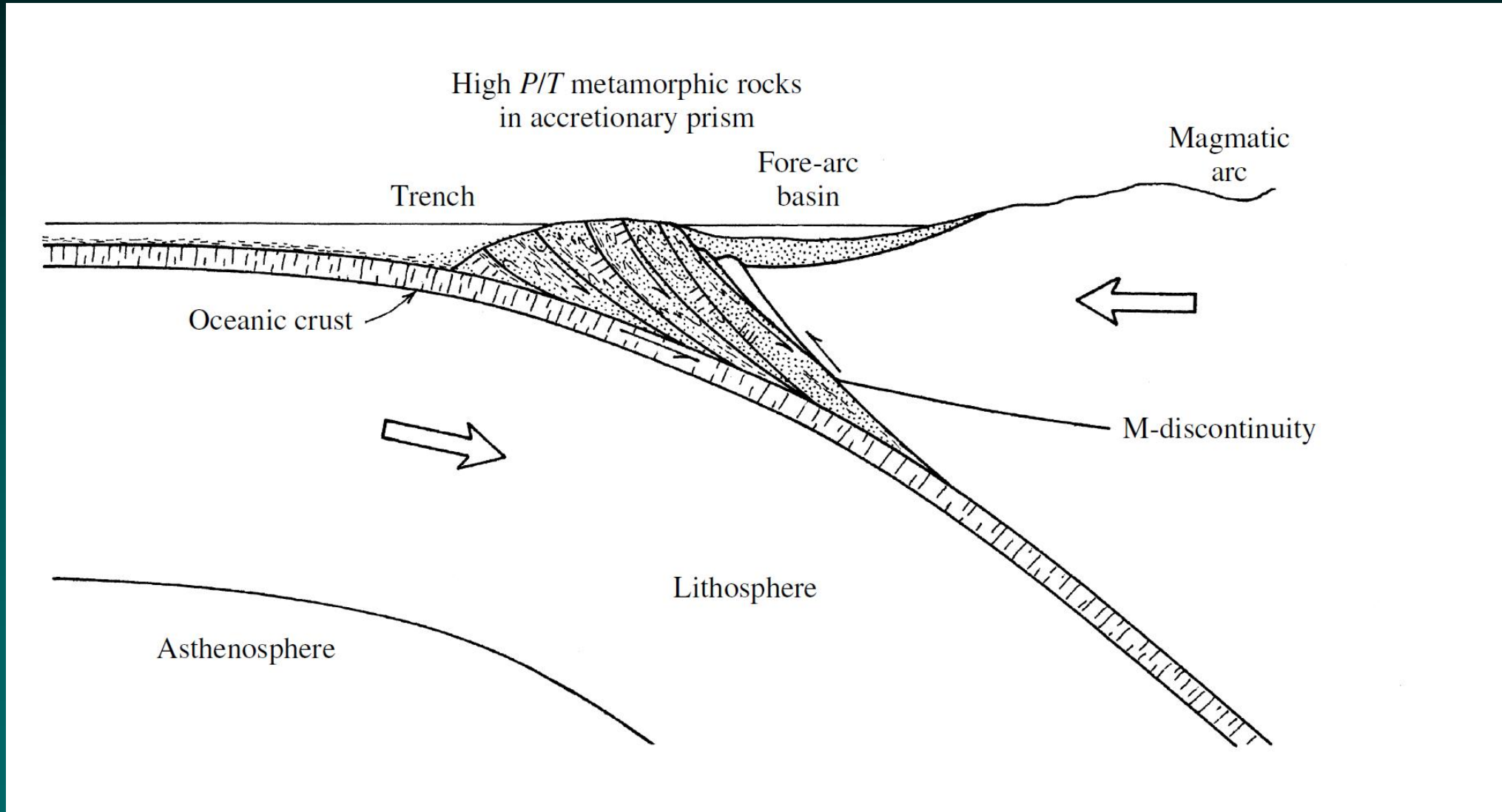


G7501 Fyzikální geochemie

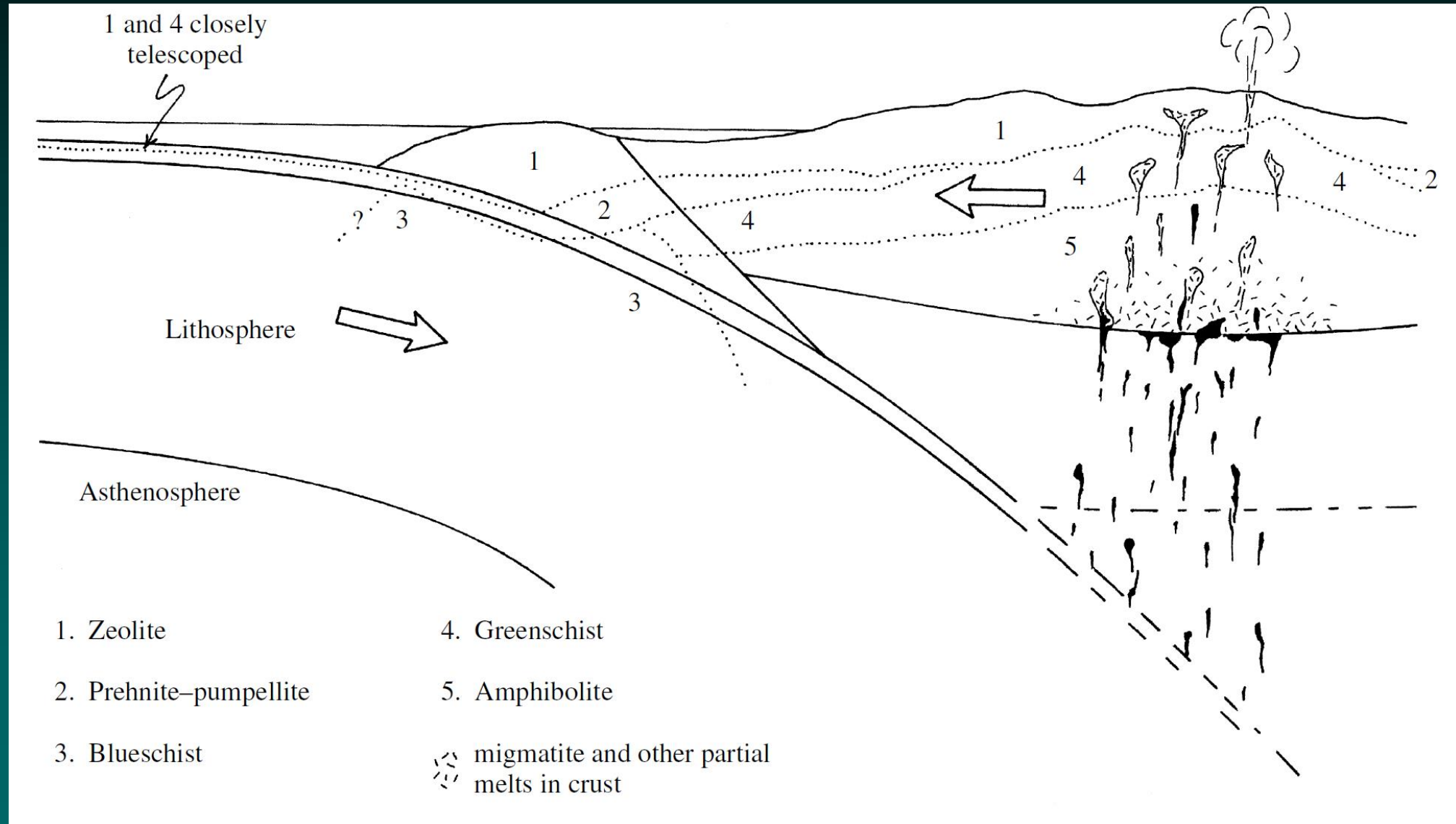
8. Metamorfní systémy

Josef Zeman

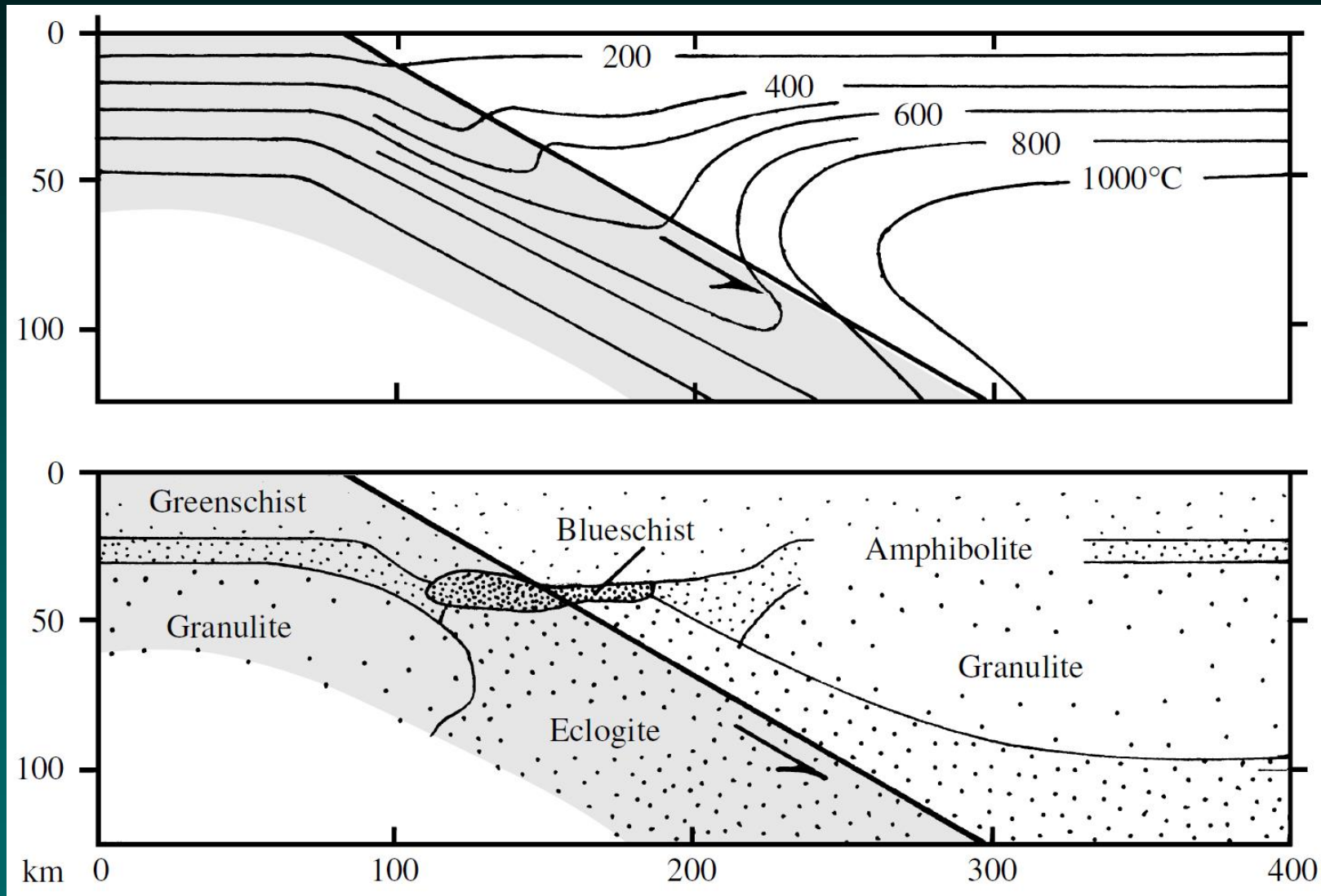
Metamorfni systémy



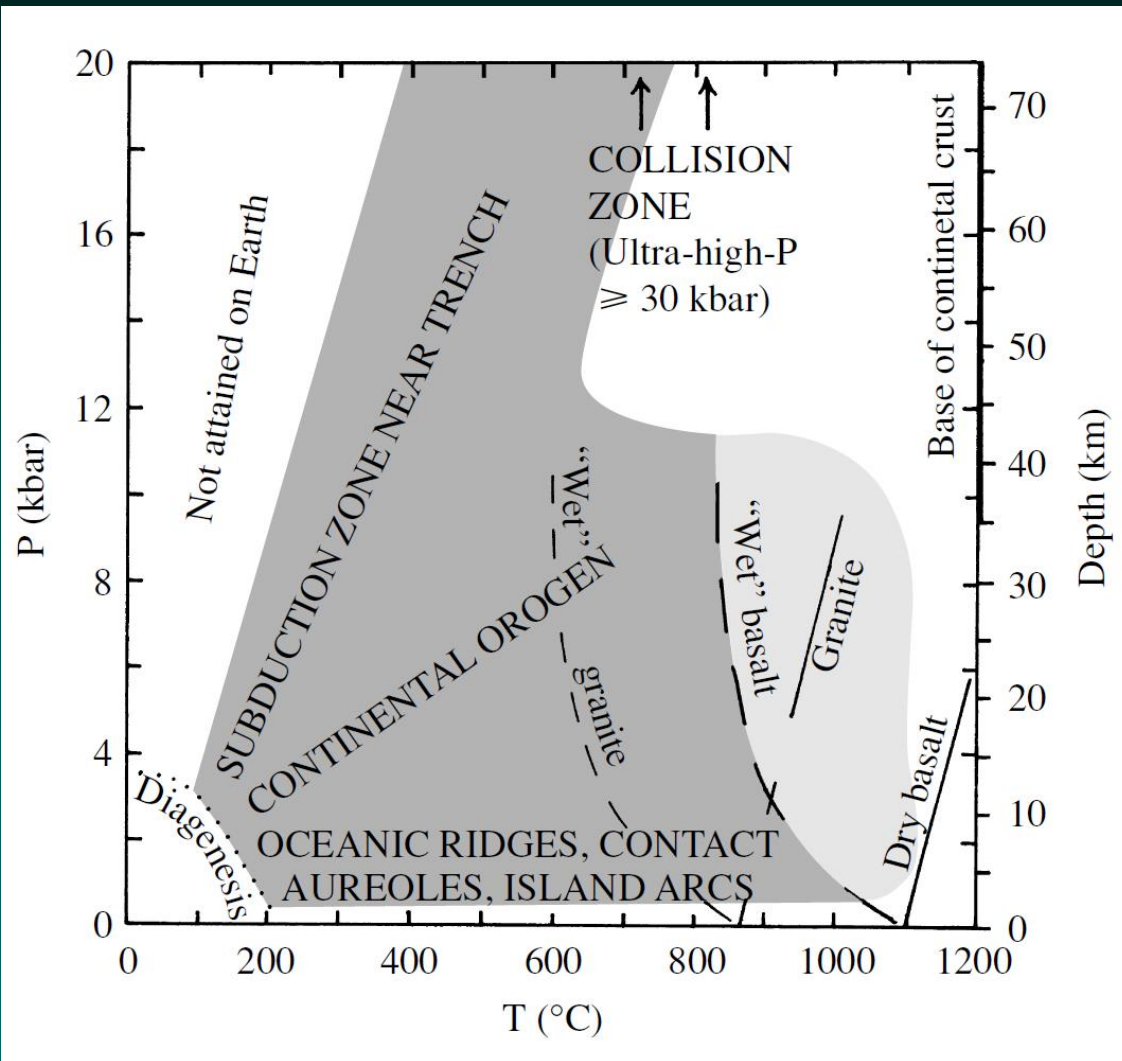
Metamorfni systémy



Metamorfni systémy

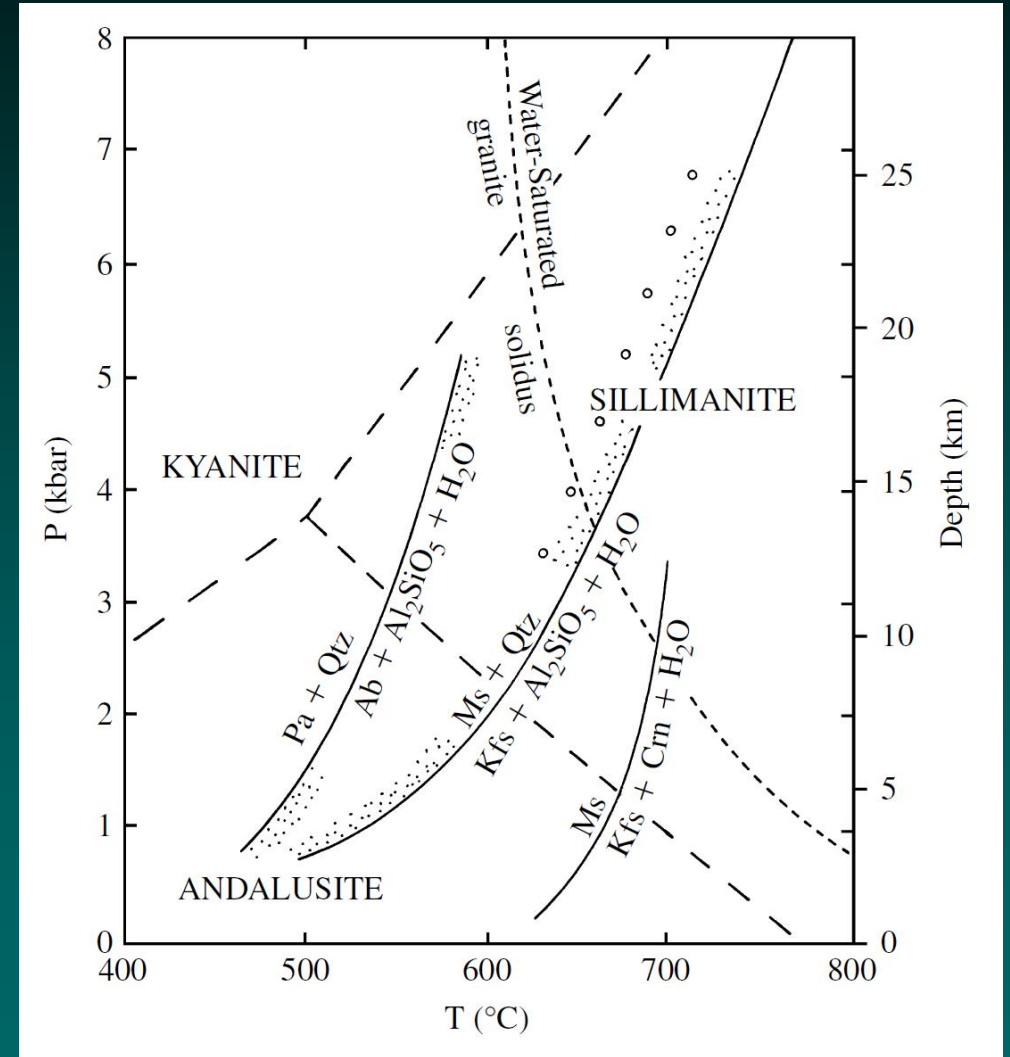
