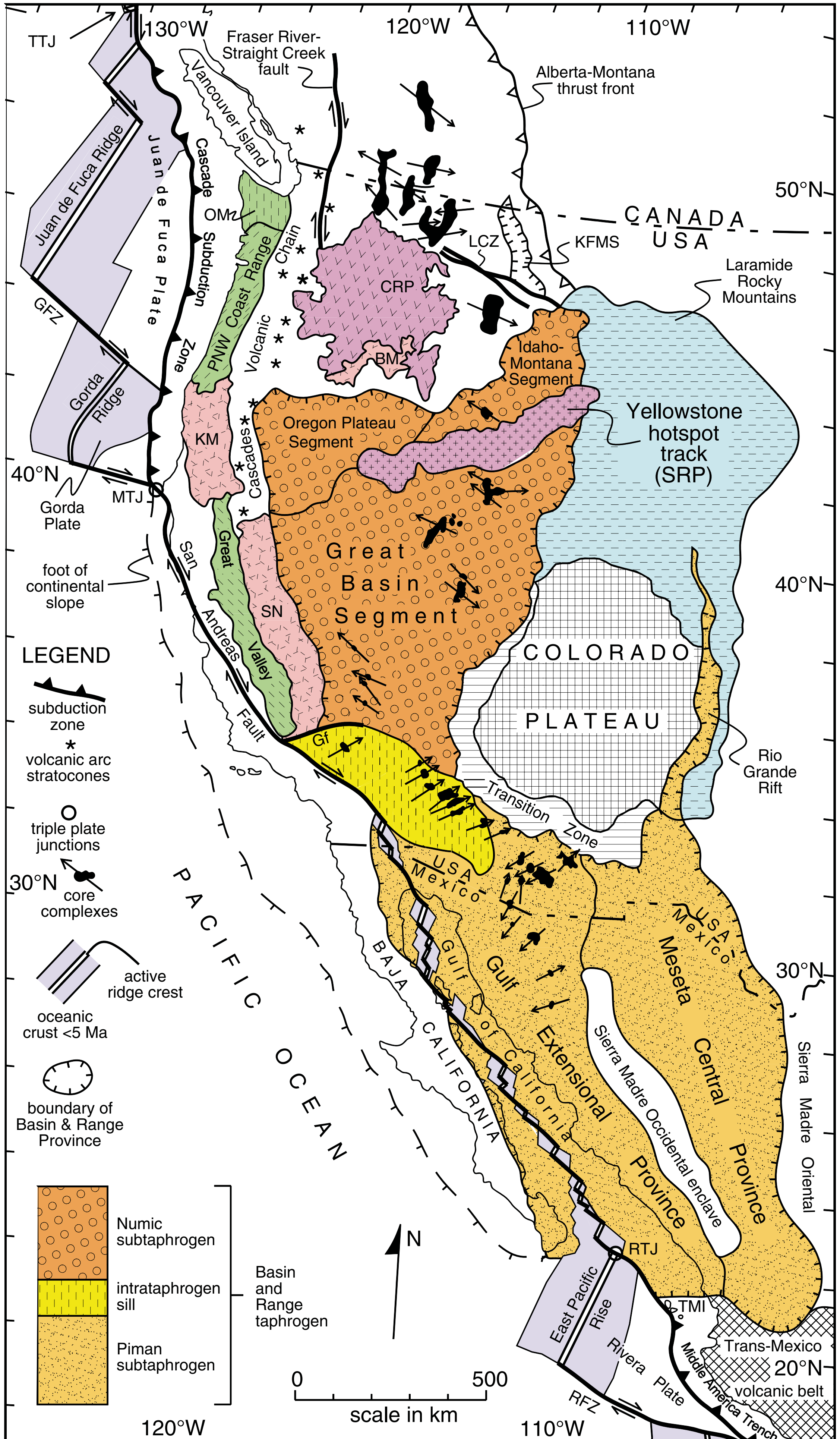
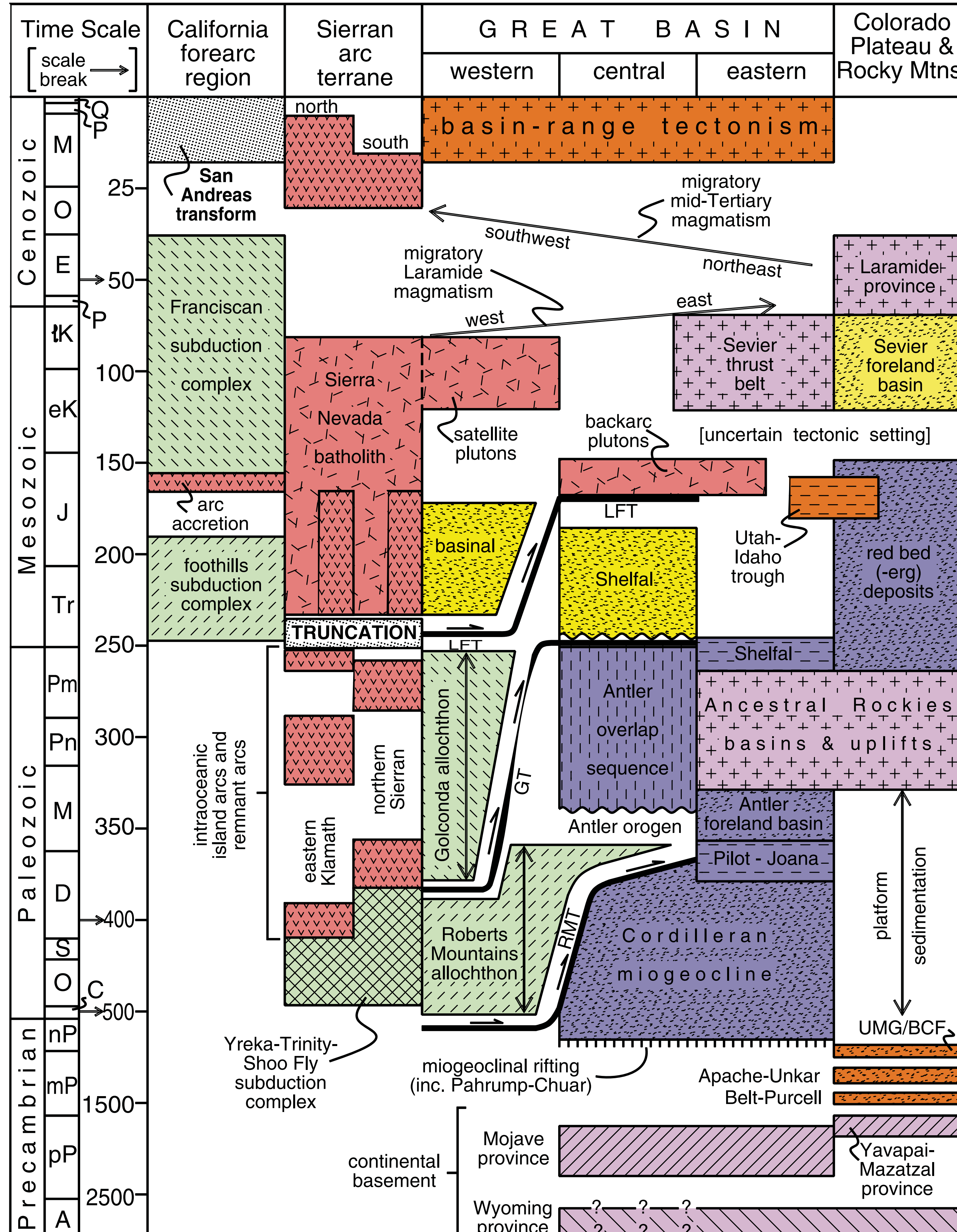
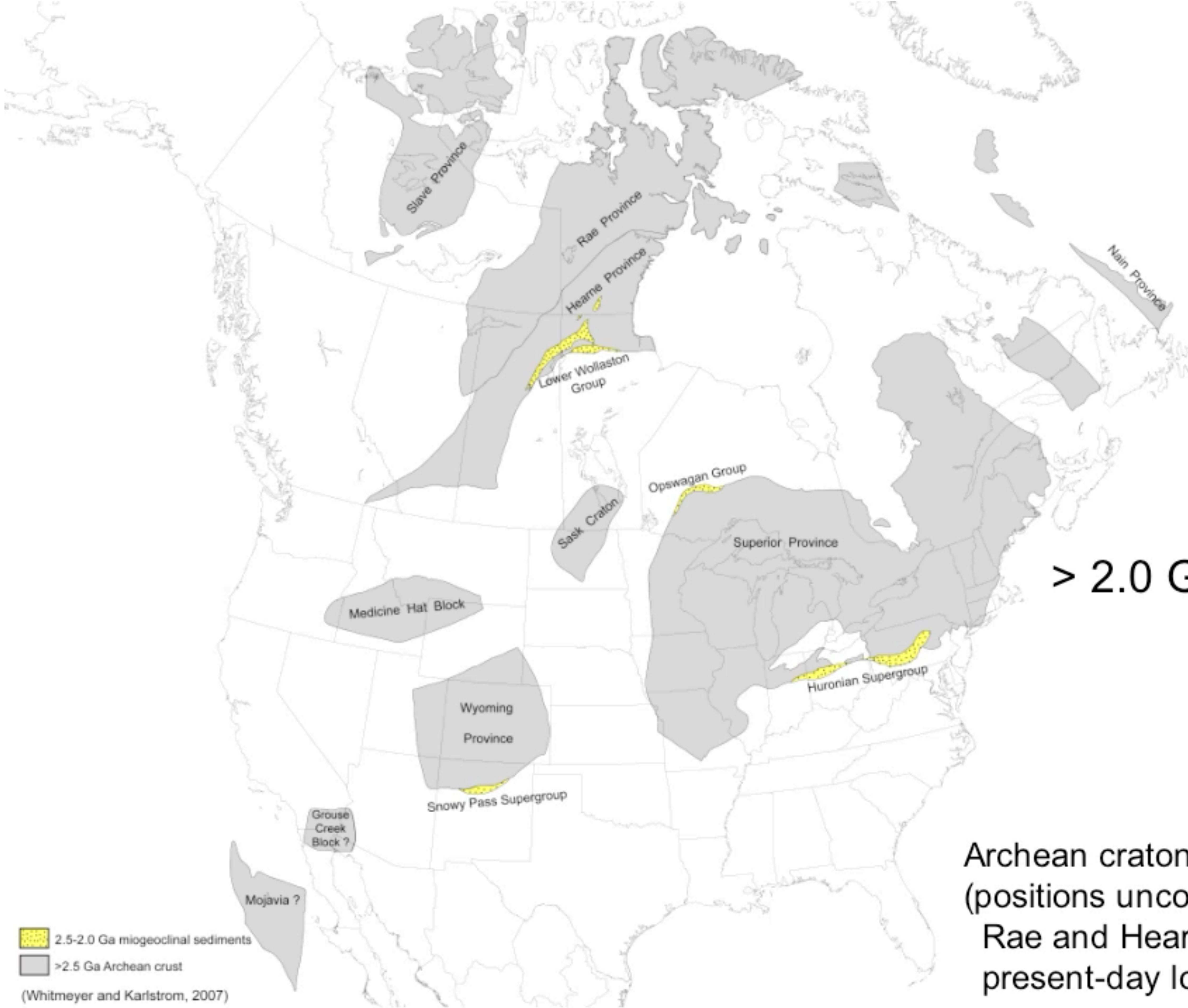


