

Géologie Structurale

STU S3



Shop

- Cahiers de Biologie + Lexique
- Accessoires de Biologie



Etudier

Visiter [Biologie Maroc](http://www.biologie-maroc.com) pour étudier et passer des QUIZ et QCM en ligne et Télécharger TD, TP et Examens résolus.

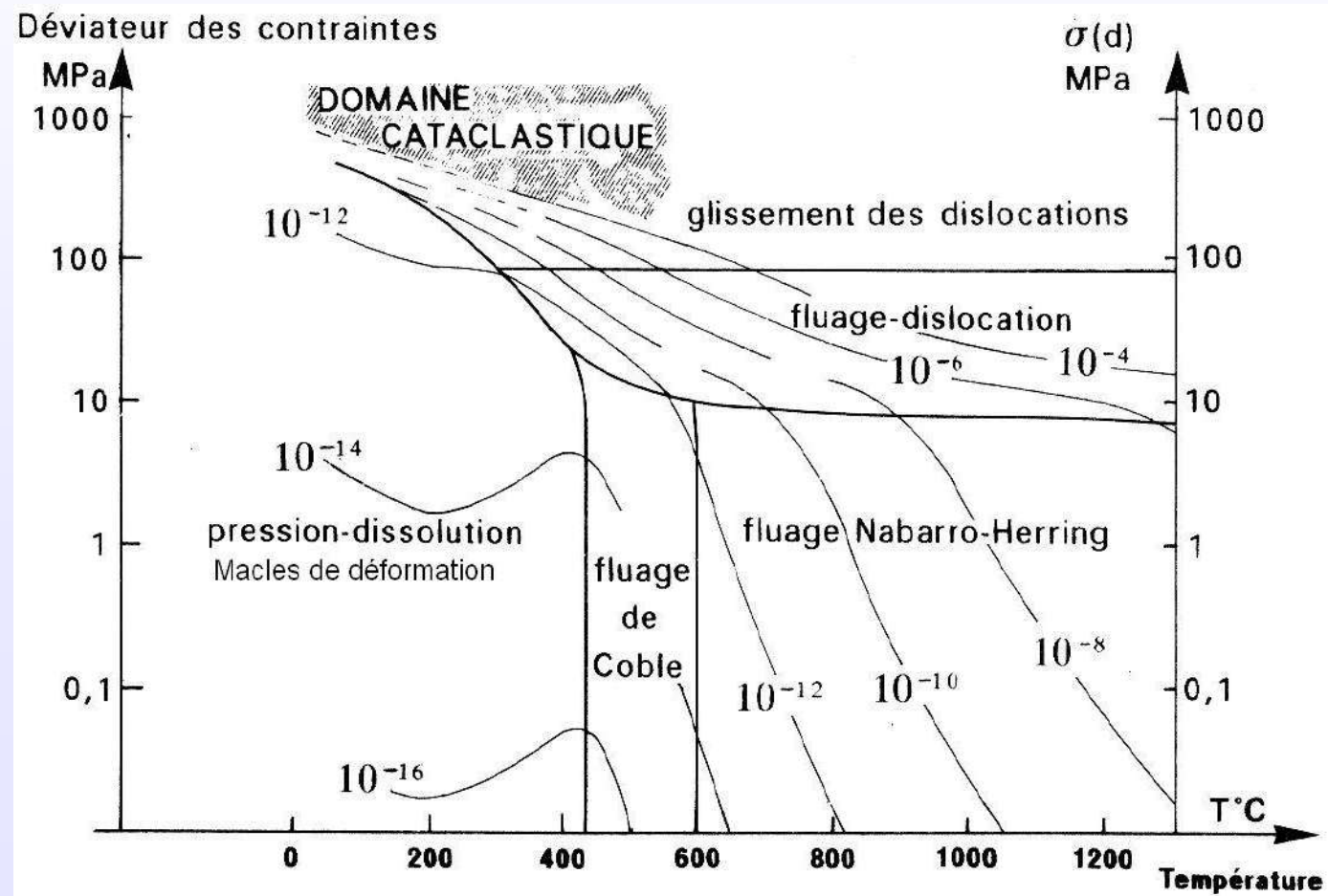


Emploi

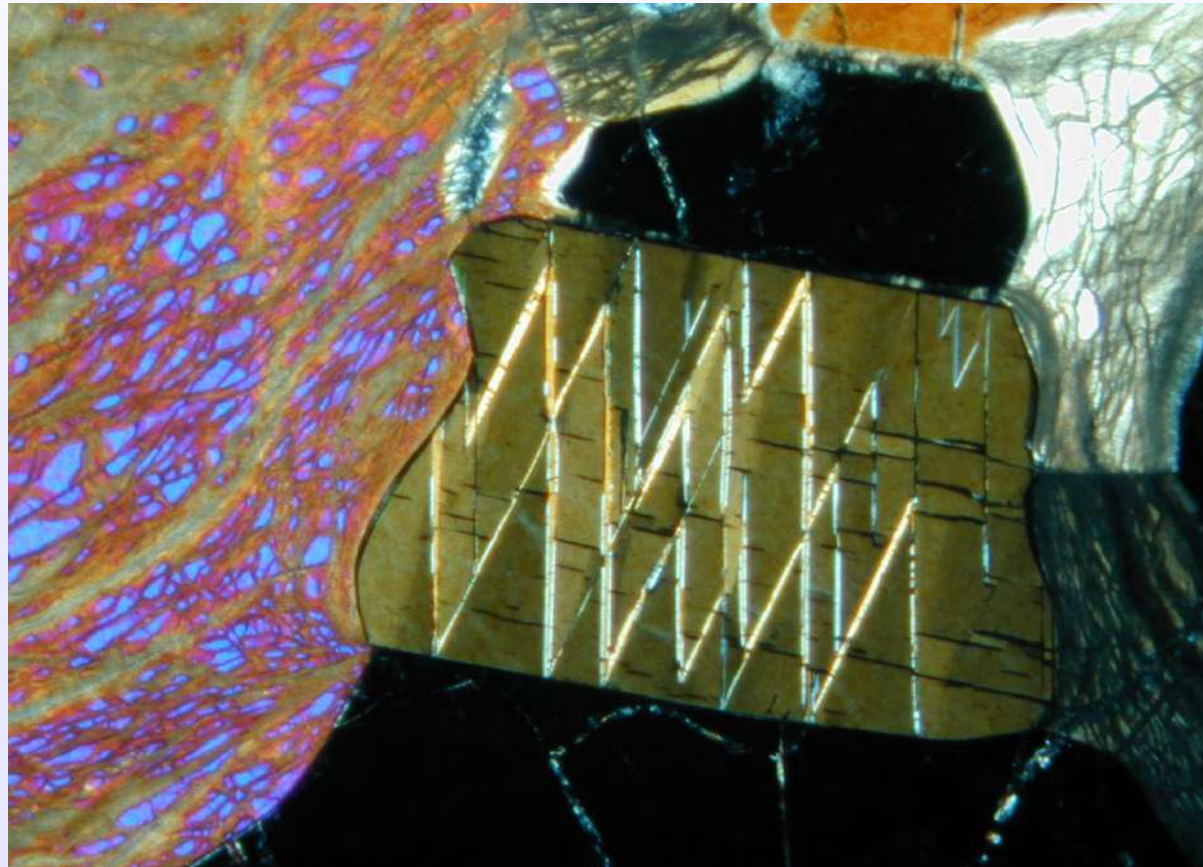
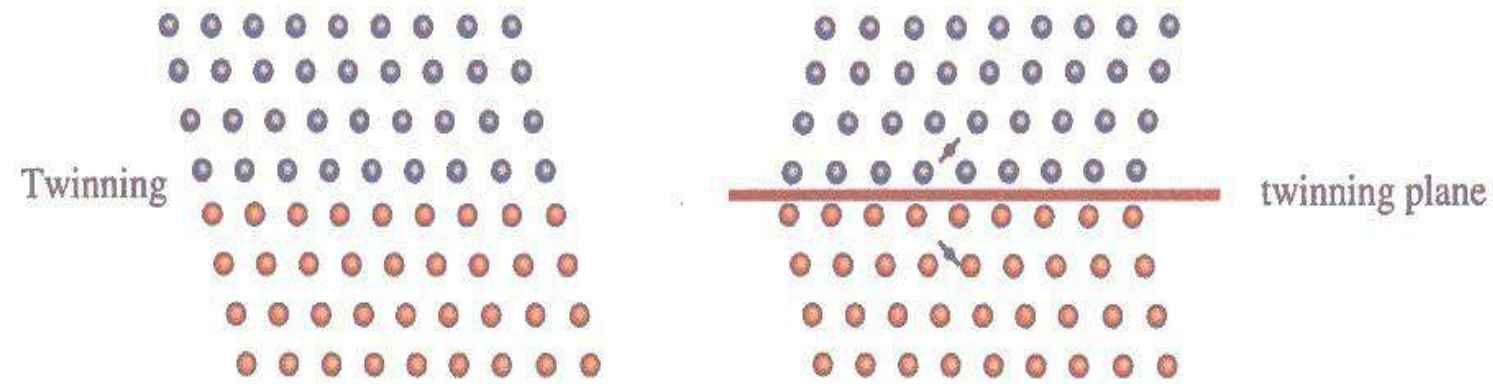
- CV • Lettres de motivation • Demandes...
- Offres d'emploi
- Offres de stage & PFE

Mécanismes de la déformation ductile

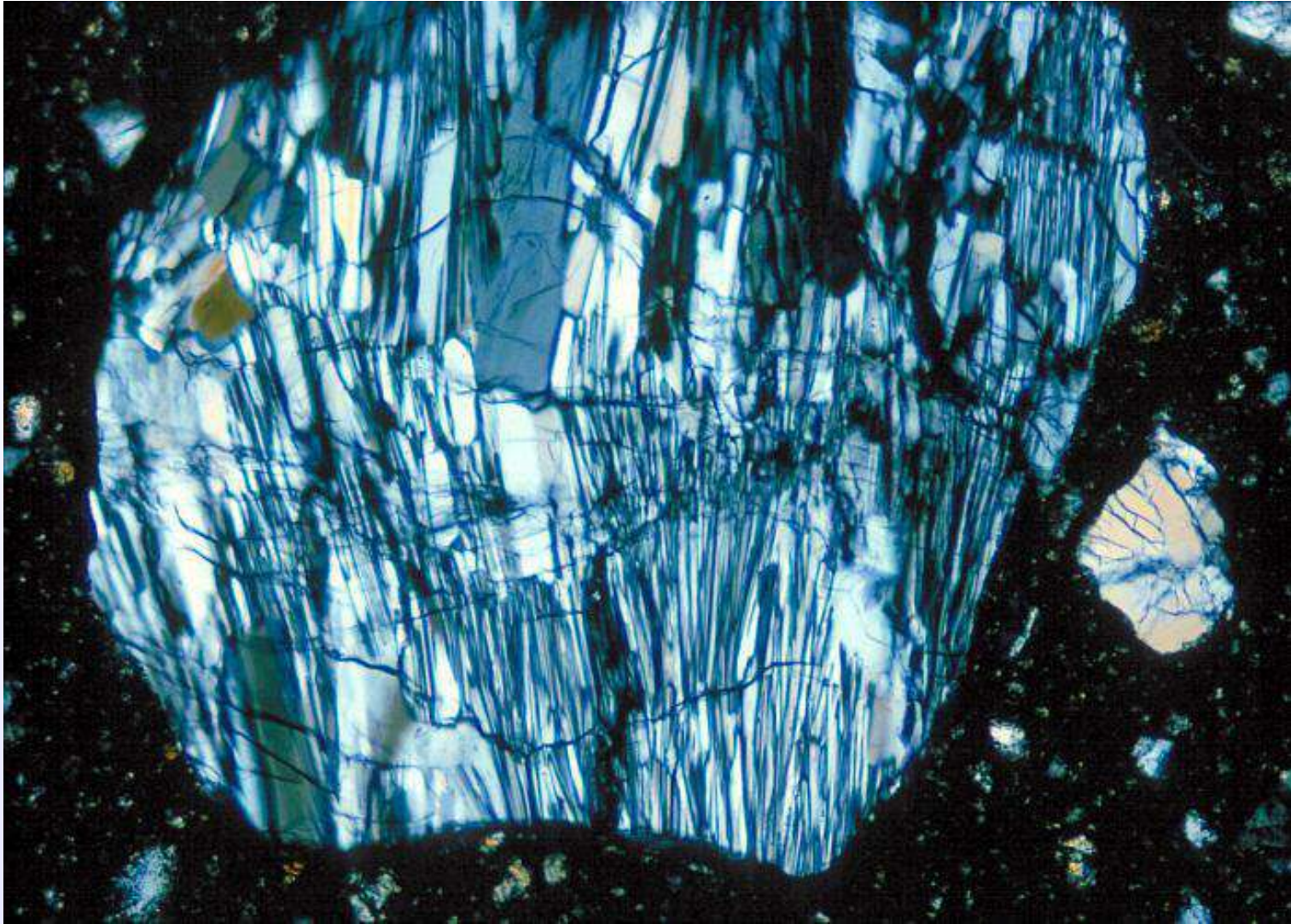
- Microfracturation/cataclase
- Macles de déformation
- Pression-dissolution
- Fluage-dissolution
(*N.-H. et Coble*)
- Fluage-dislocation
- Recristallisation
(*statique/dynamique*)



Macles de déformation



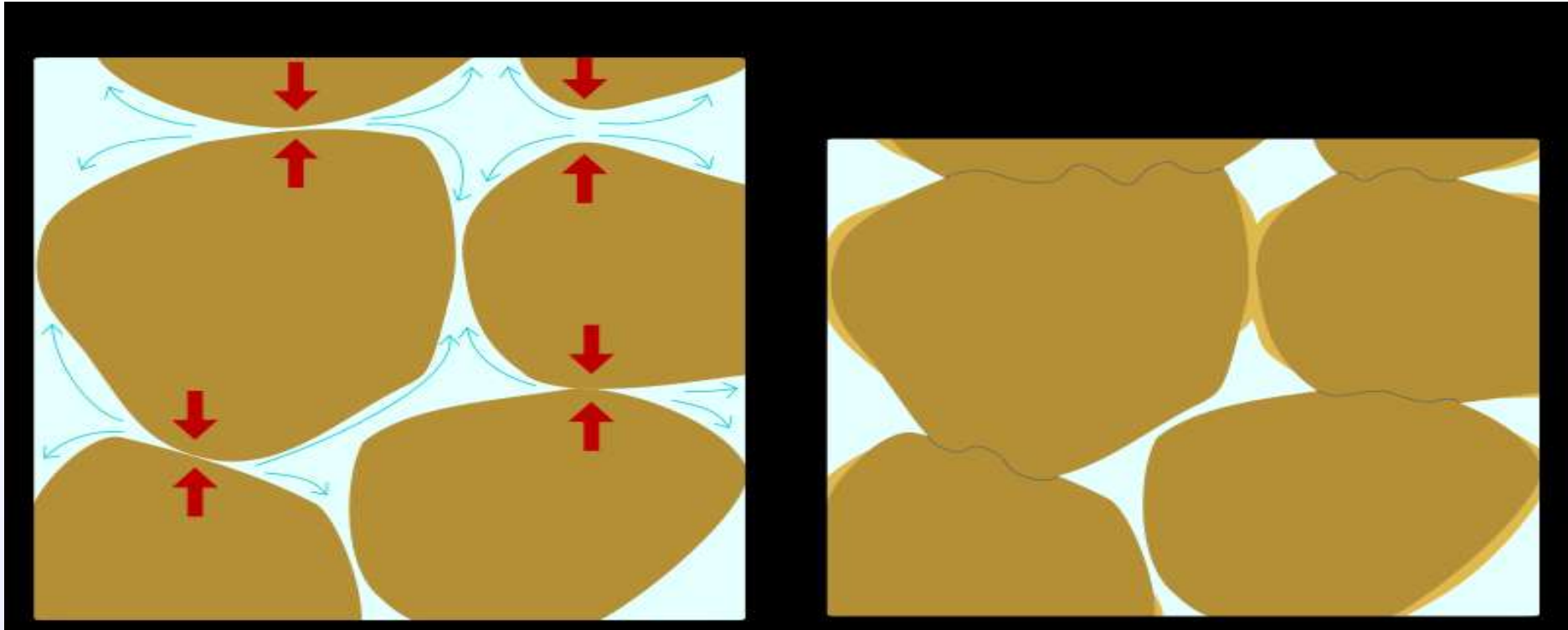
Macles de déformation dans du disthène
Eclogite à coésite, près de Kimberley, Afr. Sud



Macle de déformation (choc)

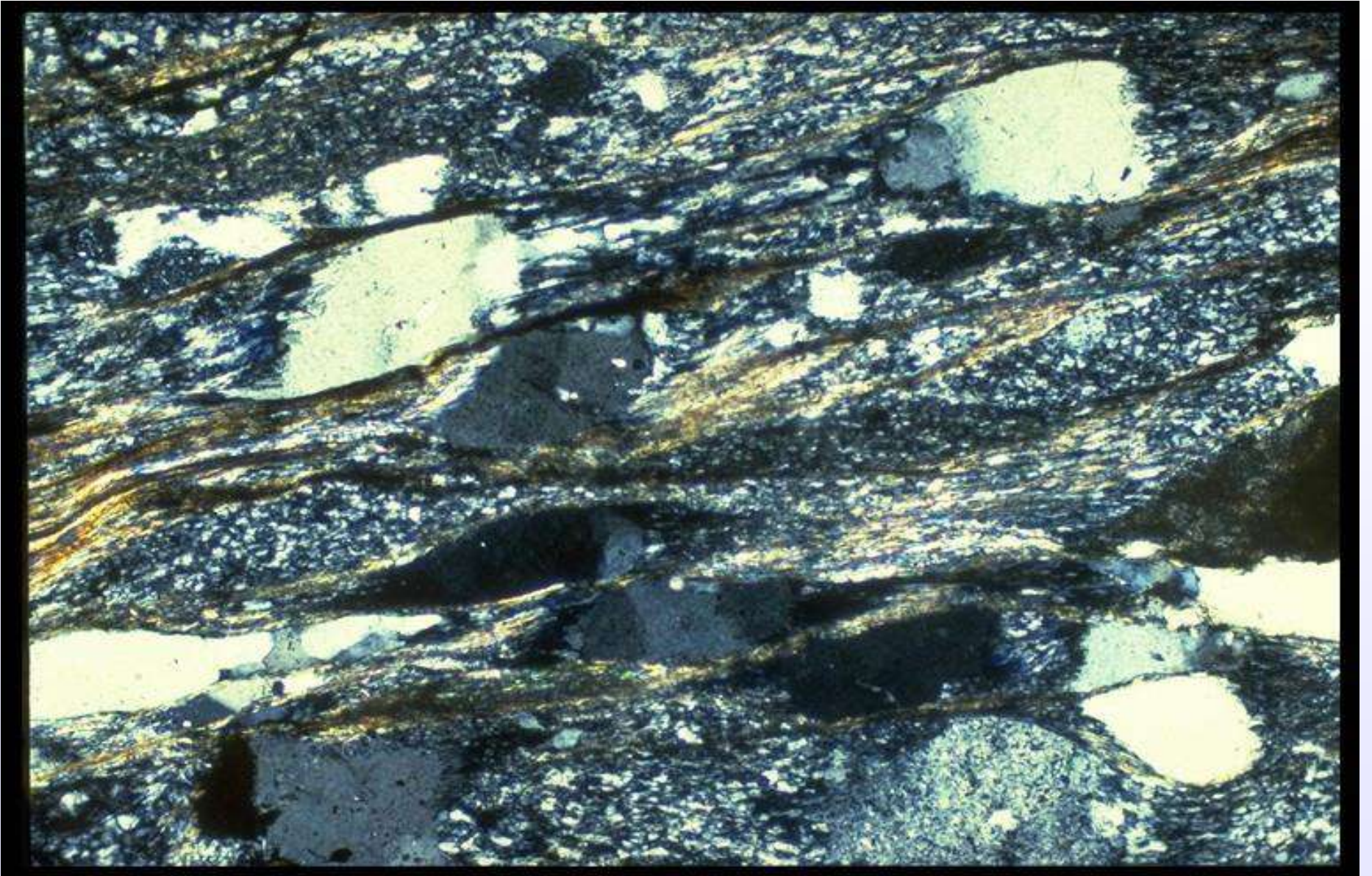
Plagioclase – échantillon lunaire 14305,176. Brèche anorthositique

Pressure-dissolution



(Wikipedia)

Pressure dissolution

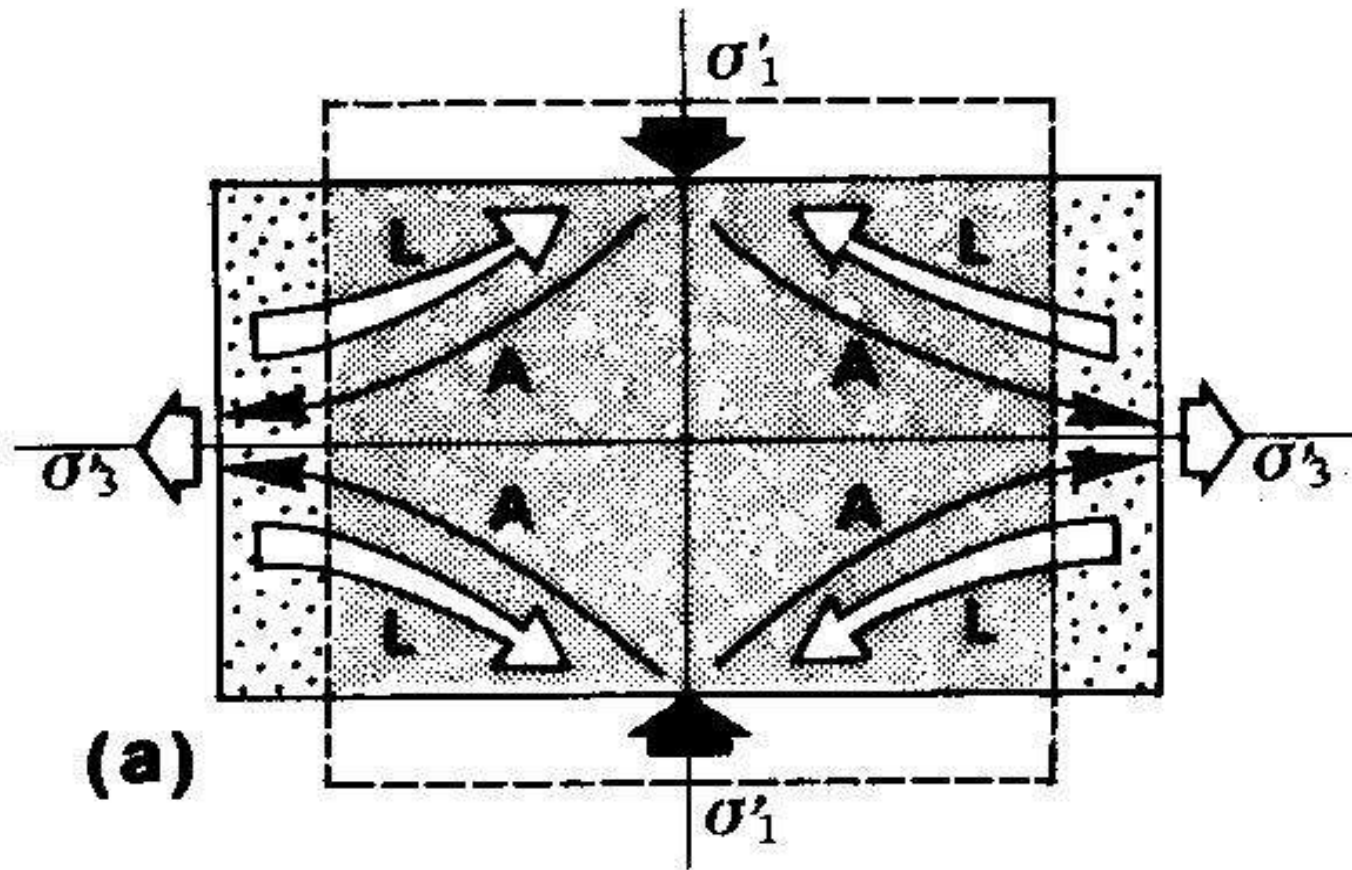


Schistosité par pression-dissolution. Grès (?)

