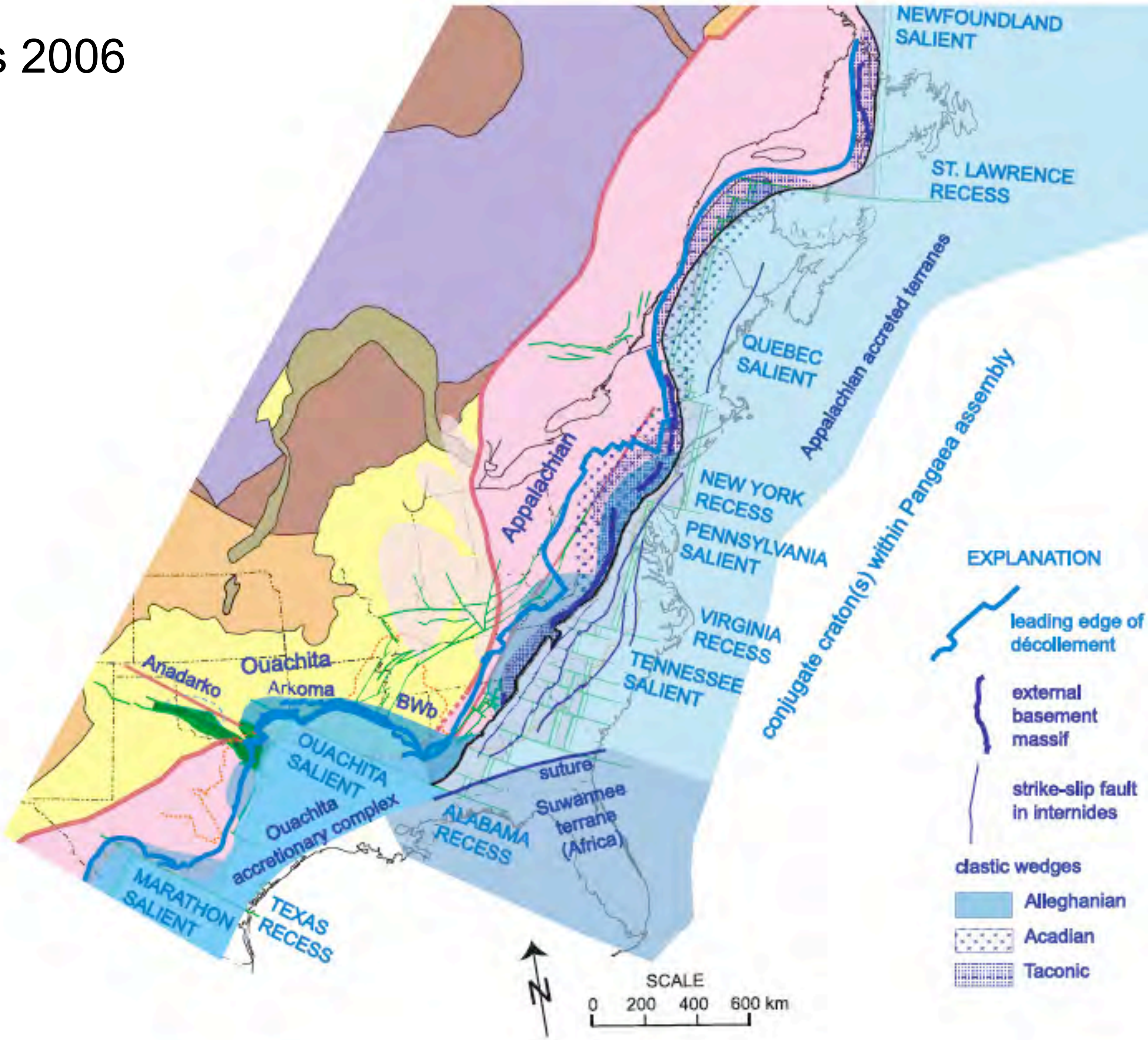
The Appalachian Chain

Thomas 2006



NEWFOUNDLAND SALIENT
ST. LAWRENCE RECESS
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Appalachian accreted terranes
conjugate craton(s) within Pangaea assembly
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MARATHON SALIENT
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N