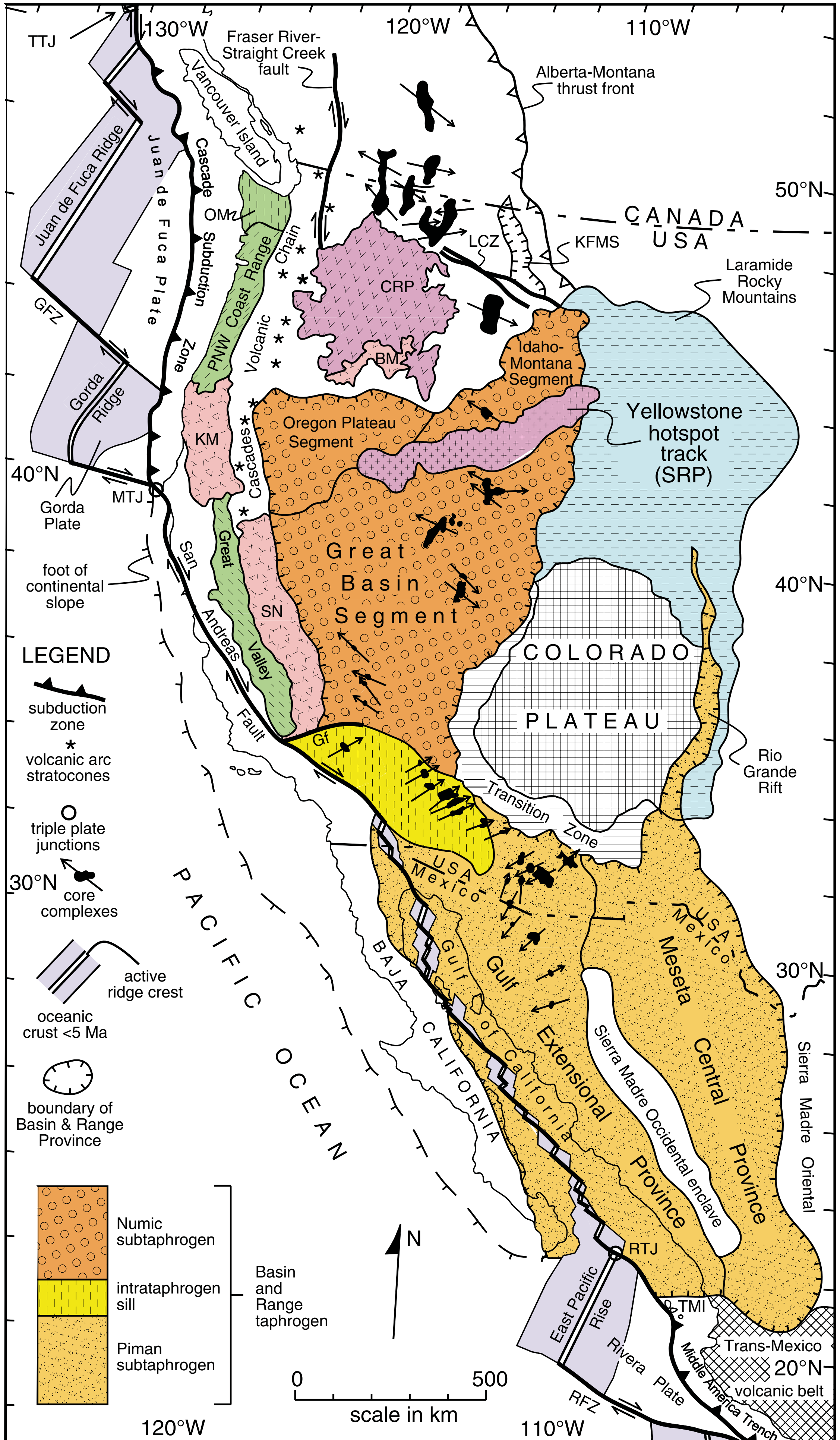


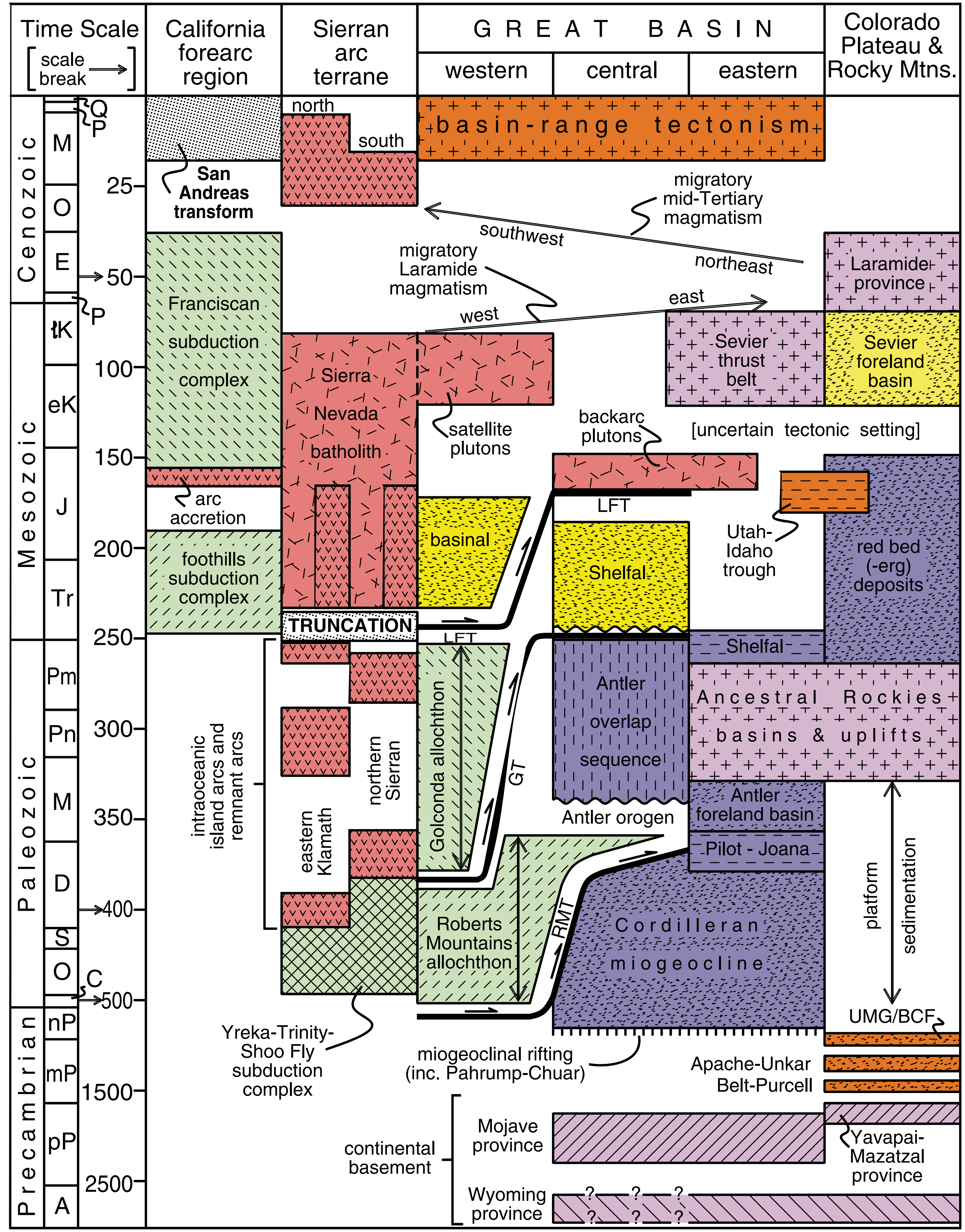
Dickinson, Geosphere, 2006



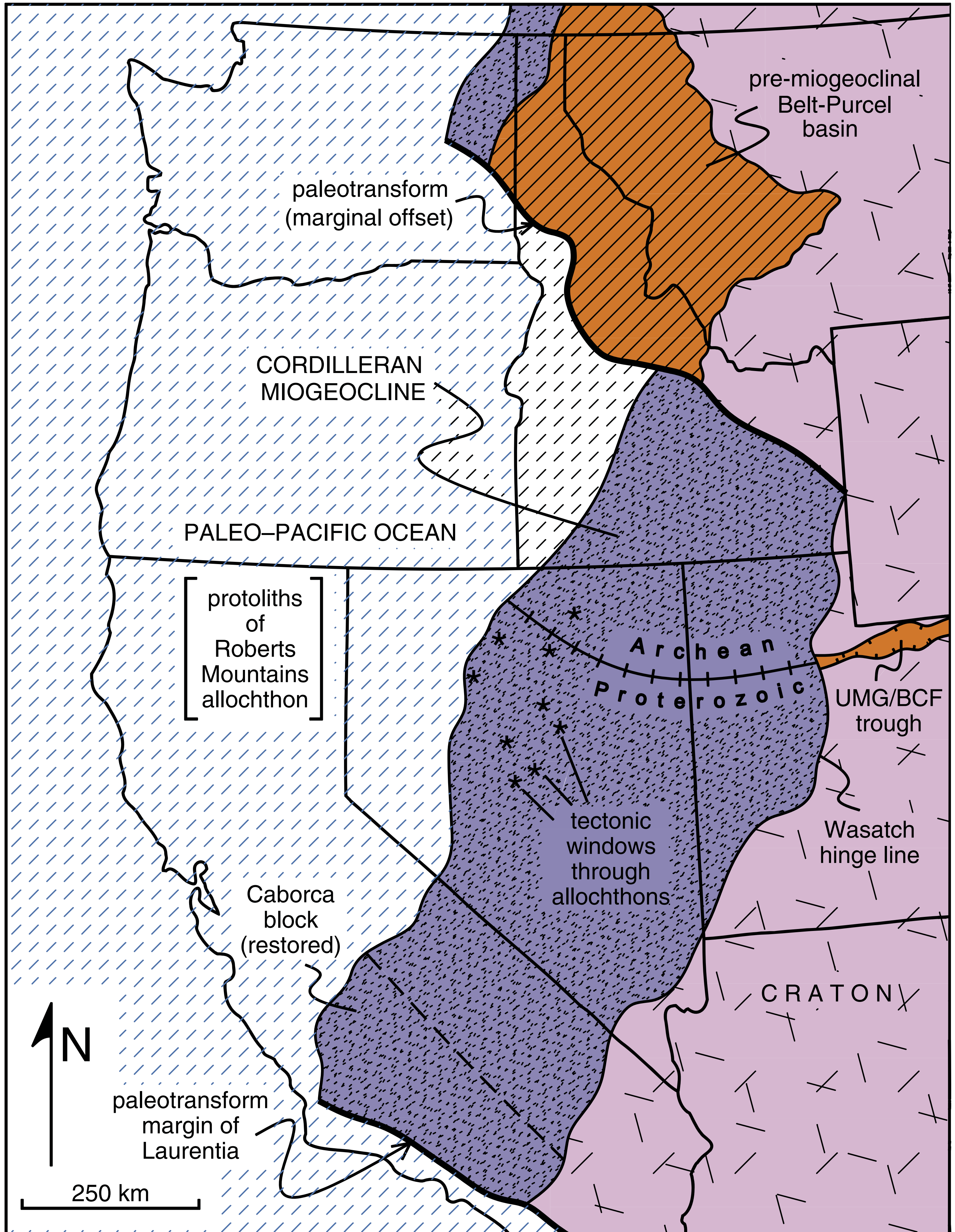
> 2.0 Ga

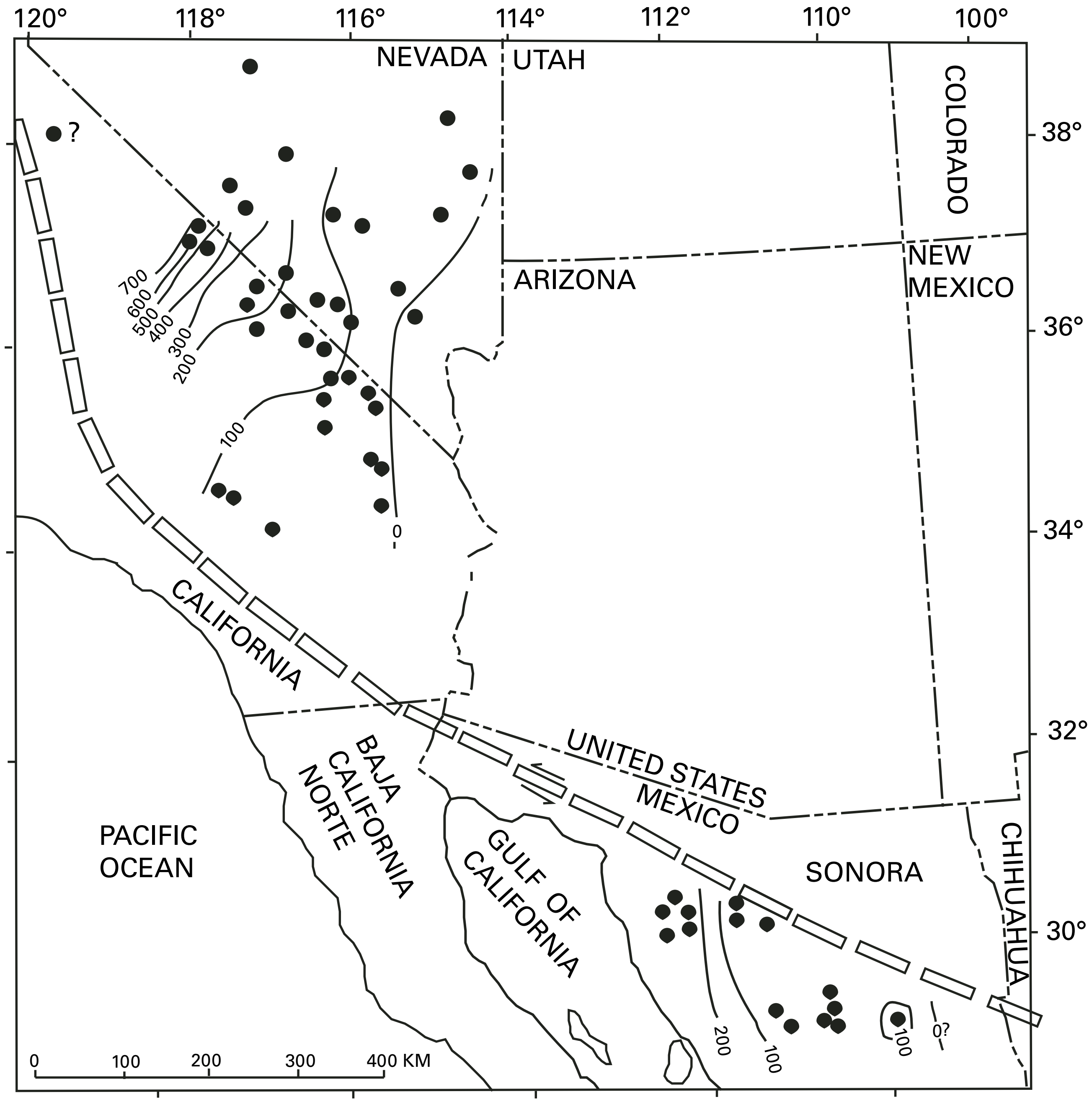
Archean cratons
(positions unconstrained
Rae and Hearne in
present-day locations)





Dickinson, Geosphere, 2006

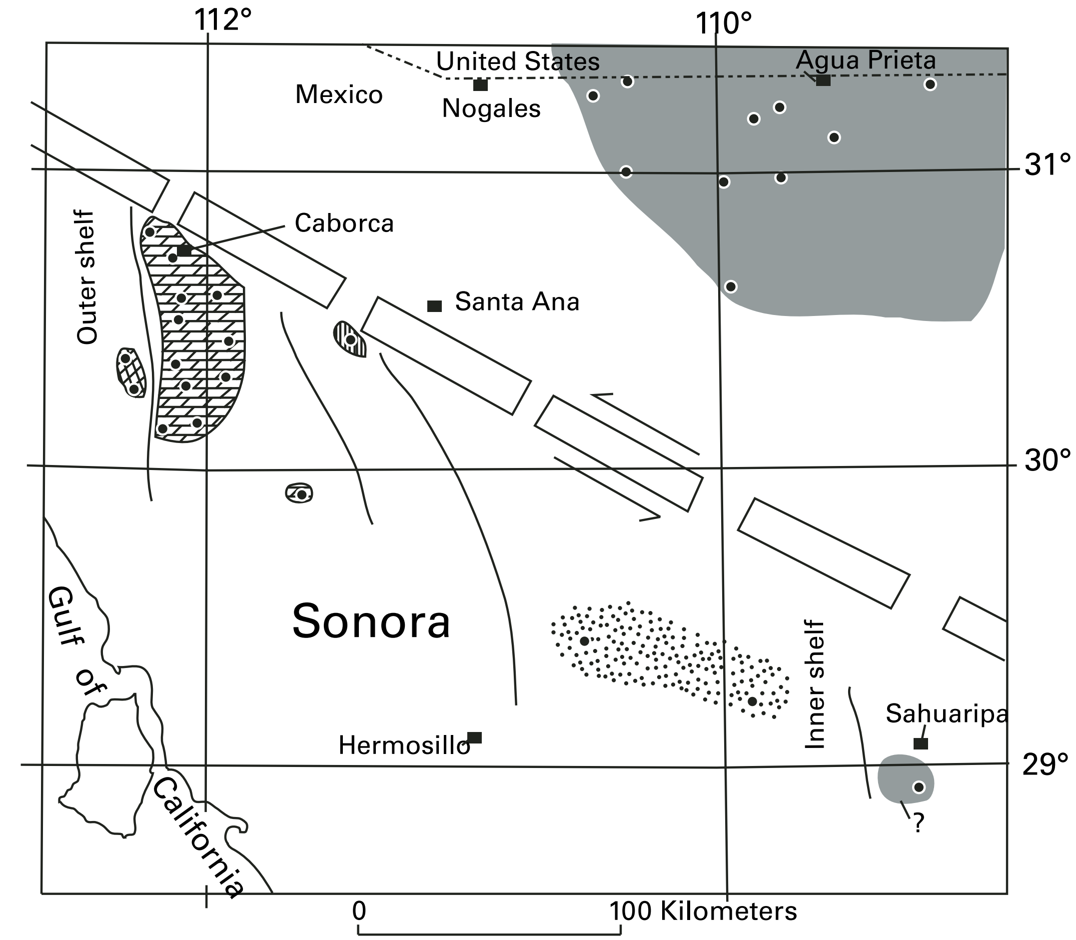

pre-miogeoclinal
Belt-Purcel
basin
paleotransform
(marginal offset)
CORDILLERAN
MIOGEOCLINE
PALEO–PACIFIC OCEAN
protoliths
of
Roberts
Mountains
allochthon
Archean
Proterozoic
UMG/BCF
trough
tectonic
windows
through
allochthons
Wasatch
hinge line
Caborca
block
(restored)
CRATON
N
paleotransform
margin of
Laurentia
250 km



EXPLANATION

- Outcrop of Lower Cambrian Proveedora Quartzite or Zabriskie Quartzite (includes a few outcrops of Lower Cambrian Harkless Formation in Nevada and California that contain quartzite equivalent to Zabriskie Quartzite
- Mojave-Sonora megashear. Postion of megashear is not corrected palinspastically for post-Late Jurassic structural dislocations. See text for discussion of location of megashear. Arrows show relative motion.
- 100 Isopach line, thickness in meters

Figure 4. Distribution and thickness of Lower Cambrian Zabriskie Quartzite in California and Nevada and of the correlative Proveedora Quartzite in Sonora. Based on Stewart (1970) and Stewart et al. (1984).



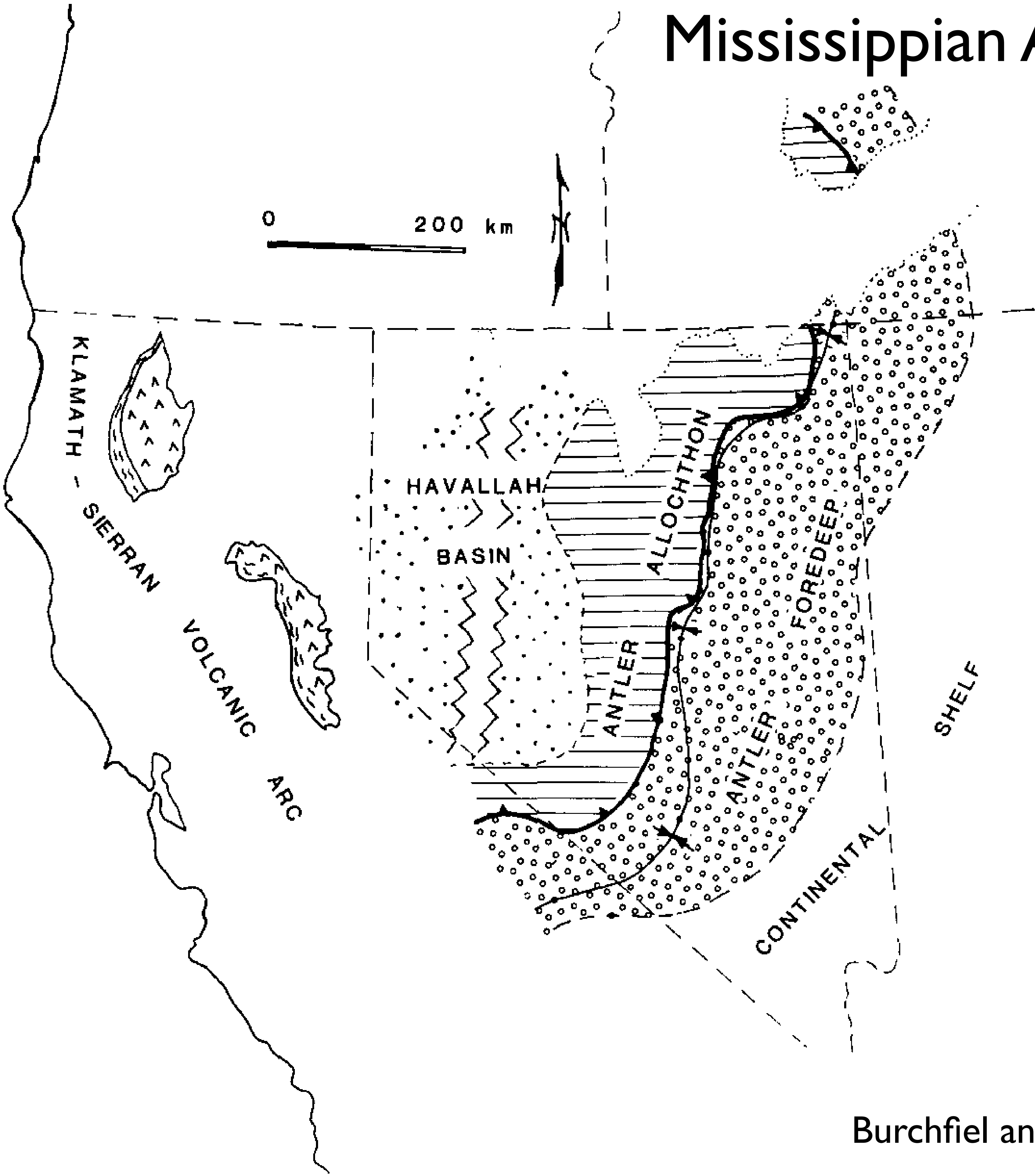
EXPLANATION

- Continental cover strata
- Thin miogeoclinal Lower Cambrian strata unconformably above Neoproterozoic Rodinian strata. No miogeoclinal Neoproterozoic strata are present
- Neoproterozoic and Lower Cambrian miogeoclinal strata of Arituaba area. Contains strata correlative with Caborca area, but thinner
- Thick Neoproterozoic and Lower Cambrian miogeoclinal strata of Caborca area consisting dominantly of dolomite, siltstone and quartzite
- Thick Neoproterozoic and Lower Cambrian miogeoclinal strata of Sierra del Viejo. Composed predominantly of dolomite
- Control point
- Line separating lithologic facies
- Mojave-Sonora megashear, arrows show relative movement

Figure 5. Facies trends of Neoproterozoic and Lower Cambrian strata in Sonora. Based on data in Stewart et al. (2002).

