

Fabrics



BASIC DEFINITIONS

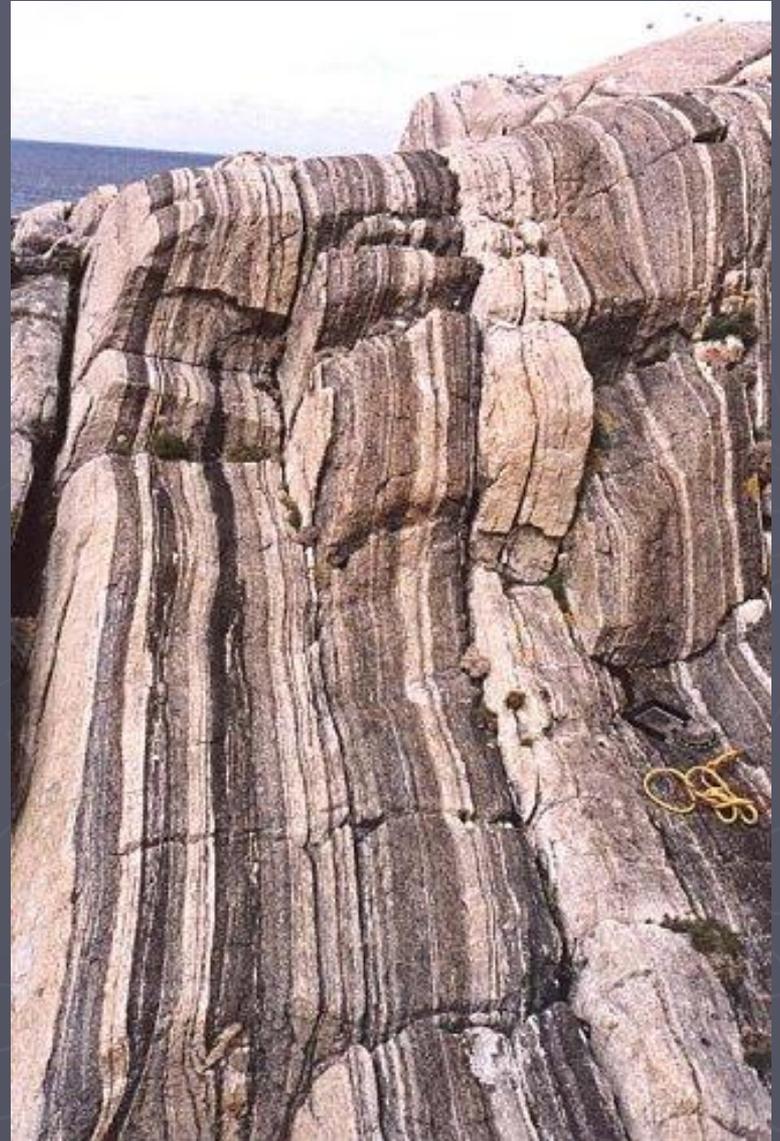
- ▶ **FOLIATION**: a homogeneously distributed planar structure in a rock (e.g., bedding, schistosity)
- ▶ **LINEATION**: a homogeneously distributed linear structure in a rock (e.g., glacial striation, slickensides, fold axis)
- ▶ **FABRIC**: the geometric organization of penetrative structures in a rock. Not all foliations and lineations are fabrics...
 - Gneissosity and cross-bedding are examples of rock fabric
 - Glacial striations are not fabrics because they are surface features, and do not penetrate the rock

FOLIATION DEFINITIONS

- ▶ **CLEAVAGE**: tendency of a rock to break along surfaces of a specific orientation
- ▶ **SPACED FOLIATION**: Foliations separate domains (*microlithons*) that are distinct from each other and/or the foliation surface
- ▶ **CONTINUOUS FOLIATION**: No distinct domains are evident, even at a microscopic scale (10 μ m)