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0 200 400 600 km
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leading edge of décollement
external basement massif
strike-slip fault in internides
clastic wedges
Alleghanian
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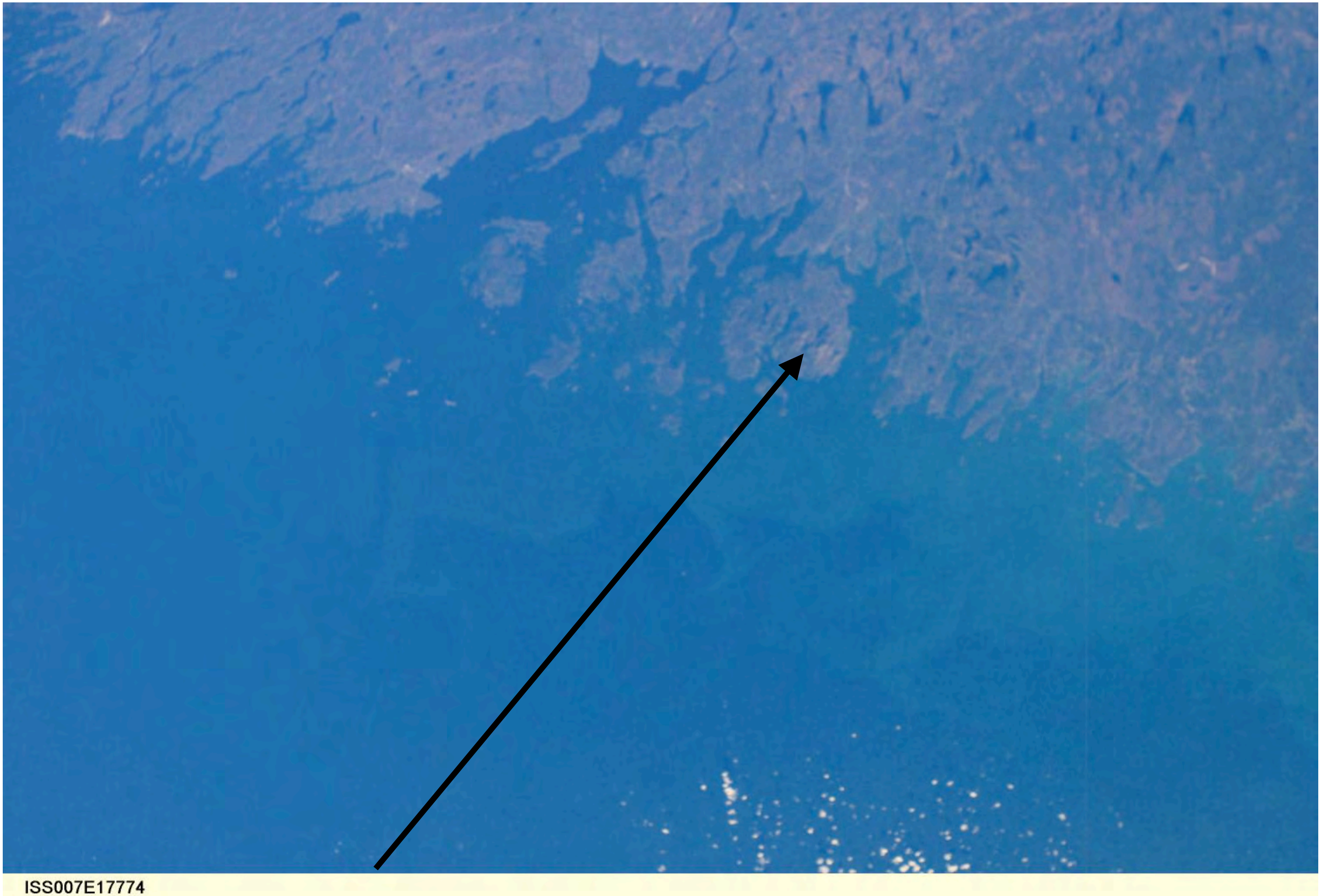
Taconic



