

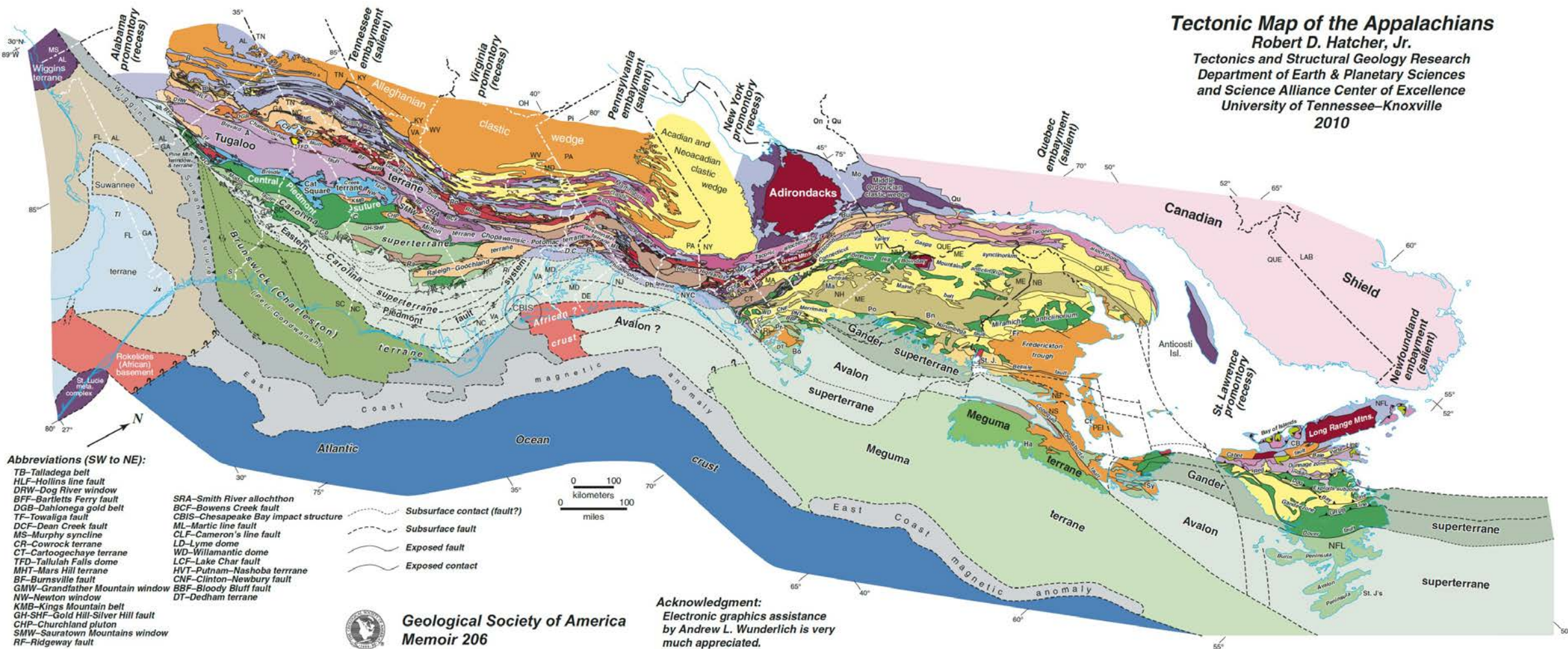
Appalachian Orogen

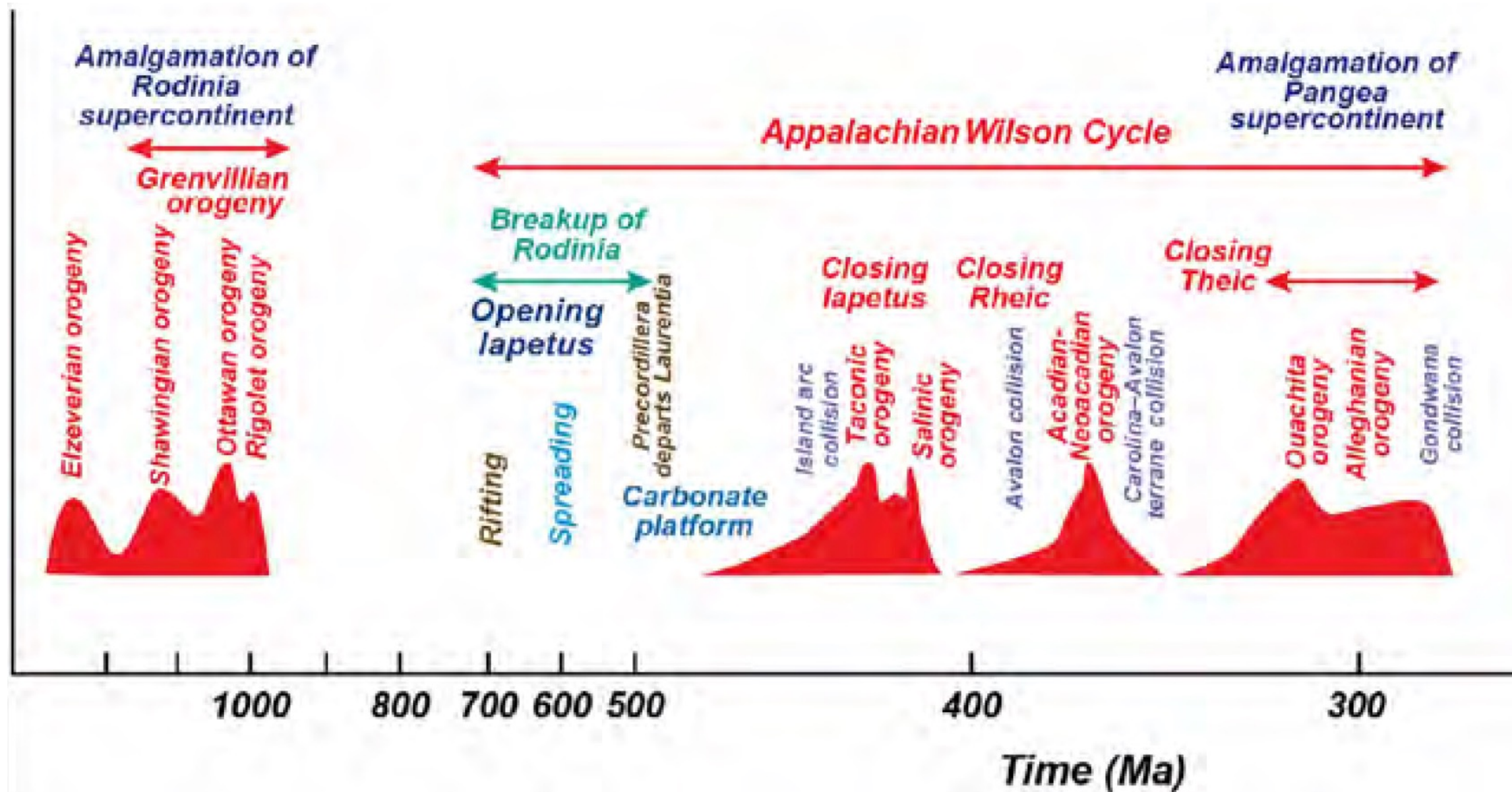
Tectonic Map of the Appalachians

Robert D. Hatcher, Jr.

Tectonics and Structural Geology Research
Department of Earth & Planetary Sciences
and Science Alliance Center of Excellence
University of Tennessee-Knoxville

