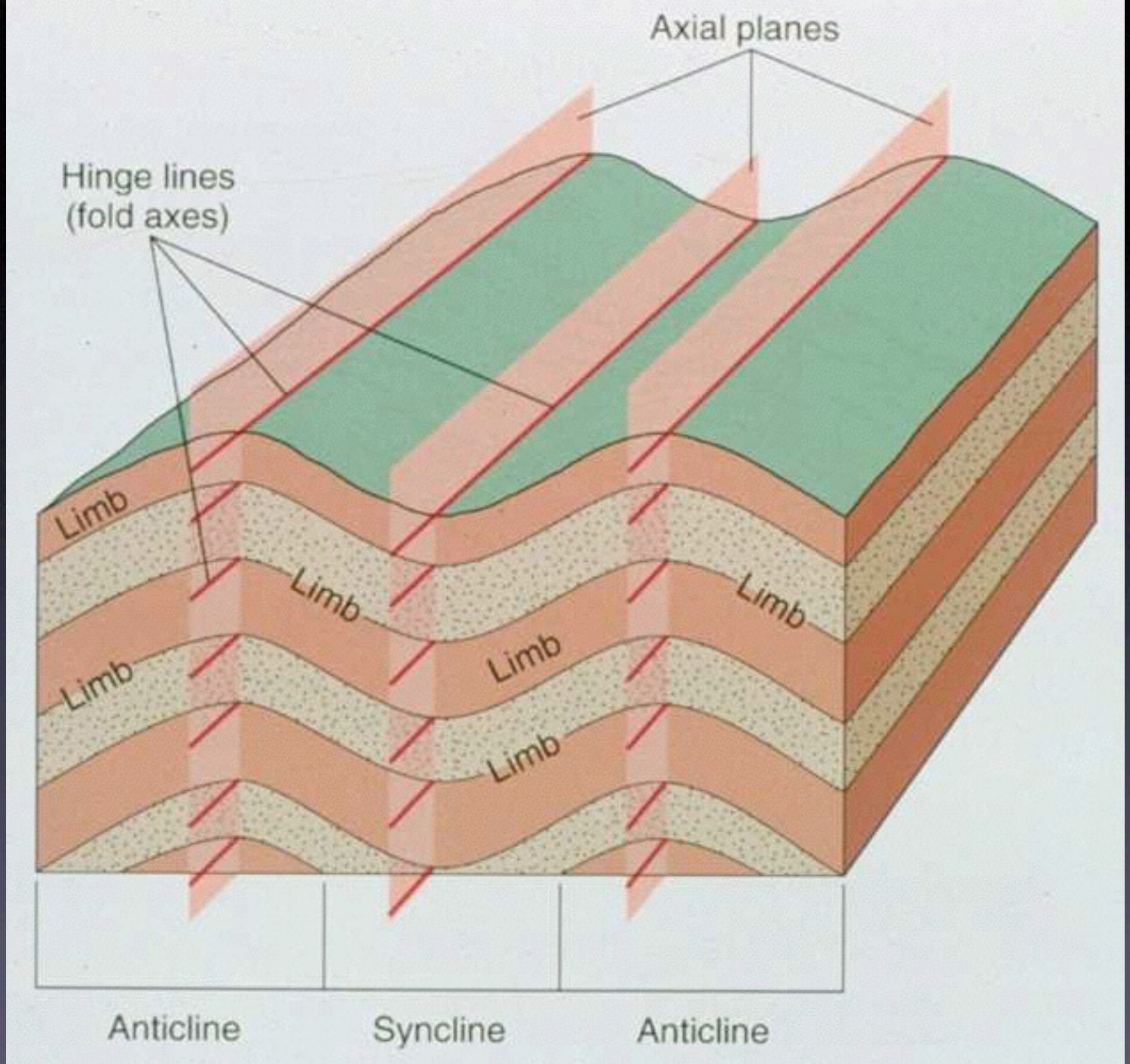
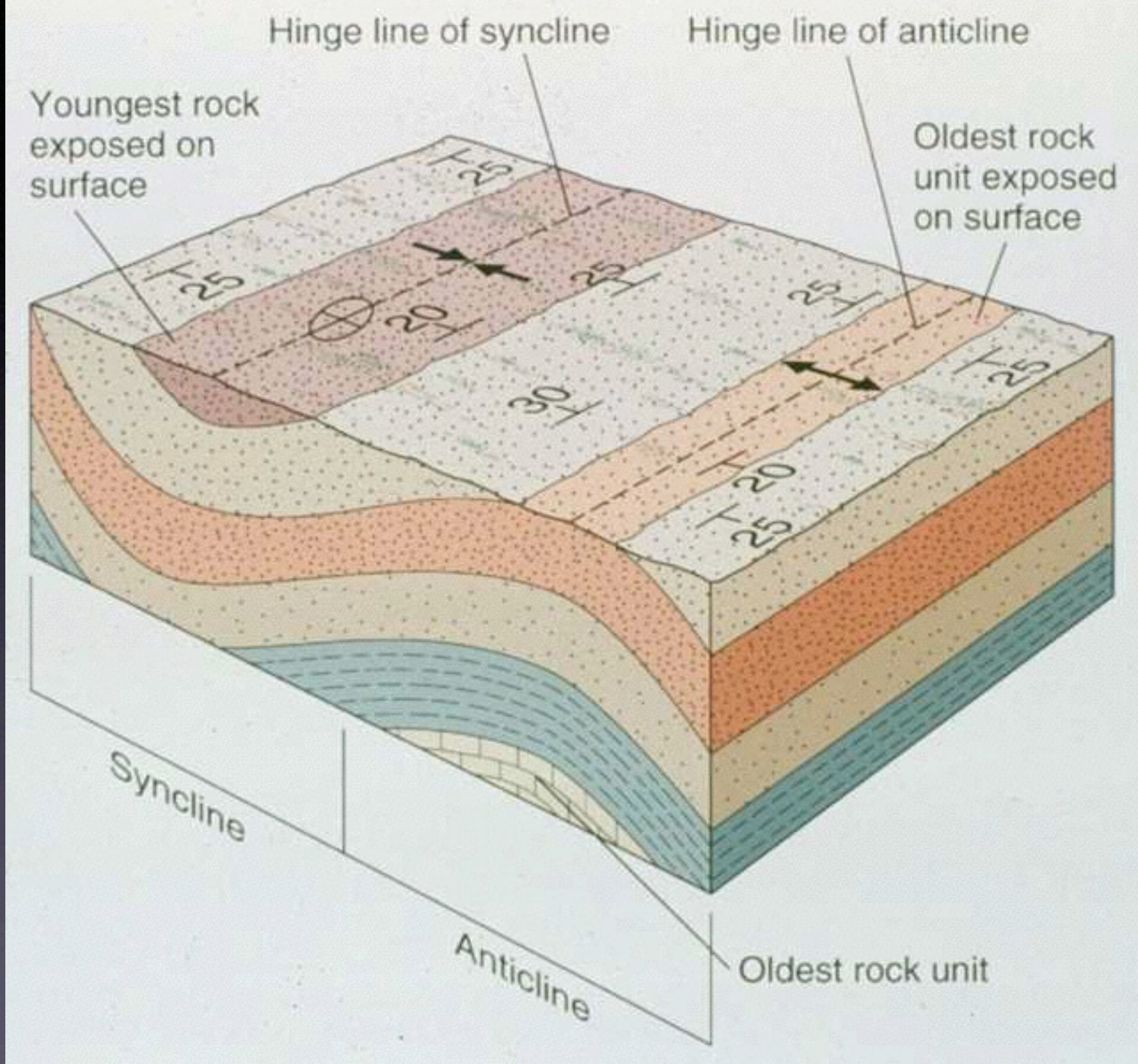
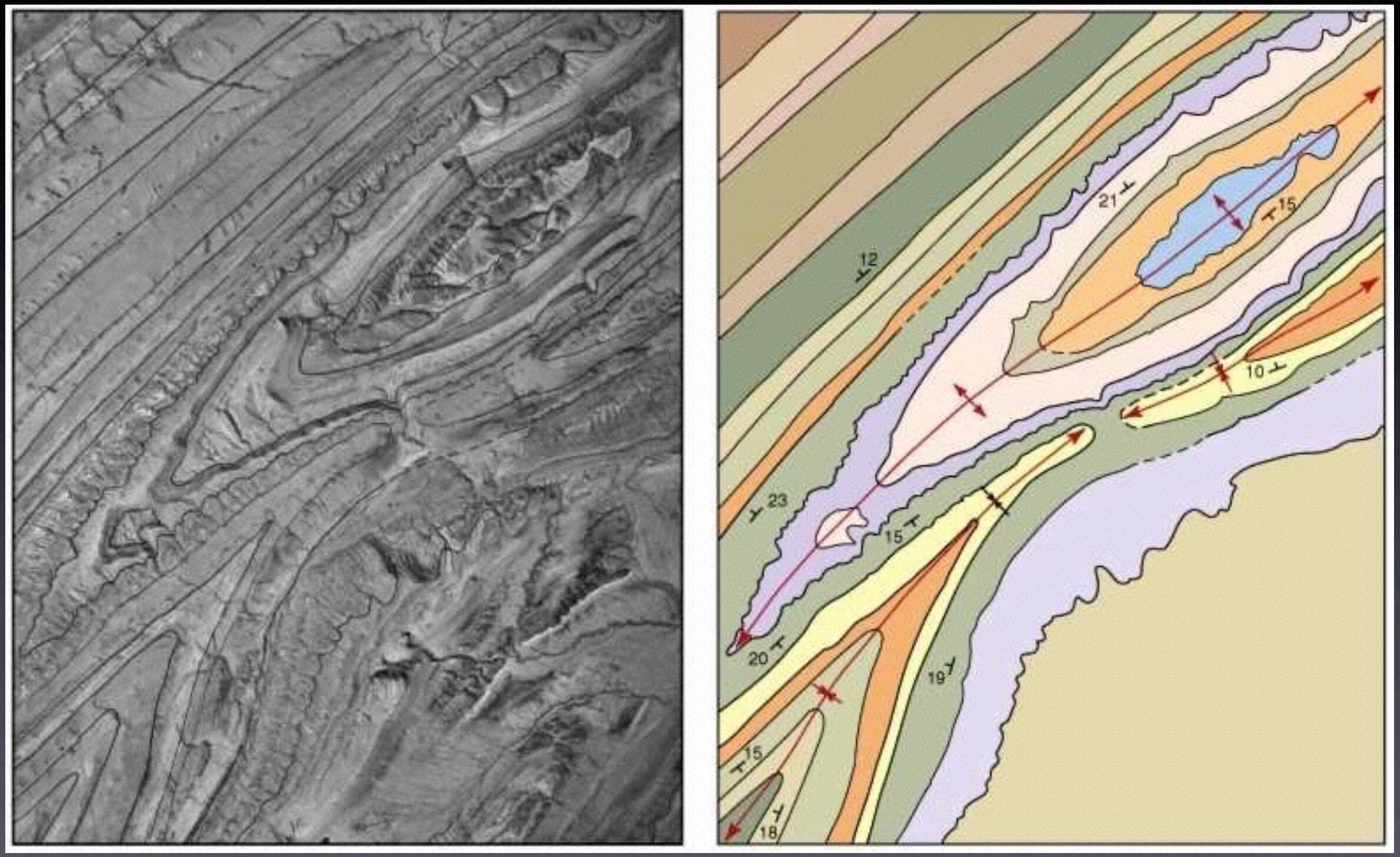
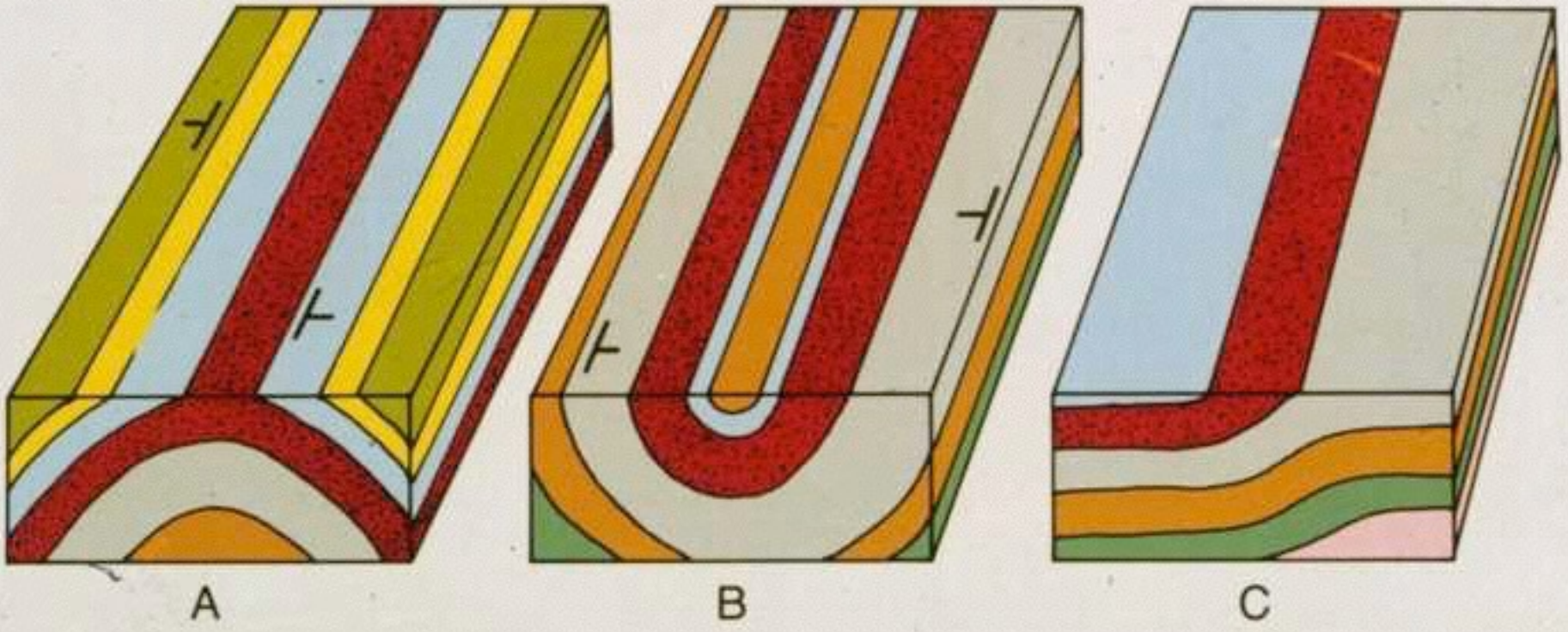
Folds

