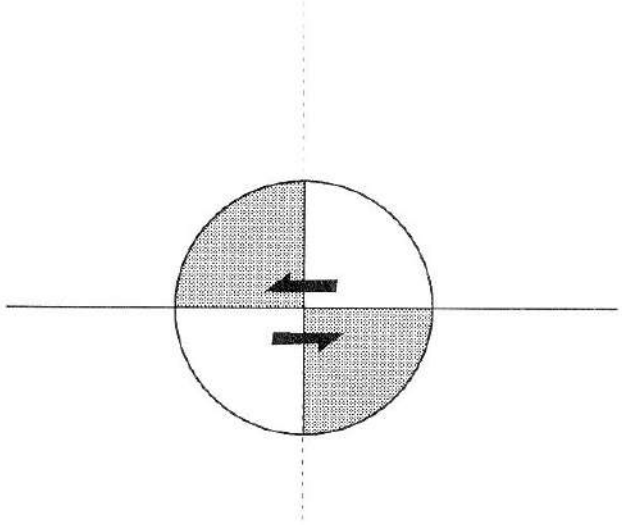
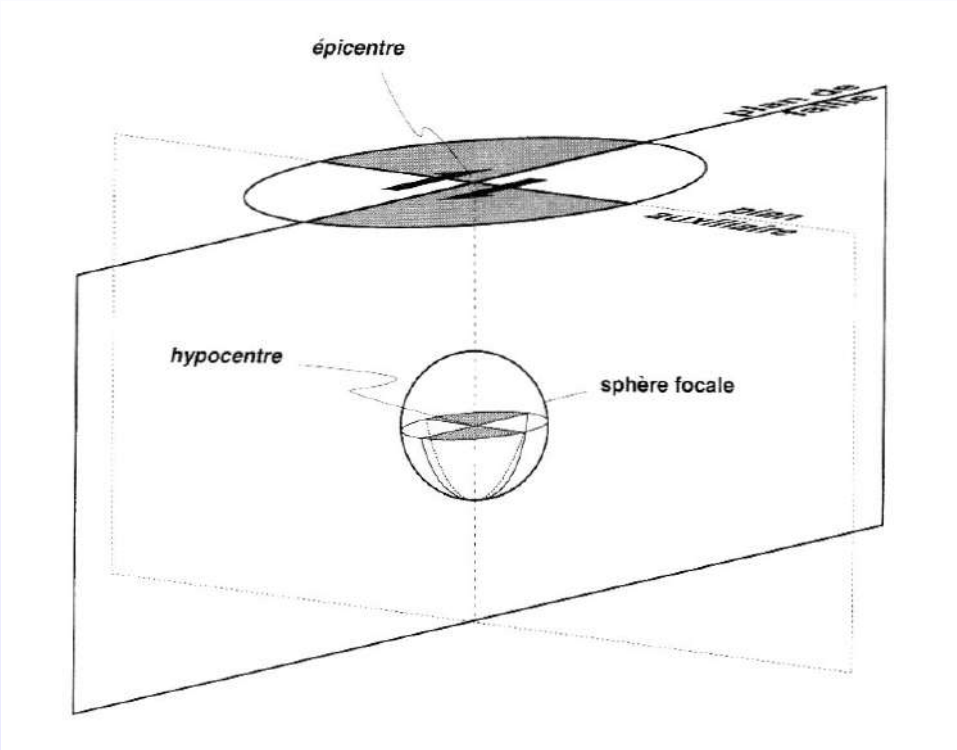
