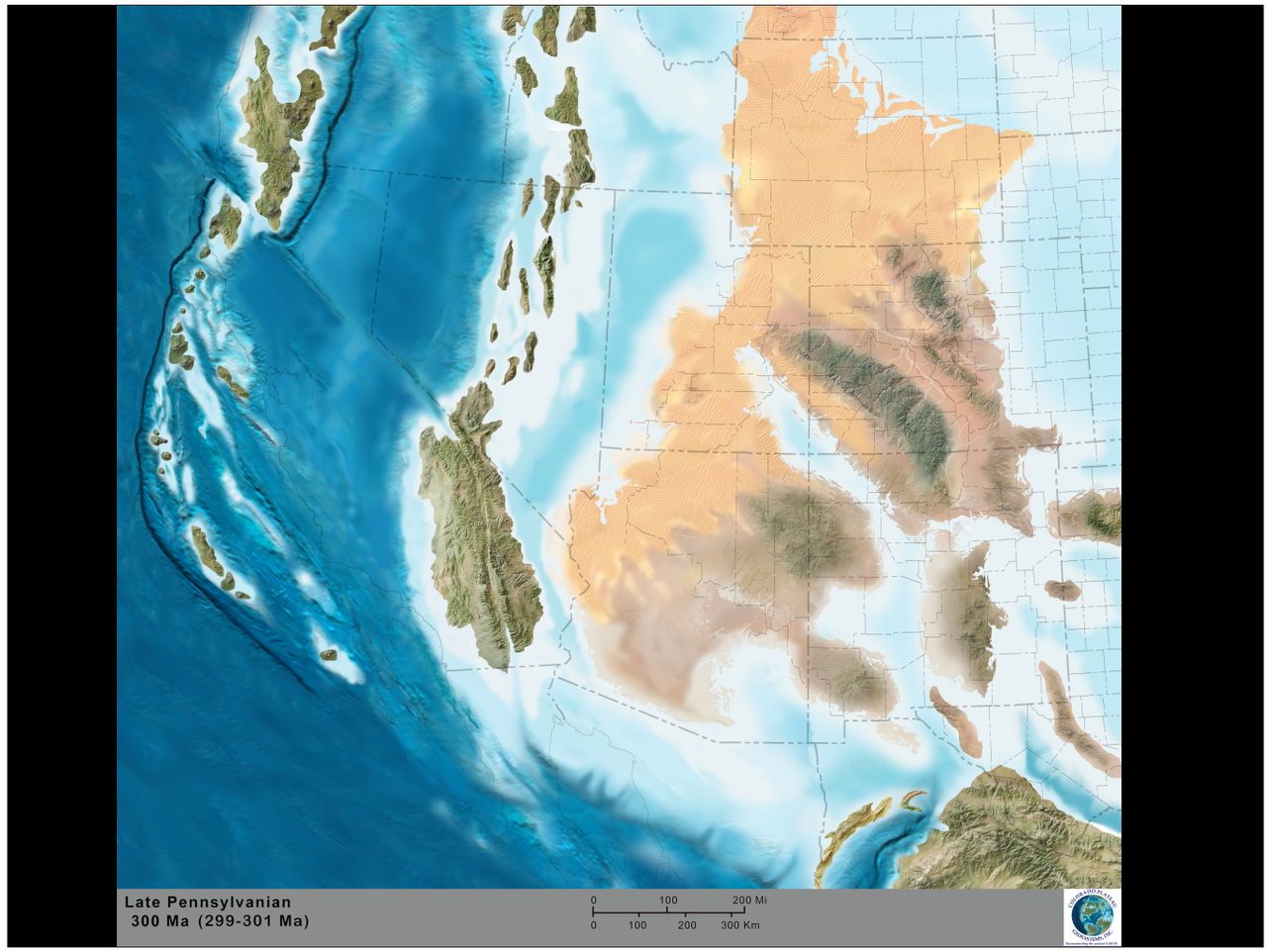
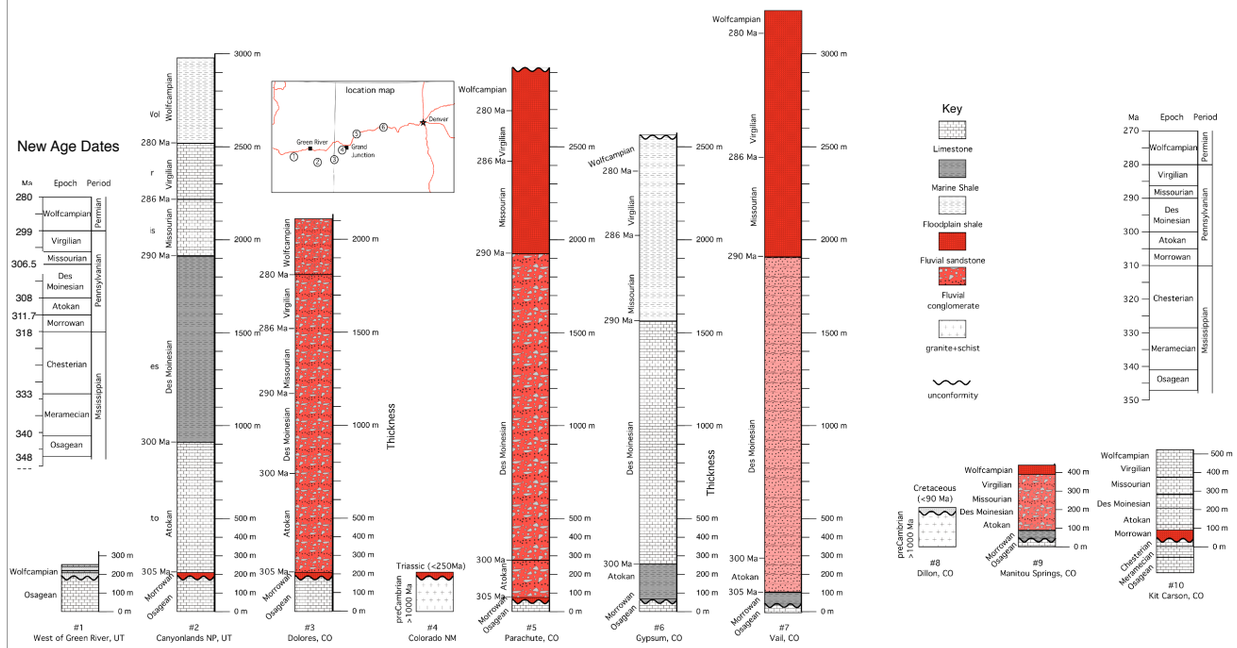

I70 west of Vail

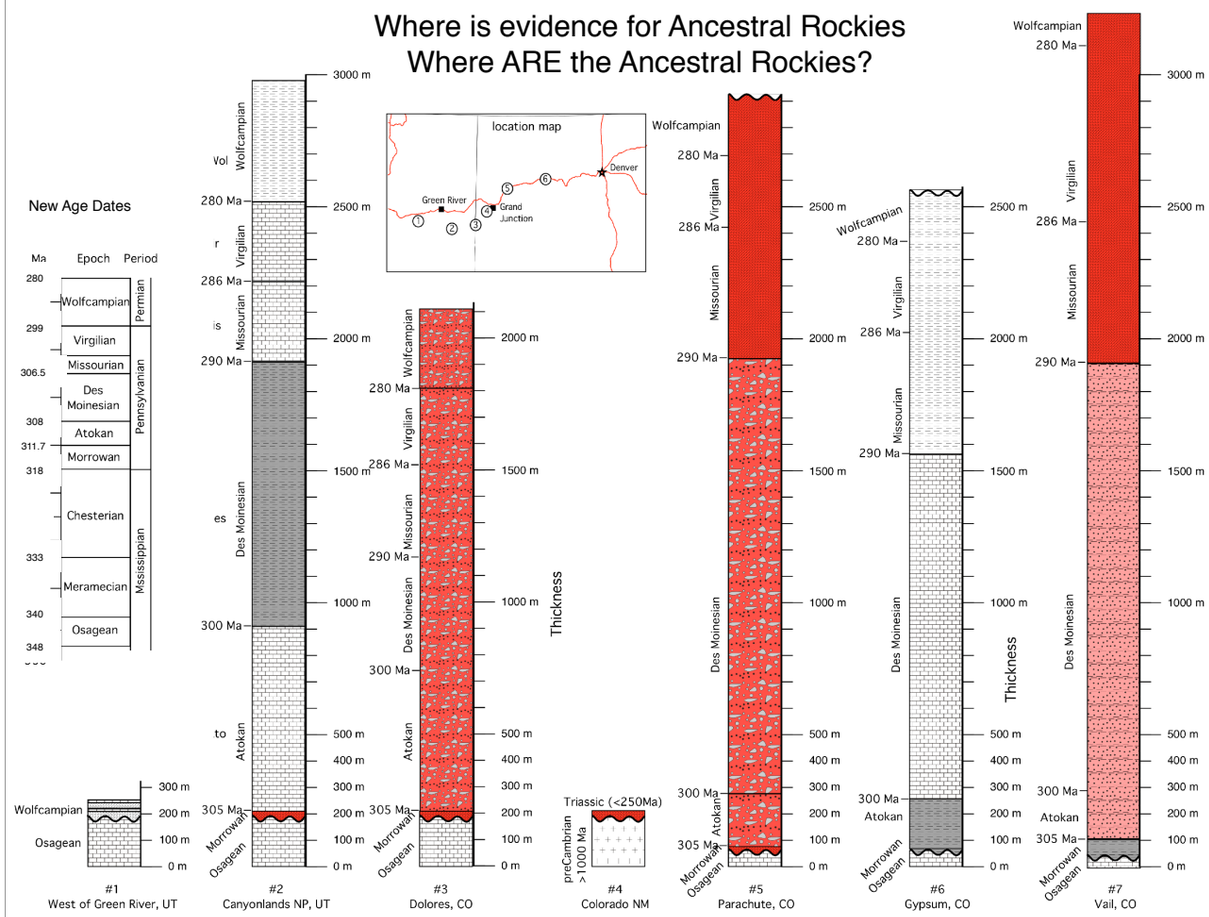

Late Pennsylvanian
300 Ma (299-301 Ma)
0 100 200 Mi
0 100 200 300 Km

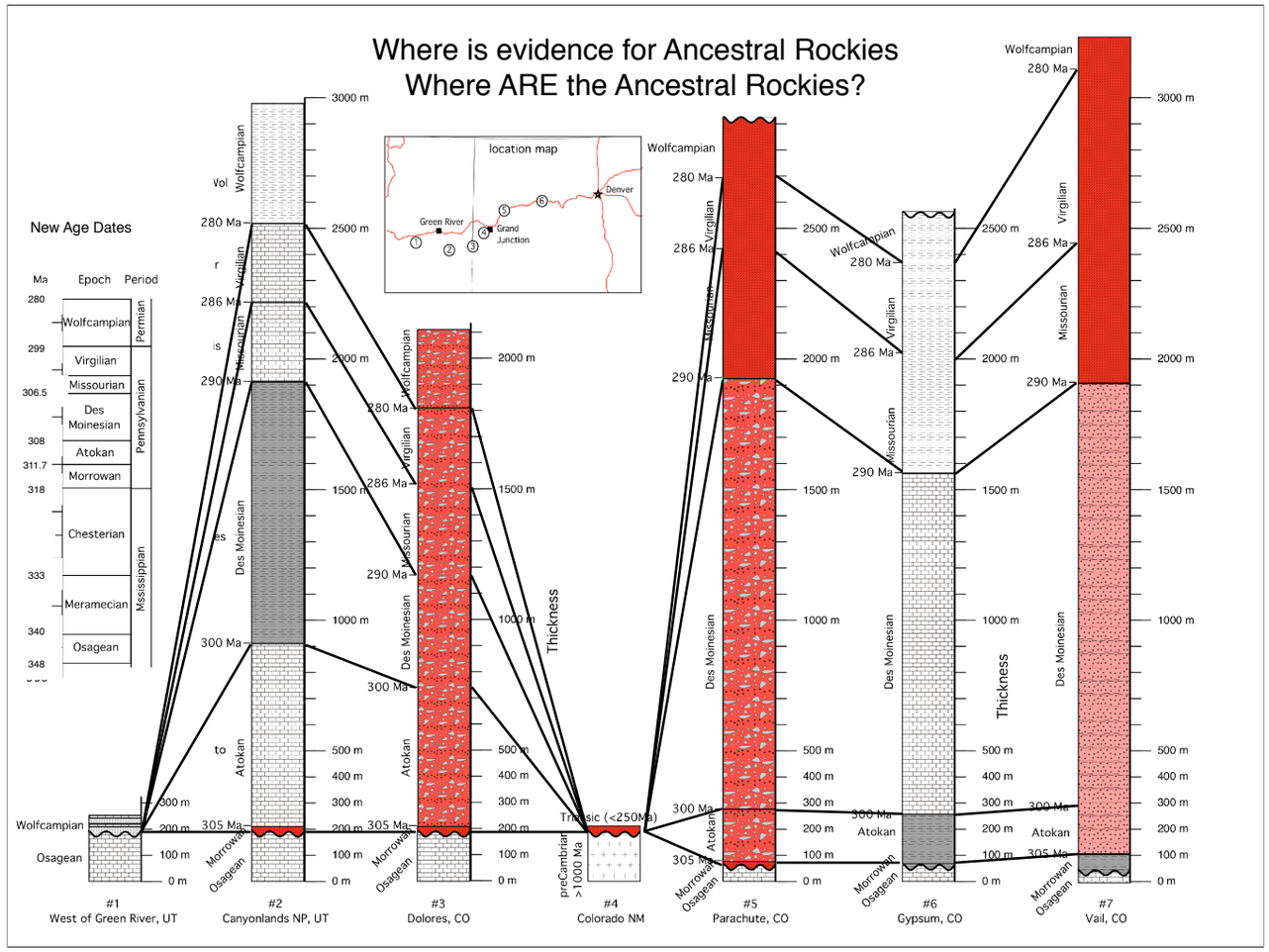
Where is evidence for Ancestral Rockies
Where ARE the Ancestral Rockies?

