


Structural Geology II

Folds

Rocks commonly are folded as a result of deformation



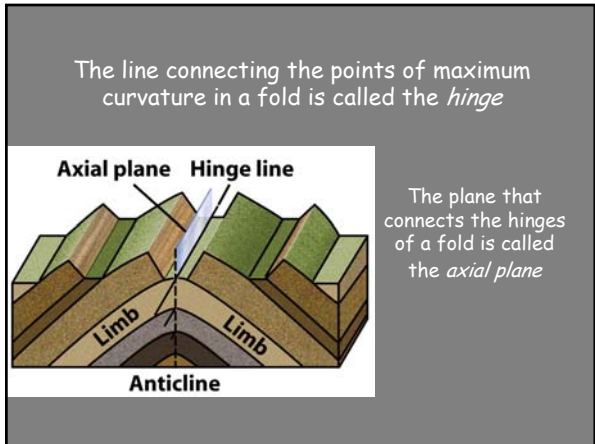
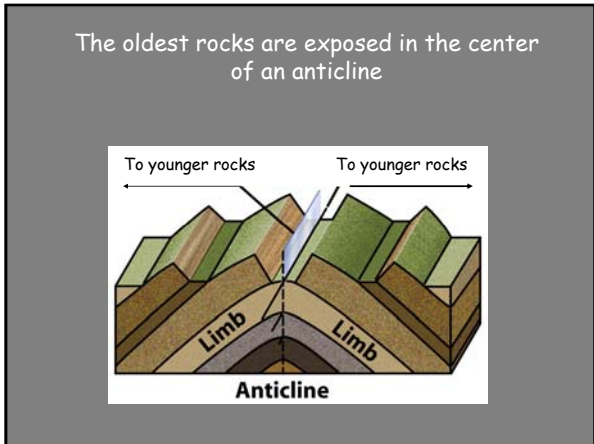

A fold in which the limbs dip away from the hinge is called an anticline

An anticline

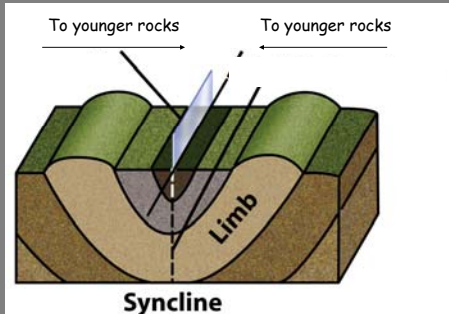


A fold in which the limbs dip toward the hinge is called a syncline

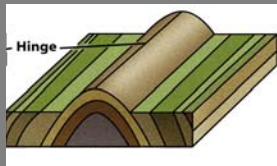
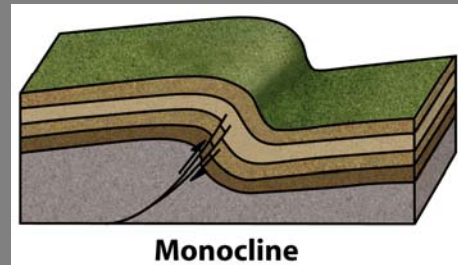
A syncline



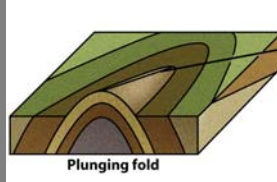
The youngest rocks are exposed in the center of a syncline



A monocline is a fold that has only one limb

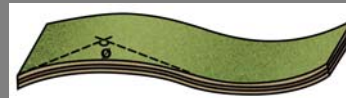


The hinge of a fold may be horizontal

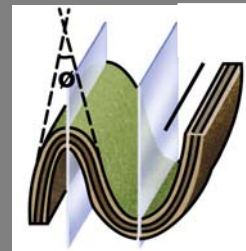


A fold that does not have a horizontal hinge is called a *plunging fold*

The angle between the hinge and the horizontal is called the *plunge*



Folds may be open (large angle between limbs)




Or they may be tight (small angle between limbs)

The axial plane of a fold may be folded



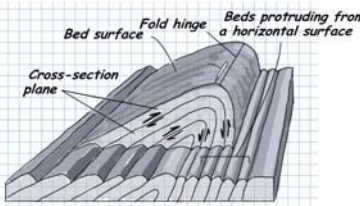
Folds can form in two ways:

- 1) Flexural slip
- 2) Ductile flow




In a flexural slip fold deformation is accommodated by slip along the bedding planes

Flexural slip folds are usually found in sedimentary rocks



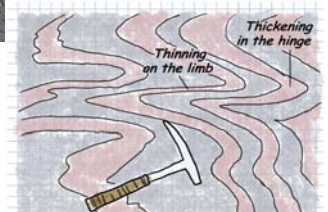
Labels in diagram: Bed surface, Fold hinge, Beds protruding from a horizontal surface, Cross-section plane.

What a geologist sees



Folds formed by ductile flow occur during high temperature deformation

Folds formed during ductile flow are usually found in metamorphic rocks

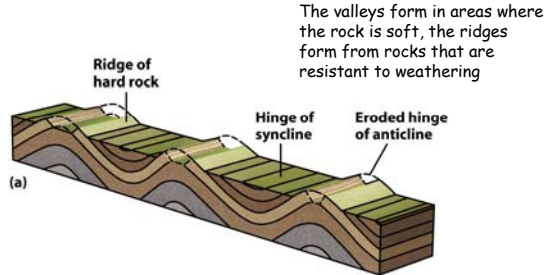


Labels in diagram: Thickening in the hinge, Thinning on the limb.