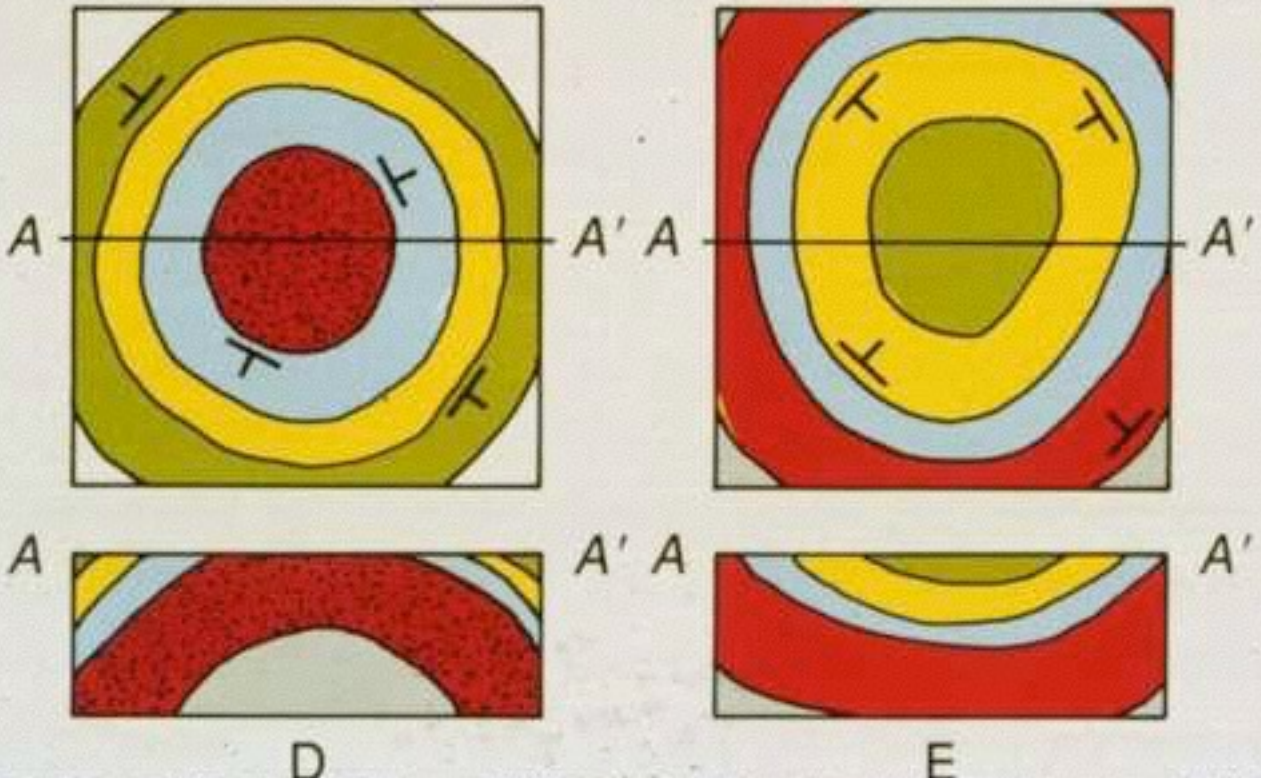
Fold Geometry

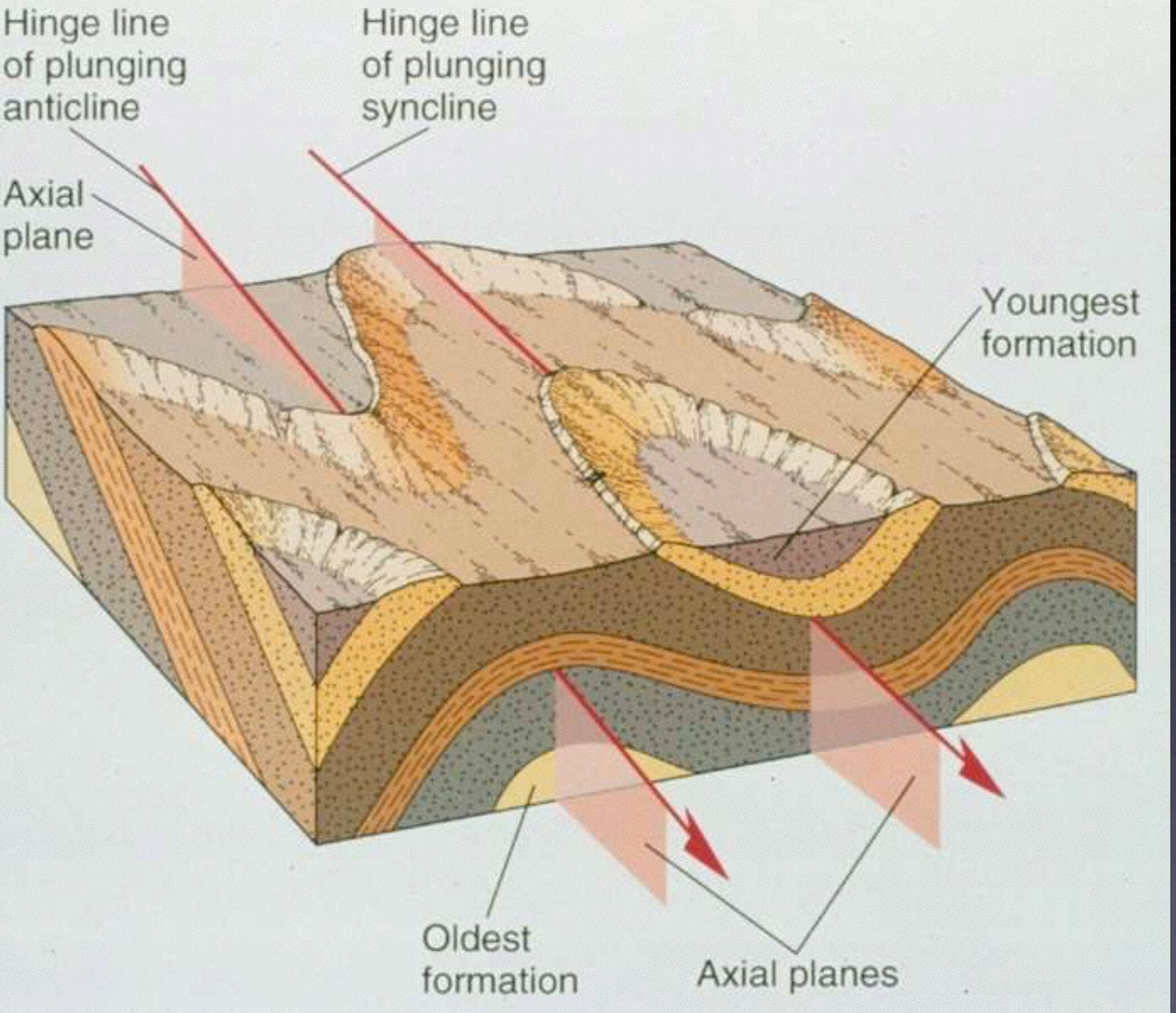

Axial planes
Hinge lines
(fold axes)
Limb
Limb
Limb
Limb
Limb
Limb
Anticline
Syncline
Anticline

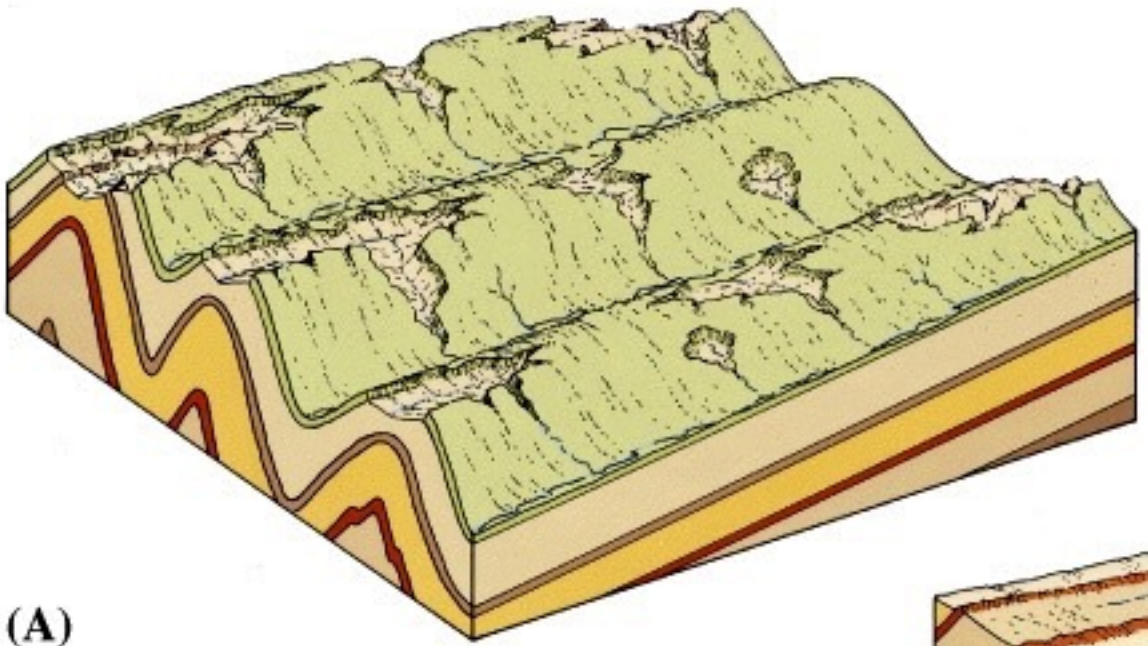

Hinge line of syncline
Hinge line of anticline
Youngest rock exposed on surface
Oldest rock unit exposed on surface
25
25
20
25
30
25
20
25
Syncline
Anticline
Oldest rock unit


12
21
15
10
23
15
20
19
15
18

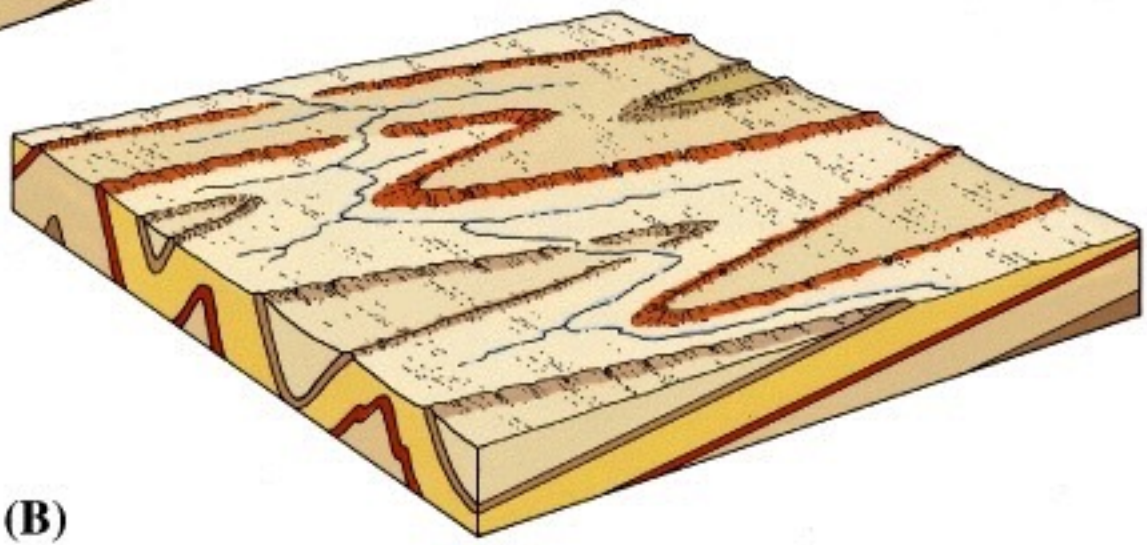

A
B
C


A
A'
A
A'
A
A'
A
A'
D
E

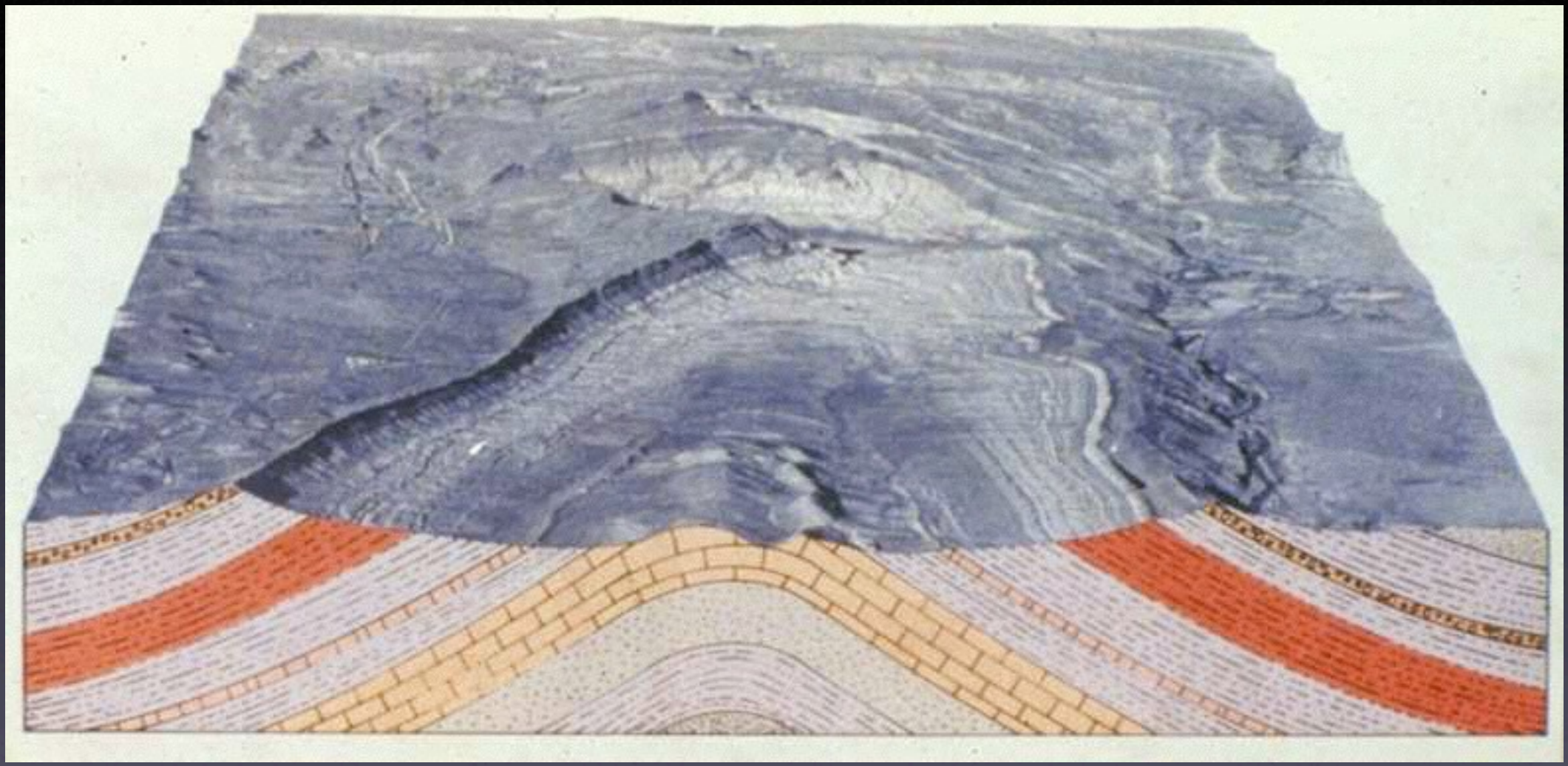

Hinge line of plunging anticline
Hinge line of plunging syncline
Axial plane
Youngest formation
Oldest formation
Axial planes

