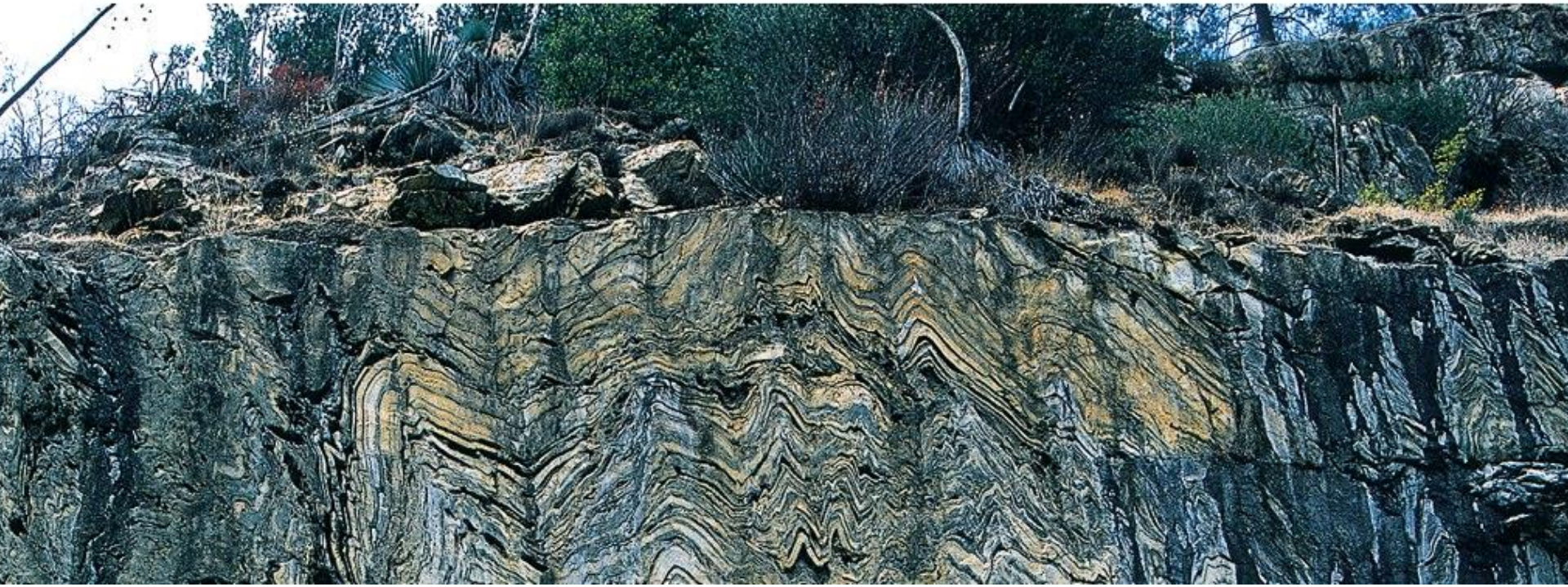
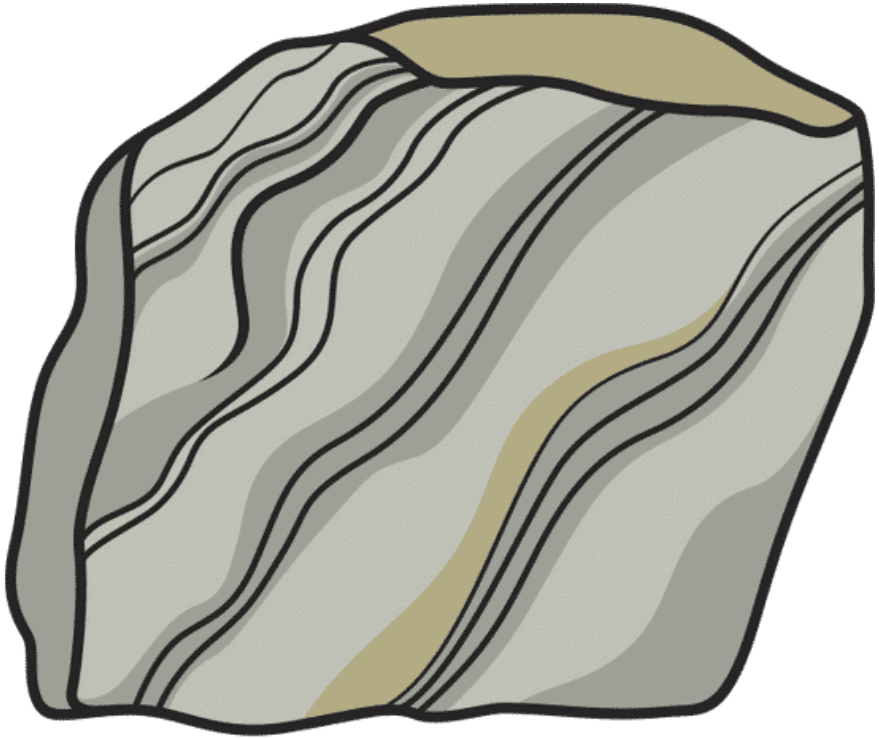
METAMORFISMO
E
ROCHAS METAMÓRFICAS (I)





- CAMBIOS NO METAMORFISMO
- GRAO METAMÓRFICO
- FACTORES DO METAMORFISMO
- FACIES METAMÓRFICAS

Aumento P e T

METAMORFISMO

Rocha nai

Rocha metamórfica

METAMORFISMO

Cambios mineralóxicos en estado sólido.