<http://www.uky.edu/AS/Geology/ohara/420g/pressure%20solution1.jpg>

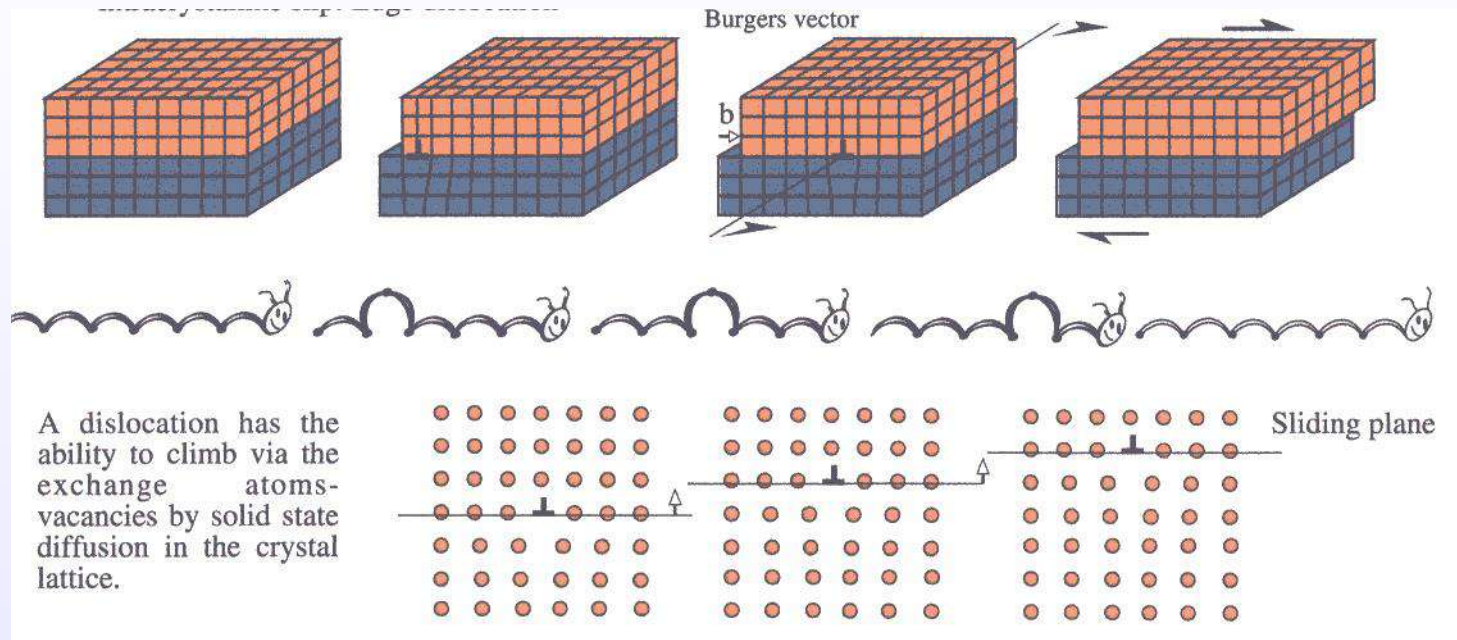
Fluage-diffusion

(newtonien)

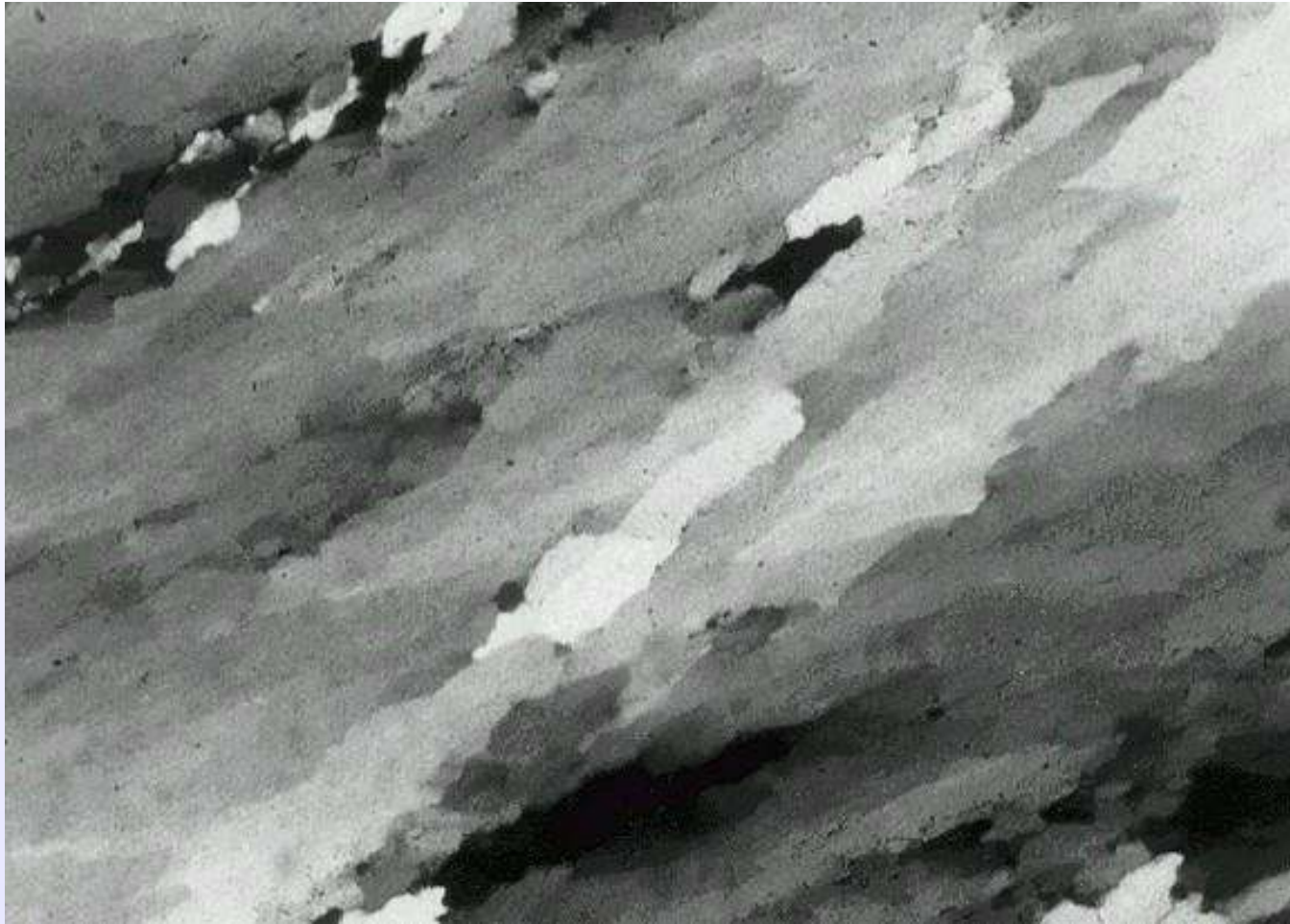


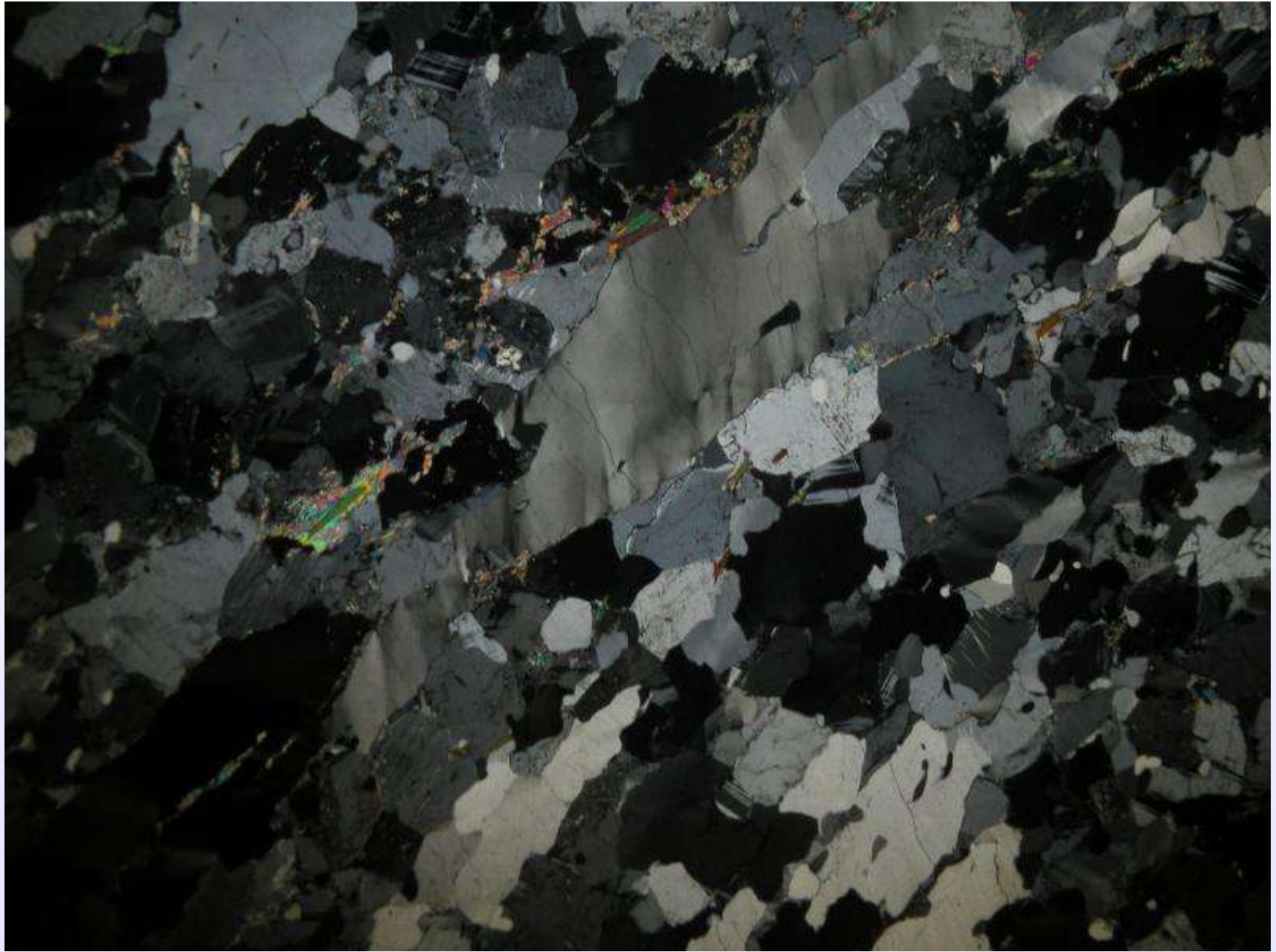
Fluage-dislocation

(non-newtonien)



Accumulation de dislocation et formation de sous-grains

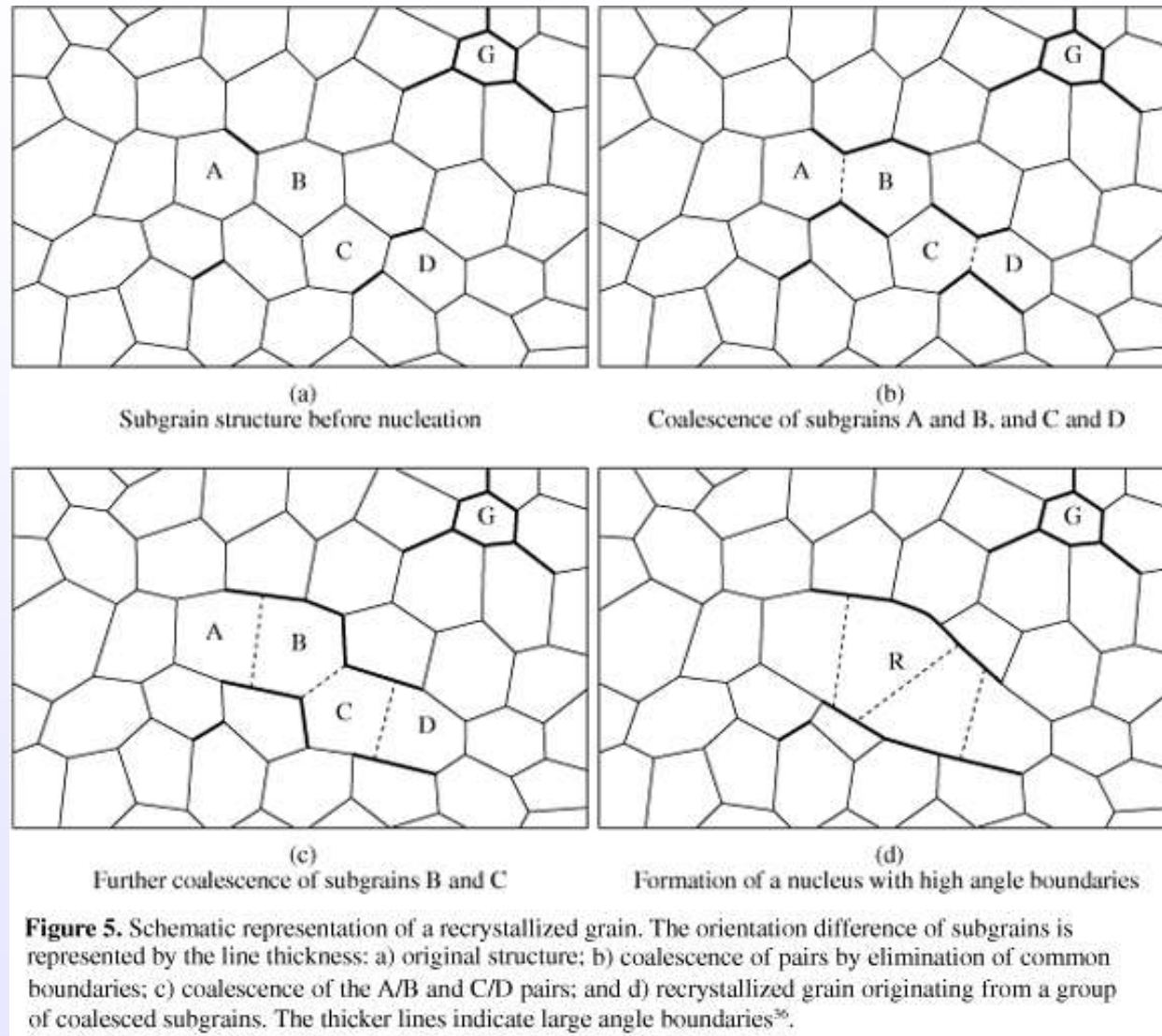




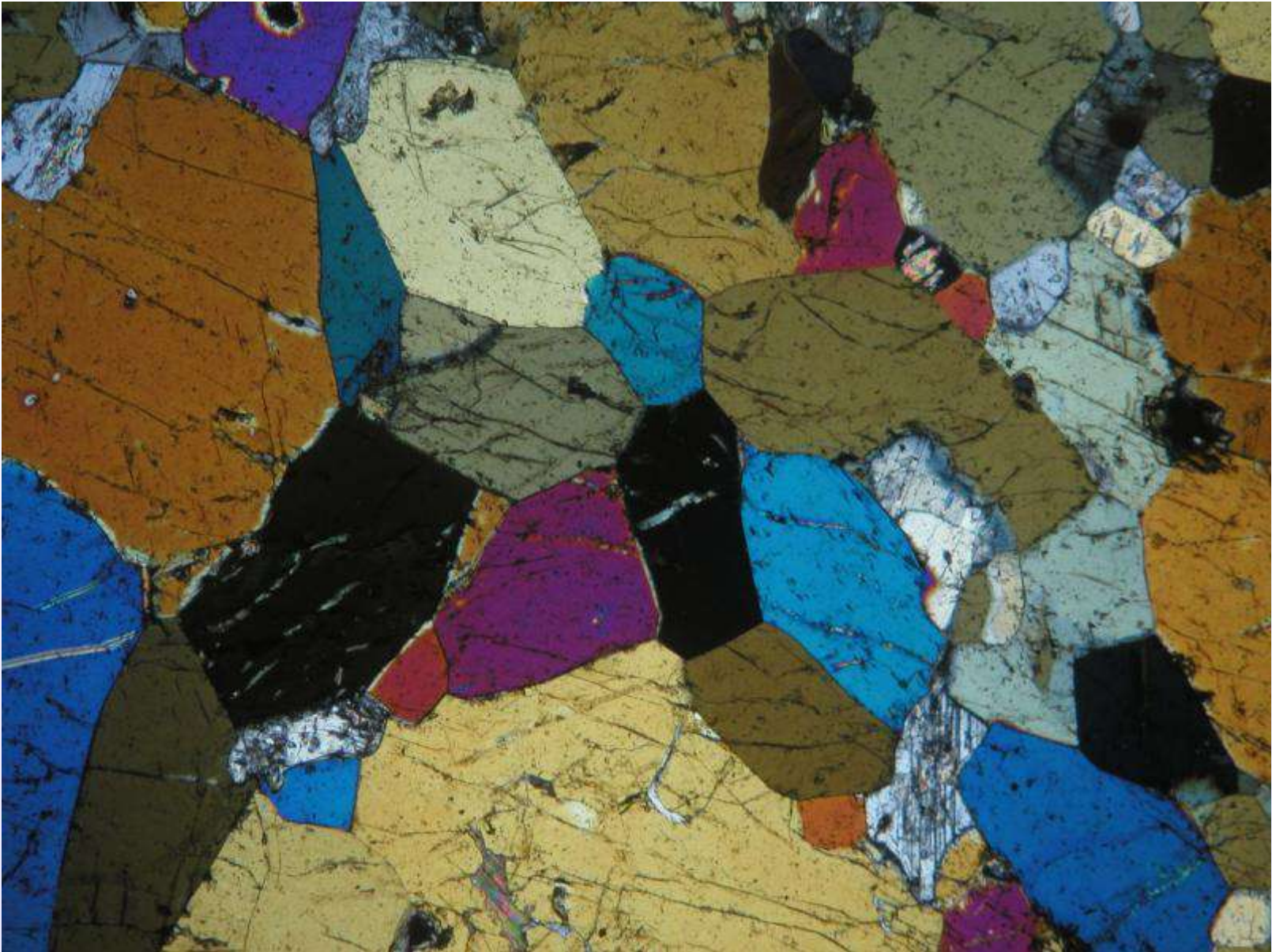
Rubans de quartz (sous-grains). Granite, W. greenland



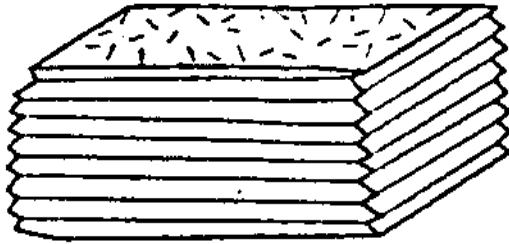
Recrystallisation dynamique



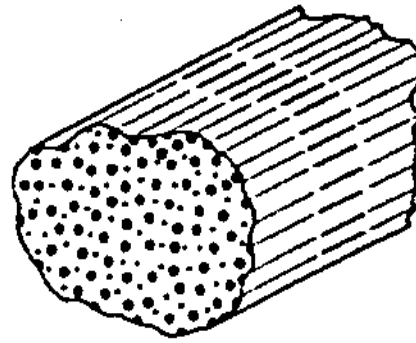
Recuit post-déformation



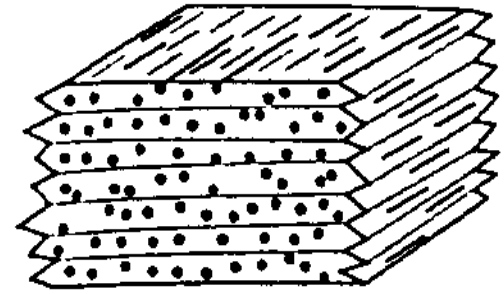
Amphibolite, W. Greenland



(a)



(b)



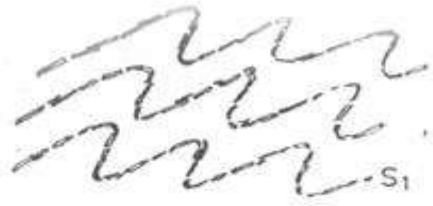
(c)

<i>En Anglais</i>	<i>En Français</i>
Planar fabric = foliation	Fabrique planaire
<ul style="list-style-type: none"> ▪ Cleavage ▪ Schistosity ▪ Gneissosity 	Schistosité = débit mécanique
	Foliation = alternances minérales
	Fabrique linéaire (linéation)

Types d'éléments planaires et mécanismes

- Schistosité disjointe (*disjunctive cleavage*)
- Schistosité de flux (*slaty cleavage*)
- Foliation (*schistosity, gneissosity*)
- Crénelation
- Transposition
- Microfracturation
- Pression-dissolution
- Rotation rigide
- Déformation de minéraux
- Cristallisation orientée

Crénulation



(a)



(b)



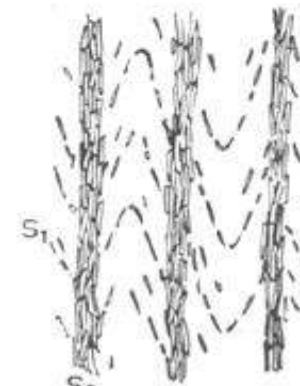
(c)



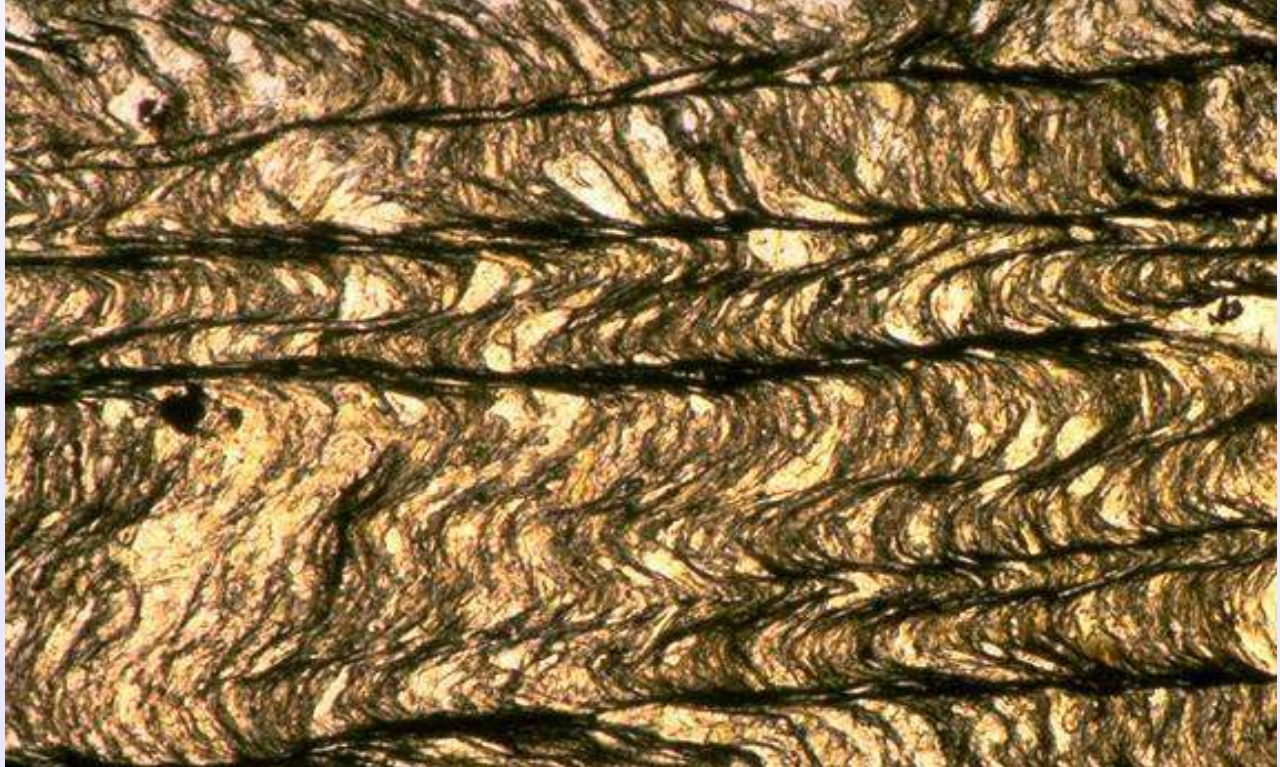
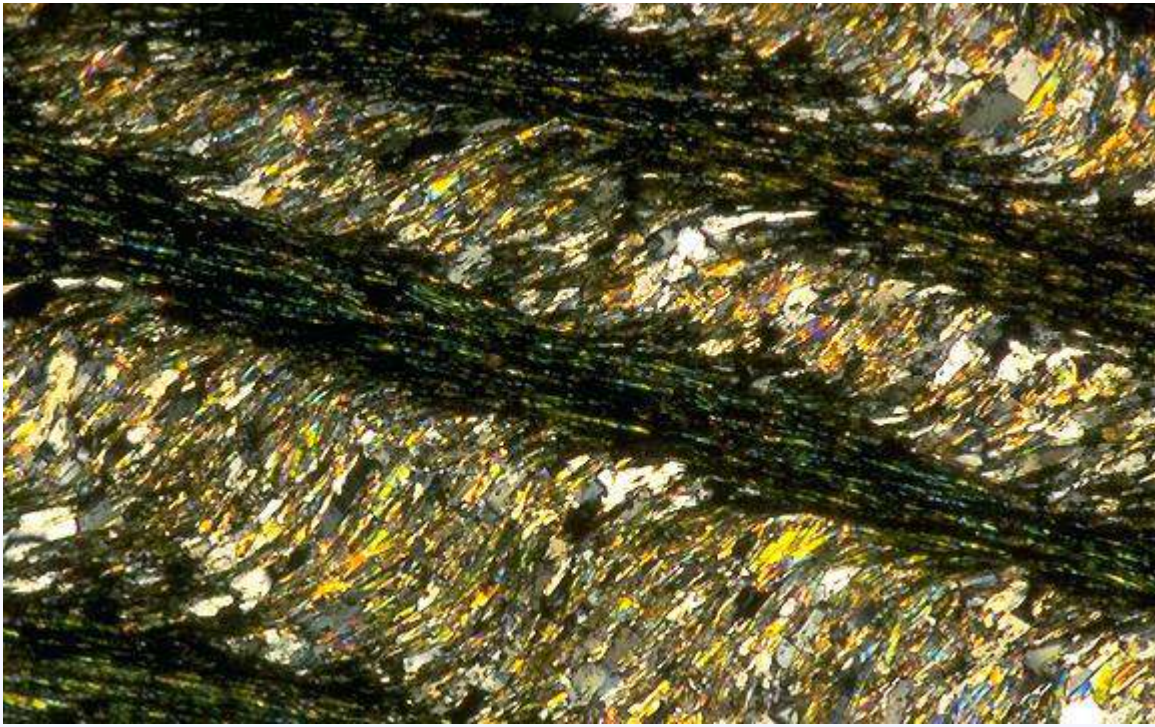
(d)



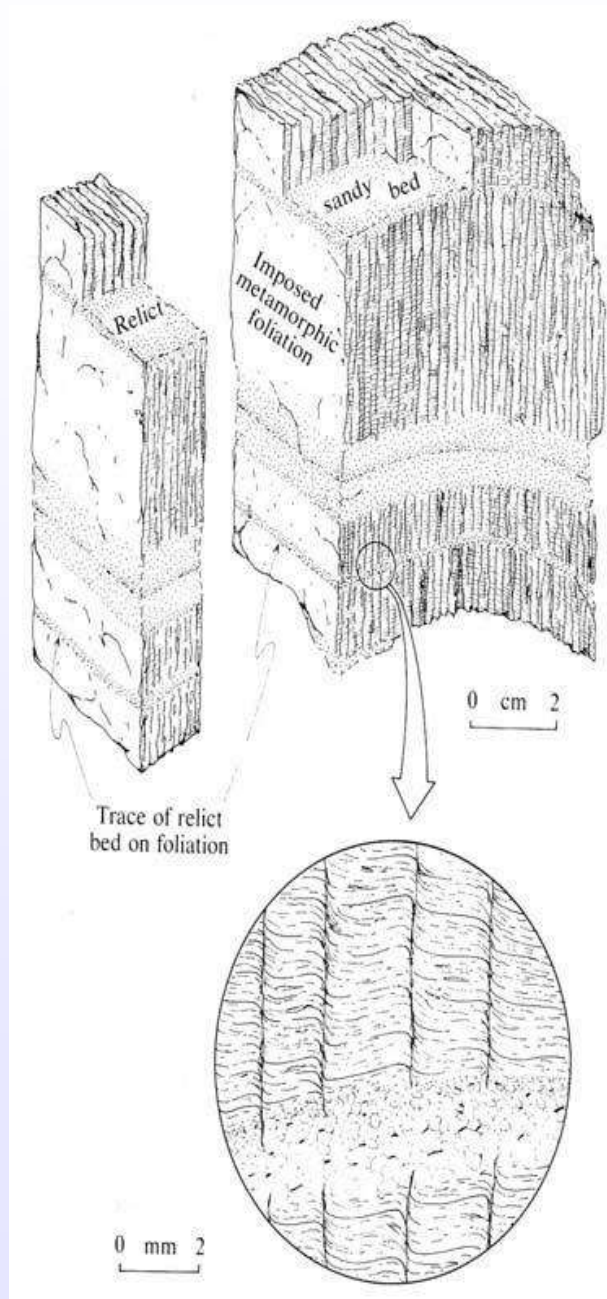
(e)