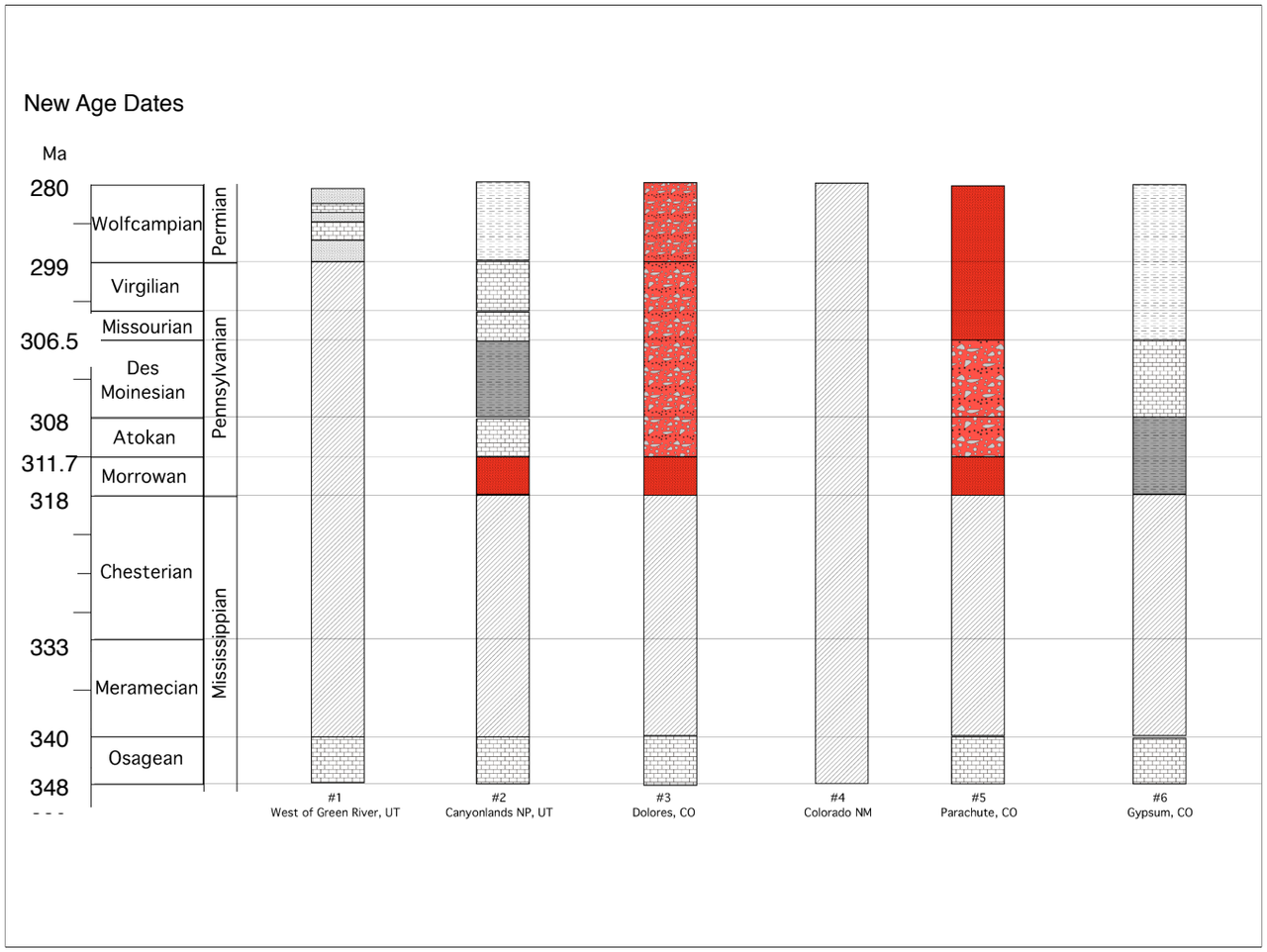


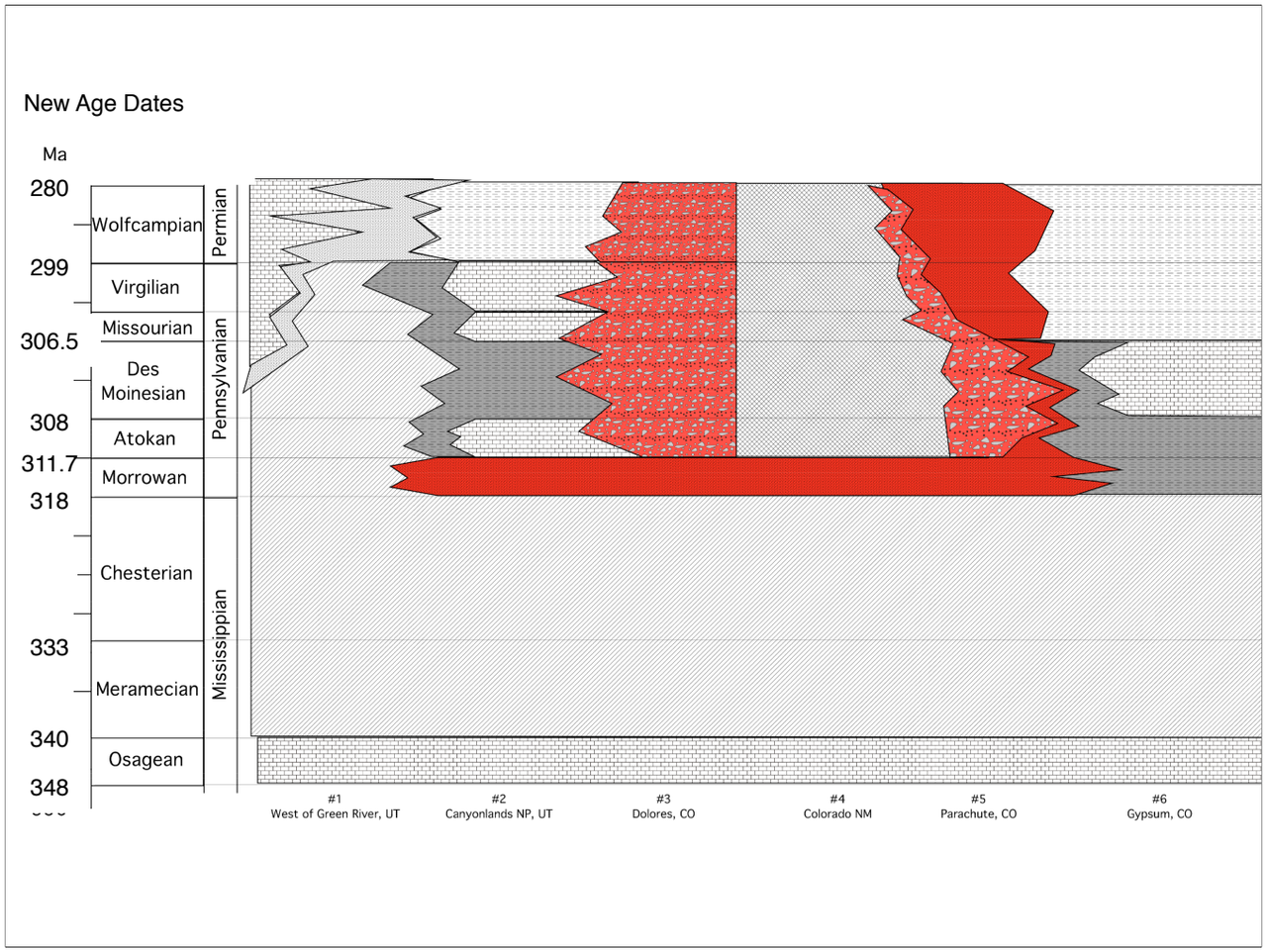
Might note that the timescale on right shown here is out of date (it was one Kluth used). Penn-Perm now put at 299 Ma, Mis-Penn 323 Ma by GSA, 318 by stratigraphy.org

Where is evidence for Ancestral Rockies
Where ARE the Ancestral Rockies?




Where is evidence for Ancestral Rockies
Where ARE the Ancestral Rockies?
New Age Dates
Ma
Epoch
Period
Wolfcampian
Virgilian
Missourian
Des Moinesian
Atokan
Morrowan
Chesterian
Meramecian
Osagean
Permian
Pennsylvanian
Mississippian
location map
Green River
Grand Junction
Denver
Thickness
Triassic (<250Ma)
preCambrian >1000 Ma
#1 West of Green River, UT
#2 Canyonlands NP, UT
#3 Dolores, CO
#4 Colorado NM
#5 Parachute, CO
#6 Gypsum, CO
#7 Vail, CO


New Age Dates
Ma
280
299
306.5
308
311.7
318
333
340
348
Wolfcampian
Virgilian
Missourian
Des Moinesian
Atokan
Morrowan
Chesterian
Meramecian
Osagean
Permian
Pennsylvanian
Mississippian
#1
West of Green River, UT
#2
Canyonlands NP, UT
#3
Dolores, CO
#4
Colorado NM
#5
Parachute, CO
#6
Gypsum, CO


New Age Dates
Ma
280
299
306.5
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Wolfcampian
Virgilian
Missourian
Des Moinesian
Atokan
Morrowan
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Meramecian
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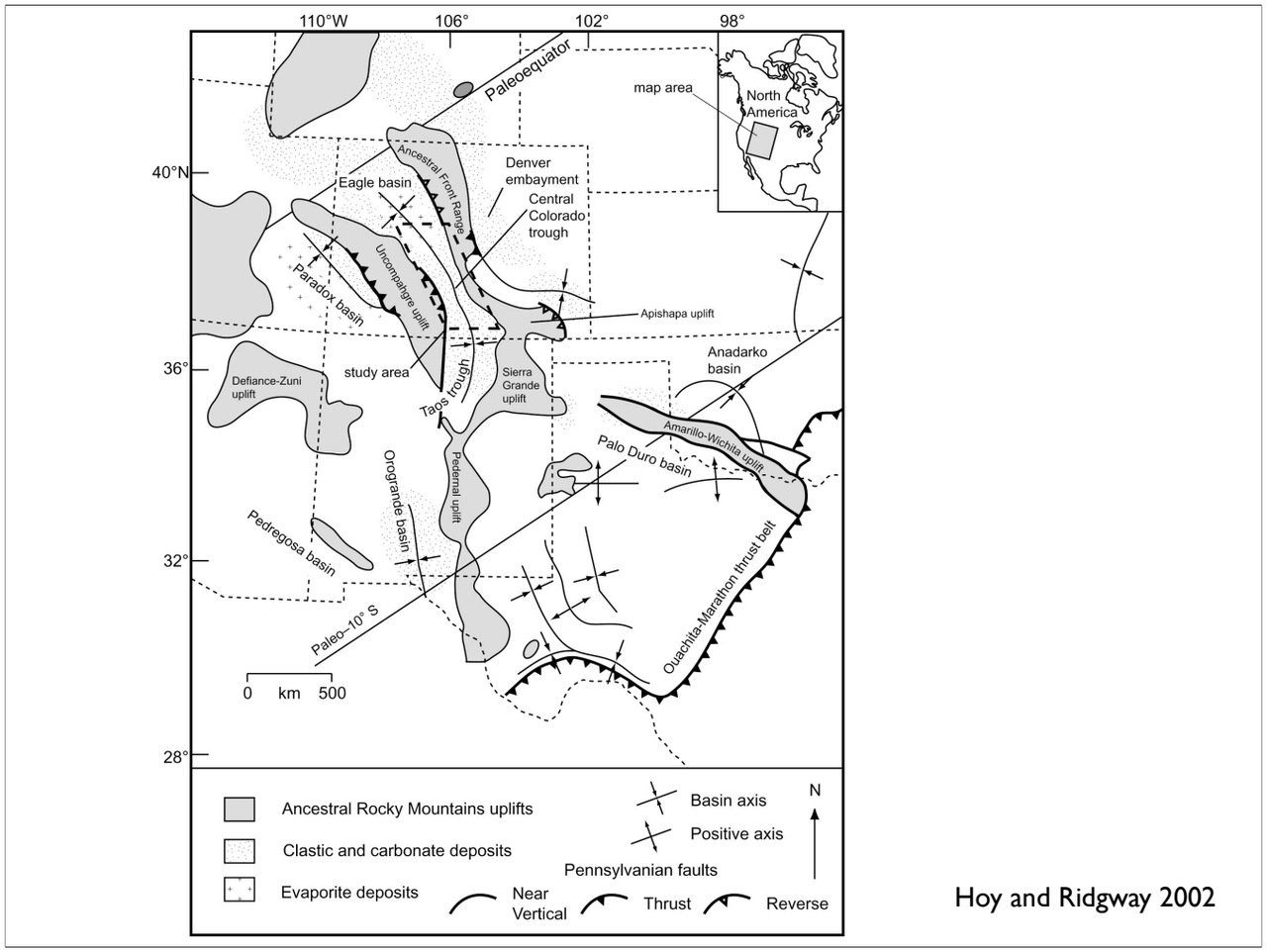
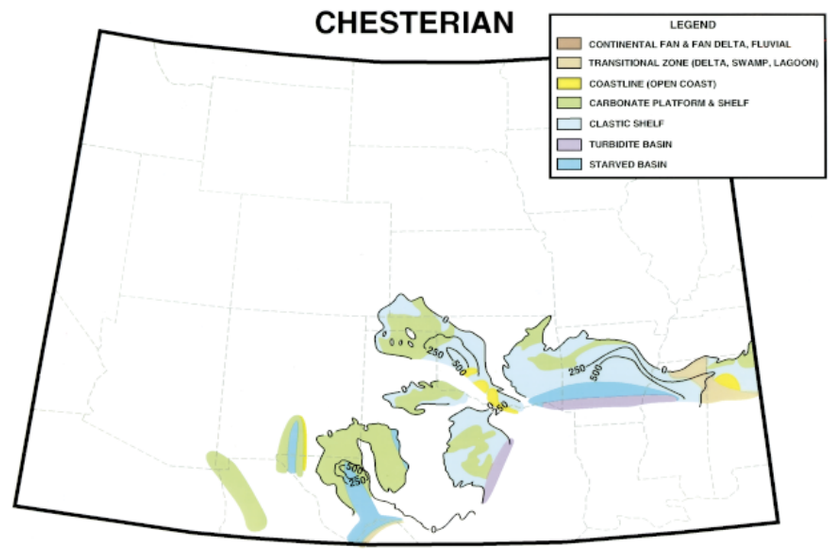
Pennsylvanian
Mississippian
#1
West of Green River, UT
#2
Canyonlands NP, UT
#3
Dolores, CO
#4
Colorado NM
#5
Parachute, CO
#6
Gypsum, CO