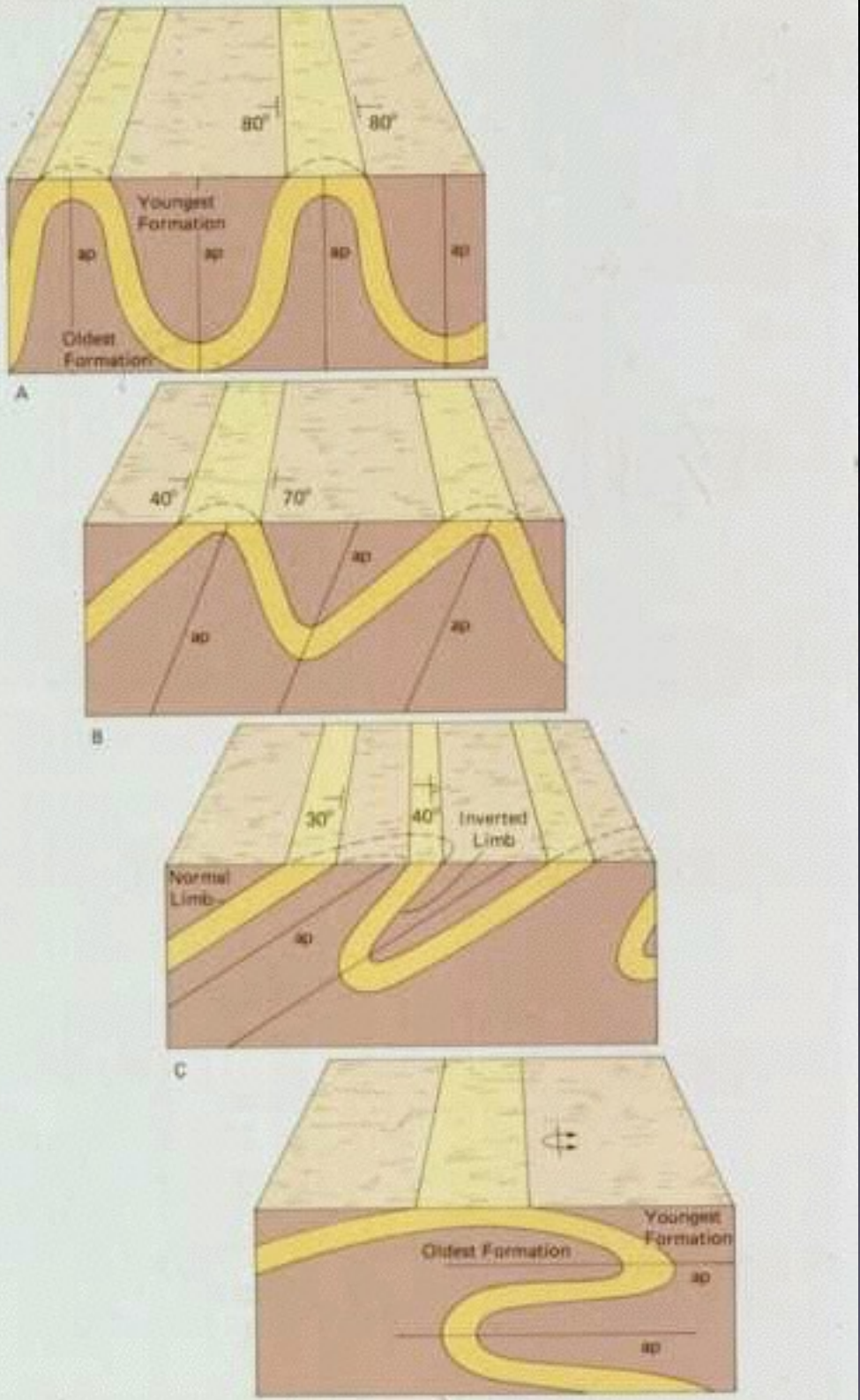


(A)

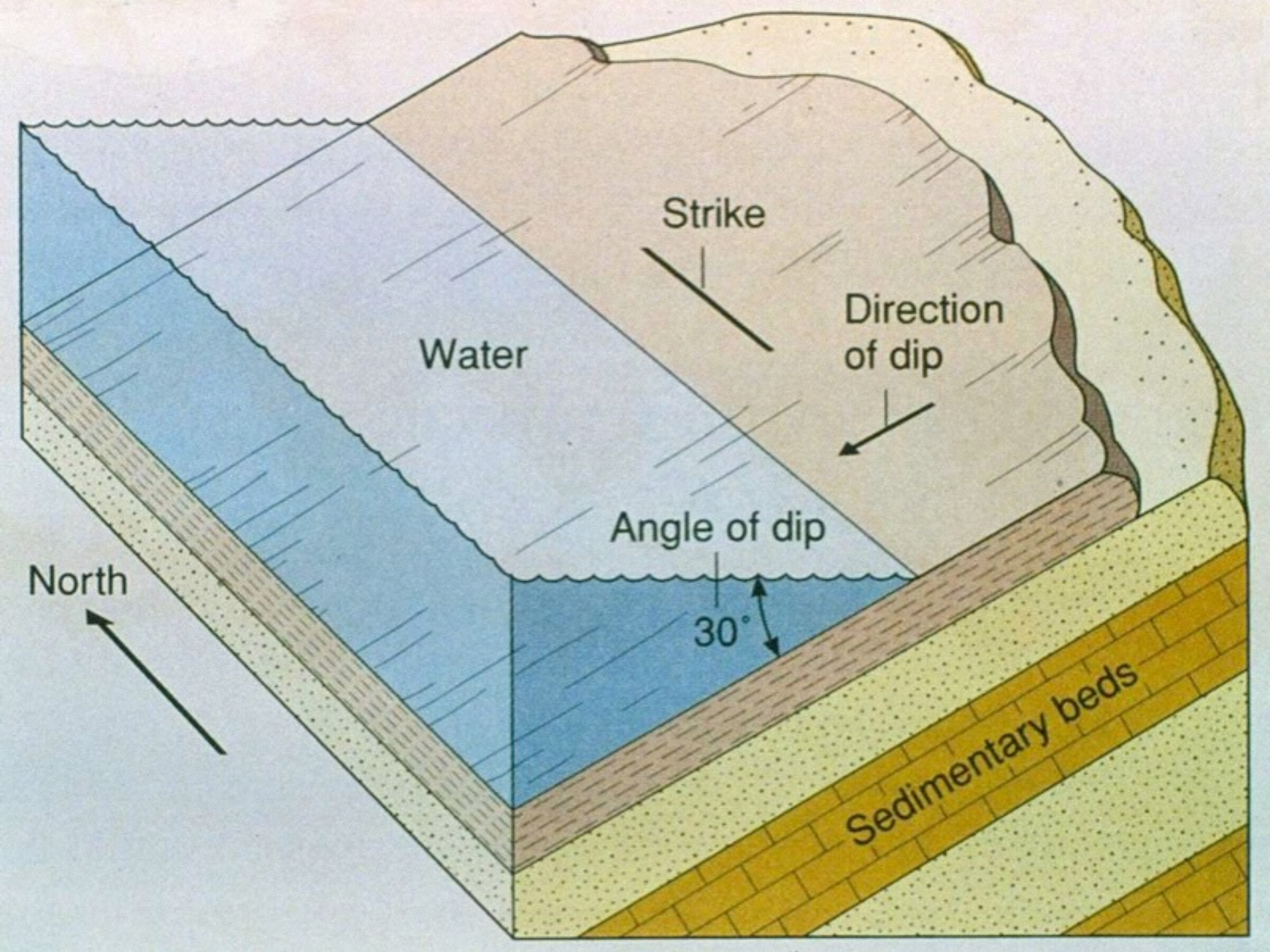


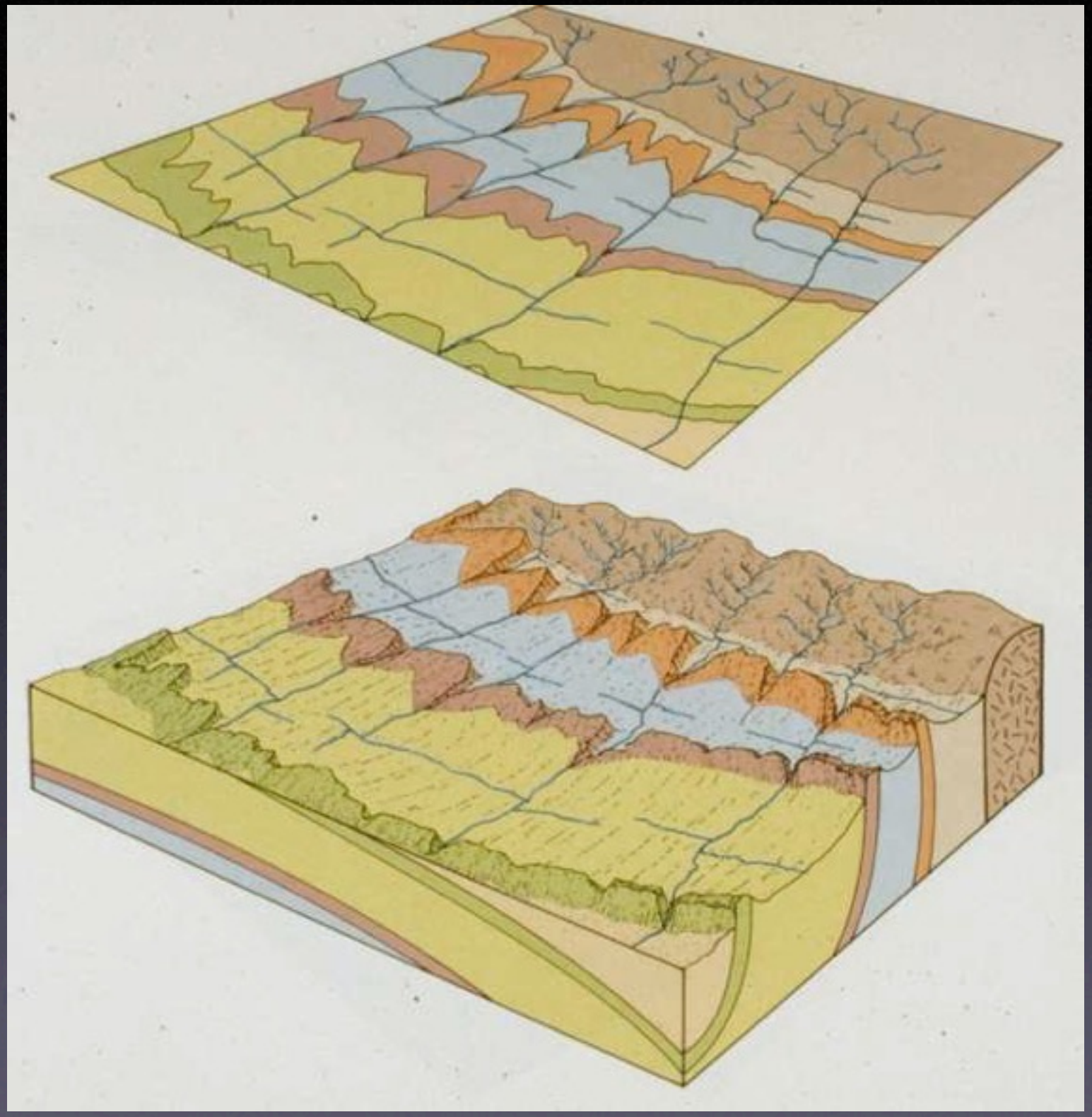
(B)