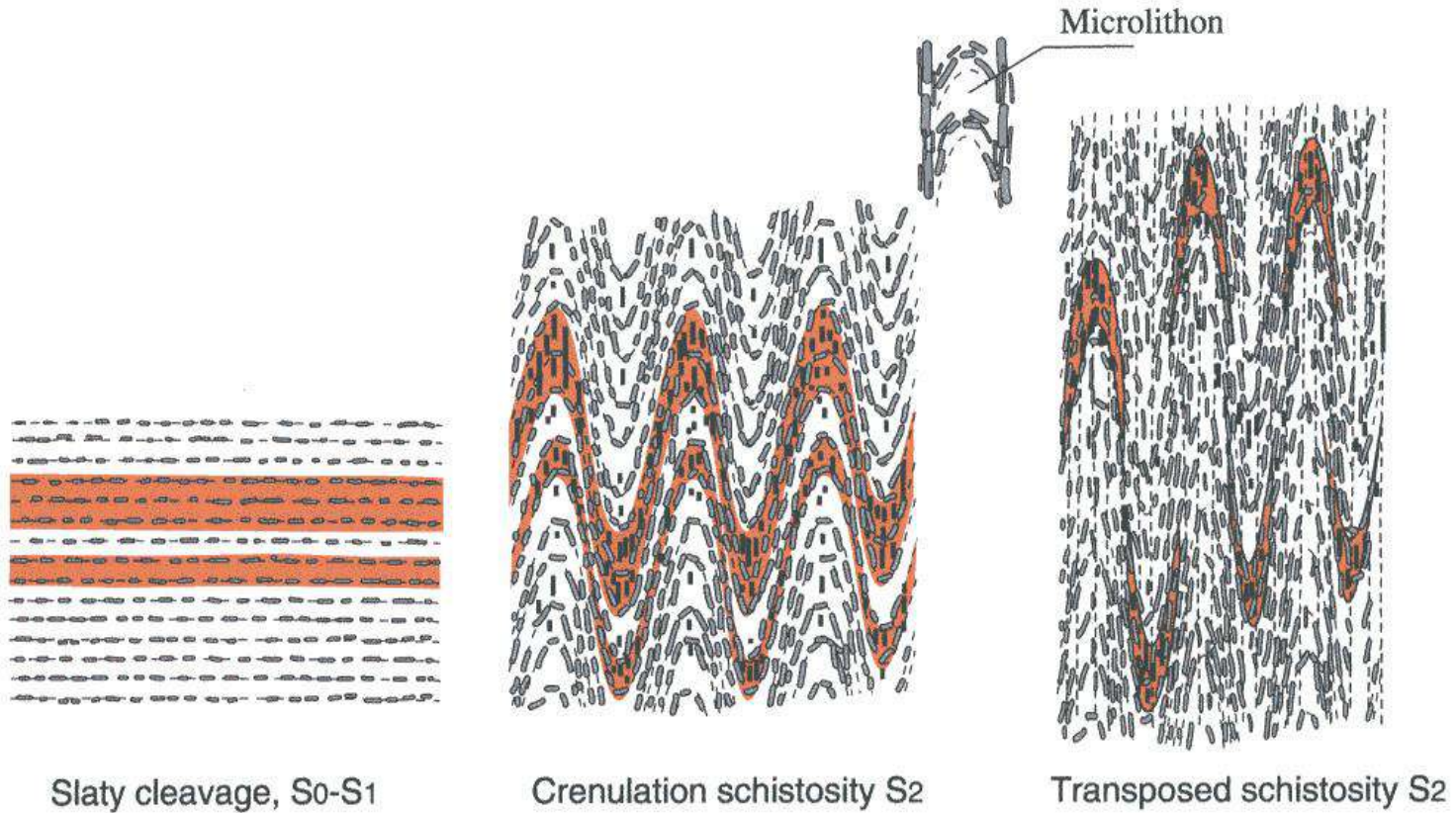
(f)



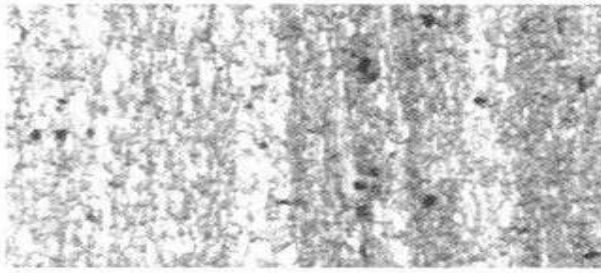
Crénulation = schisto disjointe S1/S0



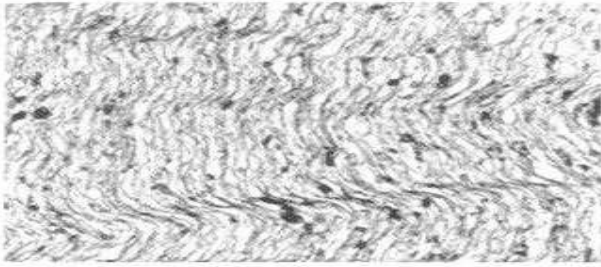
Transposition



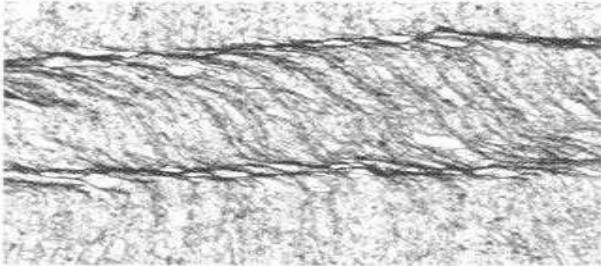
11



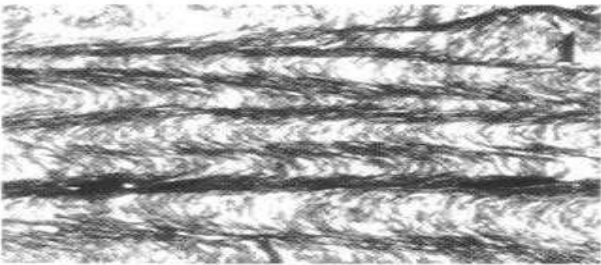
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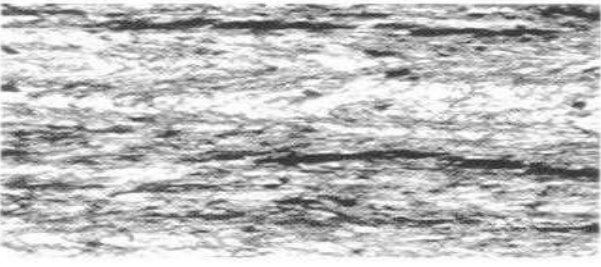
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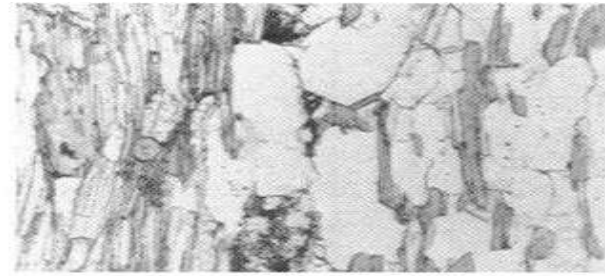
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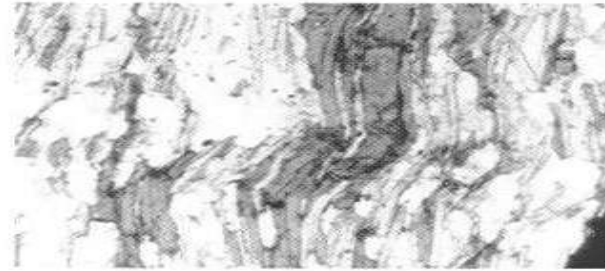
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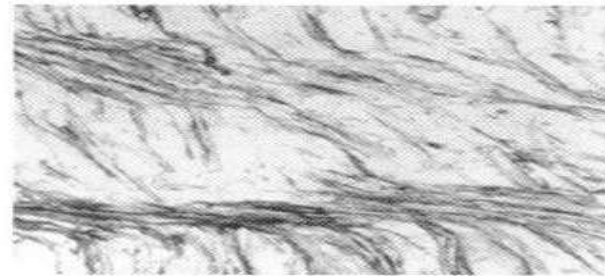
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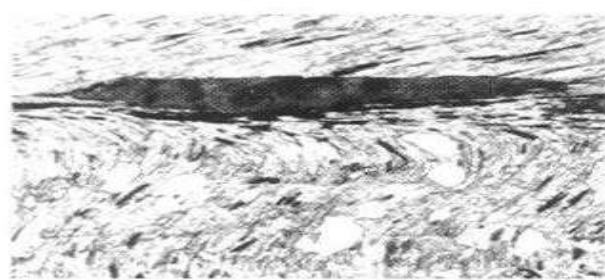
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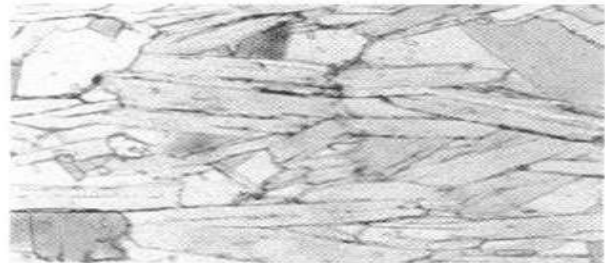
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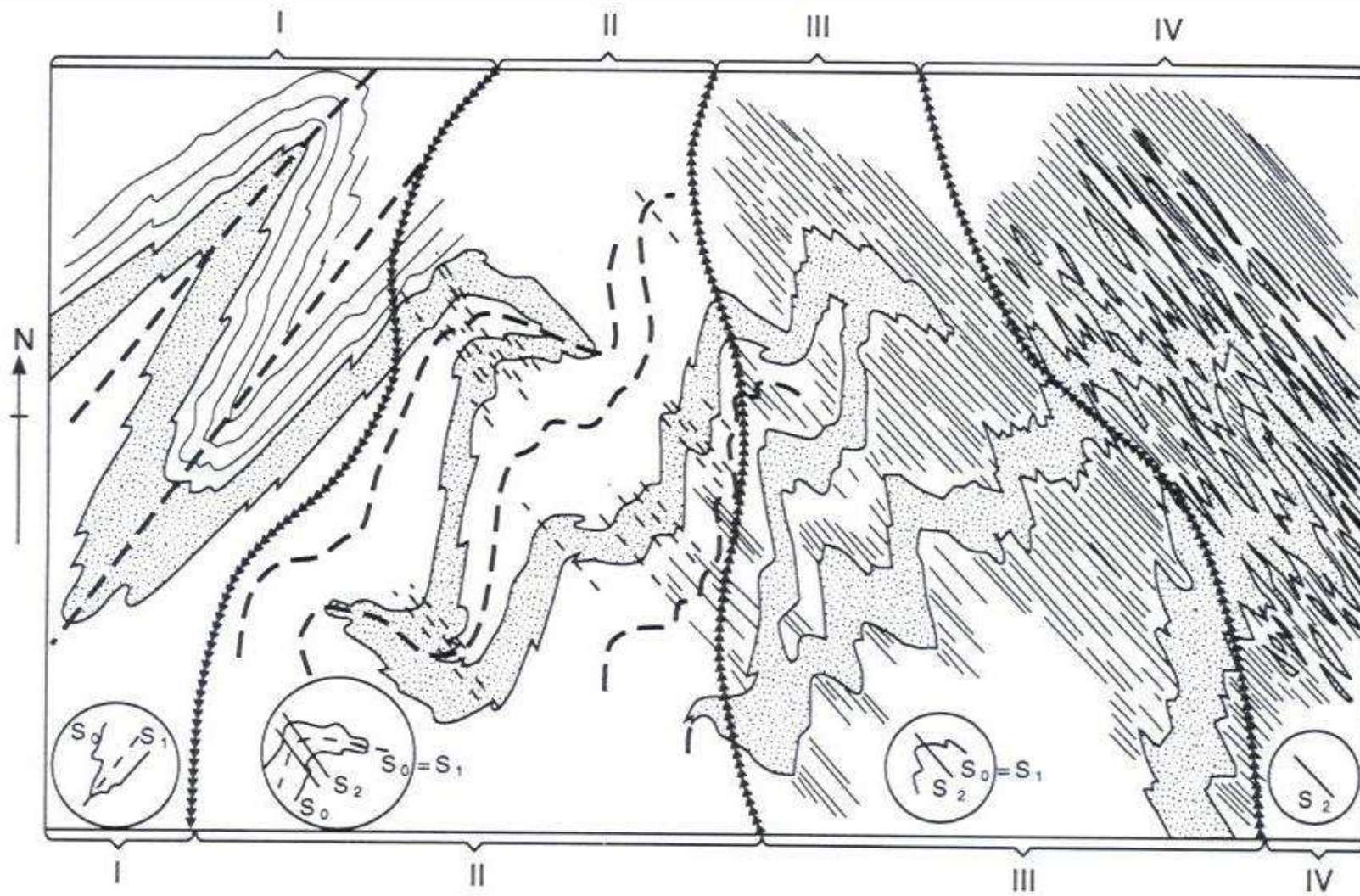
4



5



Regional scale transposition

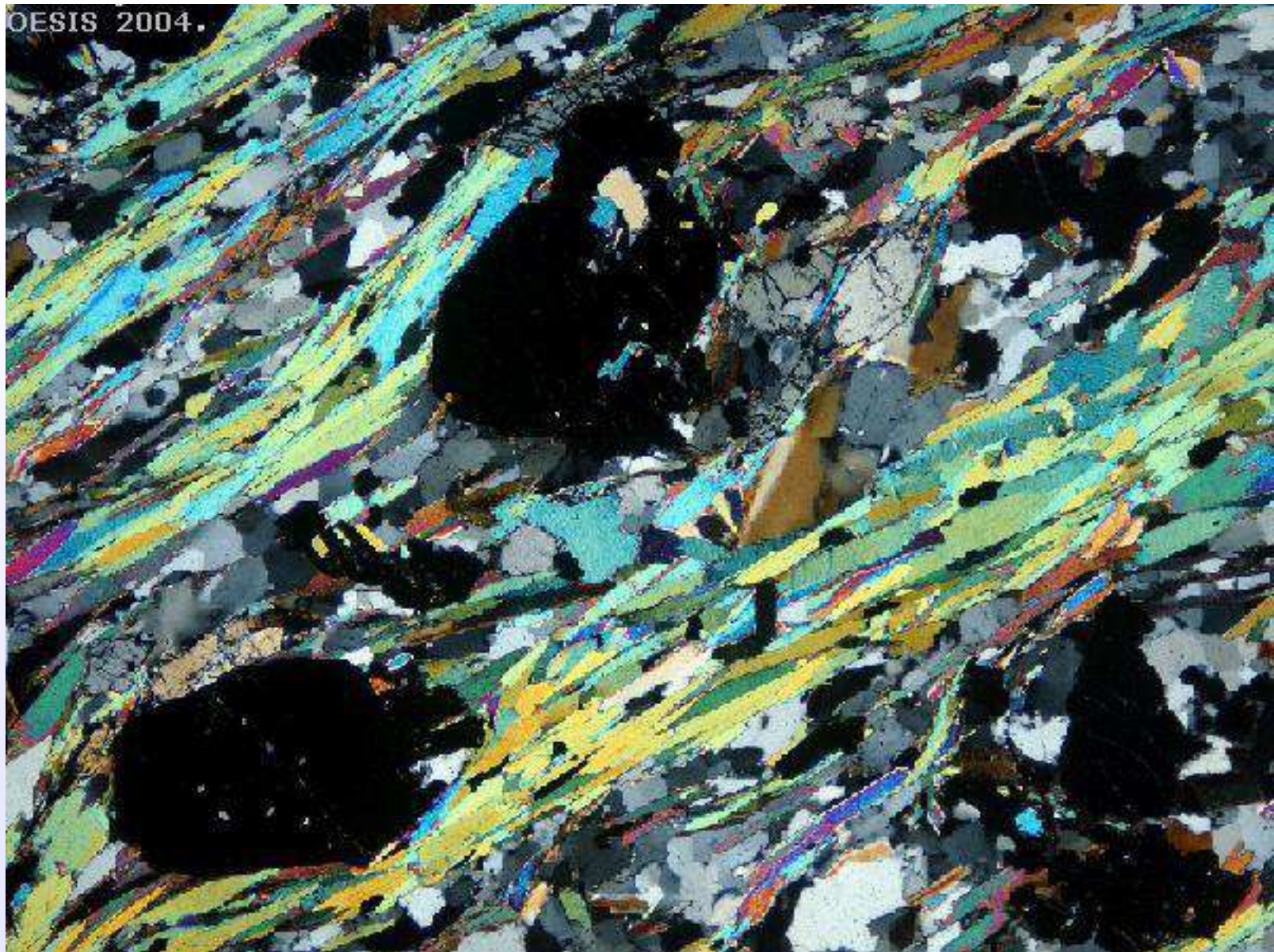








Foliation dans un schiste



Foliation dans un gneiss

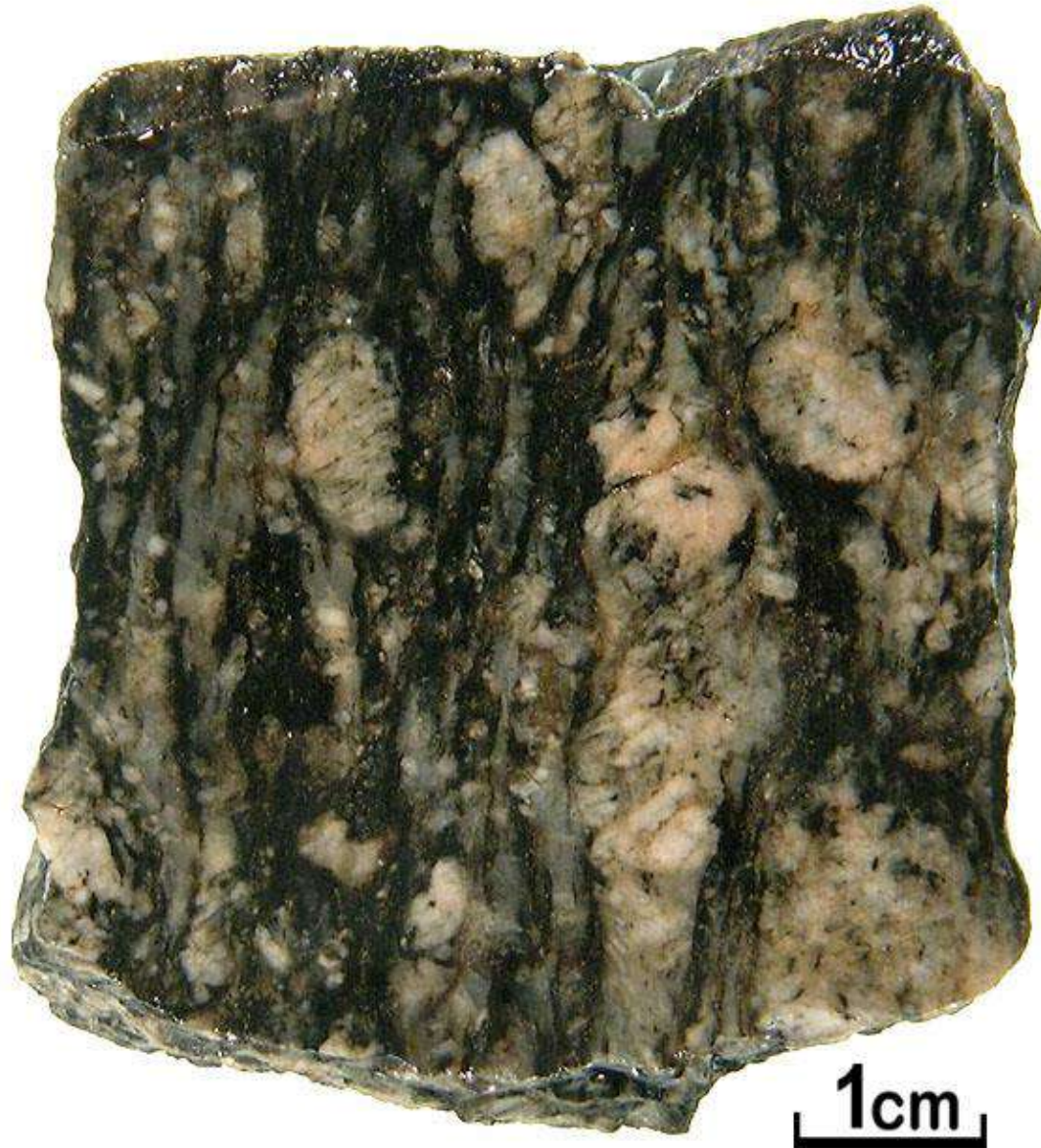


« Banded gneiss »



Sand River Gneisses; Limpopo belt, South Africa

Gneiss œillé



Un litage (S_0) et une schistosité (disjointe) (S_1)



Combien d'éléments planaires voyez-vous ?





Combien d'éléments planaires ?



2008/01/14

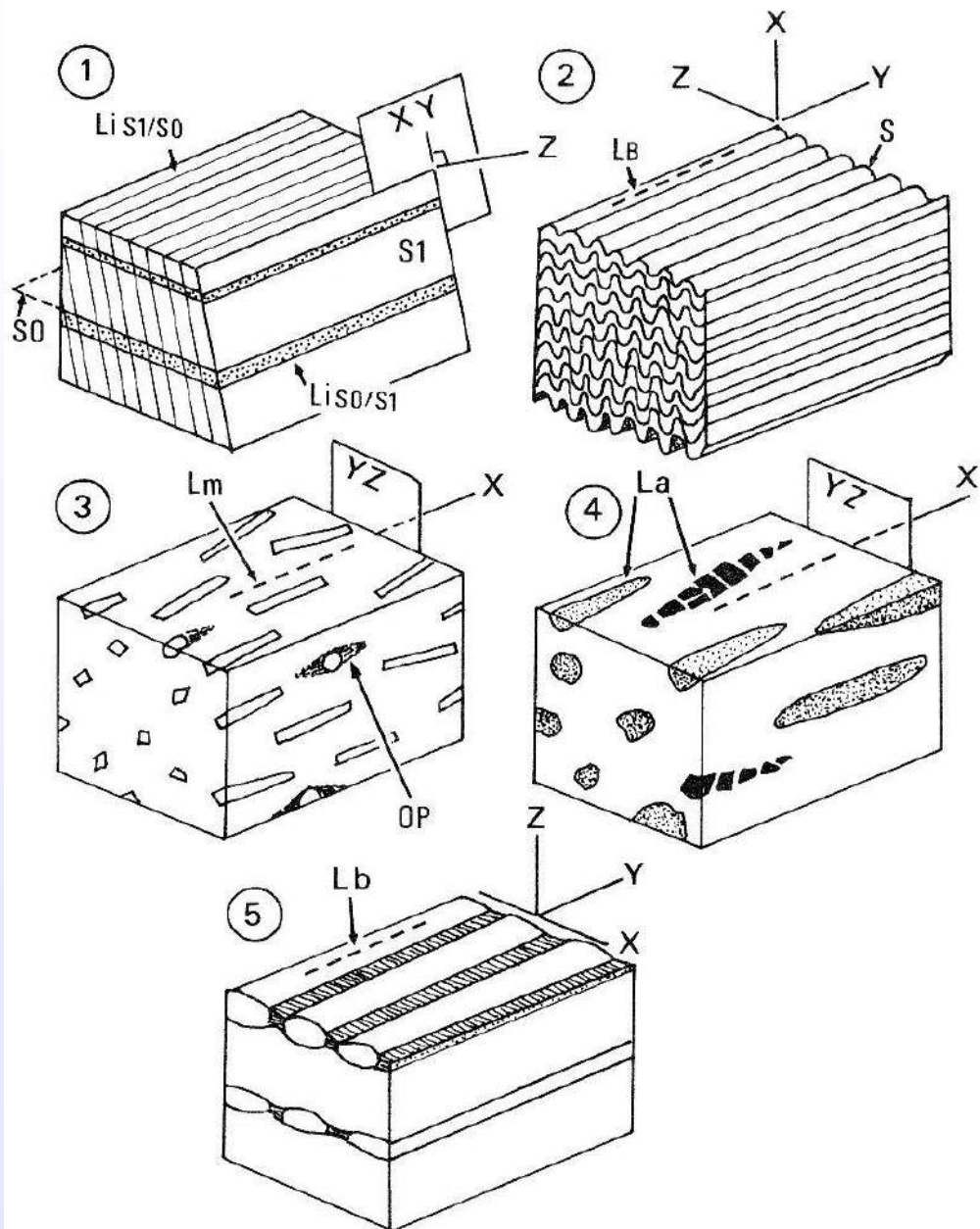


2008/01/16





Linéations



1. Intersection
2. Crénulation
3. Etirement minéral
4. Etirement
5. Boudinage



Cgl. Borden Lake,
Kapusking, Superior Prov.,
Canada



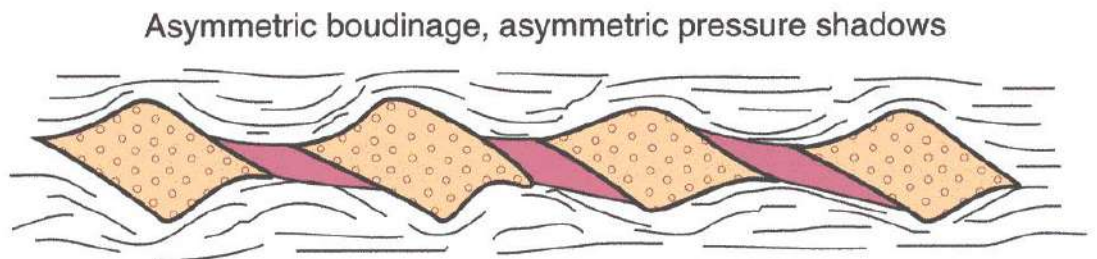
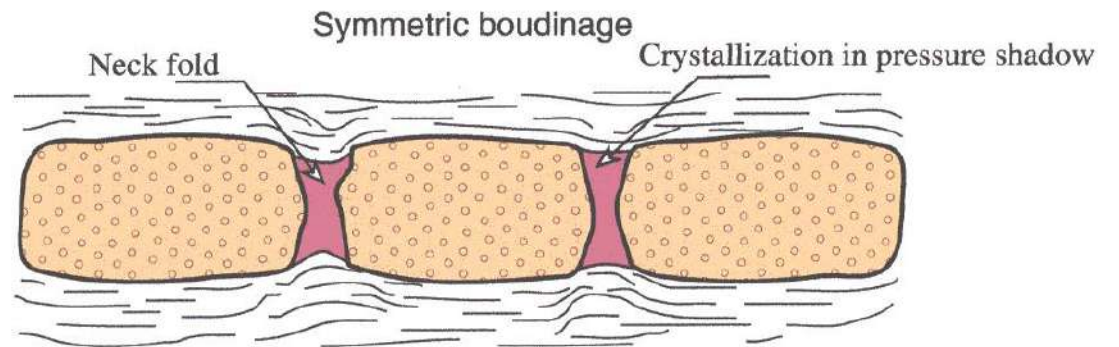
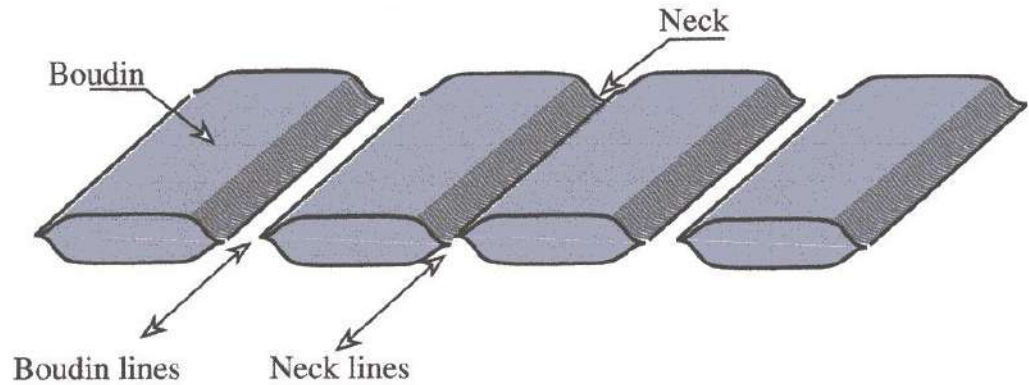
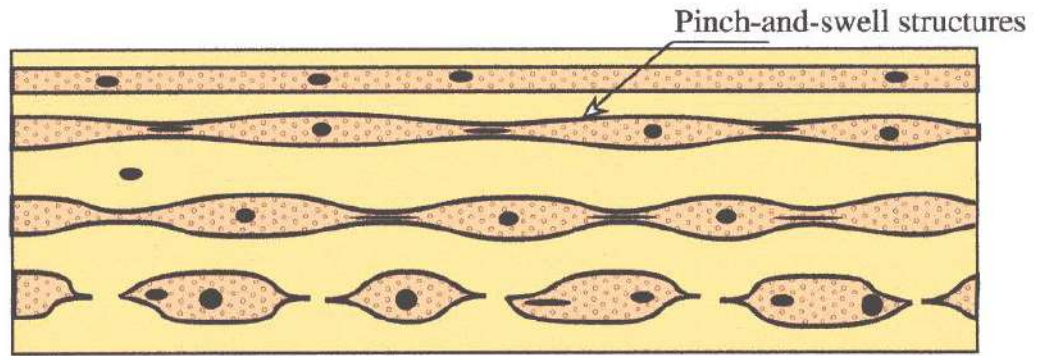
C. Nicollet