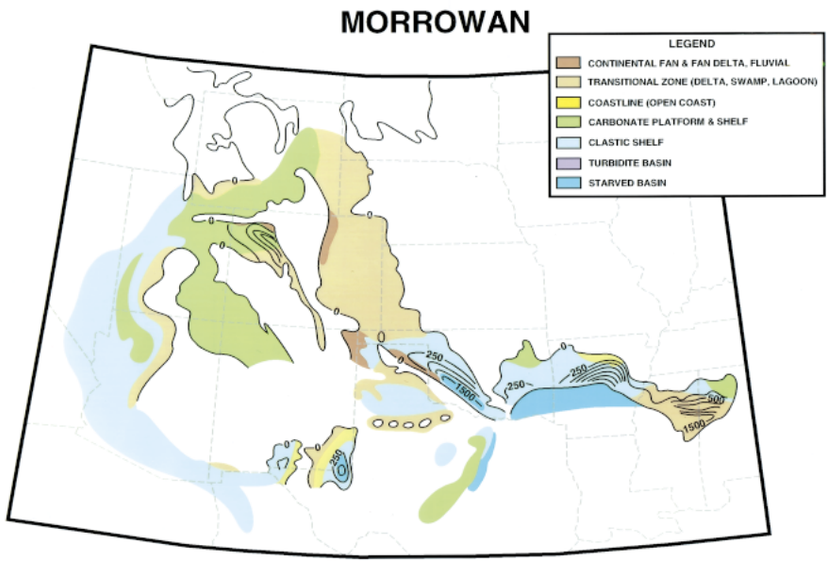
Hoy and Ridgway 2002

334-320 Ma



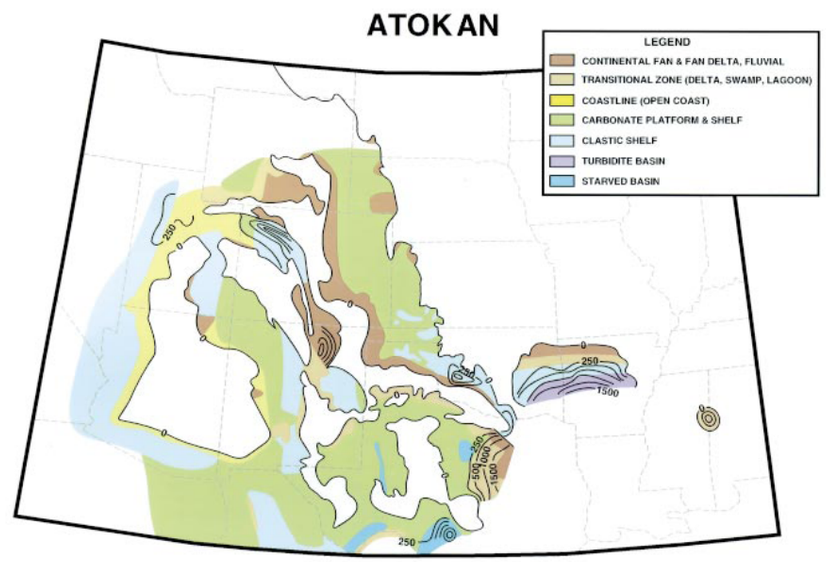
Ye et al., AAPG Bull, 1996

320-313 Ma



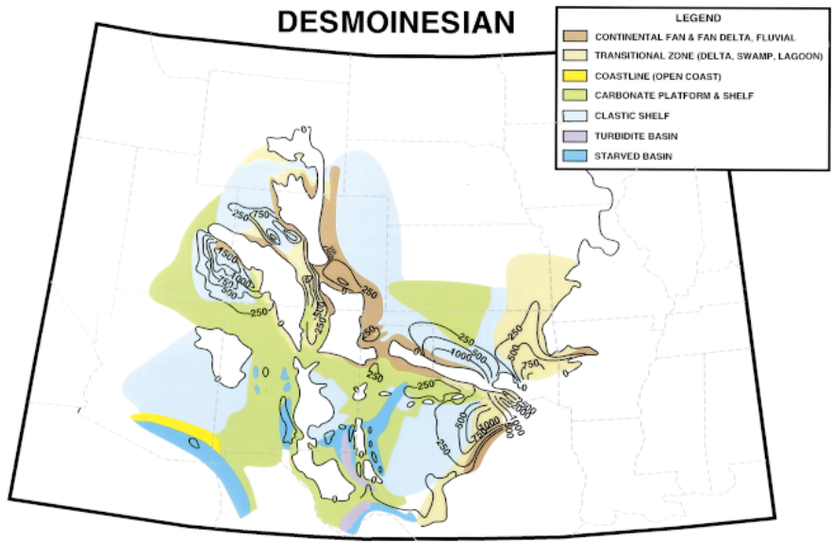
Ye et al., AAPG Bull, 1996

313-308 Ma



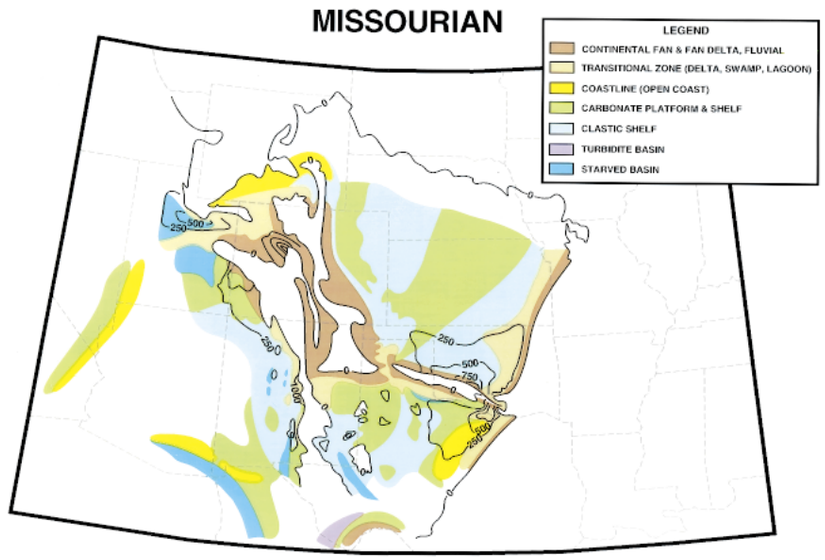
Ye et al., AAPG Bull, 1996

308-305 Ma



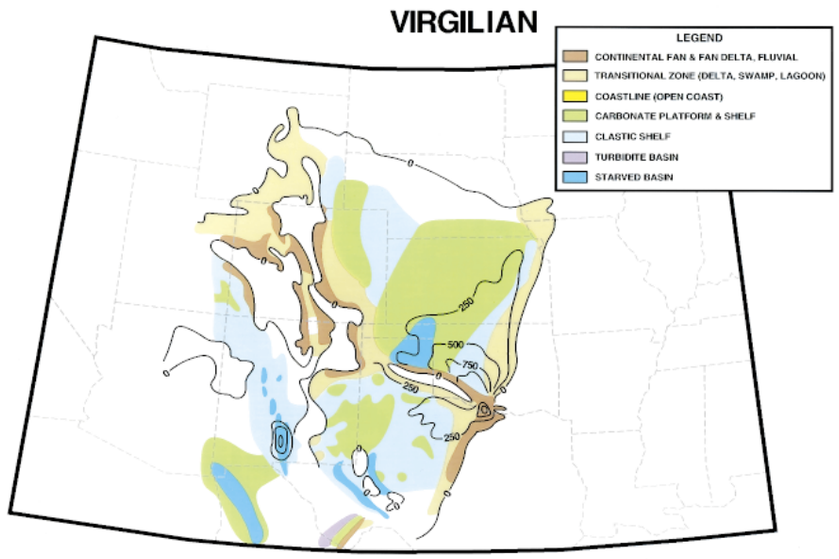
Ye et al., AAPG Bull, 1996

305-303 Ma



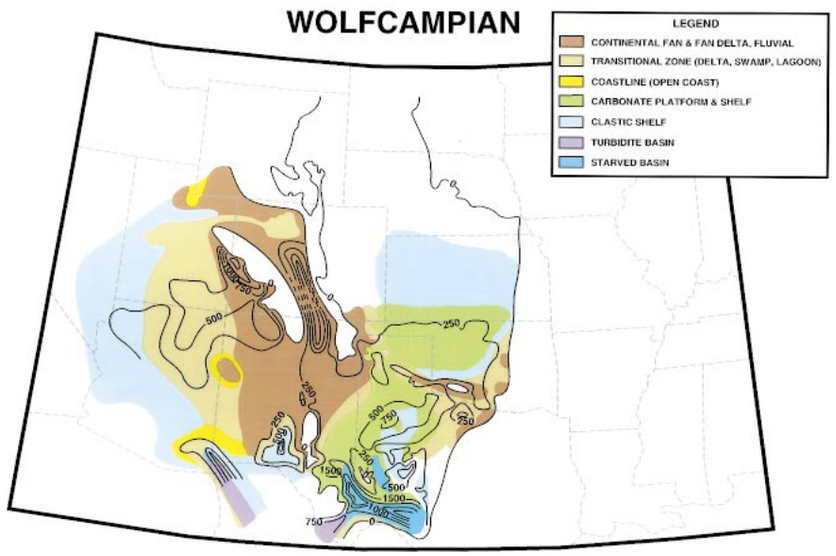
Ye et al., AAPG Bull, 1996

303-296 Ma



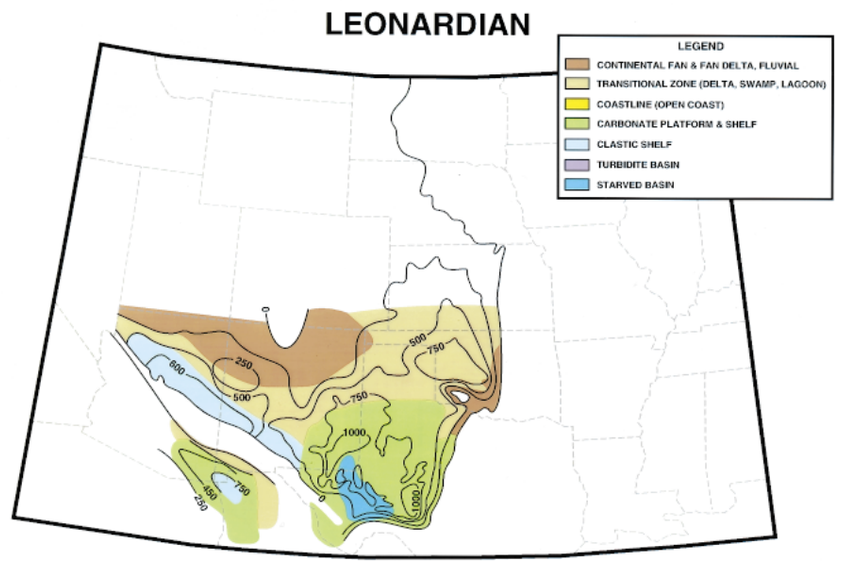
Ye et al., AAPG Bull, 1996

296-280 Ma (Permian)