What a geologist sees

When a fold belt has been eroded it produces a topography with parallel valleys and ridges

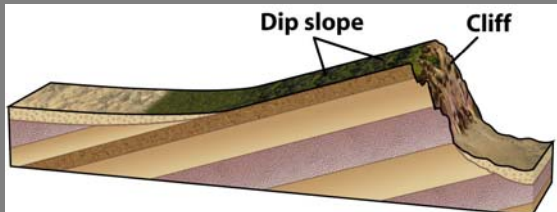
The valleys form in areas where the rock is soft, the ridges form from rocks that are resistant to weathering



Labels in diagram: Ridge of hard rock, Hinge of syncline, Eroded hinge of anticline.


(a)

A ridge formed from a resistant rock is called a *cuesta* or a *hogback*.



Labels in diagram: Dip slope, Cliff.

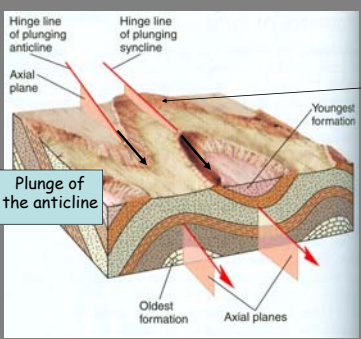
Hogbacks north of Ft. Collins.



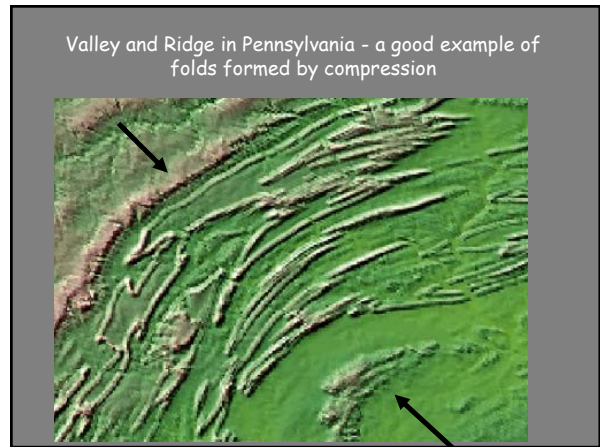
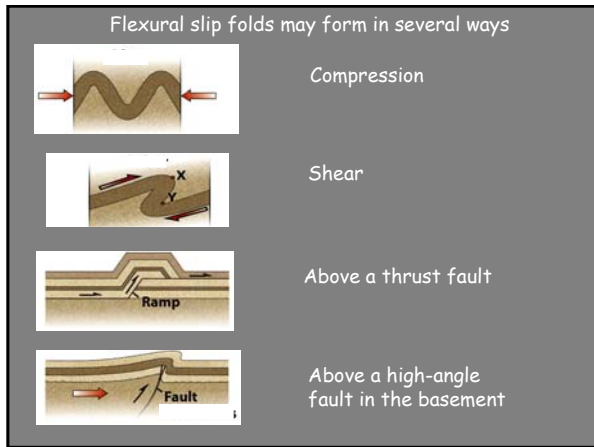
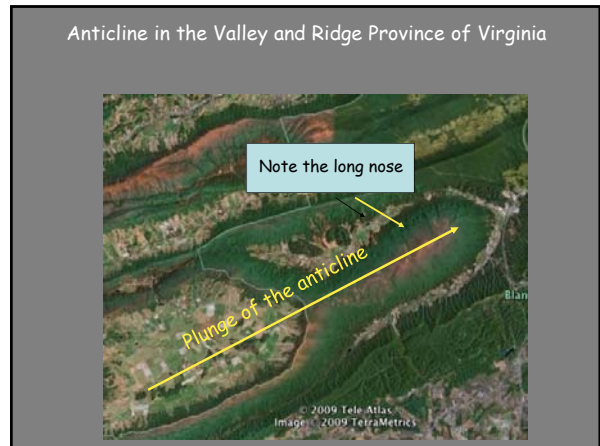
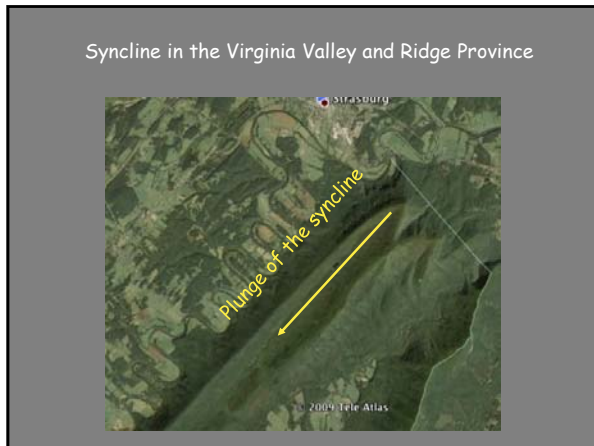
Labels in image: strike, dip, US 287.

In a topography formed by eroded folds, the anticlines will have a "nose" pointing in the direction of plunge

Synclines will have a trough oriented down-plunge



Labels in diagram: Hinge line of plunging anticline, Hinge line of plunging syncline, Axial plane, Plunge of the anticline, Oldest formation, Axial planes, Youngest formation.



Things to remember from this lecture:

Anticline, syncline, monocline

Limb, hinge, axial plane, plunge

Open versus closed folds

Flexural slip vs. ductile flow folds

Cuesta and Hogback