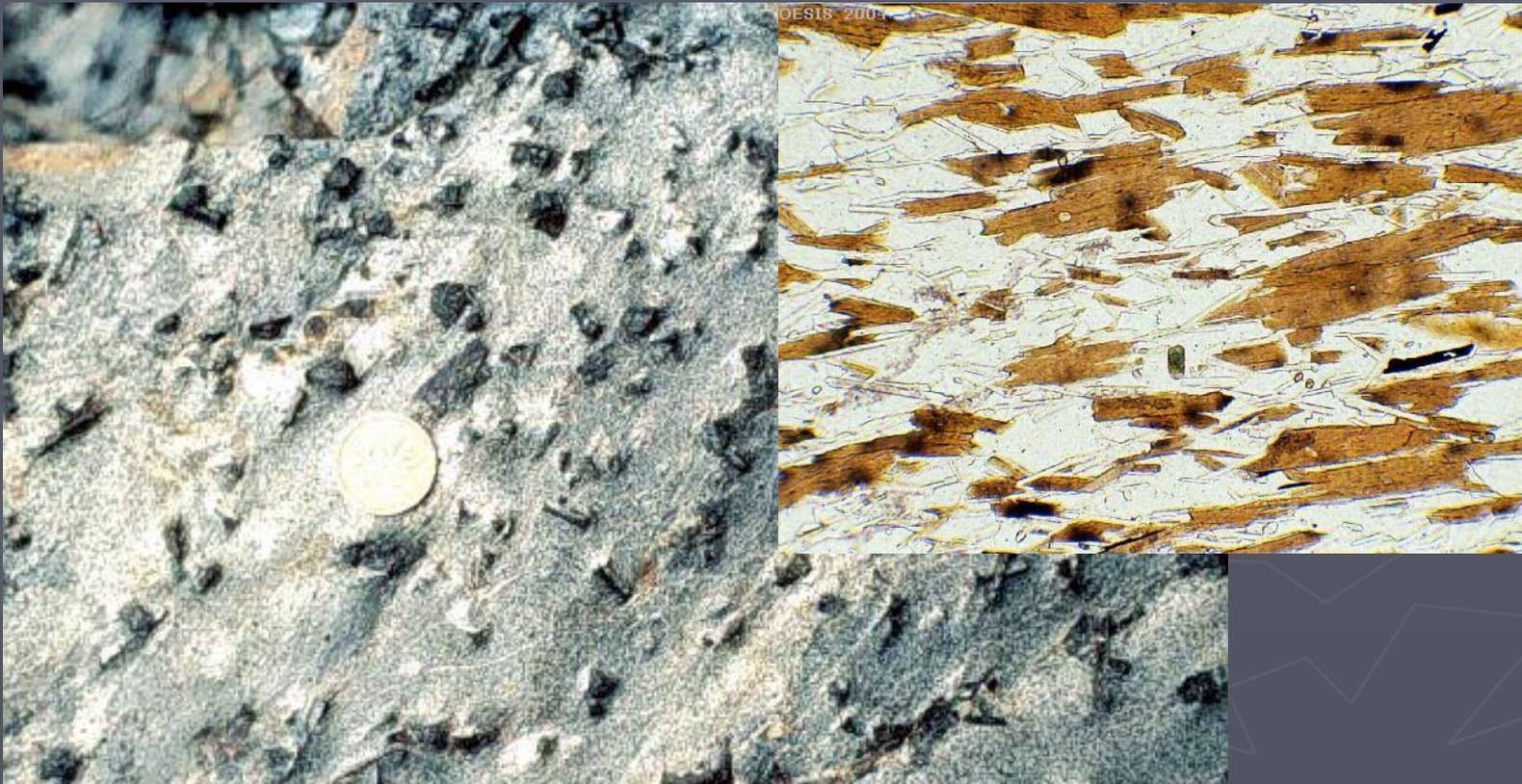
SPACED FOLIATIONS

- ▶ ***GNEISSOSITY:***
a spaced foliation defined by mineralogically distinct bands in high-grade metamorphic rocks in which platy minerals are sparse or absent