Principal proceso: **Recristalización**

Aumento da presión e da temperatura

TIPOS DE CAMBIOS METAMÓRFICOS

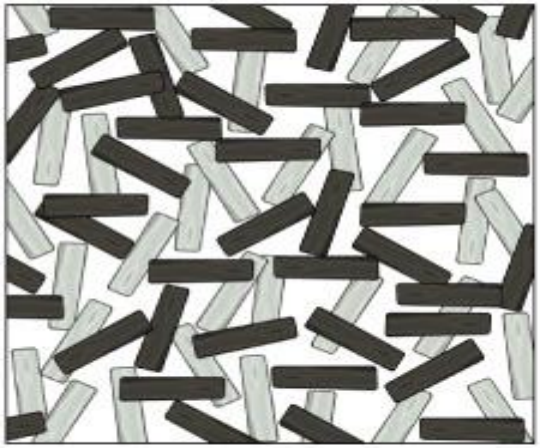
Cambios na textura da rocha

Cambios no tipo de mineral

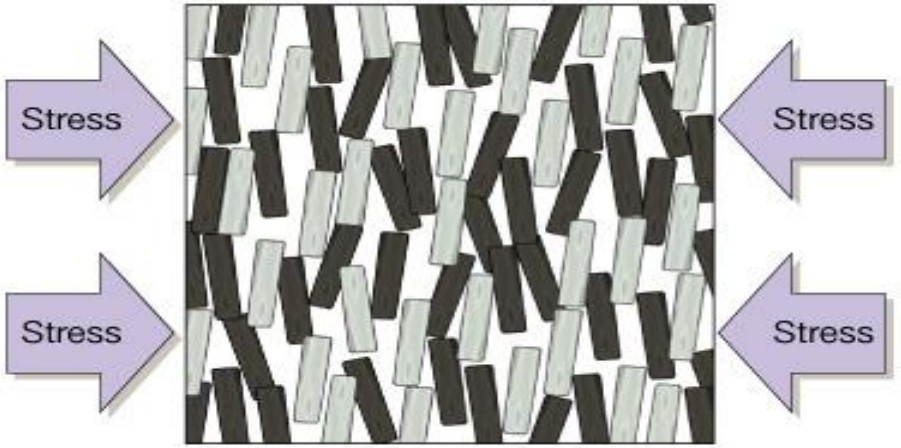
} Xeralmente van xuntos

Exemplo 1

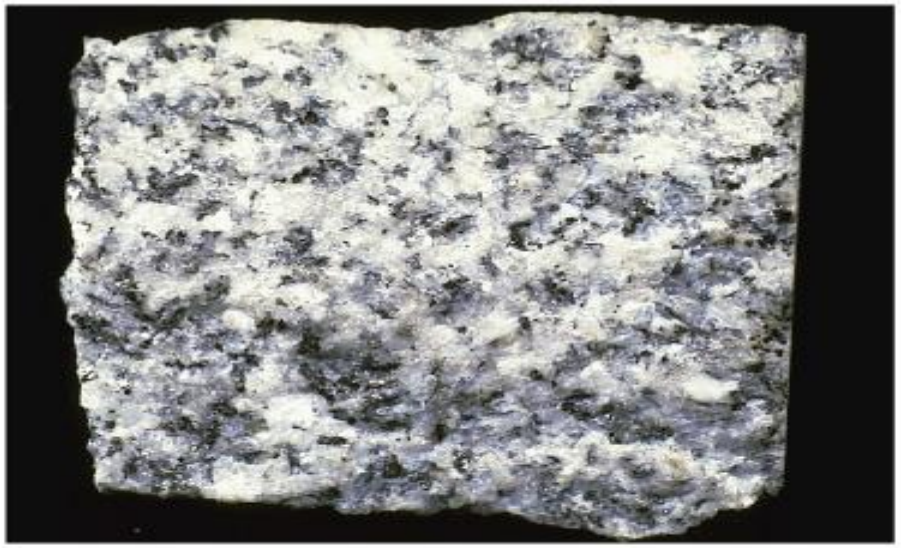
FOLIACIÓN, cambio na textura

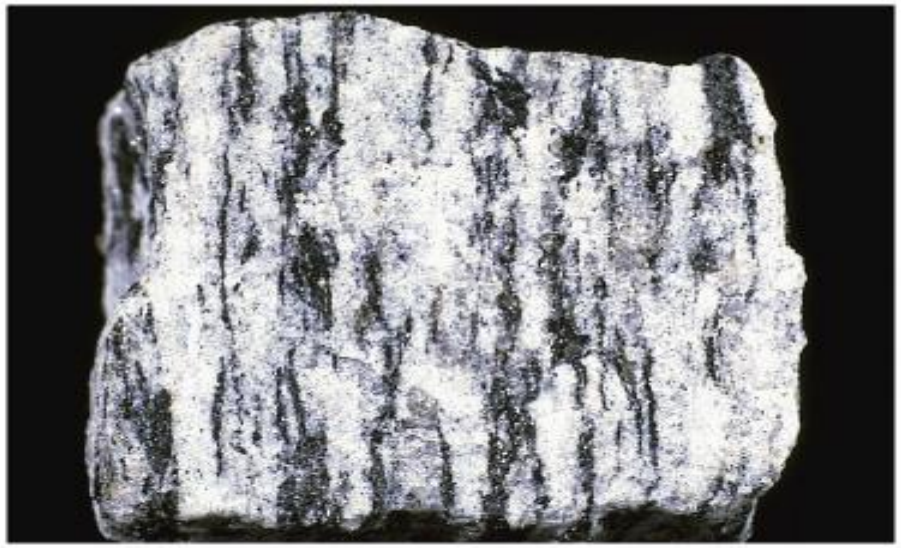


Before metamorphism



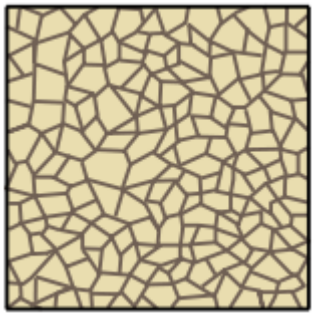
After metamorphism





Exemplo 2

Aumento do tamaño dos cristais



Aumento de temperatura

BLASTESE, cambio na textura

Exemplo 3

$$KAl_2Si_3AlO_{10}(OH)_2 + SiO_2 = KAlSi_3O_8 + Al_2SiO_5 + H_2O$$

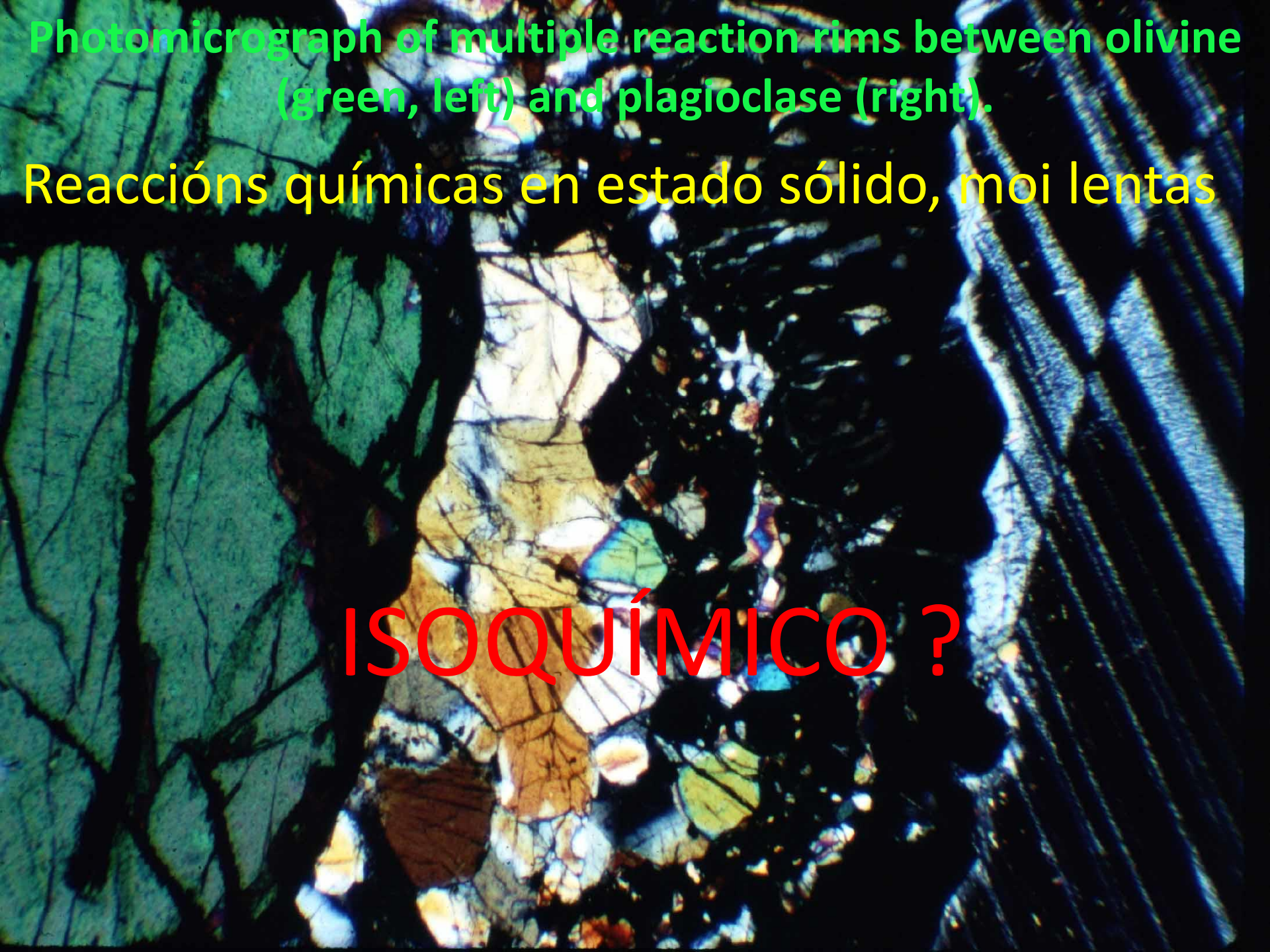
Moscovita — cuarzo — Feldespato — Sillimanita

Simplificadamente:

Minerais arxilosos → Micas → Feldespatos → Cuarzo

Aumento de presión e temperatura

Cambios de minerais por reaccións químicas


Photomicrograph of multiple reaction rims between olivine (green, left) and plagioclase (right).
Reaccións químicas en estado sólido, moi lentas
ISOQUÍMICO ?

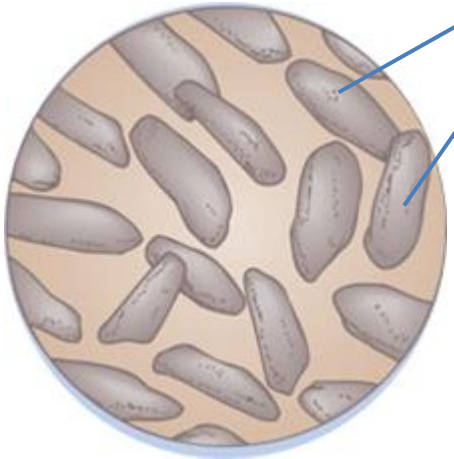
Exemplo 4

Cambios no tipo de mineral e na textura da rocha

Aumento P e T

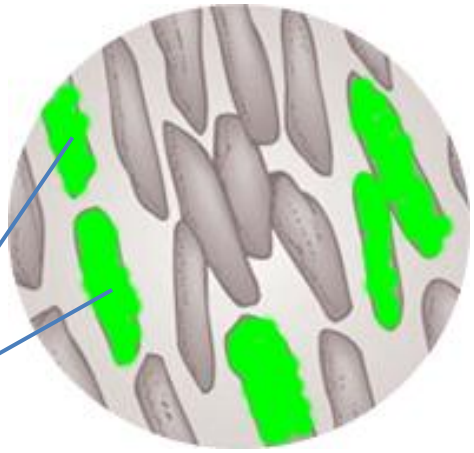
Lutita (arxila)