Boudinage



Déformation hétérogène : les zones de cisaillement

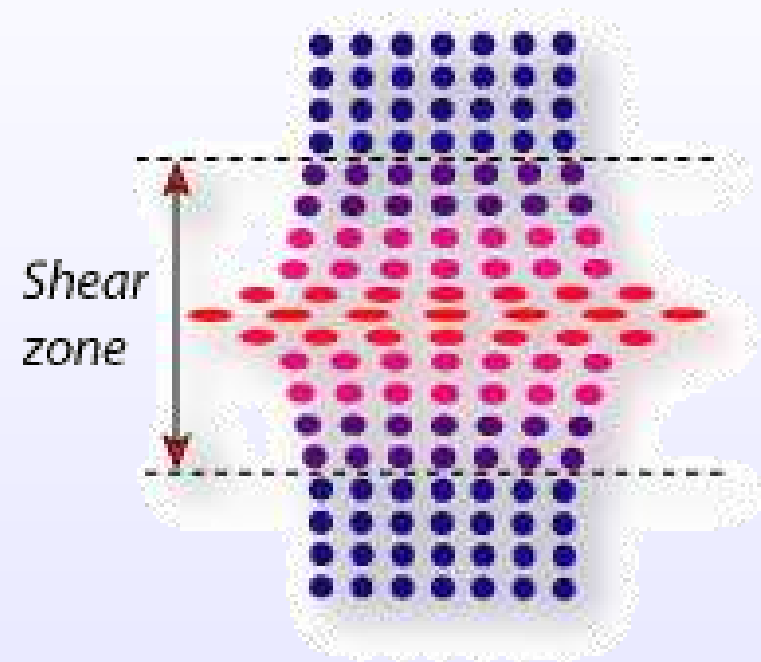
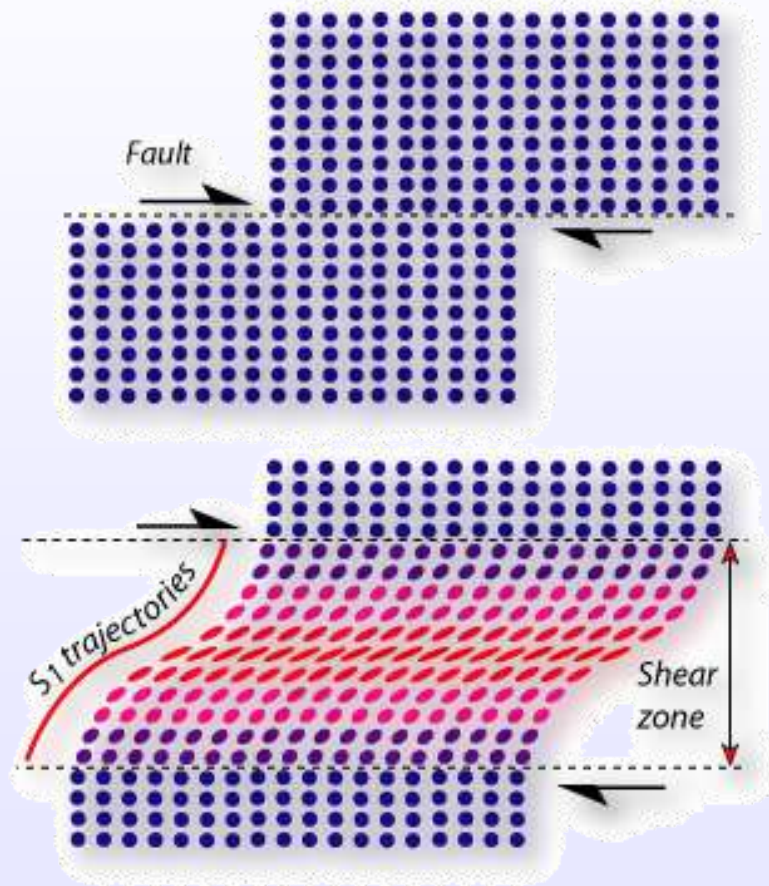


Pofadder shear zone (Protérozoïque inf.); frontière Namibie / Afrique du Sud

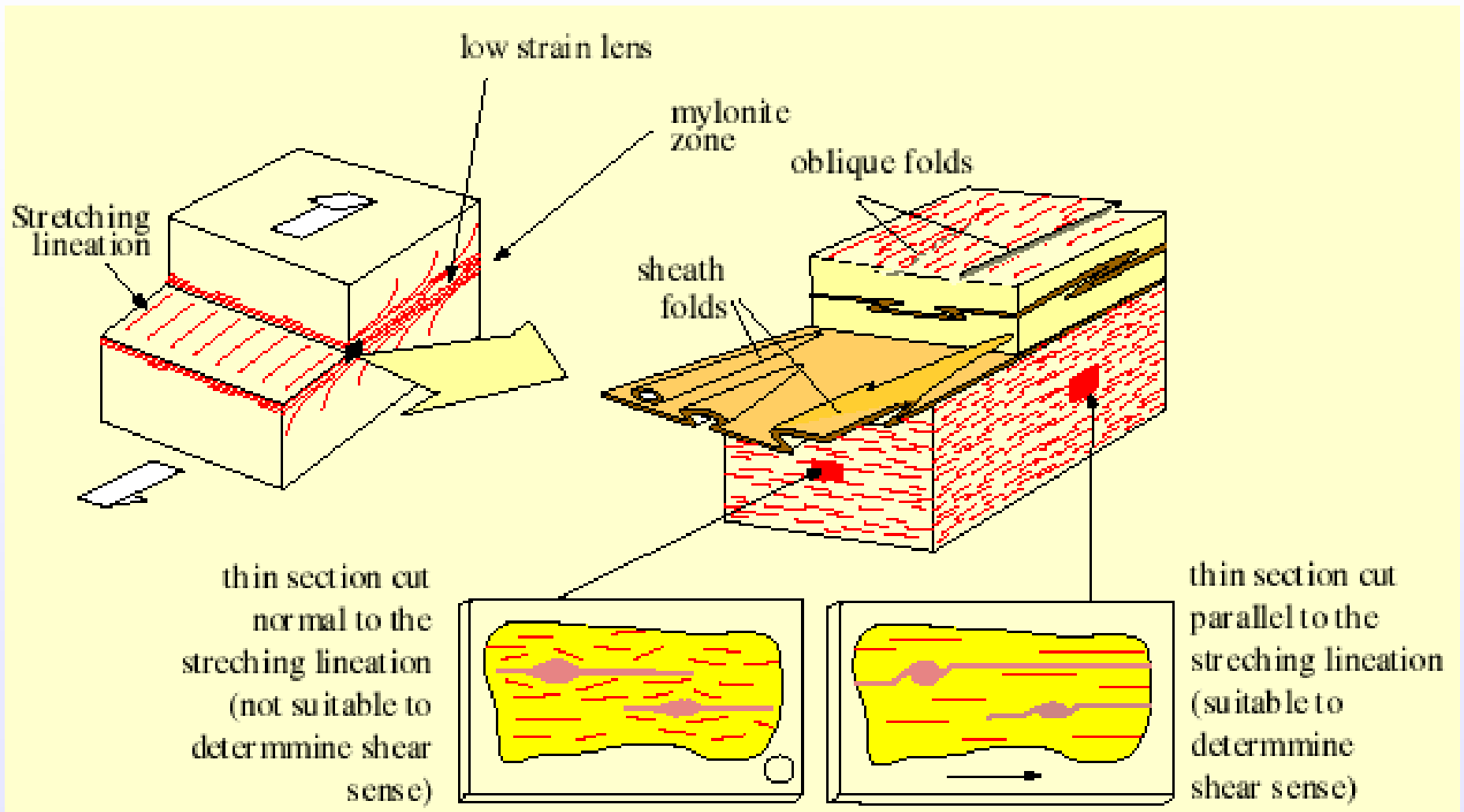




- En cisaillement simple
- En cisaillement pur



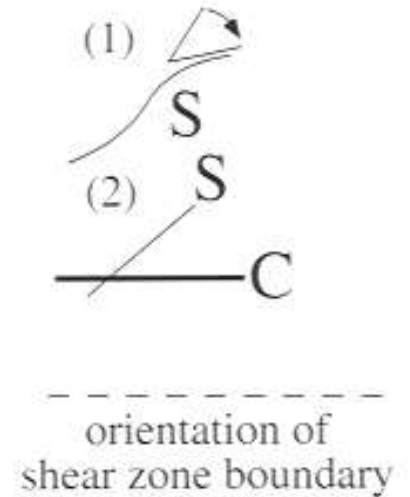
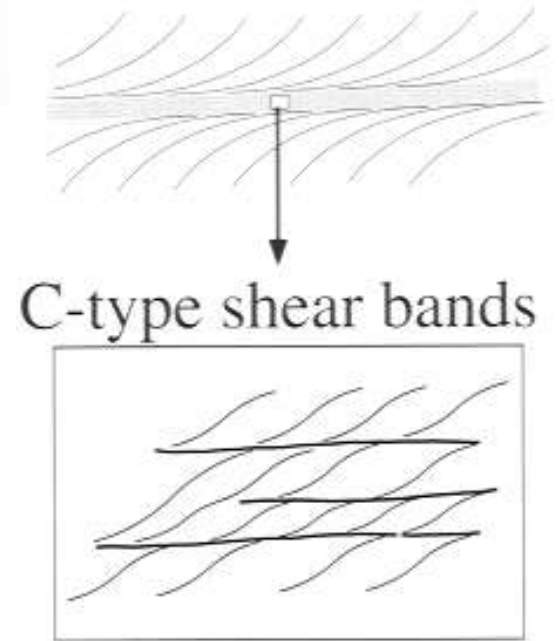
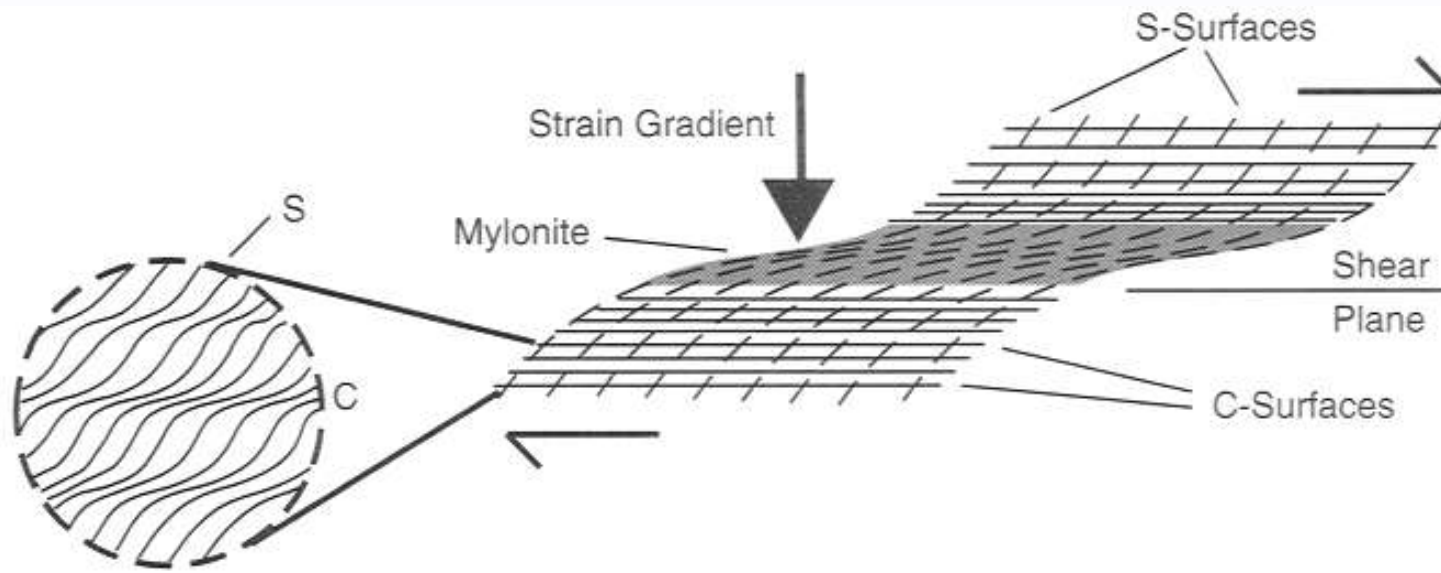
Détermination du sens de cisaillement



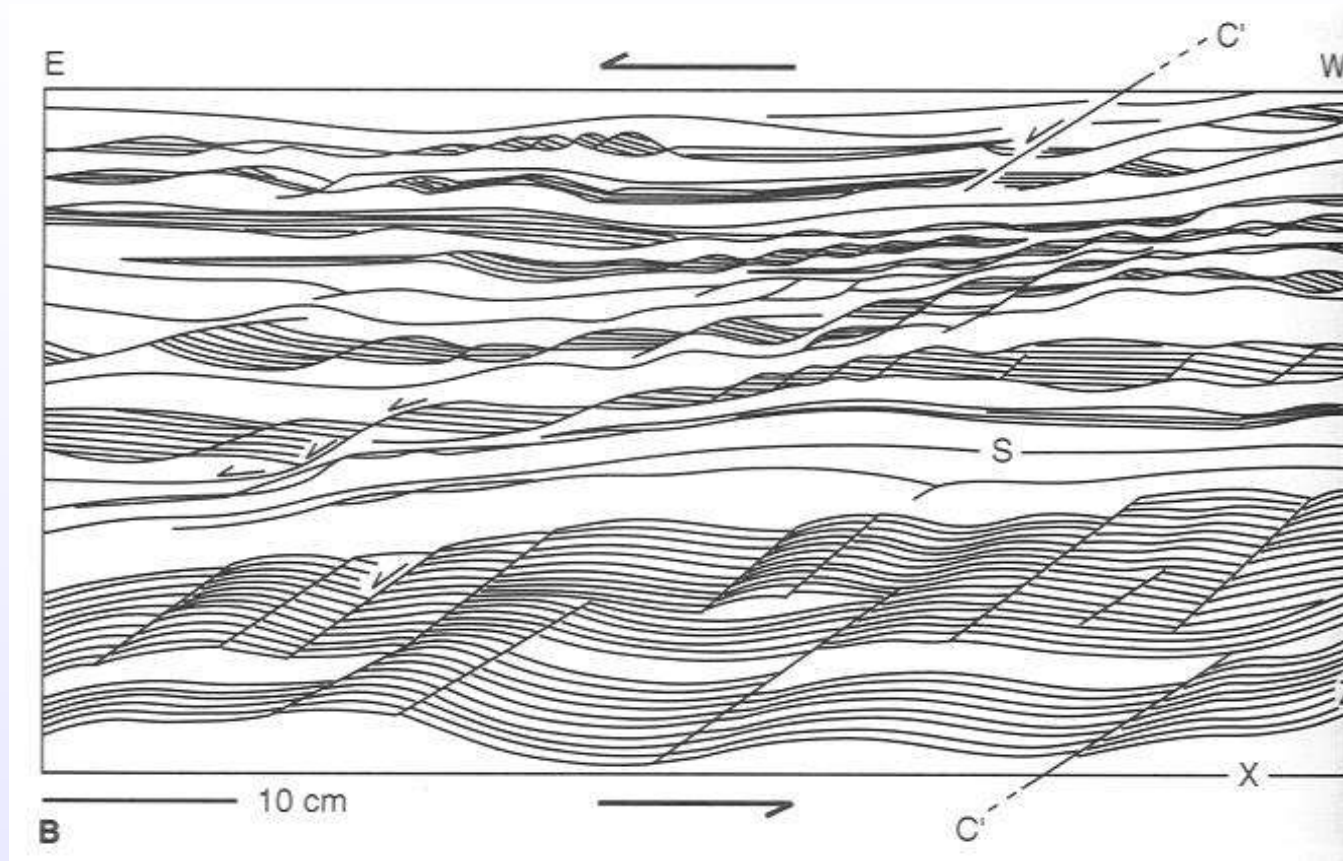


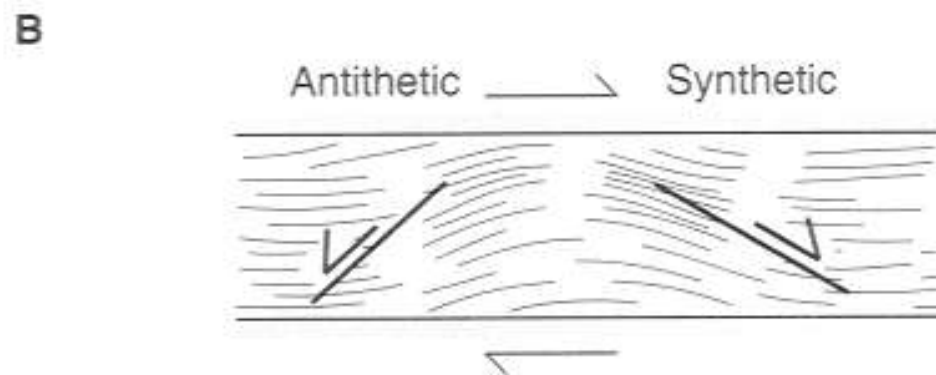
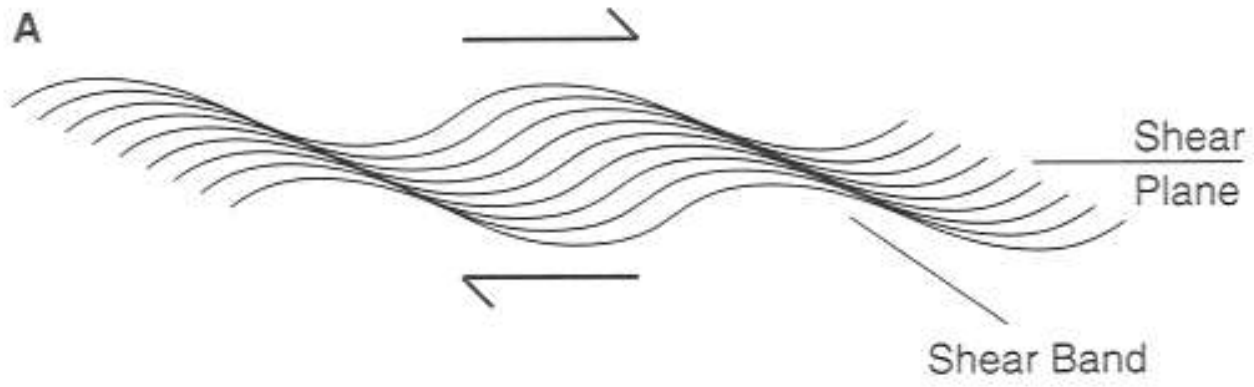
Pofadder shear zone (Protérozoïque inf.); frontière Namibie / Afrique du Sud

Fabriques C/S

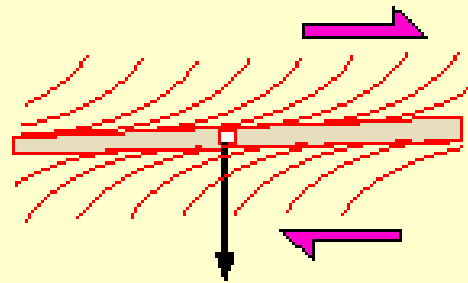


Mais... C'/CS

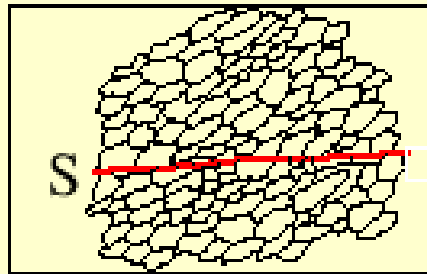




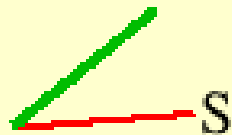
C ou C' ?



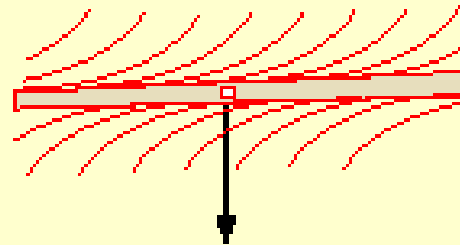
oblique foliation



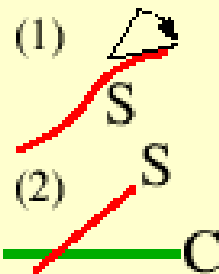
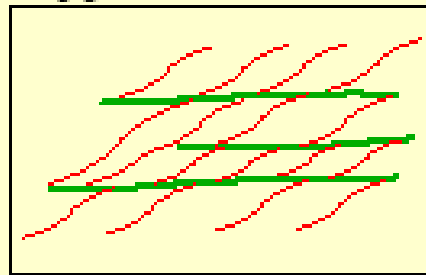
oblique foliation



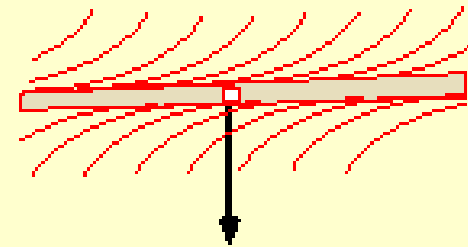
orientation of
shear zone boundary



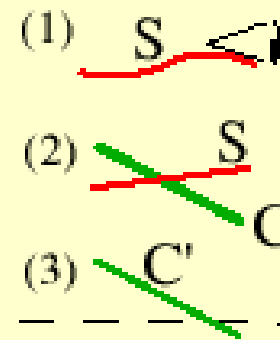
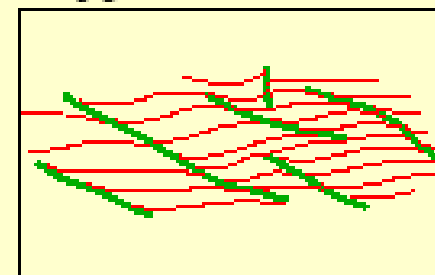
C-type shear bands



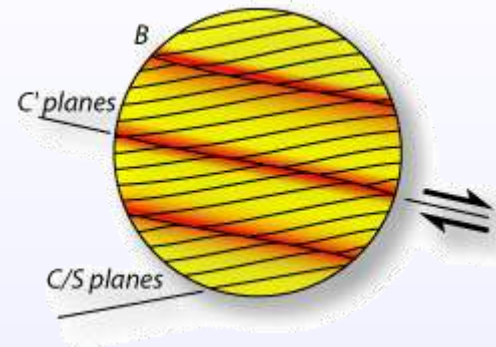
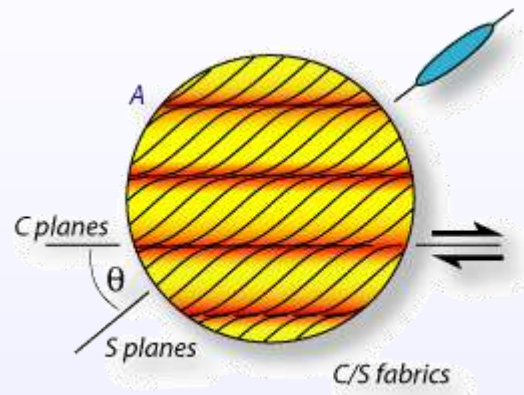
orientation of
shear zone boundary



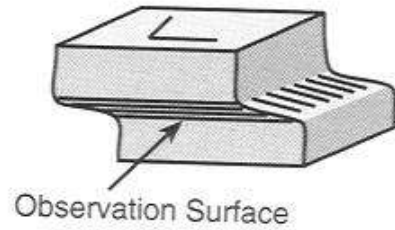
C'-type shear bands



orientation of
shear zone boundary



Surcroissances



Θ -Object (No Wings)



Winged Objects

Stair Stepping

σ - Object



No Stair Stepping

ϕ - Object



Embayment

δ - Objects



Complex Objects (Several Sets of Wings)