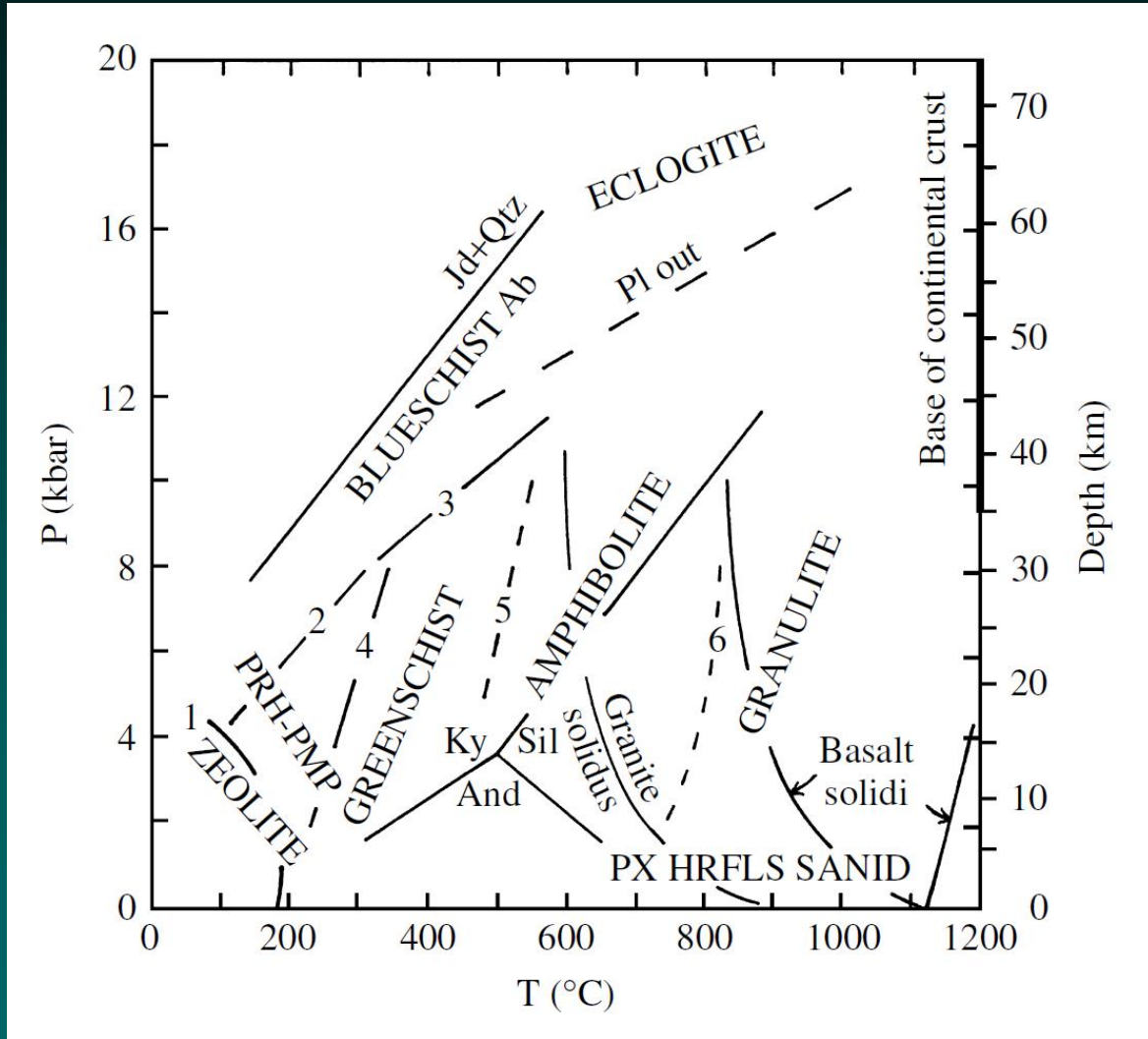


Metamorfni systémy



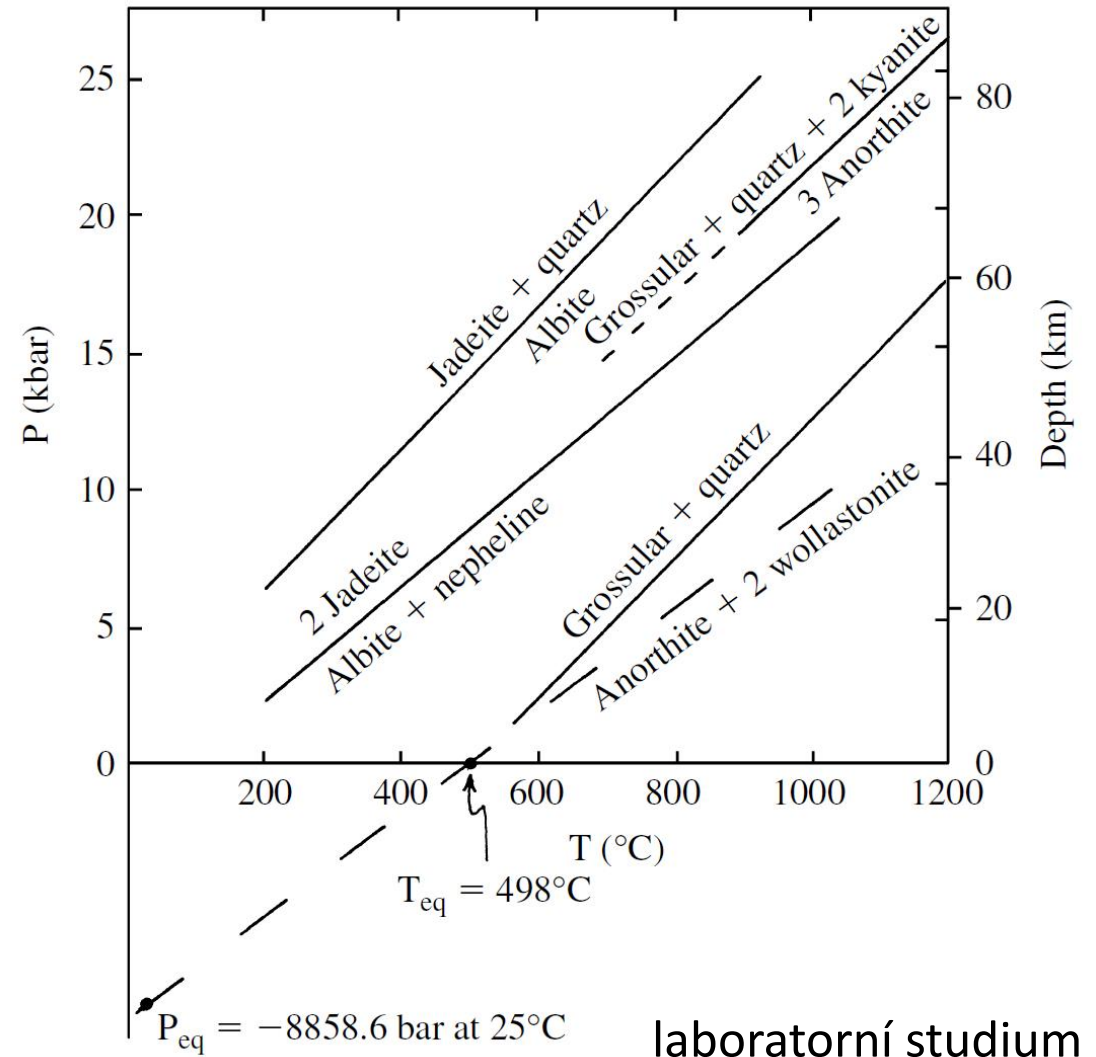
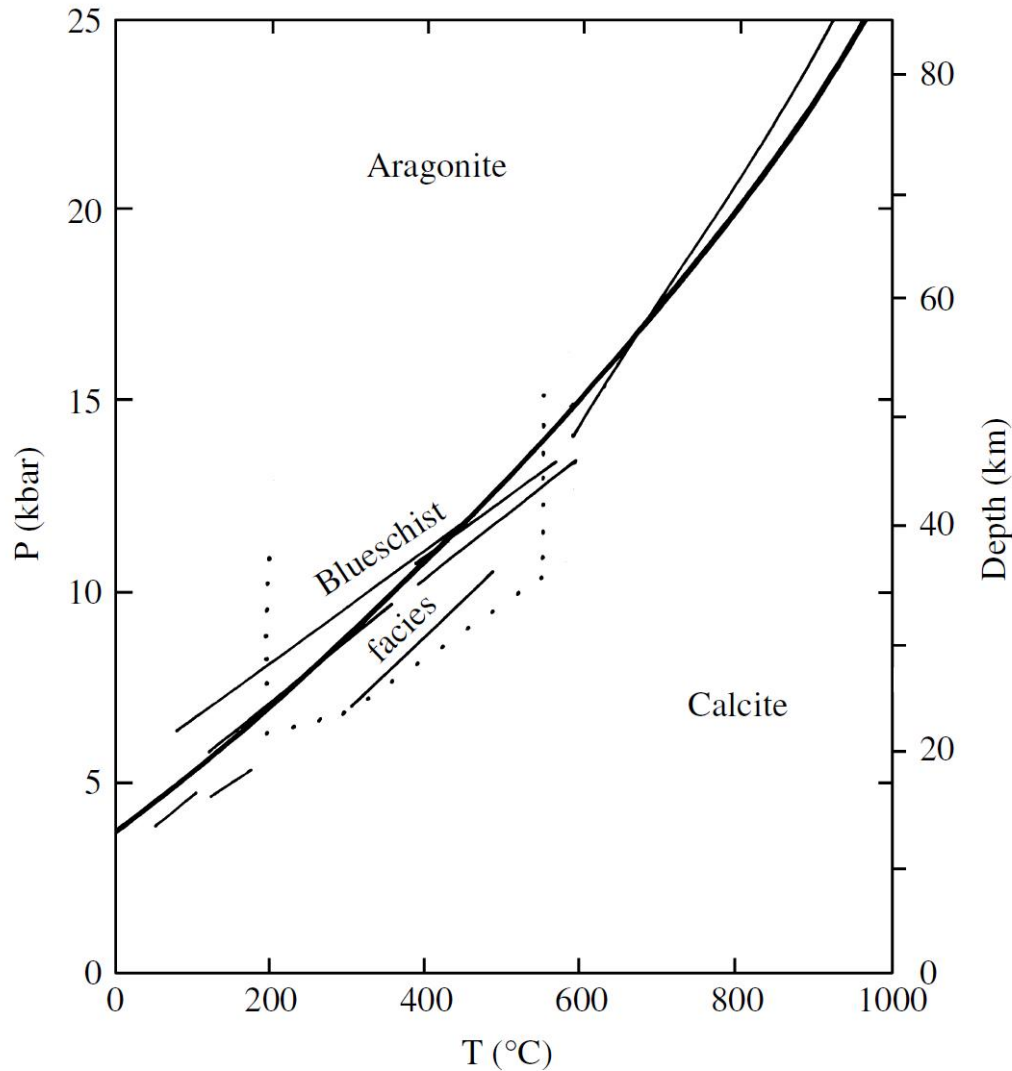
| | | |
|--|---|--|
| <i>Primary magmatic mineral(s) + water</i> | → | <i>Secondary subsolidus mineral(s)</i> |
| biotite + water | → | chlorite + rutile (or titanite) + K + Si |
| hornblende + water | → | chlorite + rutile (or titanite) + Si + Ca |
| calcic clinopyroxene + water | → | actinolite or epidote |
| olivine/orthopyroxene + water | → | serpentine + Fe-oxides |
| plagioclase + Ca + Fe + water | → | epidote |
| feldspars + water (higher T) | → | sericite + Si + K |
| feldspars + water (lower T) | → | clay minerals + Si + Ca + Na |