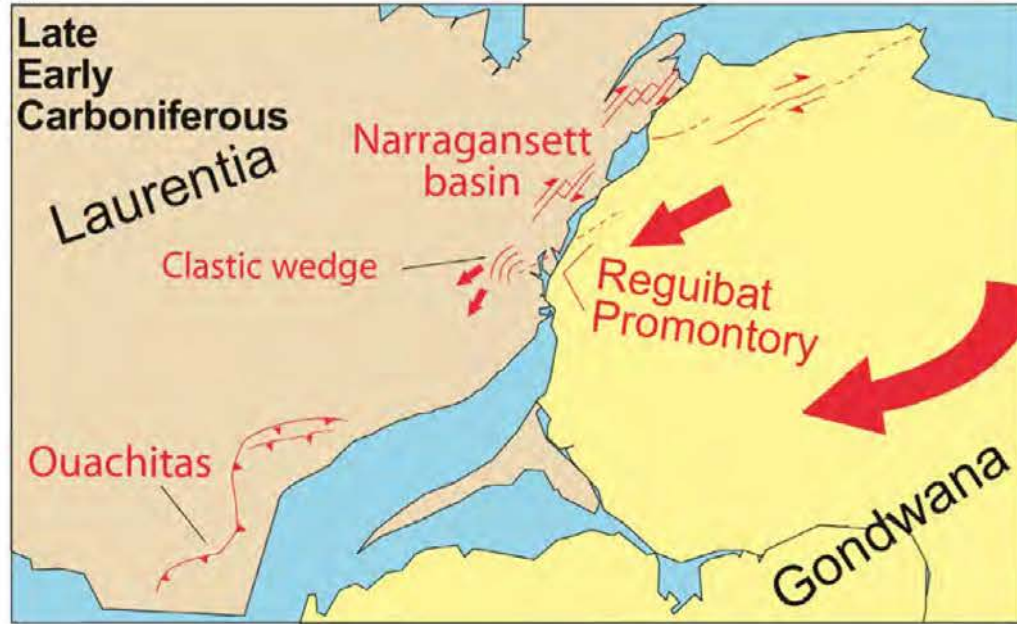
2010



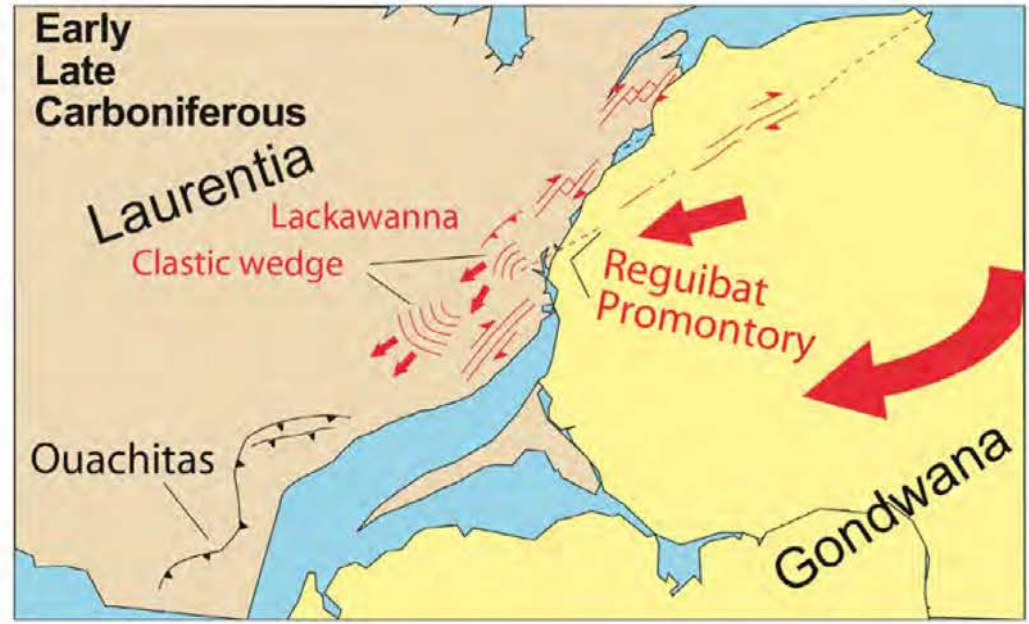


Last Event—Alleghanian Orogeny

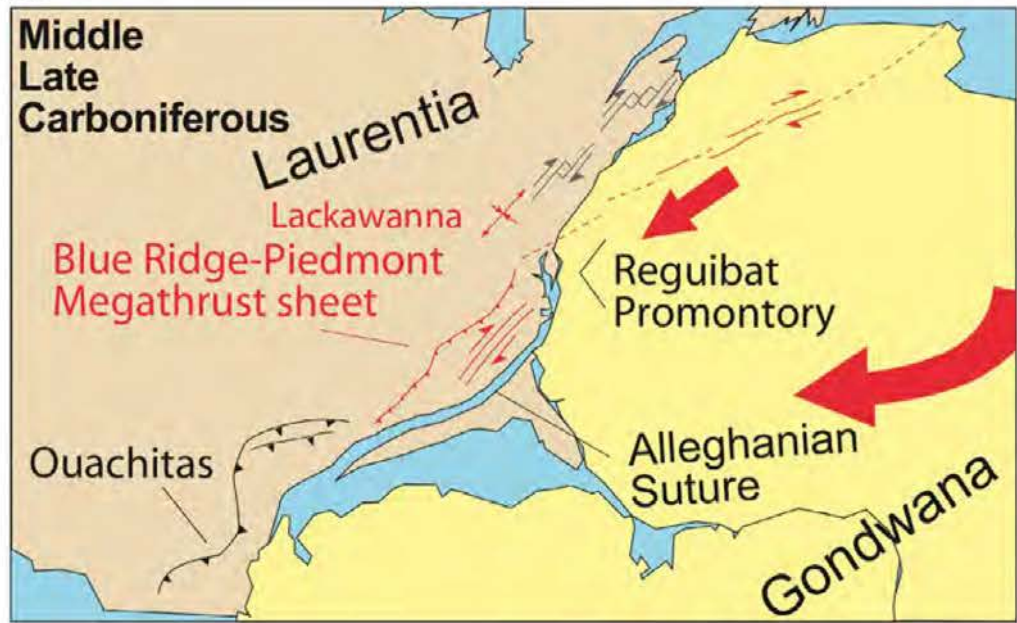
(A)



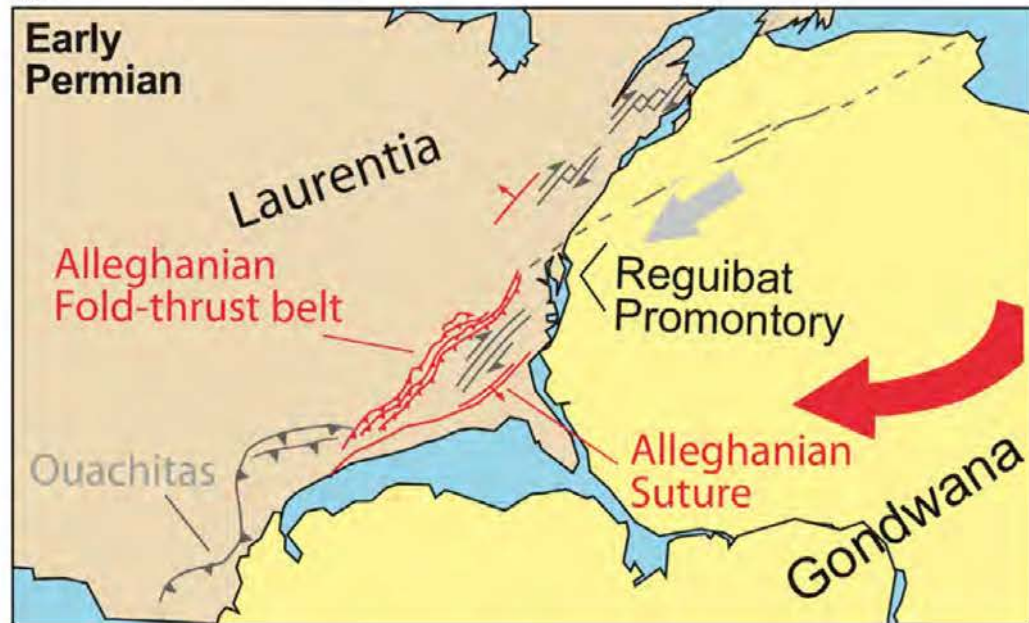
(B)