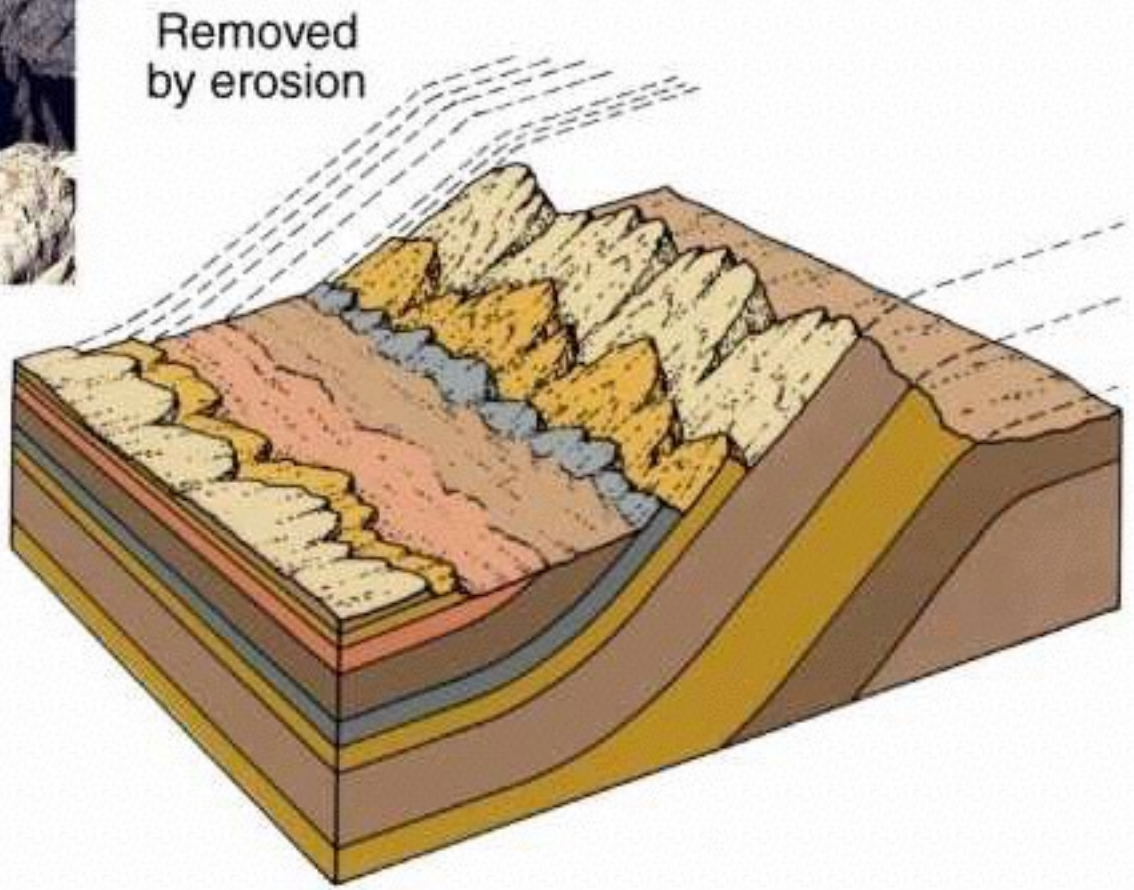


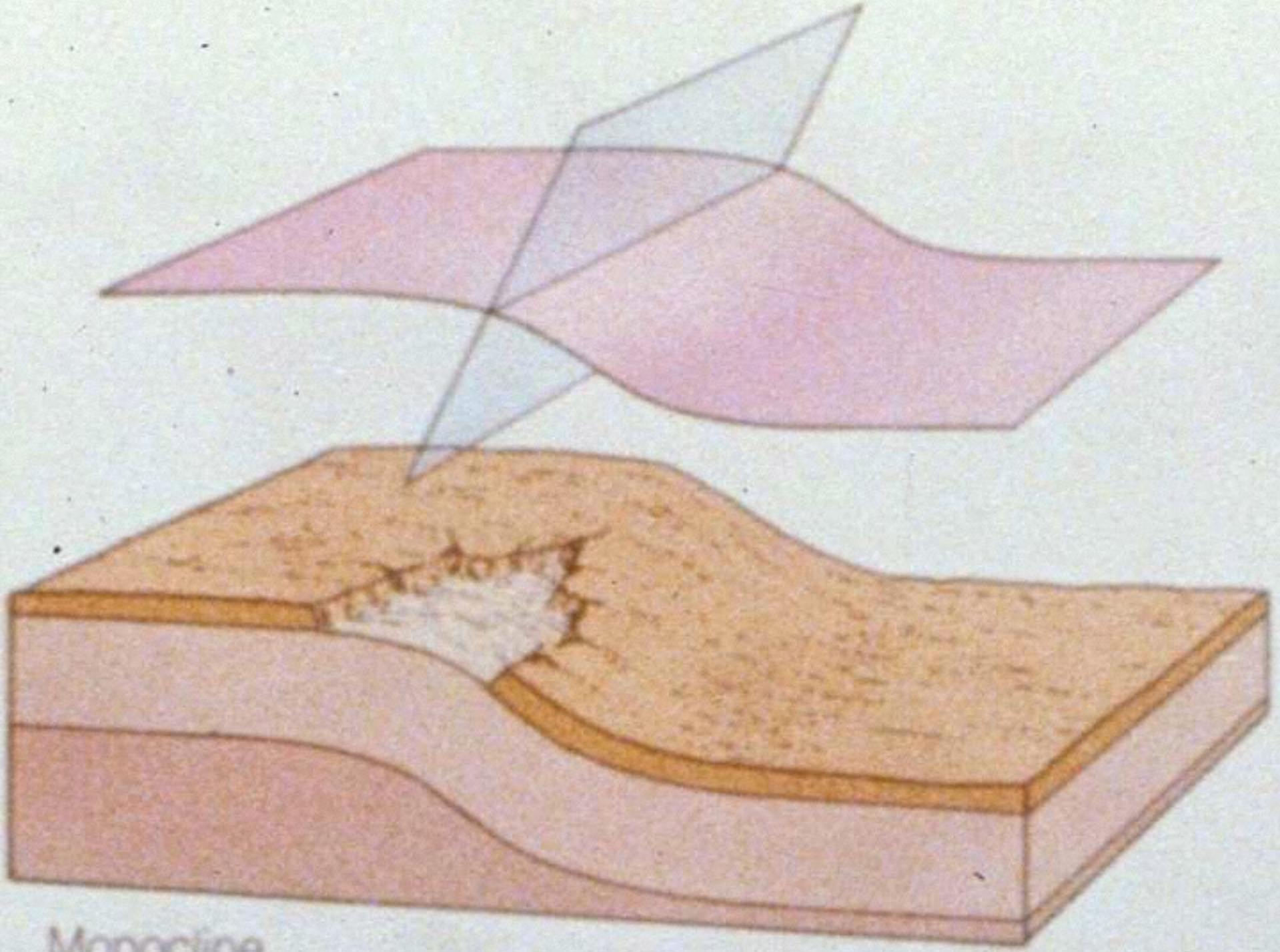

80°
80°
Youngest Formation
ap
ap
ap
ap
Oldest Formation
A
40°
70°
ap
ap
ap
B
30°
40°
Inverted Limb
Normal Limb
ap
C
Youngest Formation
Oldest Formation
ap
ap