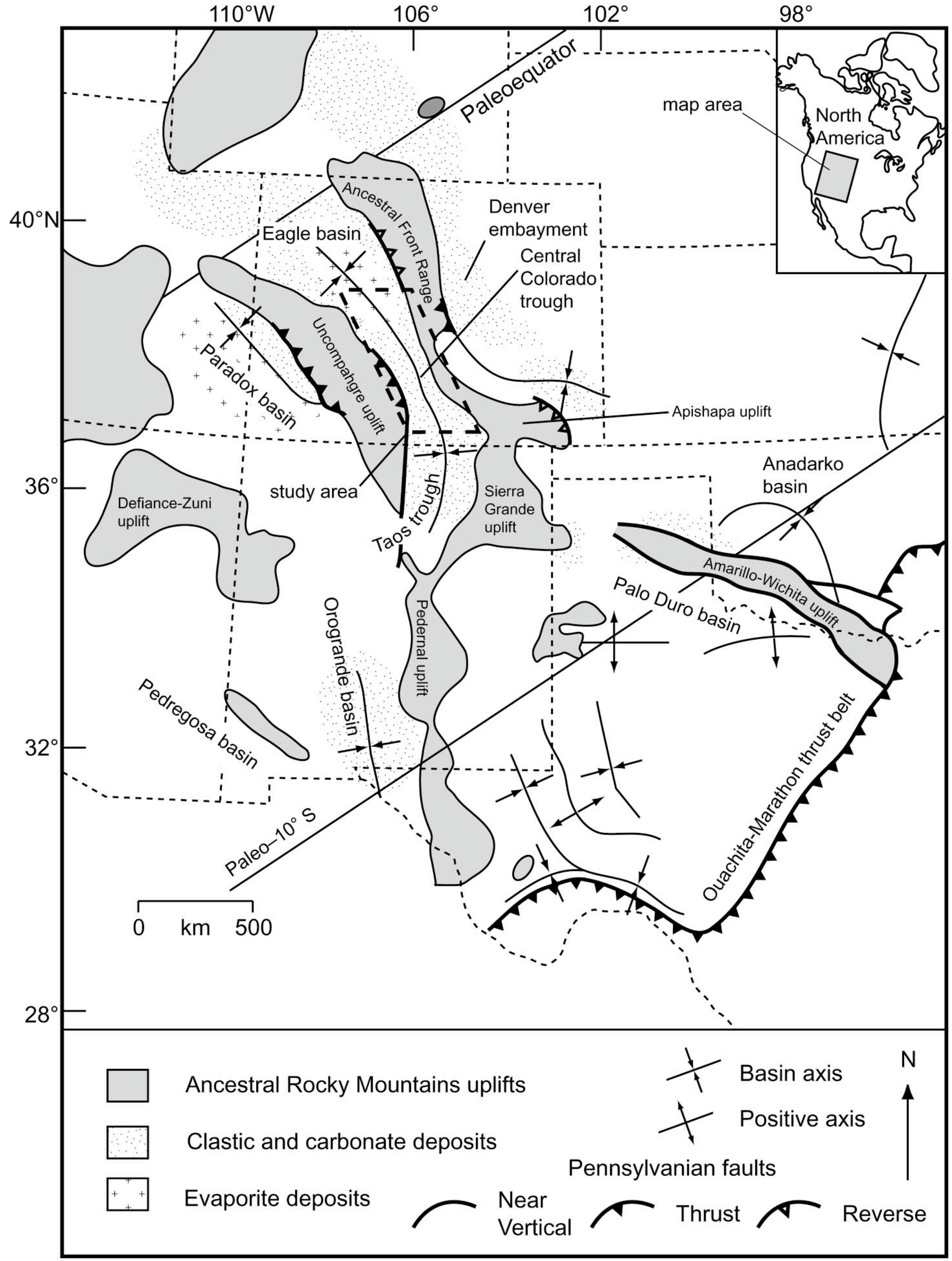
Stewart, GSA SP 393, 2005

Mississippian Antler orogeny



Burchfiel and Royden, Geology, 1991

Pennsylvanian



Hoy and Ridgway 2002

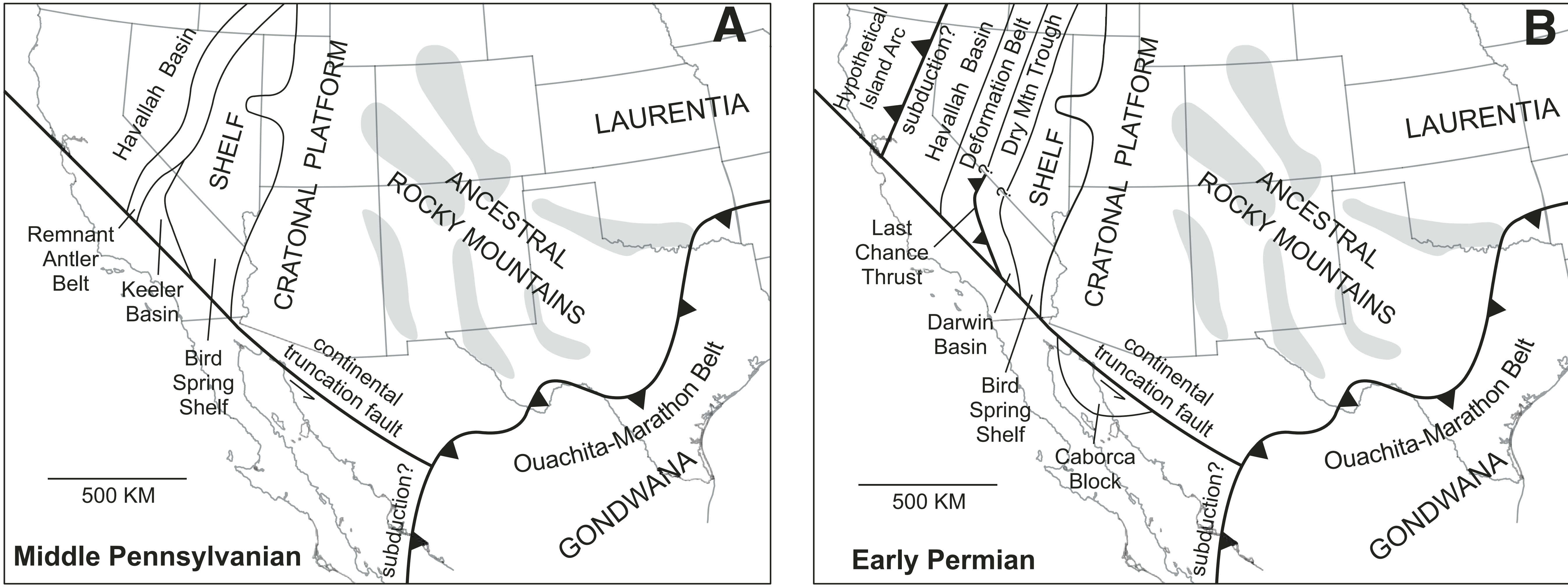


Figure 13. Maps showing major paleotectonic features related to the Bird Spring Shelf. (A) Middle Pennsylvanian. (B) Early Permian. Modified from Stevens et al. (1993), Dickinson (2000) and Trexler et al. (2004). Shaded areas are uplifts of the ancestral Rocky Mountains.

Stevens and Stone,
GSA SP 429, 2007

Luning-Fencemaker thrust belt mid or late J to K

Central Nevada thrust belt (Ely belt) mid-J to Cretaceous

Sevier thrust belt late J to early T

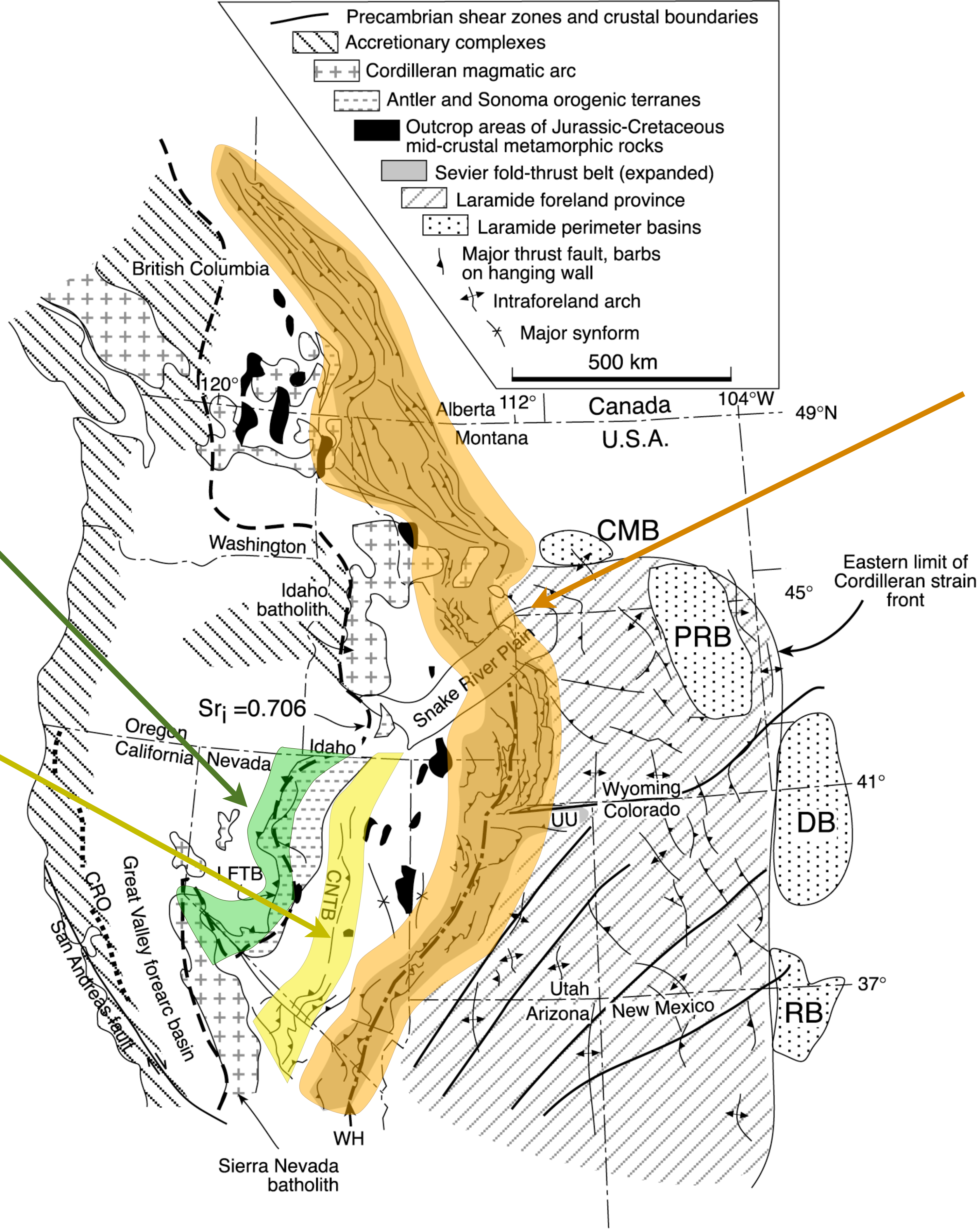
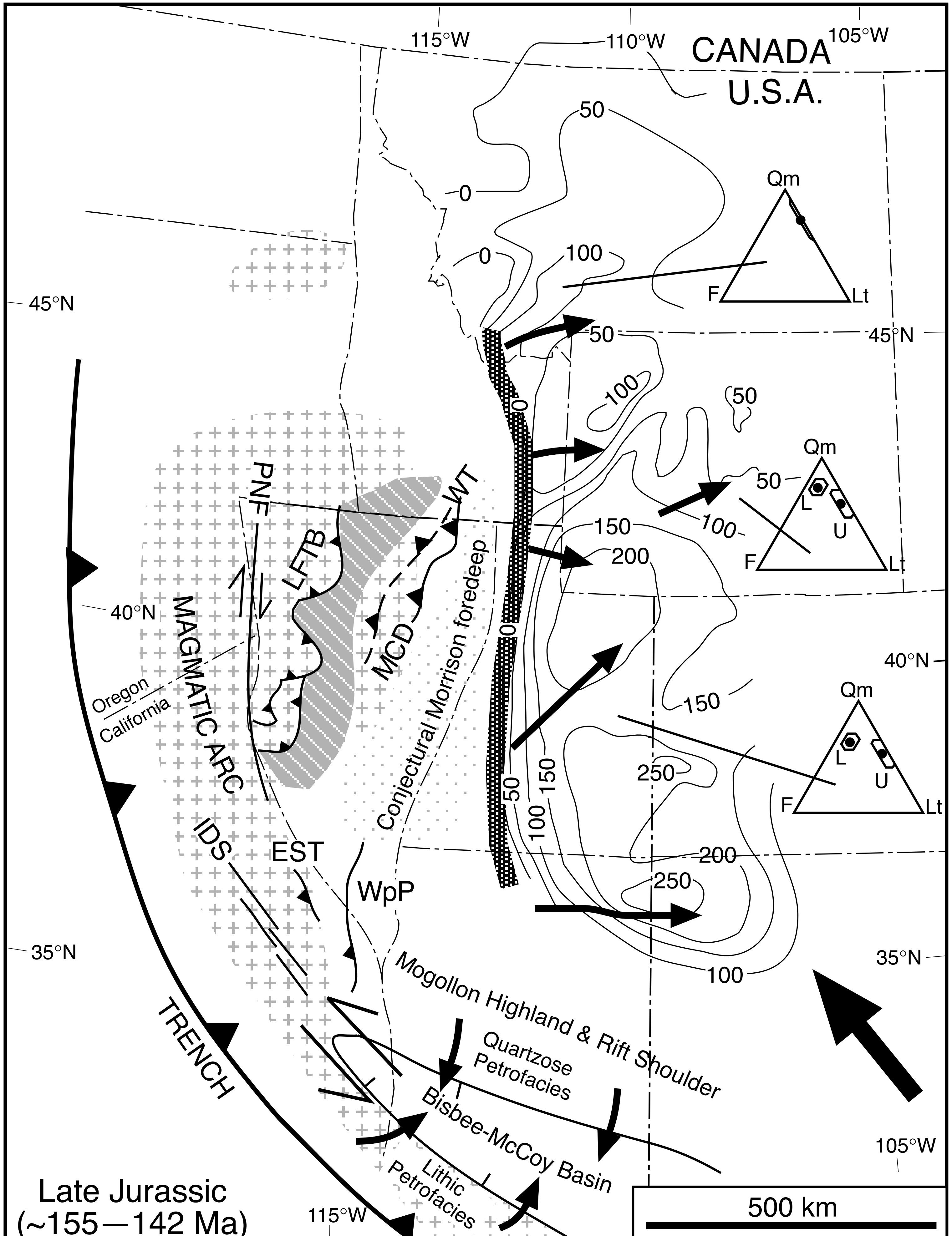


Fig. 2. Tectonic map of the western United States, showing the major components of the Cordilleran orogenic belt. The initial Sr ratio line is taken to represent the approximate western edge of North American cratonic basement (Armstrong and others, 1977; Kistler and Peterman, 1978). Abbreviations as follows: CRO, Coast Range ophiolite; LFTB, Luning-Fencemaker thrust belt; CNTB, Central Nevada thrust belt; WH, Wasatch hinge line; UU, Uinta Mountains uplift; CMB, Crazy Mountains basin; PRB, Powder River basin; DB, Denver basin; RB, Raton basin. Precambrian shear zones after Karlstrom and Williams (1998).

DeCelles, *Am J Sci*, 2004



DeCelles, *Am J Sci*, 2004

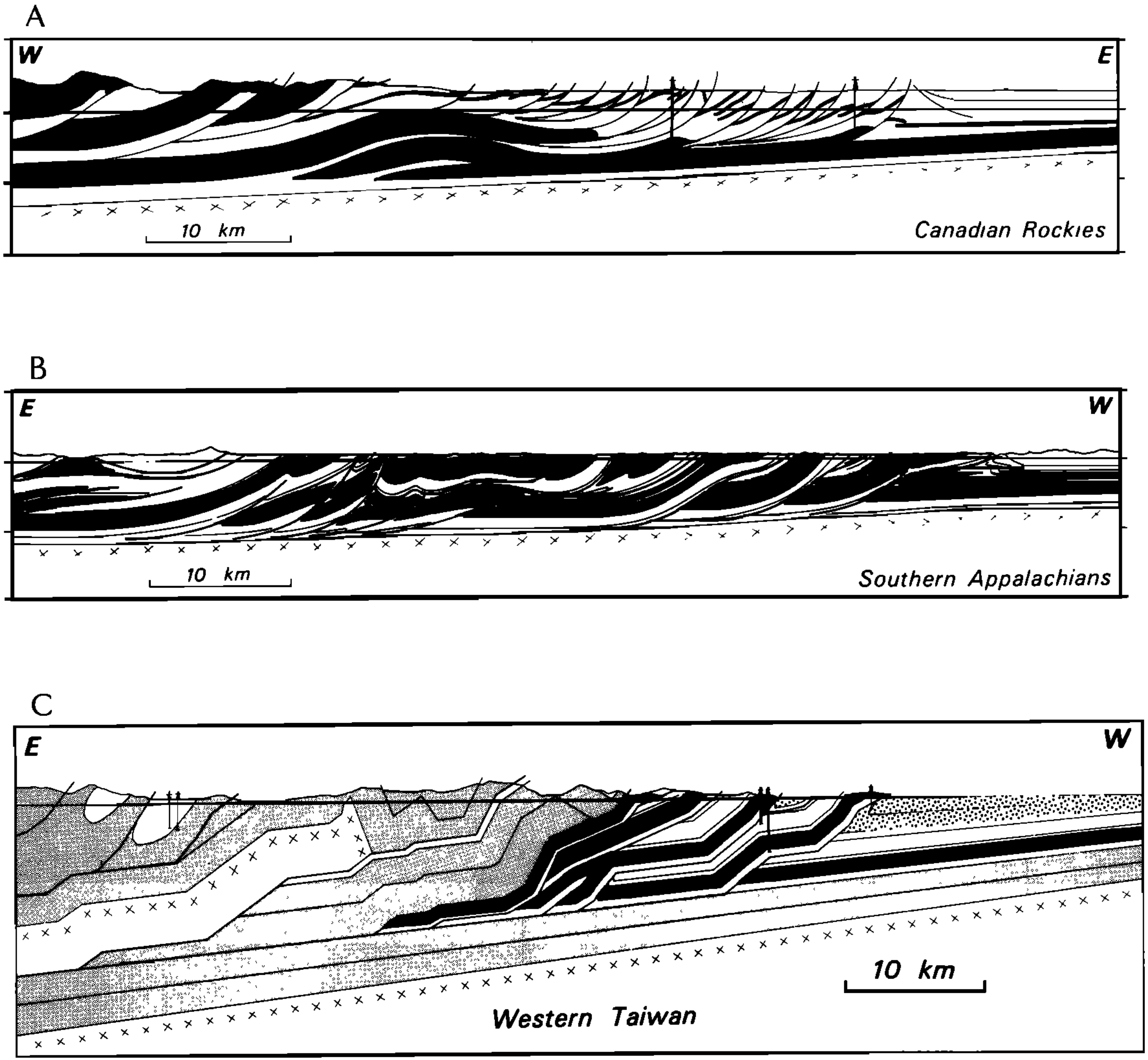
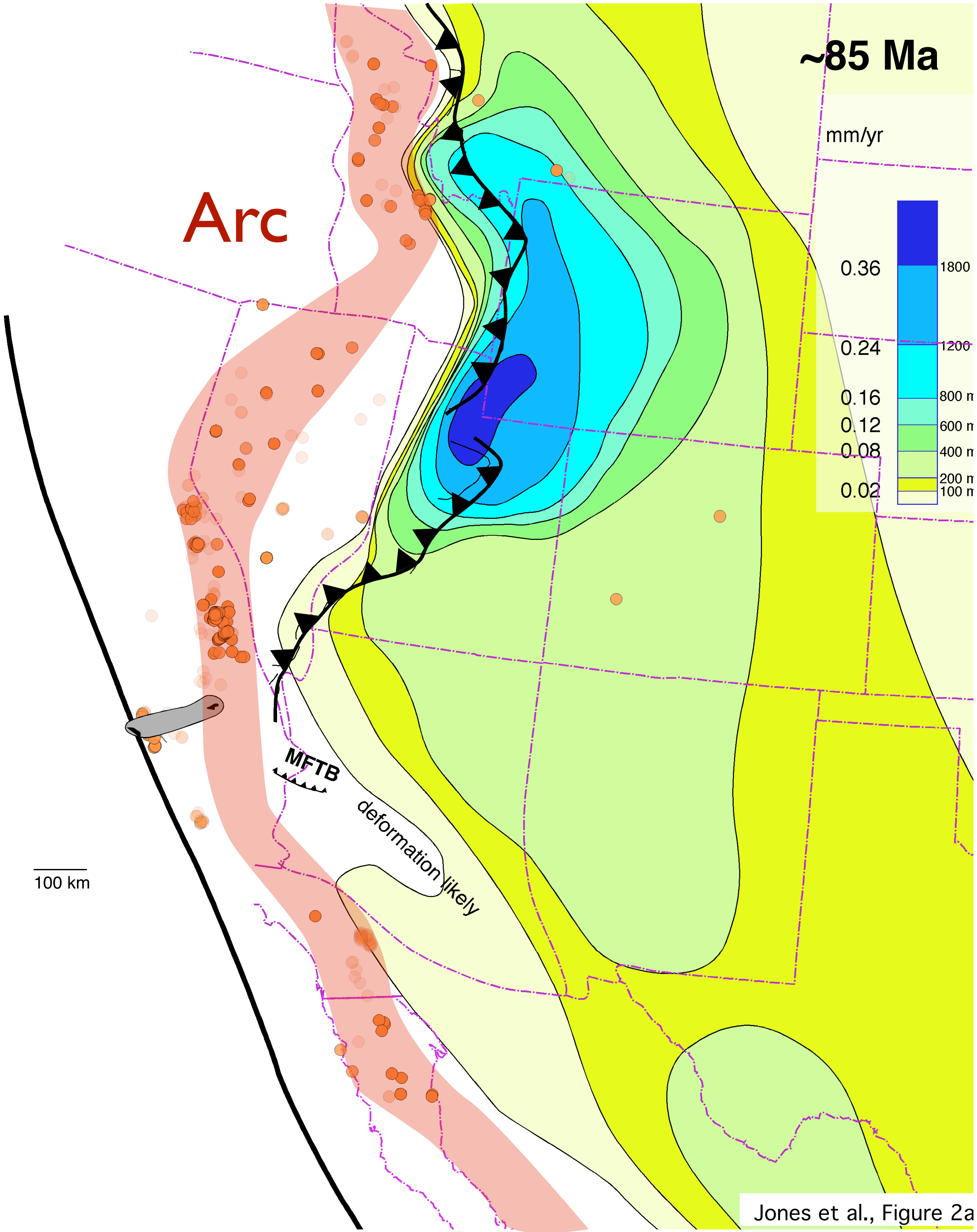