Metamorfni systémy

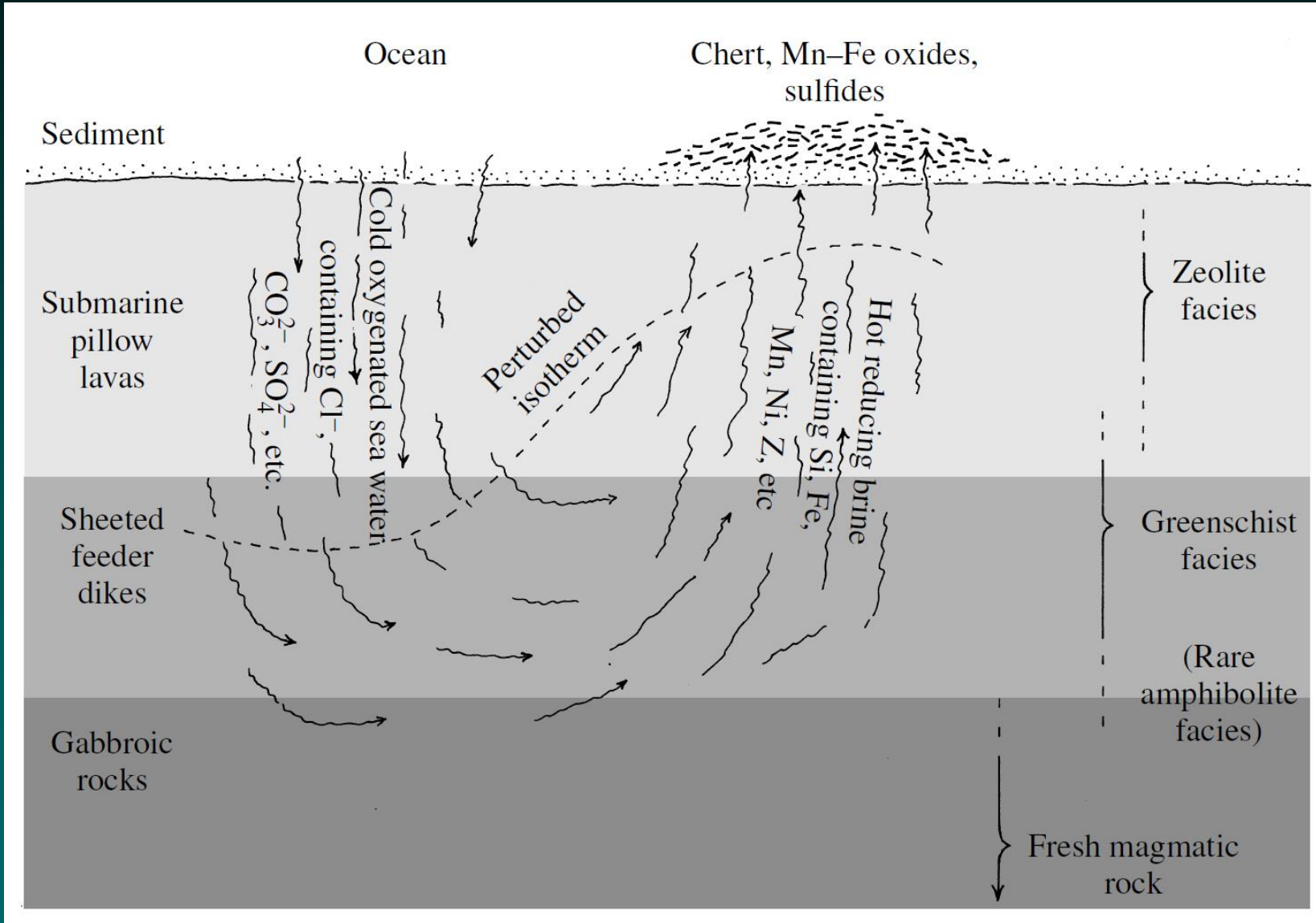


rozpad paragonitu a muskovitu

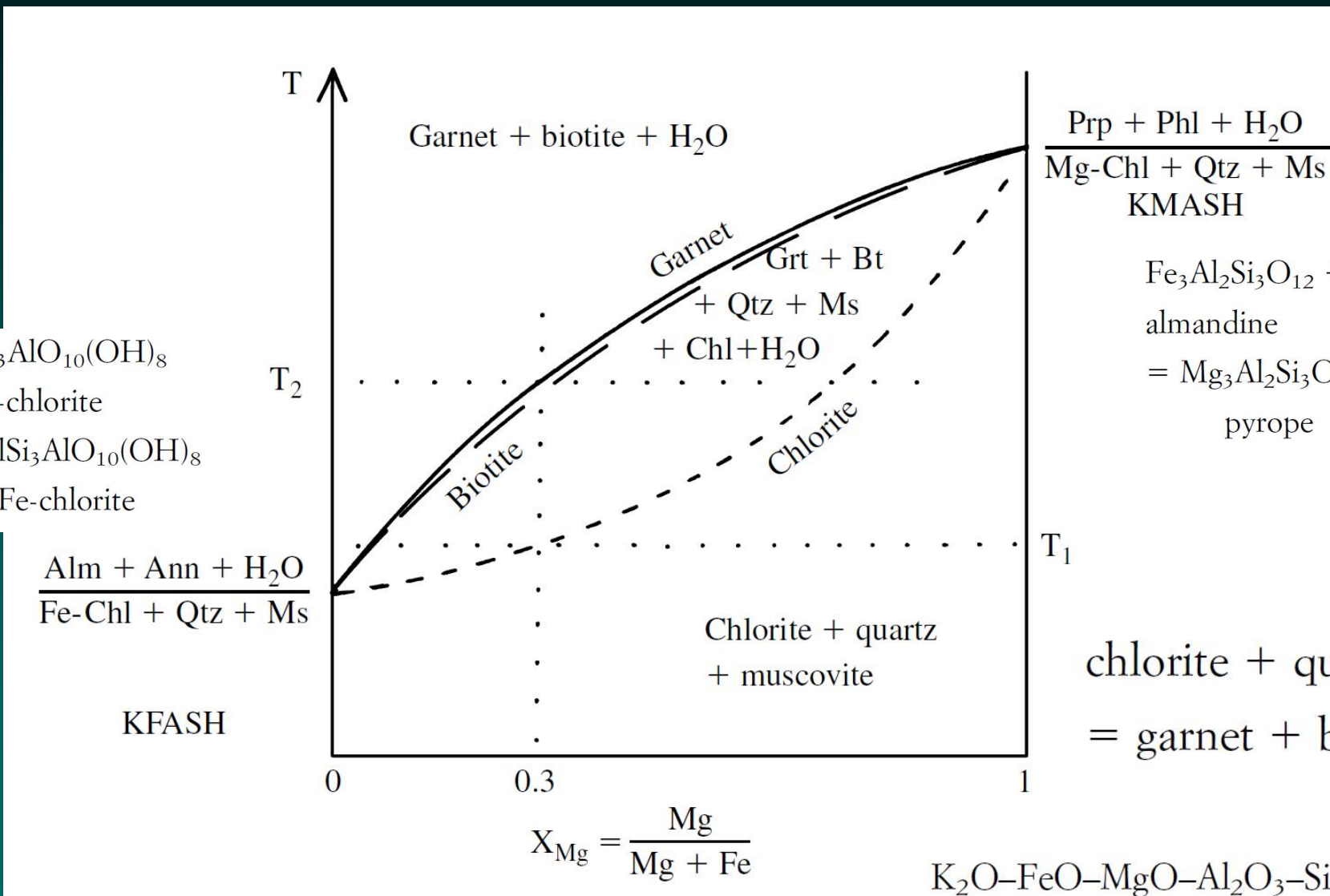
Metamorfni systémy



Metamorfni systémy



Metamorfní systémy



$Fe_3Al_2Si_3O_{12} + Mg_5AlSi_3AlO_{10}(OH)_8$