Homoclines and Monoclines


Strike
Direction of dip
Water
Angle of dip
North
30°
Sedimentary beds

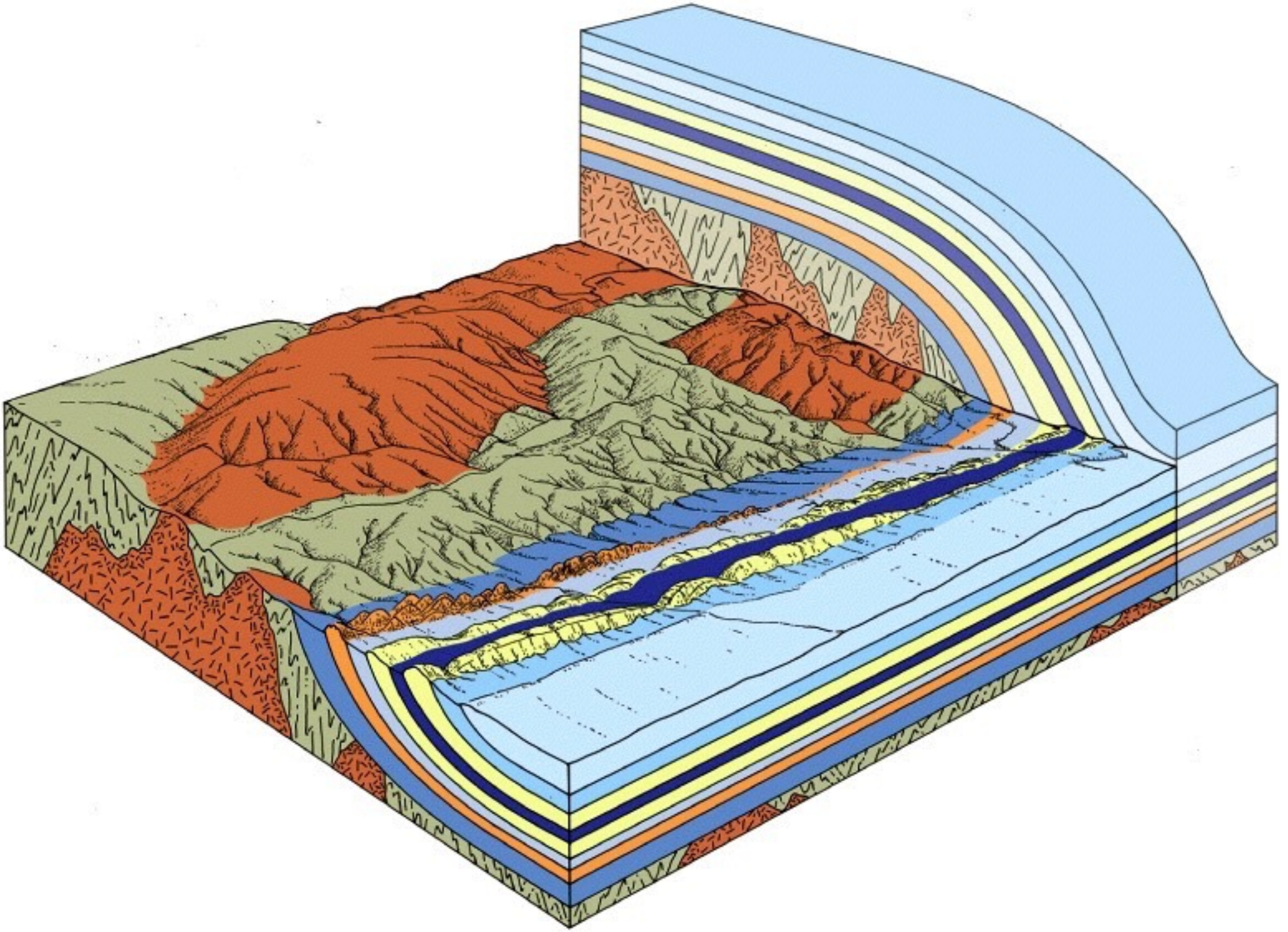


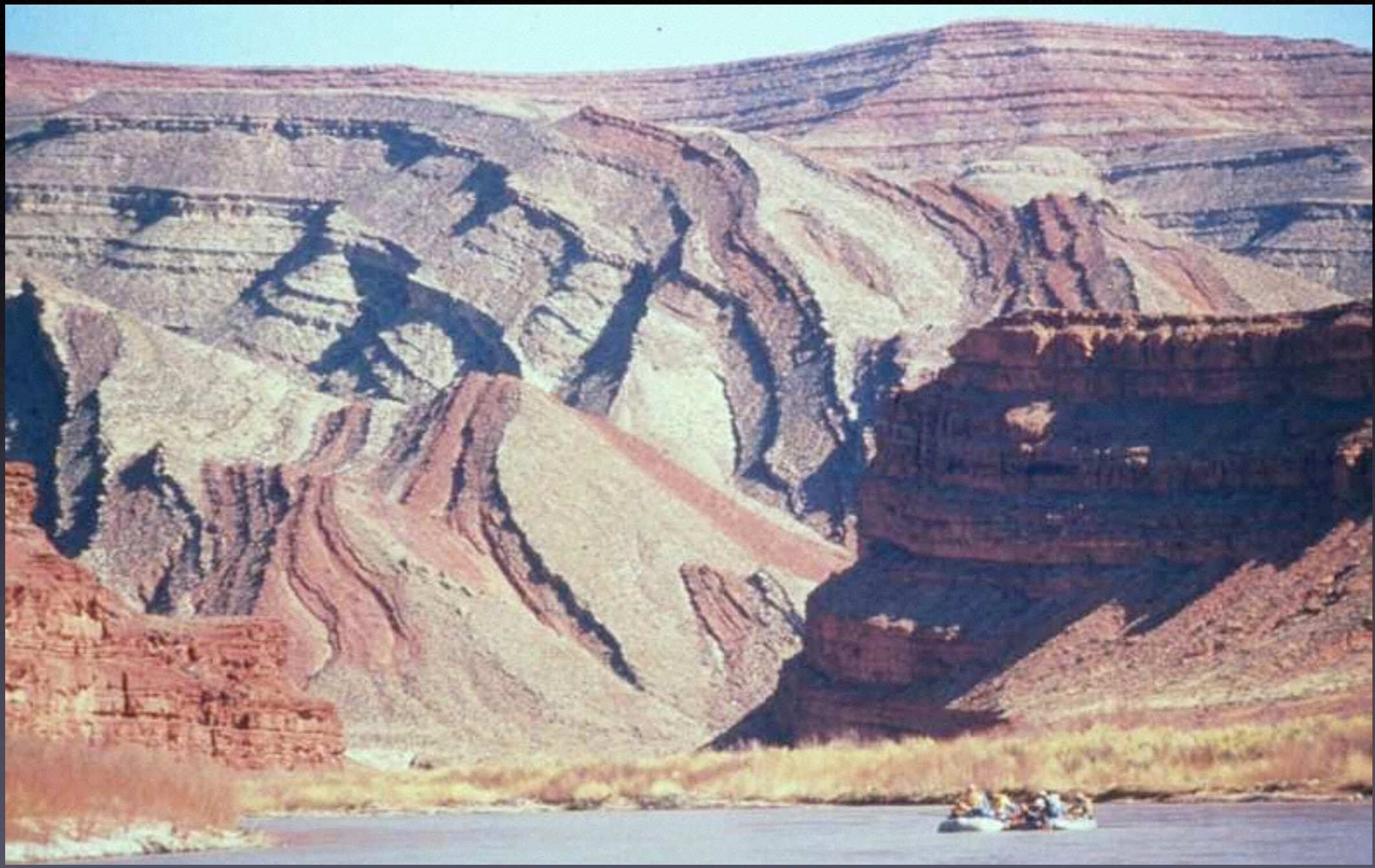

Removed
by erosion

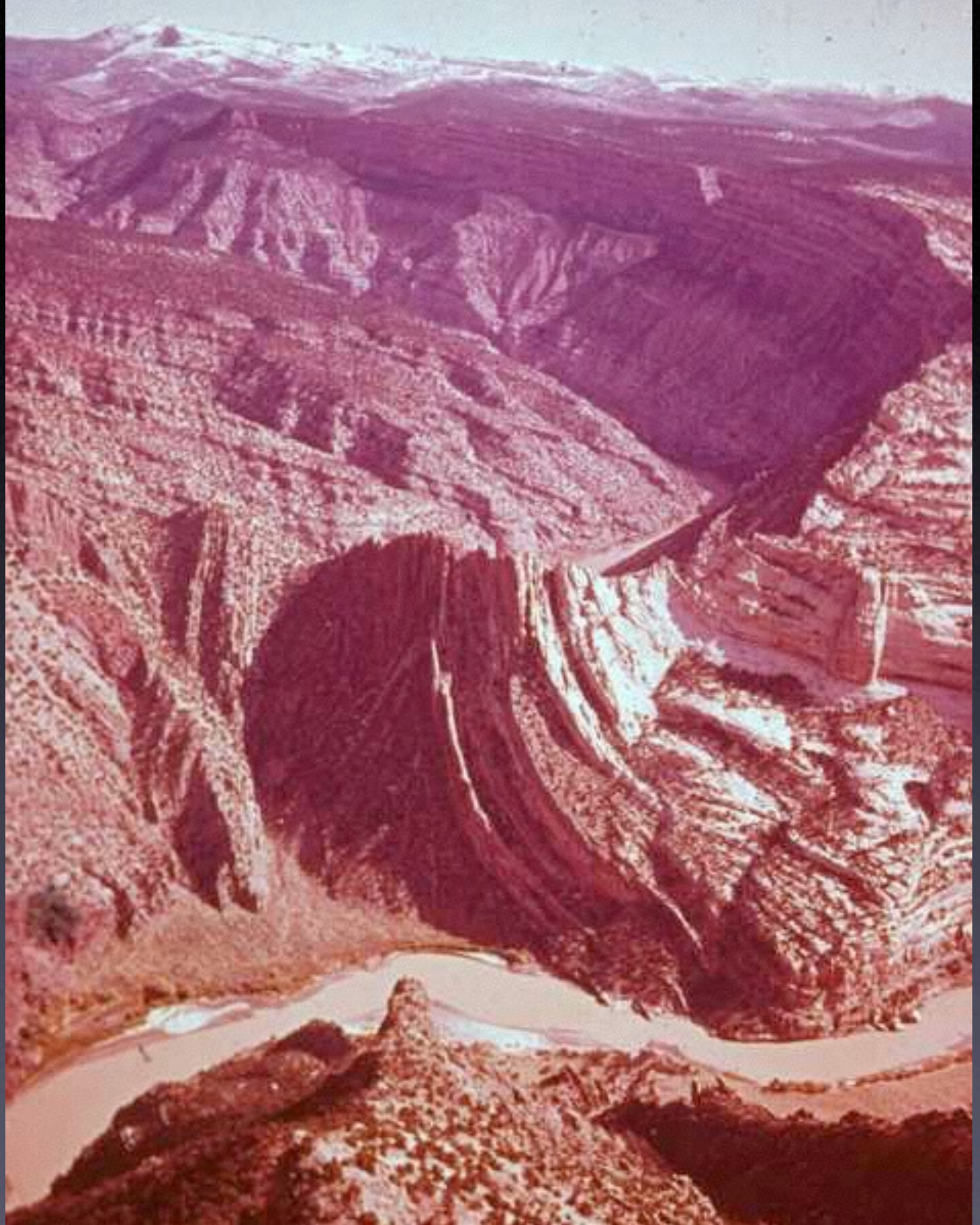


Monocline

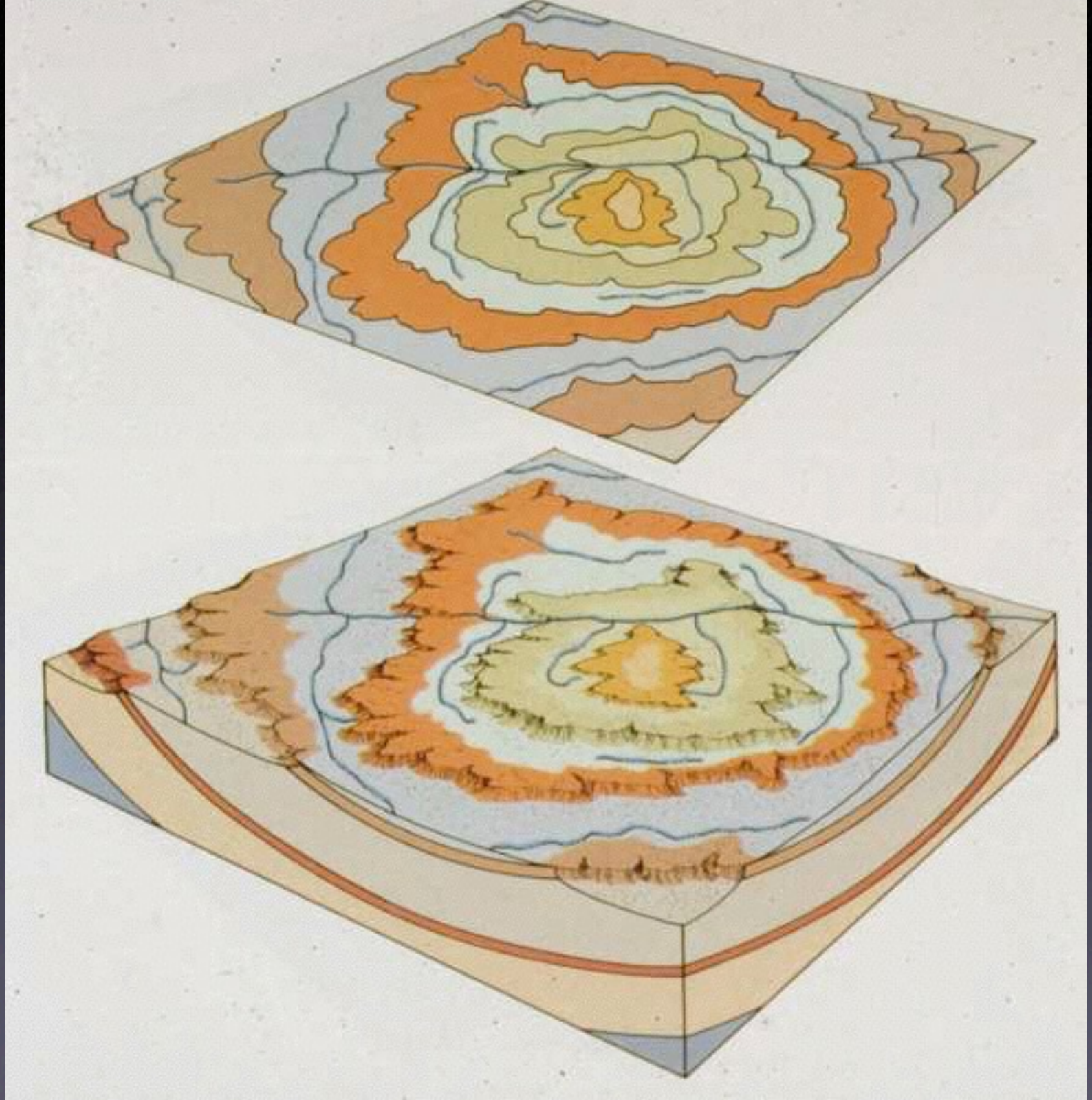
Passive Drape Folds

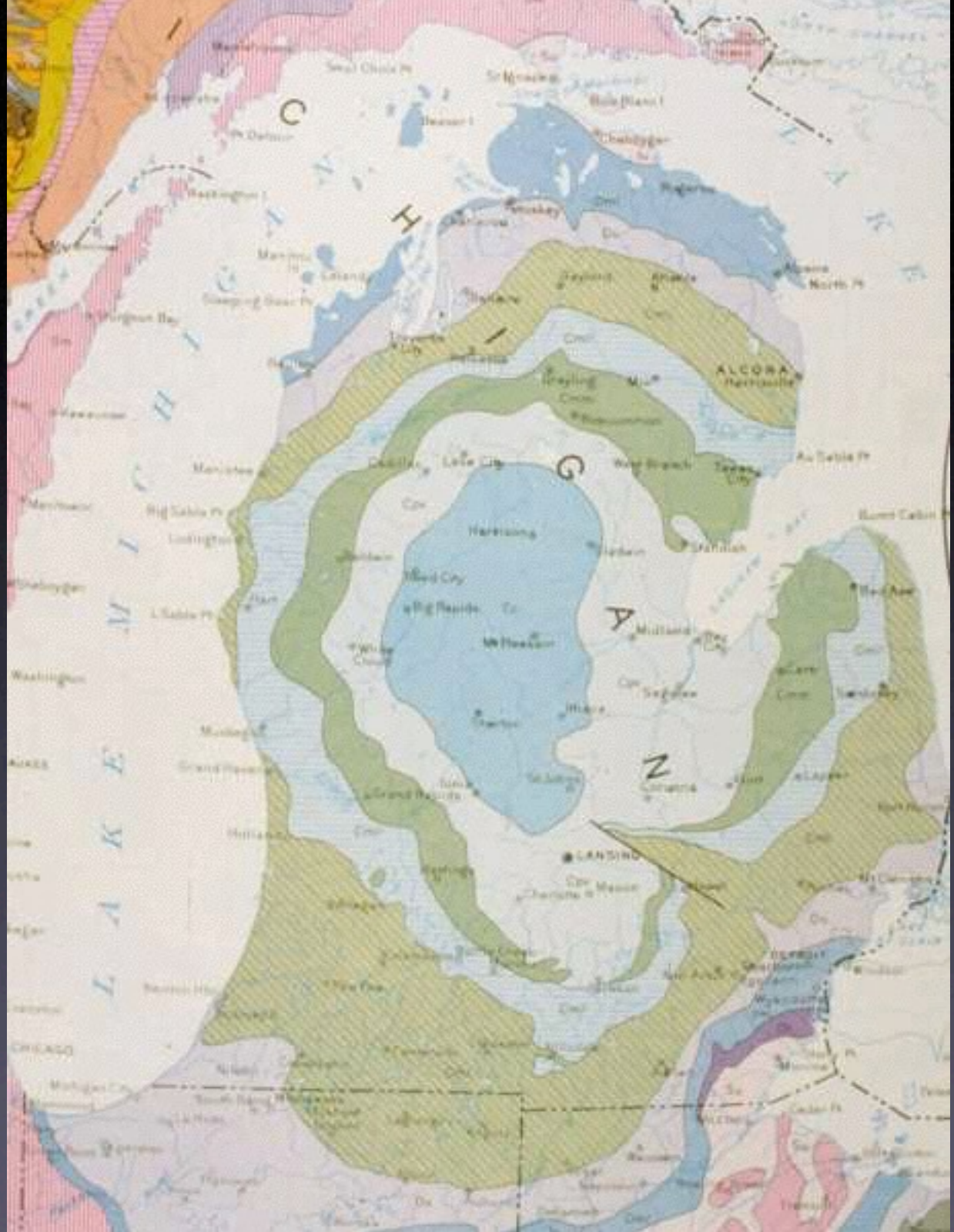


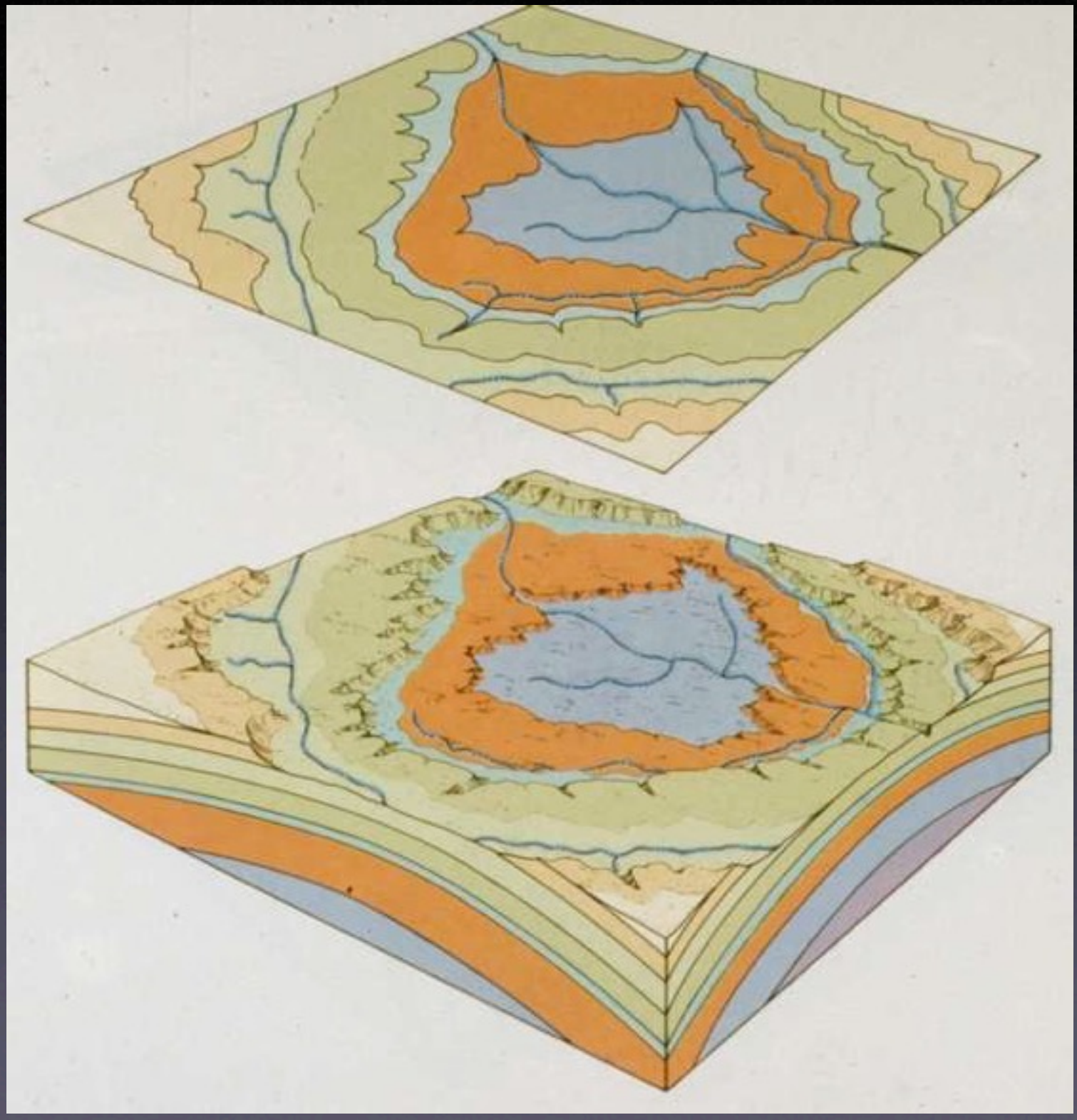


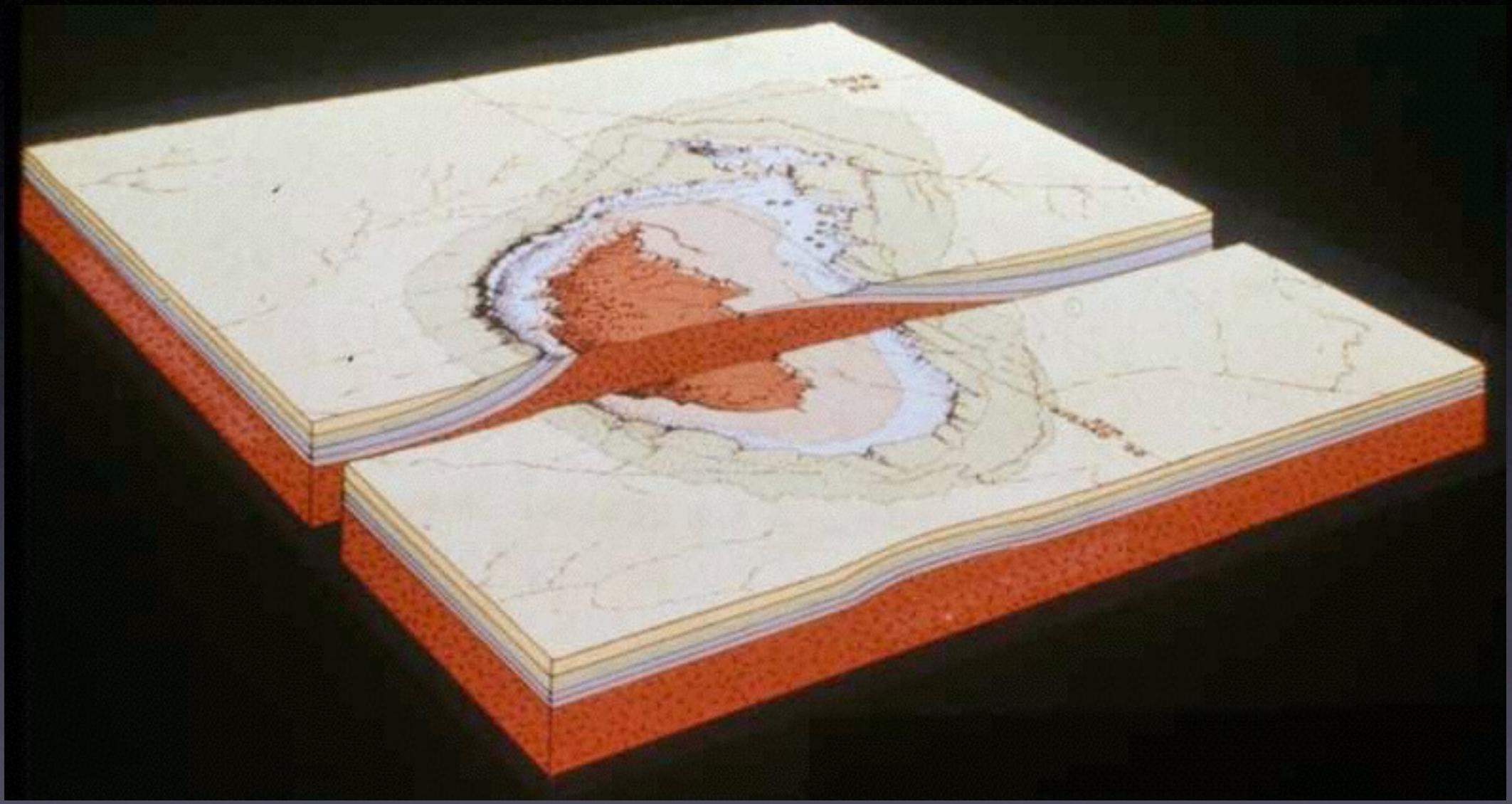