Fig. 1. Cross sections of several foreland fold-and-thrust belts: (*a*) Canadian Rockies [after *Bally et al.*, 1966], (*b*) southern Appalachians [after *Roeder et al.*, 1978], and (*c*) western Taiwan [after *Suppe*, 1980*a*].

Davis et al., JGR, 1984



Sevier orogeny

Classic “Andean margin”
- -arc
- -fold-and-thrust
- -foredeep

Jones et al., Subm. Geosphere 2009

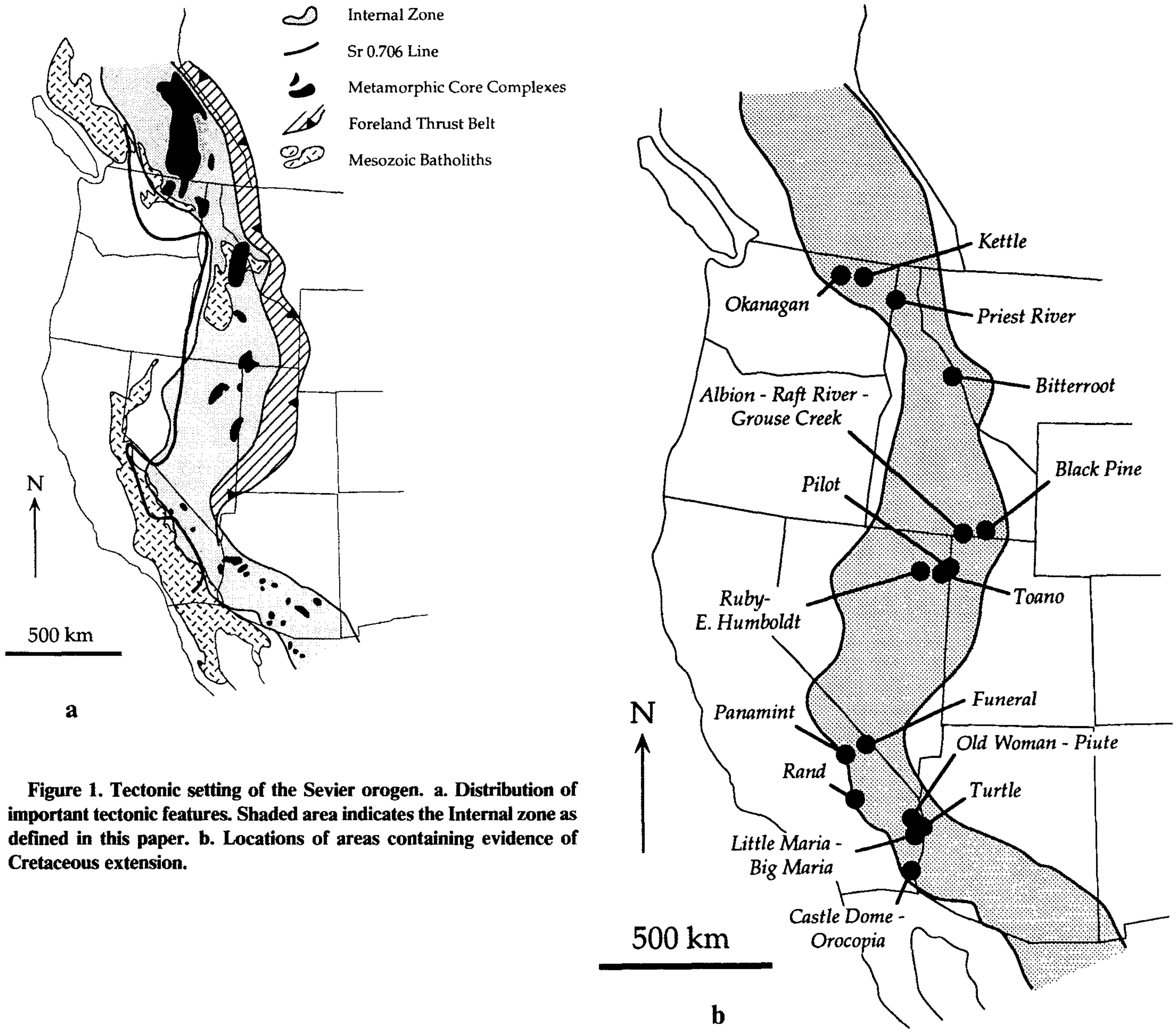


Figure 1. Tectonic setting of the Sevier orogen. a. Distribution of important tectonic features. Shaded area indicates the Internal zone as defined in this paper. b. Locations of areas containing evidence of Cretaceous extension.

Hodges & Walker, GSA Bull., 1992

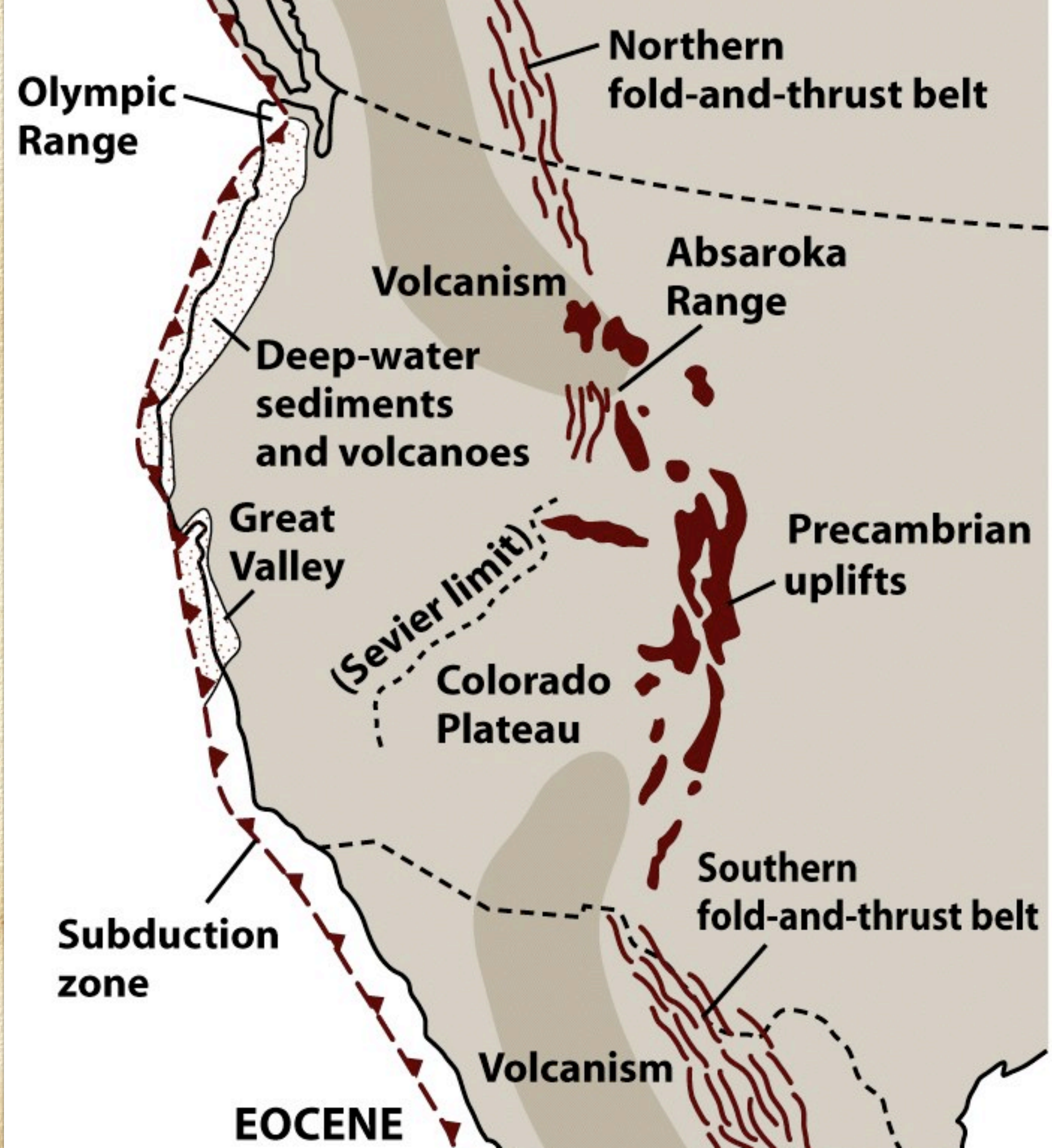
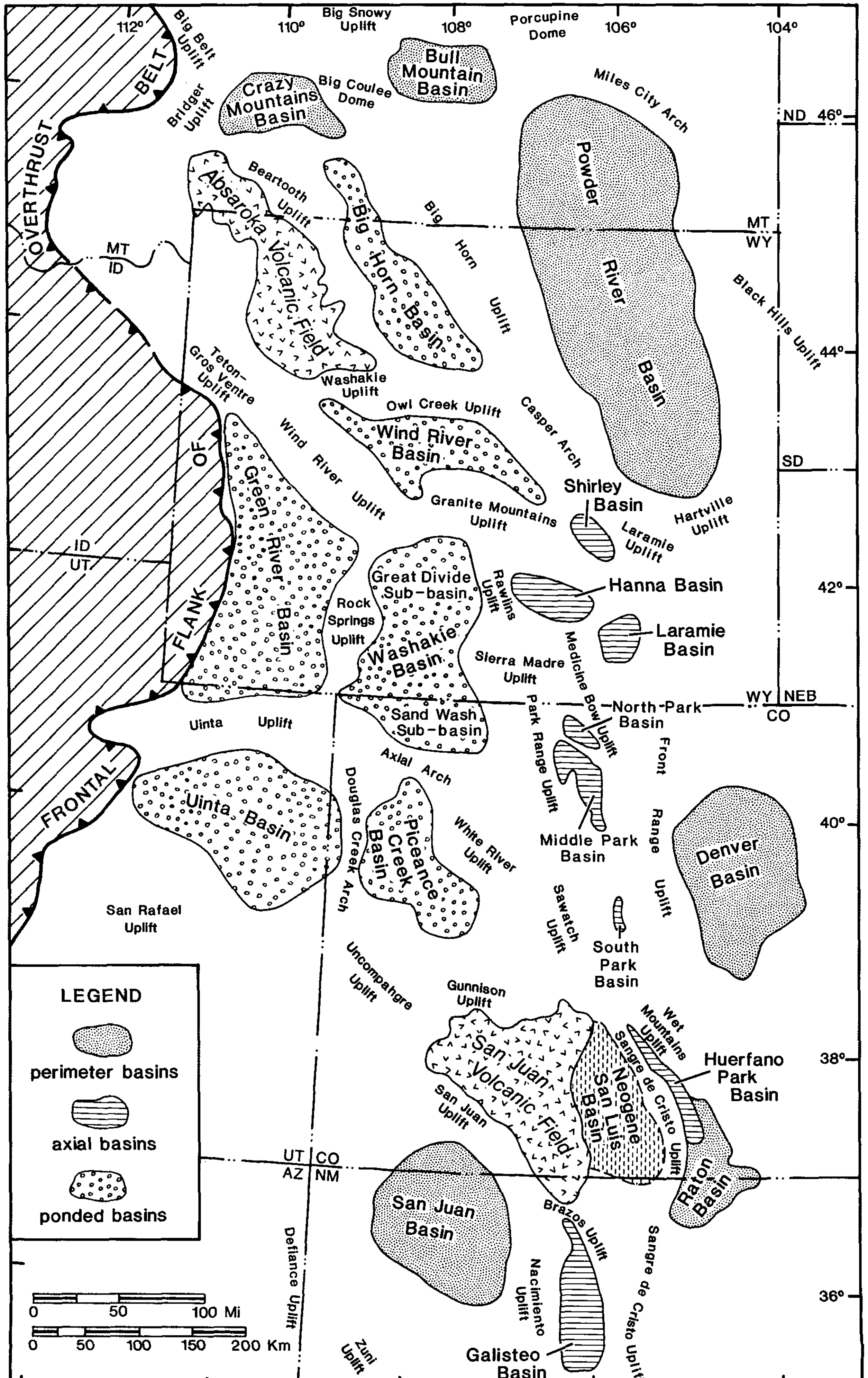
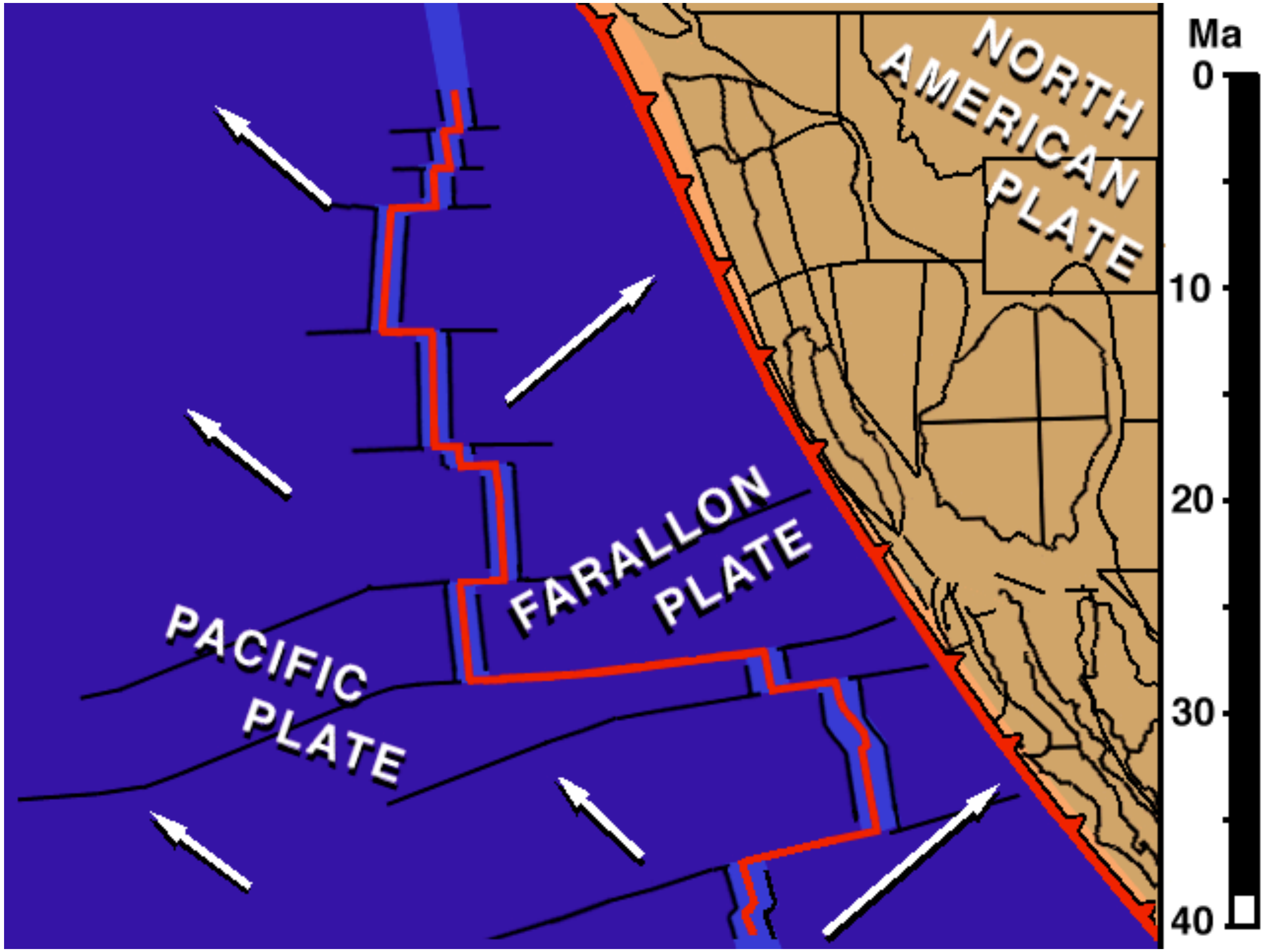