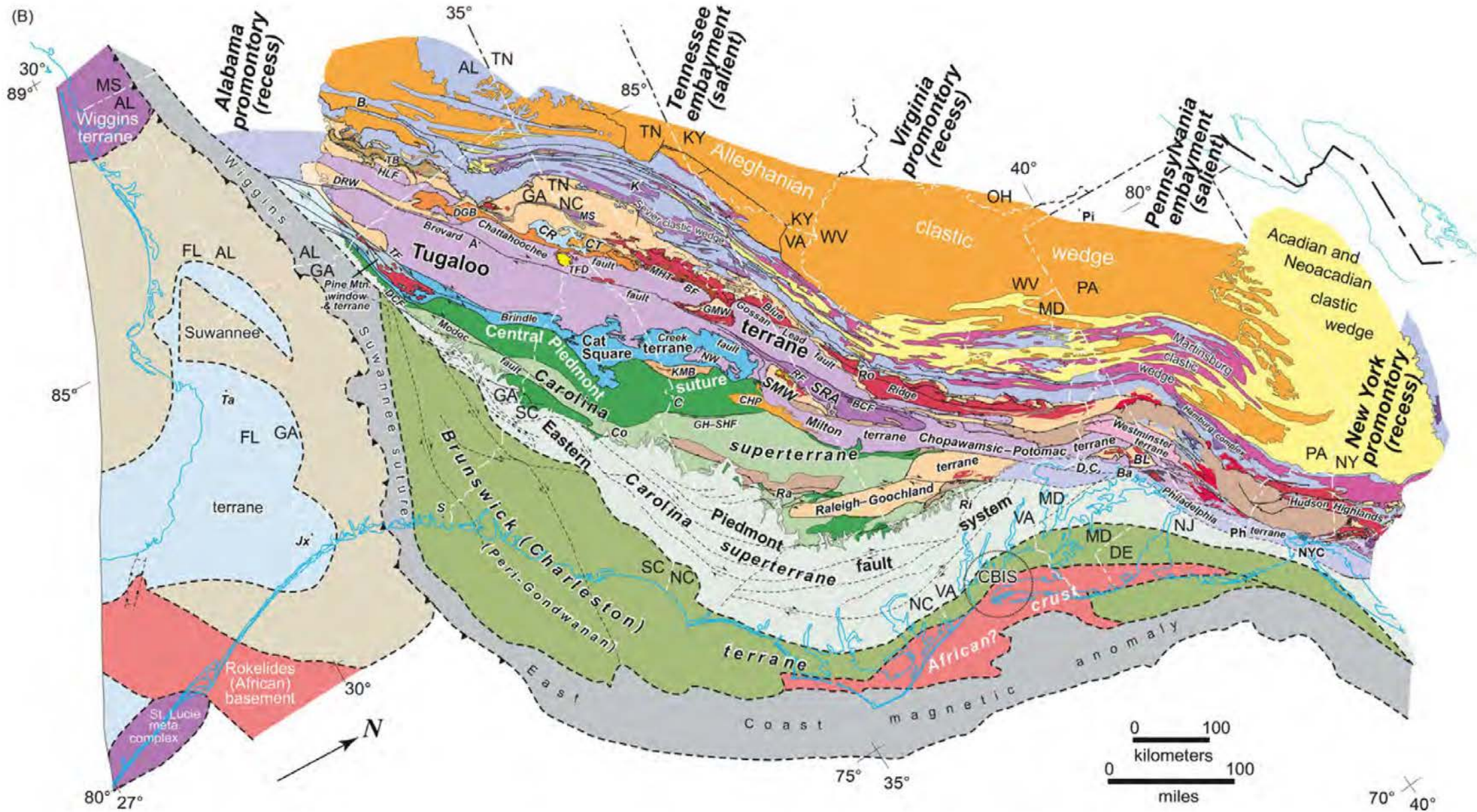


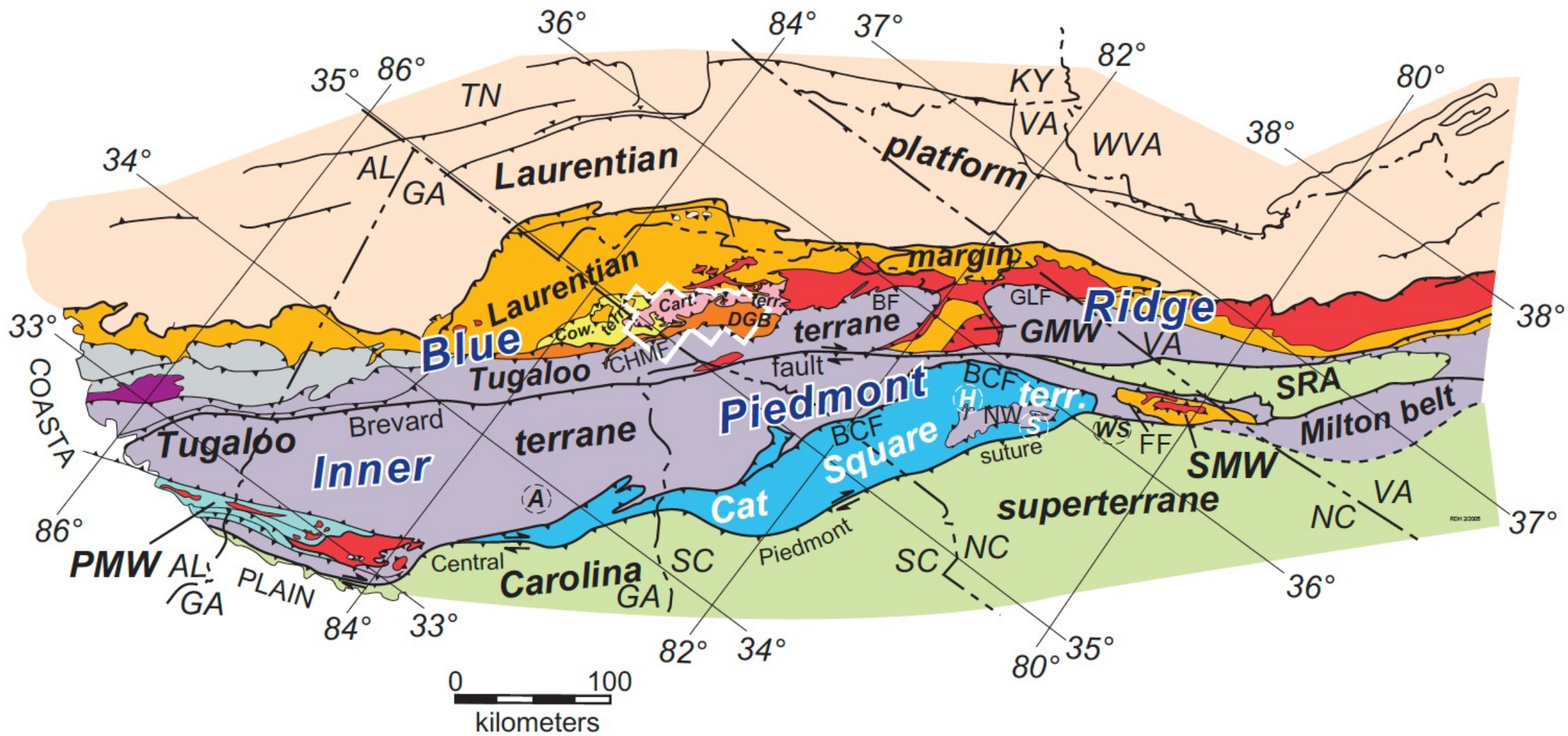
(C)

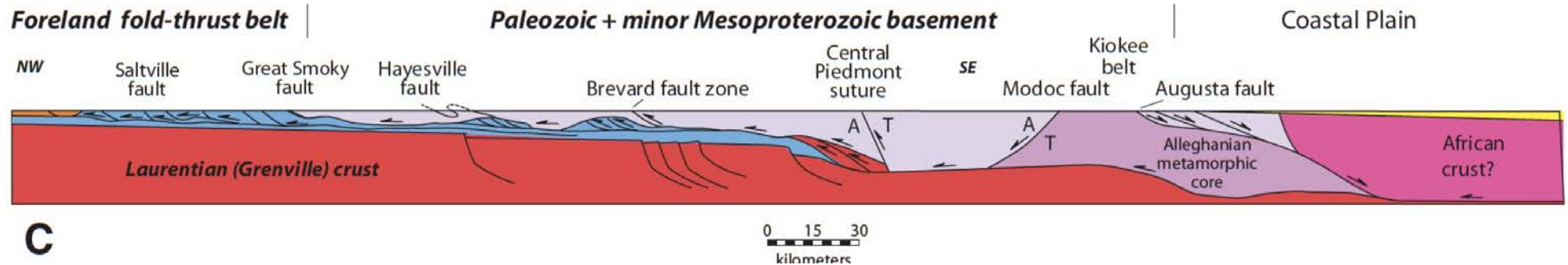
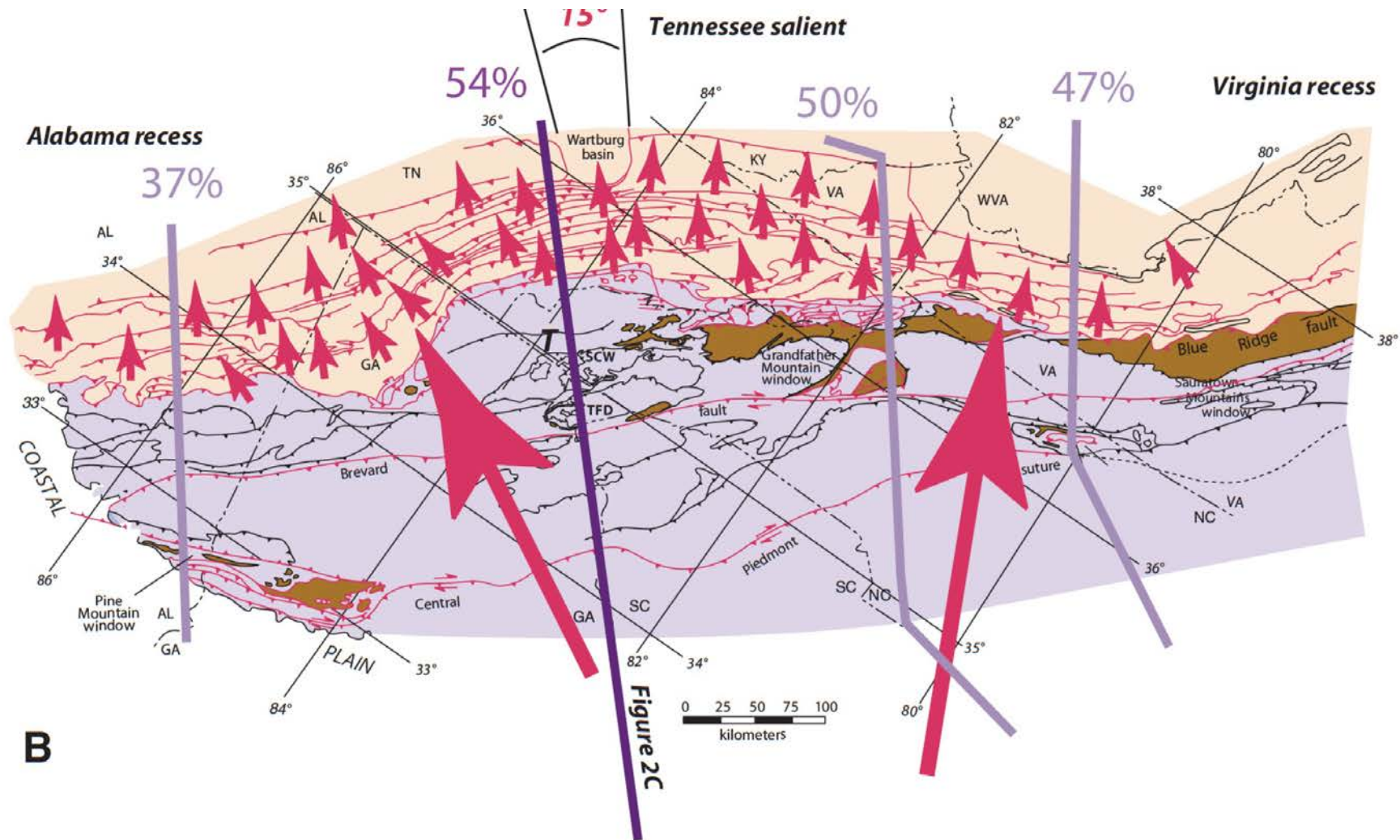


(D)