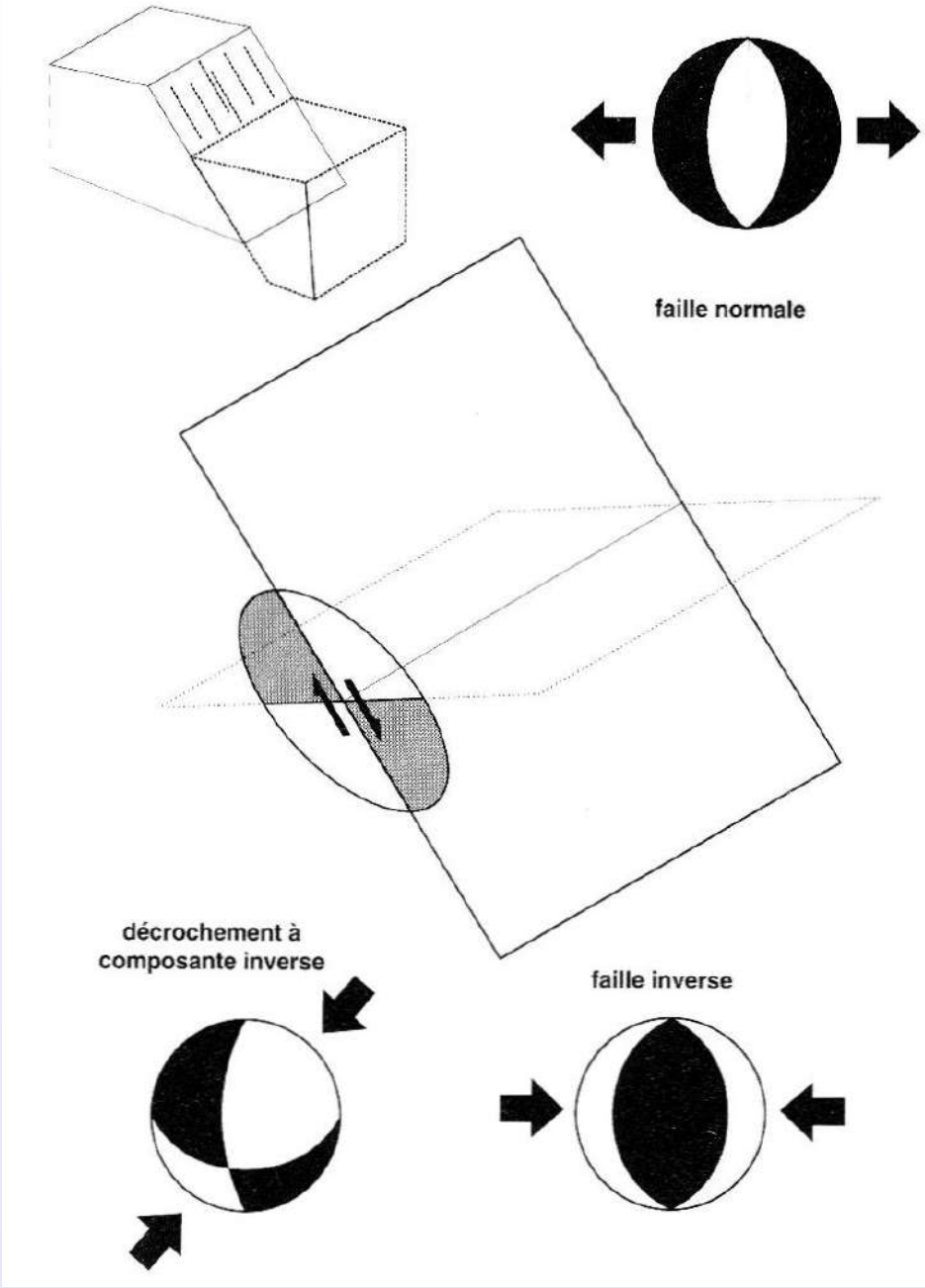