Northern
fold-and-thrust belt
Olympic
Range
Absaroka
Range
Volcanism
Deep-water
sediments
and volcanoes
Great
Valley
Precambrian
uplifts
(Sevier limit)
Colorado
Plateau
Southern
fold-and-thrust belt
Subduction
zone
Volcanism
EOCENE

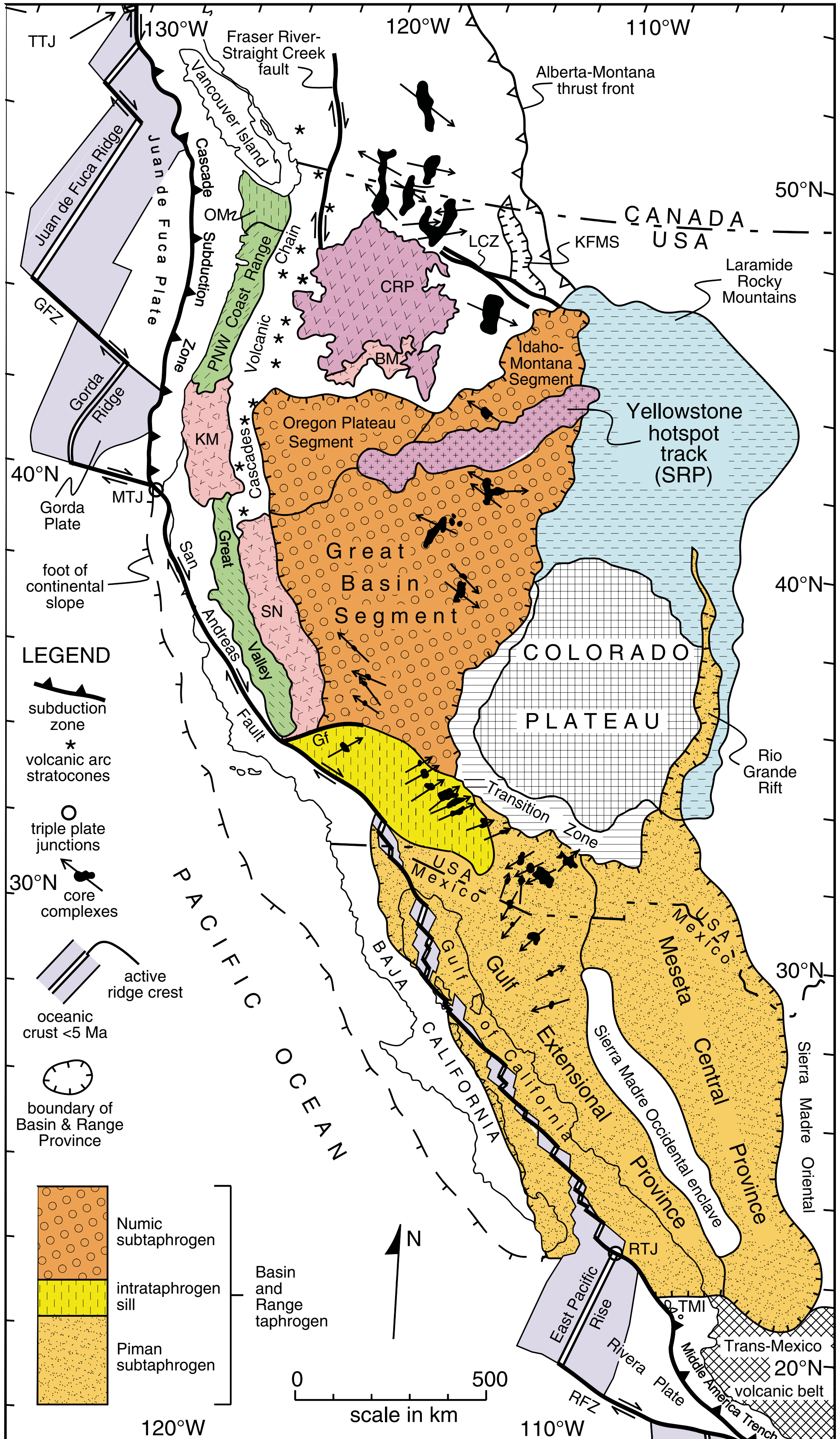
Figure 2. Distribution of key Laramide sedimentary basins and intervening uplifts in the Rocky Mountain region between central Montana and central New Mexico. Eocene Absaroka and Oligocene San Juan volcanic fields mask Laramide relations locally.

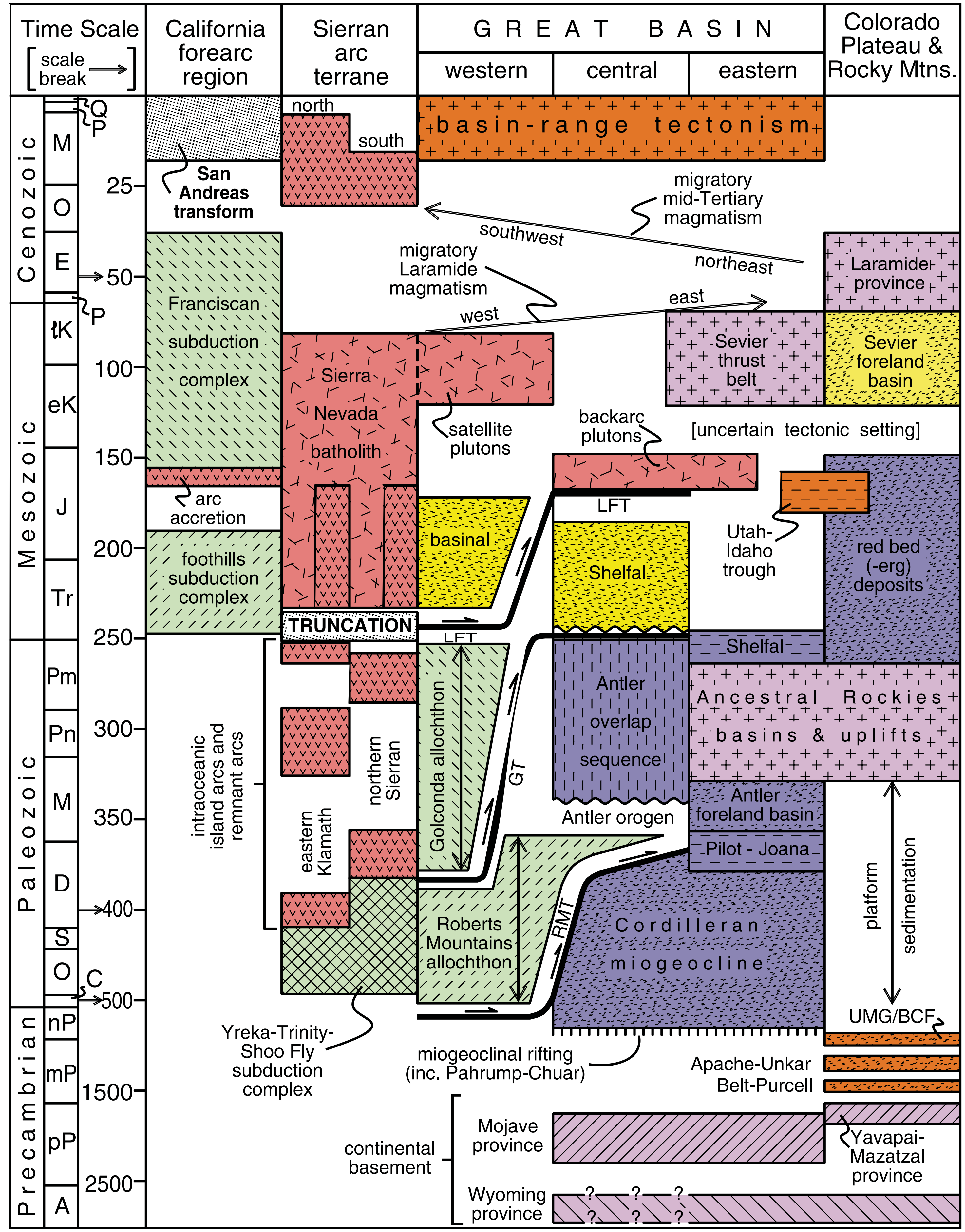


Dickinson et al., GSA Bull 1988

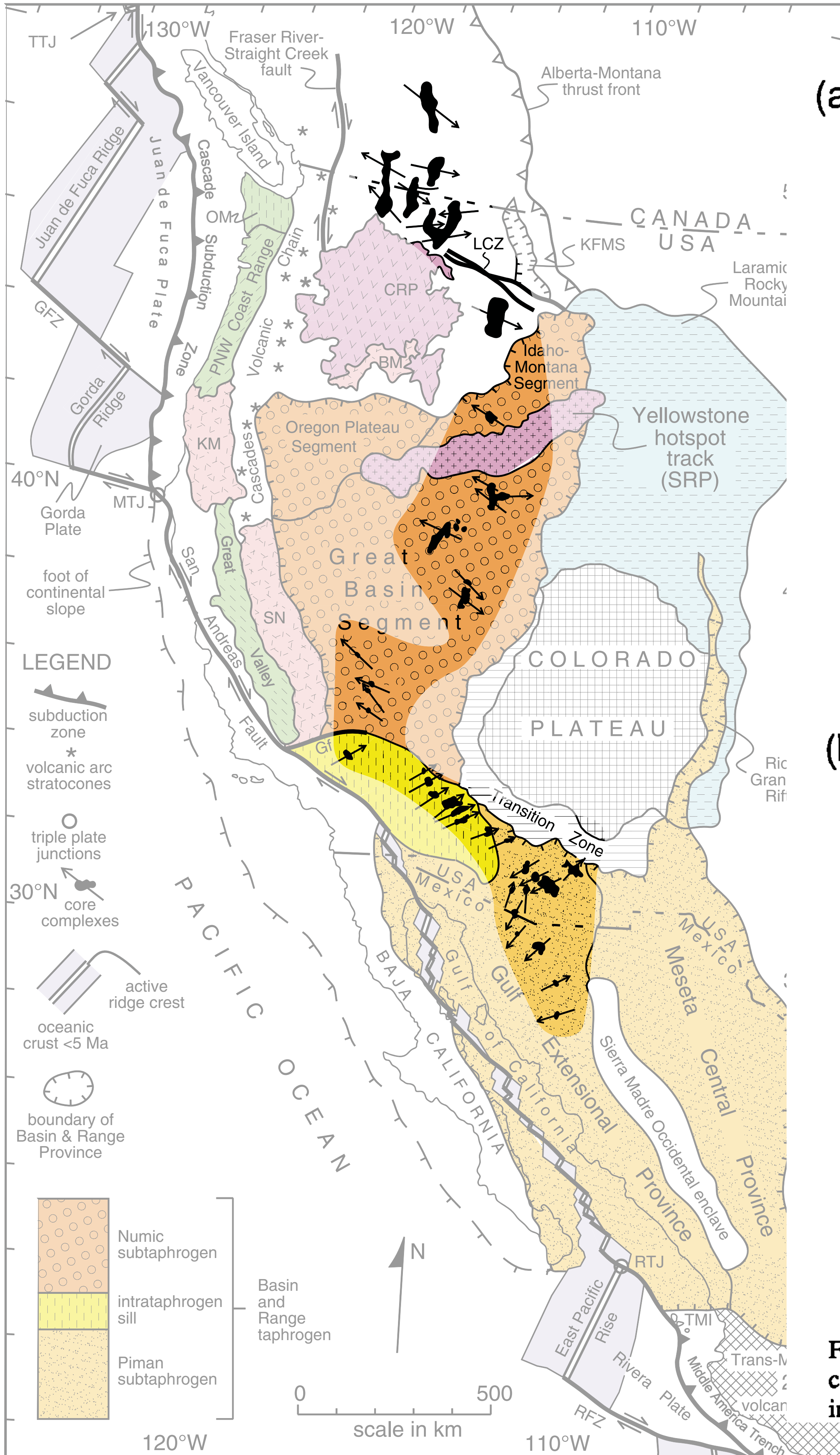


T. Atwater animation
http://emvc.geol.ucsb.edu/2_infopgs/IP4WNACal/bNEPacWNoAmer.html





Dickinson, Geosphere, 2006



Dickinson, Geosphere, 2006

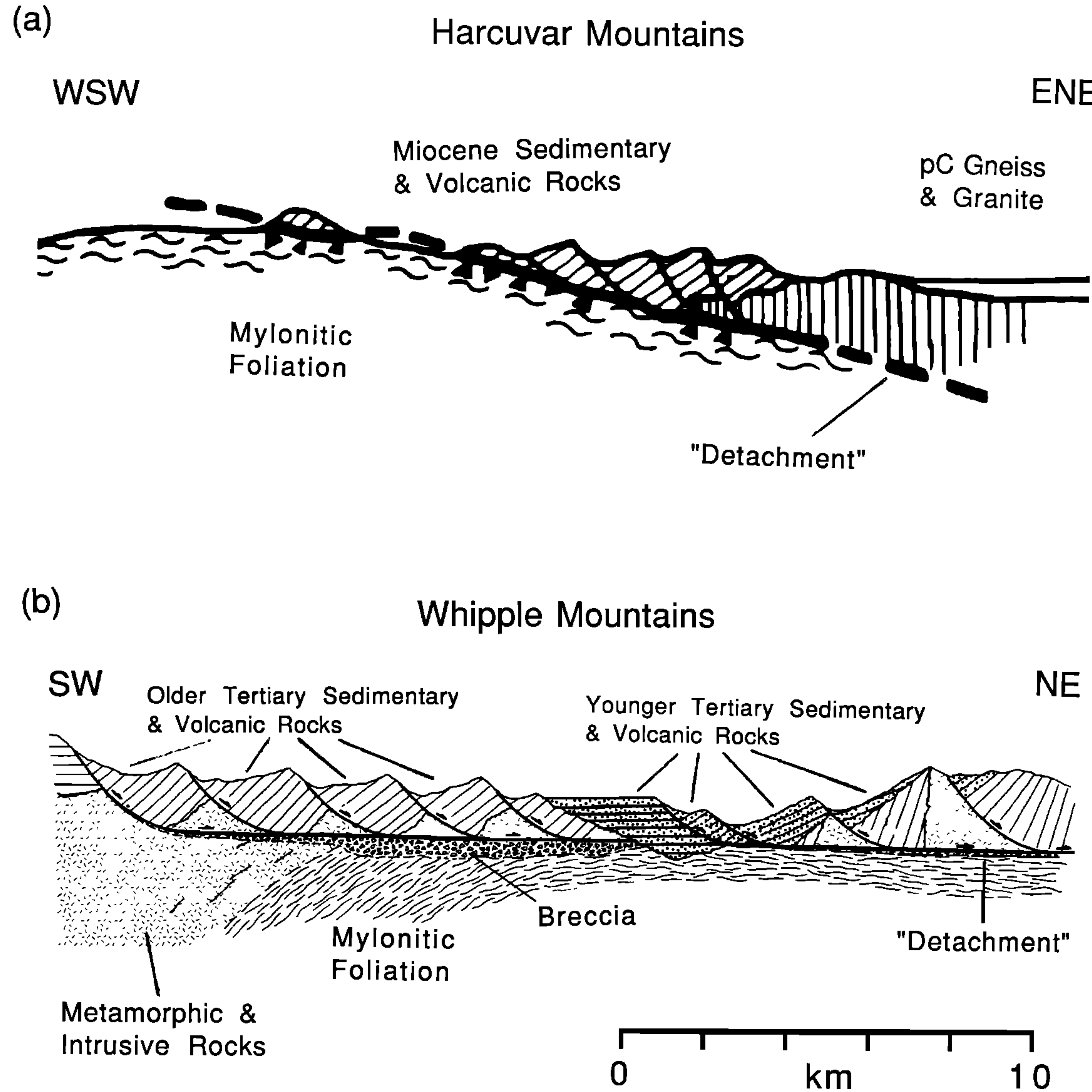
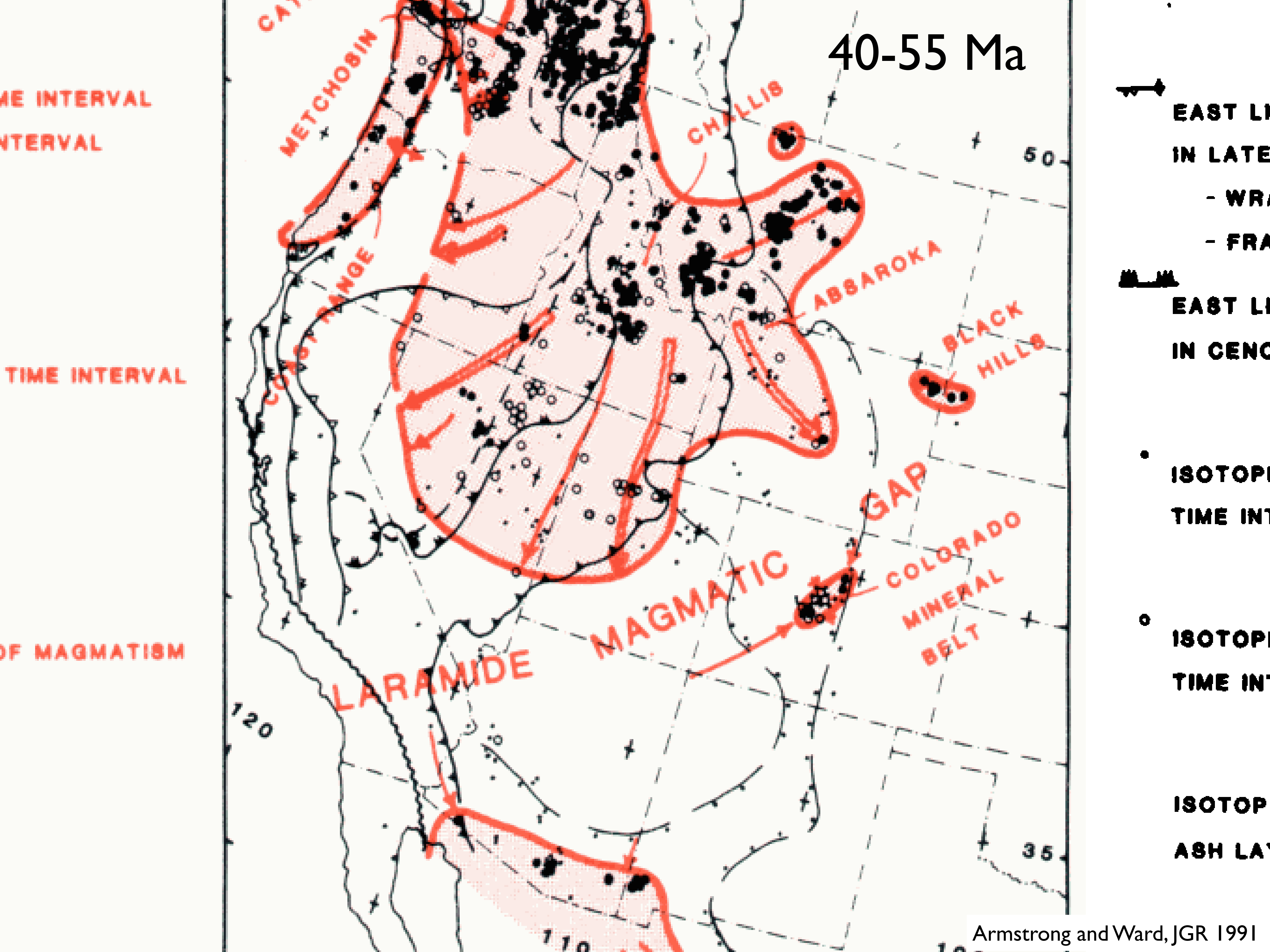


Fig. 1. Interpretative cross sections of two metamorphic core complexes showing features common to many core complexes: (a) the Harcuvar Mountains in Arizona [after Rehrig and Reynolds, 1980] and (b) the Whipple Mountains in California with inferred doming removed [after Davis, 1980].