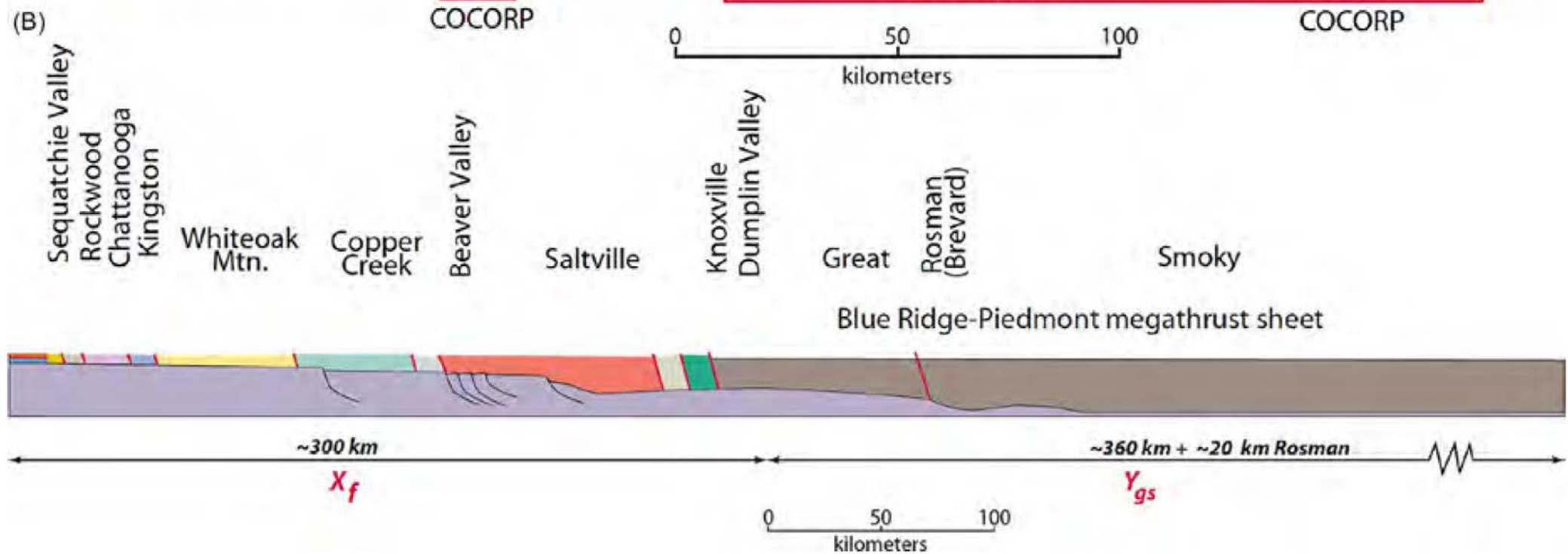
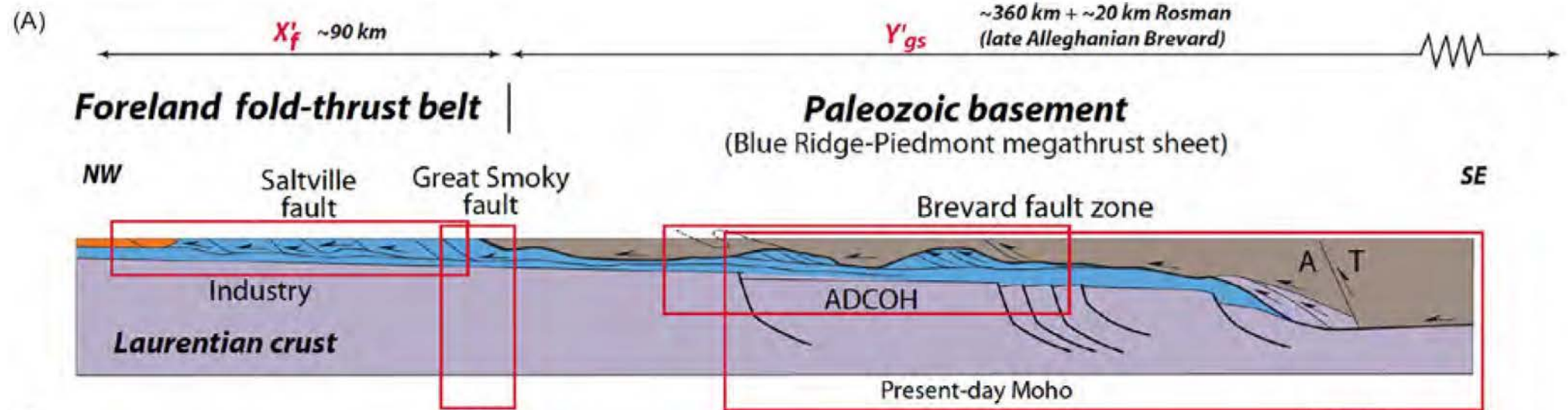
B

C

TABLE 1. ESTIMATED DISPLACEMENTS FOR SOUTHERN APPALACHIAN THRUST SYSTEM NAMED FAULTS ALONG REGIONAL CROSS SECTION IN FIGURE 13

Fault	Minimum total displacement (heave + throw) (km)	Basis
NW Sequatchie Valley–Cumberland Plateau overthrust	5	Last ramp toward foreland in system, and throw at ramp takes up most displacement; very small displacement west of ramp
Rockwood	7	Width; short strike length
Chattanooga	20	Width; short strike length
Kingston	10	Width; short strike length
Whiteoak Mountain	80	Mid-Ordovician facies boundary; throw; long strike length
Copper Creek	50	Width; moderate strike length
Beaver Valley	10	Motion transferred from Saltville west of Knoxville; short strike length
Saltville	100	Width; very long strike length (Virginia to Alabama); facies changes in Mid-Ordovician
Knoxville–Rocky Valley	10	Width; short strike length
Dumplin Valley–Chestuee	10	Width; short strike length; fold-related; may be out of sequence
Foreland total	302	
Great Smoky	360	Long strike length; measurable subsurface width based on seismic-reflection data
SE Rosman	20	Footwall Knox horses along Rosman fault, and geometry from ADCOH seismic-reflection profile
BRP total	380	

BRP—Blue Ridge–Piedmont megathrust; ADCOH—Appalachian Ultradeep Core Hole Project.



East Tennessee Geological Society Blue Ridge Foothills Field Trip

December 3, 2022

Prof. Bob Hatcher

Tectonics and Structural Geology Research
University of Tennessee–Knoxville



Wilhite Slate

Western Blue Ridge Geology Southwestern North Carolina & Southeastern Tennessee

Map compiled by
Mark W. Carter 1995–1996
Modified by J. Ryan Thigpen, 2003
and Bob Hatcher, 2003, 2012

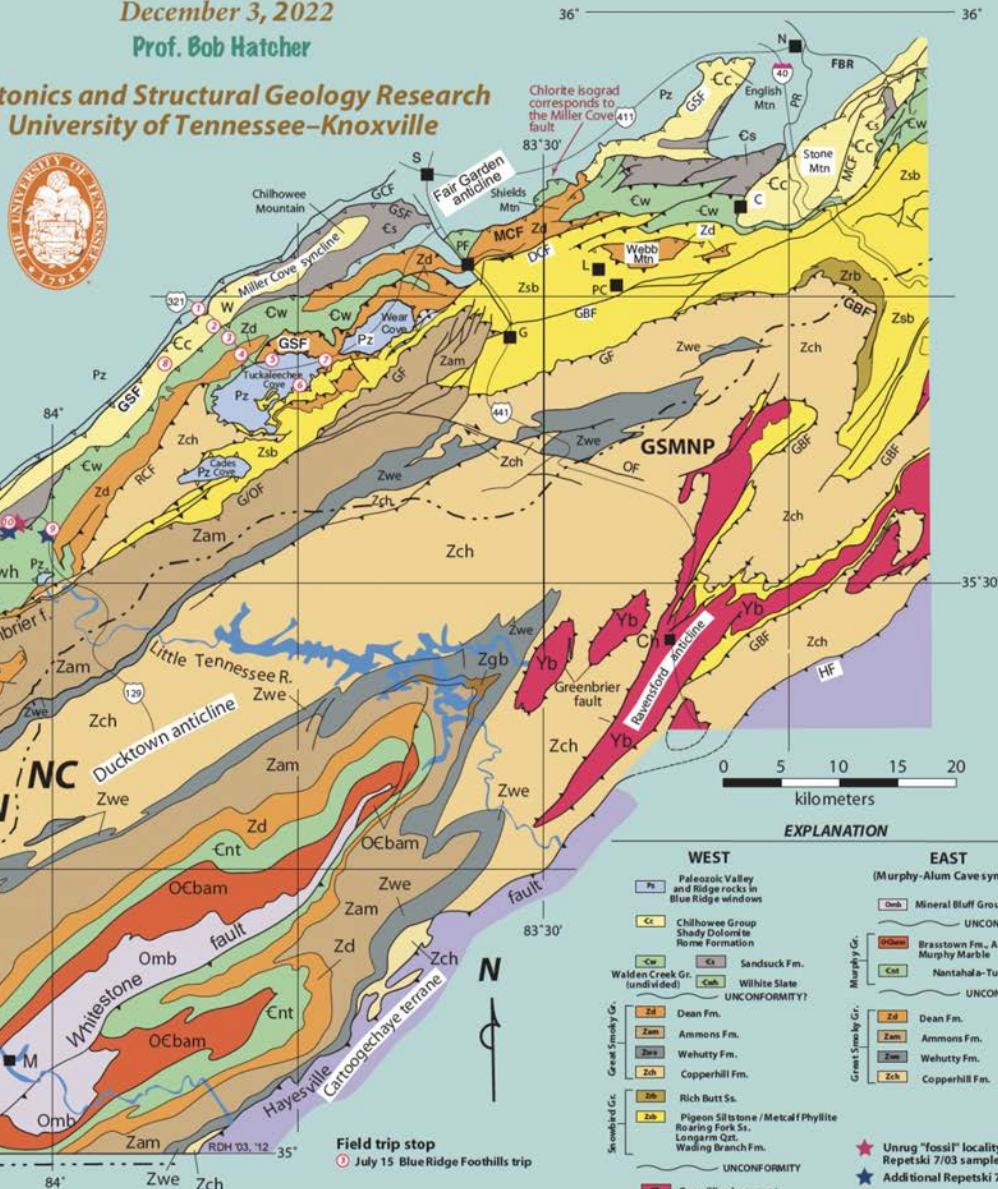


Science Alliance
Center of Excellence

Map compiled (and modified) from:
M. R. Anderson et al. (1988) *Regional geol., NC Geol. Surv. Rep. of U.S.G.S. Professional Paper 249*
D. W. Mohr (1971) *Revised Geol. map, NC Geol. Surv. Univ. of North Carolina unpublished Ms. D. 41*
J. S. Carter (1995)
D. W. Mohr (1971) *Revised Geol. map, NC Geol. Surv. Univ. of North Carolina unpublished Ms. D. 41*
M. R. Anderson et al. (1988) *Regional geol., NC Geol. Surv. Rep. of U.S.G.S. Professional Paper 249*
G. J. Galloway (1978)
S. L. Mearns (1975)
H. A. Phillips (1952)
R. S. Roubicek (1971)
L. S. Mearns and C. E. Murchison (1952) *SPANC, 20 W., 8th GA Geologic Map, NC Geol. Surv.*

