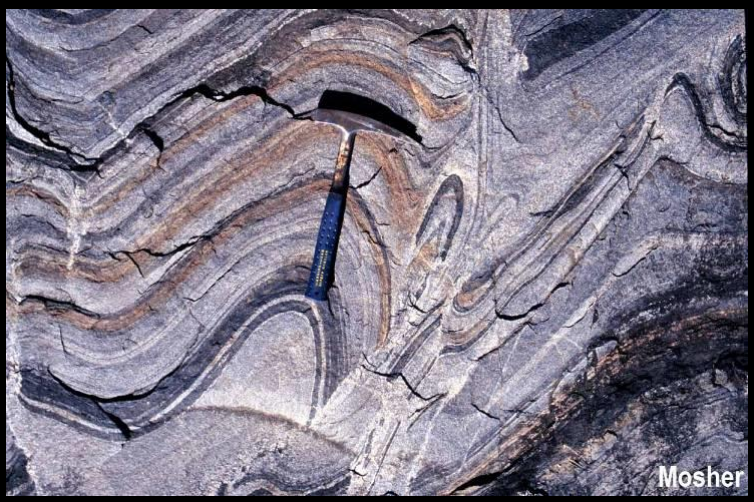
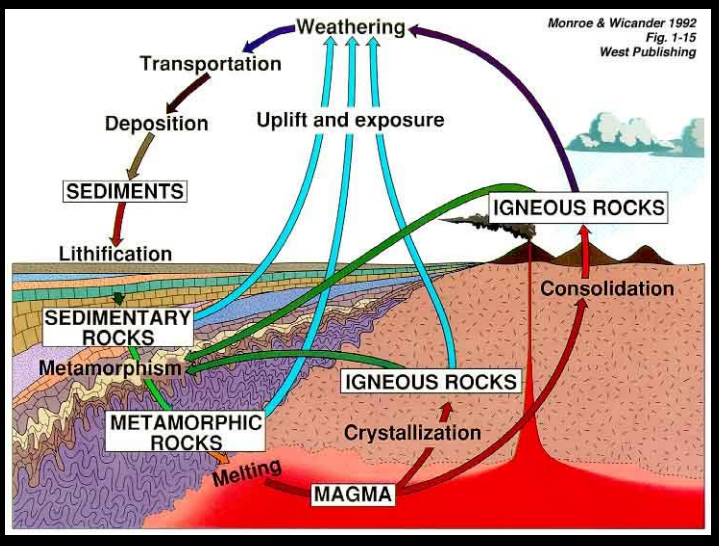
5. Under Pressure



Metamorphic Rocks

Metamorphism



Metamorphism

Heat and pressure

Can affect any rock

Low-High grade

Solid state change

Hand specimens

First impressions?

Metamorphism

Temperature >200°C

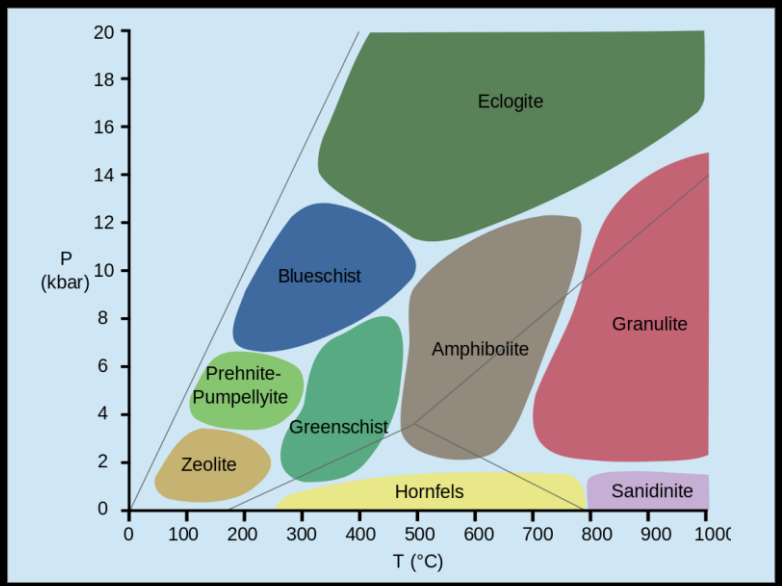
AND/OR

Pressure >300 MPa (3 kbar)