Minerais arxilosos

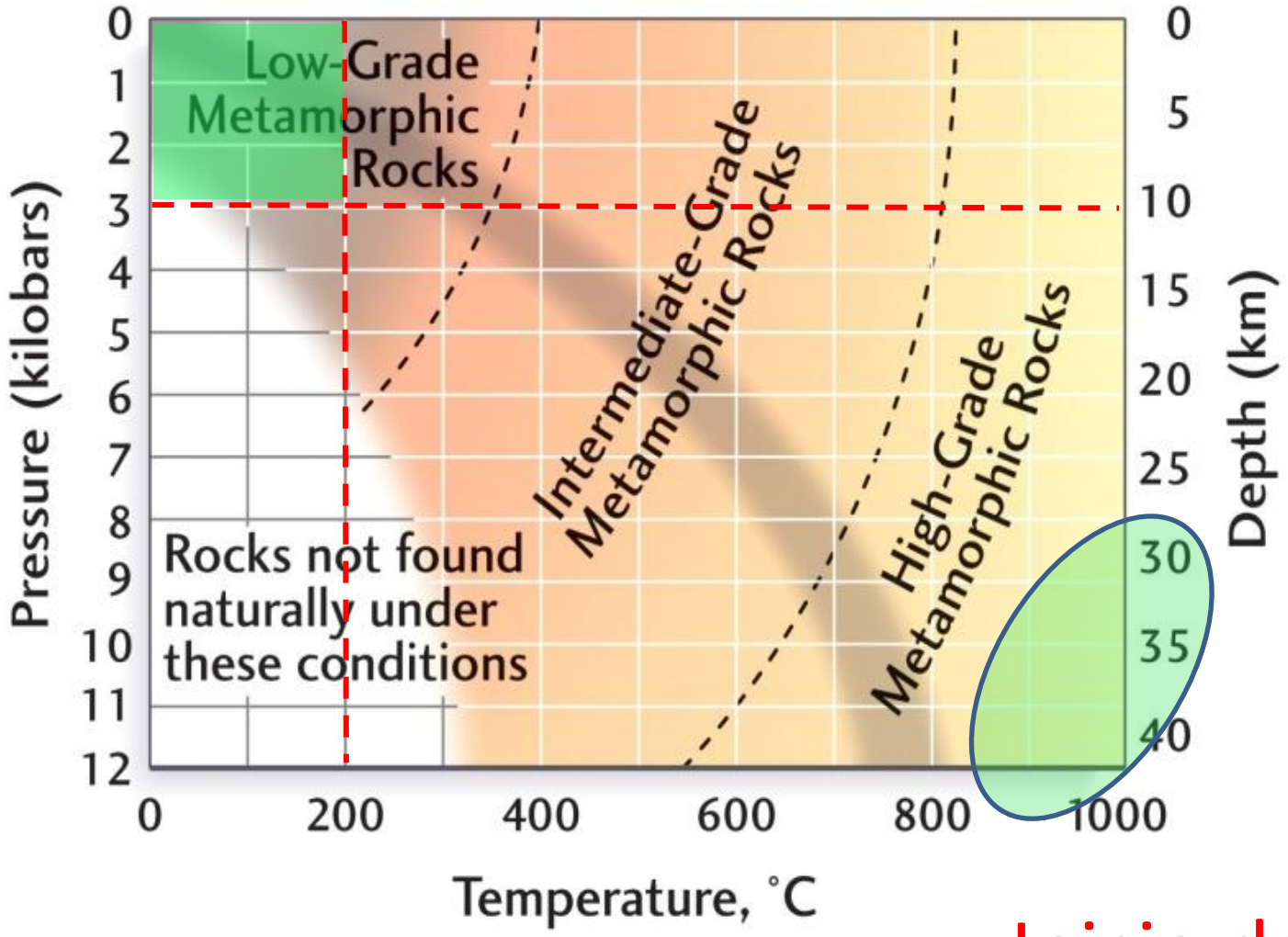


Lousa (pizarra)