RDH 7/1/2012

GA

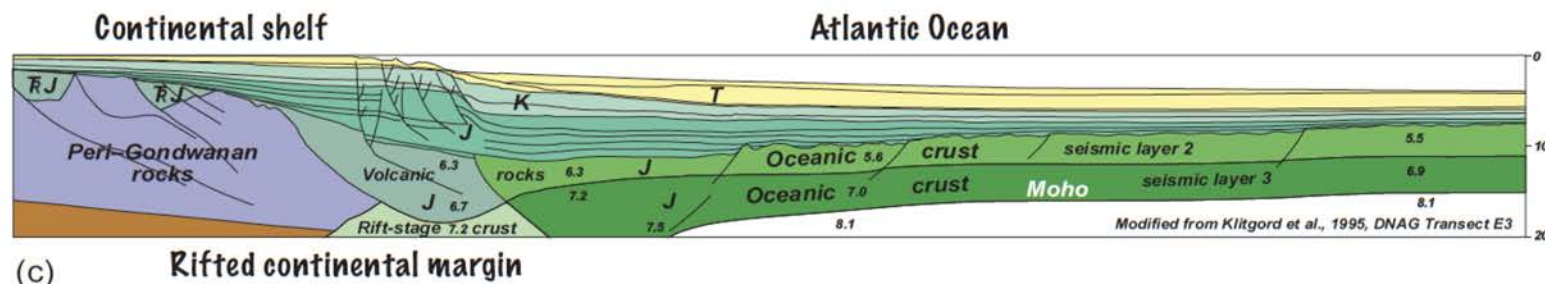
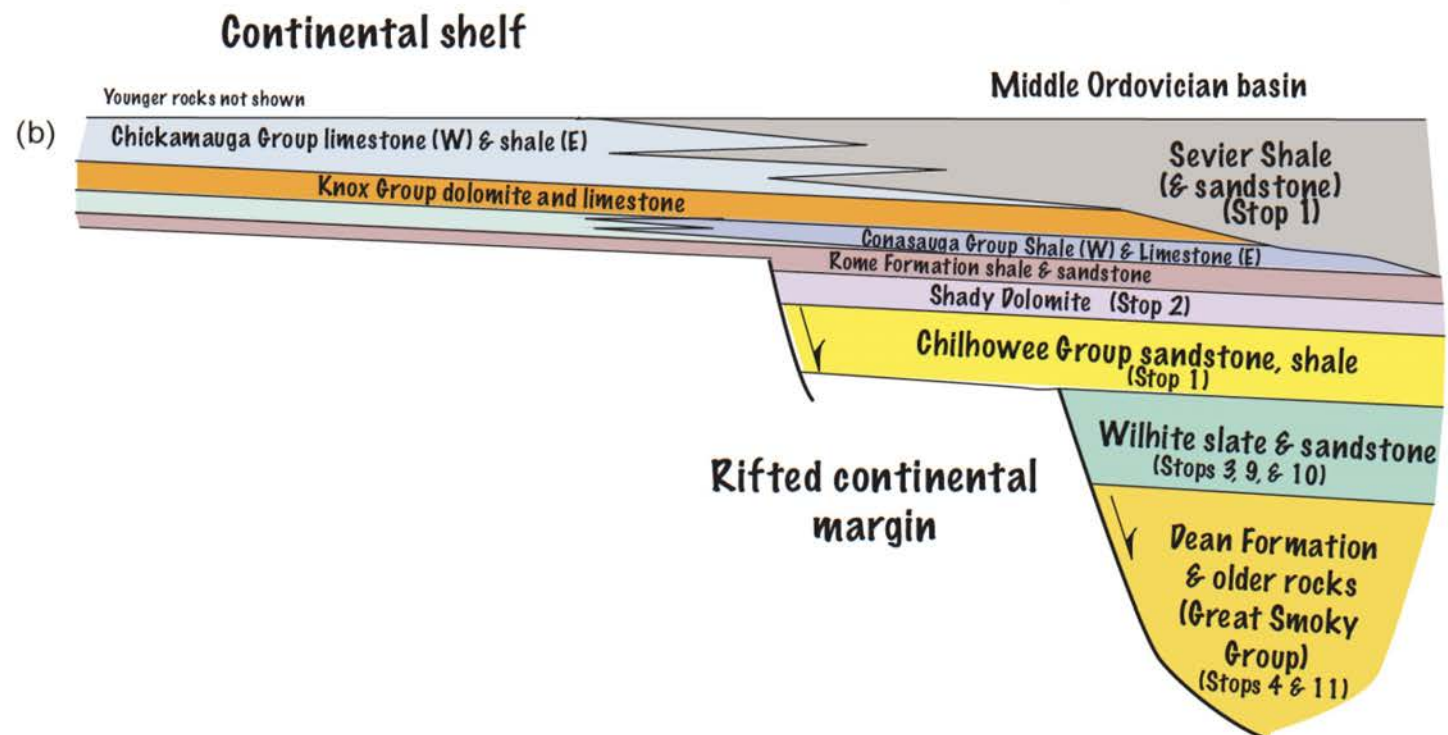
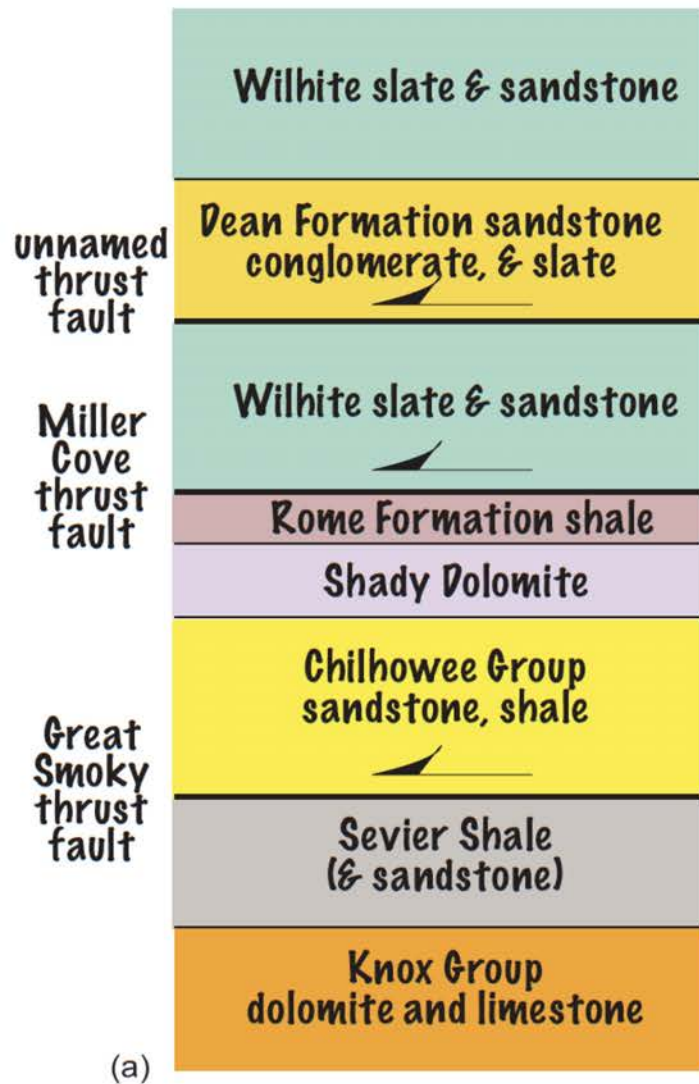


WEST		EAST (Murphy-Alum Cave syncline)	
	Palaeozoic Valley and Ridge rocks in Blue Ridge windows		Mineral Bluff Group
	Chilhowee Group Shady Dolomite Rome Formation		UNCONFORMITY
	Walden Creek Gr. (undivided)		Brasstown Fm., Andrews Fm., Murphy Marble
	Whitesite Slate UNCONFORMITY?		Nantahala-Tusquitte Fm. UNCONFORMITY?
	Dean Fm.		Dean Fm.
	Ammons Fm.		Ammons Fm.
	Wehuttu Fm.		Wehuttu Fm.
	Copperhill Fm.		Copperhill Fm.
	Rich Butt Ss.		
	Pigeon Siltsstone / Metcal Phyllite Roaring Fork Ss. Longarm Qtz. Wading Branch Fm.		
	UNCONFORMITY		
	Grenvillian basement		