Asymétrie des plis

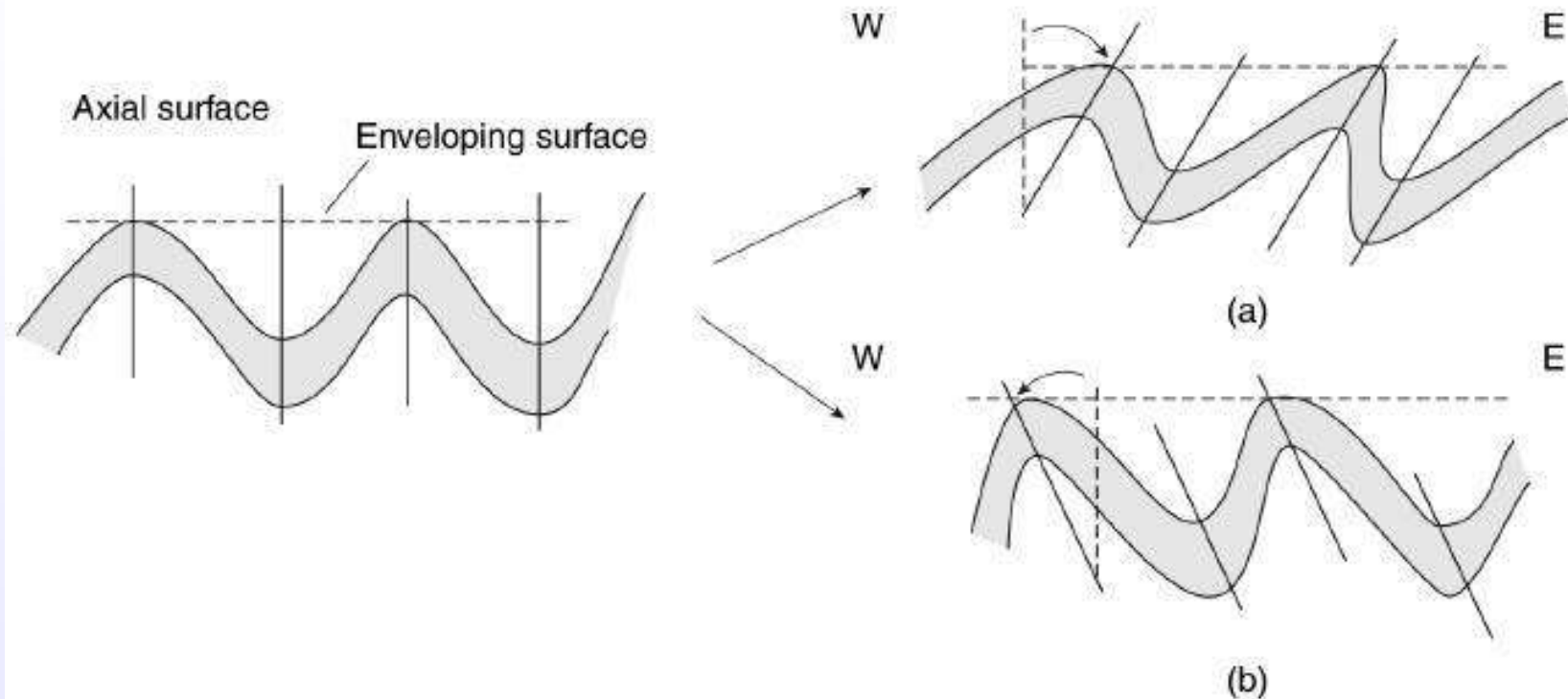
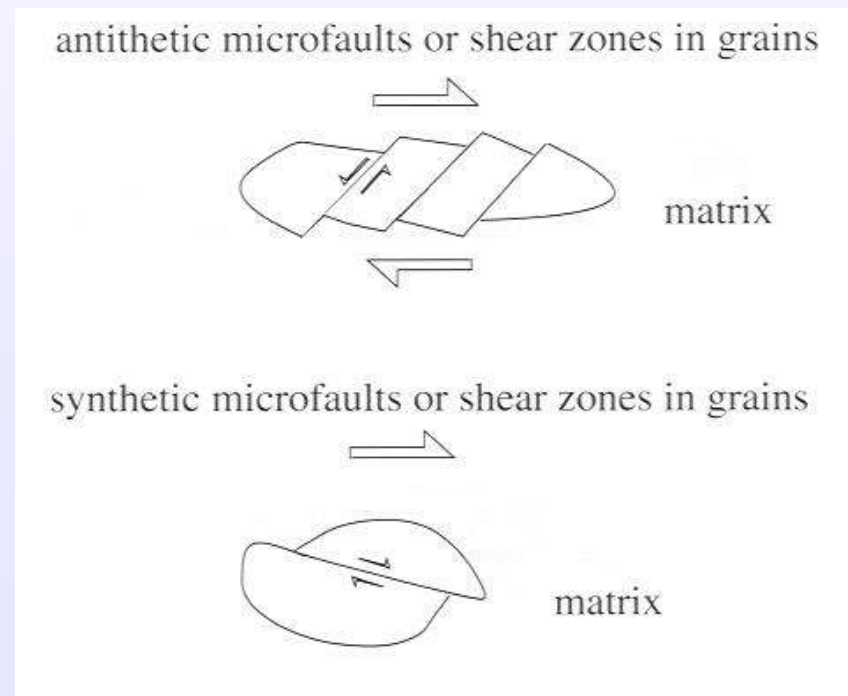
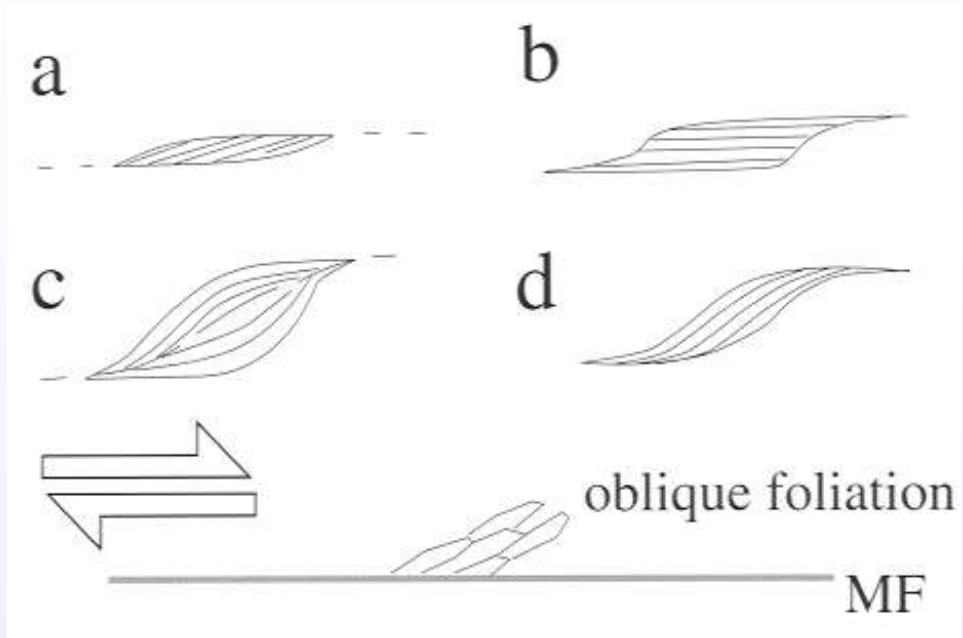


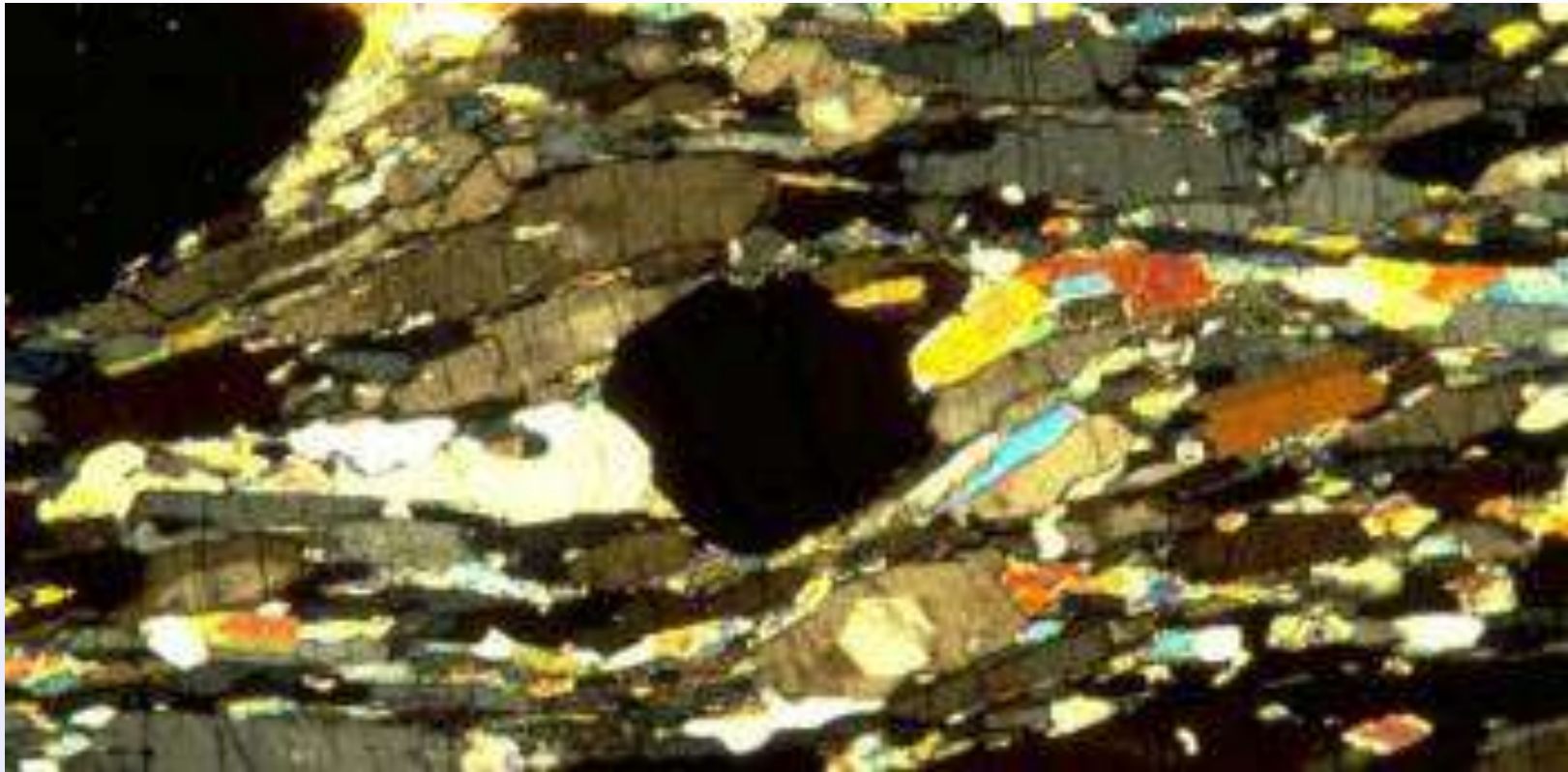
FIGURE 10.15 Fold vergence, clockwise (a) and counterclockwise (b), is defined by the apparent rotation of the axial surface from a hypothetical symmetric fold into the observed asymmetric fold, without changing the orientation of the enveloping surface. In a given geographic coordinate system we may also say east-verging (a) and west-verging (b) folds for clockwise and counterclockwise folds, respectively [for this example]. In all descriptions we are looking down the plunge of the fold.

Divers...





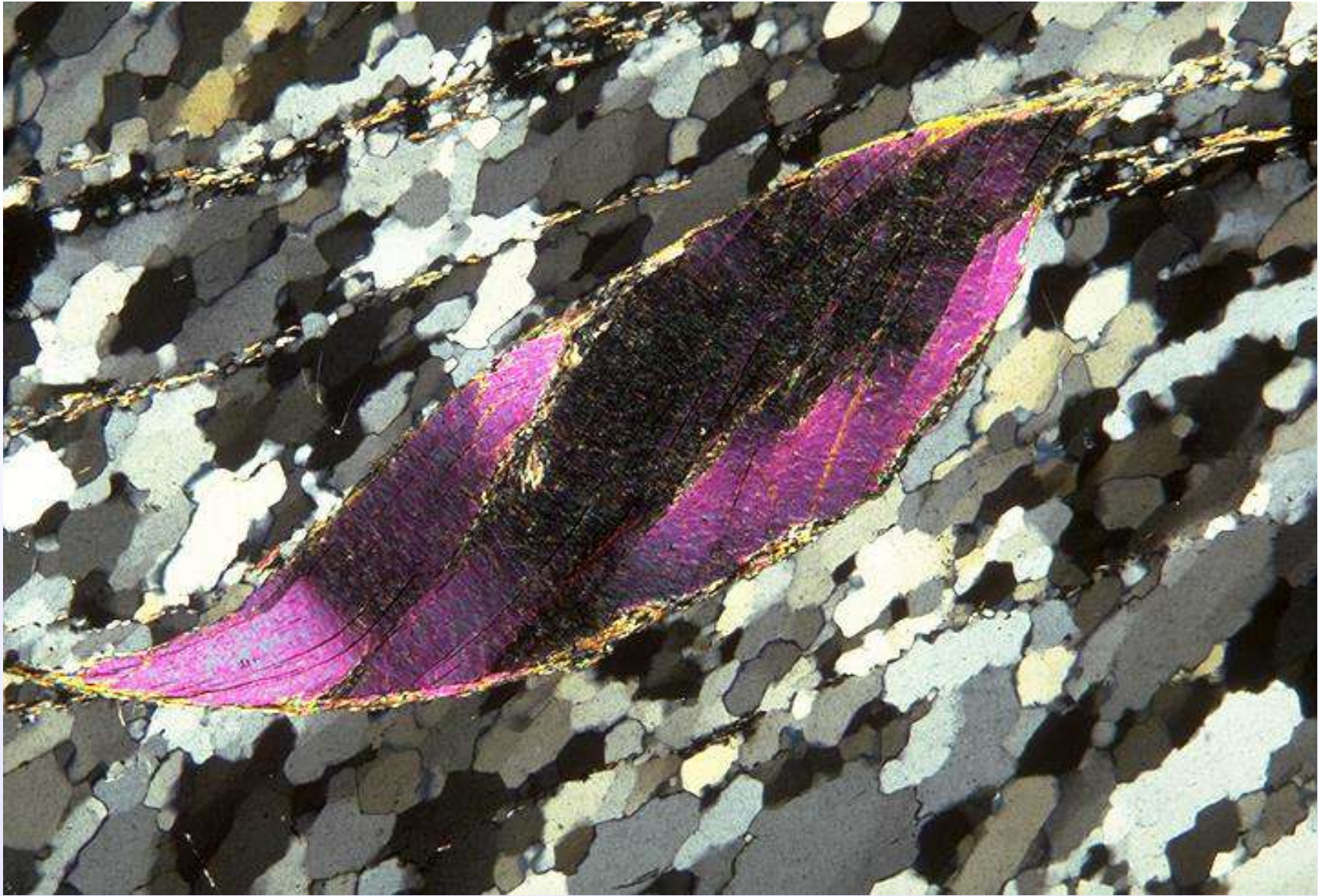


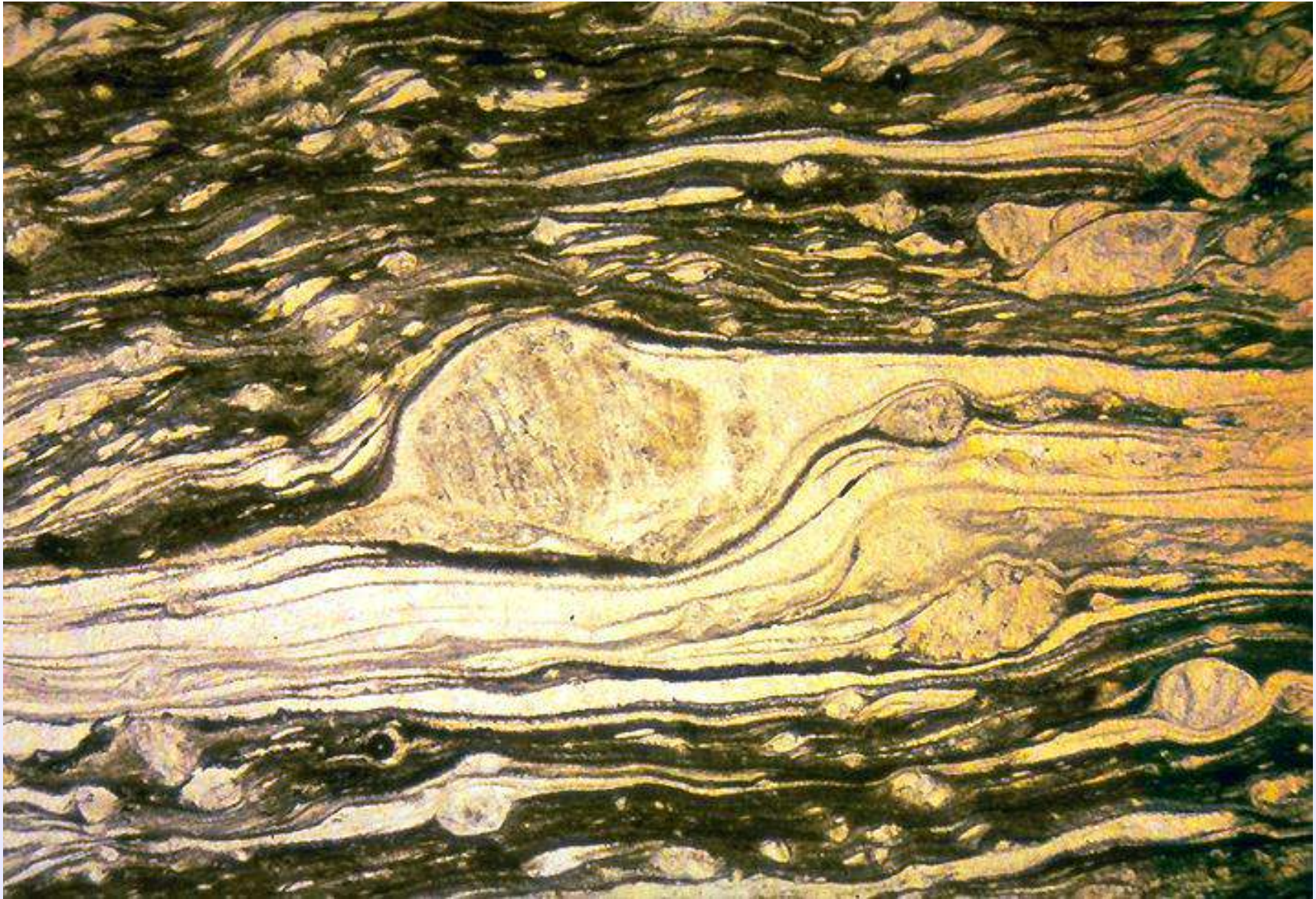


Sigmoidal foliation pattern and strain increase adjacent to a shear zone

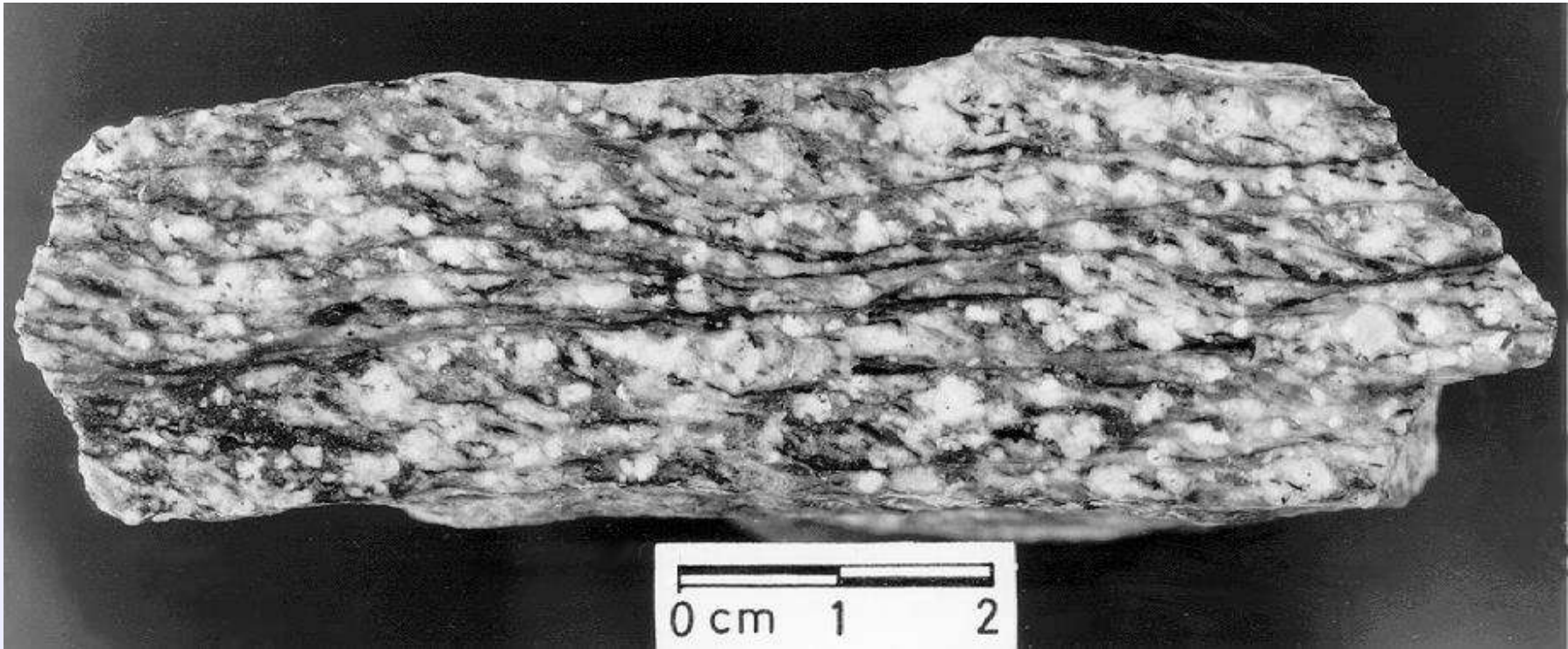
















SZ à l'échelle régionale

Zones profondes
des chaînes de
montagnes :
SZ = équivalent des
failles!