Micas

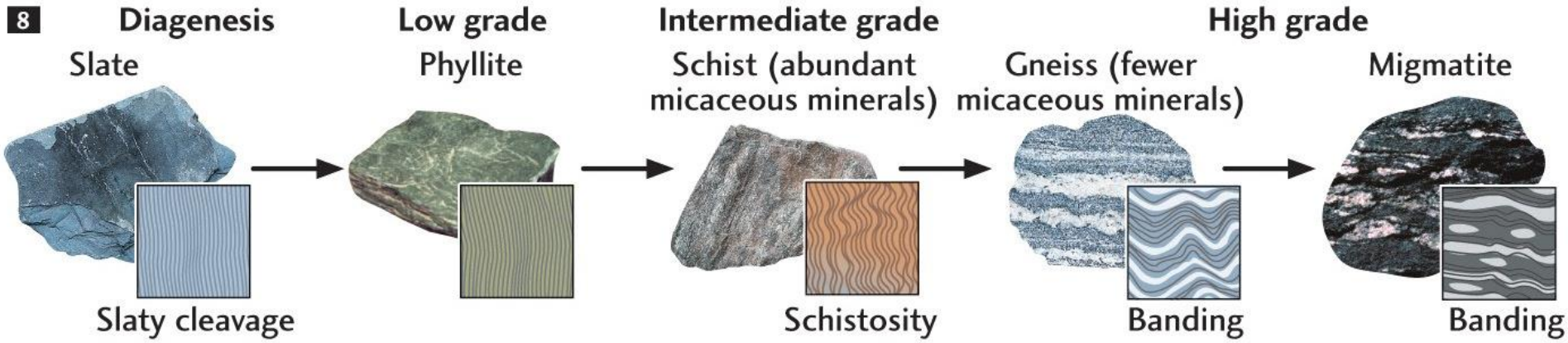


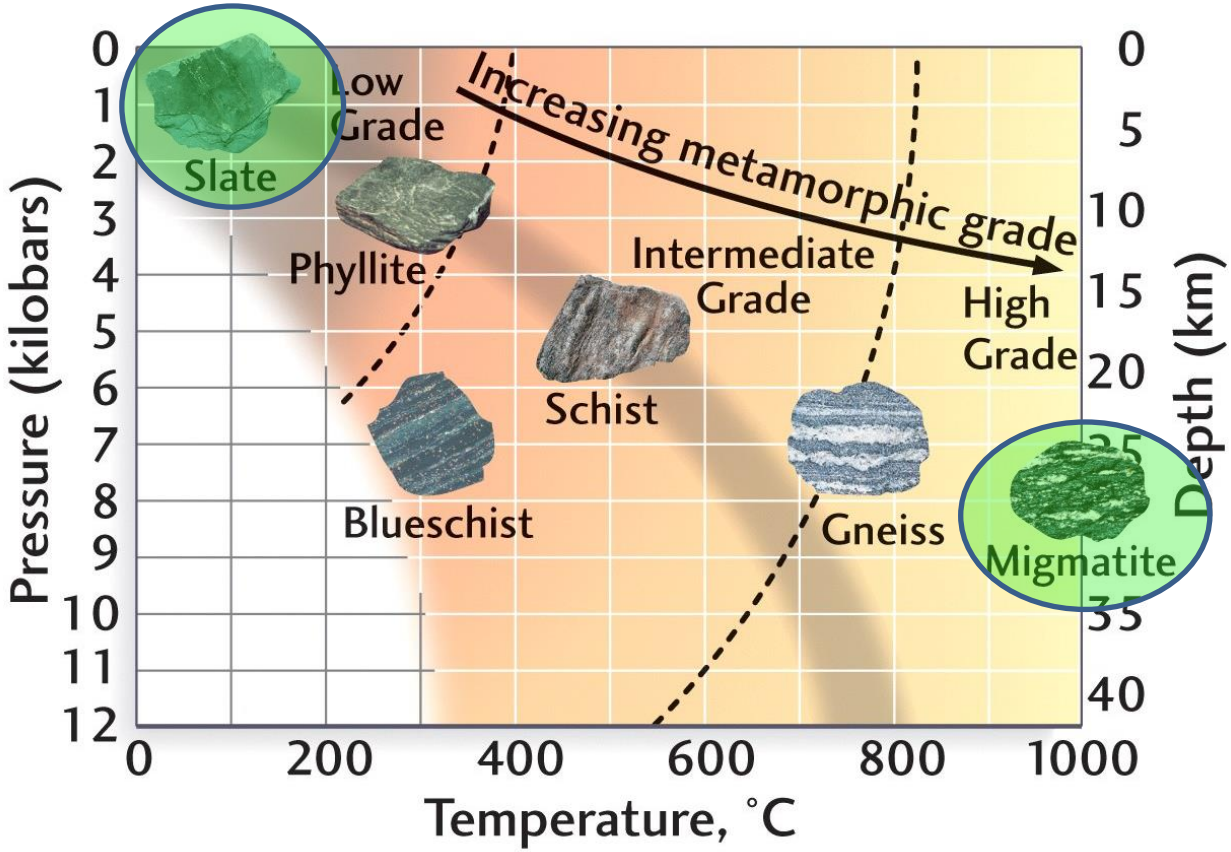
LÍMITES E GRAO METAMÓRFICO



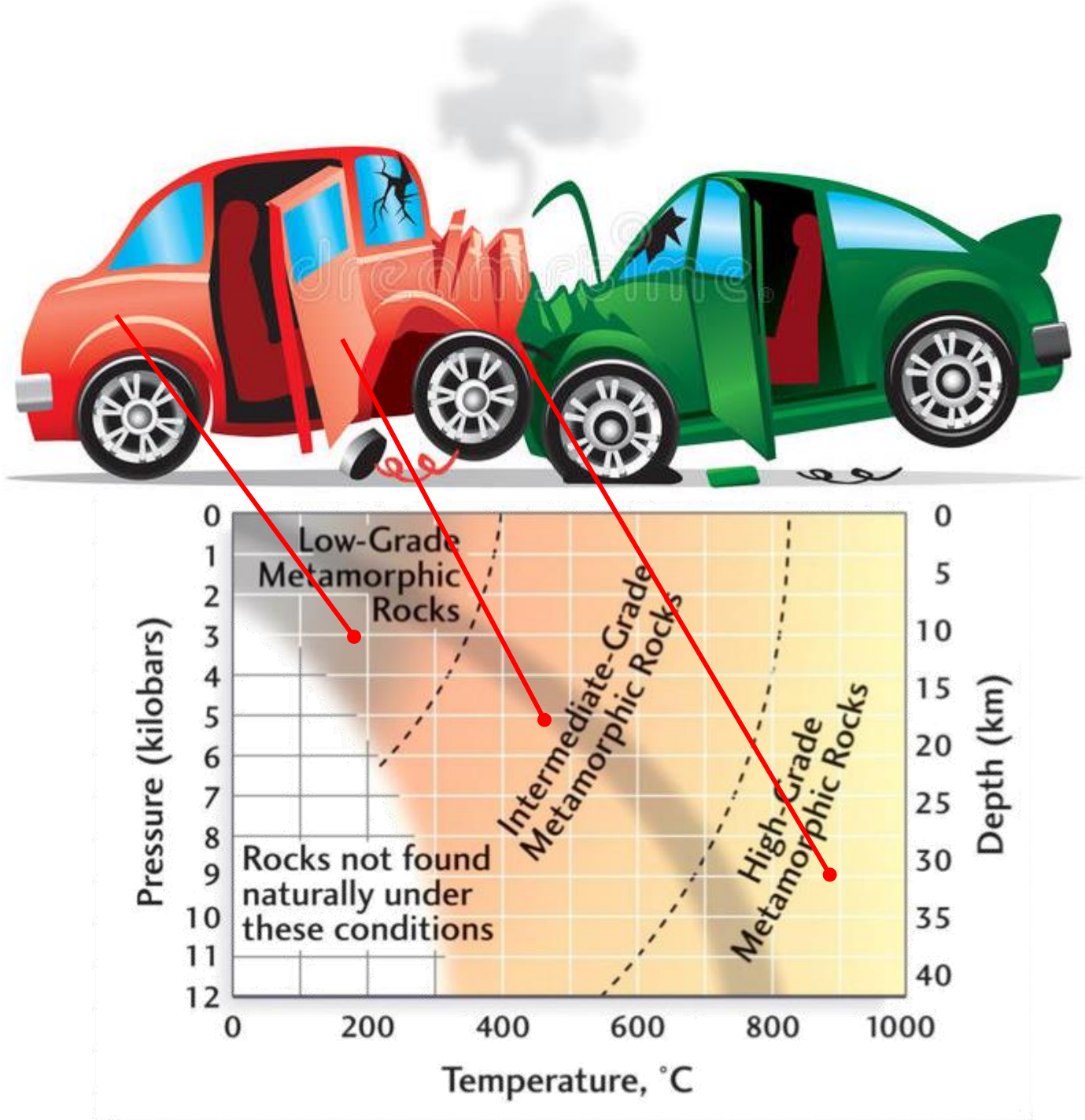
Inicio da fusión

GRAO METAMÓRFICO: INTENSIDADE DOS CAMBIOS

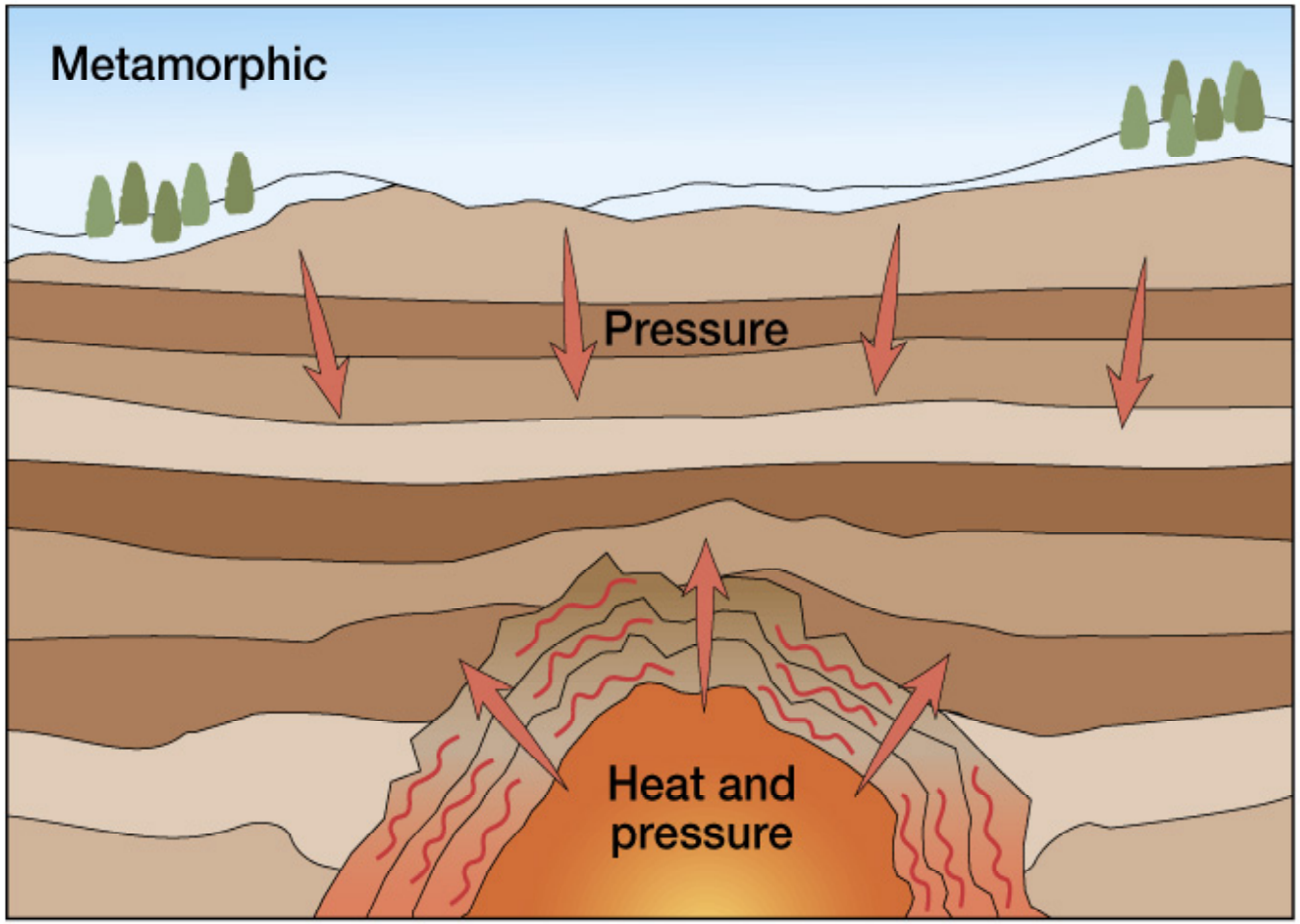




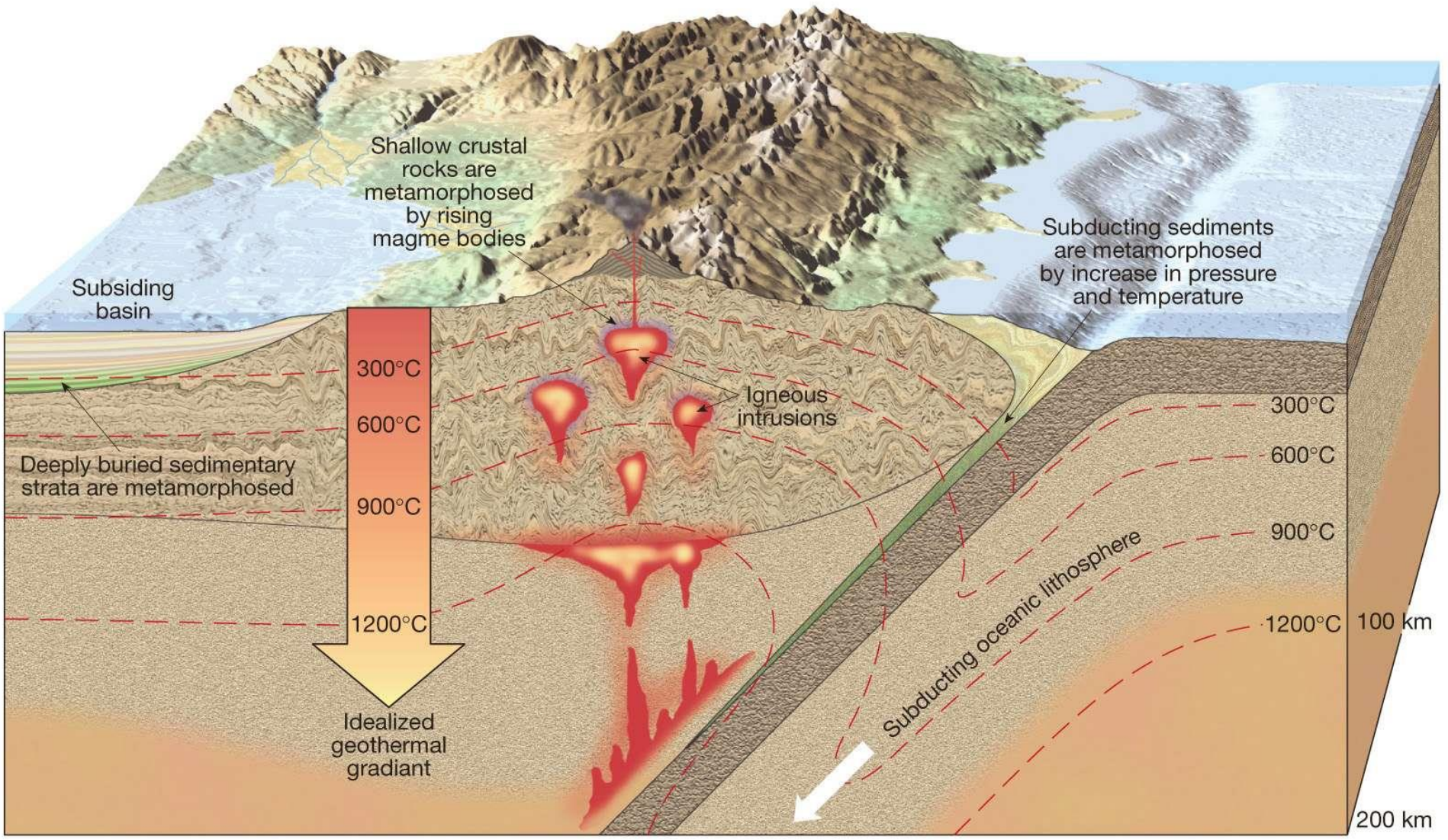
ANATEXIA:
FUSIÓN PARCIAL


Low-Grade Metamorphic Rocks
Intermediate-Grade Metamorphic Rocks
High-Grade Metamorphic Rocks
Rocks not found naturally under these conditions
Pressure (kilobars)
Depth (km)
Temperature, °C
0
1
2
3
4
5
6
7
8
9
10
11
12
0
5
10
15
20
25
30
35
40
0
200
400
600
800
1000