 almandine Mg-chlorite
 $= Mg_3Al_2Si_3O_{12} + Fe_5AlSi_3AlO_{10}(OH)_8$
 pyrope Fe-chlorite

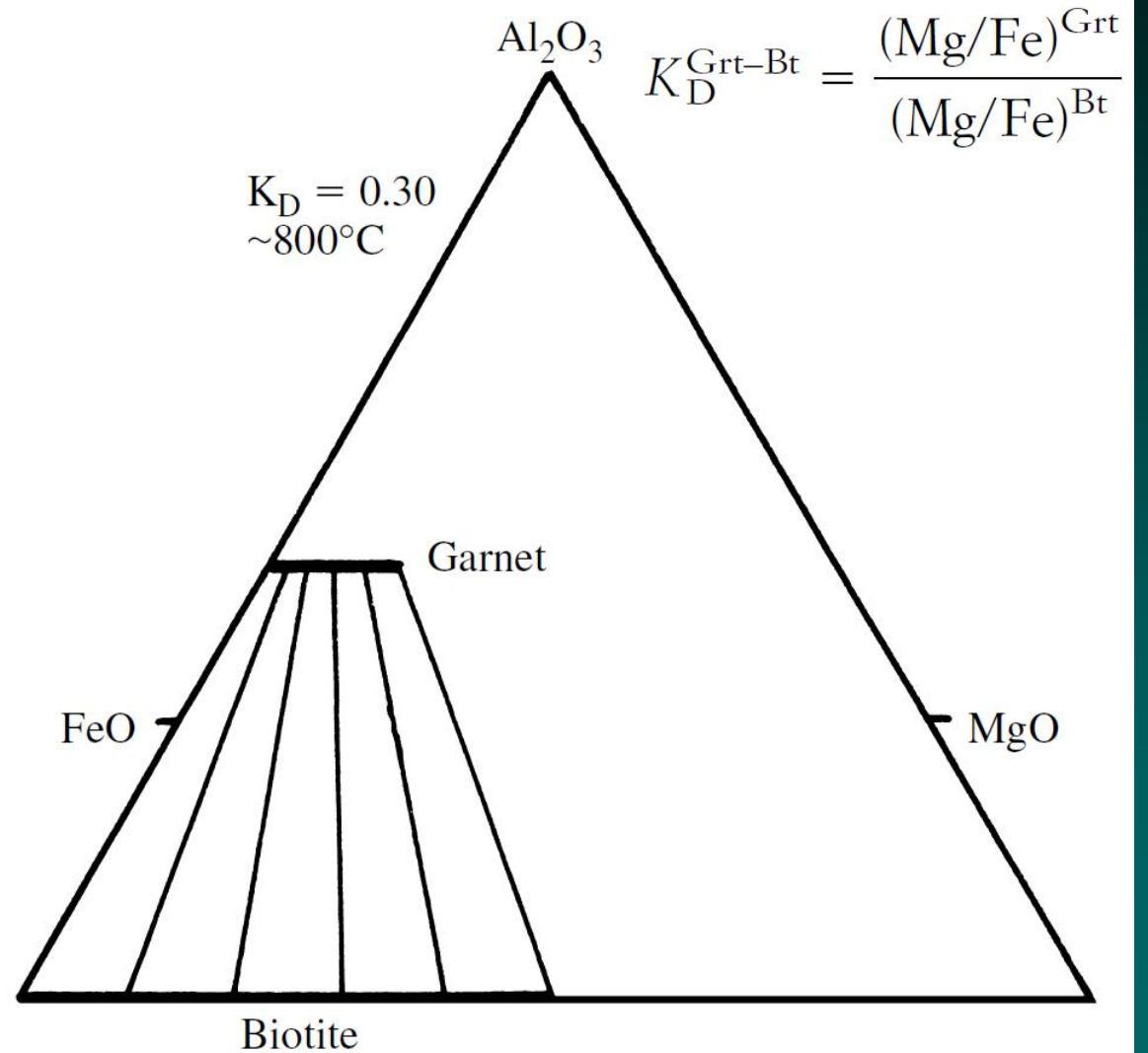
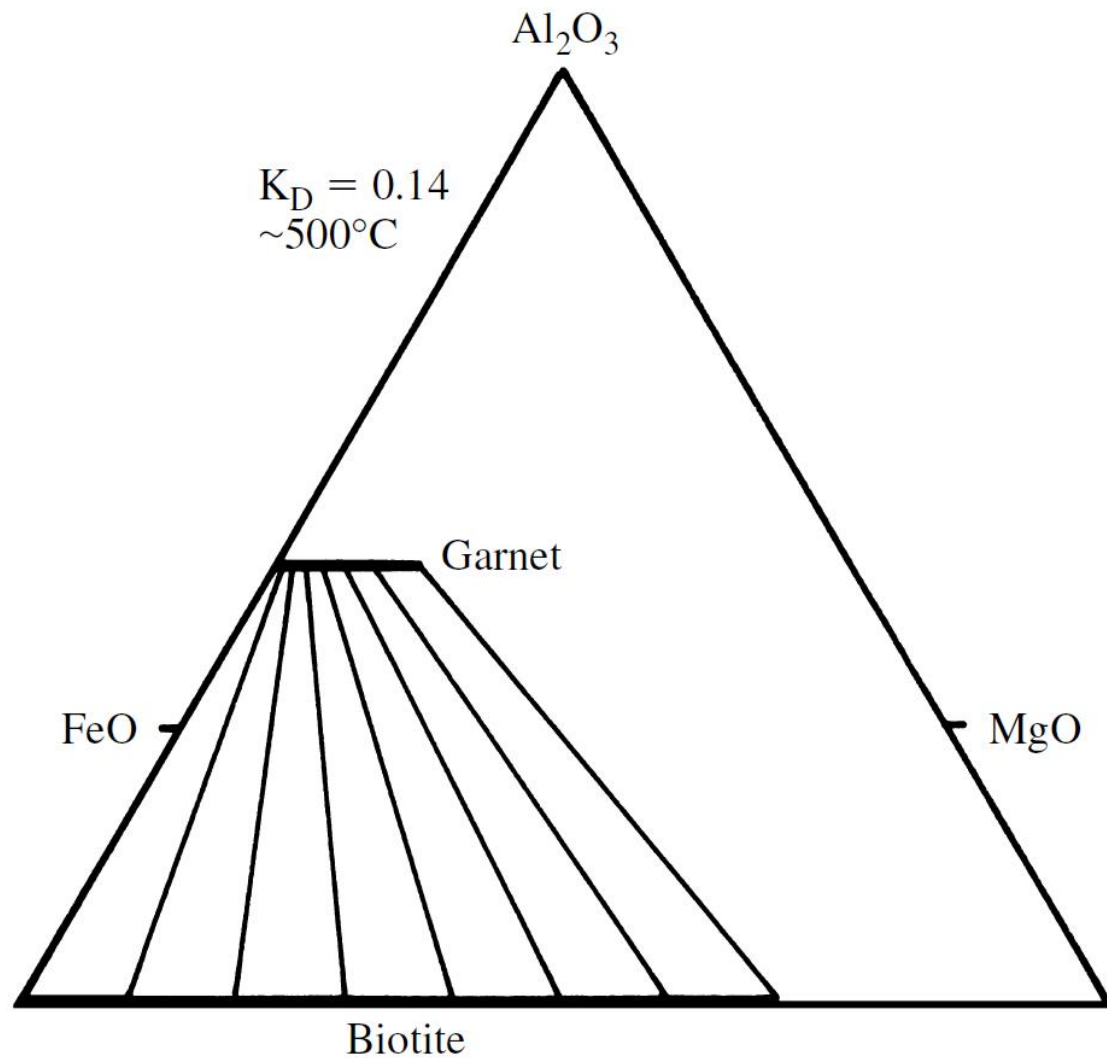
$\frac{Alm + Ann + H_2O}{Fe-Chl + Qtz + Ms}$
 KFASH