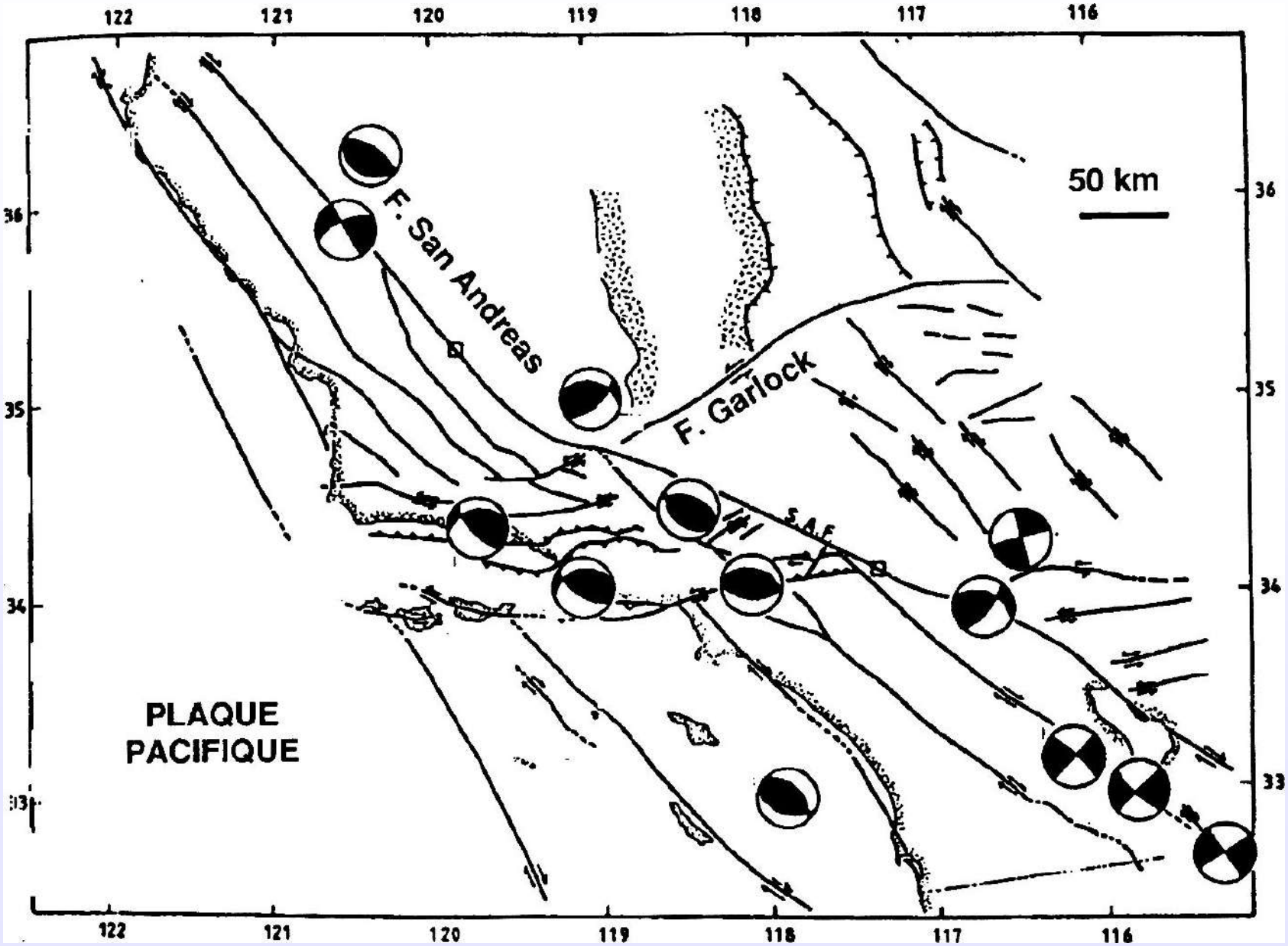
Figure V.2
Déplacements des stations d'enregistrement d'un séisme vers ou en s'éloignant de l'épicentre, et distribution en quadrants compressifs et extensifs. Le séisme est marqué par une étoile, la portion de faille activée pendant le séisme par un trait épais.