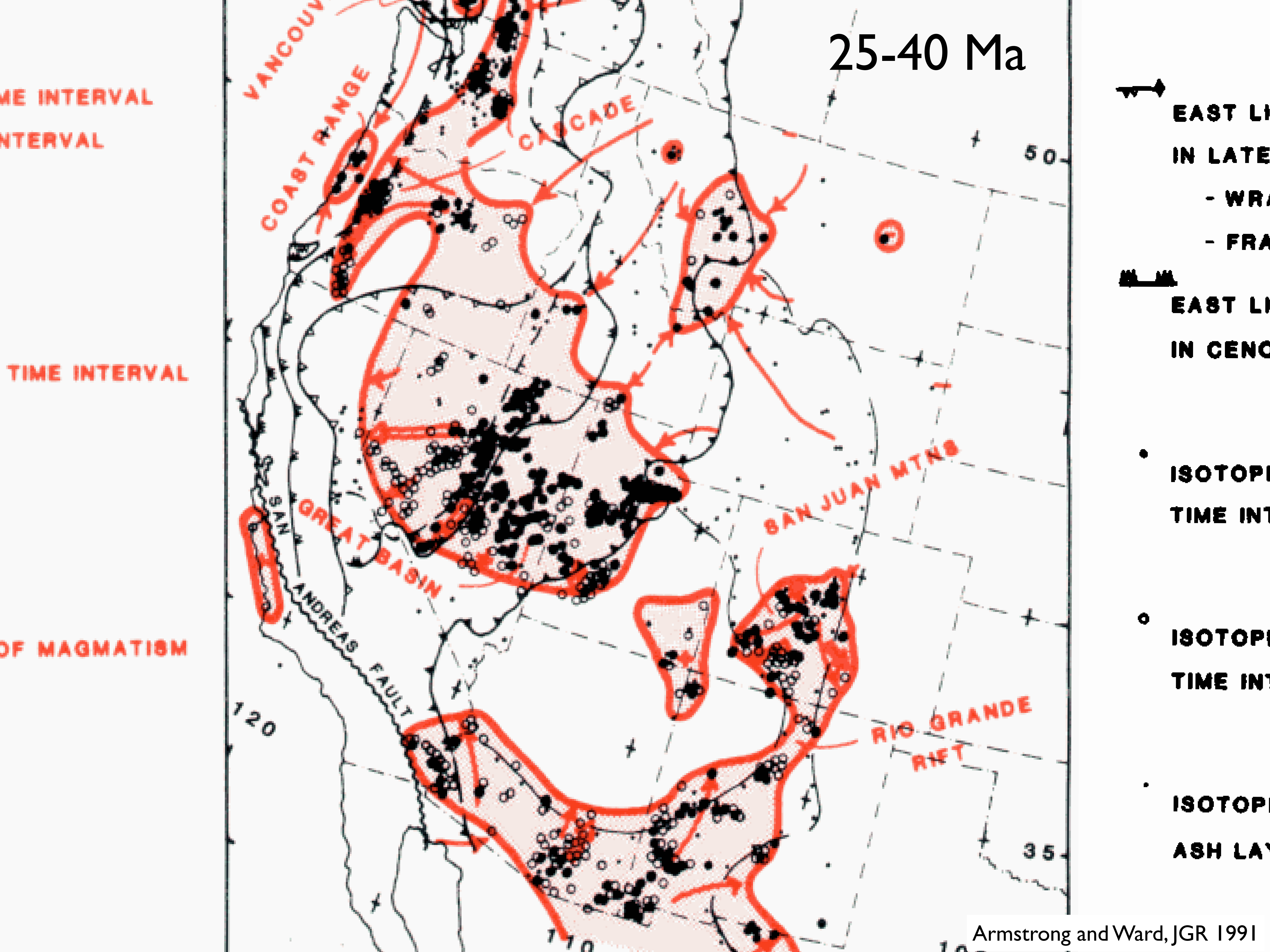
Buck, Tectonics, 1988

40-55 Ma

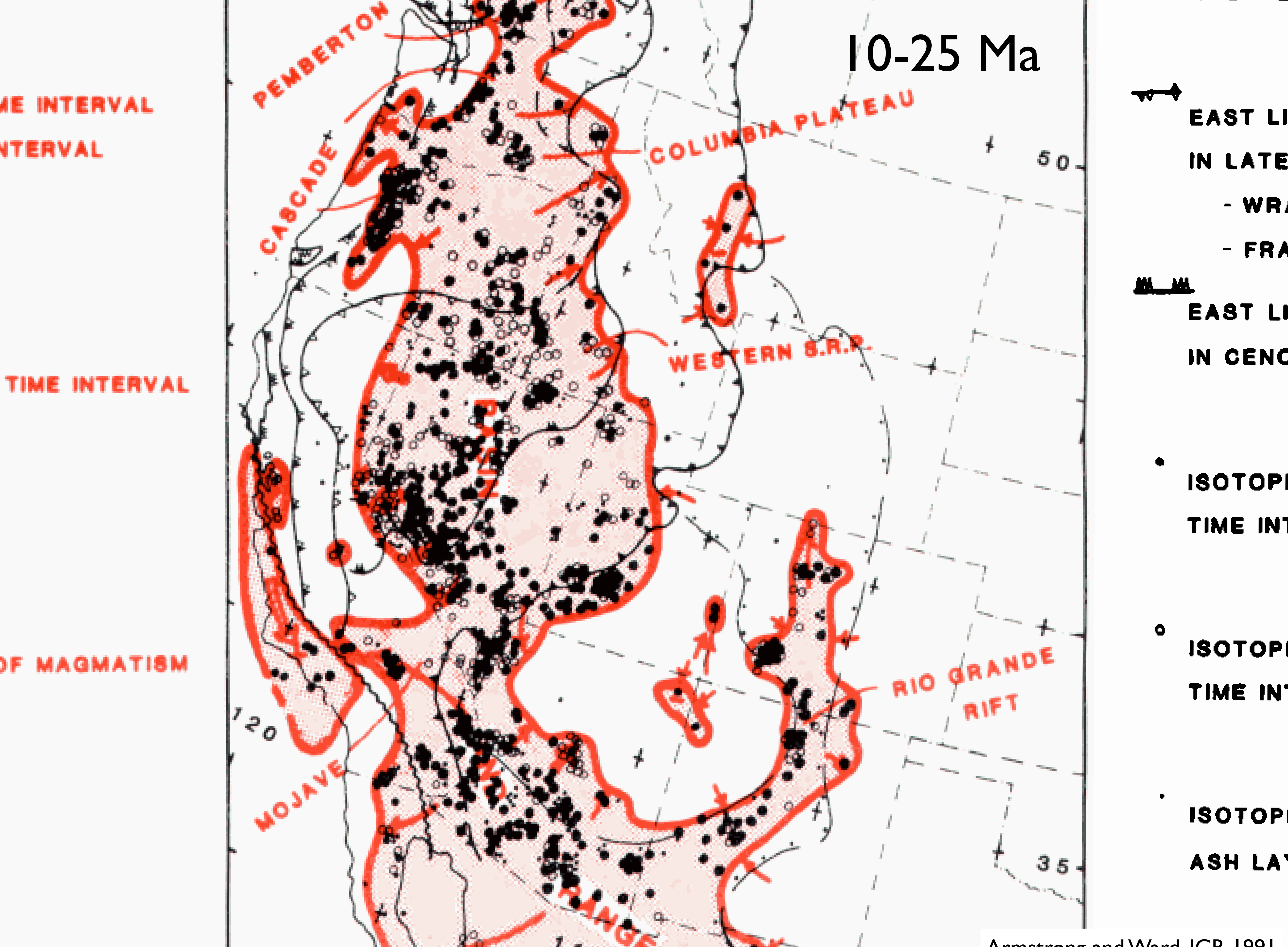


Armstrong and Ward, JGR 1991

25-40 Ma

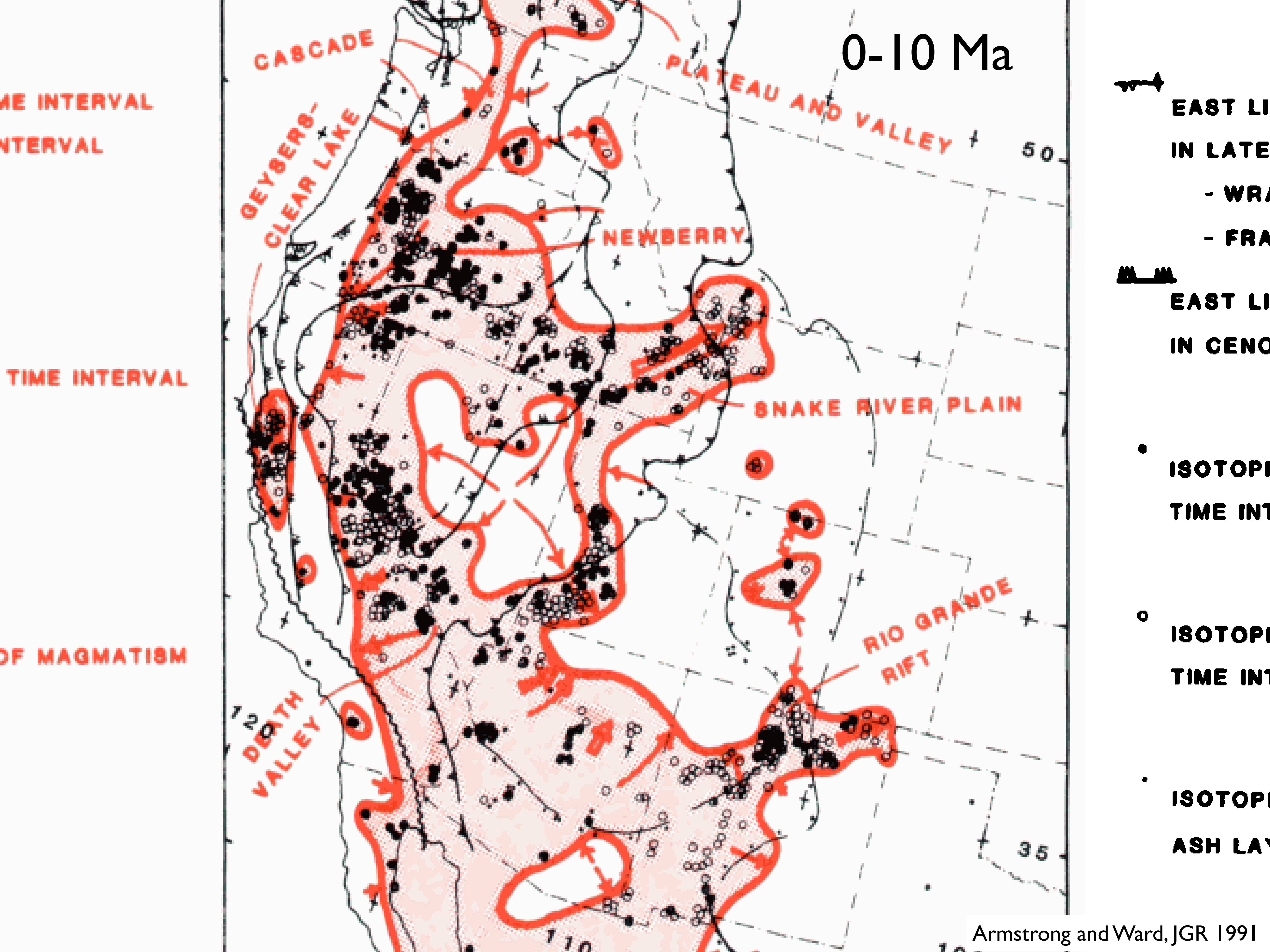


Armstrong and Ward, JGR 1991

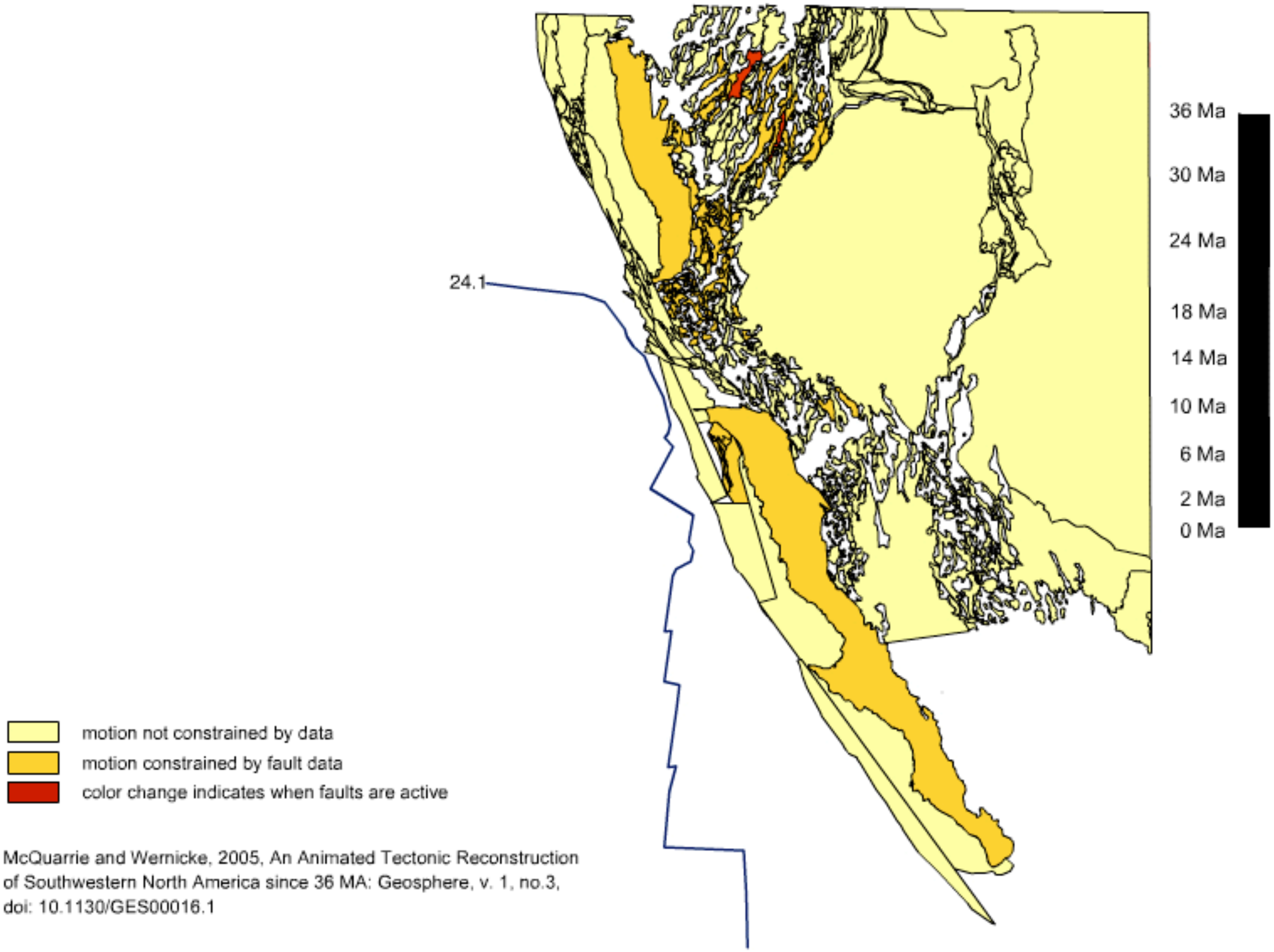


Armstrong and Ward, JGR 1991

0-10 Ma



Armstrong and Ward, JGR 1991



McQuarrie and Wernicke, 2005, An Animated Tectonic Reconstruction of Southwestern North America since 36 MA: Geosphere, v. 1, no.3, doi: 10.1130/GES00016.1