$\frac{Prp + Phl + H_2O}{Mg-Chl + Qtz + Ms}$
 KMASH

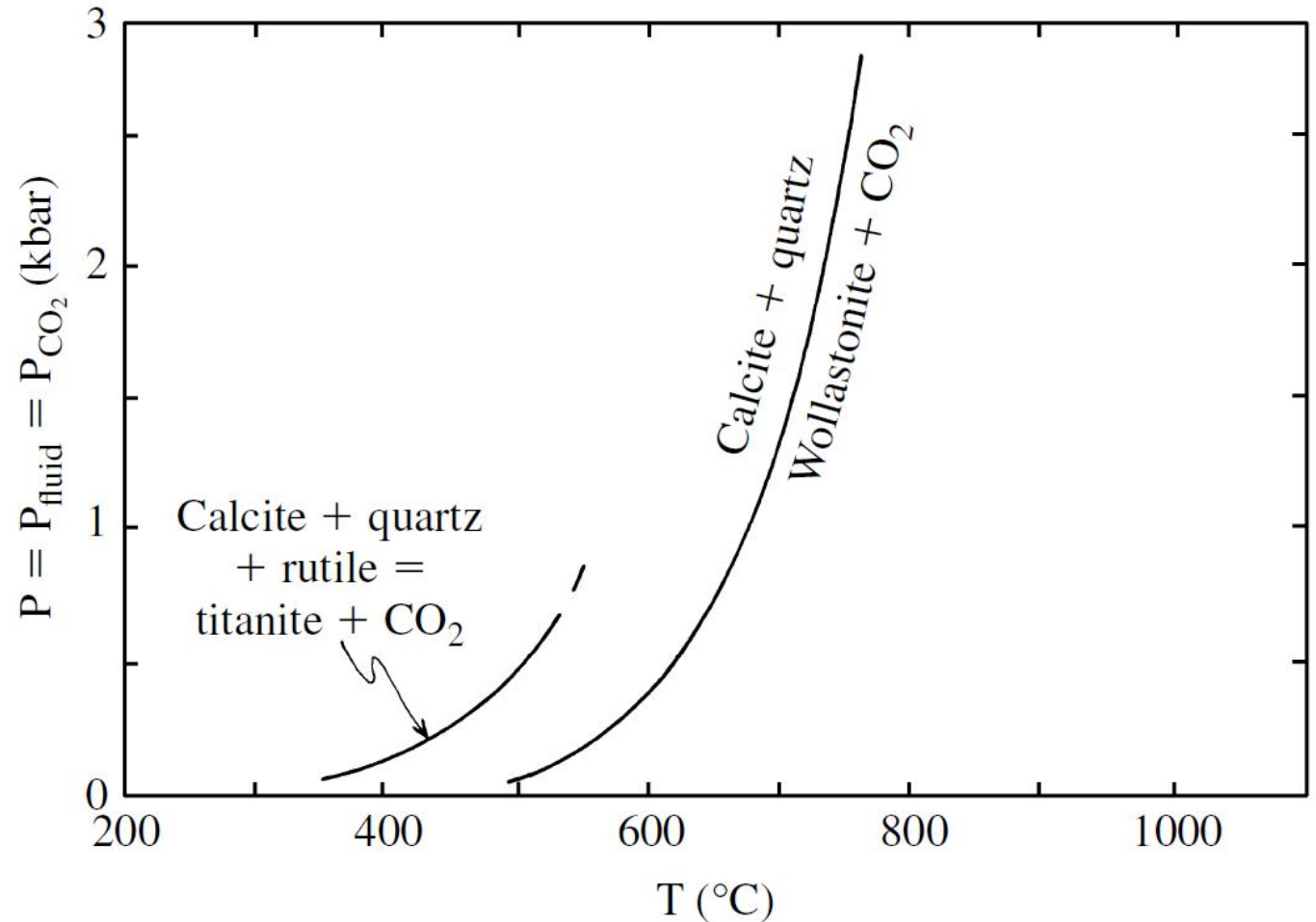
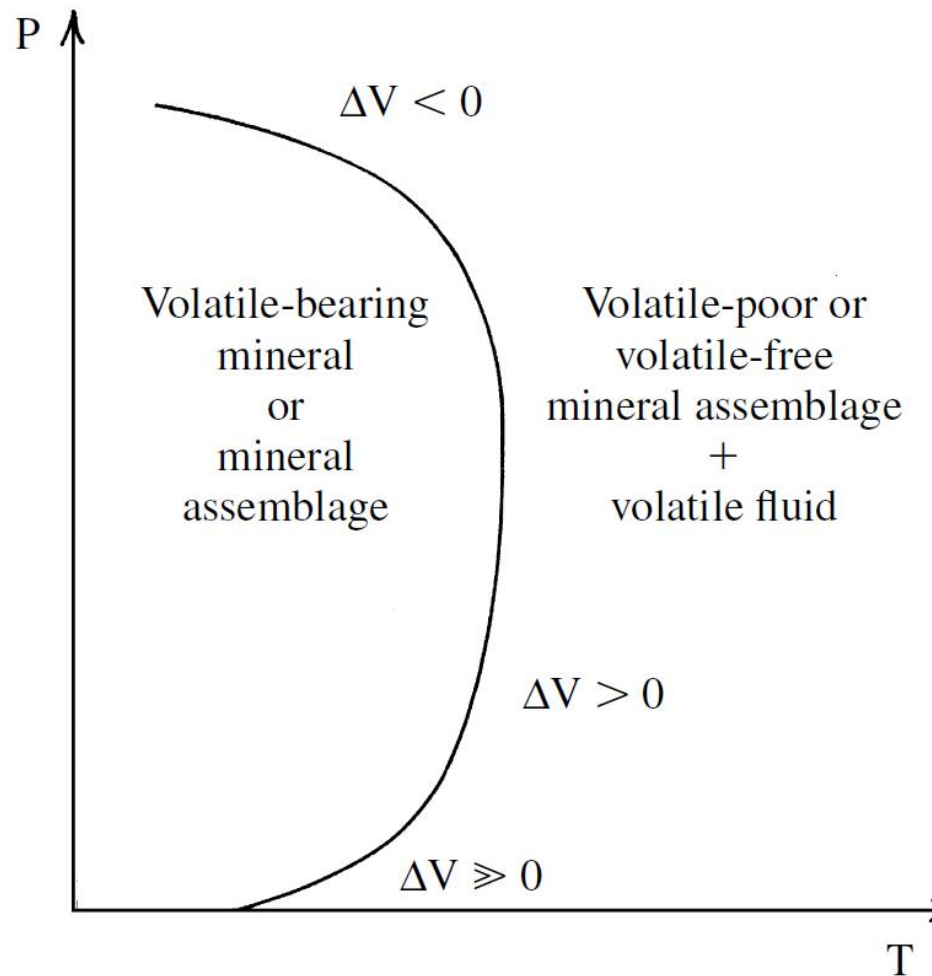
$Fe_3Al_2Si_3O_{12} + KMg_3AlSi_3O_{10}(OH)_2$
 almandine phlogopite
 $= Mg_3Al_2Si_3O_{12} + KFe_3AlSi_3O_{10}(OH)_2$
 pyrope annite