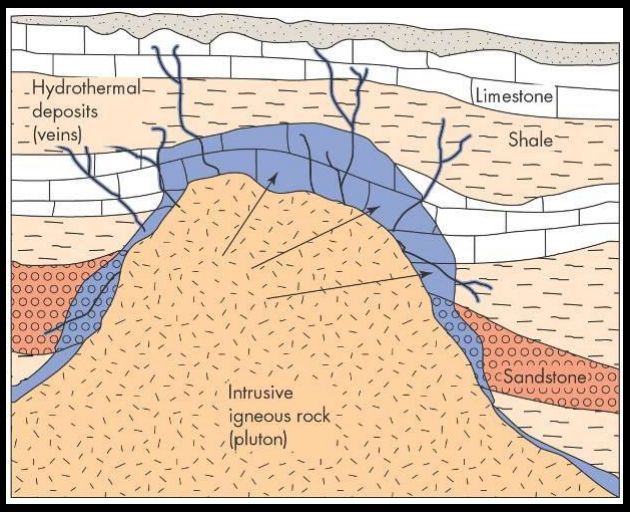
AND/OR

Chemically active fluids

Metamorphic facies

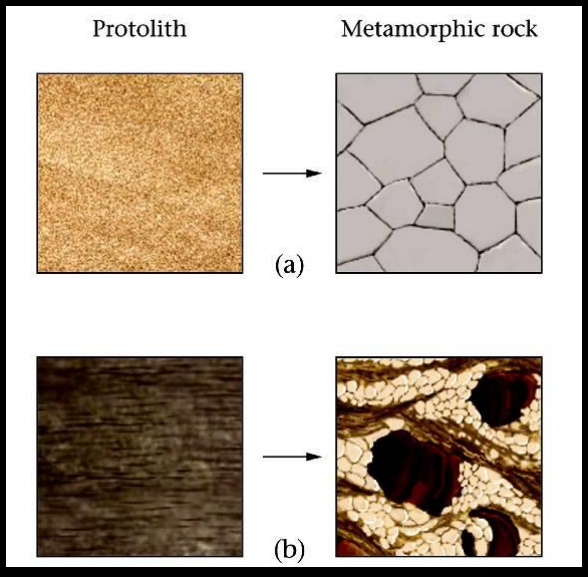


Thermal metamorphism



Igneous intrusion bakes surrounding rocks

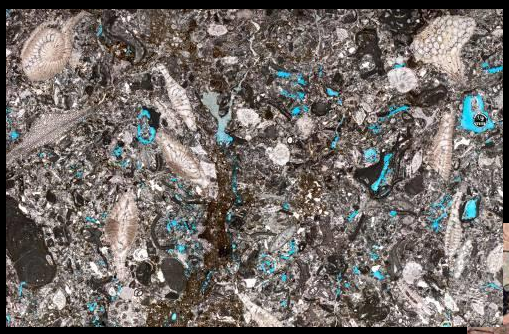
Thermal metamorphism



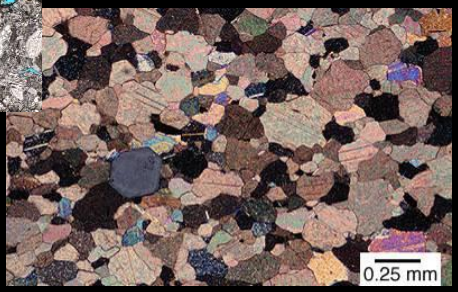
Hornfels

Marble

Thermal metamorphism

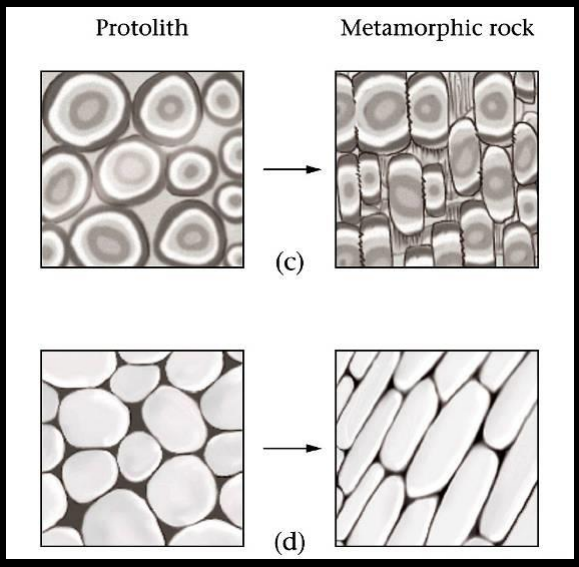


Limestone grains



Marble crystals

Metamorphism by pressure