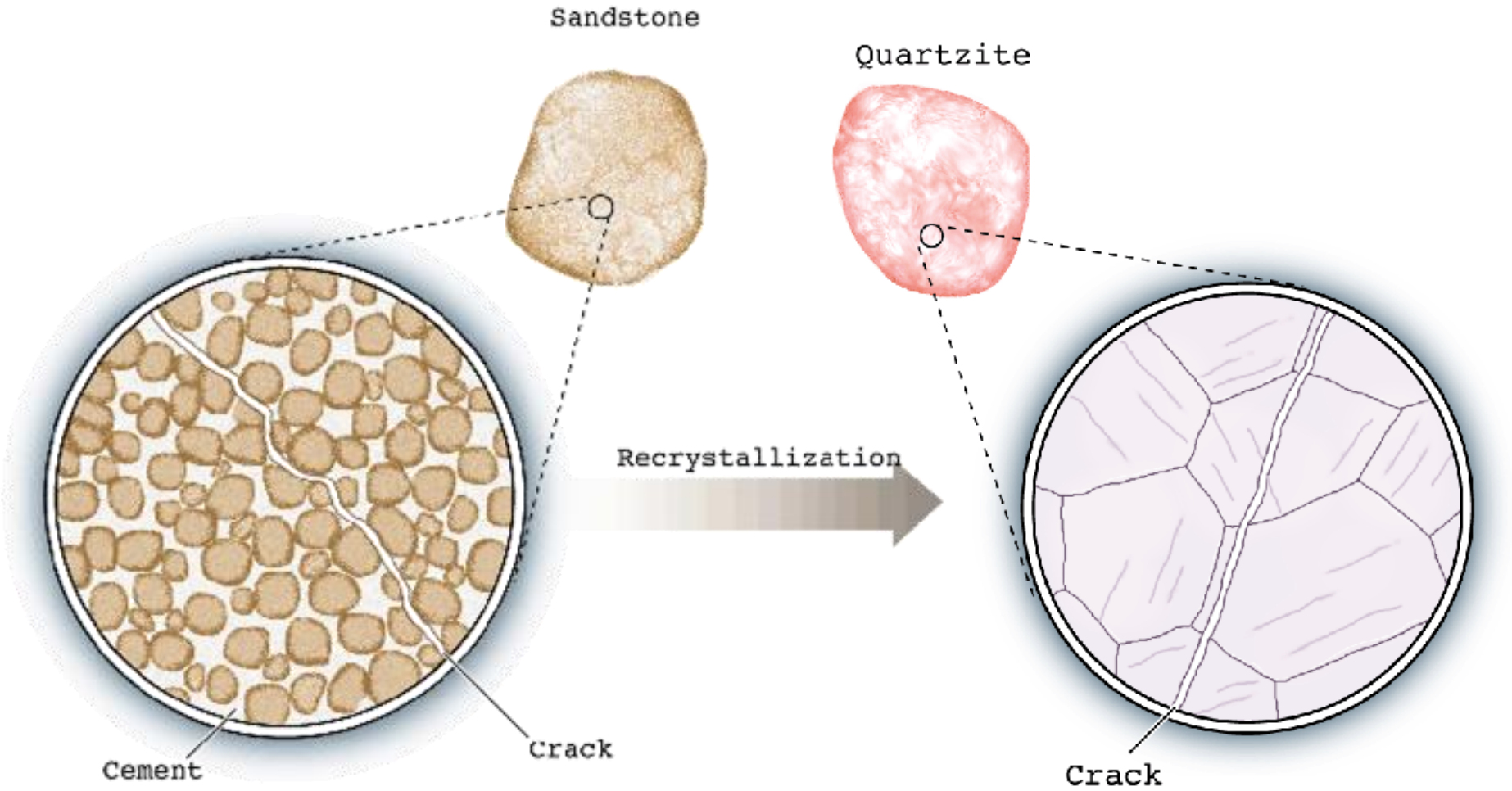
Factores do metamorfismo: presión, temperatura e fases fluídas



TEMPERATURA: GRADIENTE XEOTÉRMICO



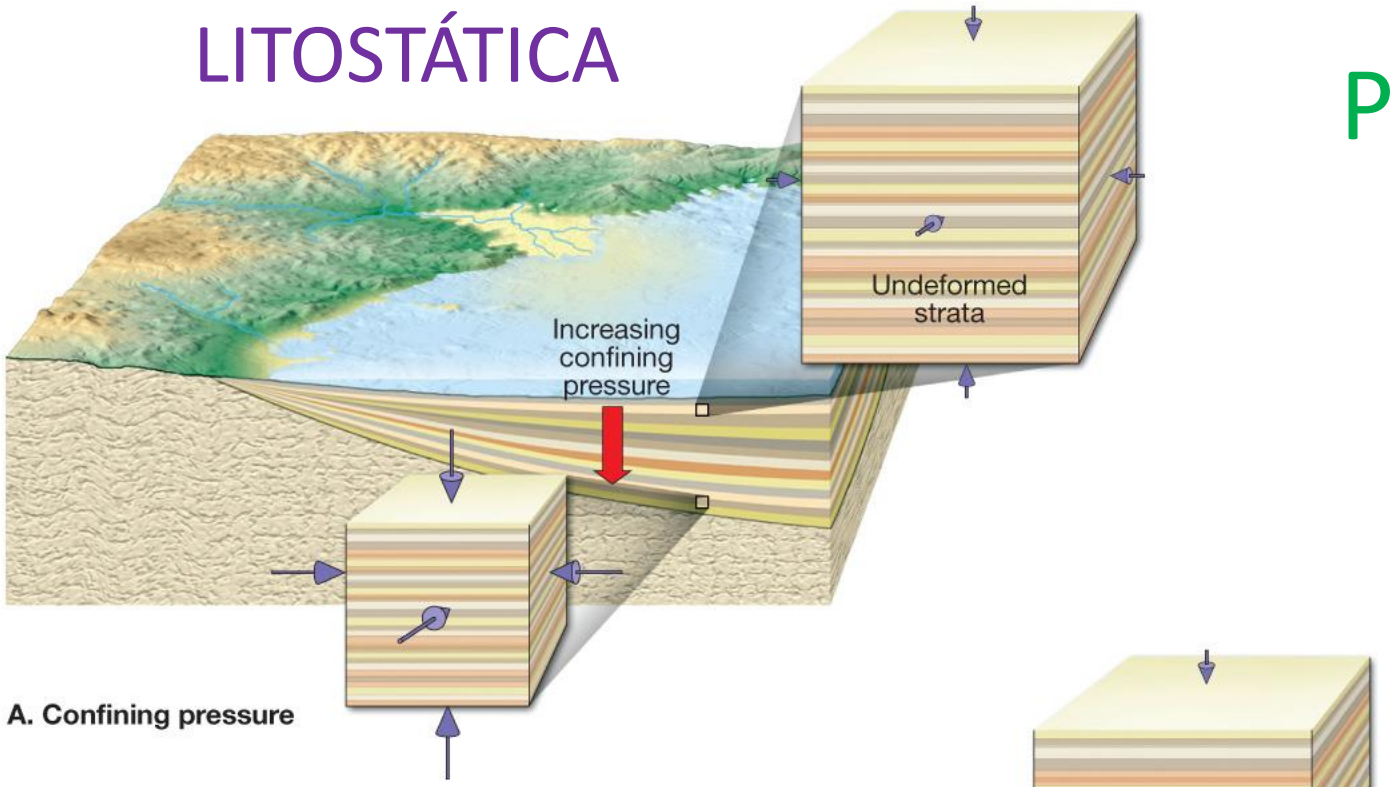
Aumento da velocidade de reacción, blastese, etc.