chlorite + quartz + muscovite
 $= garnet + biotite + water$

Metamorfní systémy

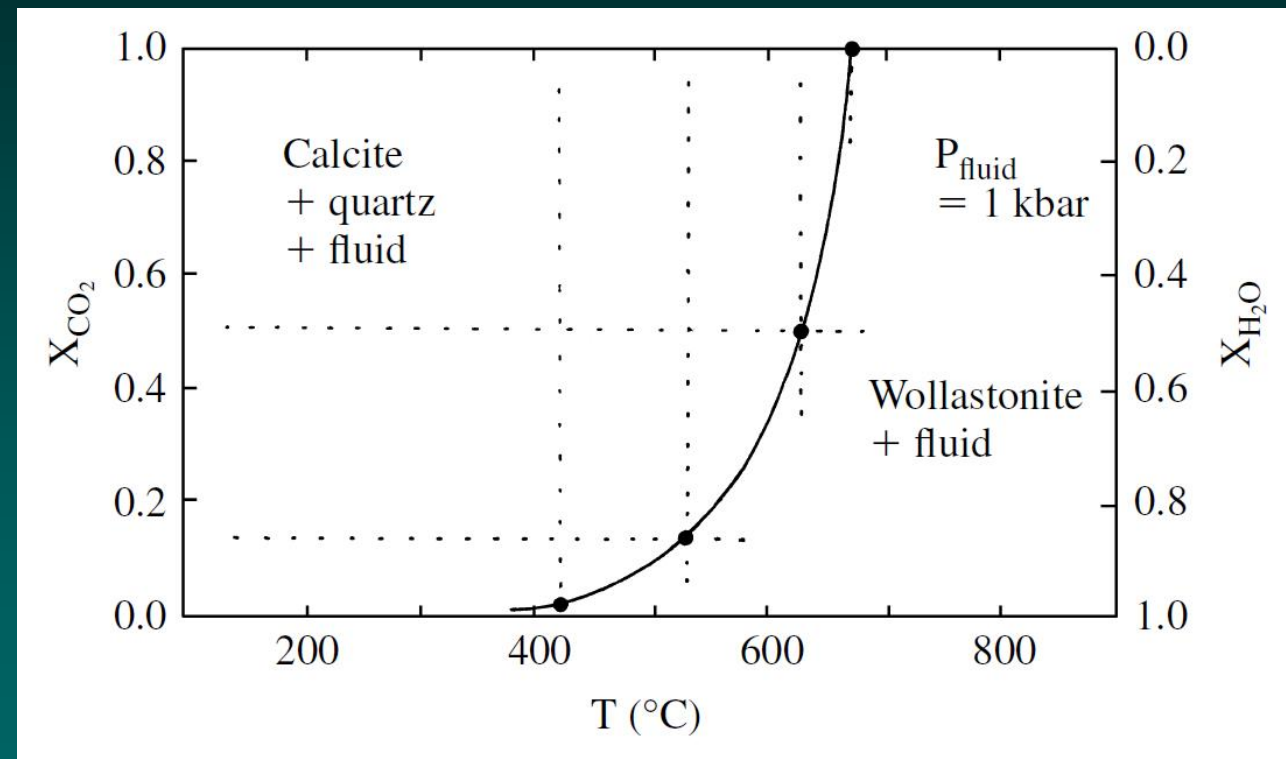
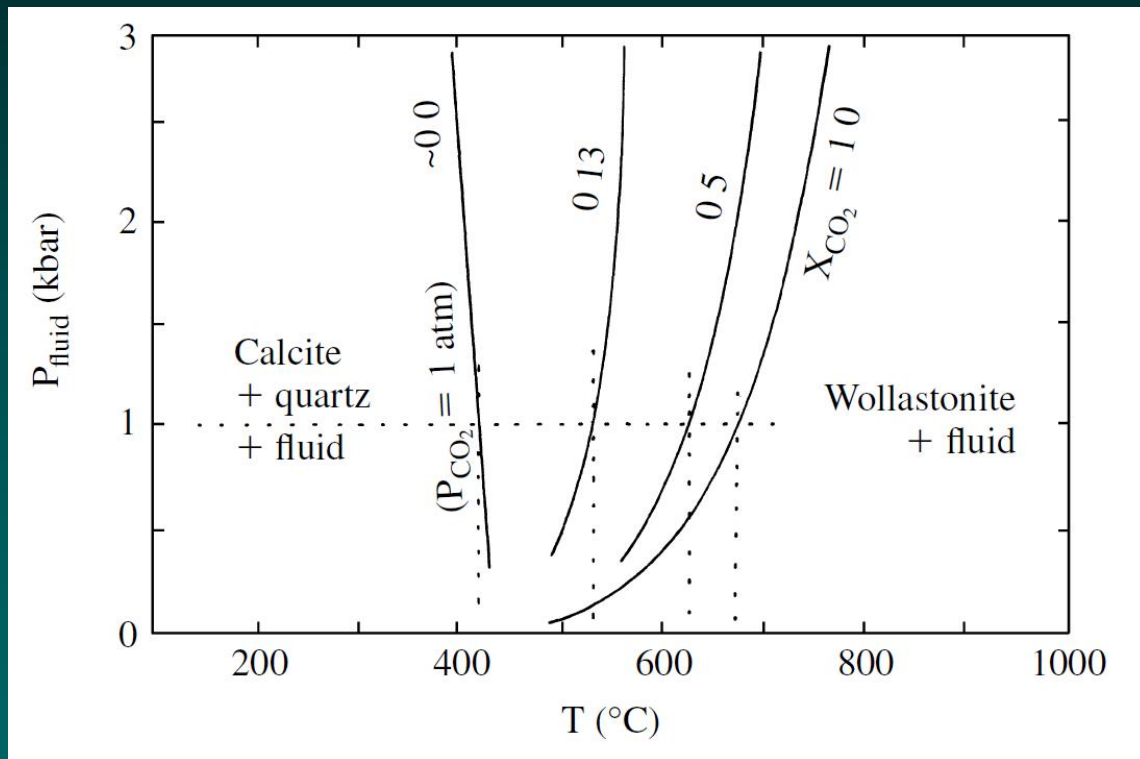


Metamorfní systémy



s těkavými složkami

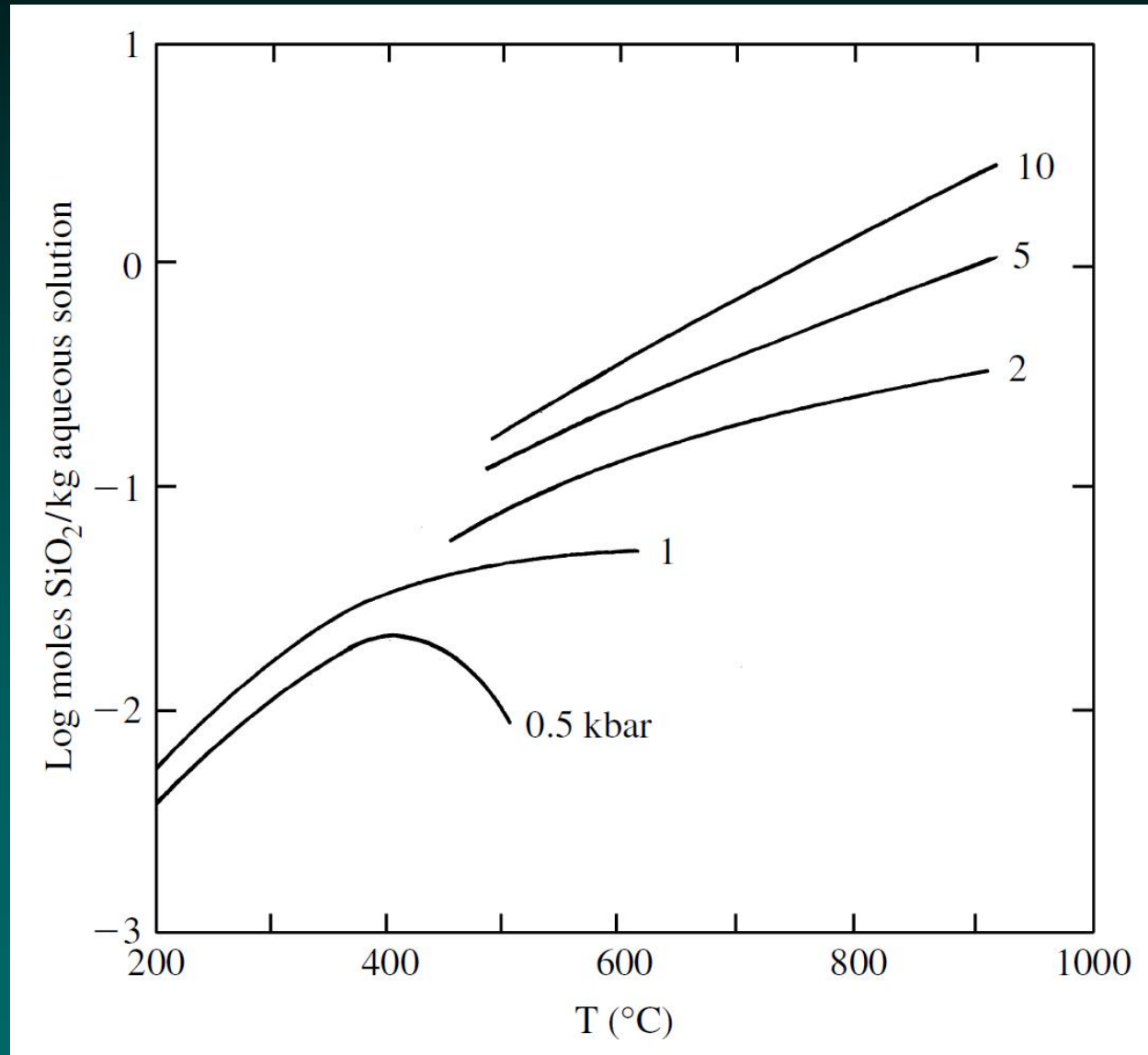
Metamorfní systémy



s těkavými složkami – několik těkavých složek

Metamorfni systémy

rozpustnost SiO_2 v H_2O
(mol. hm. = 60,08 g/mol)