SPACED FOLIATIONS

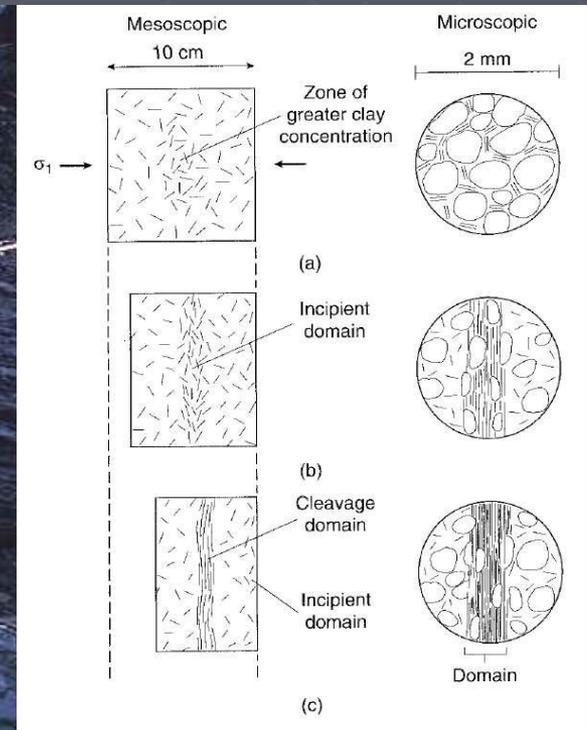
- ▶ **SCHISTOSITY**: a continuous or spaced cleavage defined by the parallel orientation of macroscopic platy minerals (micas, chlorite, amphiboles)



SPACED FOLIATIONS

► *SPACED CLEAVAGE:*

Broadly spaced cleavage domains with intervening uncleaved areas called microlithons



SPACED FOLIATIONS

► ***CRENULATION CLEAVAGE:***

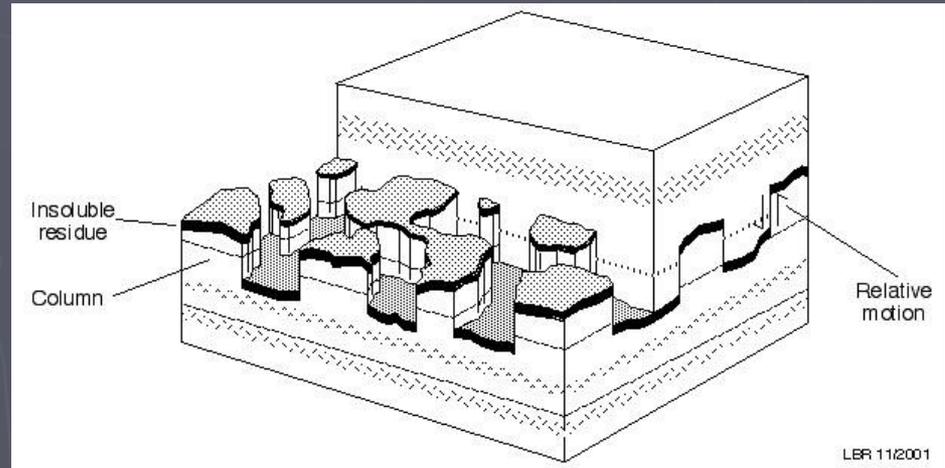
a form of spaced cleavage defined by disruptions of pre-existing foliations along distinct planar foliations



SPACED FOLIATIONS

► *STYLOLITES*:

a form of spaced cleavage commonly found in limestones, defined by interlocked, tooth-like columns that form through pressure solution



CONTINUOUS FOLIATIONS

- ▶ ***SLATY CLEAVAGE***: a continuous cleavage defined by the parallel orientation of microscopic platy minerals (clays, muscovite, chlorite) in low-grade metapelitic rocks (slates)



CONTINUOUS FOLIATIONS

- ▶ ***PHYLLITIC CLEAVAGE***: a continuous cleavage defined by the parallel orientation of platy minerals (clays, chlorite muscovite,) on the macro/microscopic border in greenschist-facies metapelitic rocks (phyllites). Similar to a slate, but shinier.