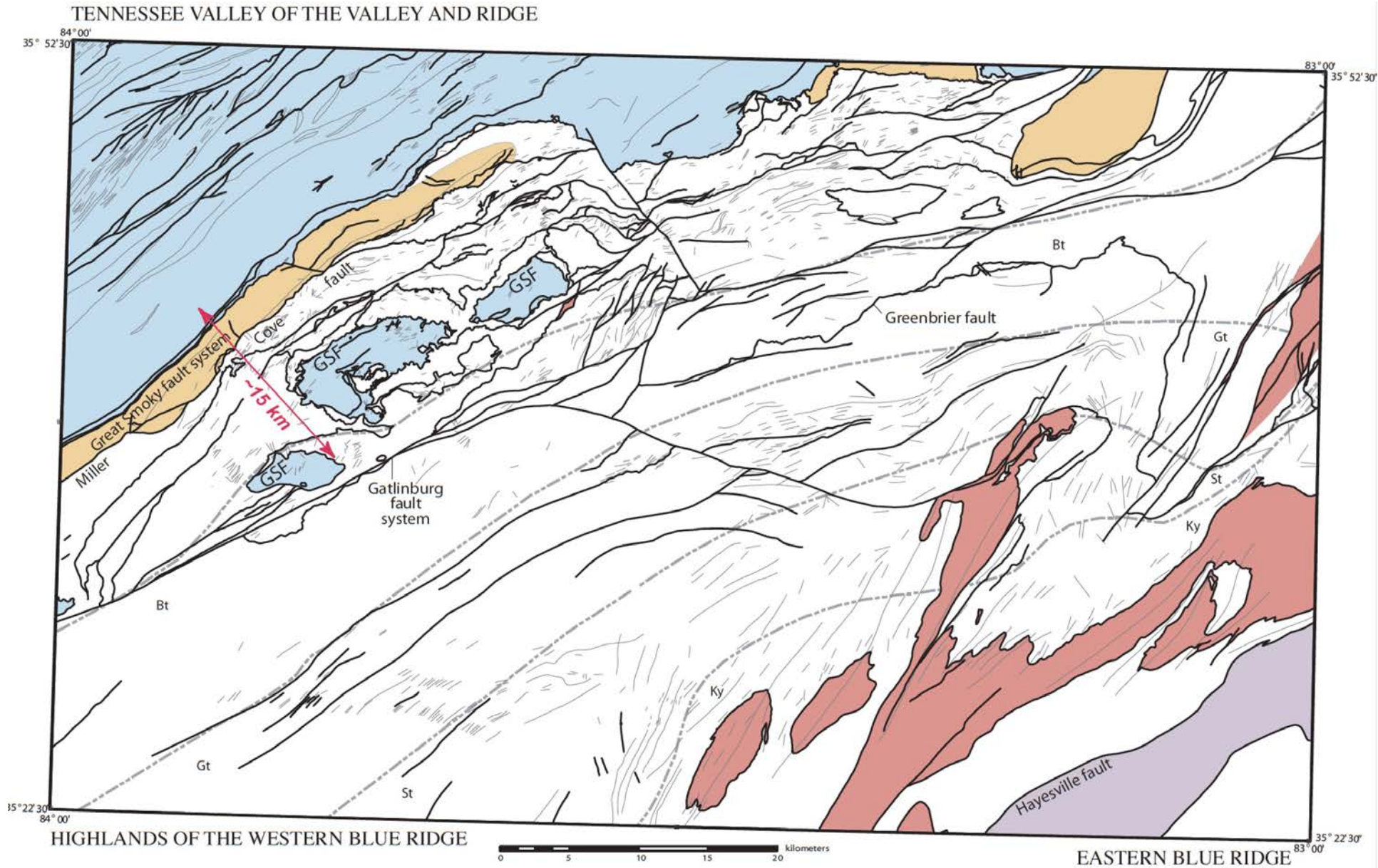
Field trip stop
○ July 15 Blue Ridge Foothills trip

Additional explanation inside front cover.