McQuarrie and Wernicke, Geosphere, 2005

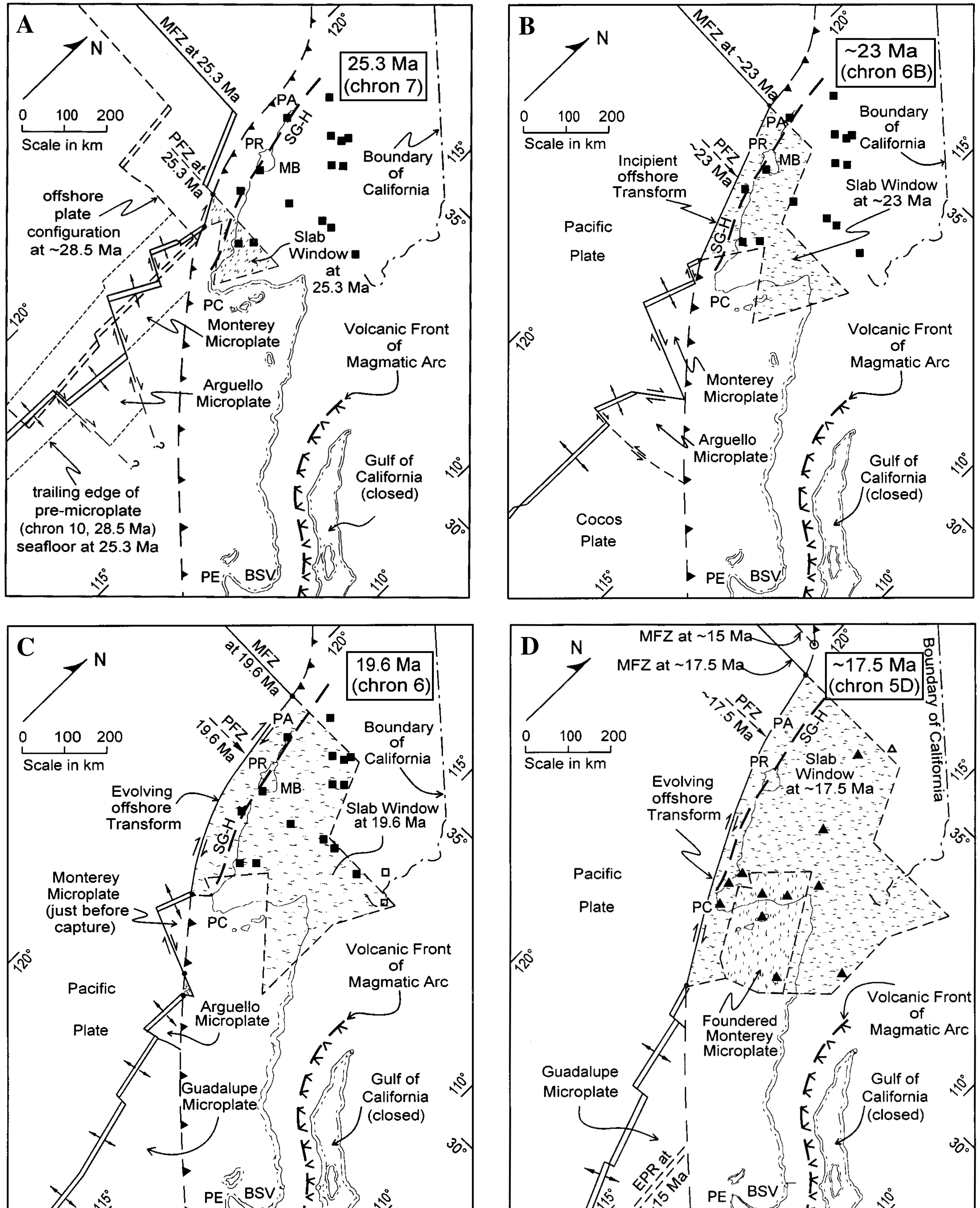
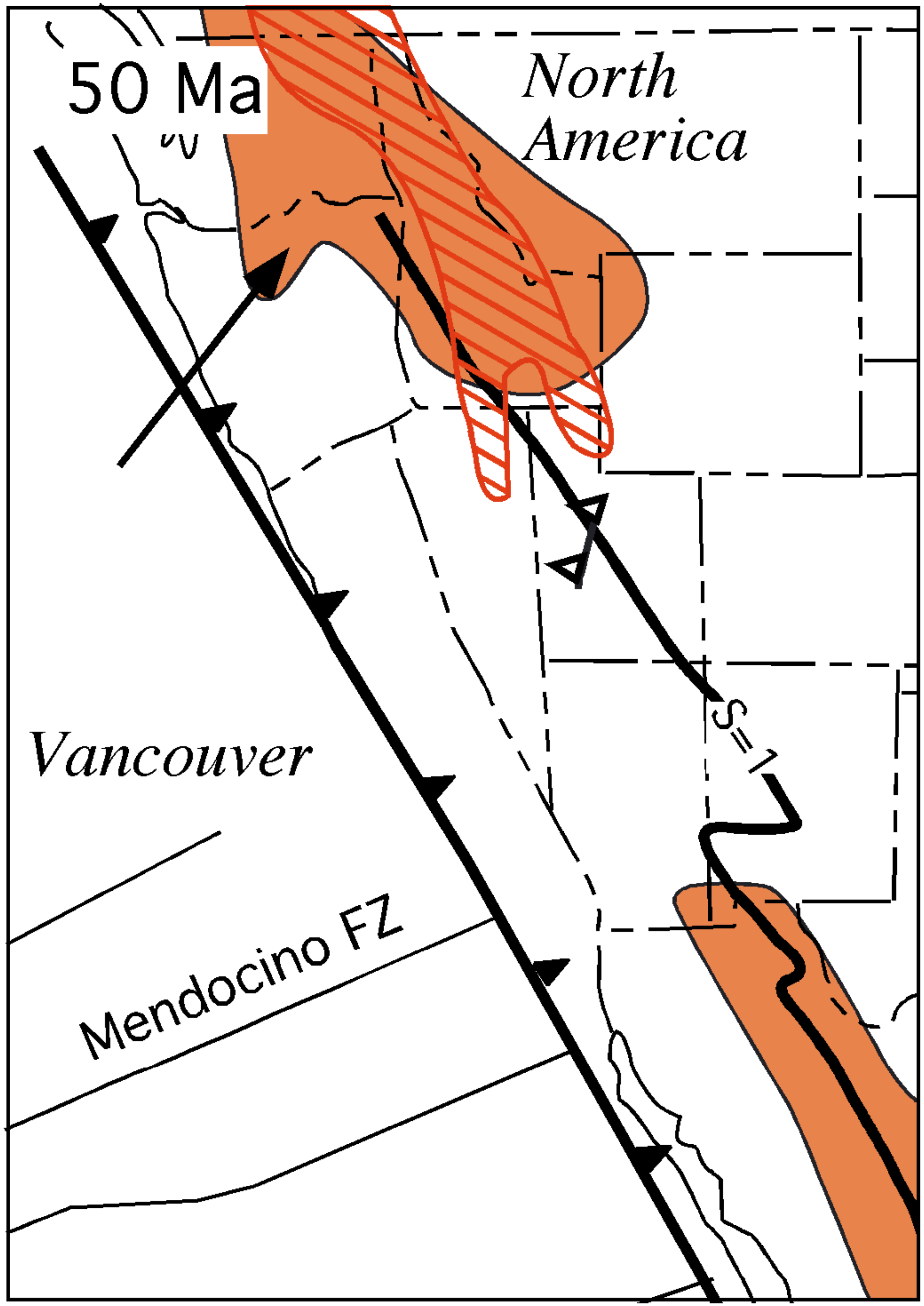
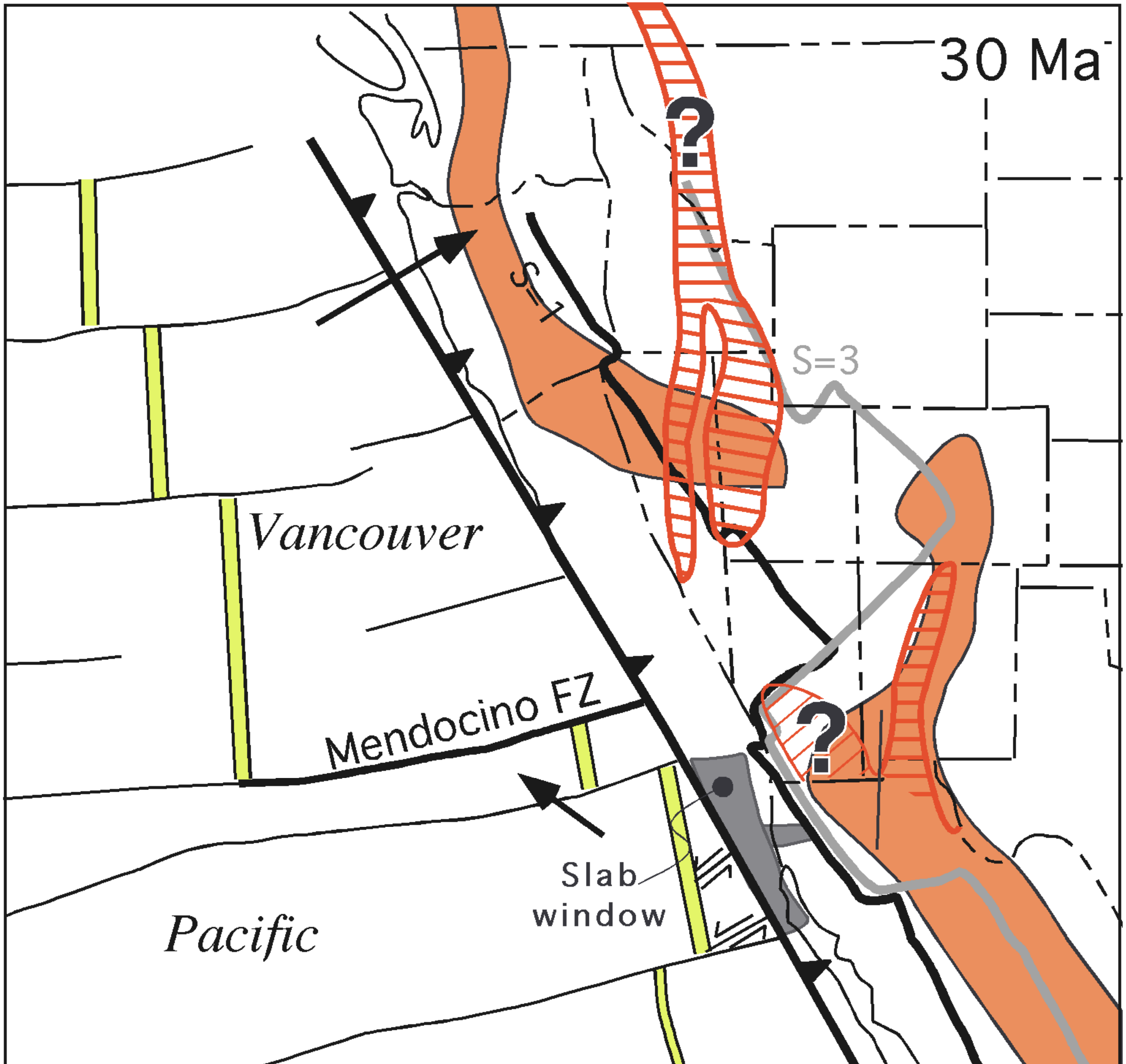
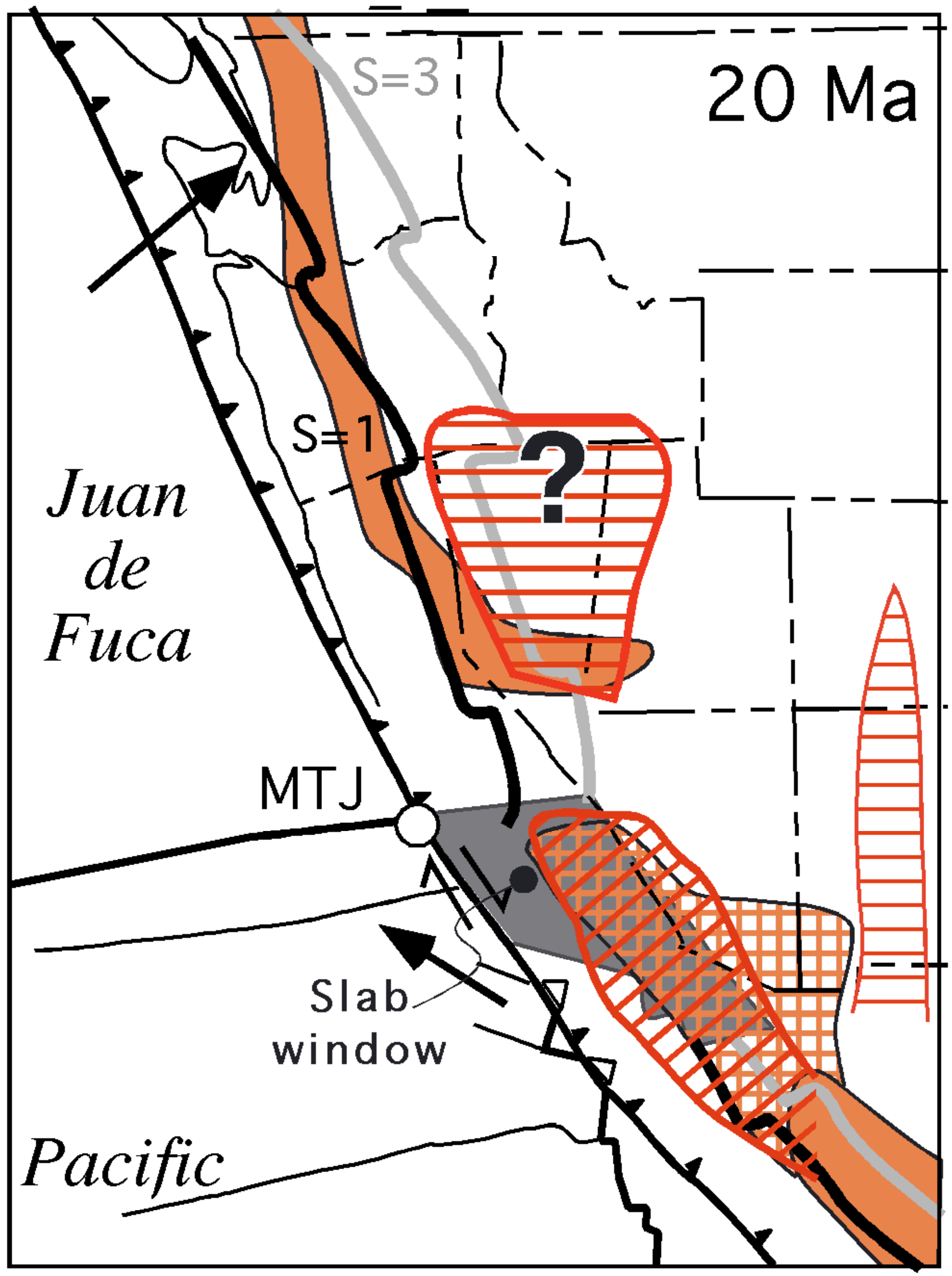


Figure 5.