RELATIONS OF FOLIATIONS TO OTHER STRUCTURES

► *AXIAL PLANAR CLEAVAGE*

Foliations almost always form parallel to the axial plane of folds

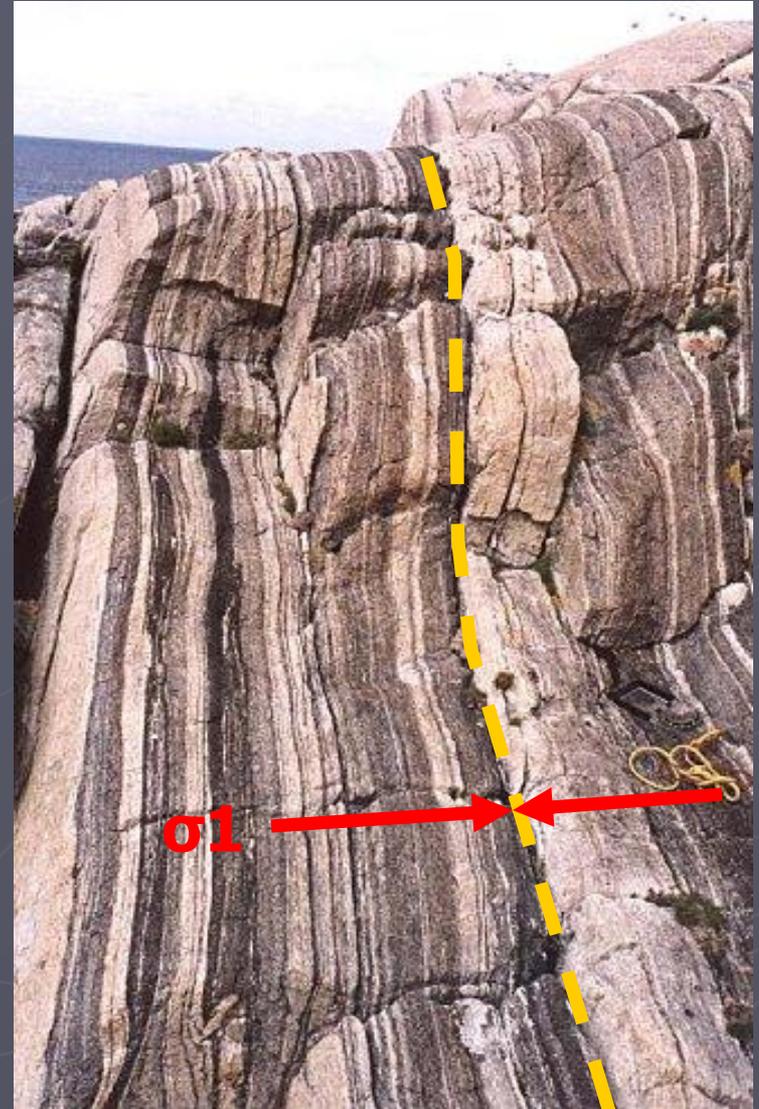
- Helps to define axial plane in the field



FIGURE 11.10 An overturned syncline with a well-developed axial plane slaty cleavage (southern Appalachians, USA).

FOLIATIONS RELATIVE TO PRINCIPAL AXES

- ▶ Most foliations form perpendicular to σ_1



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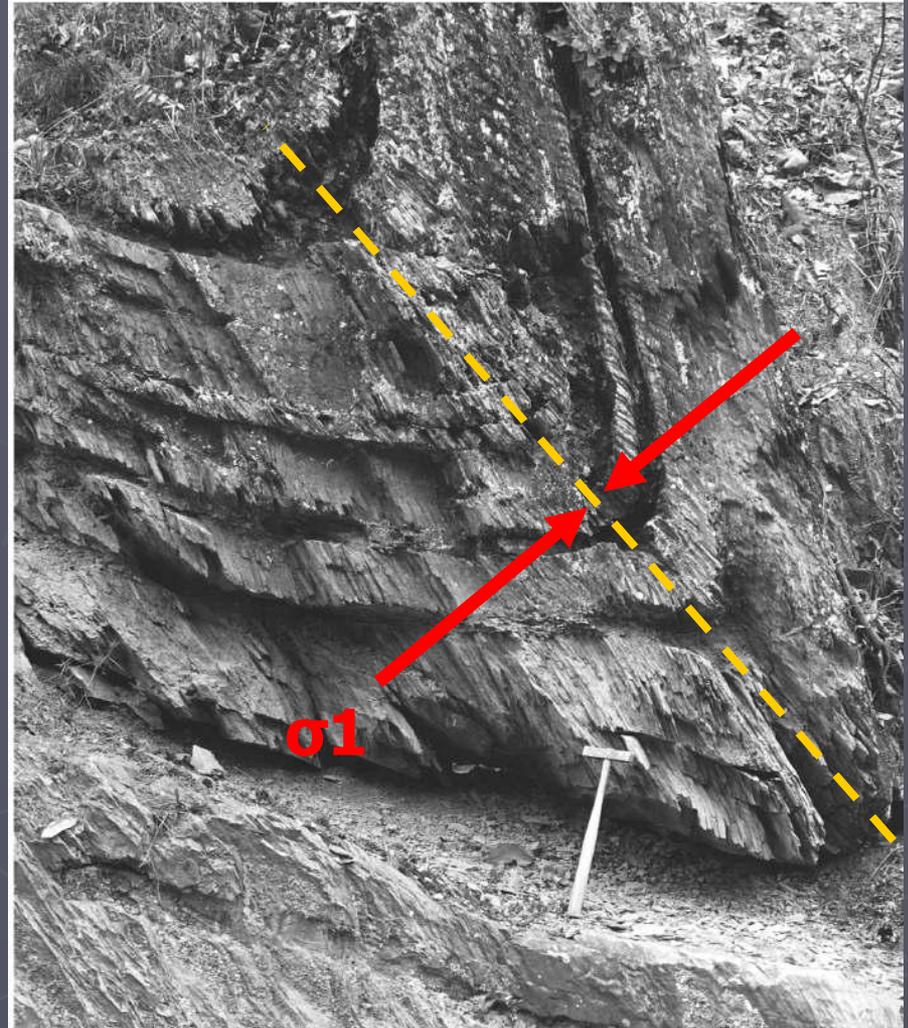