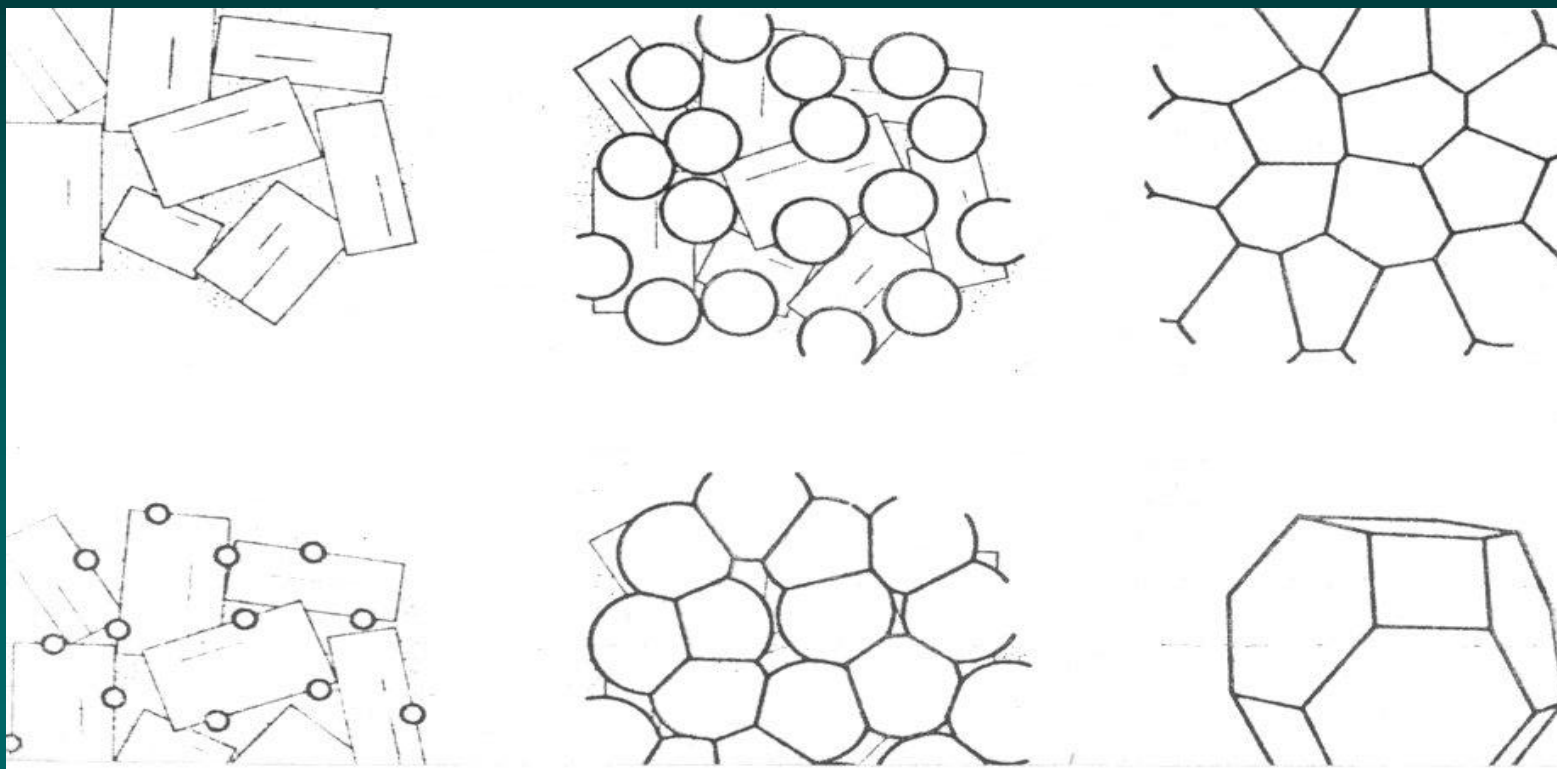


Metamorfni systémy

kinetické faktory

Reakce

- pevná fáze + pevná fáze
- pevná fáze + (fluida–pevná fáze)
- oxidačně-redukční reakce



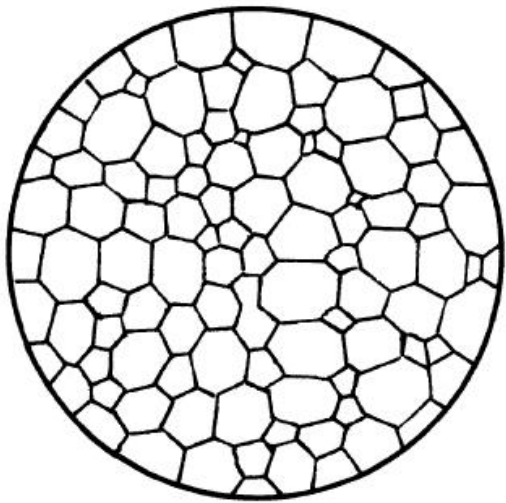
rekrytalizace

Metamorfní systémy

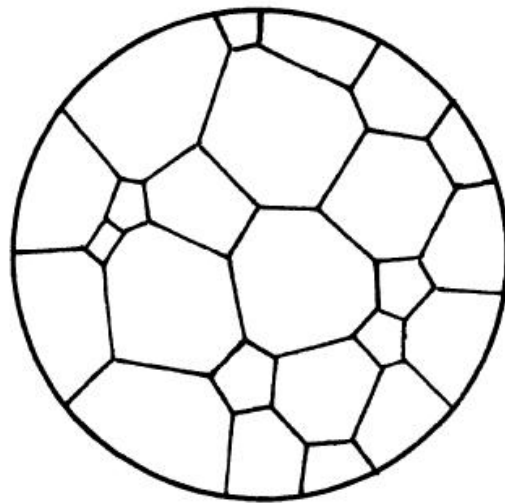
kinetické faktory

Rekrystalizace – Ostwaldovo zrání

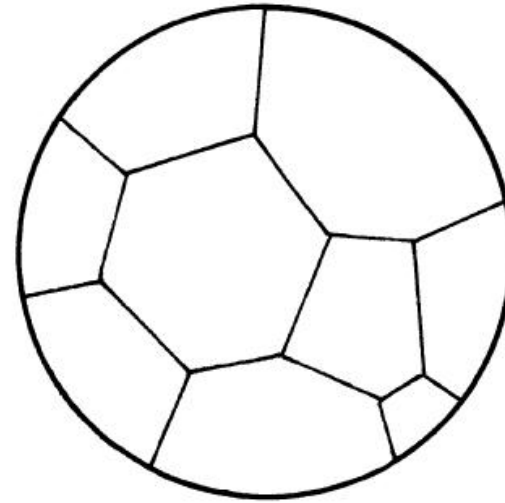
změna velikosti a tvaru mýdlových bublin s časem



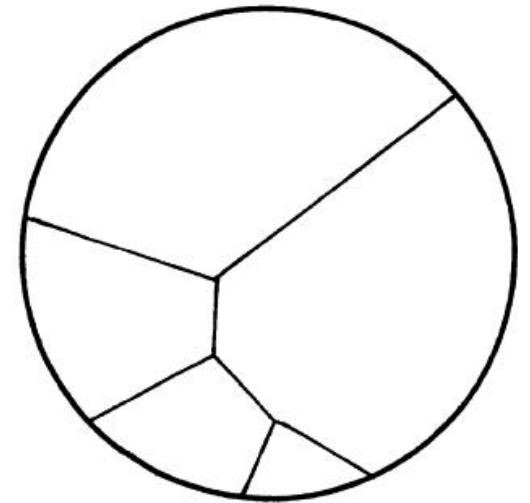
11 minutes



49.5



156

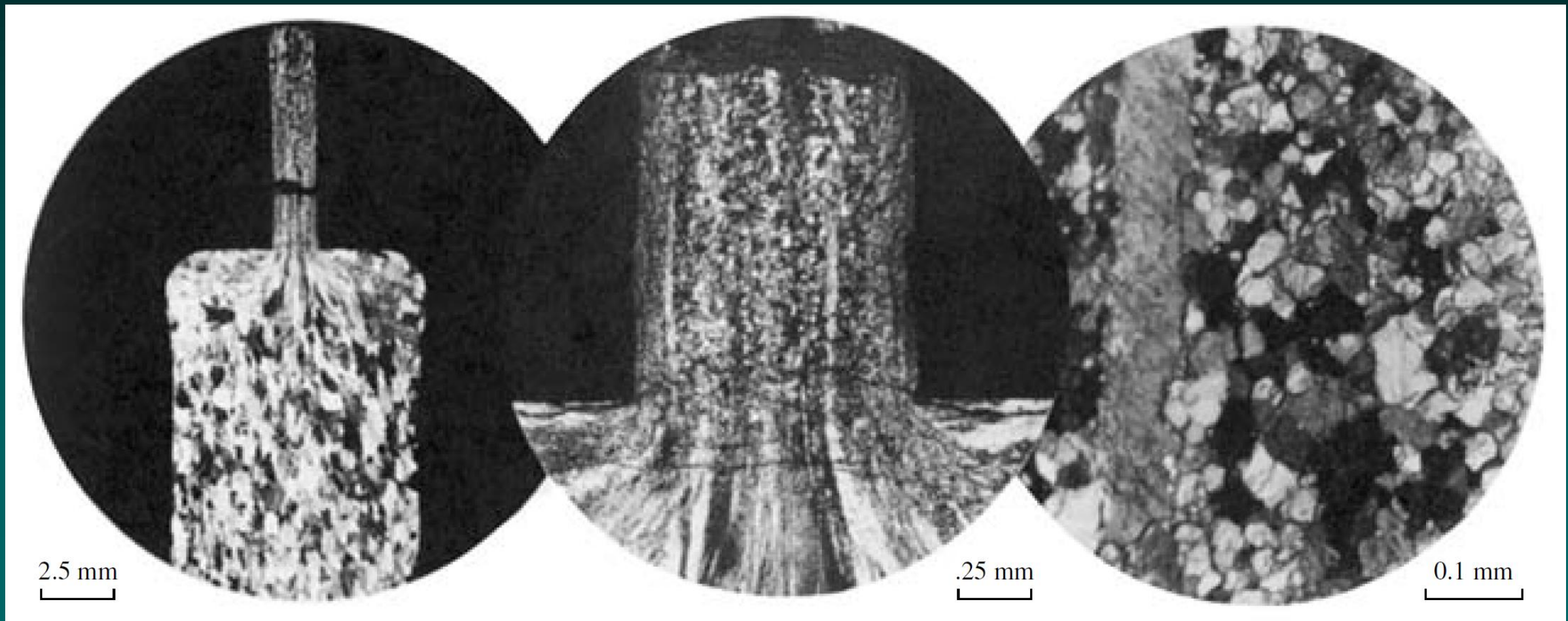


225

Metamorfní systémy

plastický tok
mramor 500 °C, 5 kbar

kinetické faktory



Metamorfní systémy

kinetické faktory

Vznik metakrystů