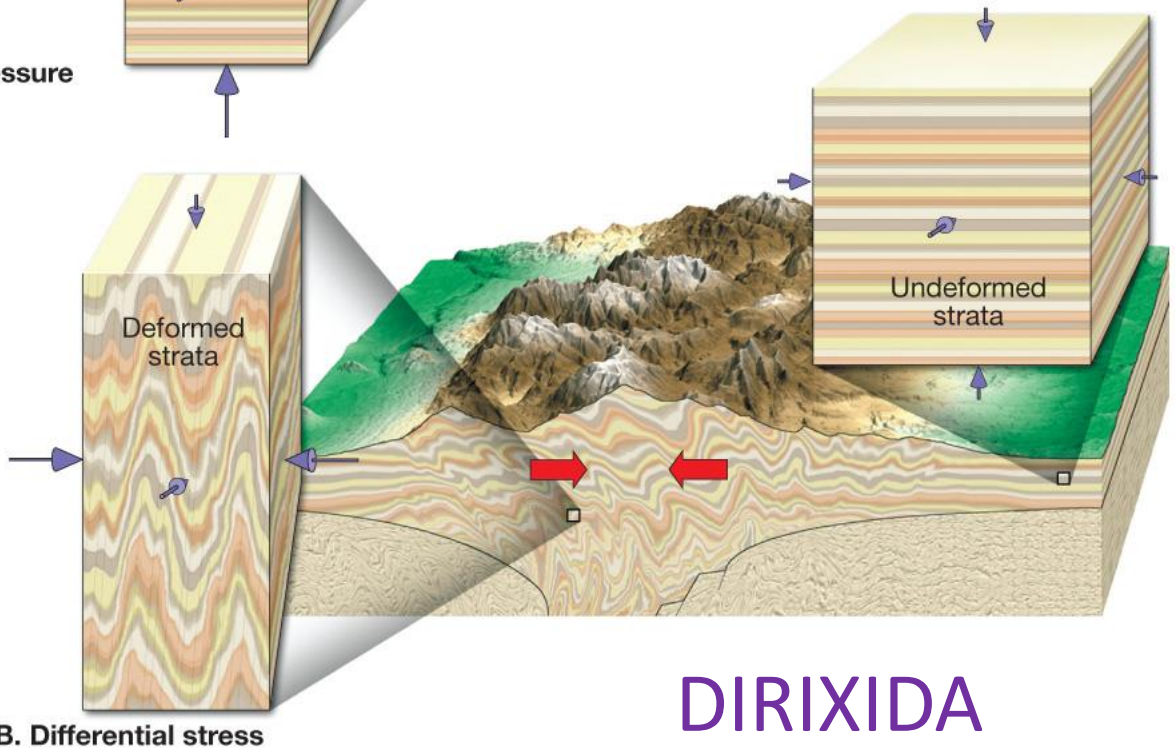


LITOSTÁTICA

PRESIÓN

$P = f/s$

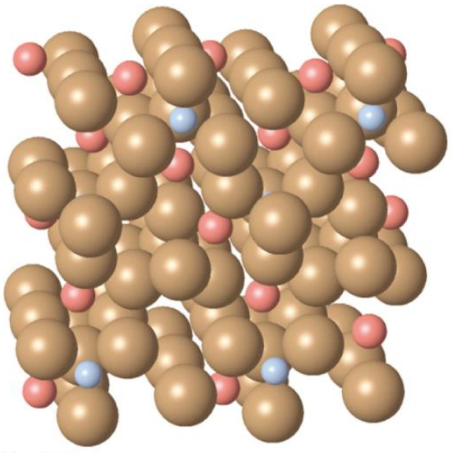




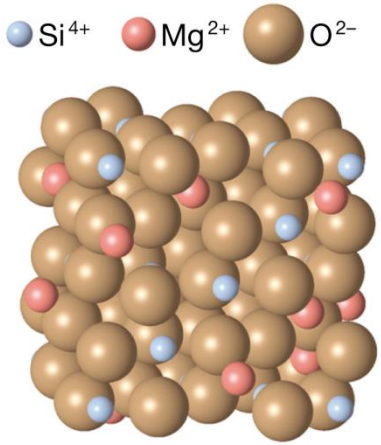
DIRIXIDA

PRESIÓN LITOSTÁTICA OU DE CONFINAMENTO. PESO DO MATERIAL SUPRAXACENTE

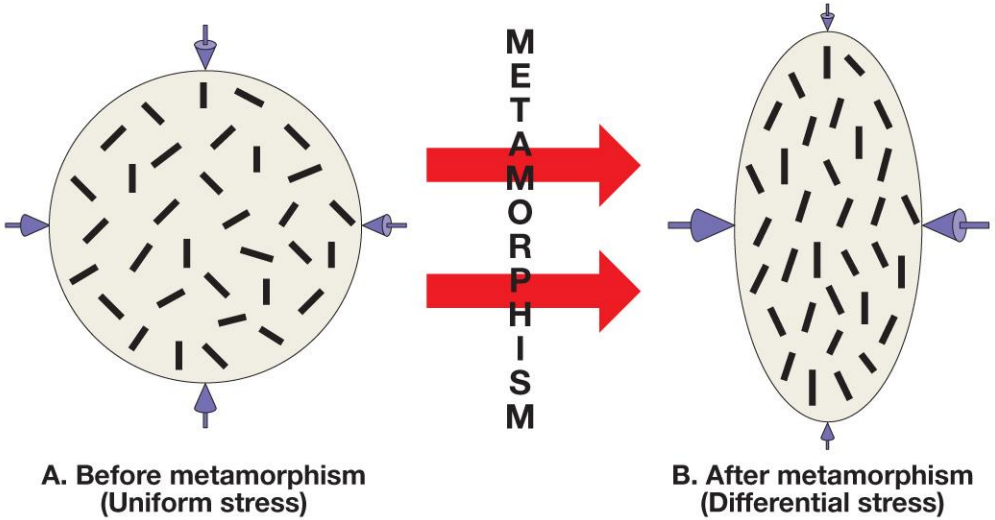
Olivino

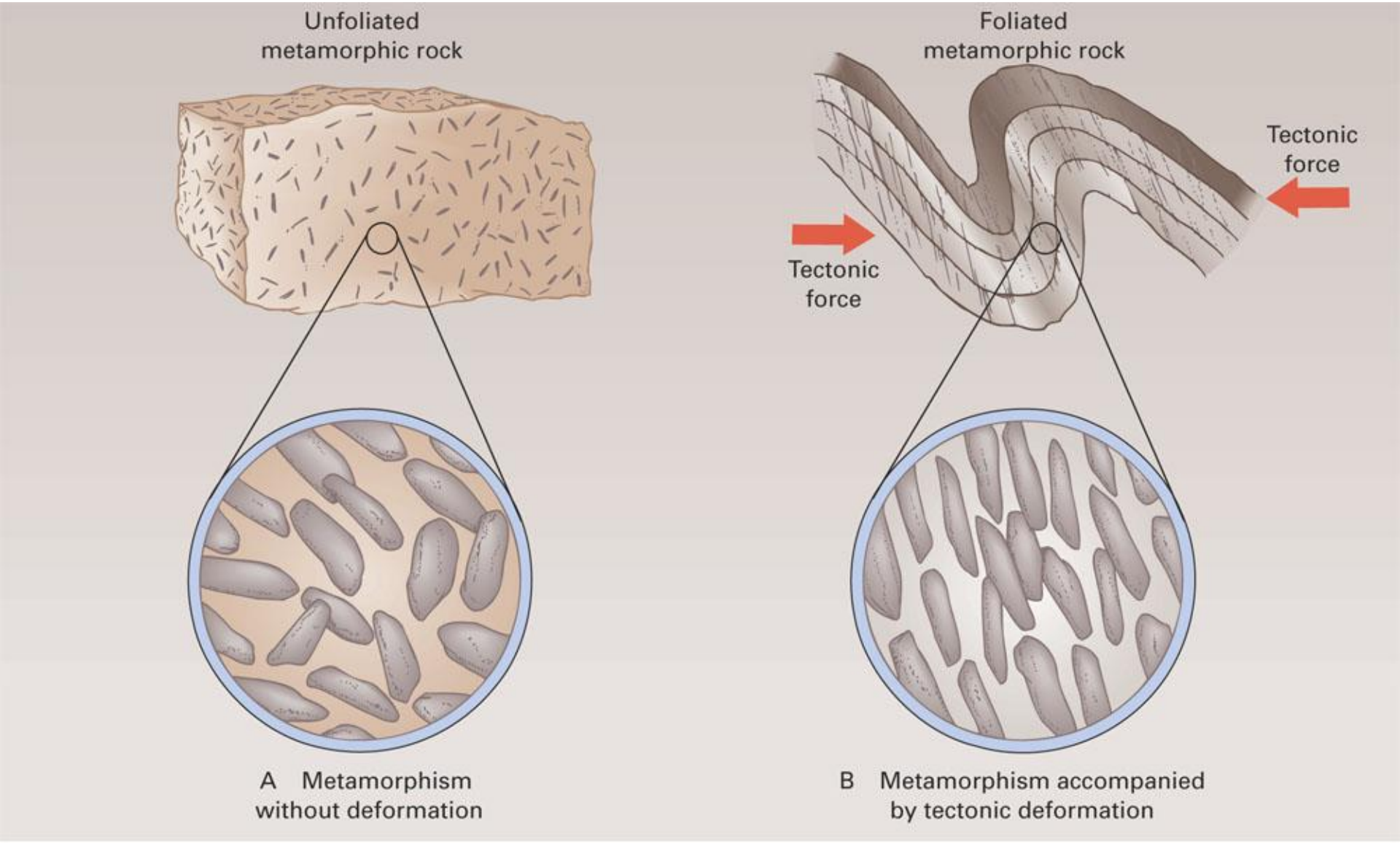


Olivino recristalizado a un mineral tipo espinela (Ringwoodita)