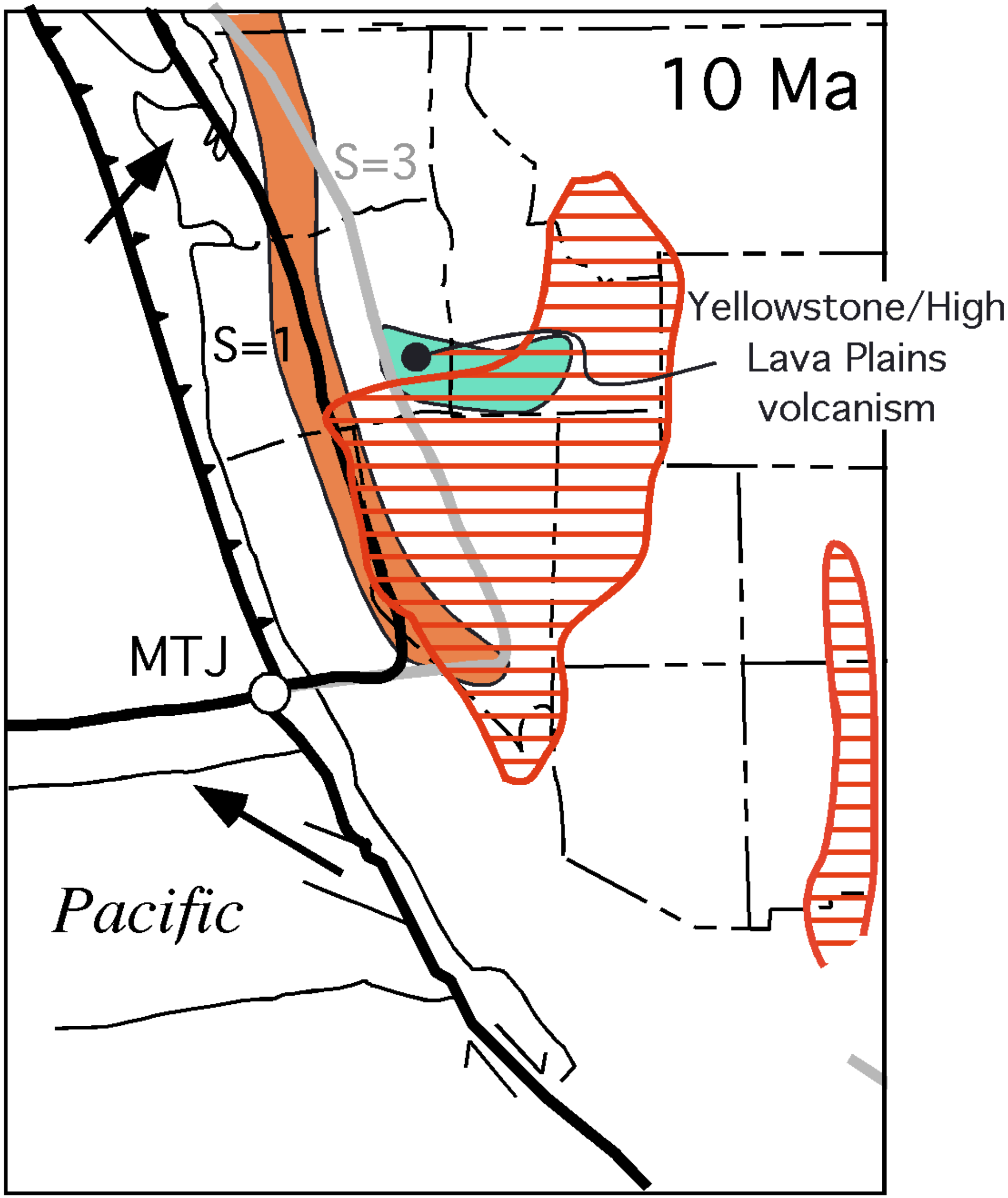
Dickinson, GSA Bull 1997

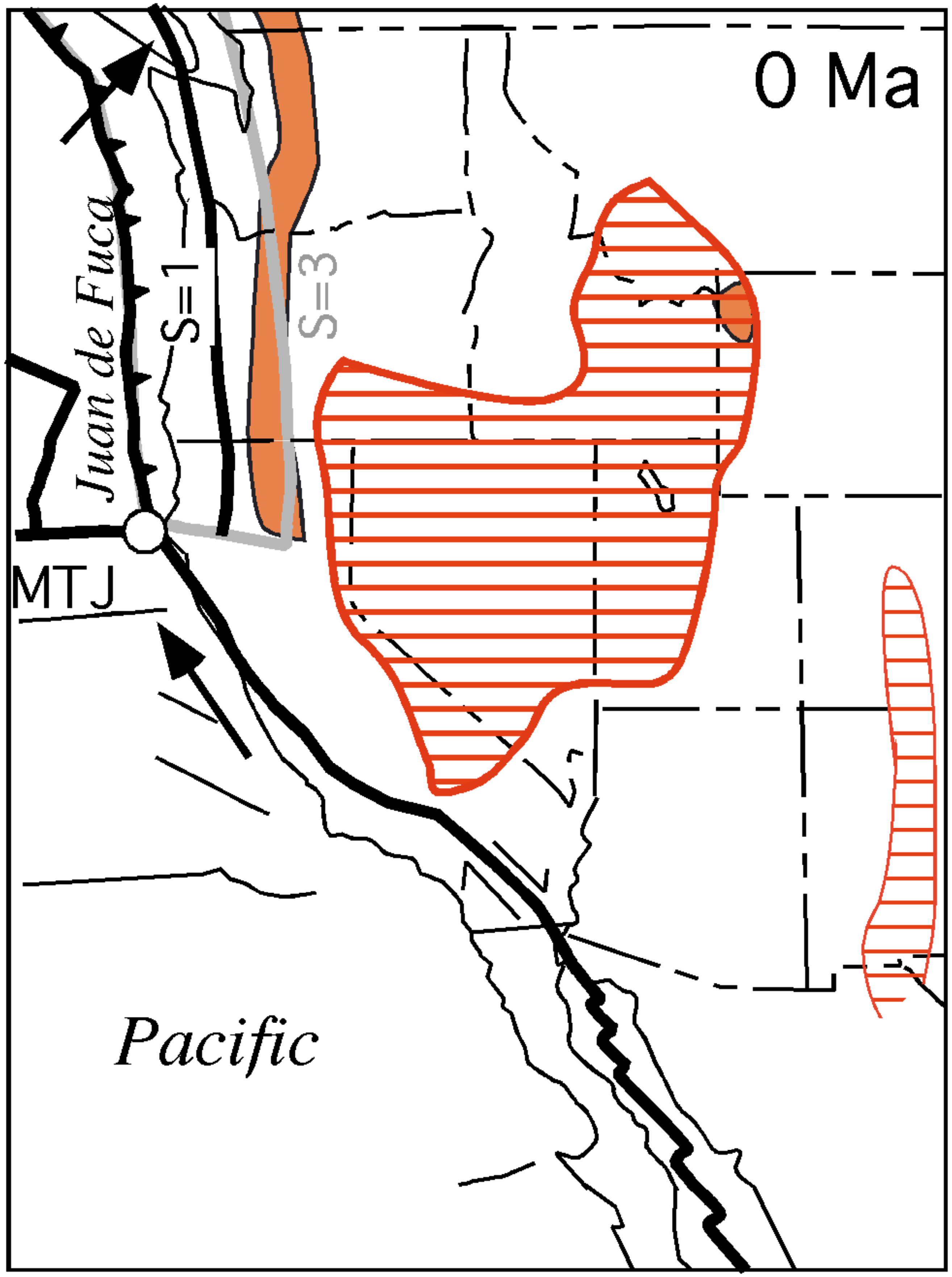

50 Ma
North America
Vancouver
Mendocino FZ
S=1

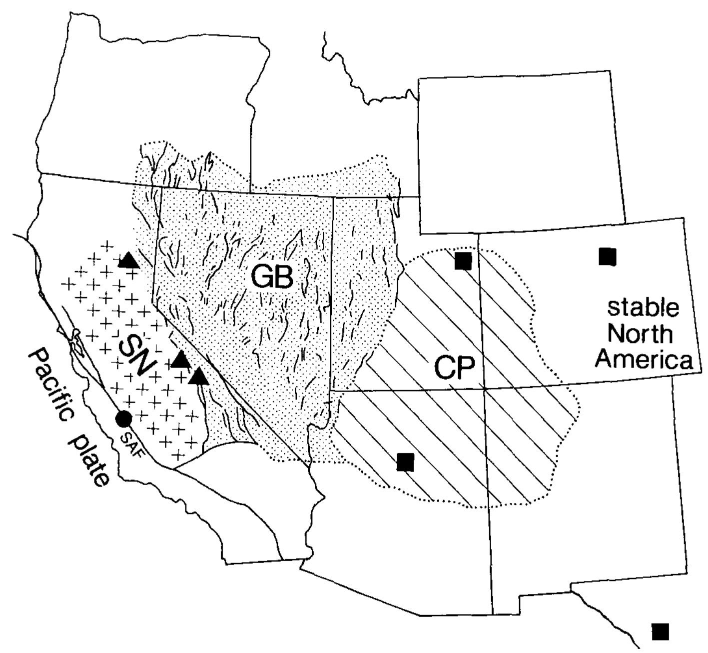

30 Ma
S=1
S=3
Vancouver
Mendocino FZ
Slab
window
Pacific



20 Ma
S=3
S=1
?
Juan
de
Fuca
MTJ
Slab
window
Pacific


10 Ma
S=3
S=1
Yellowstone/High
Lava Plains
volcanism
MTJ
Pacific


0 Ma
Juan de Fuca
S=1
S=3
MTJ
Pacific



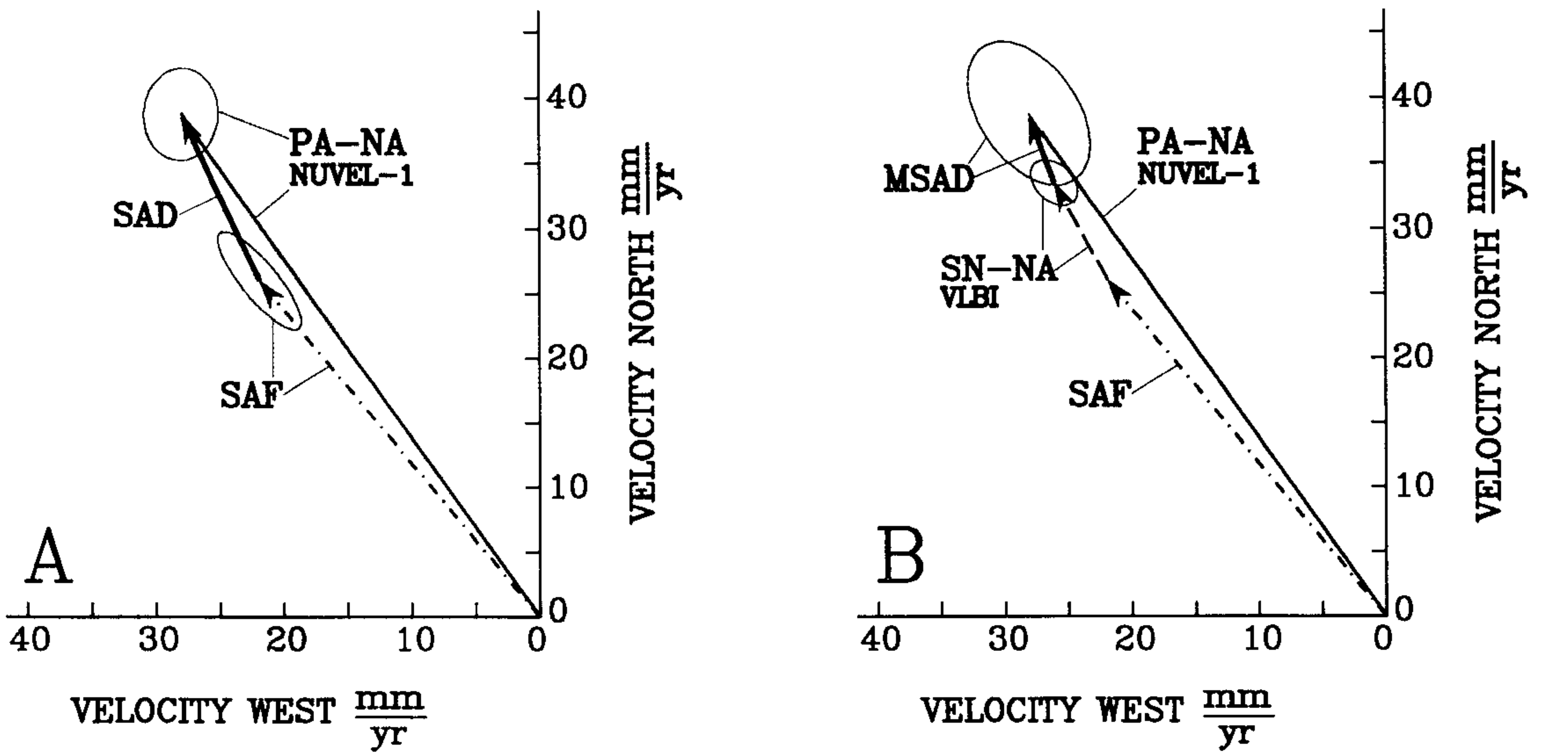
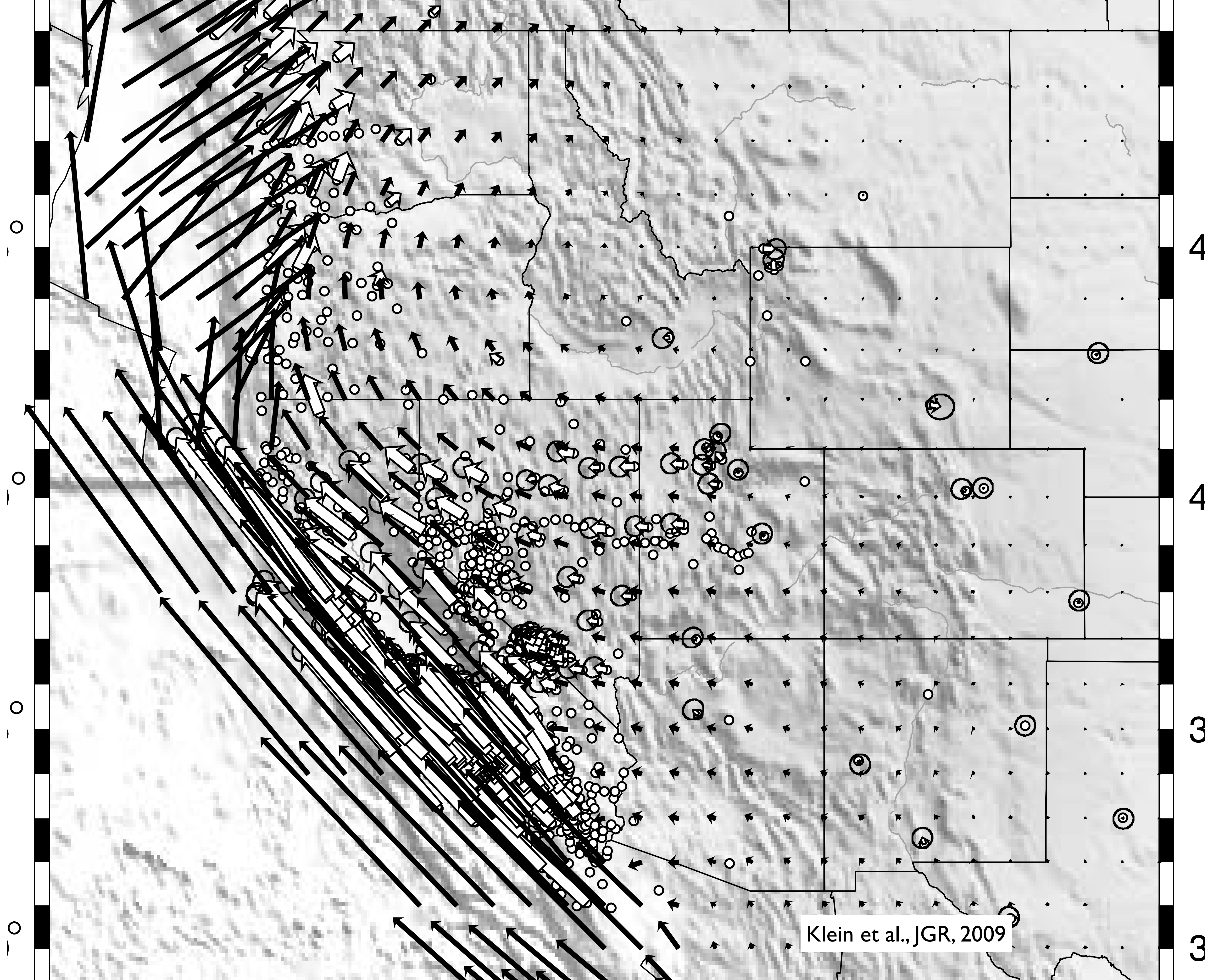
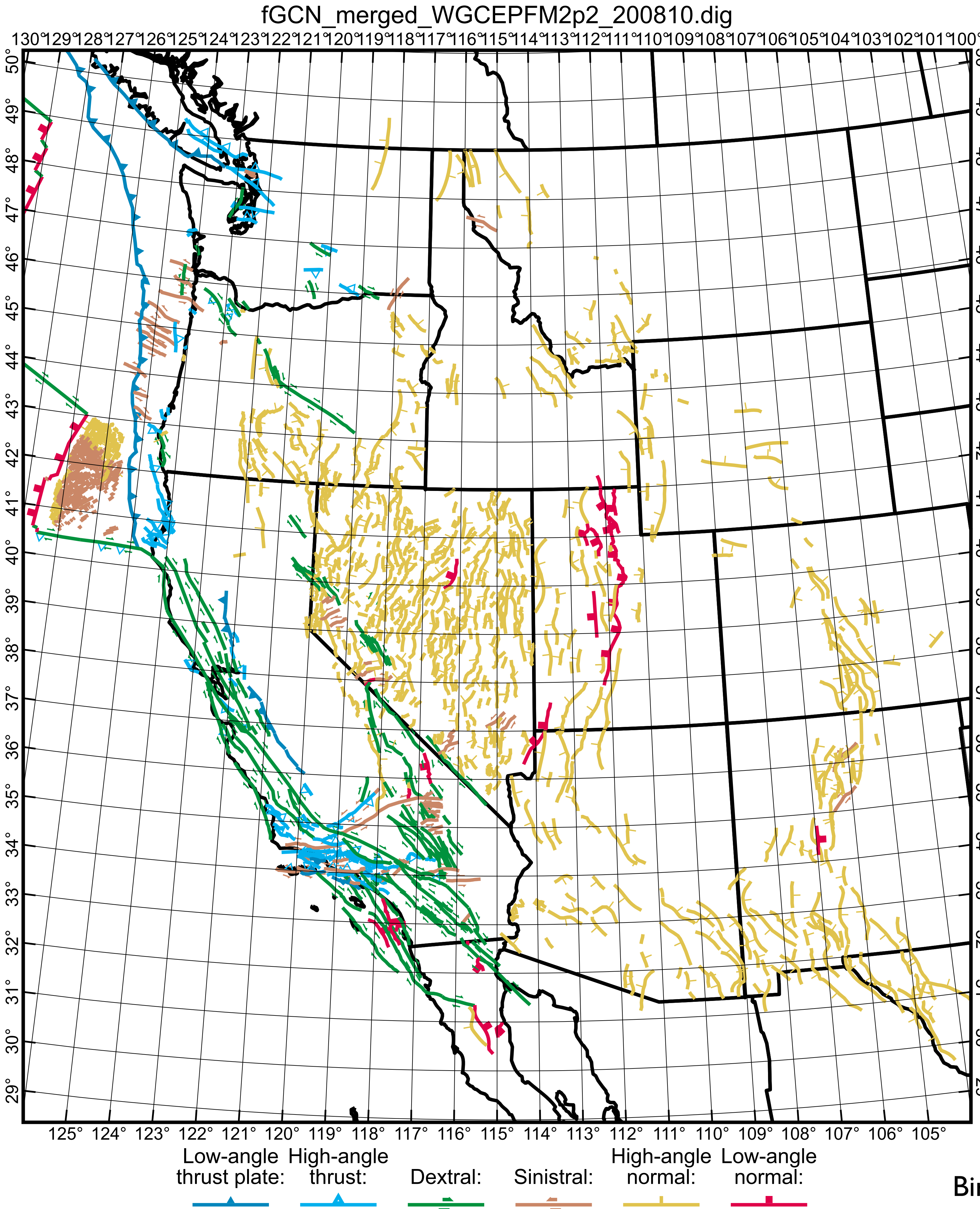


Figure 2. Linear velocity vectors along San Andreas fault at lat 36°N. A: Slip along San Andreas fault (SAF; alternating dash-dot vector) takes up only part of Pacific–North America motion predicted by global-plate-motion model NUVEL-1 (thin solid vector). Vector difference between the two, termed San Andreas discrepancy (SAD; thick solid vector), equals 14 ±2 mm/yr toward N26° ±6°W. Circle and ellipse indicate 95% confidence limits for San Andreas fault slip and for Pacific–North America (PA-NA) motion. B: Vector sum of strike slip along San Andreas fault and Sierra Nevada–North America motion (SN-NA; dashed vector; VLBI = very long baseline interferometry) differs little from Pacific– North America motion. Modified San Andreas discrepancy (MSAD), which equals difference between these two quantities, is 6 ±2 mm/yr toward N20° ±17°W. Ellipses indicate 95% confidence limits for Sierra Nevada–North America motion and for modified San Andreas discrepancy.

Argus and Gordon, Geology, 1991


Klein et al., JGR, 2009



Bird, JGR, 2009