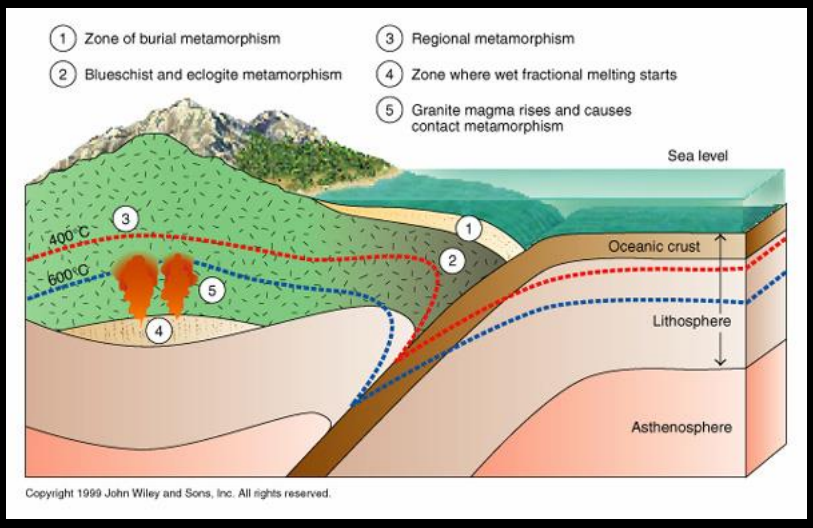
Metamorphism by pressure

SLATE

Metamorphism by pressure

SLATE

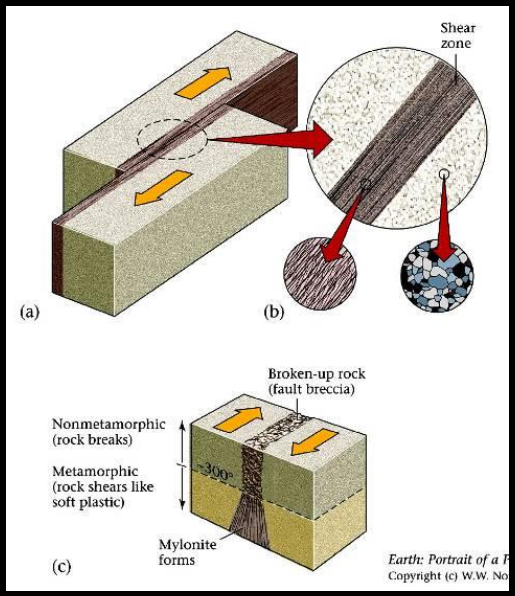
Regional metamorphism



High temps and pressures

= High-grade metamorphism

Mechanical metamorphism



Mylonite = milled

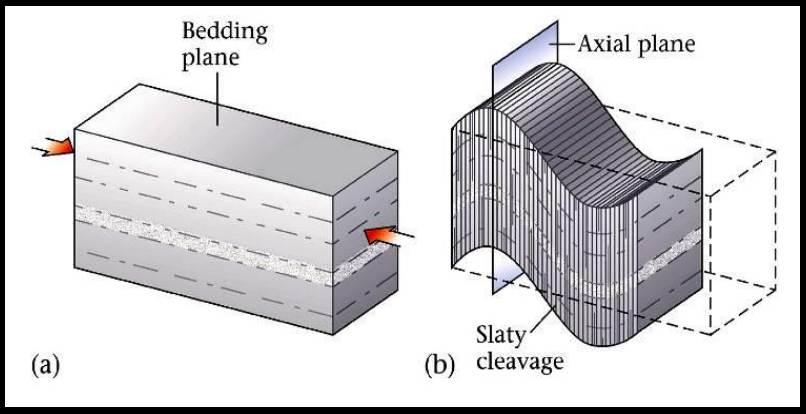
Chemical metamorphism

Metasomatism:

Soapstone

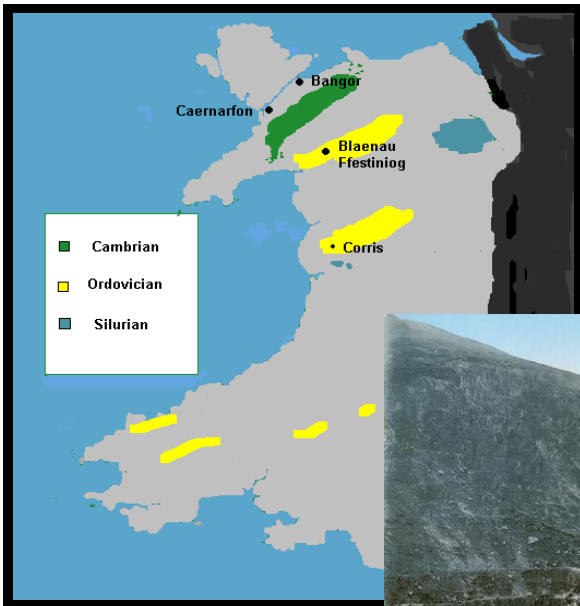
Key metamorphic features

Cleavage:



Slaty cleavage

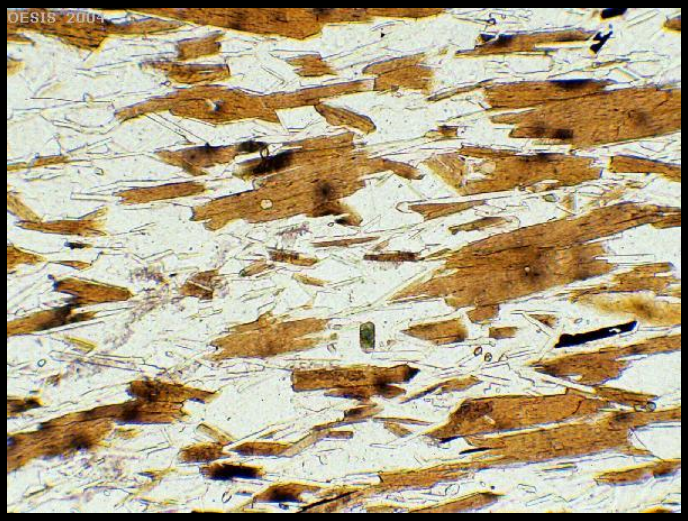
Welsh slate belts



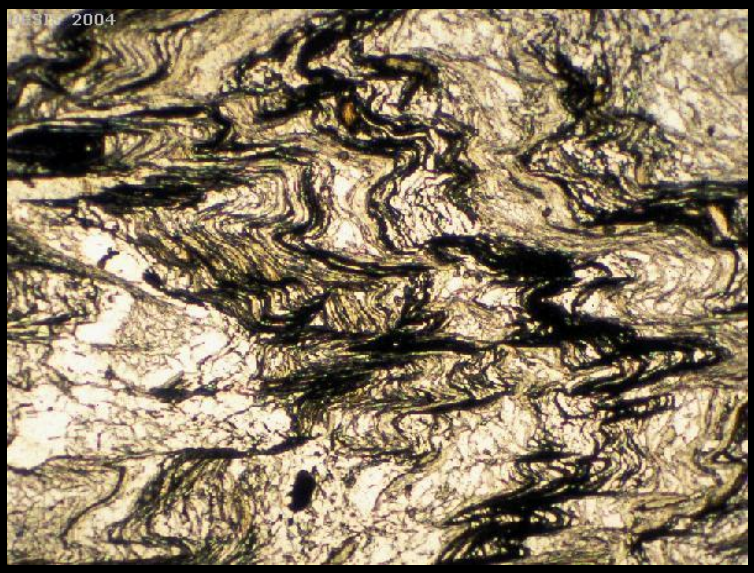
Penrhyn Slate Quarry, Bethesda, c. 1900

Foliation

Schist under the microscope



Multiple foliation

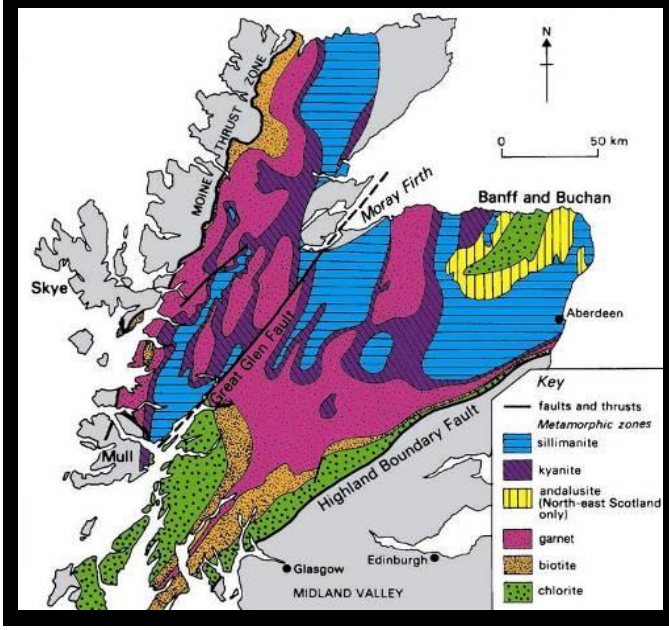


Banding