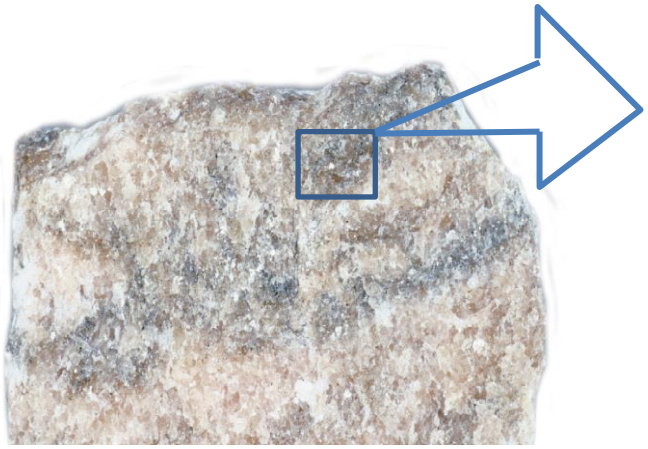
PRESIÓN DIRIXIDA, XERALMENTE DE ORIXE TECTÓNICO

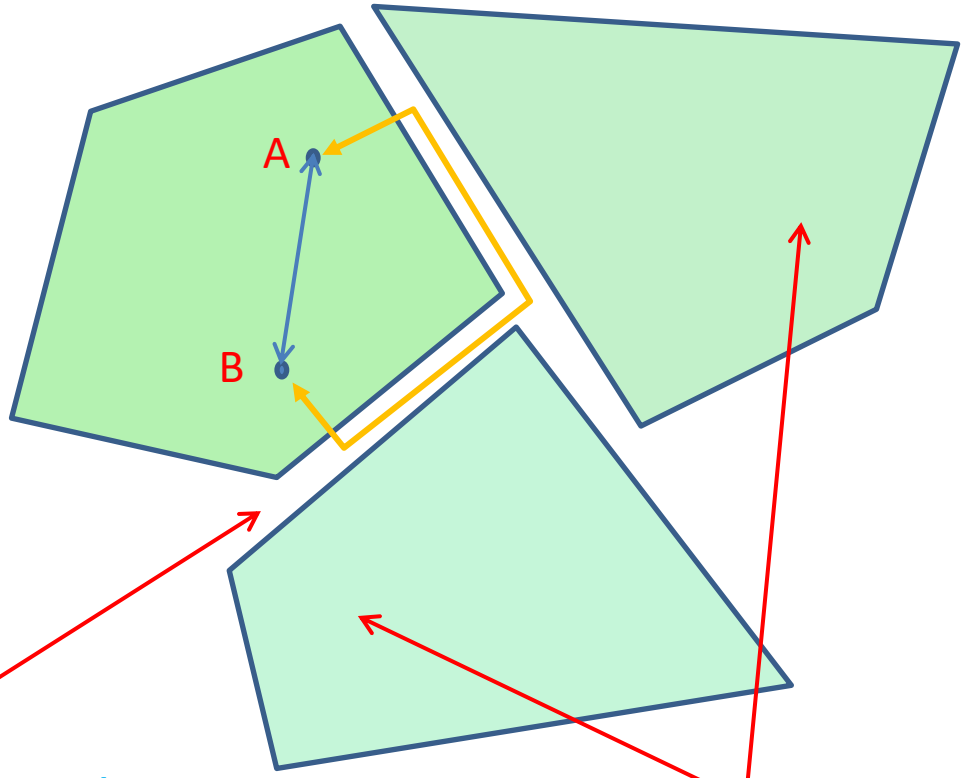





CM

FASES FLUÍDAS: presenza de auga e gases



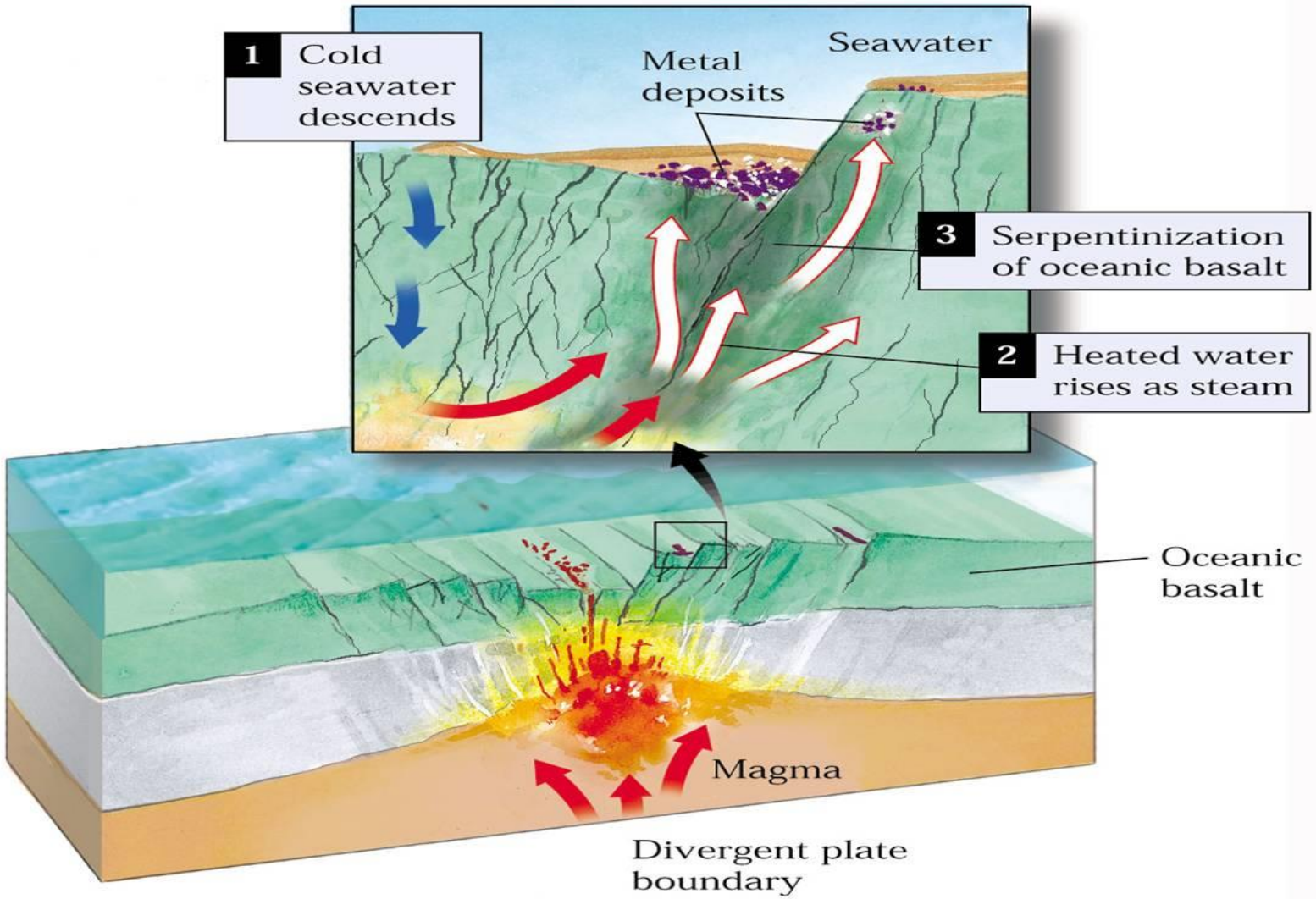


Poros: fluído intergranular

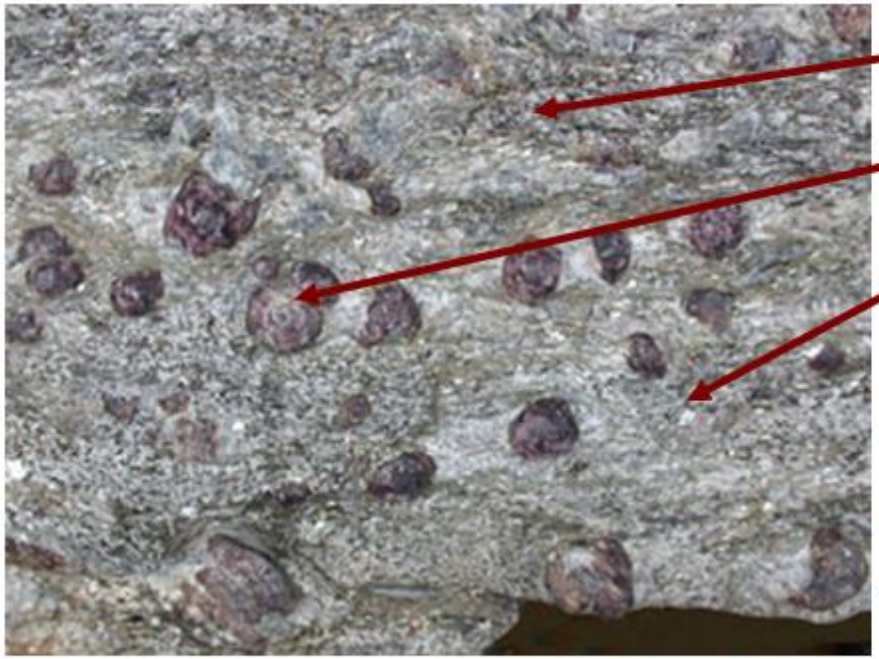
Partículas sólidas

AUMENTO FLUÍDO INTERGRANULAR → VELOCIDADE E INTENSIDADE DO METAMORFISMO ↑

METASOMATISMO: tipo especial de metamorfismo onde a fase fluída supera o 10 %



MINERAIS ÍNDICE DO METAMORFISMO

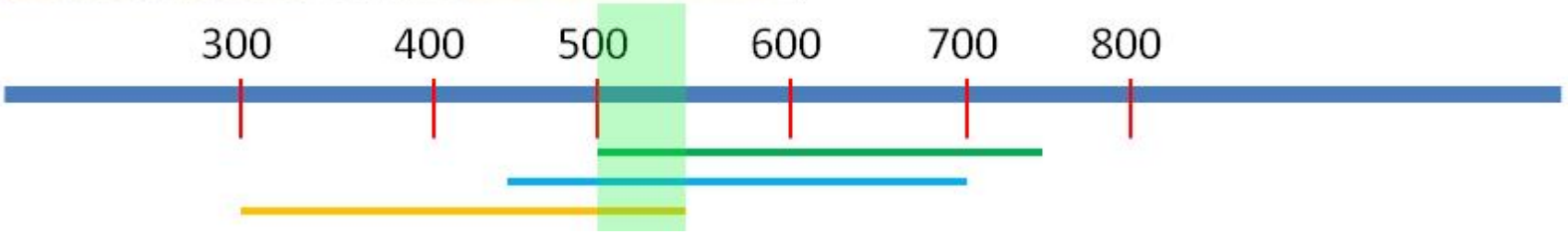


Estaurolita - 500-750°C

Granate - 450-700°C

Moscovita - 300-550°C

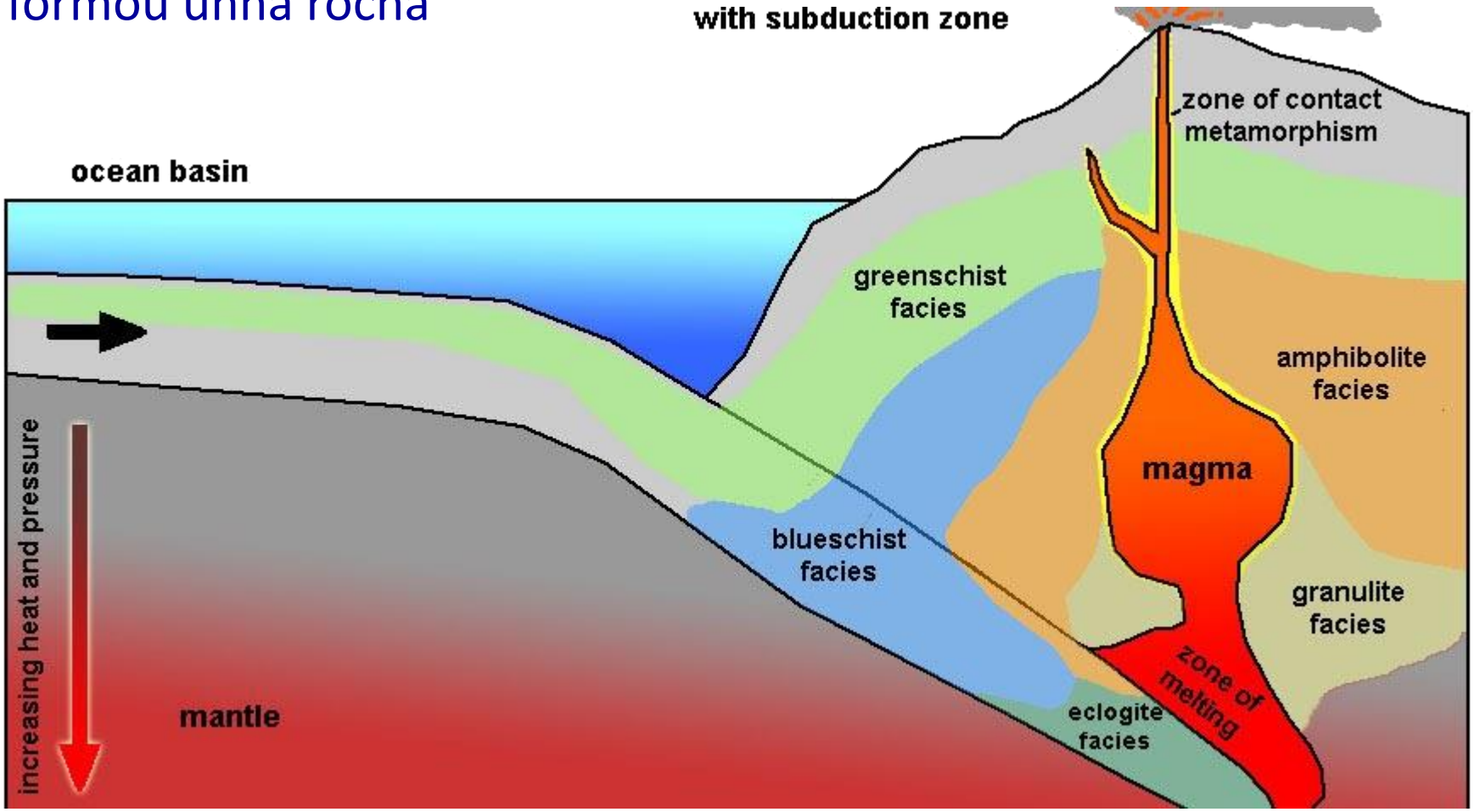
Temperatura de formación da rocha: 500-550°C