FIGURE 11.10 An overturned syncline with a well-developed axial plane slaty cleavage (southern Appalachians, USA).

LINEATION DEFINITIONS

- ▶ ***MINERAL LINEATIONS***: growth or deformation of minerals during deformation
- ▶ ***DISCRETE LINEATIONS***: formed from the deformation of pre-existing discrete objects such as ooids or pebbles
- ▶ ***CONSTRUCTED LINEATIONS***: formed from the construction or deformation of planar features during deformation

MINERAL LINEATIONS

- ▶ ***SLICKENLINES***: linear streaks on fault planes and slickensides by the smearing out of pre-existing minerals



MINERAL LINEATIONS

- ▶ ***MINERAL ROD LINEATIONS***: linear polycrystalline mineral aggregates with a distinct long axis



MINERAL LINEATIONS

- ▶ ***MINERAL FIBER LINEATIONS***: linear orientation of minerals with an elongate form (e.g., amphibole)



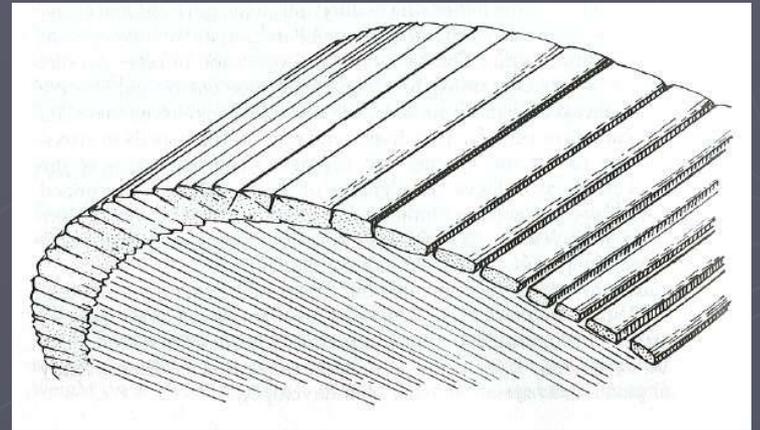
DISCRETE LINEATIONS

- ▶ Formed from the deformation of pre-existing discrete objects such as ooids or pebbles



CONSTRUCTED LINEATIONS

- ▶ **MULLIONS**: linear fluted structures at lithologic interfaces



CONSTRUCTED LINEATIONS

- ▶ ***BOUDINS***: linear segments of a competent layer that has been pulled apart



RELATIONS OF LINEATIONS TO OTHER STRUCTURES

- ▶ Slickenlines parallel fault movement
- ▶ Lineations commonly parallel fold axes
 - Fold hinges
 - Fold mullions
 - Intersection Lineation: Axial Planar Cleavage and the folded surface
- ▶ Mineral lineations and boudin lines may be either parallel or perpendicular to fold axes
- ▶ Slickenlines on fold limbs are perpendicular to fold axes