charriages synsédimentaires-
tectonique cassante

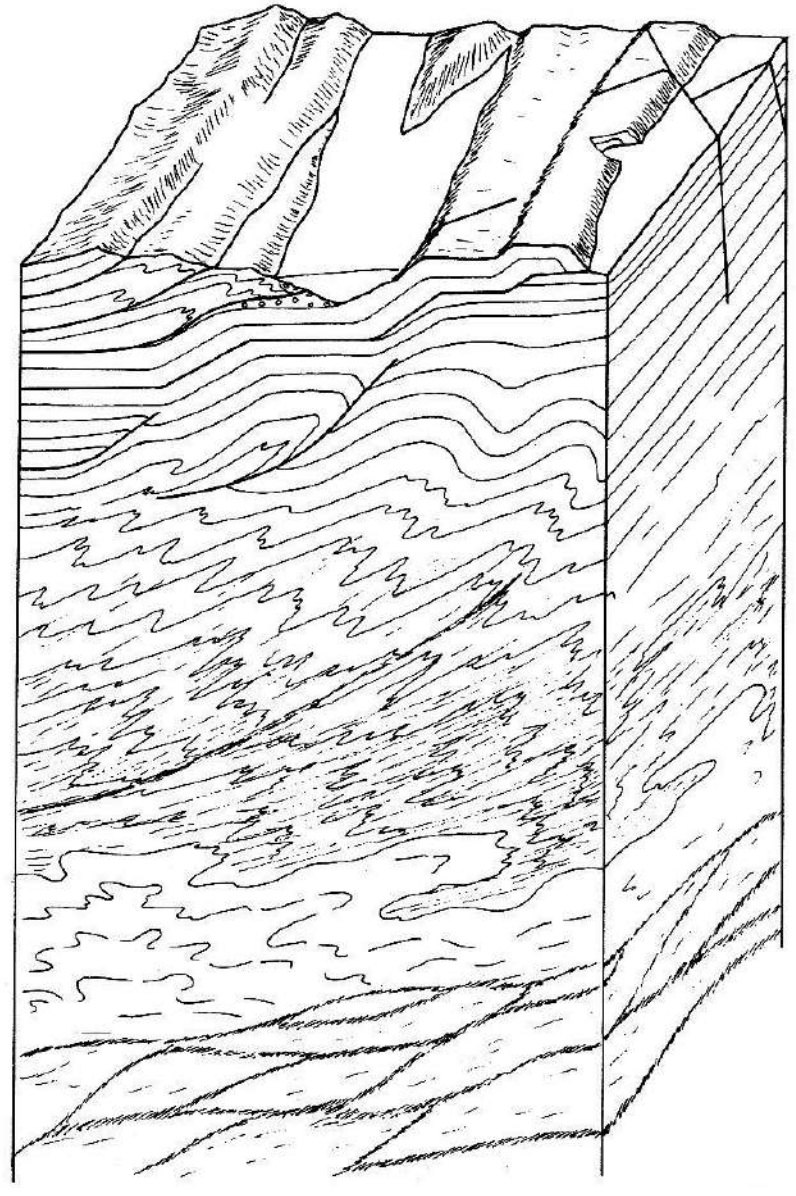
plis isopaques

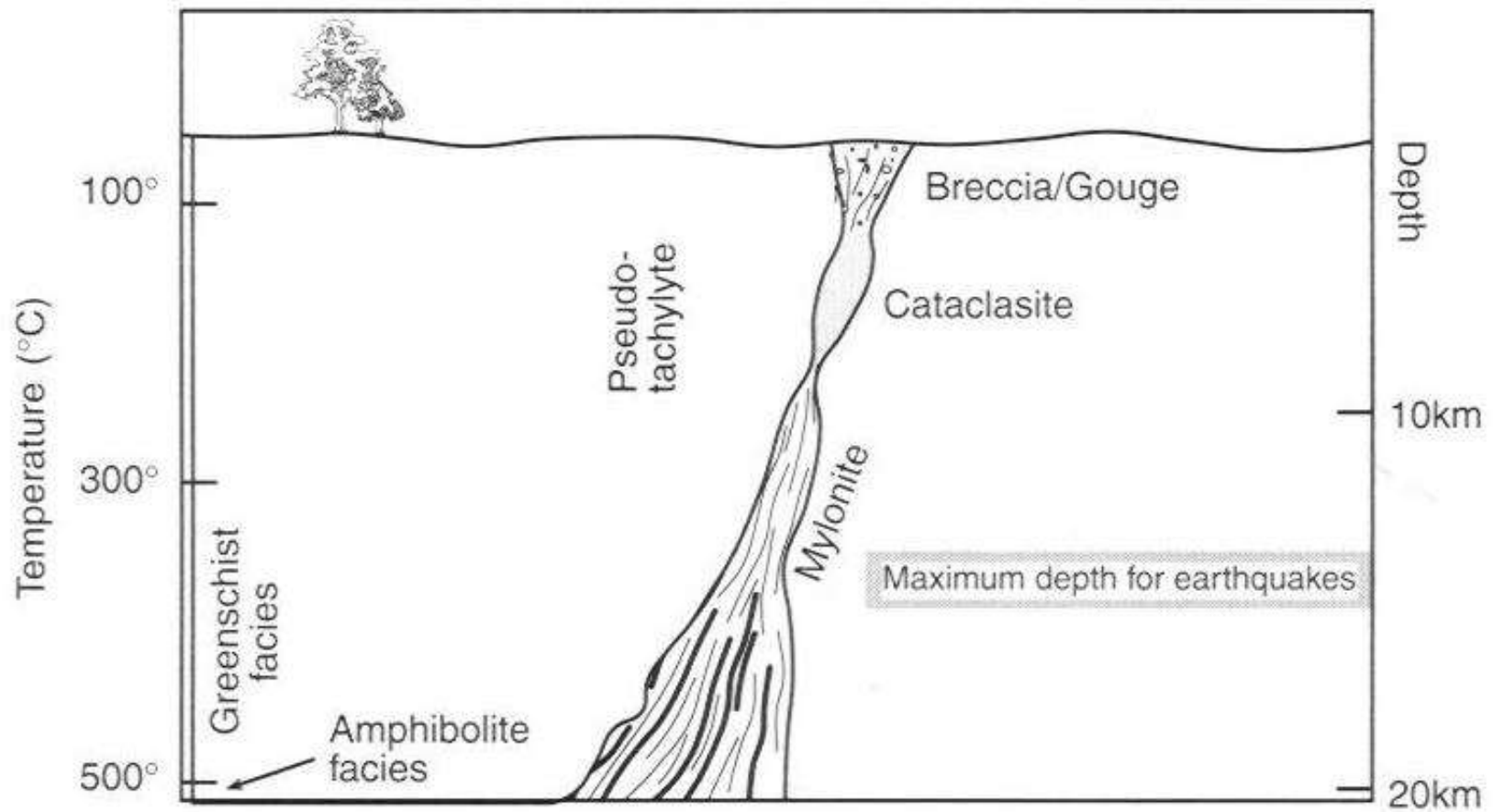
plis anisopaques-
schistosité

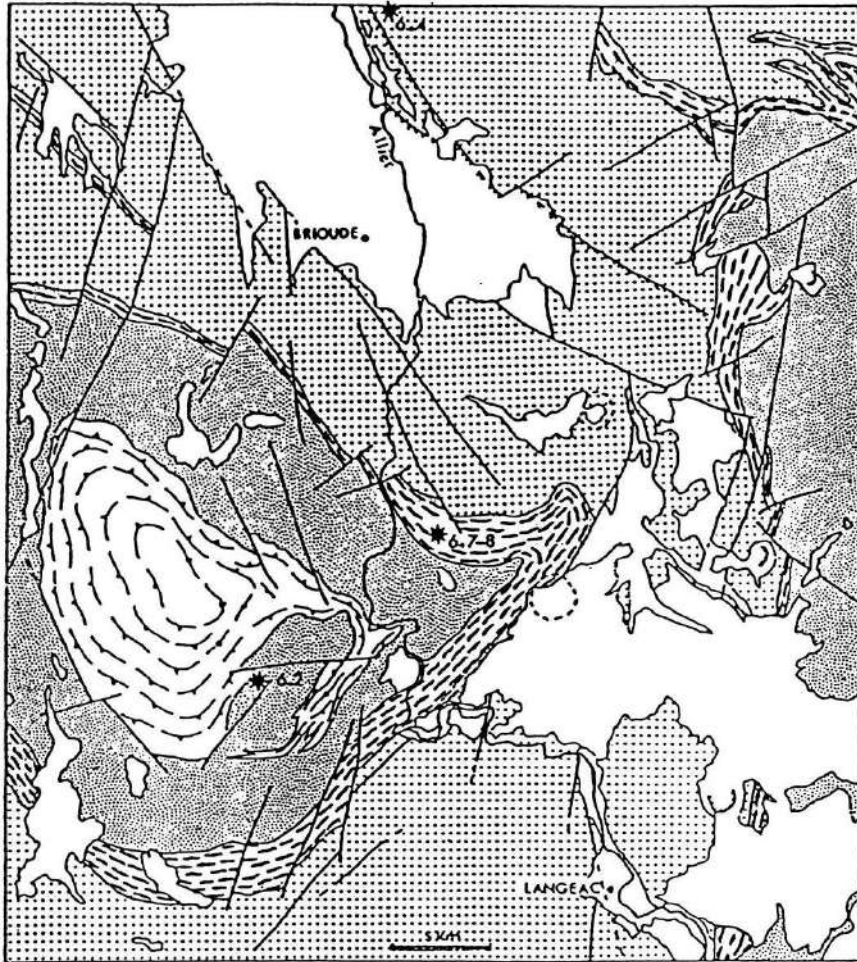
foliation





dômes migmatitiques

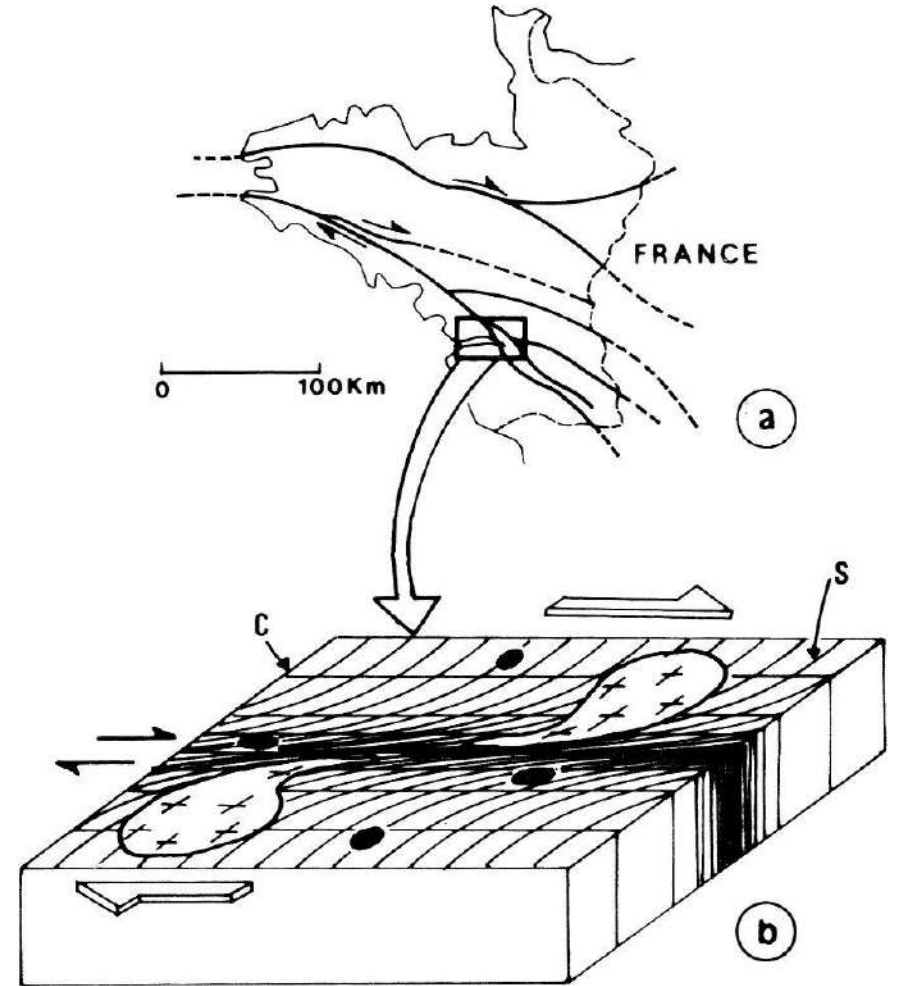
cisaillements ductiles



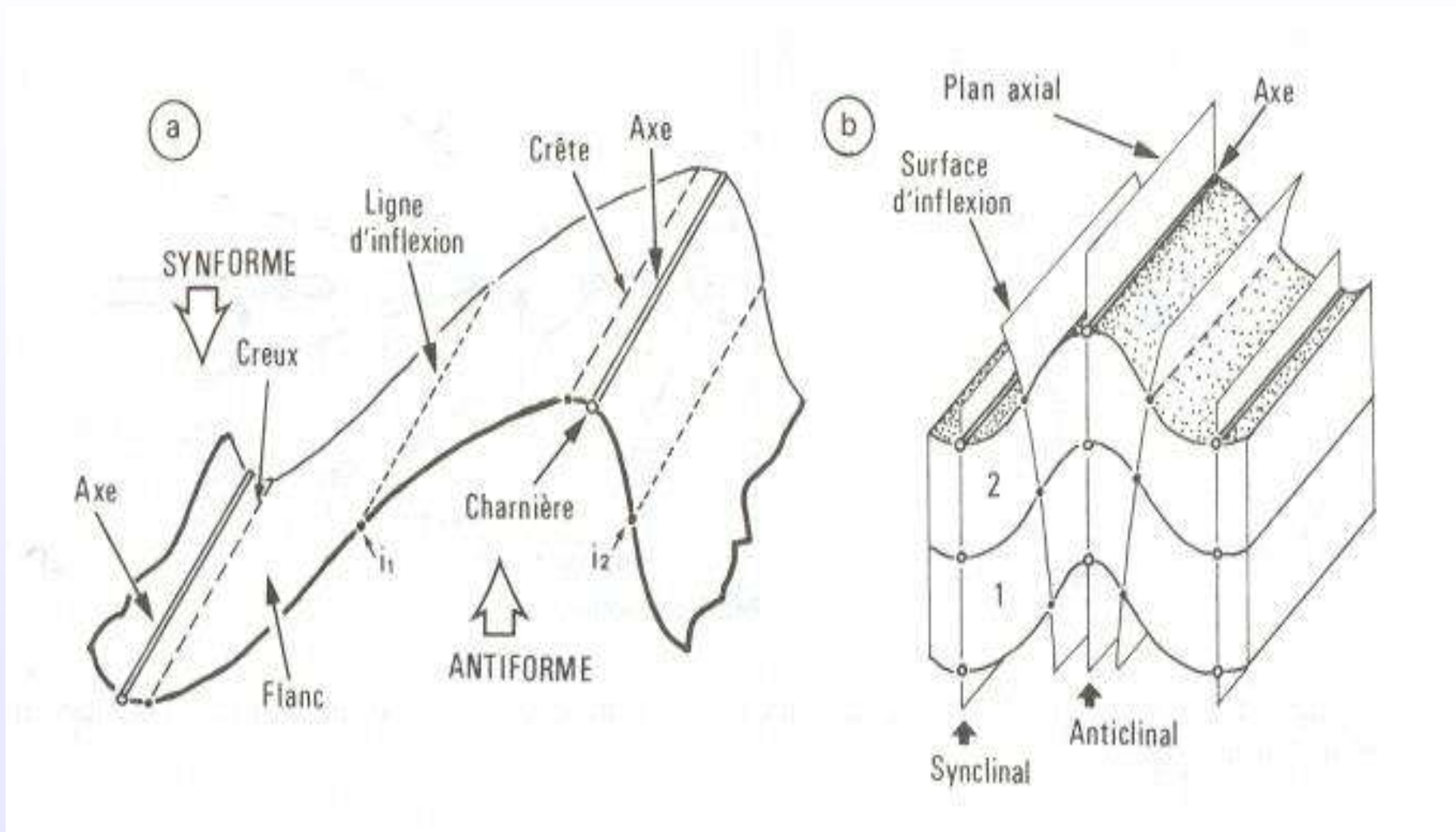




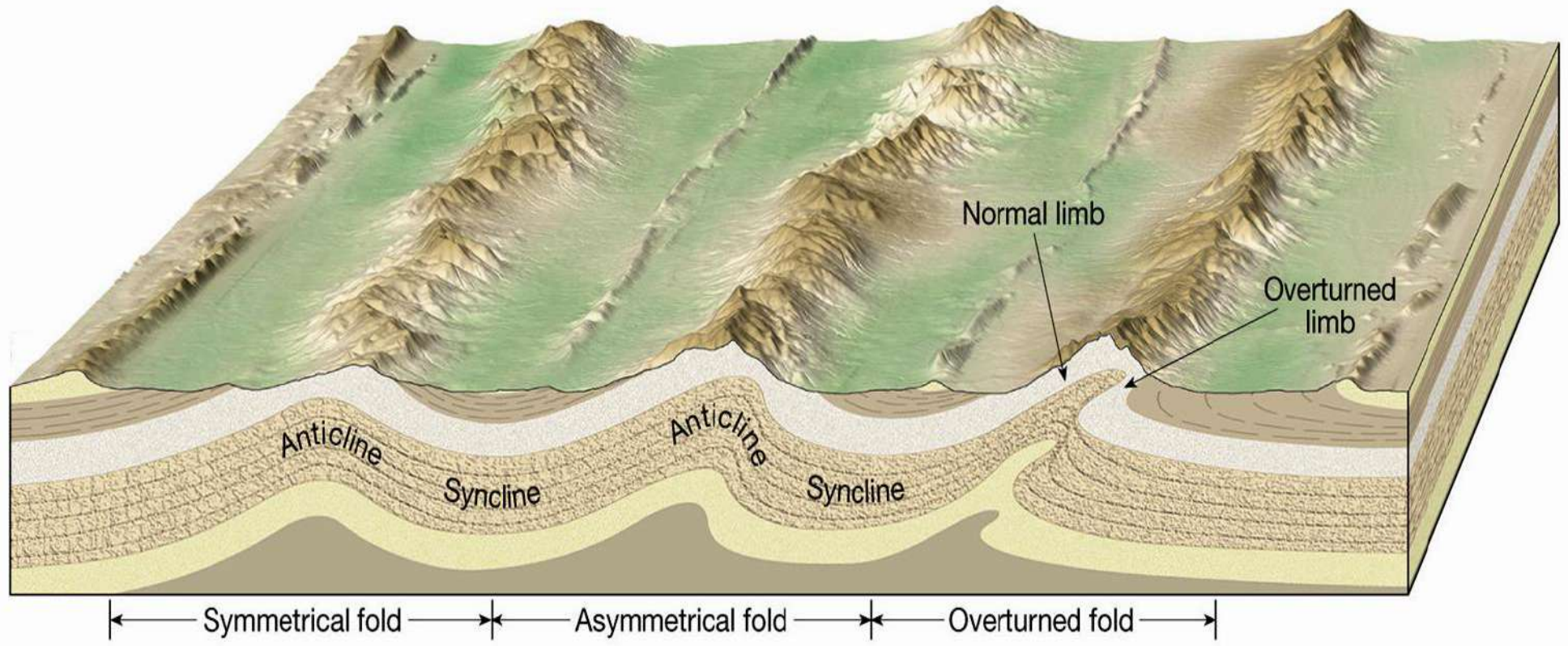
-  Formations volcaniques et superficielles
-  Gneiss anatectiques à reliques granitiques
-  Groupe leptyno-amphibolique
-  Gneiss à biotites et sillimanites
-  Orthogneiss du Ceyloux



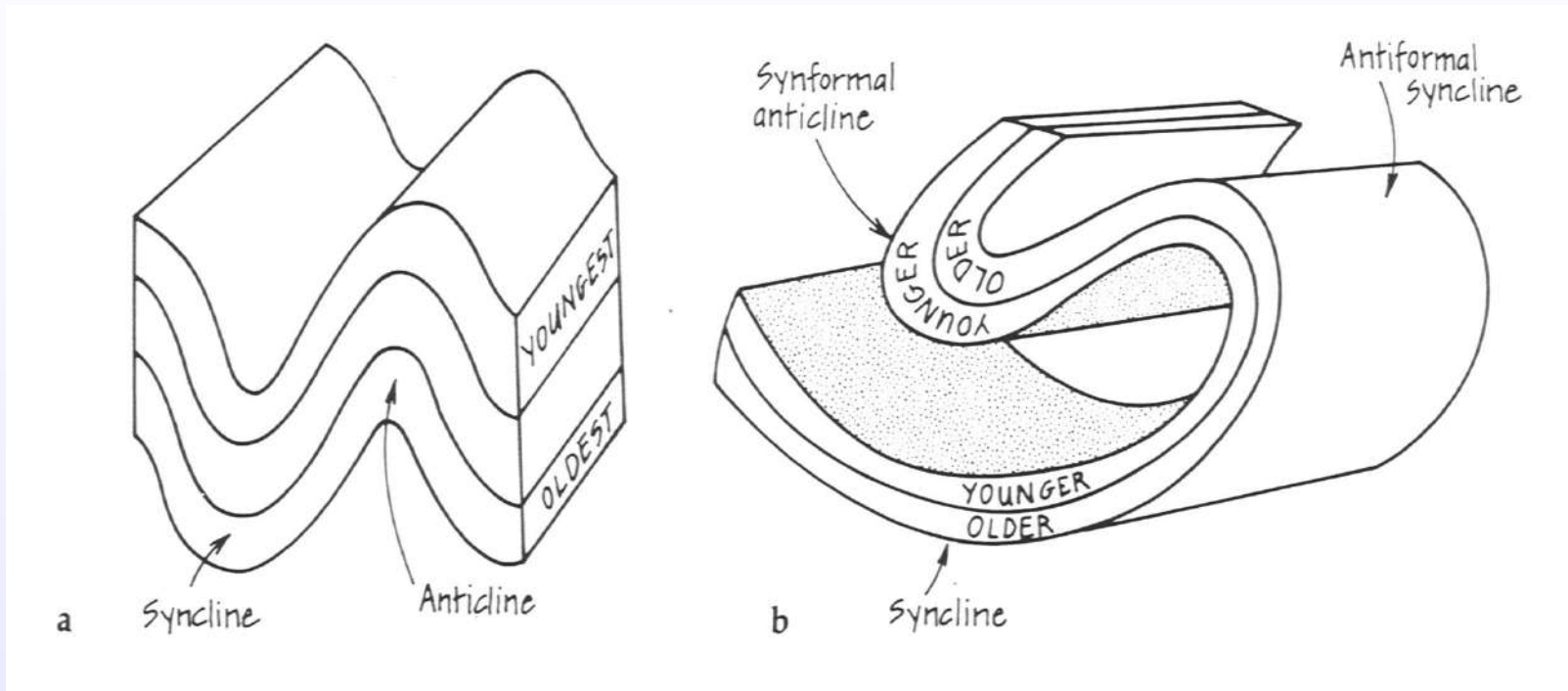
Les plis



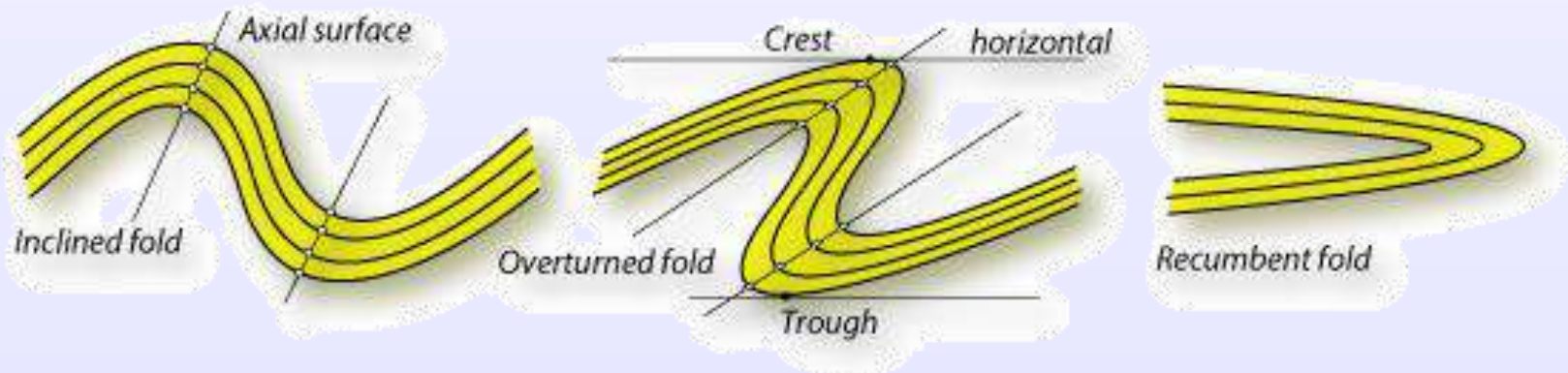
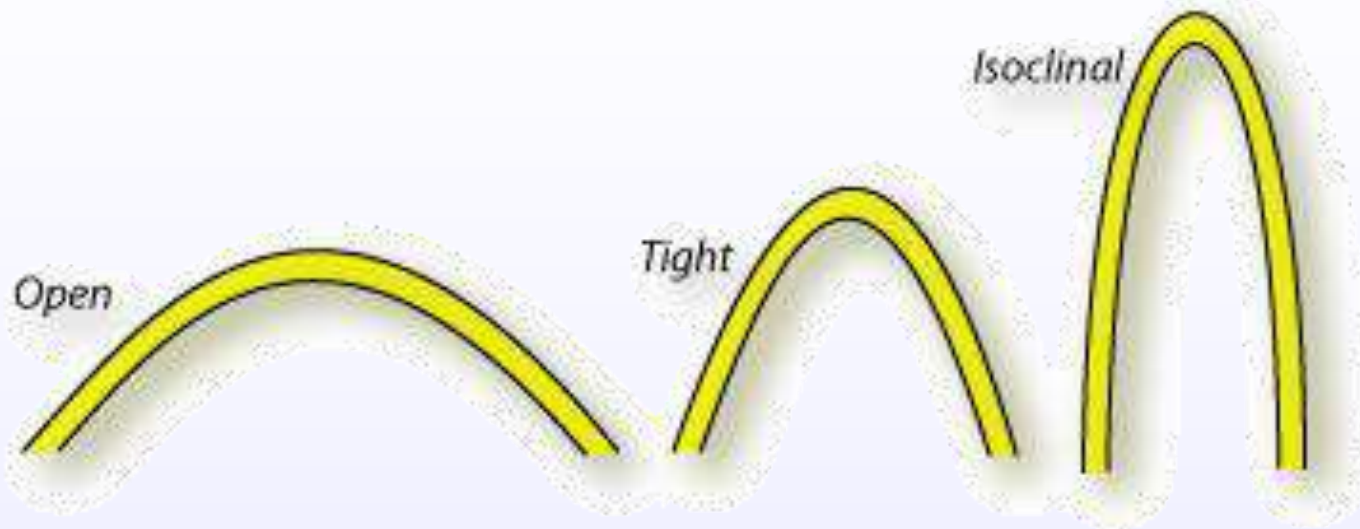
Forme



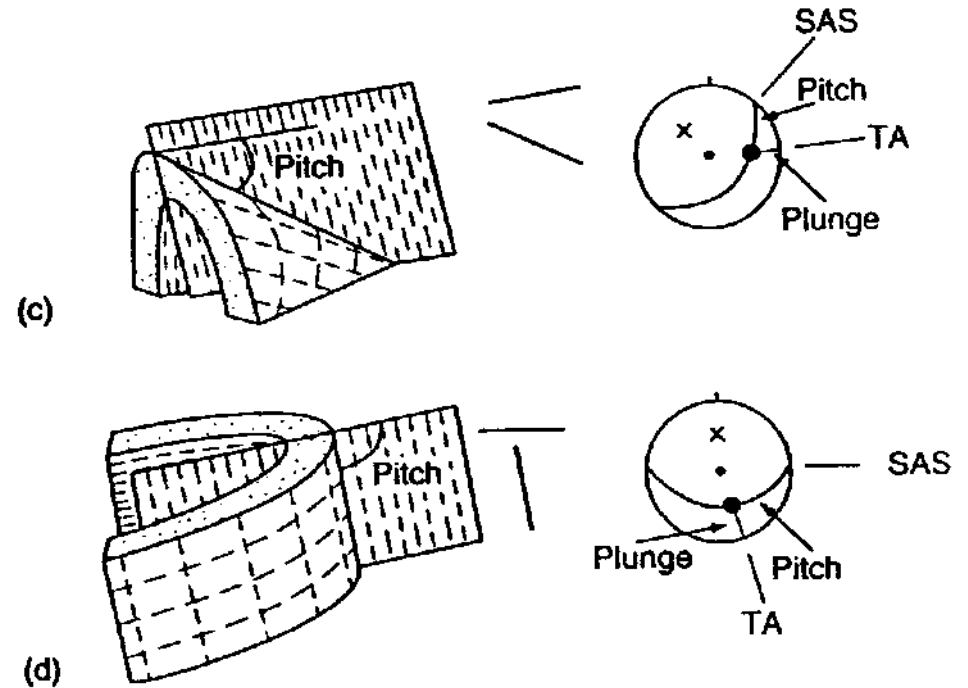
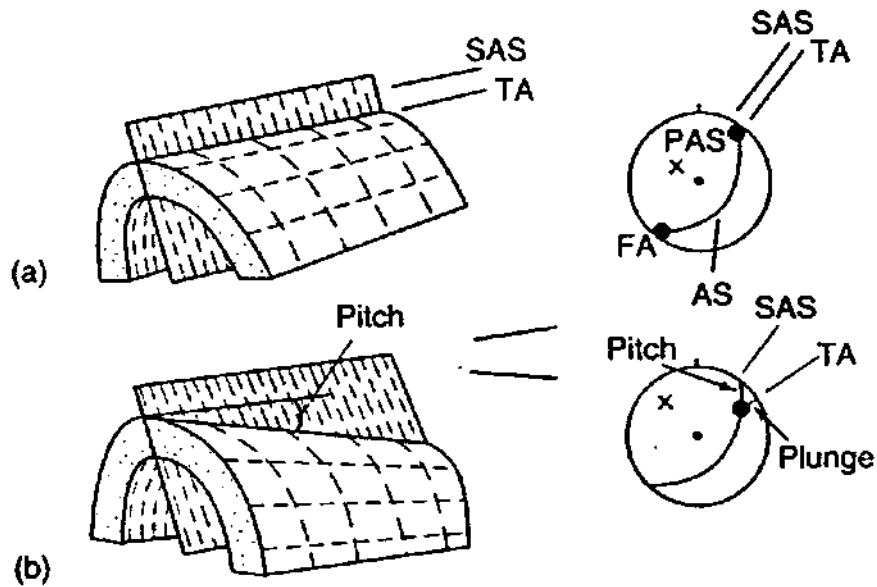
Attention...



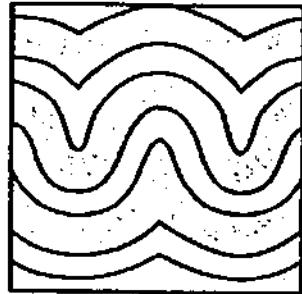
Profil



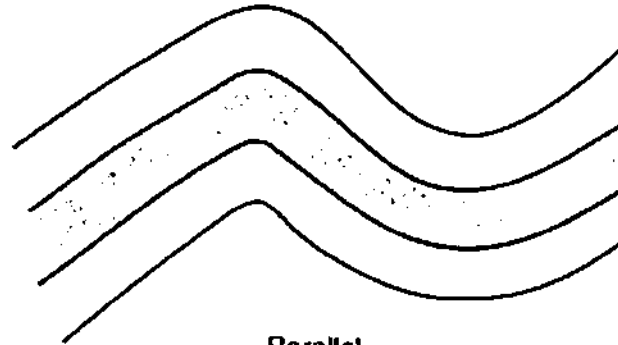
Pendage de l'axe



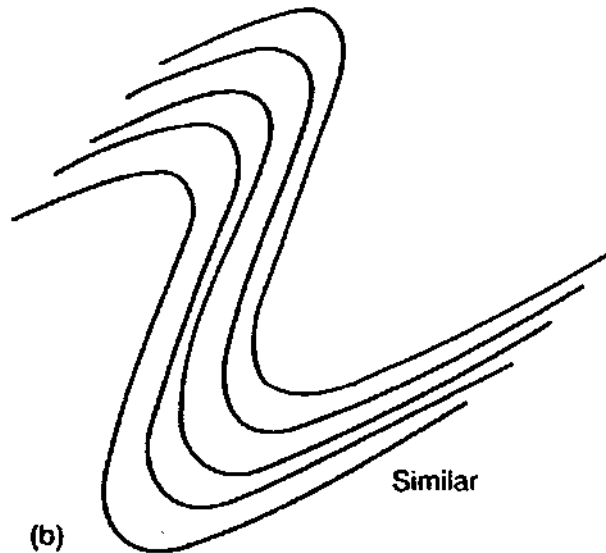
Plis isopaques ; plis conformes



(a) Parallel-concentric



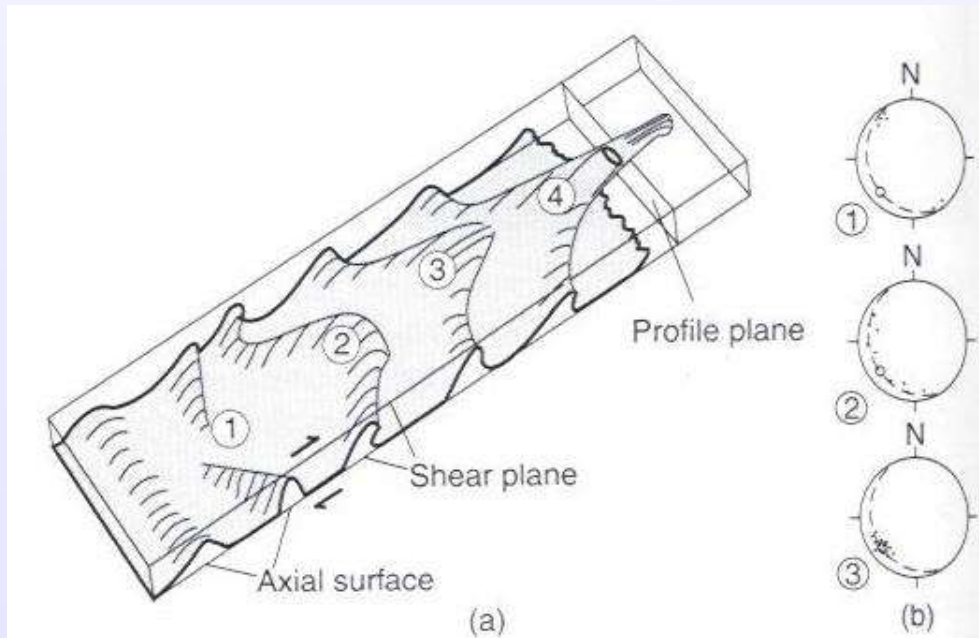
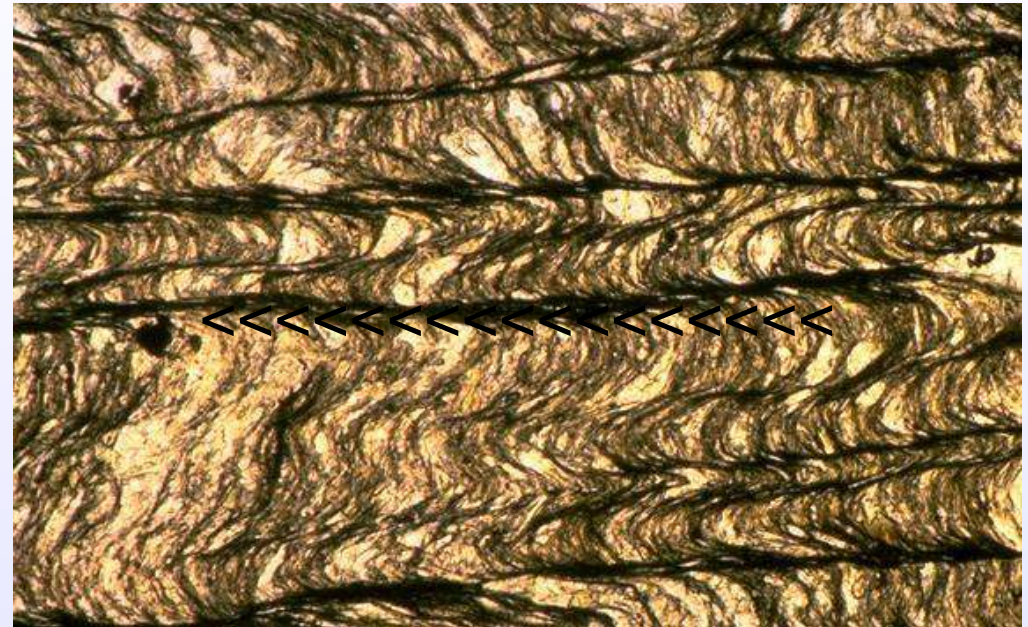
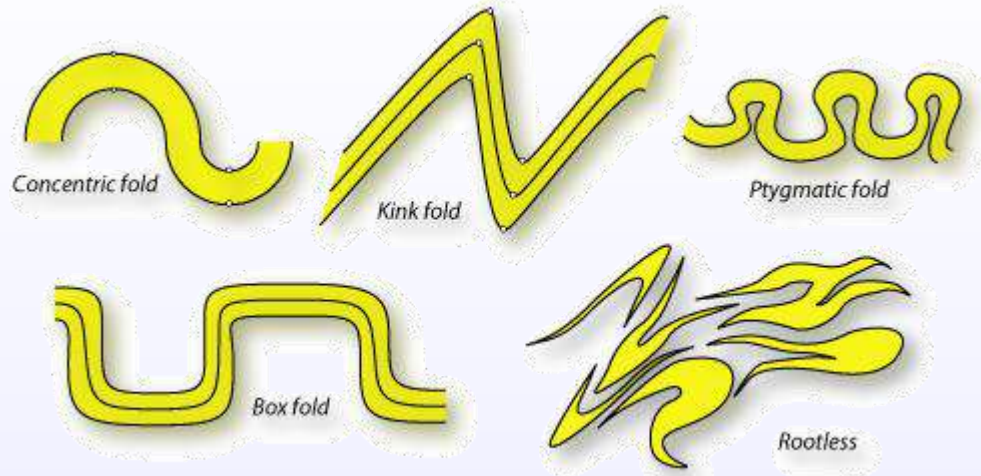
Parallel