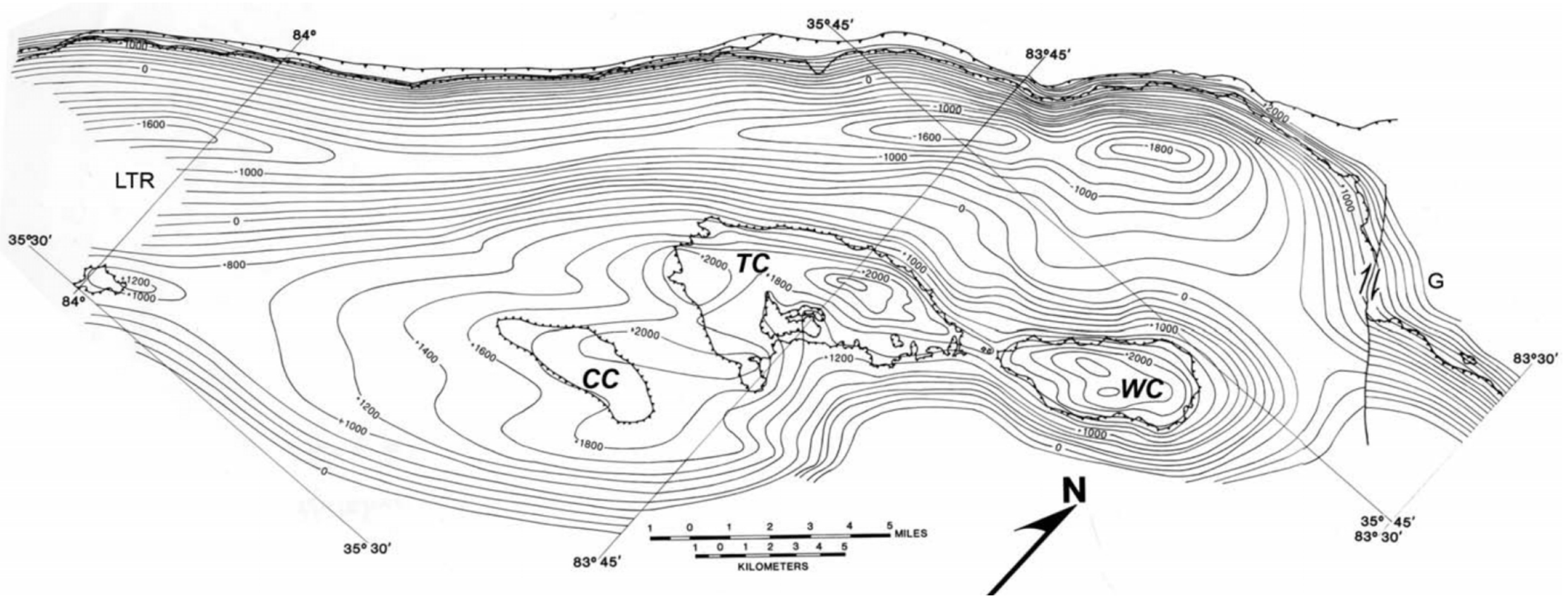
Stratigraphy



Simplified Geologic Map

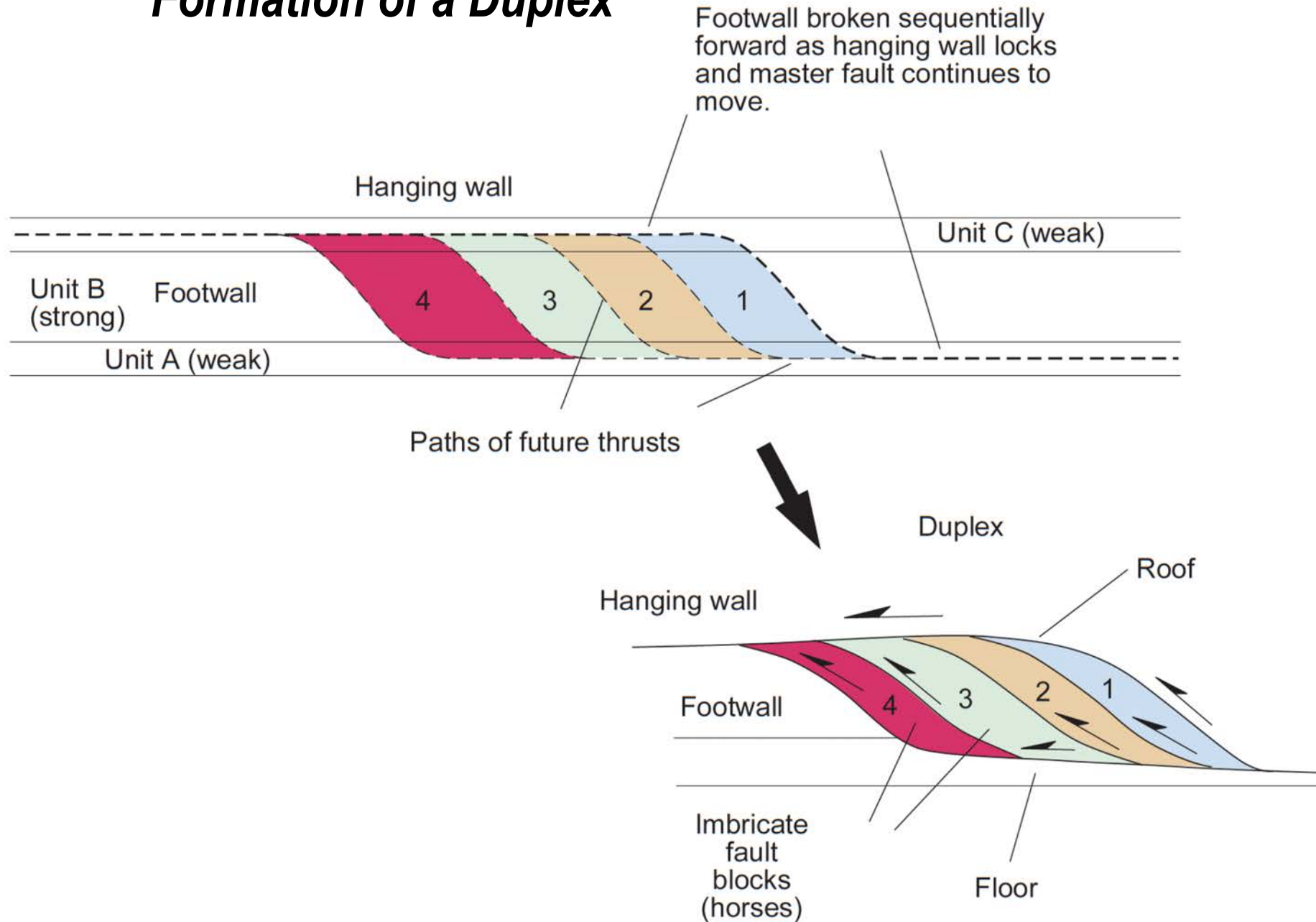


Structure Contours on Great Smoky Thrust



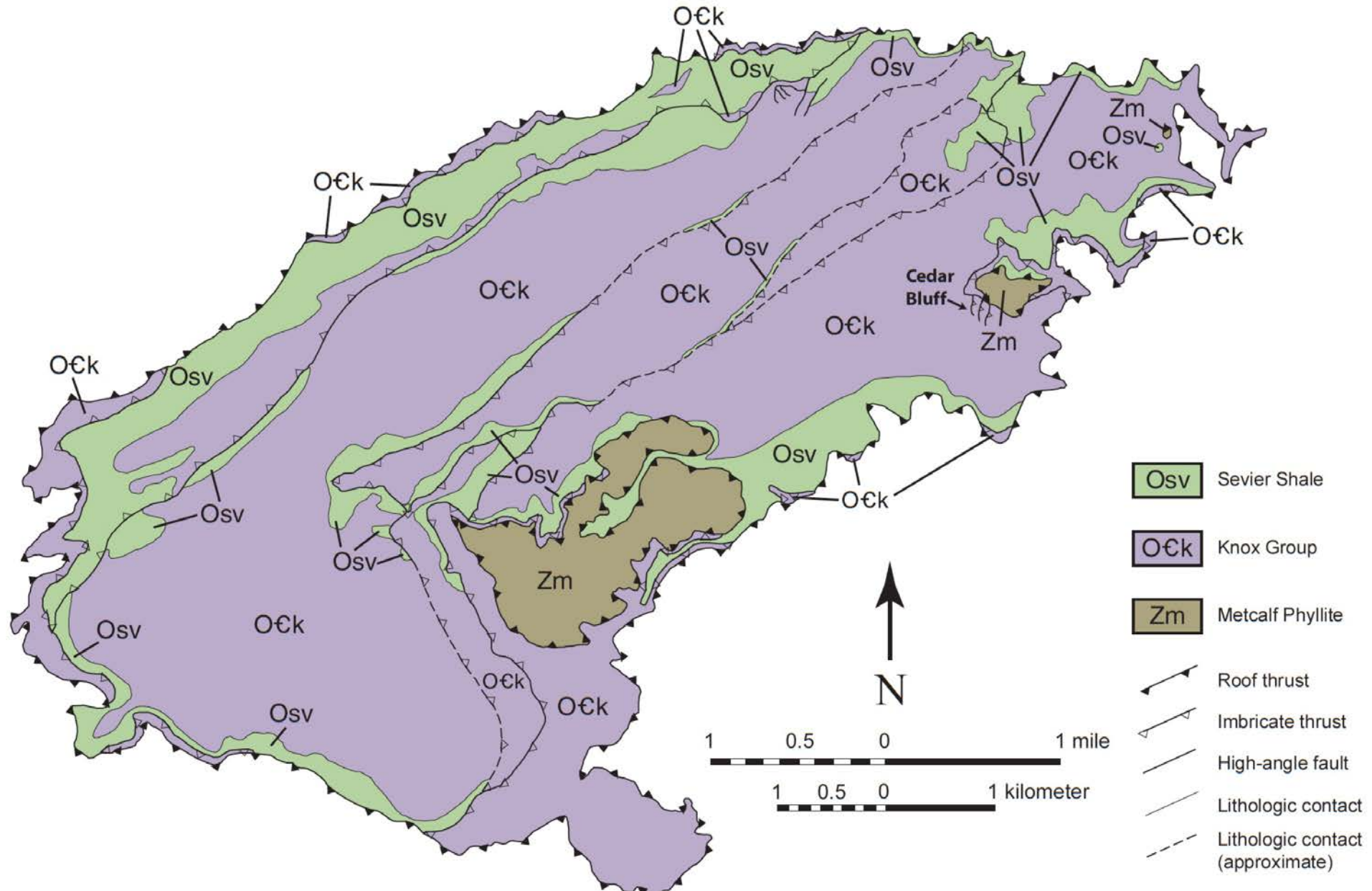
After Philip B. King, 1962 USGS Prof. Paper 349-C