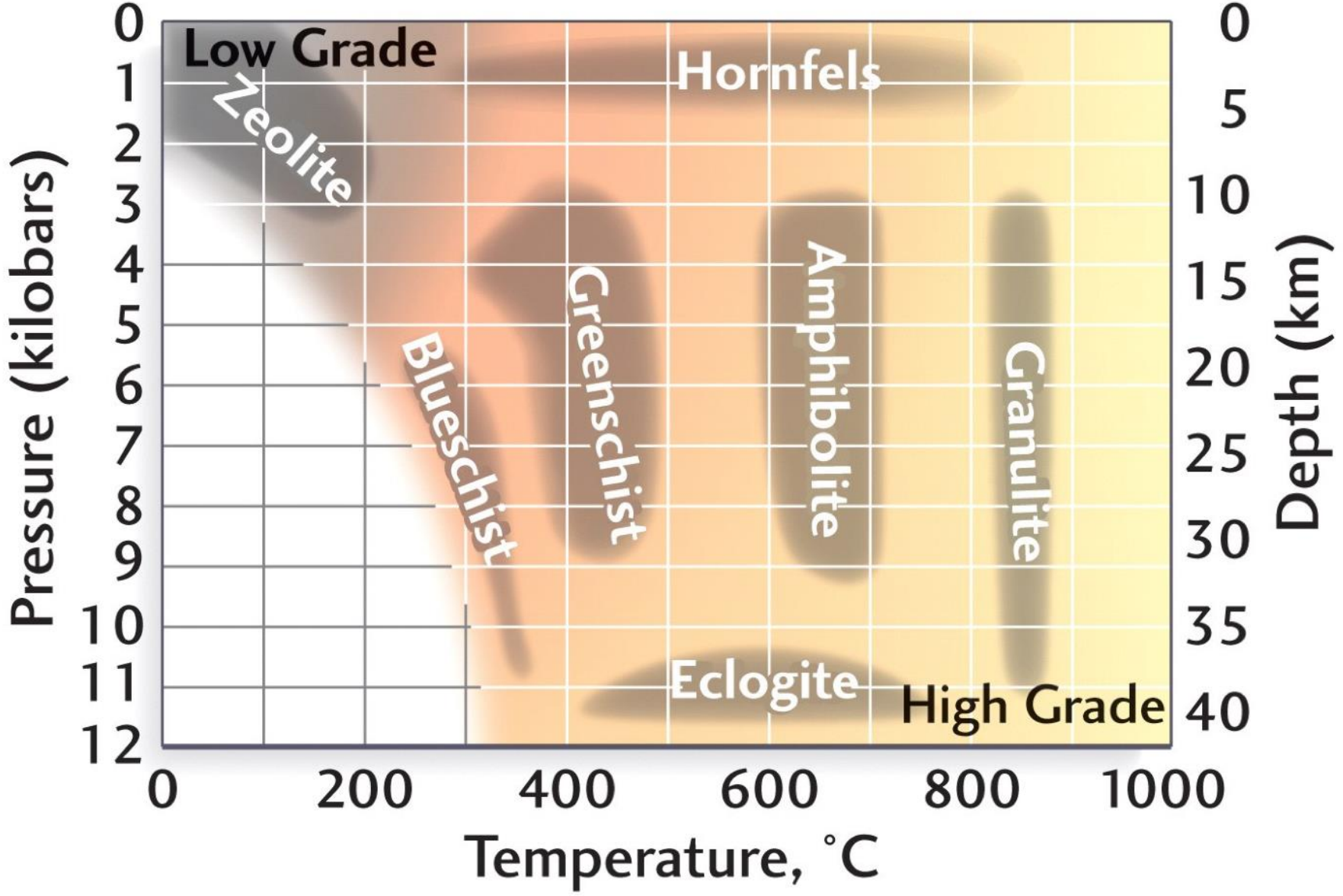


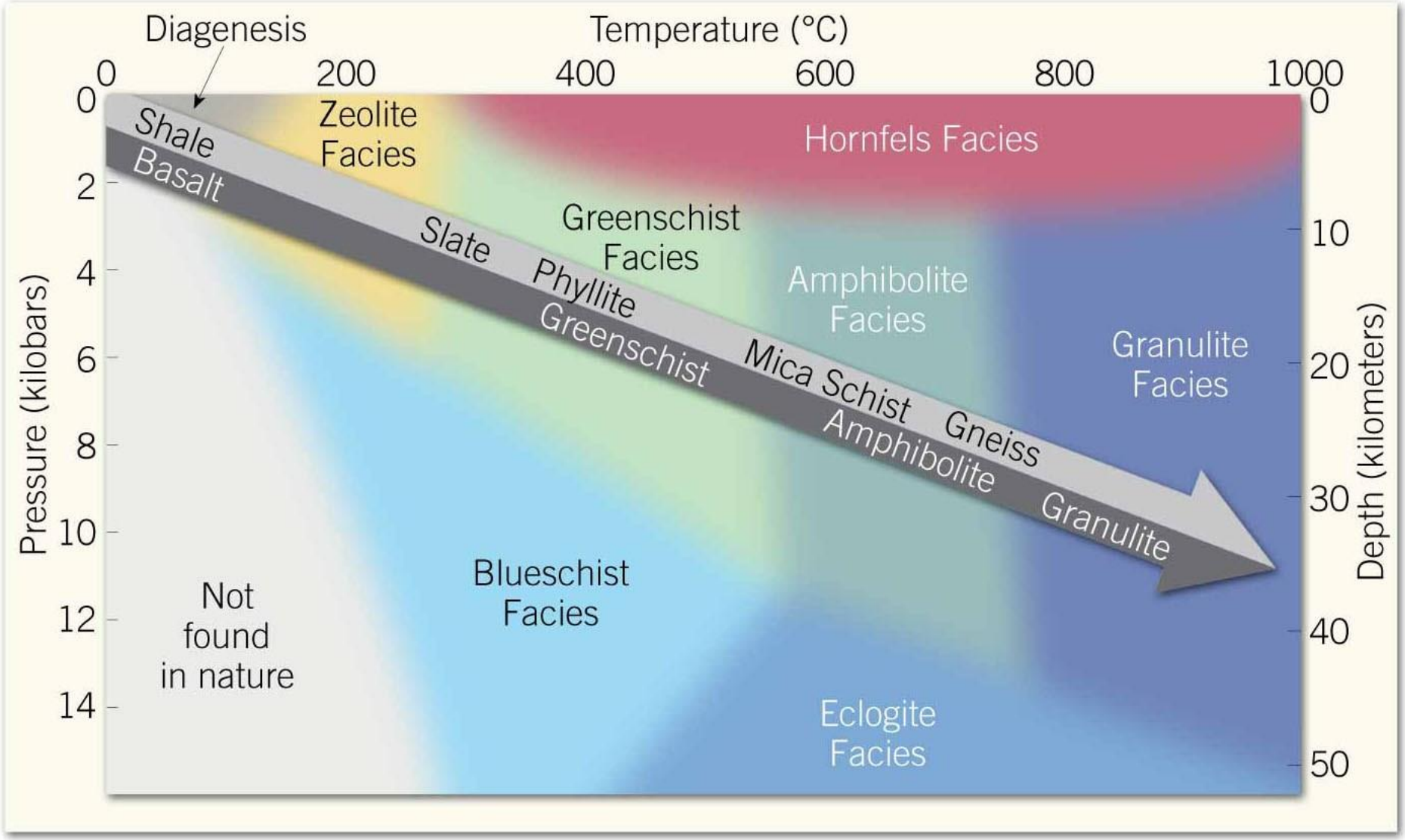
XEOTERMÓMETROS - XEOBARÓMETROS

FACIES METAMÓRFICAS

Unha **facie metamórfica** é un conxunto de minerais que aparecen xuntos e que nos indican unhas determinadas condicións ás que se formou unha rocha




Low Grade
Zeolite
Hornfels
Blueschist
Greenschist
Amphibolite
Granulite
Eclogite
High Grade
Pressure (kilobars)
0
1
2
3
4
5
6
7
8
9
10
11
12
Depth (km)
0
5
10
15
20
25
30
35
40
0
200
400
600
800
1000
Temperature, ˚C


Diagenesis
Temperature (°C)
0
200
400
600
800
1000
Pressure (kilobars)
0
2
4
6
8
10
12
14
Depth (kilometers)
0
10
20
30
40
50
Shale
Basalt
Slate
Phyllite
Greenschist
Mica Schist
Gneiss
Amphibolite
Granulite
Zeolite Facies
Hornfels Facies
Greenschist Facies
Amphibolite Facies
Granulite Facies
Not found in nature
Blueschist Facies
Eclogite Facies