Similar

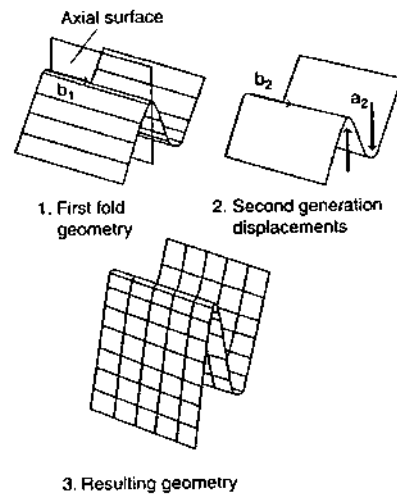
(b)

Plis particuliers

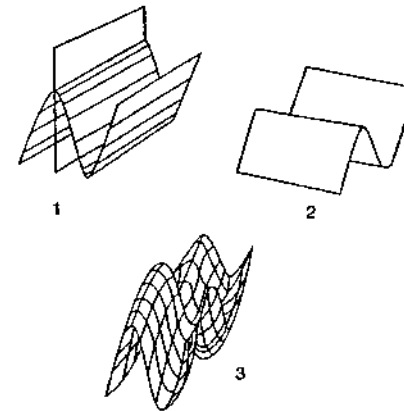


Interférences de plis

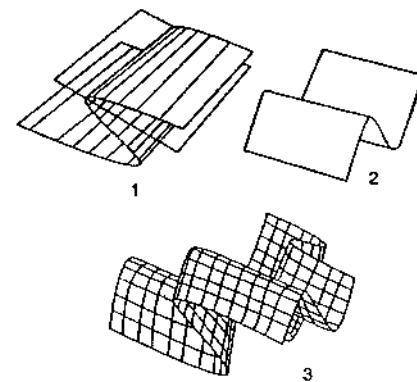
(a) Type 0



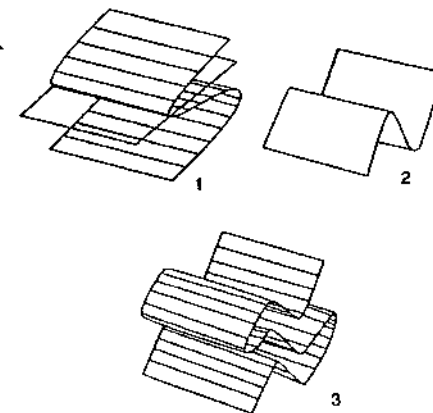
(b) Type 1



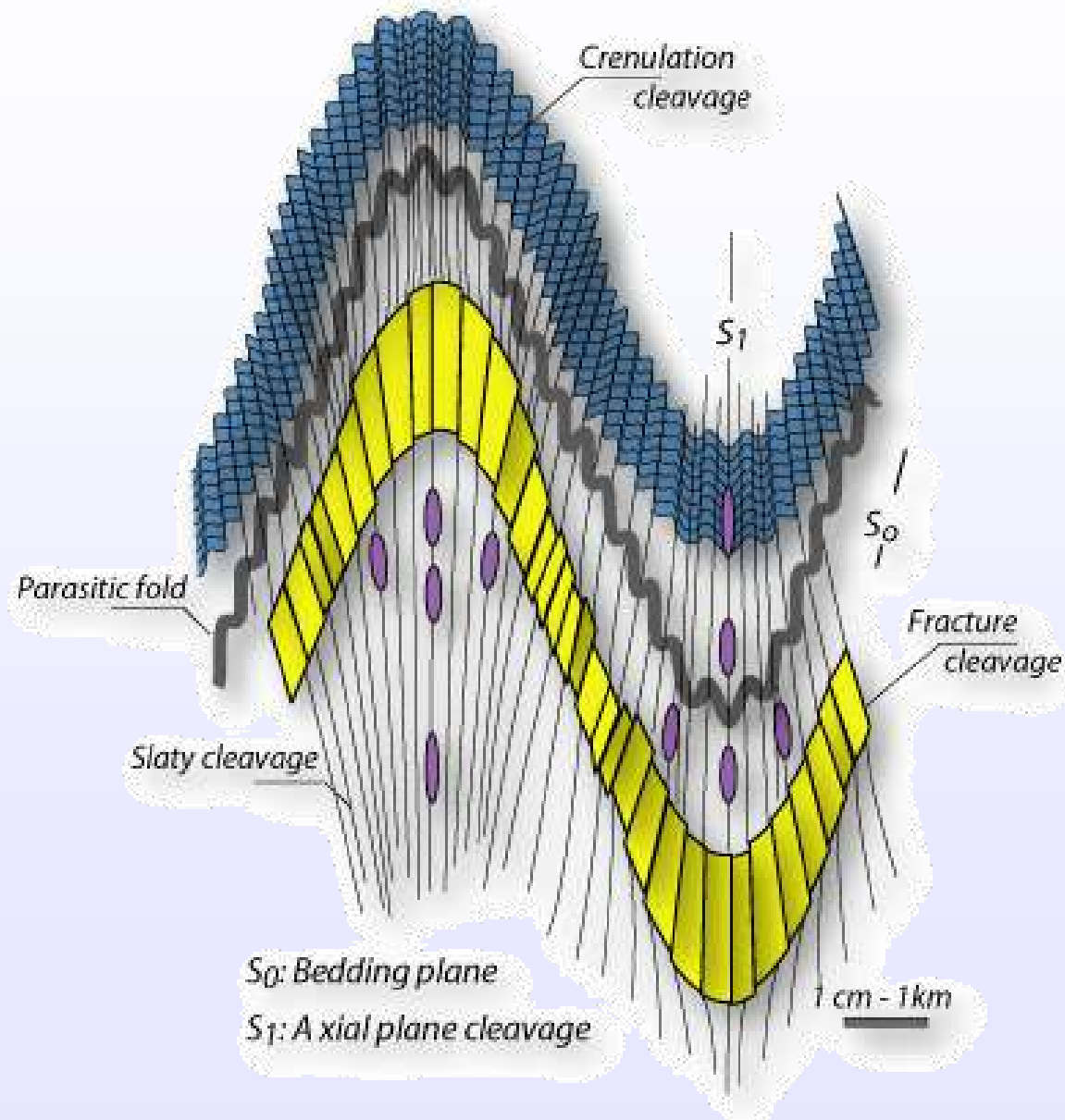
(c) Type 2



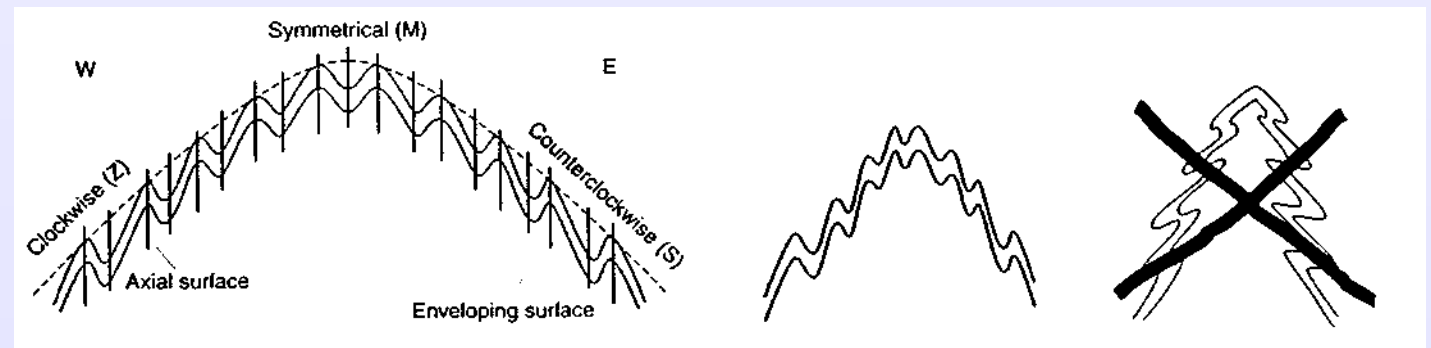
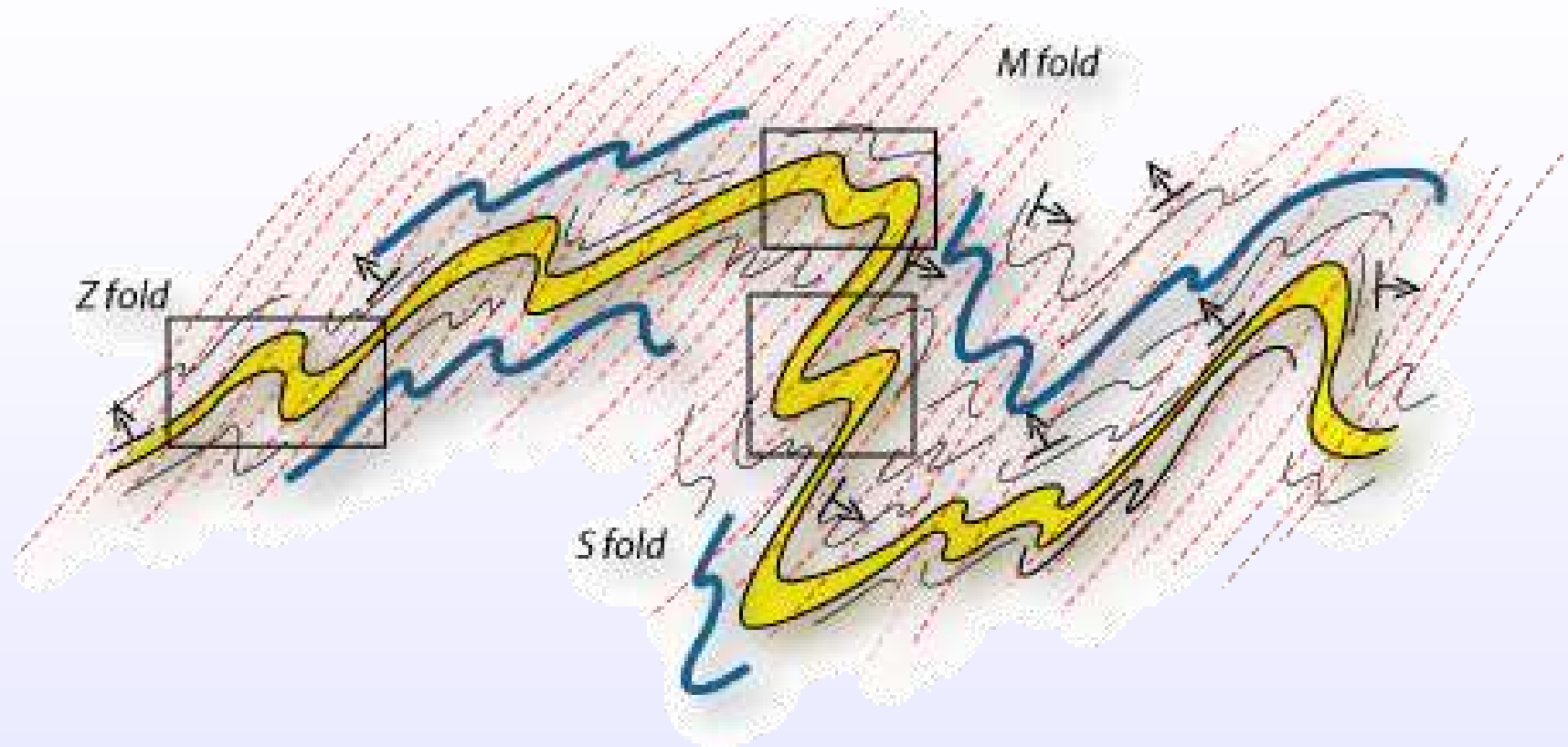
(d) Type 3



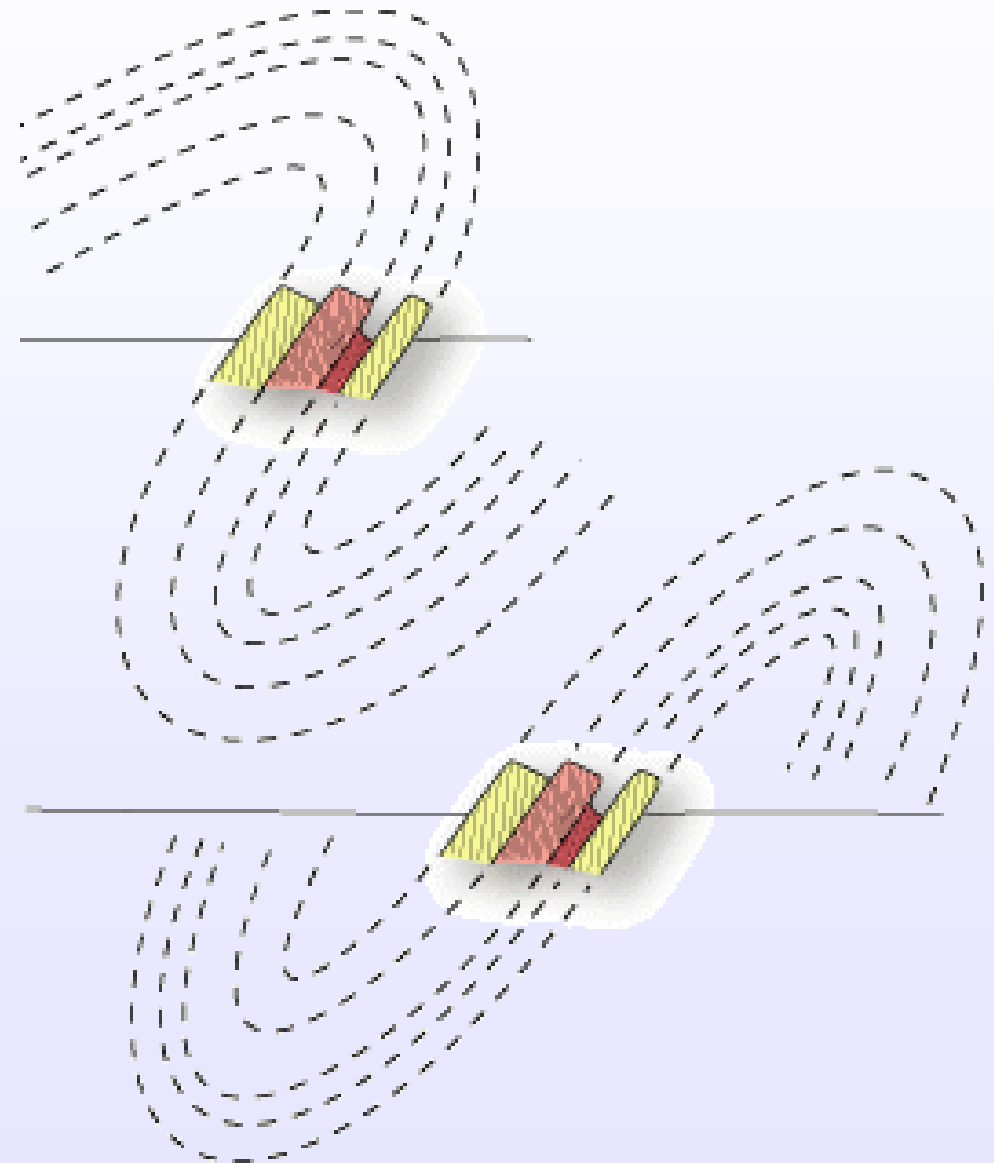
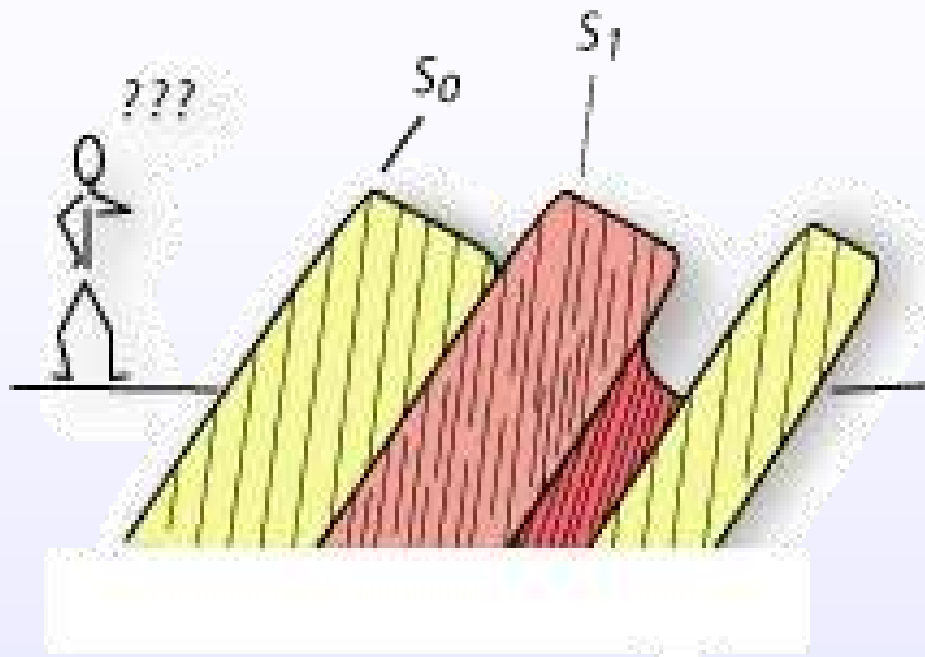
Schistosité de plan axial

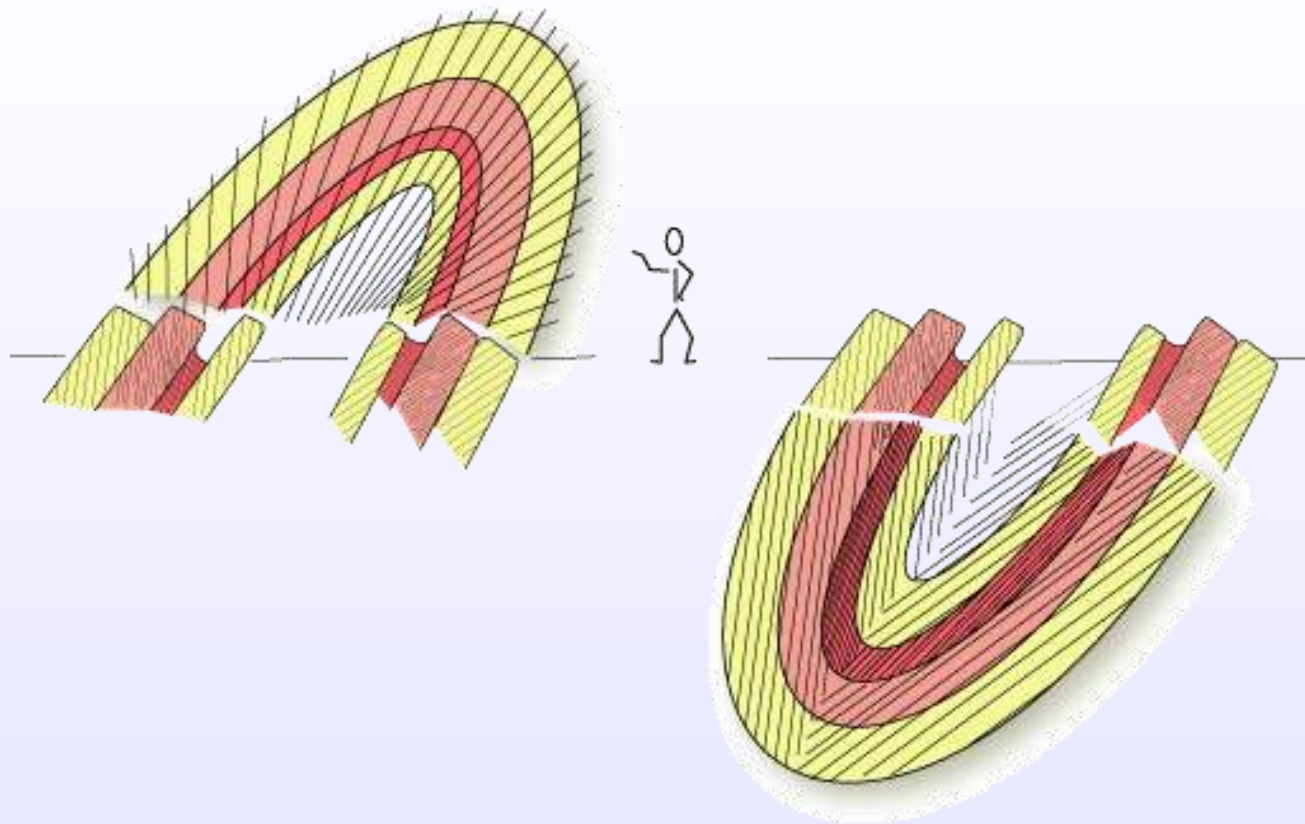


Associations de plis « parasites »

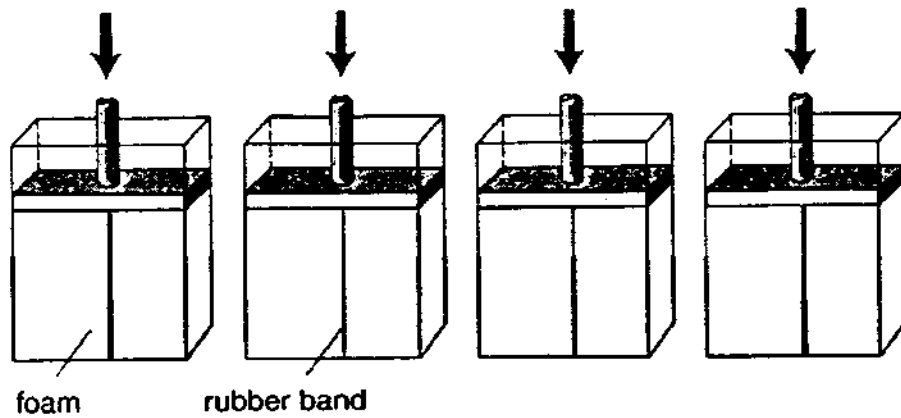


Utiliser ces relations sur le terrain...