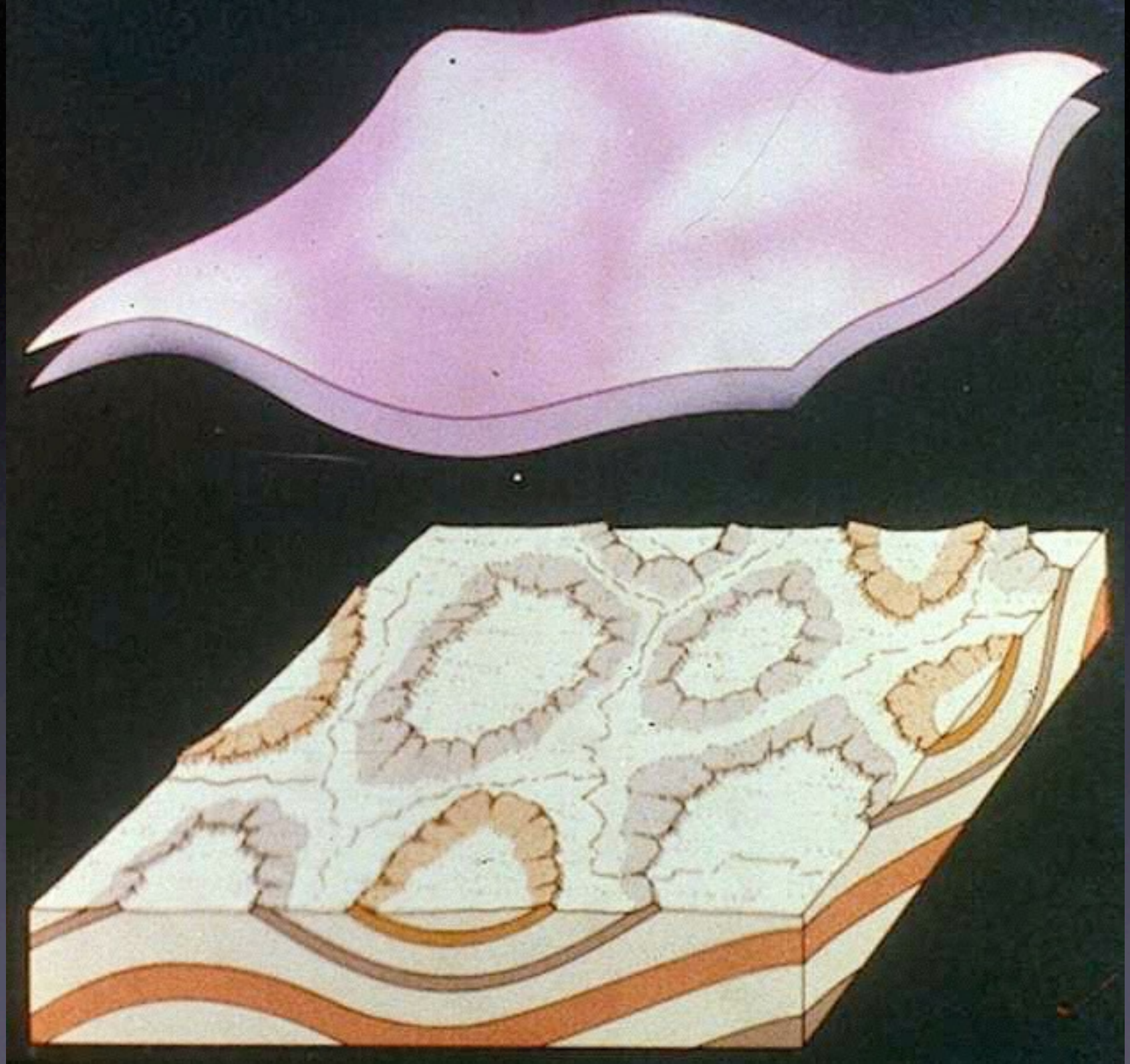
Structural Domes and Basins

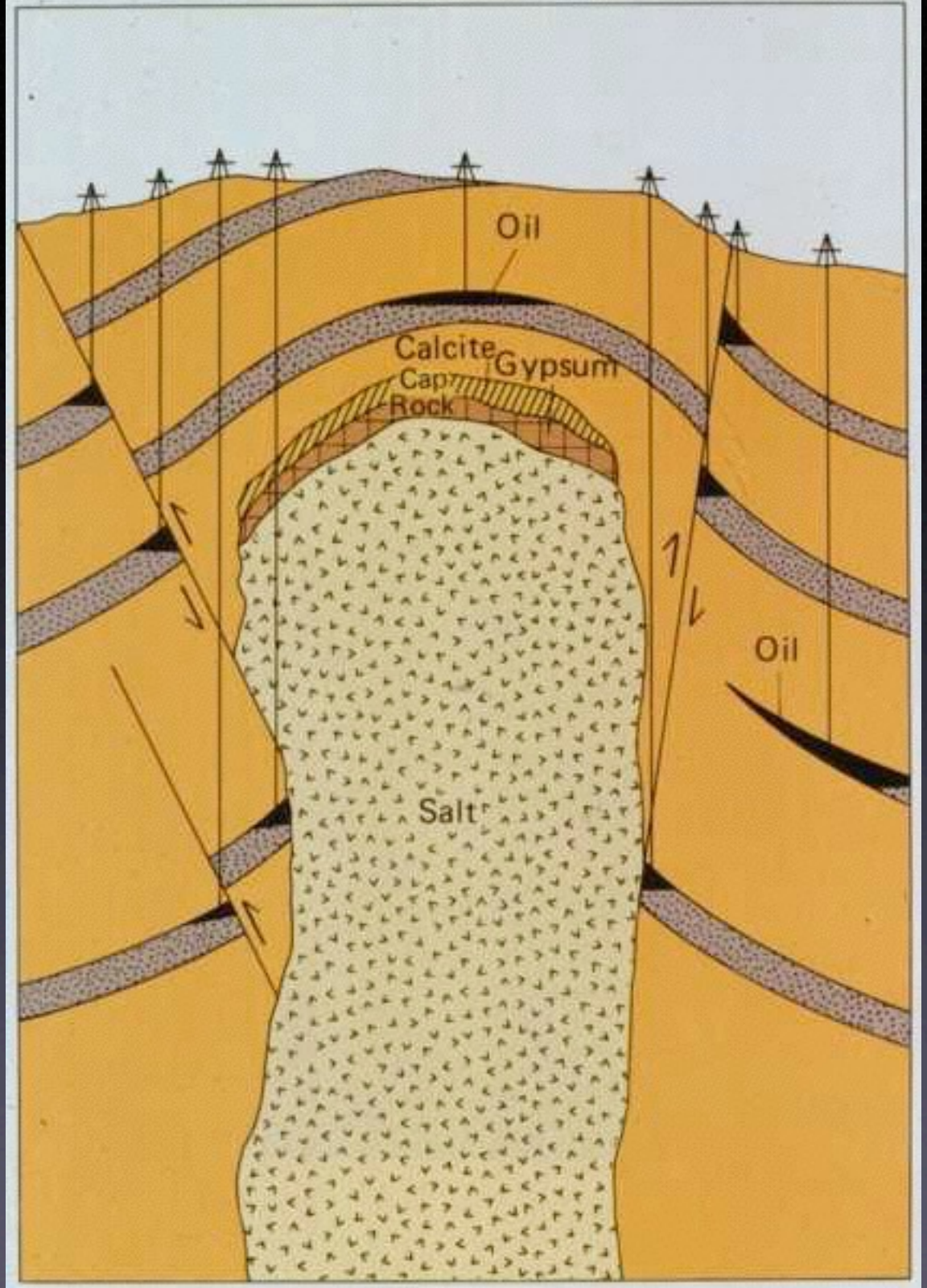


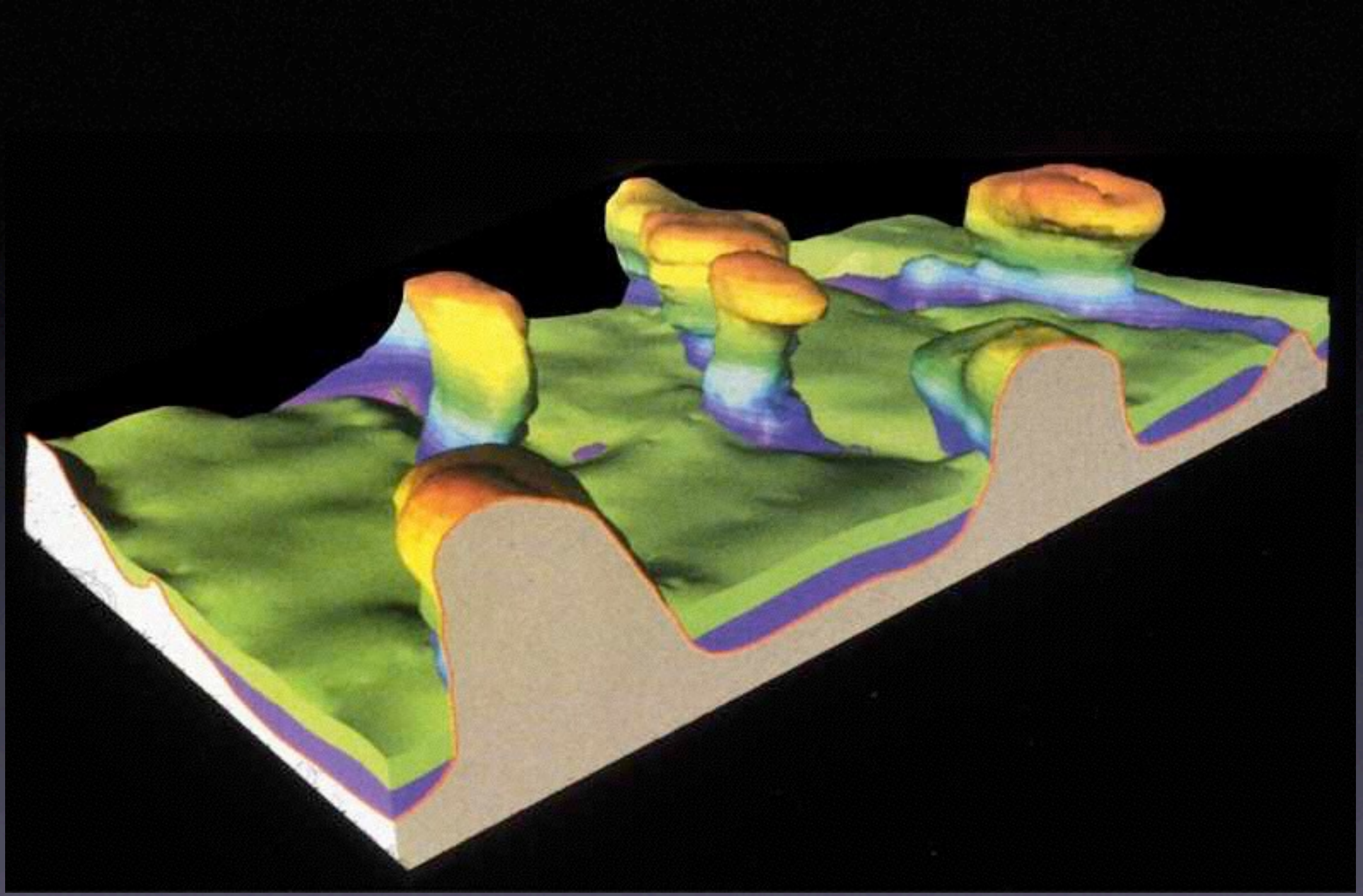

MICHIGAN
LAKE MICHIGAN
ALCONA
LANSING

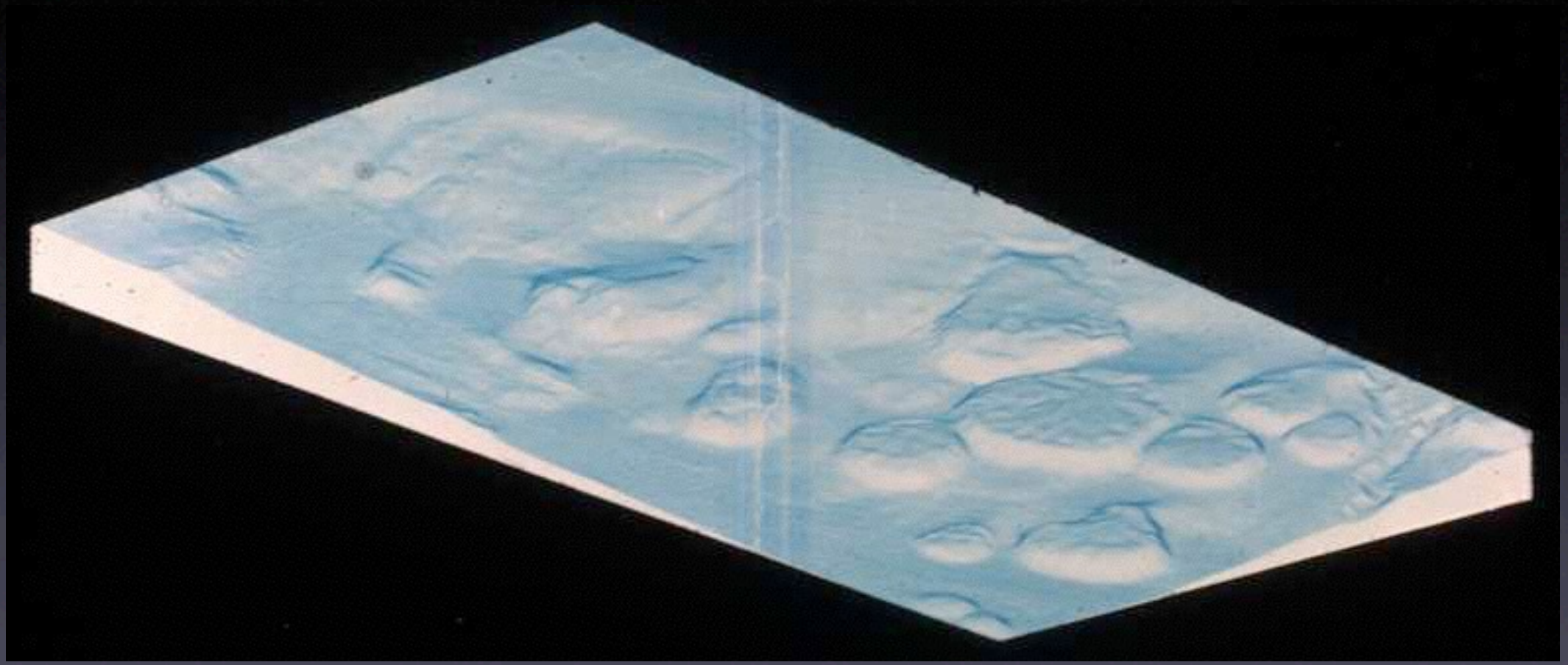




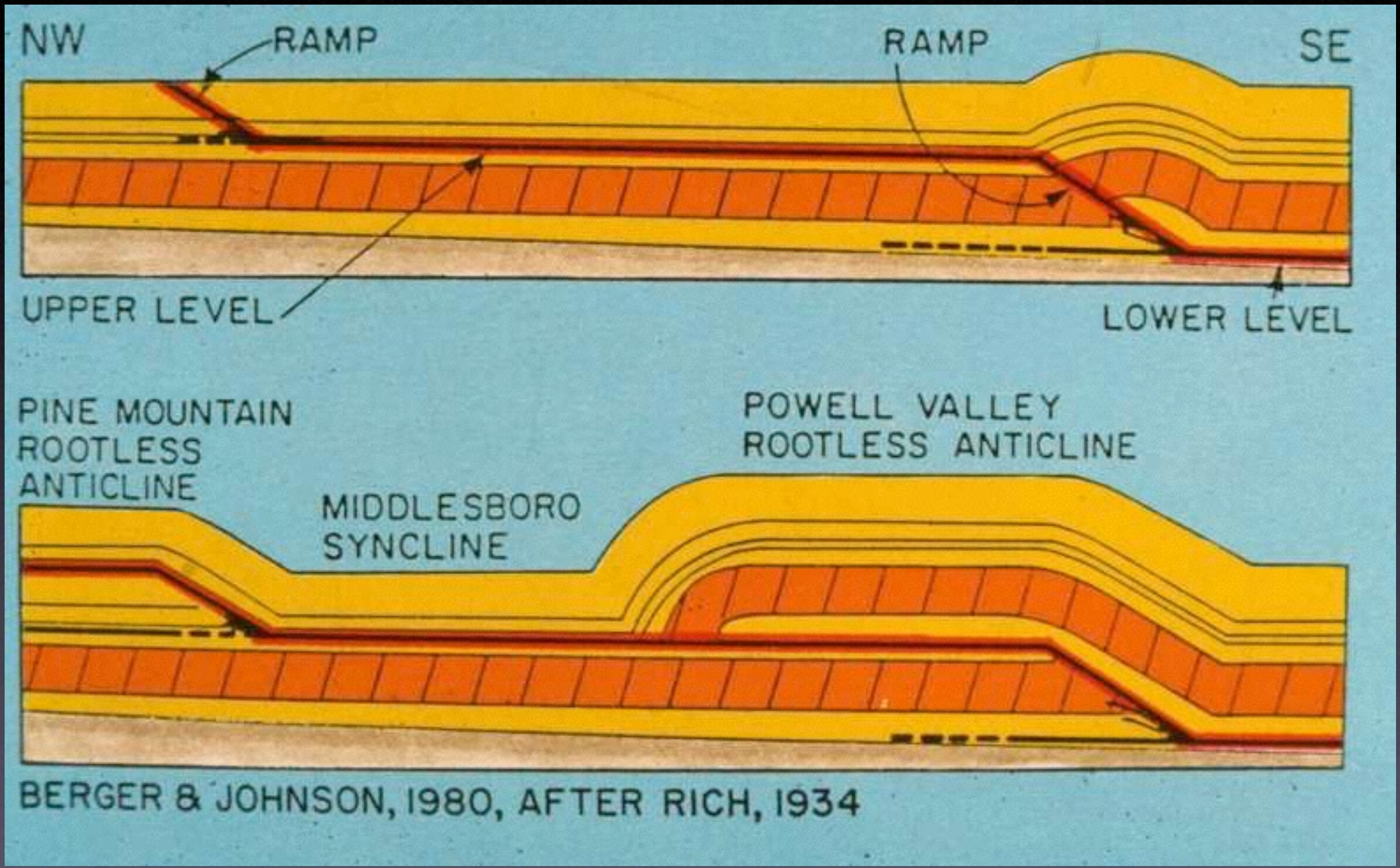



Oil
Calcite
Gypsum
Cap
Rock
Oil
Salt

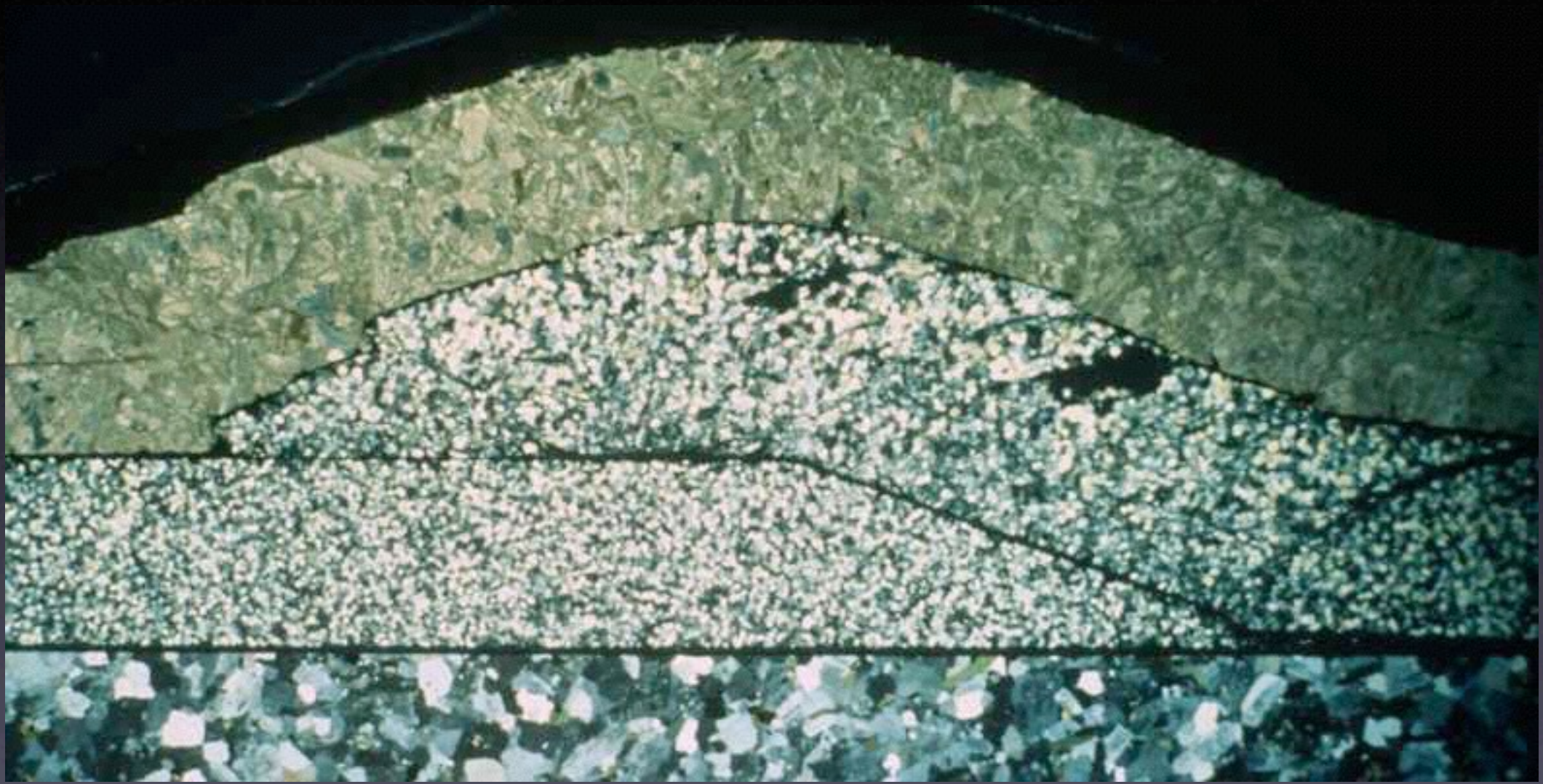




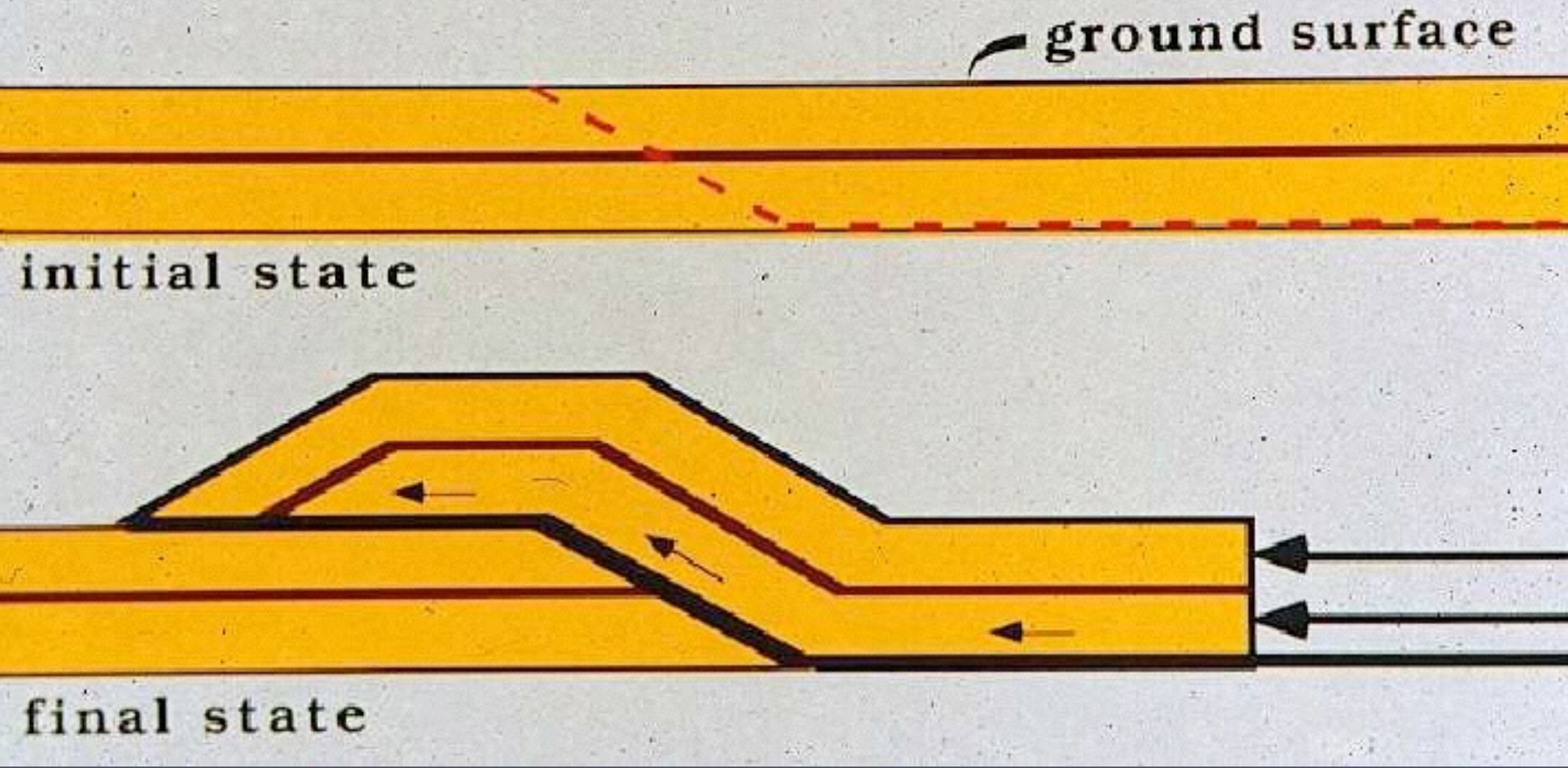
Fault-Bend Folds



BERGER & JOHNSON, 1980, AFTER RICH, 1934