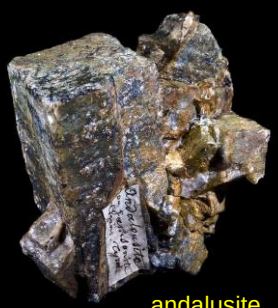
Gneiss, Stockholm

Partial melting

Metamorphic zones



Almandine garnet



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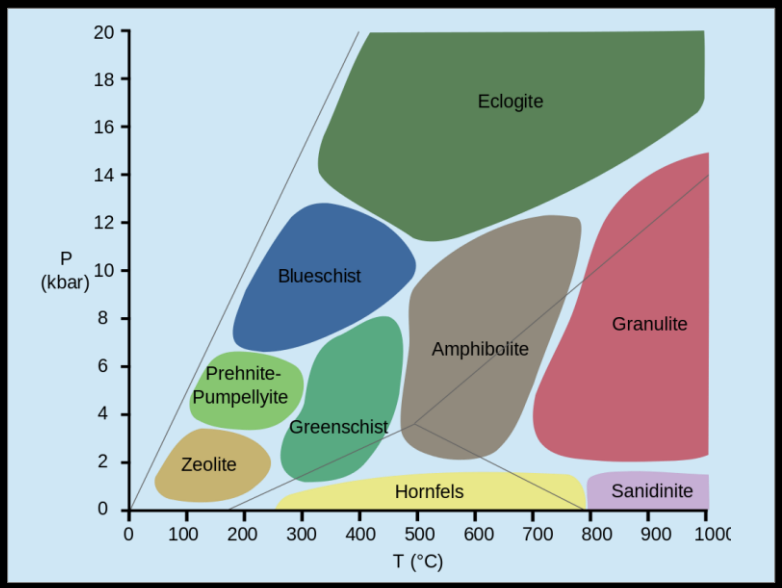
Metamorphic facies



Next week

Folds, Faults & Plate Tectonics