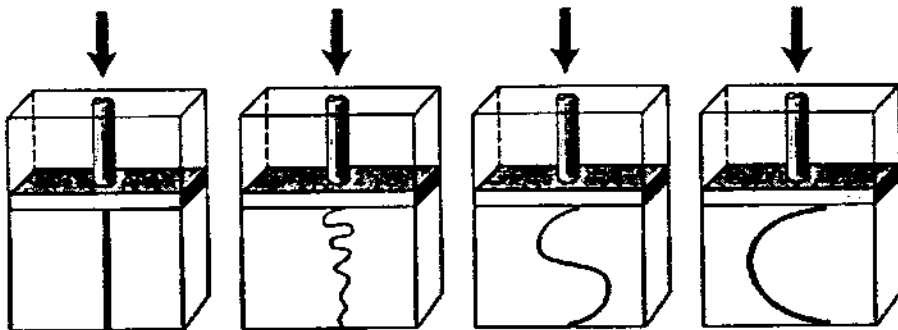




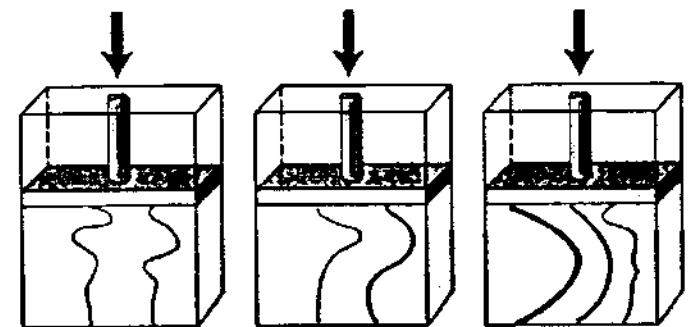
1) Flexion et formation de plis isopaques : le flambage



(a)



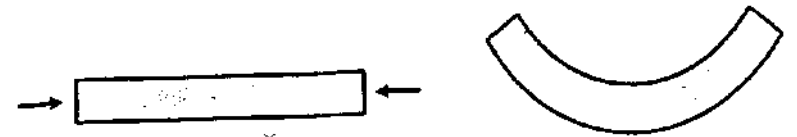
(b)



(c)

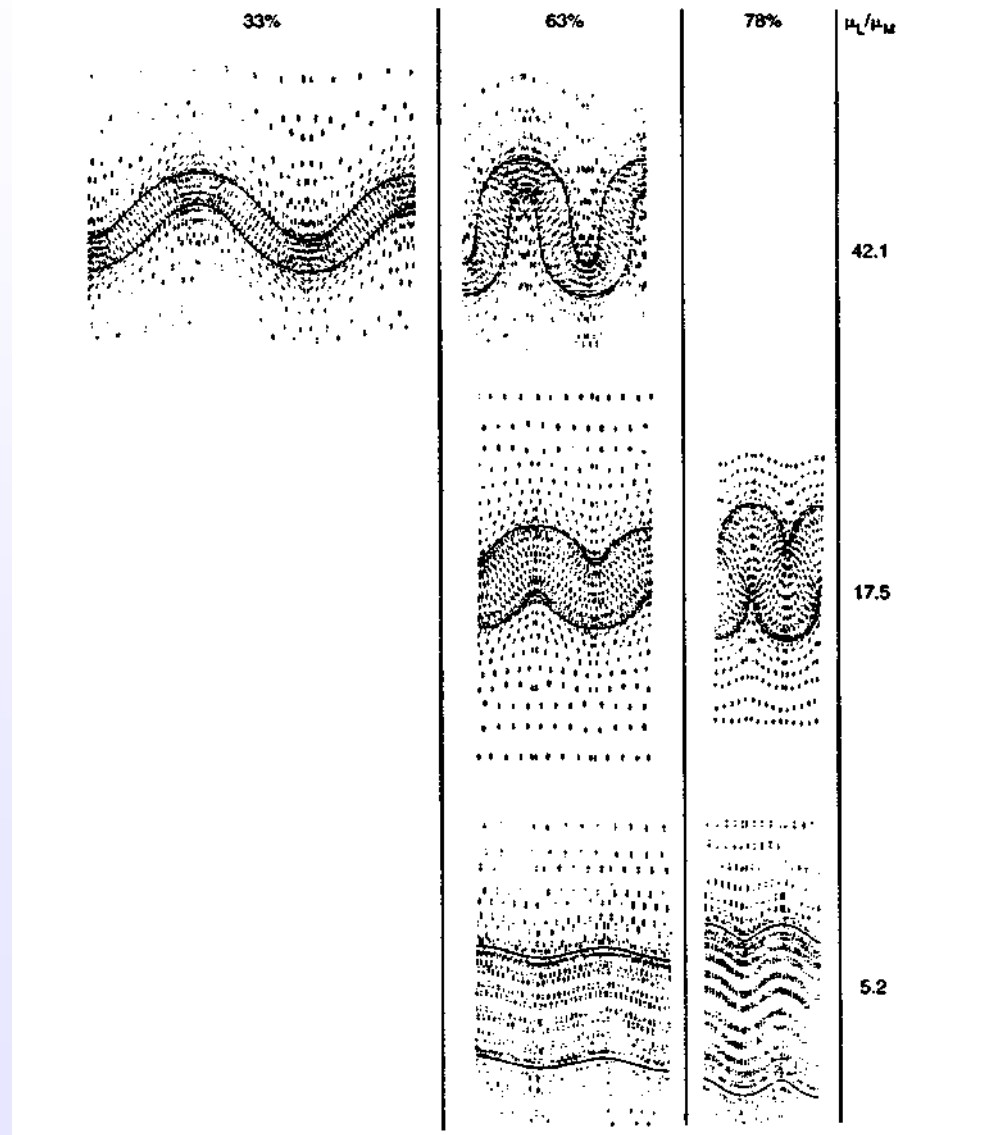


(a)



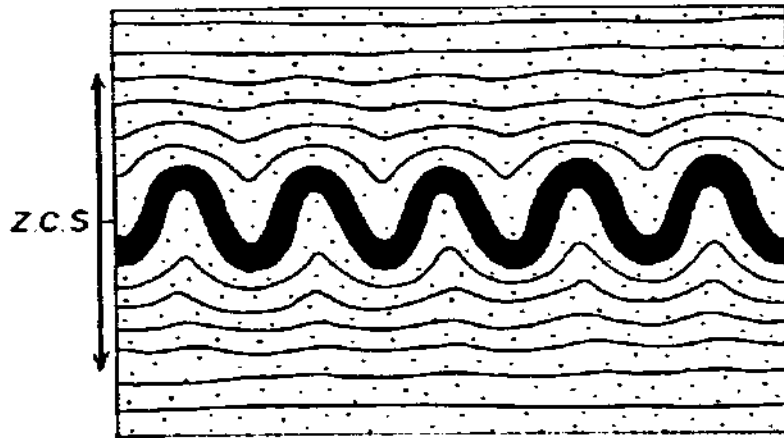
(b)

Contraste de viscosité

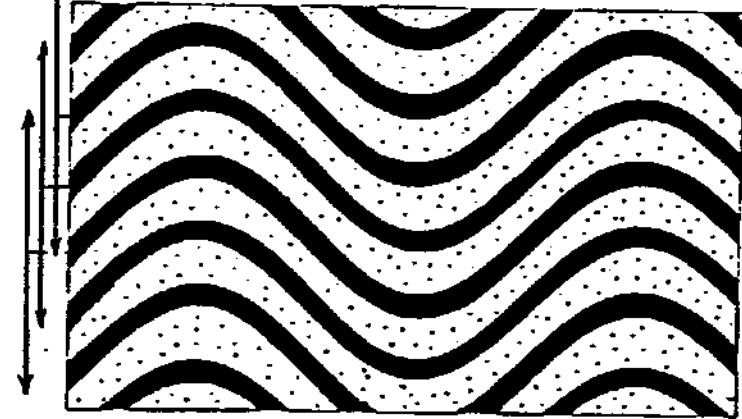


Plissement d'une pile de couches

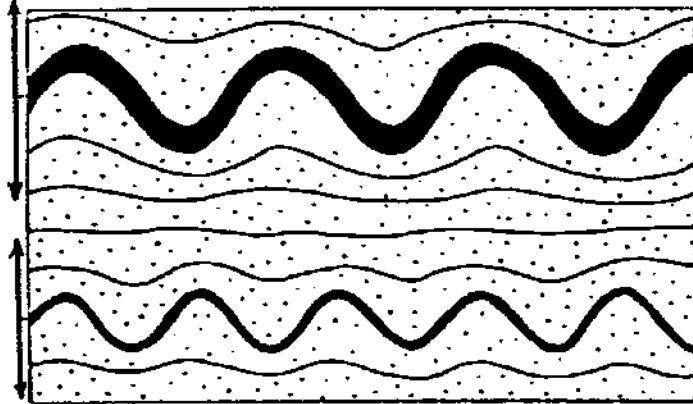
A. Single competent layer



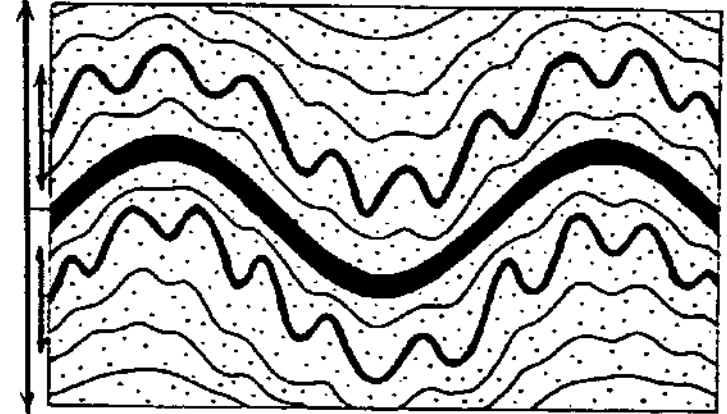
C. Harmonic folding



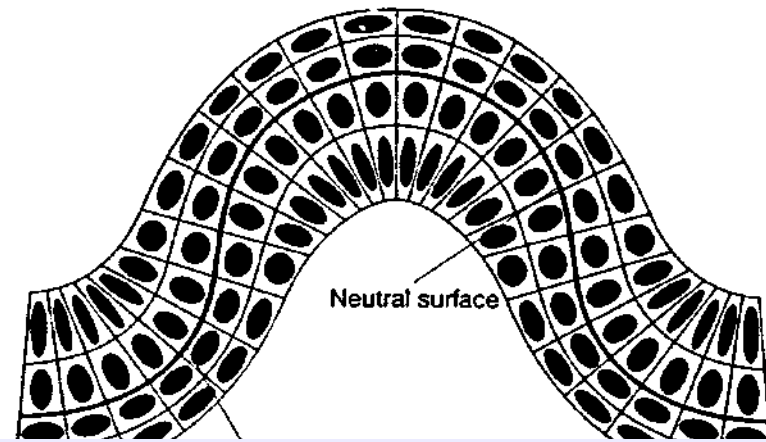
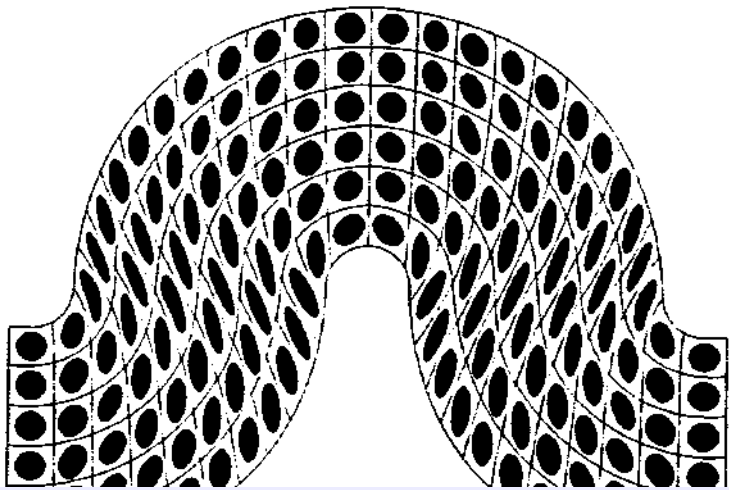
B. Disharmonic folding



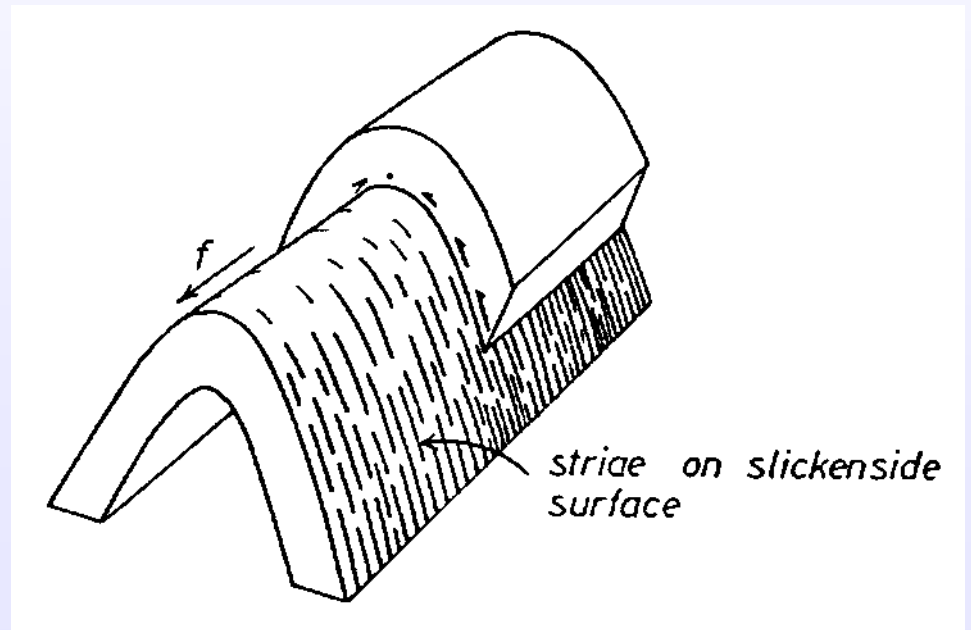
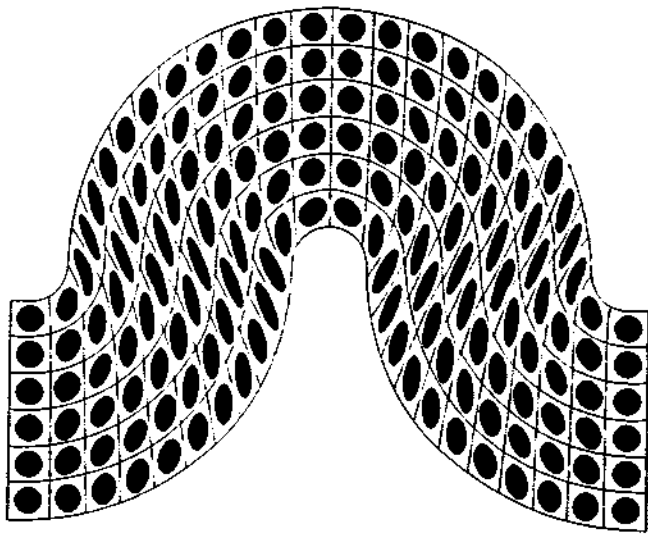
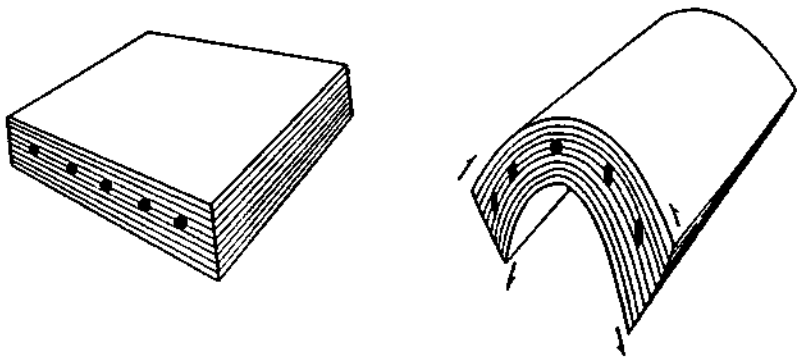
D. Polyharmonic folding



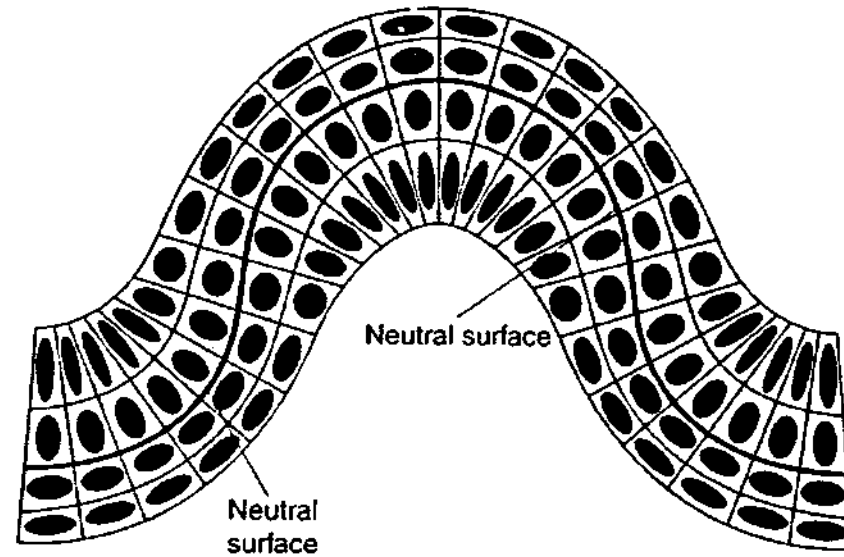
Déformation de flanc / de charnière



Déformation de flanc



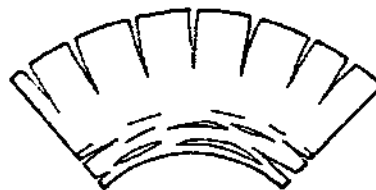
Déformation de charnière (avec plan neutre, intrados, extrados)



B.



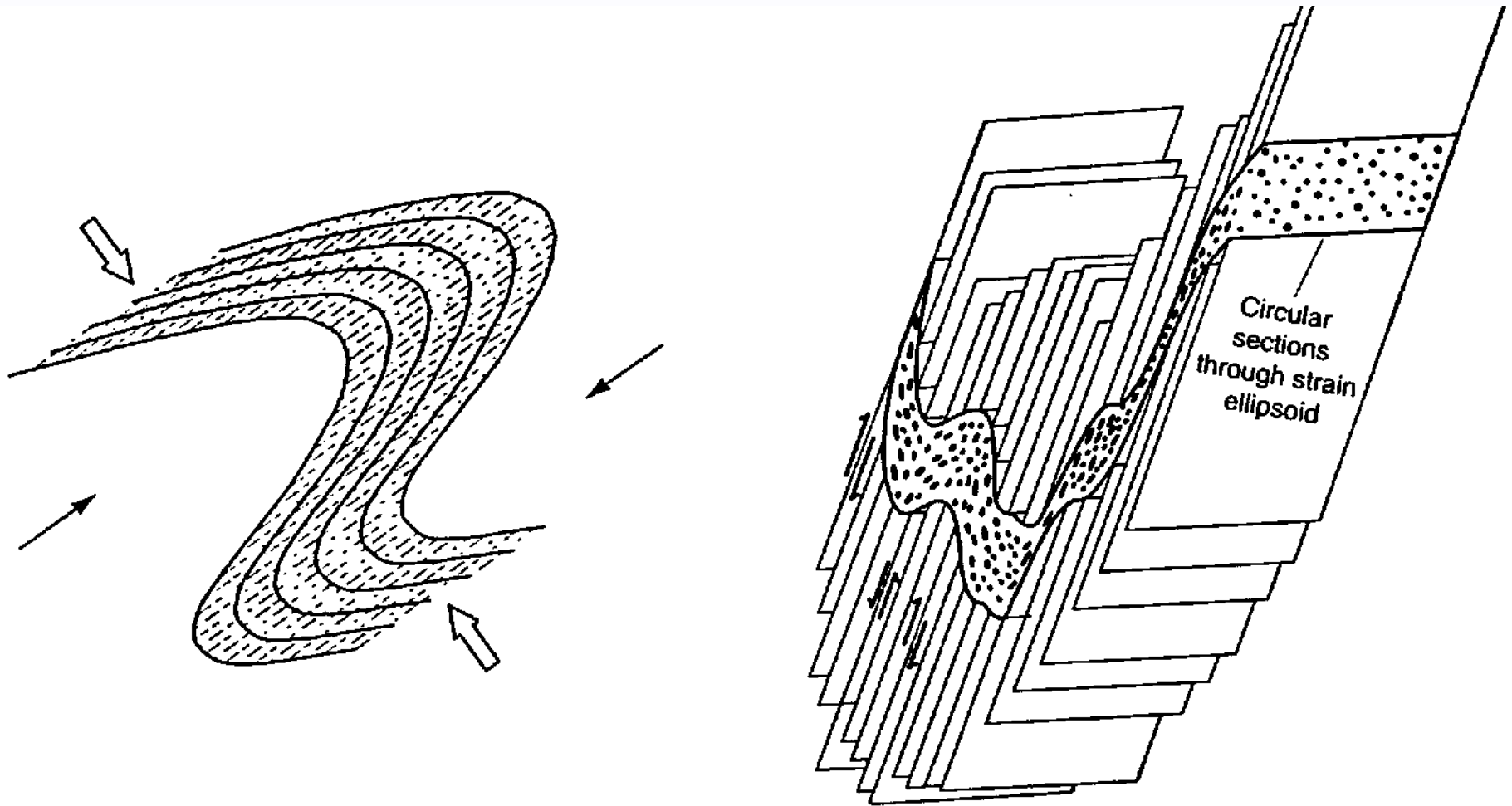
C.

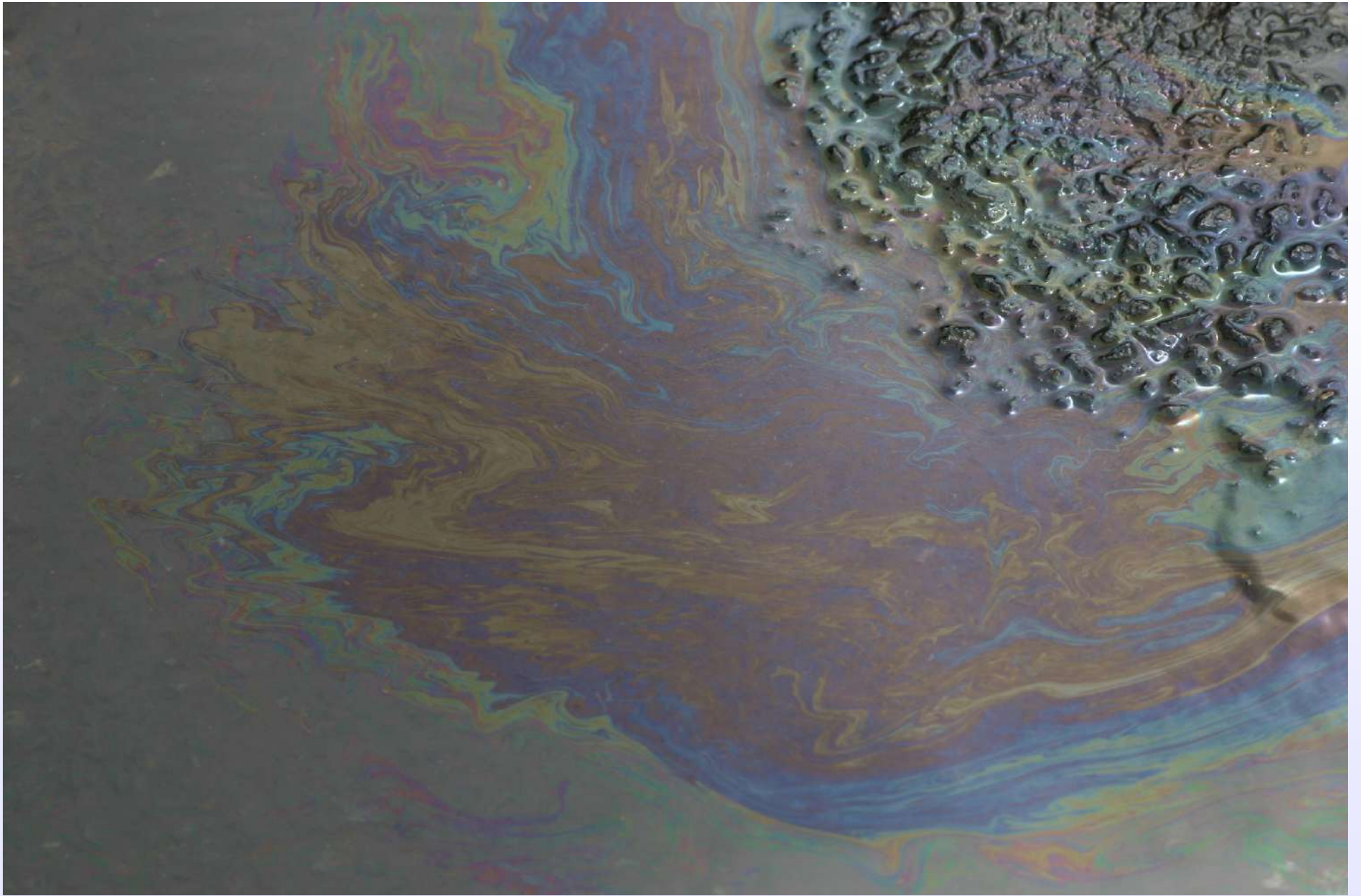


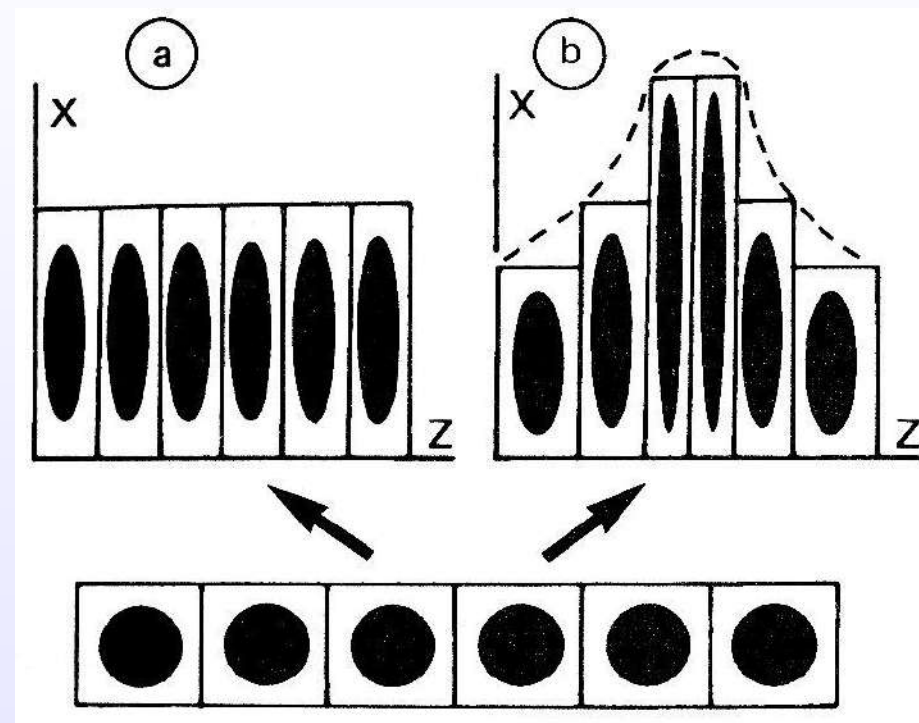
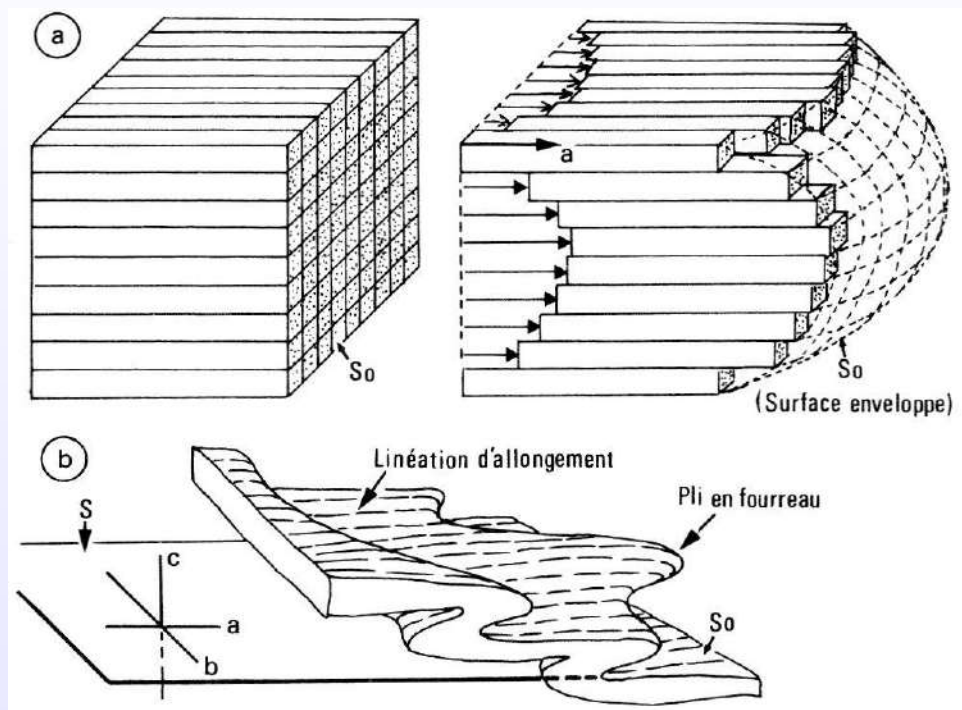
D.



2) Plis passifs (conformes)







Folded bedding/strata

A.



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Small-scale folding







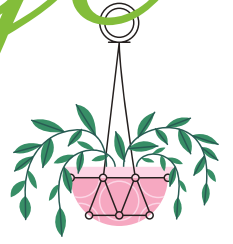






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Bon courage



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