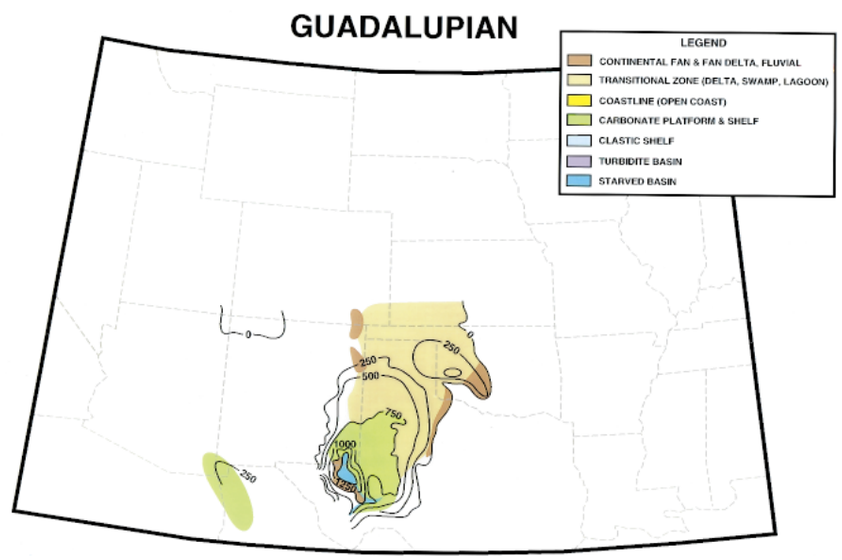
Ye et al., AAPG Bull, 1996

280-273 Ma



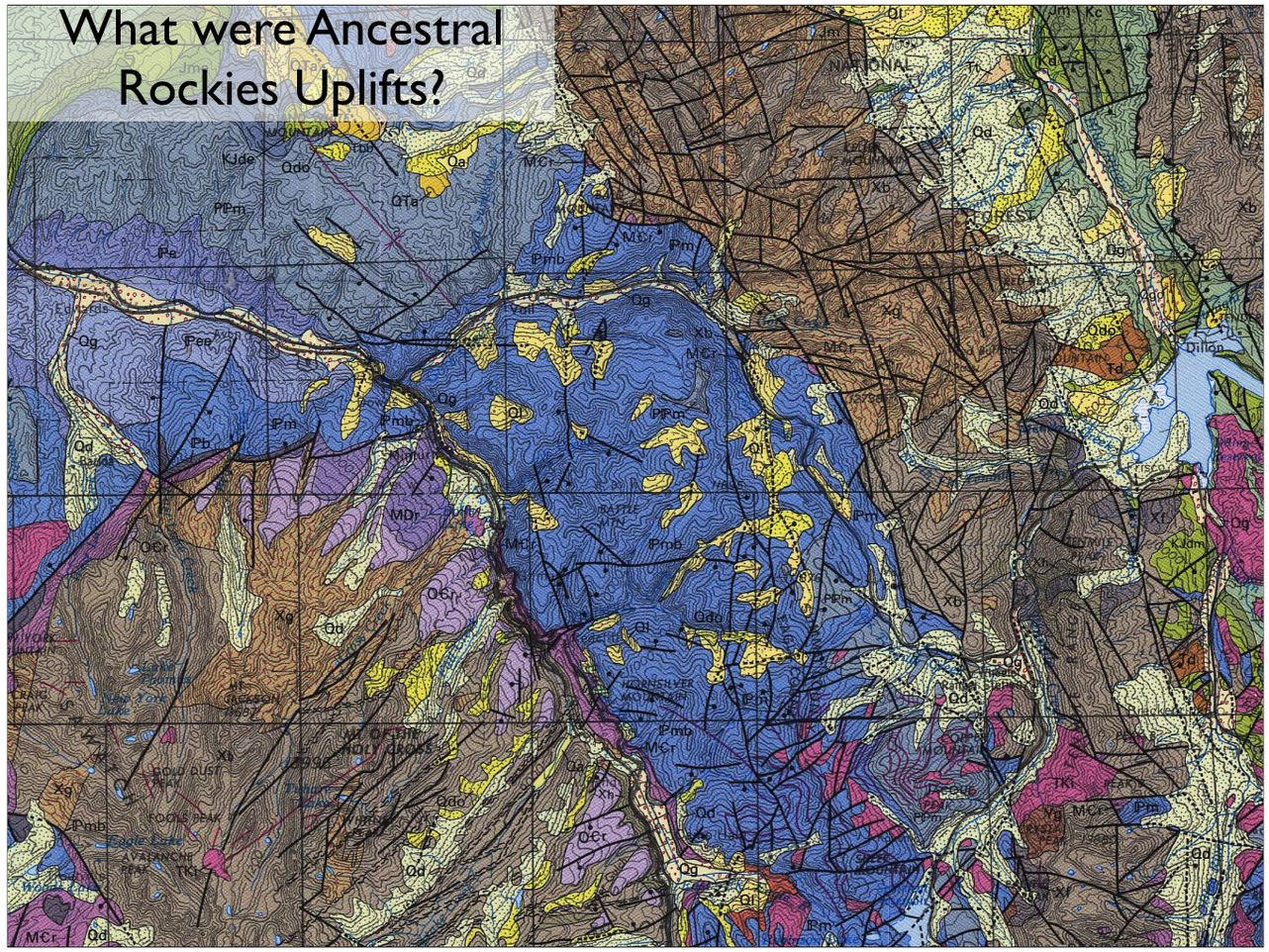
Ye et al., AAPG Bull, 1996

273-261 Ma

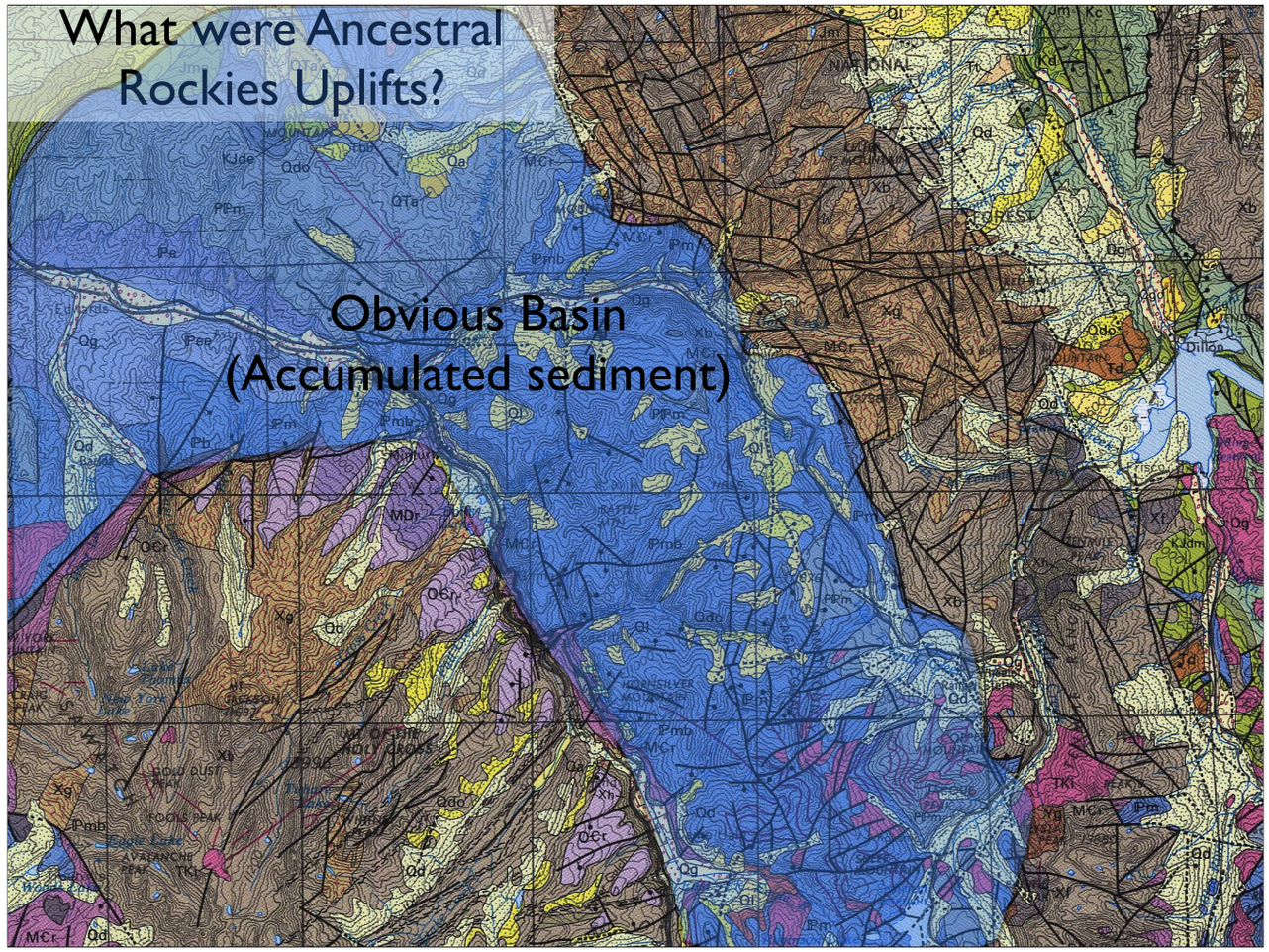


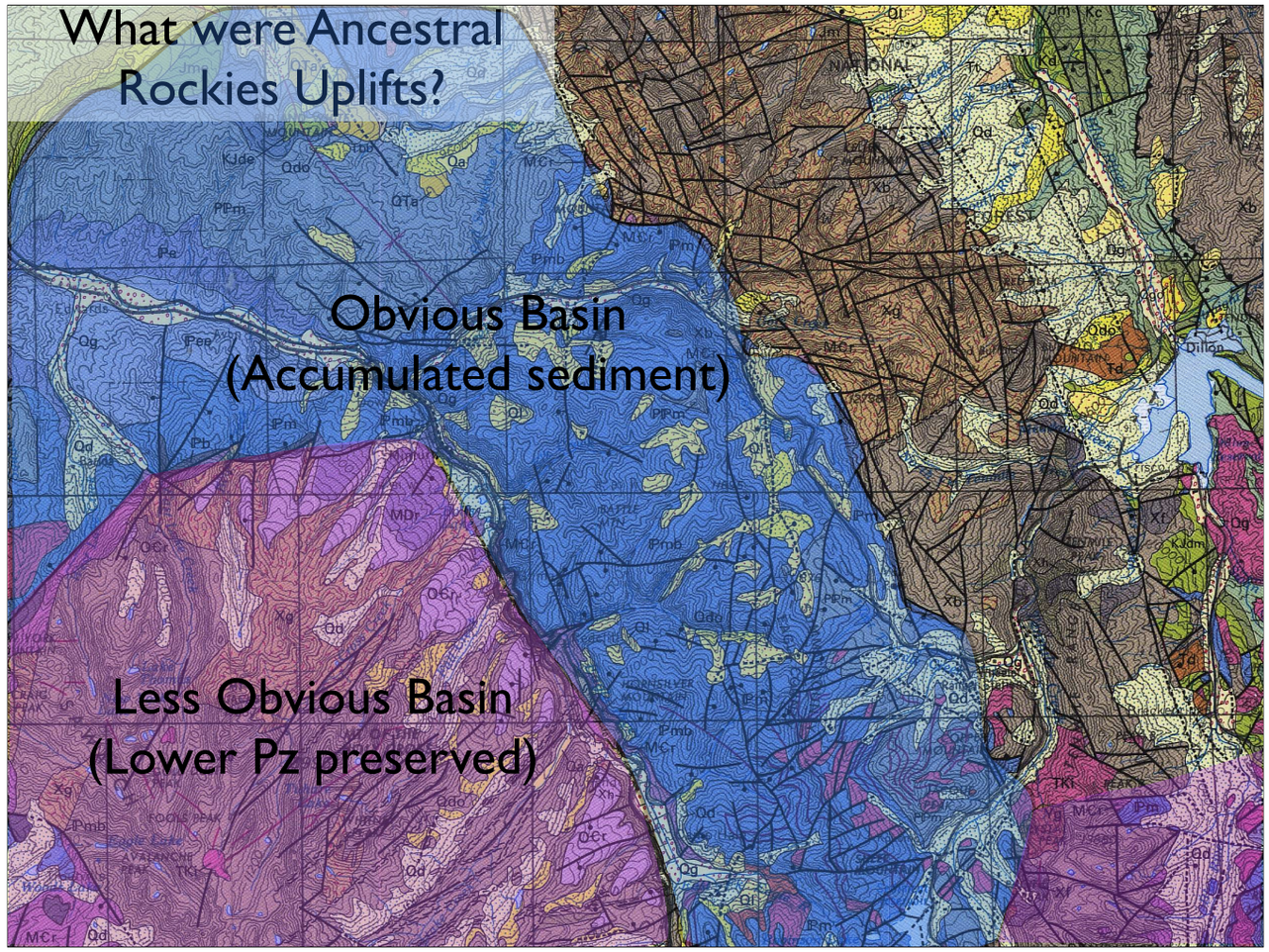
Ye et al., AAPG Bull, 1996

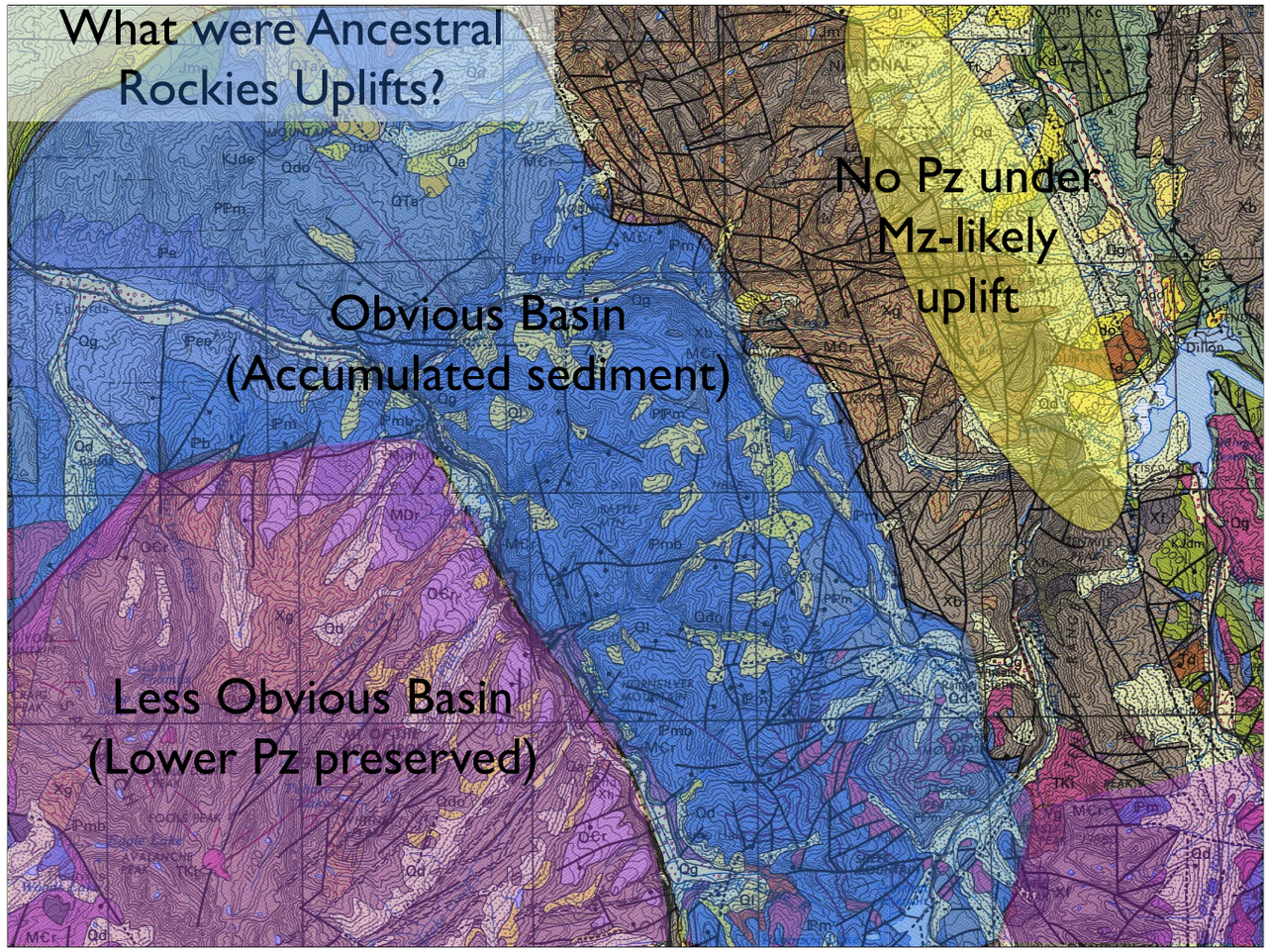