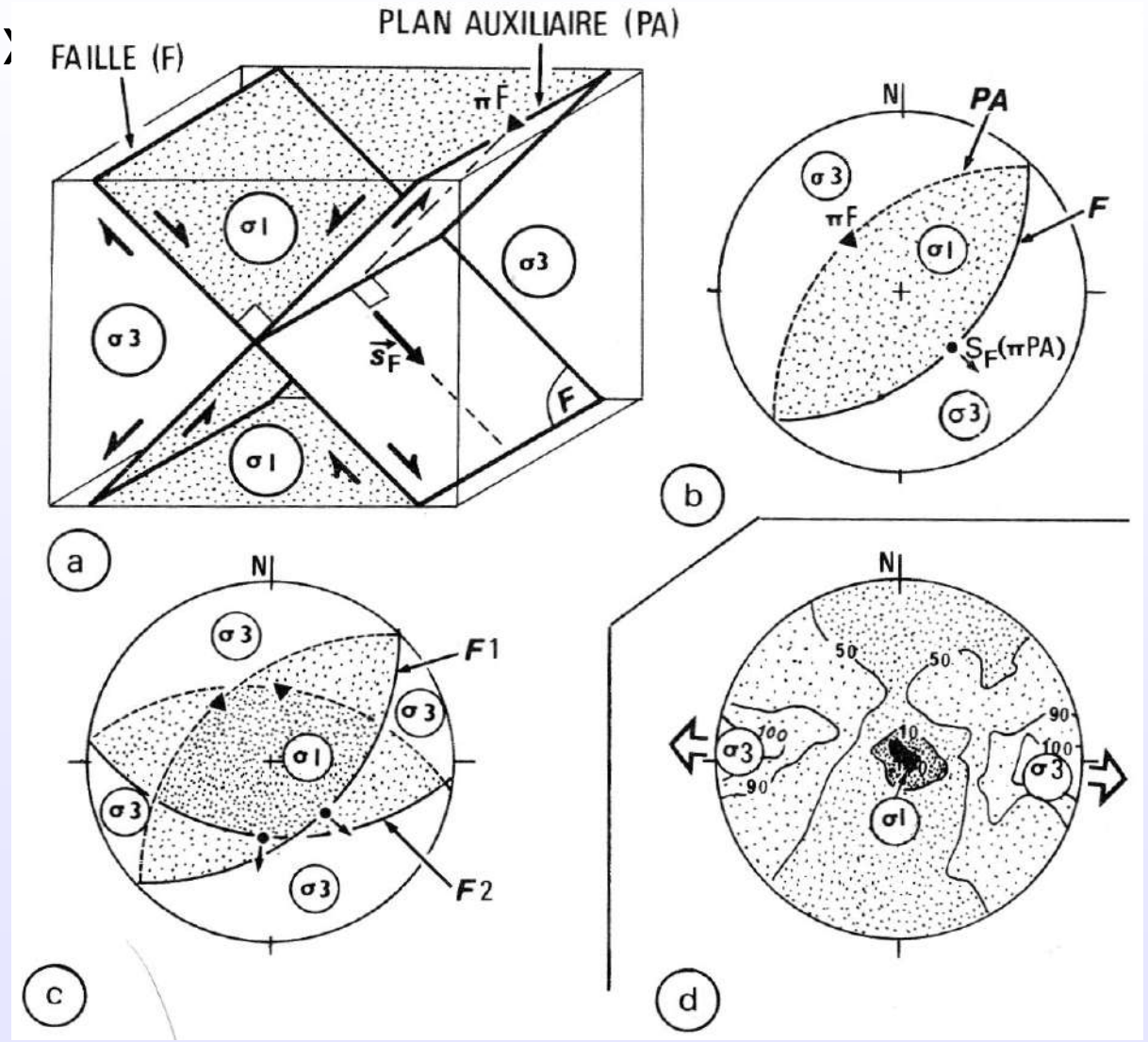

épicentre
hypocentre
sphère focale


faille normale
décrochement à
composante inverse
faille inverse

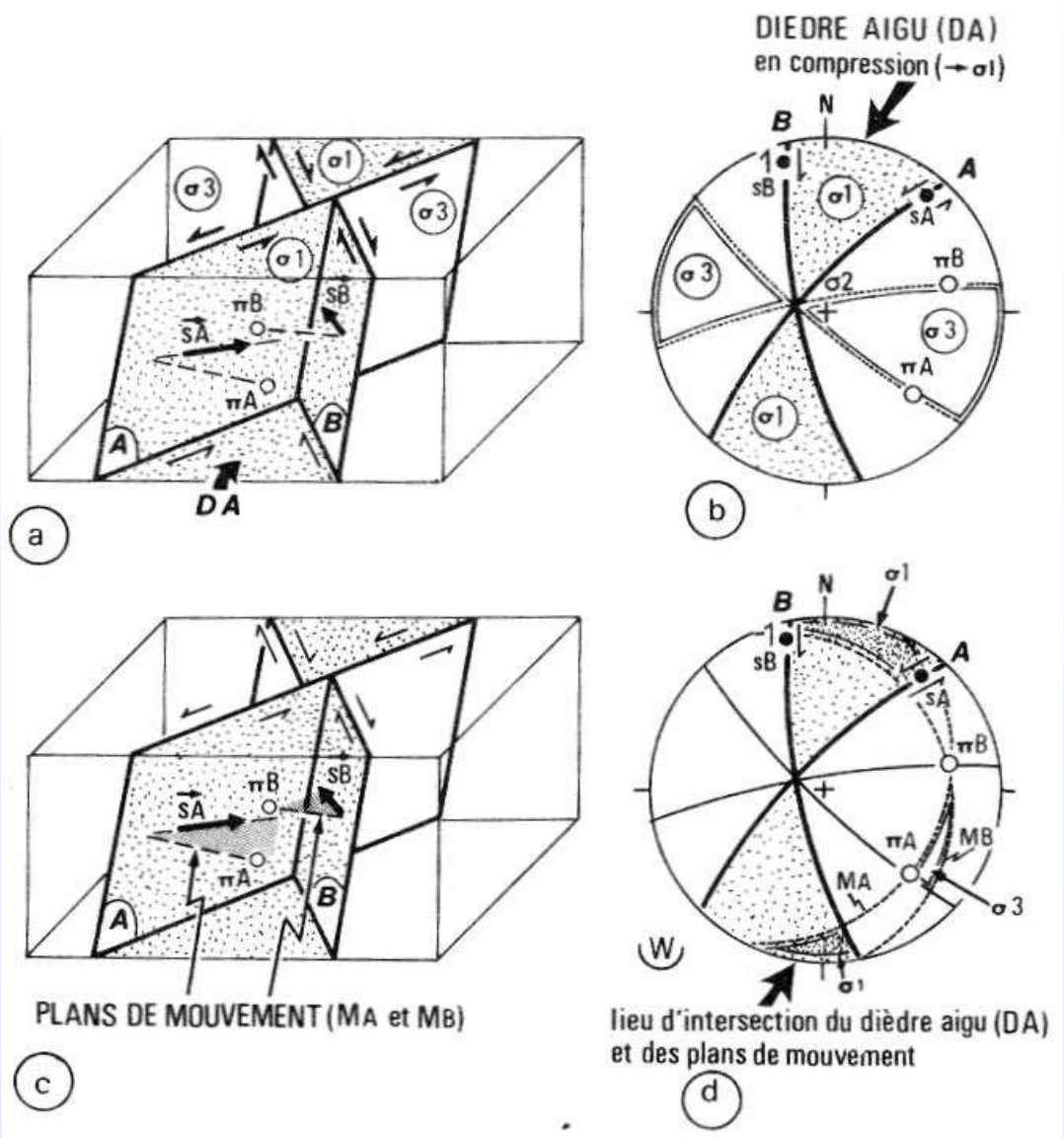

122
121
120
119
118
117
116
36
35
34
33
F. San Andreas
F. Garlock
S.A.F.
50 km
PLAQUE
PACIFIQUE

Paléocontraintes

- « Dièdres droits »



- « Dièdres aigus »



Bon courage

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   - Télécharger des cours, TD, TP et examens résolus (PDF Gratuit)

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   - Trouver des cadeaux et accessoires pour biologistes et géologues.
   - Trouver des bourses et des écoles privées

3. https://biologie-maroc.com/emploi/
   - Télécharger des exemples des CV, lettres de motivation, demandes de ...
   - Trouver des offres d'emploi et de stage