Evolution of a fault-bend fold (ramp anticline)



023

Kink Folds

Nikon

Nikon

Kink Band
Nikon

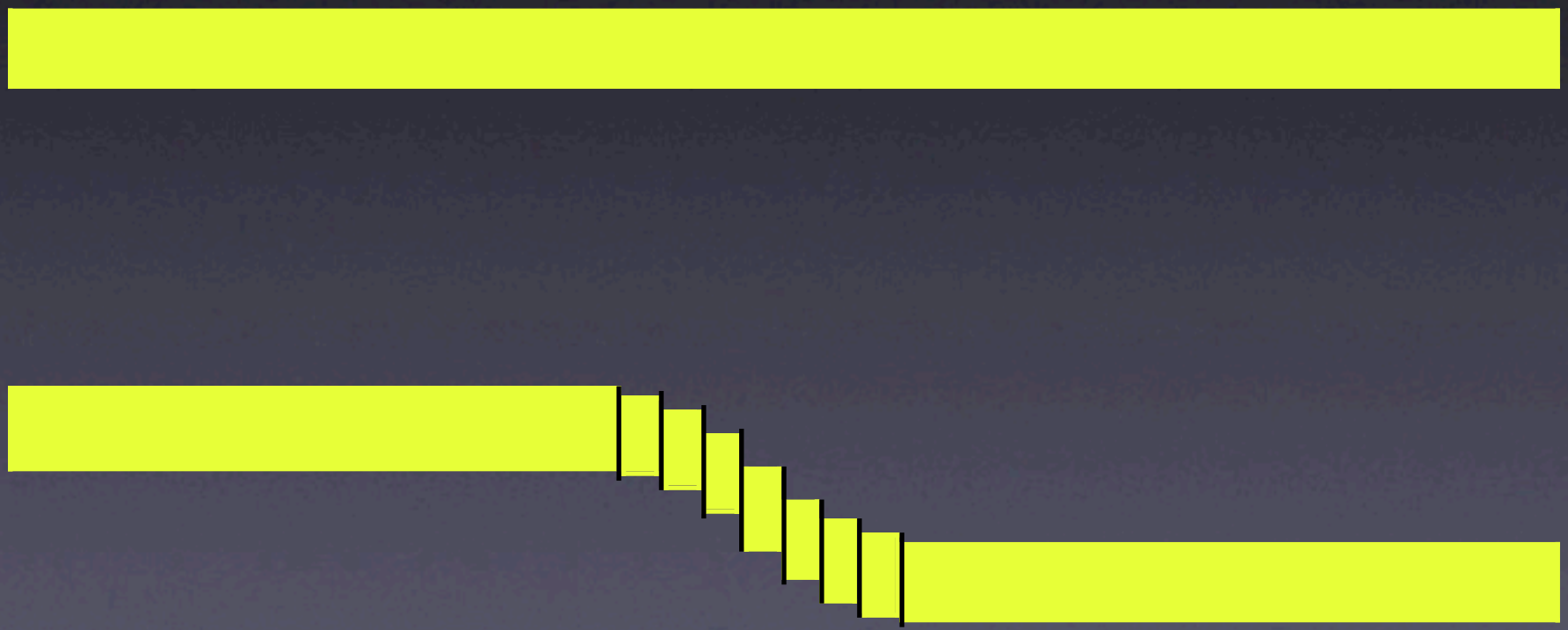
Nikon

Drag Folds: formed adjacent to faults as a result of shear along the fault

Flexural Folds: folds in which the layers exert a mechanical influence on fold form

LIBERTY

Similar Folds: passive folds formed in simple shear



Parasitic Folds: S, Z and M folds in weaker layers deformed between stronger layers

strong or “competent”