Formation of a Duplex

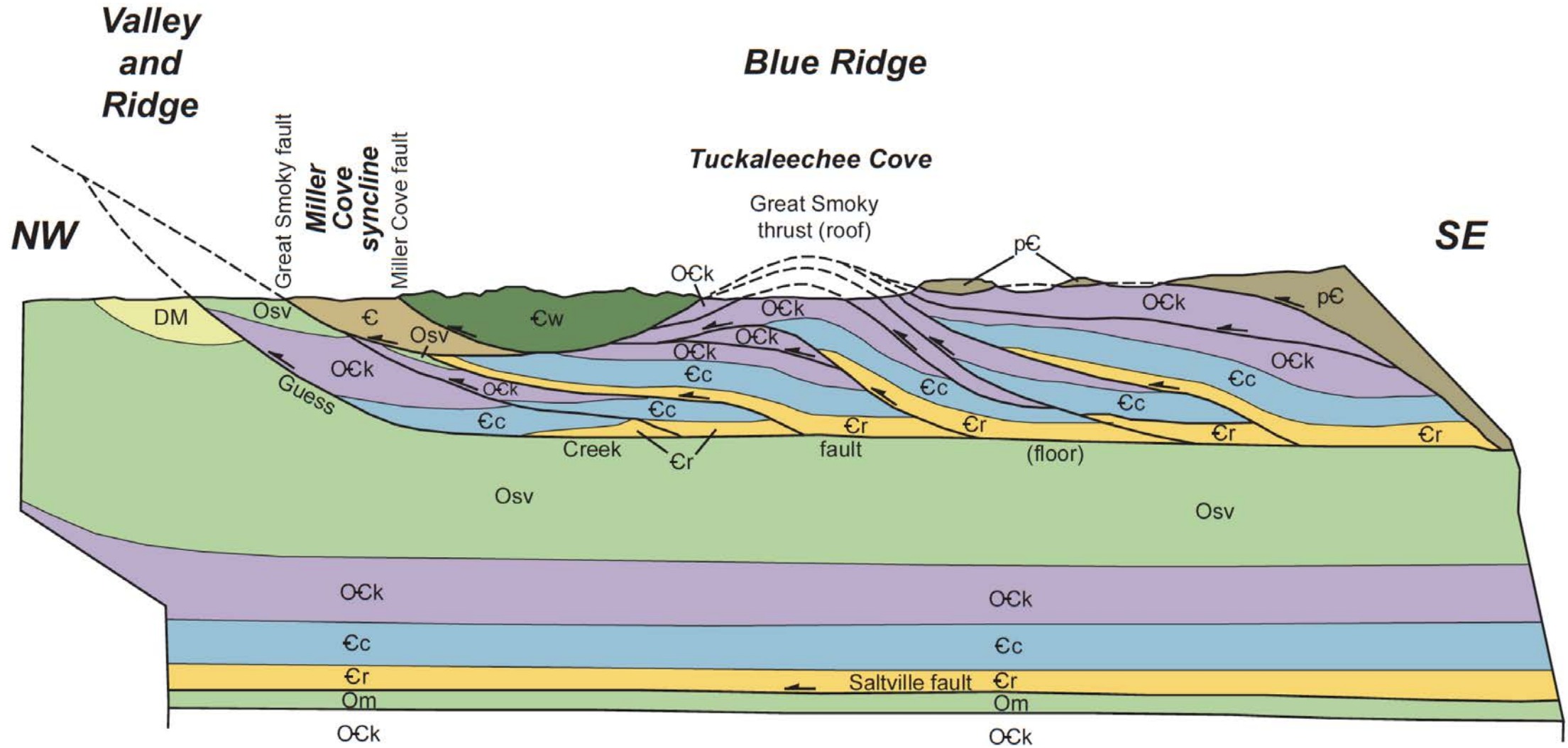


83°47'30"
35°42'30" +

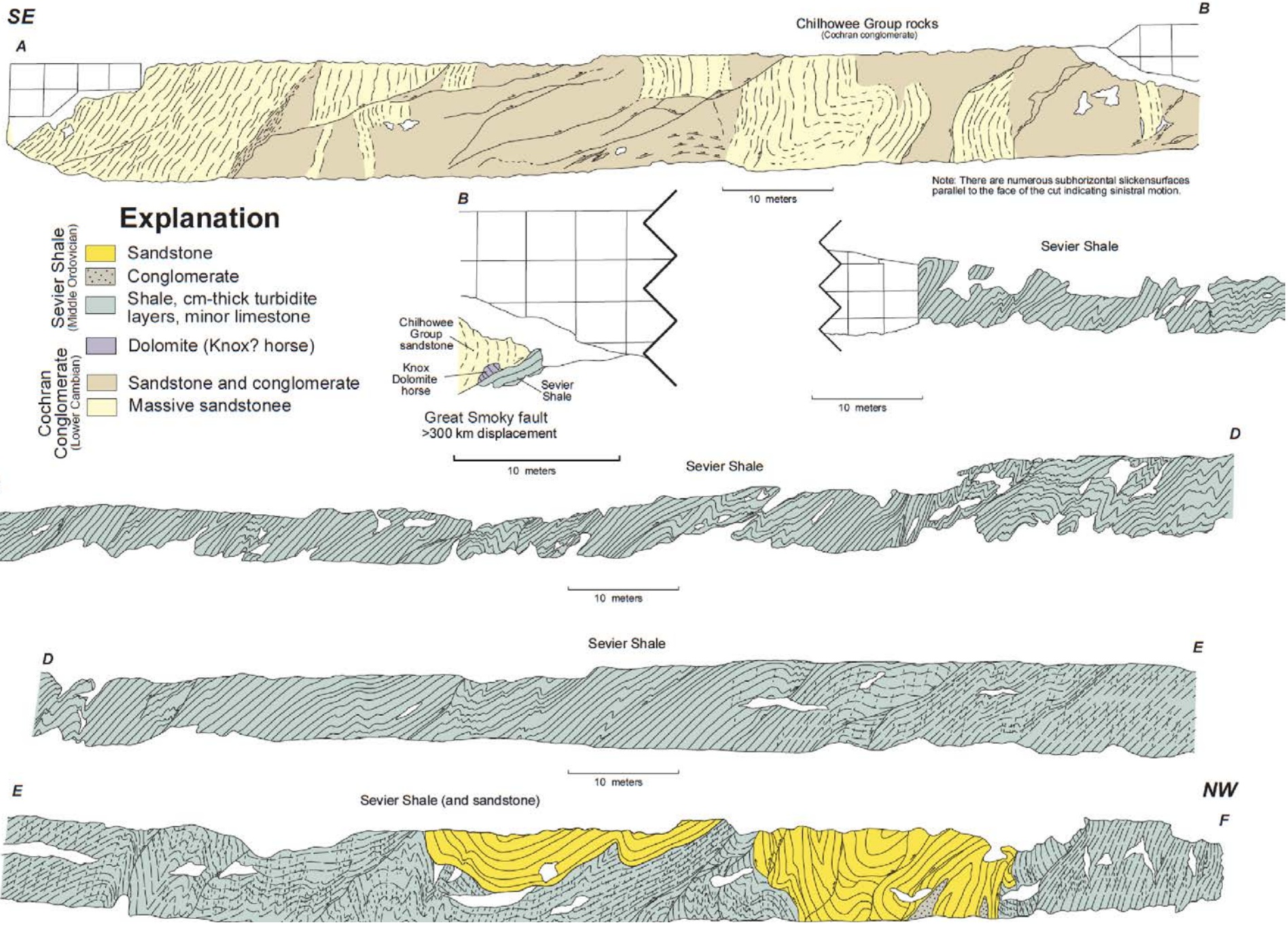
83°42'30"
35°42'30" +



Structure Section Through the Townsend Area



Stop 1



Stop 1

Great Smoky fault



Stop 3



Stop 3 fold



Wilhite Slate

Pre-TDOT



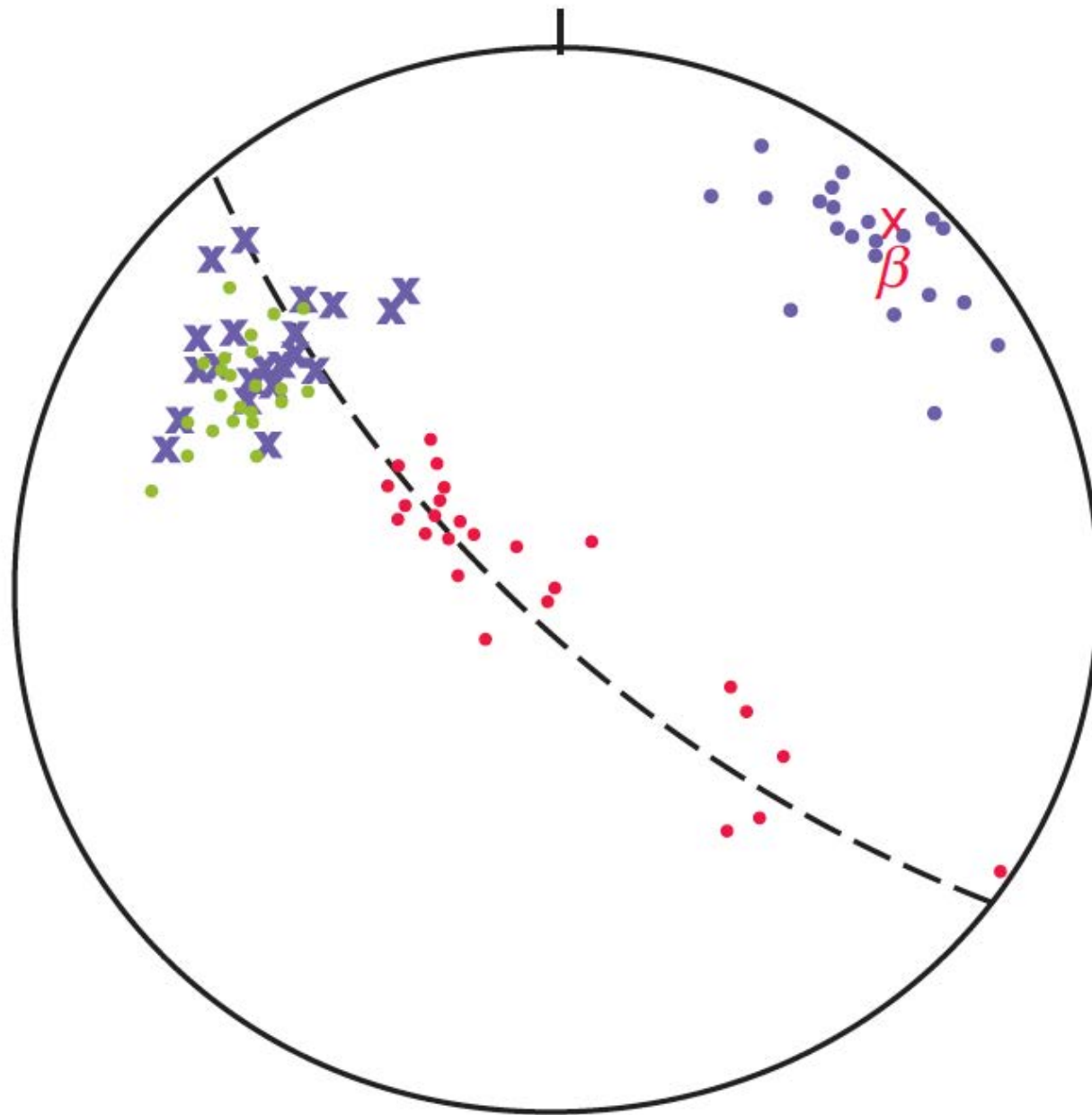
Post-TDOT = today

Stop 3

***New exposure,
courtesy of TDOT***



Stop 3



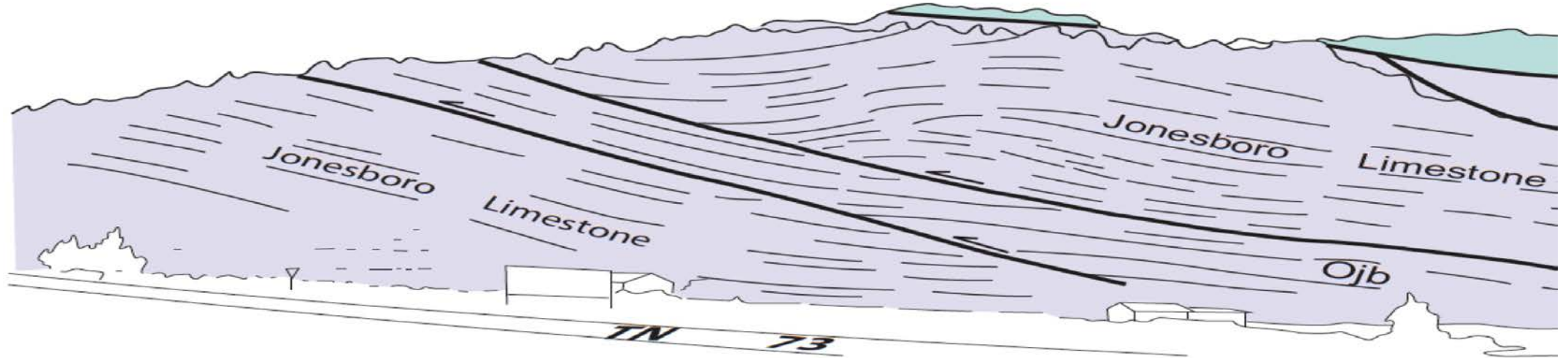
*Structural data from
US 64, same rocks*

Cedar Bluff, Tuckaleechee Cove



klippe

Stop 6



Stop 7



Stop 9



Stop 9



(b)

Stop 9



Stop 10



Stop 11



Stop 11



How many to go on December 3 Field Trip?



Arm courtesy of Steve Petty, MS FSU 1982

Near Charlotte, NC