What were Ancestral Rockies Uplifts?

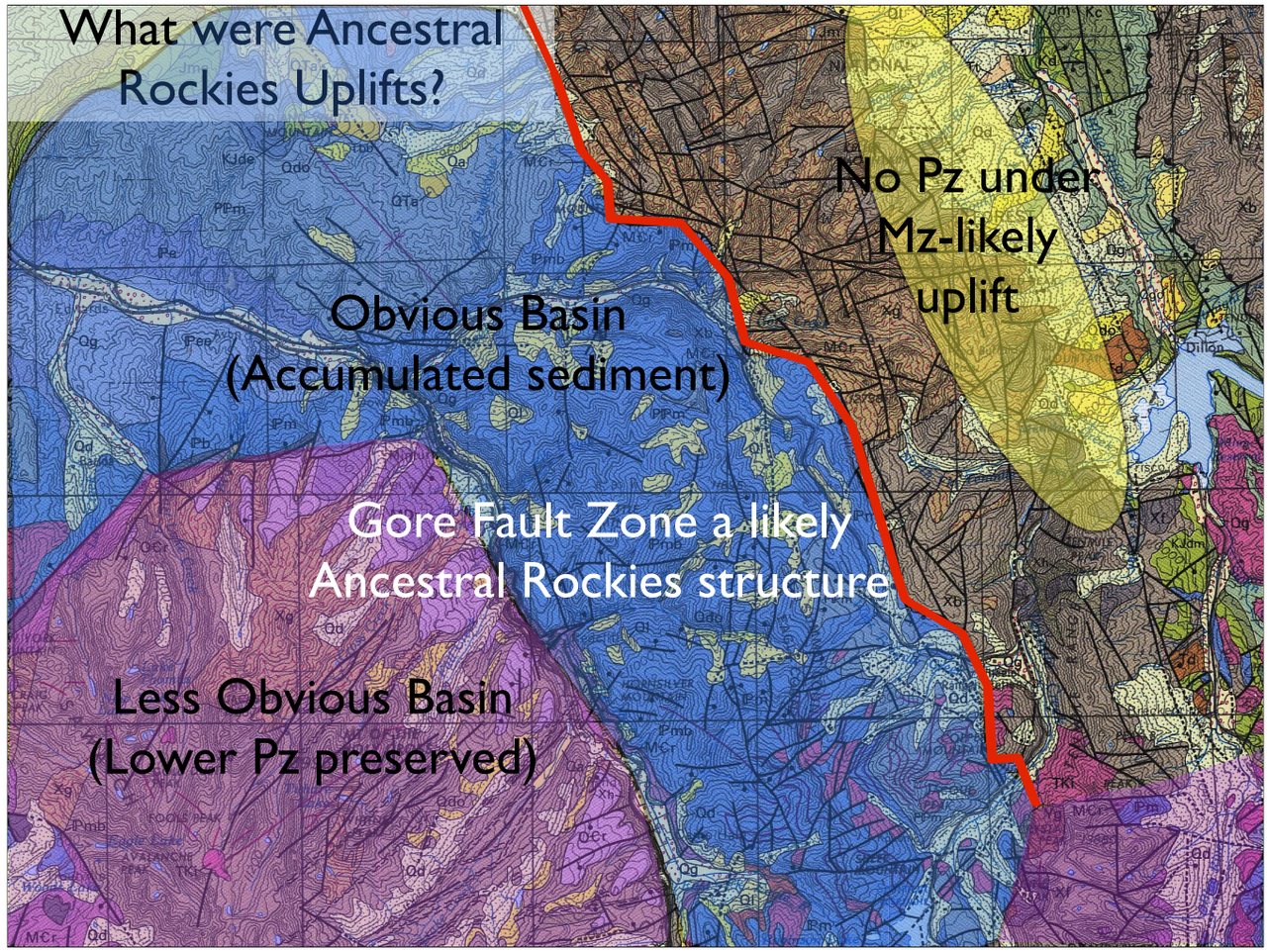


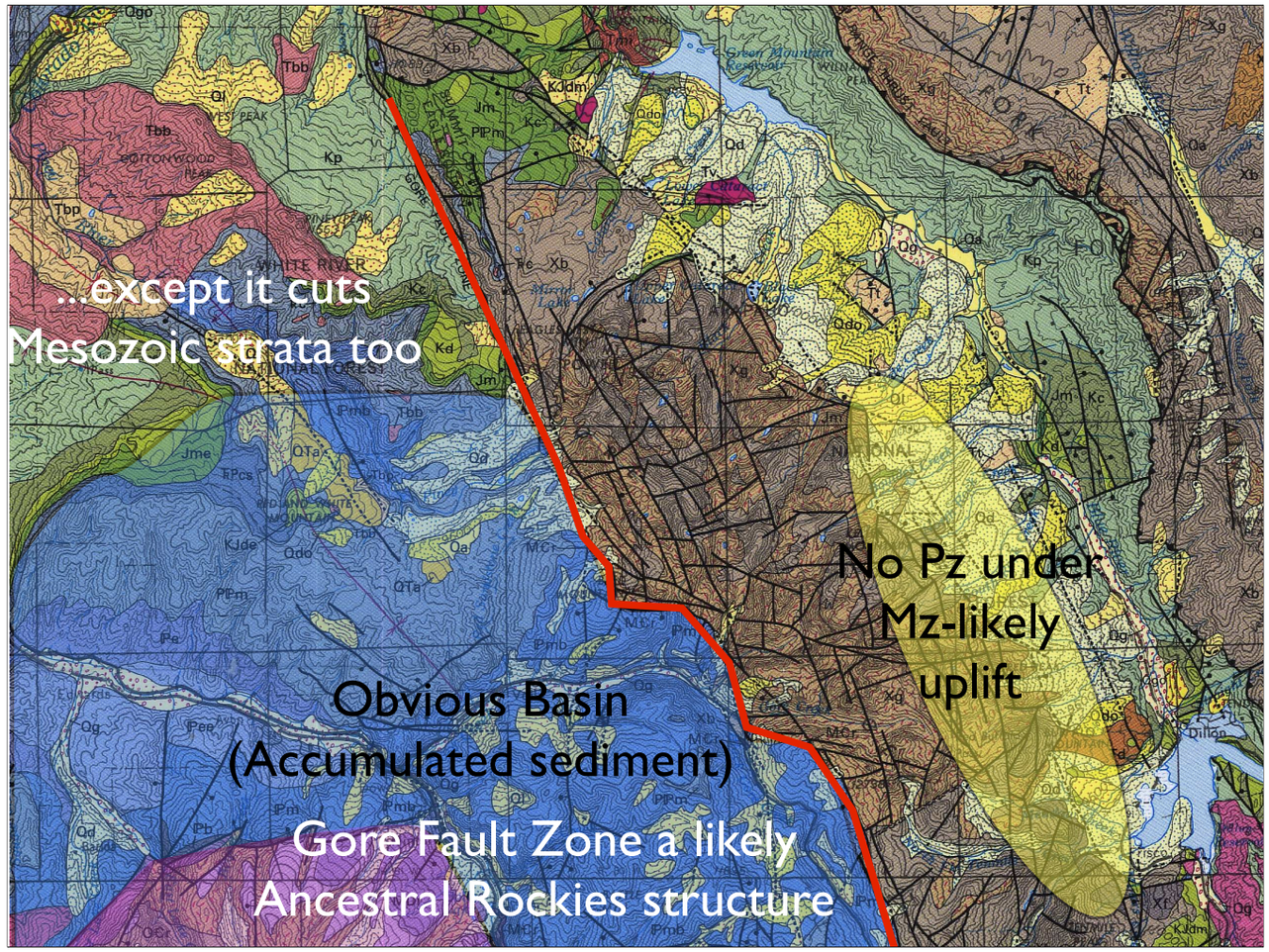
What were Ancestral Rockies Uplifts?

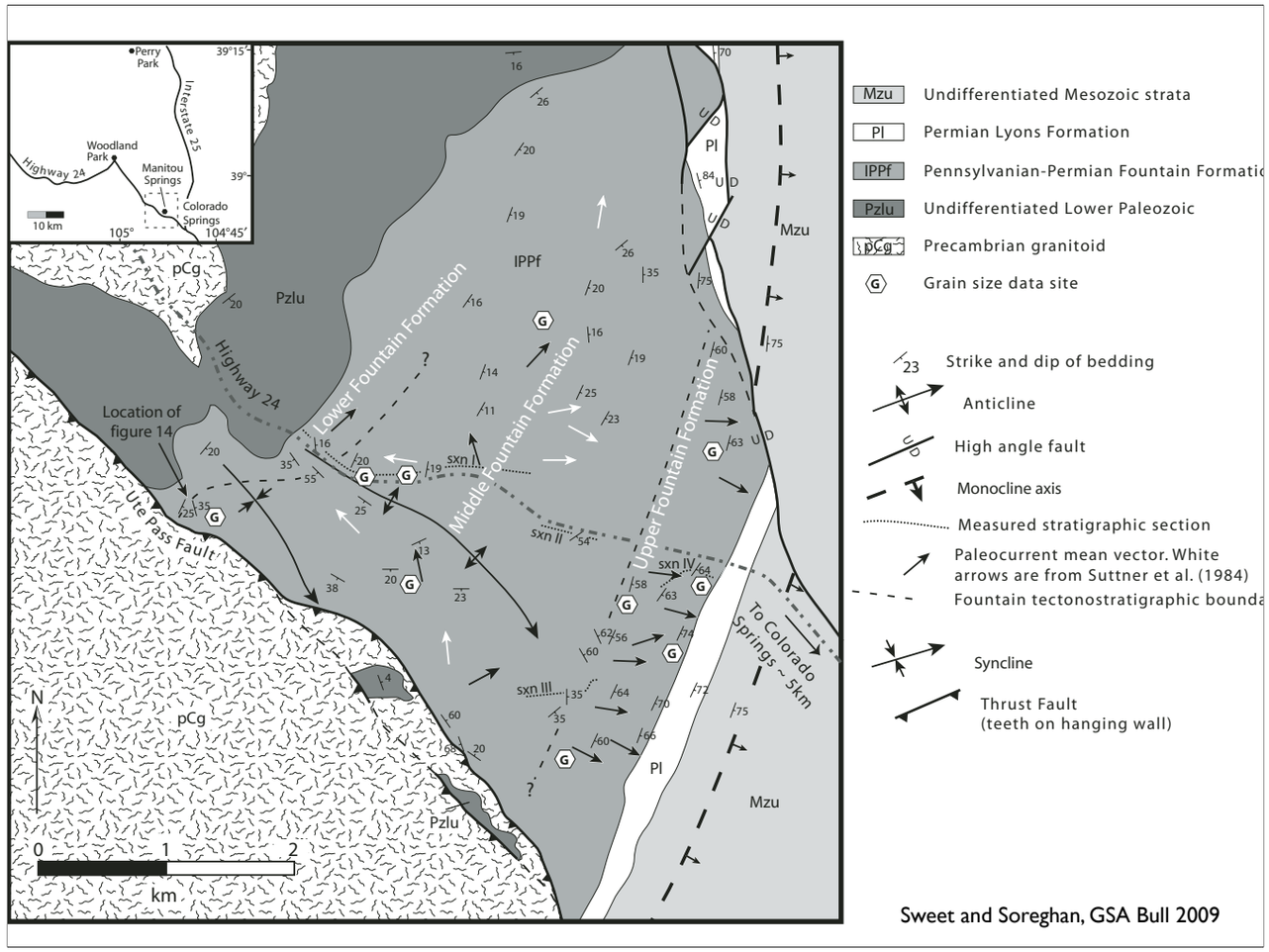



What were Ancestral Rockies Uplifts?
Obvious Basin
(Accumulated sediment)
Less Obvious Basin
(Lower Pz preserved)