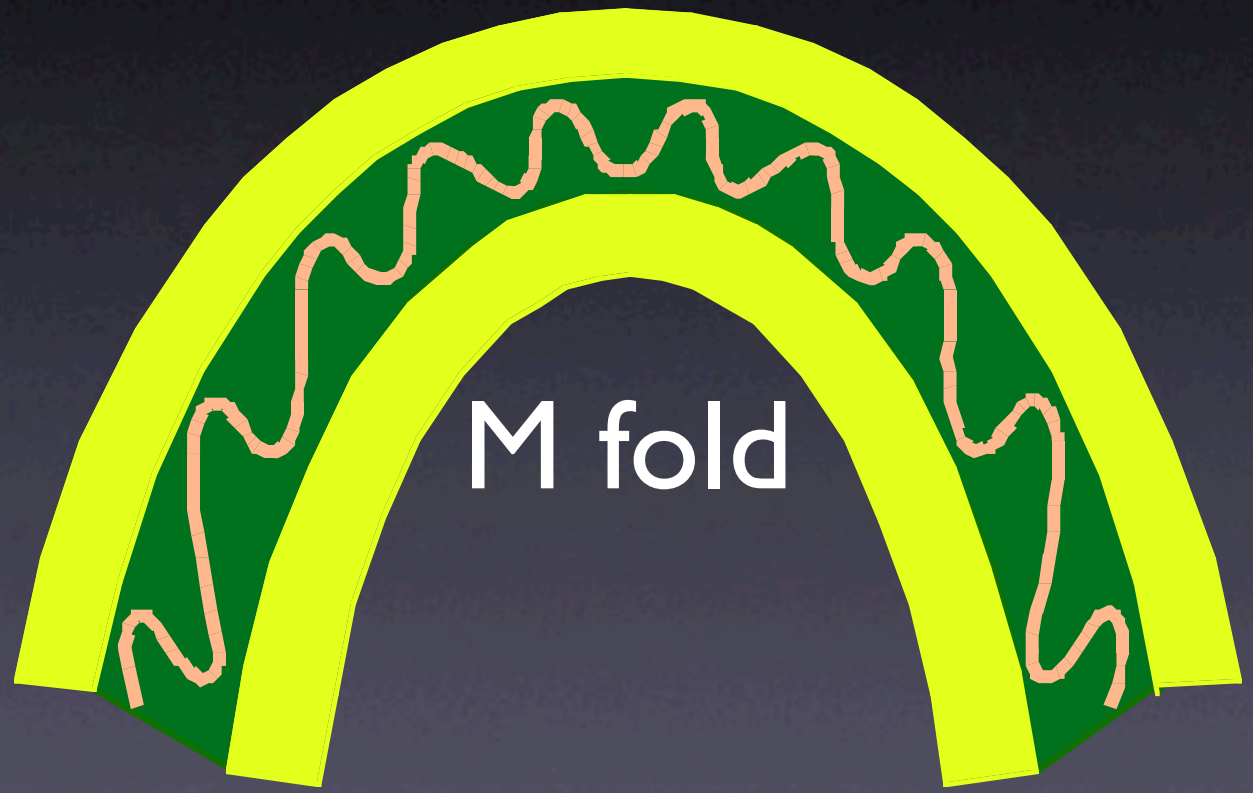
weak or “incompetent”

strong or “competent”

strong or “competent”

weak or “incompetent”

strong or “competent”



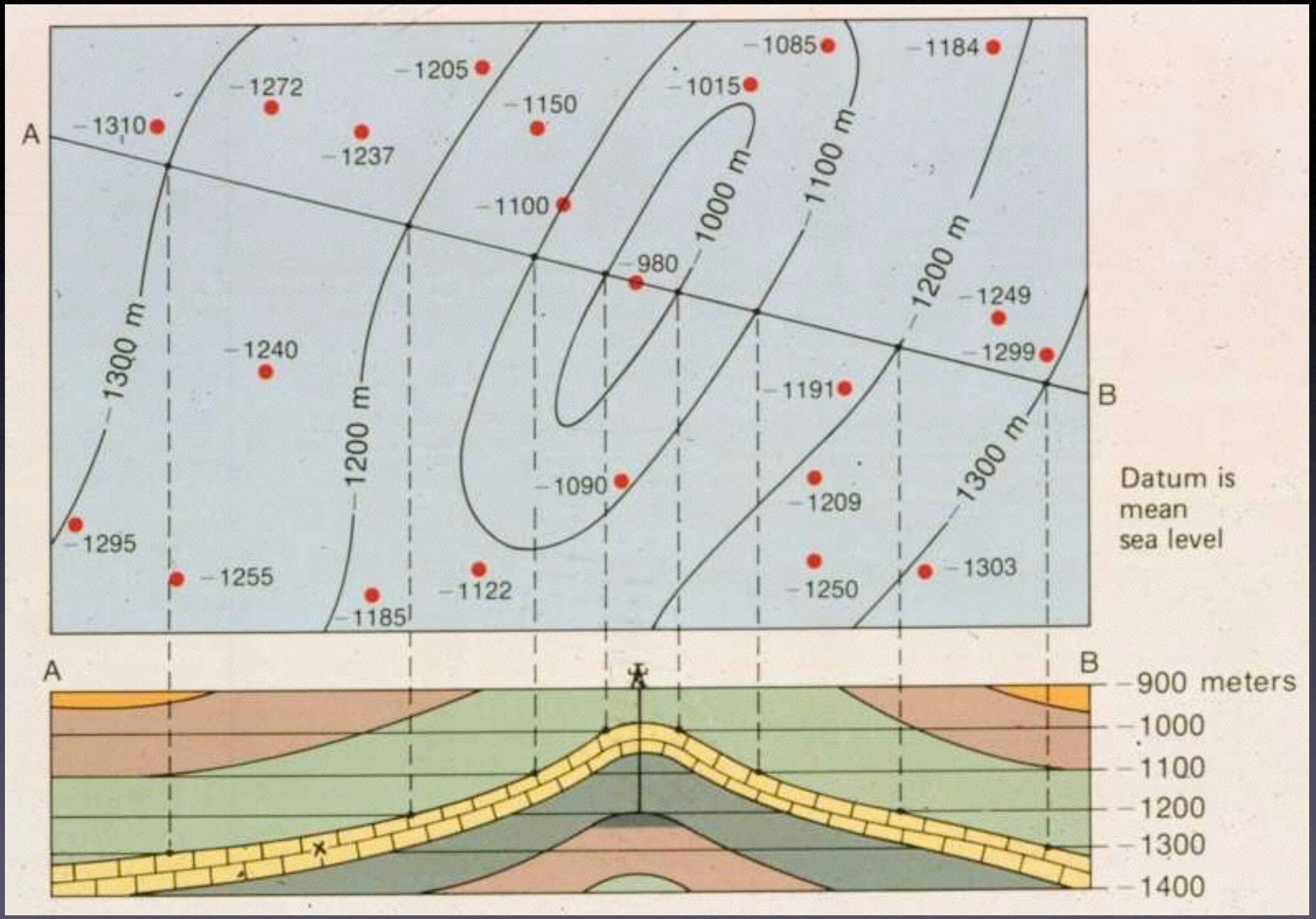
Z fold

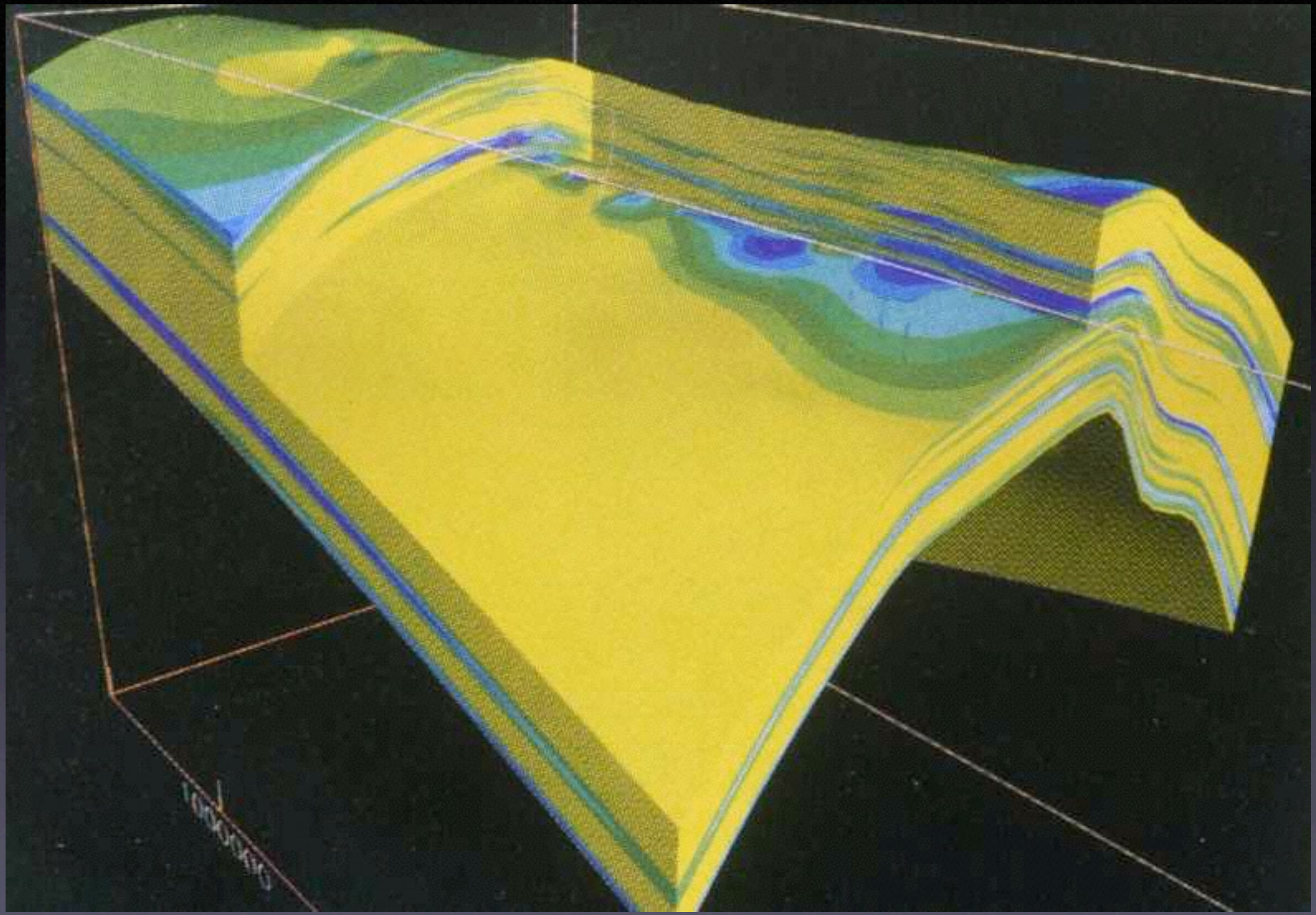
M fold

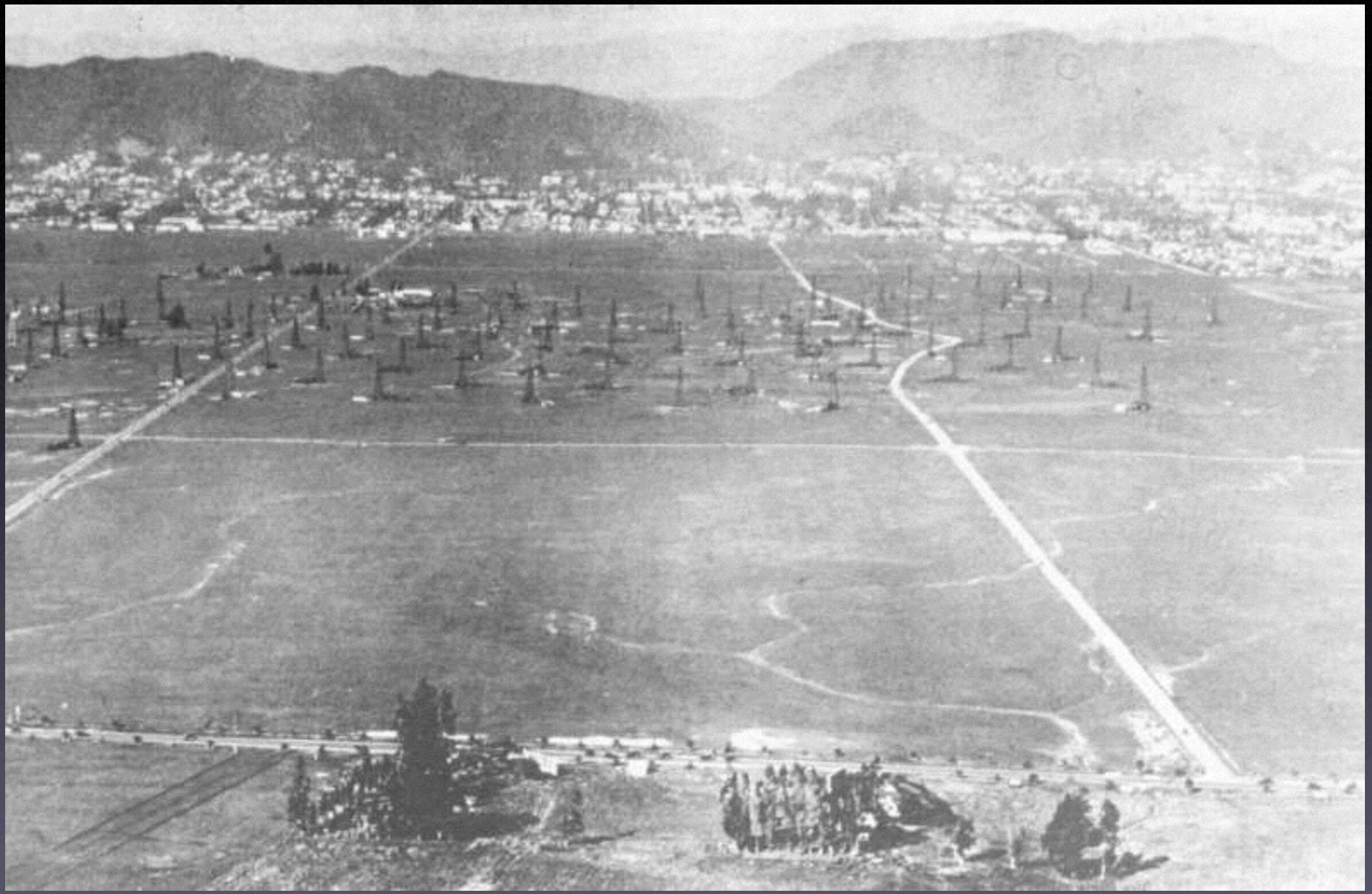
S fold

Parasitic Folds

Antiforms as Structural Traps for Hydrocarbons


A
B
1310
1272
1205
1237
1150
1085
1015
1184
1100
980
1249
1299
1240
1191
1295
1255
1185
1122
1090
1209
1250
1303
1300 m
1200 m
1000 m
1100 m
1200 m
1300 m
Datum is mean sea level
A
B
900 meters
1000
1100
1200
1300
1400





Folds and Foliation