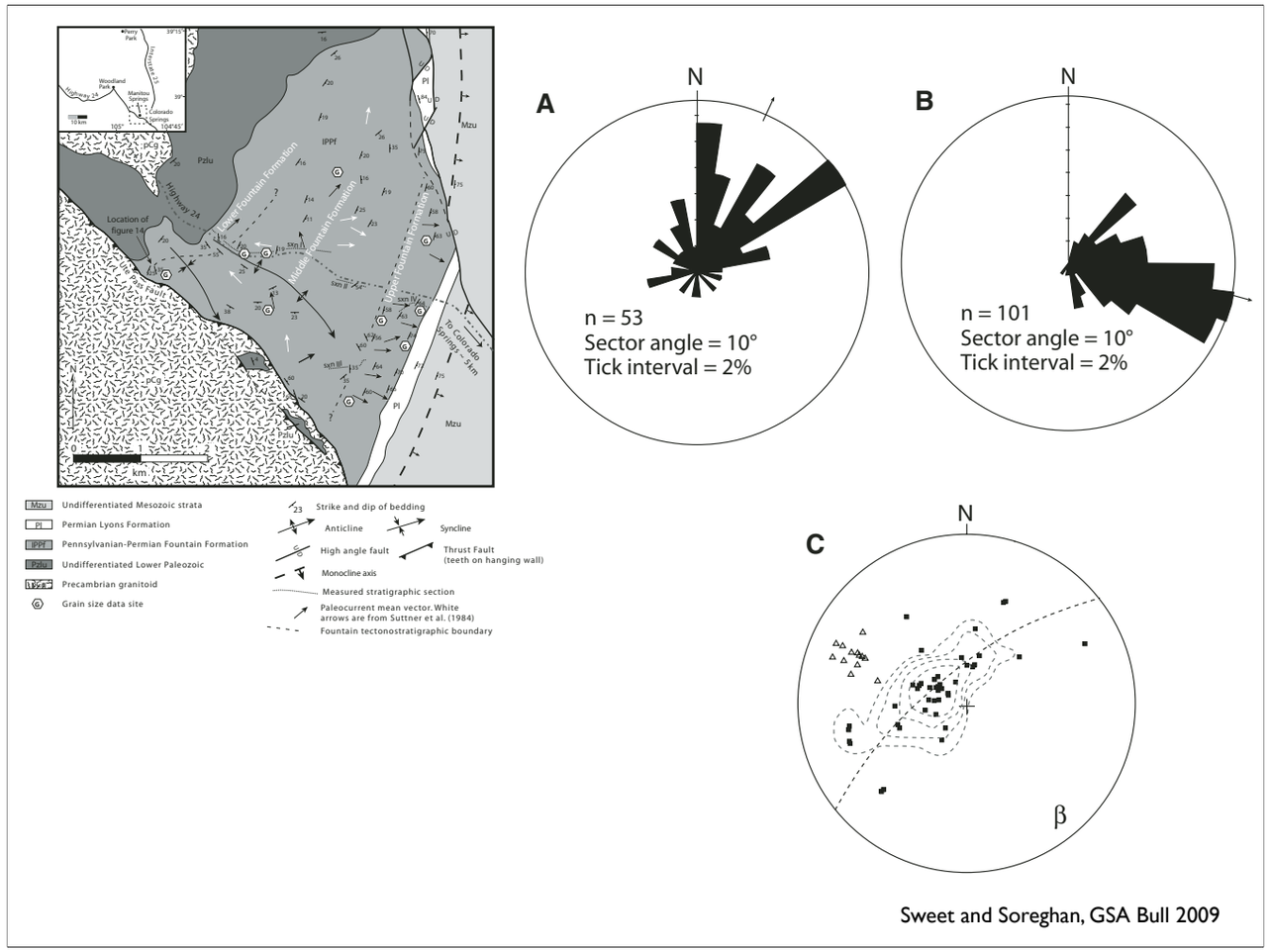

What were Ancestral Rockies Uplifts?
No Pz under Mz-likely uplift
Obvious Basin (Accumulated sediment)
Less Obvious Basin (Lower Pz preserved)


What were Ancestral Rockies Uplifts?
No Pz under Mz-likely uplift
Obvious Basin (Accumulated sediment)
Gore Fault Zone a likely Ancestral Rockies structure
Less Obvious Basin (Lower Pz preserved)


...except it cuts
Mesozoic strata too
No Pz under
Mz-likely
uplift
Obvious Basin
(Accumulated sediment)
Gore Fault Zone a likely
Ancestral Rockies structure

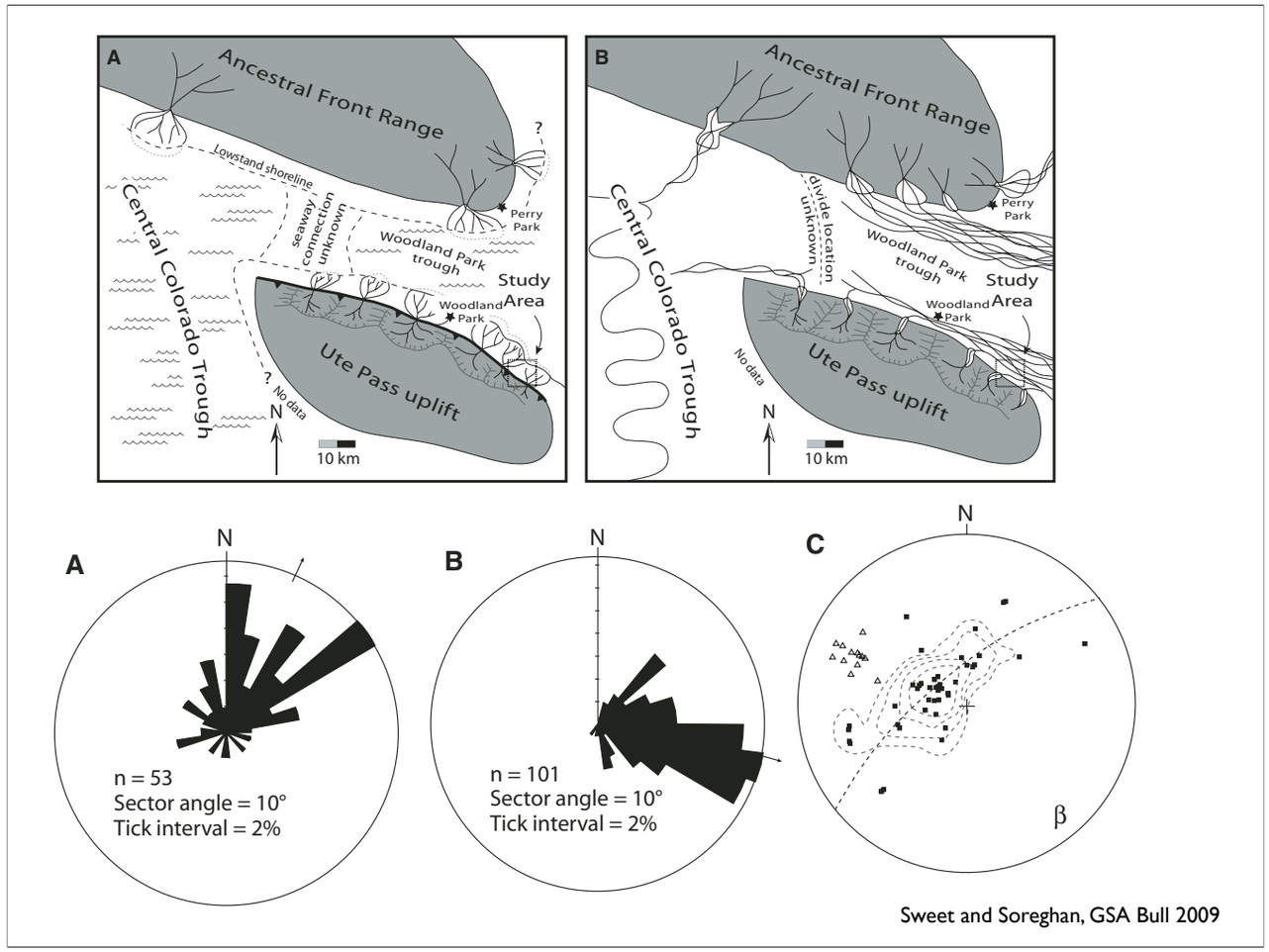


So maybe can look at strat record more closely

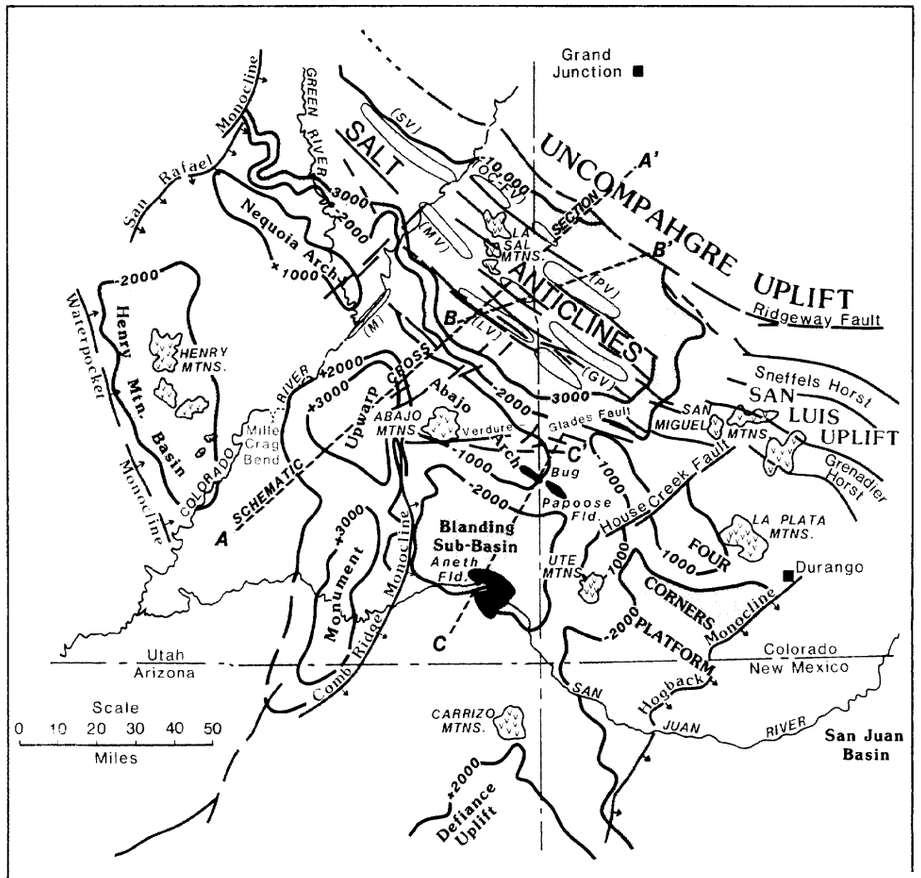


Sweet and Soreghan, GSA Bull 2009

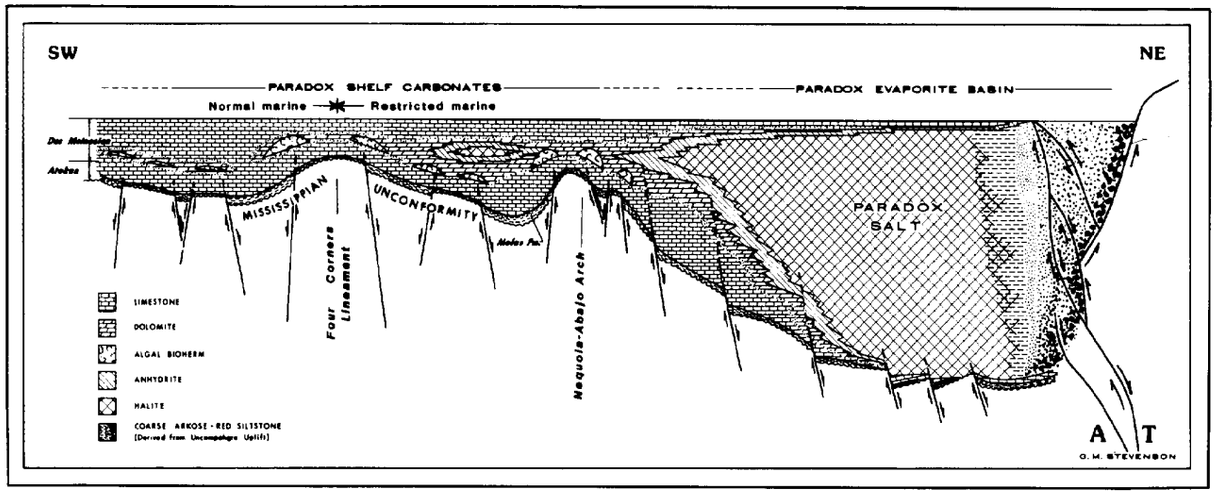
So maybe can look at strat record more closely

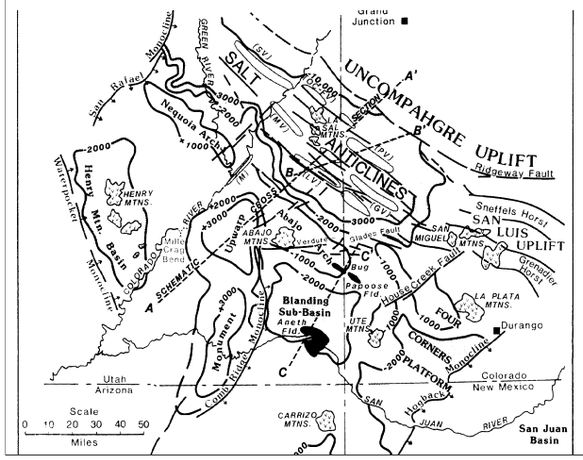


So maybe can look at strat record more closely



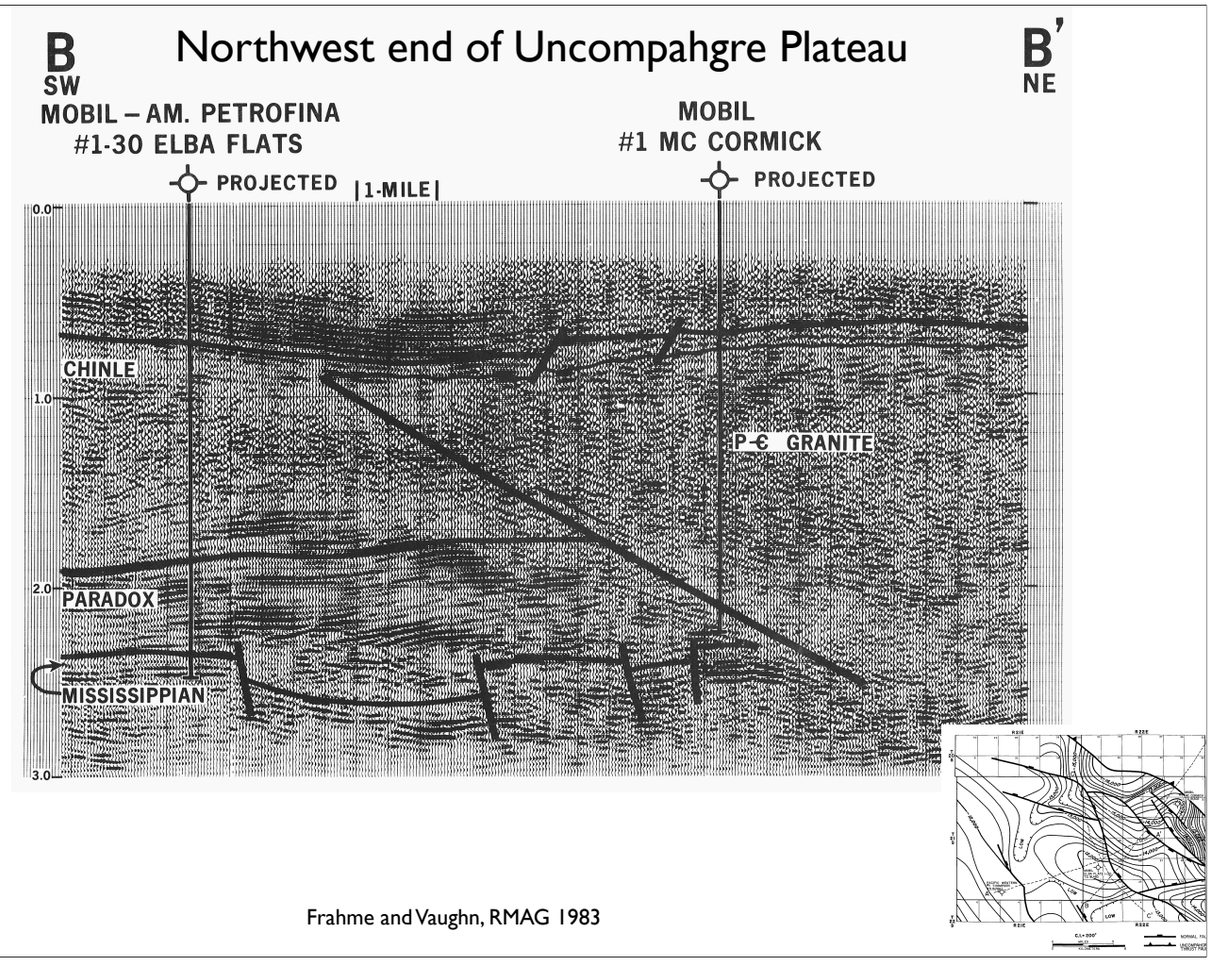
Stevenson and Baars, AAPG Mem 41, 1986





Inferred lots of normal faults and strike-slip faults

Stevenson and Baars, AAPG Mem 41, 1986



Frahme and Vaughn, RMAG 1983

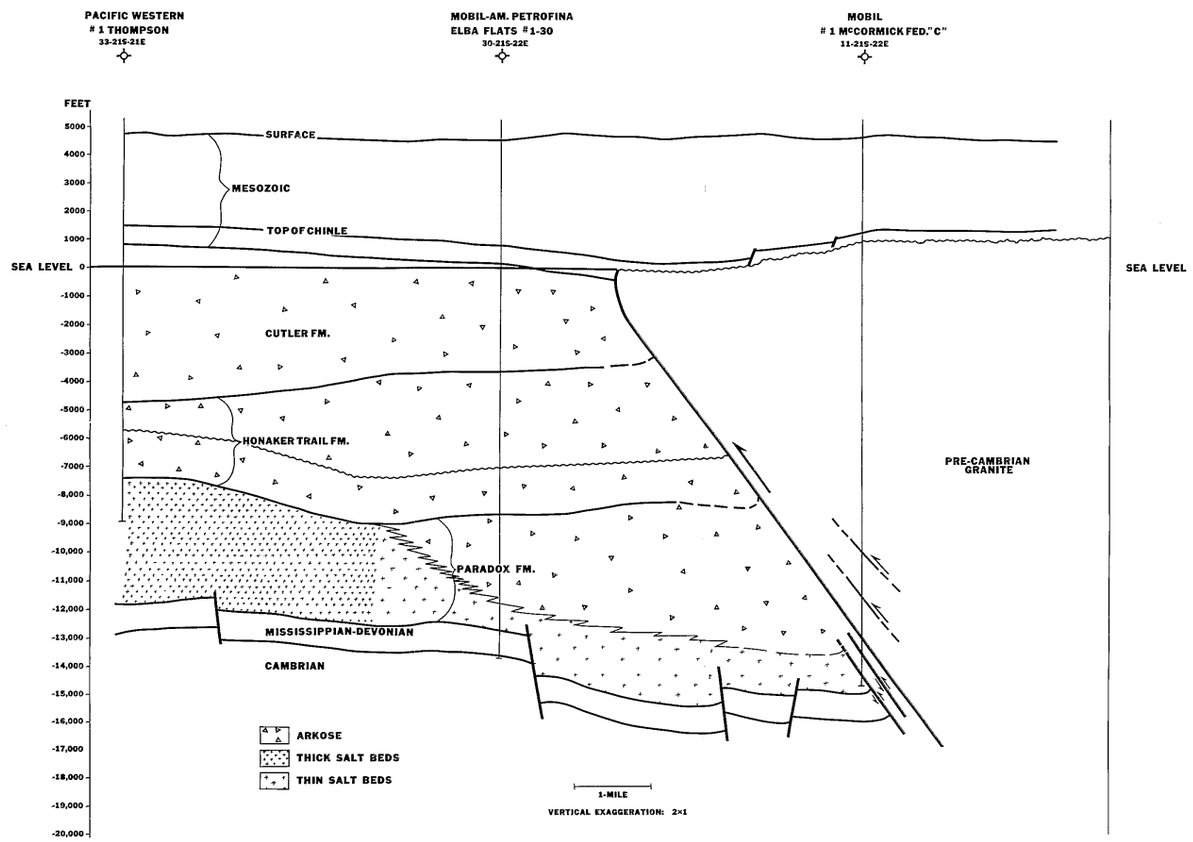
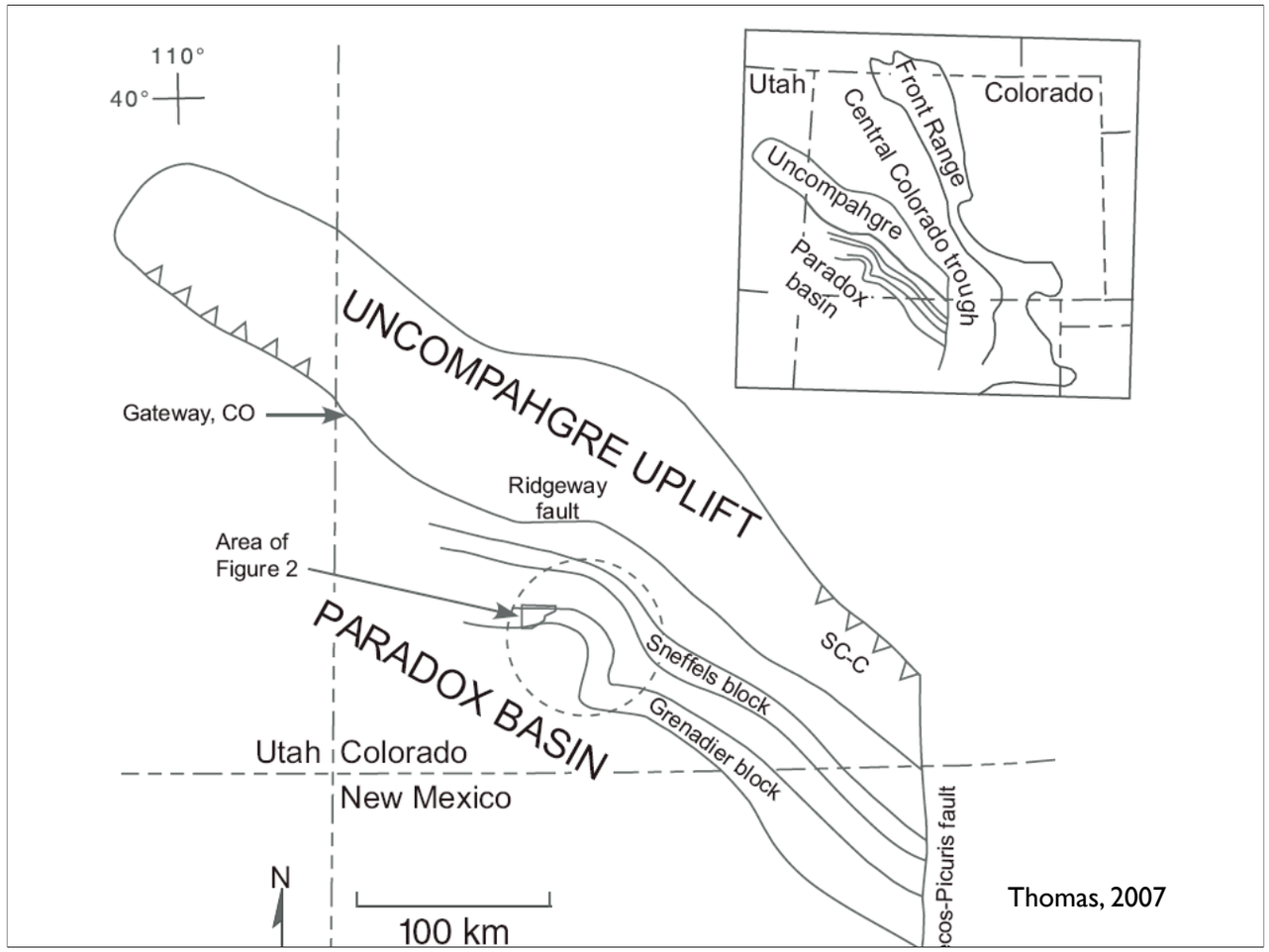
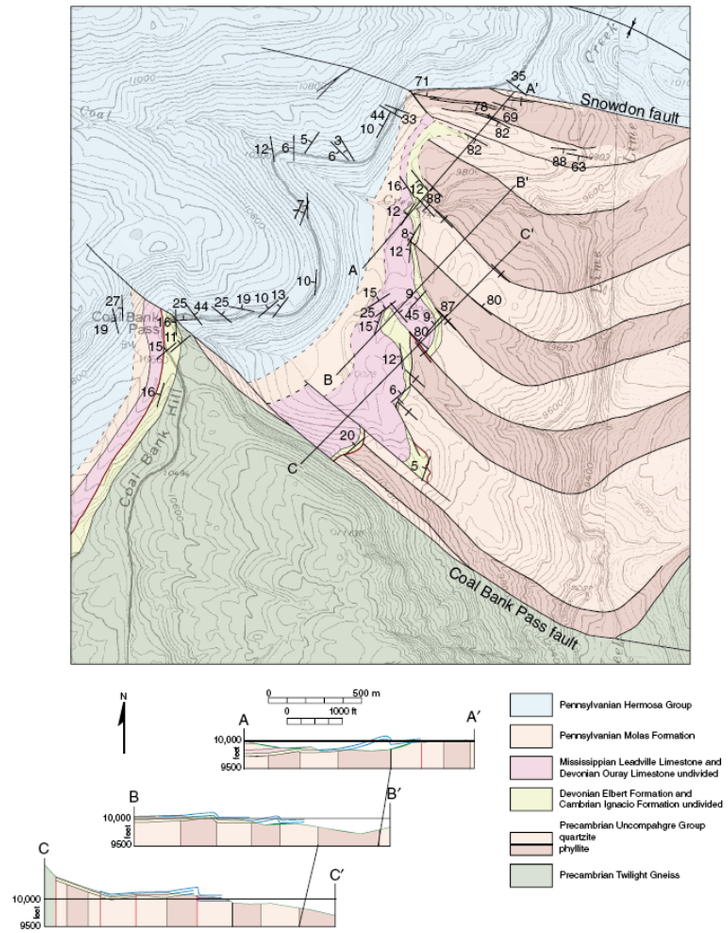


Figure 9. Generalized cross-section model of the northern Uncompahgre front.

Frahme and Vaughn, RMAG 1983


110°
40°
Utah
Colorado
Front Range
Central Colorado trough
Uncompahgre
Paradox basin
UNCOMPAHGRE UPLIFT
Gateway, CO
Ridgeway fault
Area of Figure 2
PARADOX BASIN
Sneffels block
Grenadier block
SC-C
Utah
Colorado
New Mexico
N
100 km
cos-Picuris fault

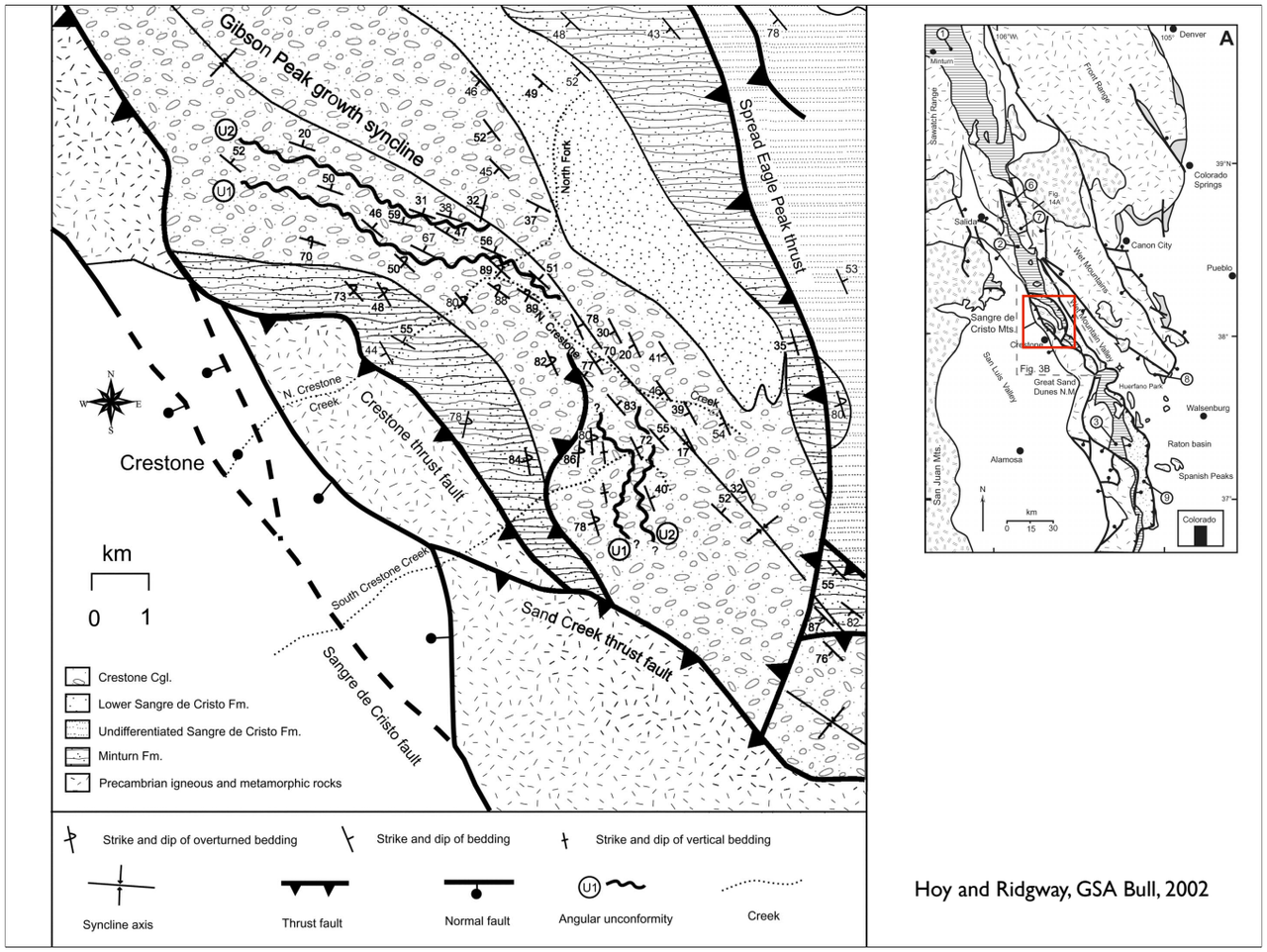
Thomas, 2007


Snowdon fault
Coal Bank Pass fault
Coal Bank Pass
Coal Bank Hill
A
A'
B
B'
C
C'
N
0 500 m
0 1000 ft
10,000
feet
9500
Pennsylvanian Hermosa Group
Pennsylvanian Molas Formation
Mississippian Leadville Limestone and Devonian Ouray Limestone undivided
Devonian Elbert Formation and Cambrian Ignacio Formation undivided
Precambrian Uncompahgre Group
quartzite
phyllite
Precambrian Twilight Gneiss

Thomas, 2007

Figure 9. Photographs of angular unconformity in Hermosa beds exposed along U.S. Highway 550 south of the Snowdon fault. Orientations of the views are shown in Figure 2, and the location is shown in Figure 5. (A) Steep south limb of anticline at west end of the Snowdon fault; the angular unconformity is exposed beneath more gently dipping beds south (left in view) of the abrupt hinge on the south limb of the anticline (view to west). The crest of the anticline and the trace of the Snowdon fault are out of the view to the north (right in view). (B) Angular unconformity exposed in highway cut (view to north). The hinge and steep up-turn of the south limb of the anticline are hidden behind the shoulder of the highway cut. The Snowdon fault crosses the highway approximately at the position of the most distant car on the highway. The north-dipping beds in the distance are in the north limb of the anticline on the north side of the Snowdon fault.

Thomas, 2007



Hoy and Ridgway, GSA Bull, 2002

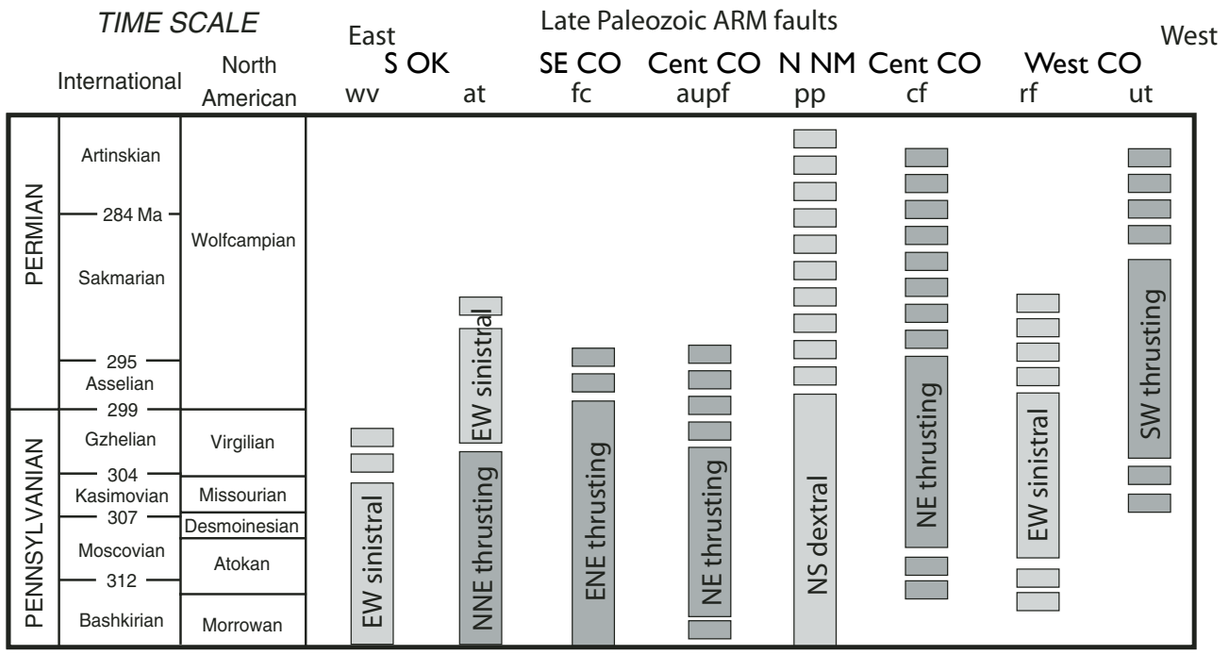
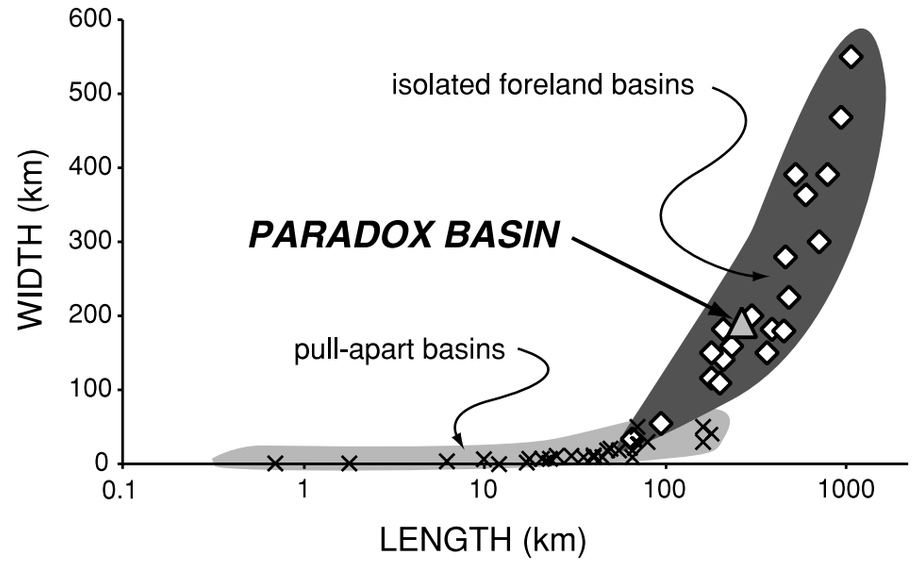


Figure 17. Inferred timing and kinematics of faults with a documented ancestral Rocky Mountains history. Light gray represents predominantly strike-slip motion, whereas dark gray indicates predominantly reverse motion. Dashed bars indicate range of time faulting is thought to have initiated (bottom of figure) or ceased (top of figure). Abbreviations: ut—Uncompahgre thrust (slip-sense from Frahme and Vaughn, 1983); rf—Ridgeway fault (slip-sense from Stevenson and Baars, 1986; Thomas, 2007); pp—Picuris-Pecos fault (slip-sense from Cather et al., 2006; Wawrzyniec et al., 2007); ct—Crestone thrust (slip-sense from Hoy and Ridgway, 2002); aupf—ancestral Ute Pass fault (slip-sense data herein); fc—Freezeout Creek fault (slip-sense from Maher, 1953; McKee, 1975); at—Anadarko thrust (slip-sense from Brewer et al., 1983); wv—Washita Valley fault (slip-sense from Tanner, 1967). Time scale is from Gradstein et al. (2004).

Sweet and Soreghan, GSA Bull 2009



Barbeau, 2003