Mt Desert Island, Maine: Acadian Event

ISS014E15545

Portland Maine: Penobscot Event

Deerfield MA: Taconic Event

ISS015E08150

Lake Champlain

ISS007E16766

Cornwall NY St Lawrence River Canada

ISS015E09183

Harrisburg PA: Valley and Ridge Province


Oil City PA: Appalachian Plateau

Lewiston PA: Valley and Ridge Province

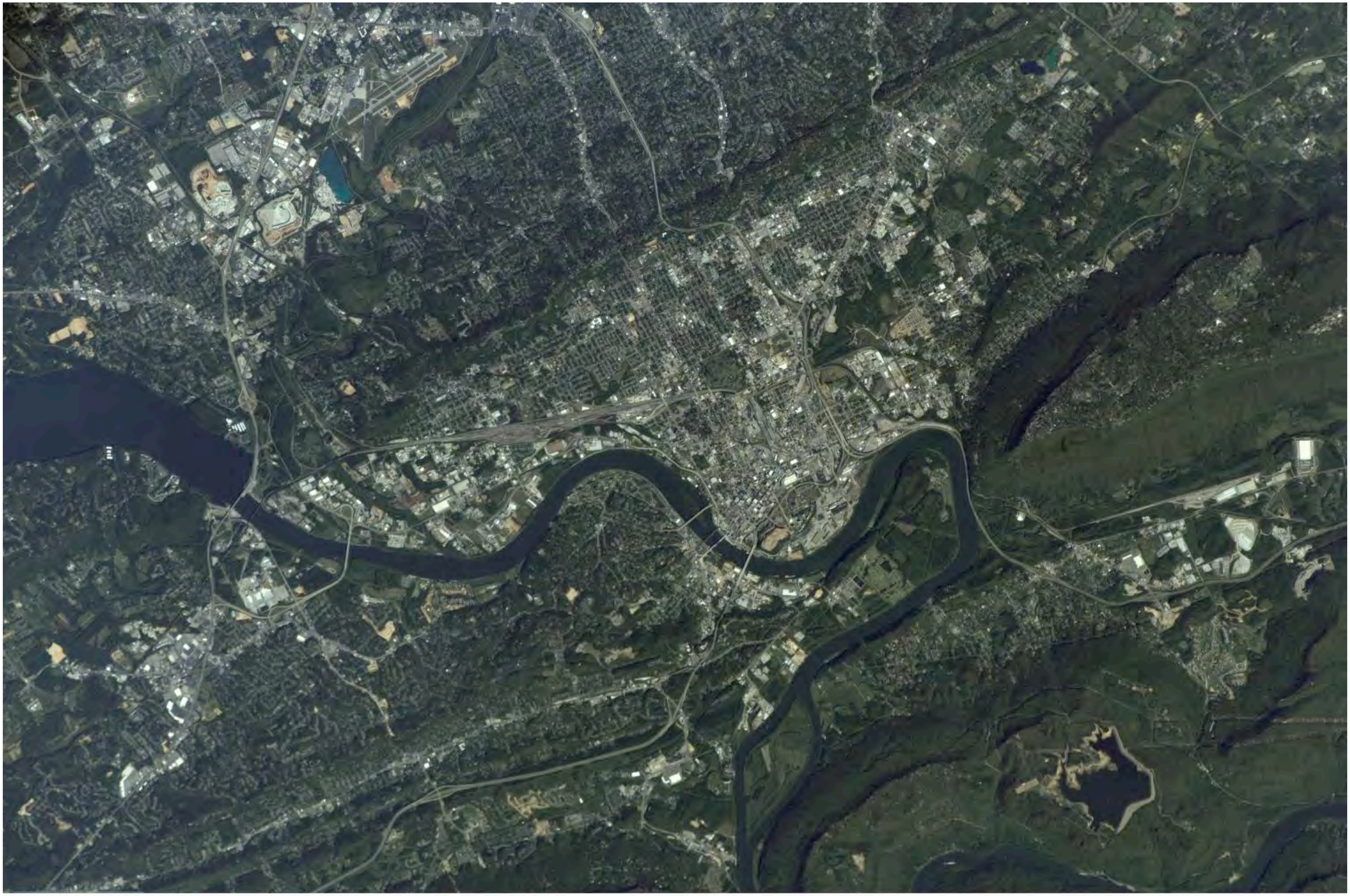
ISS019E006009

Chocklett Springs, WV: Appalachian Plateau

ISS018E011347

Massnutten Mountain, VA: Valley and Ridge Province

Lake Moowah VA: Valley and Ridge Province



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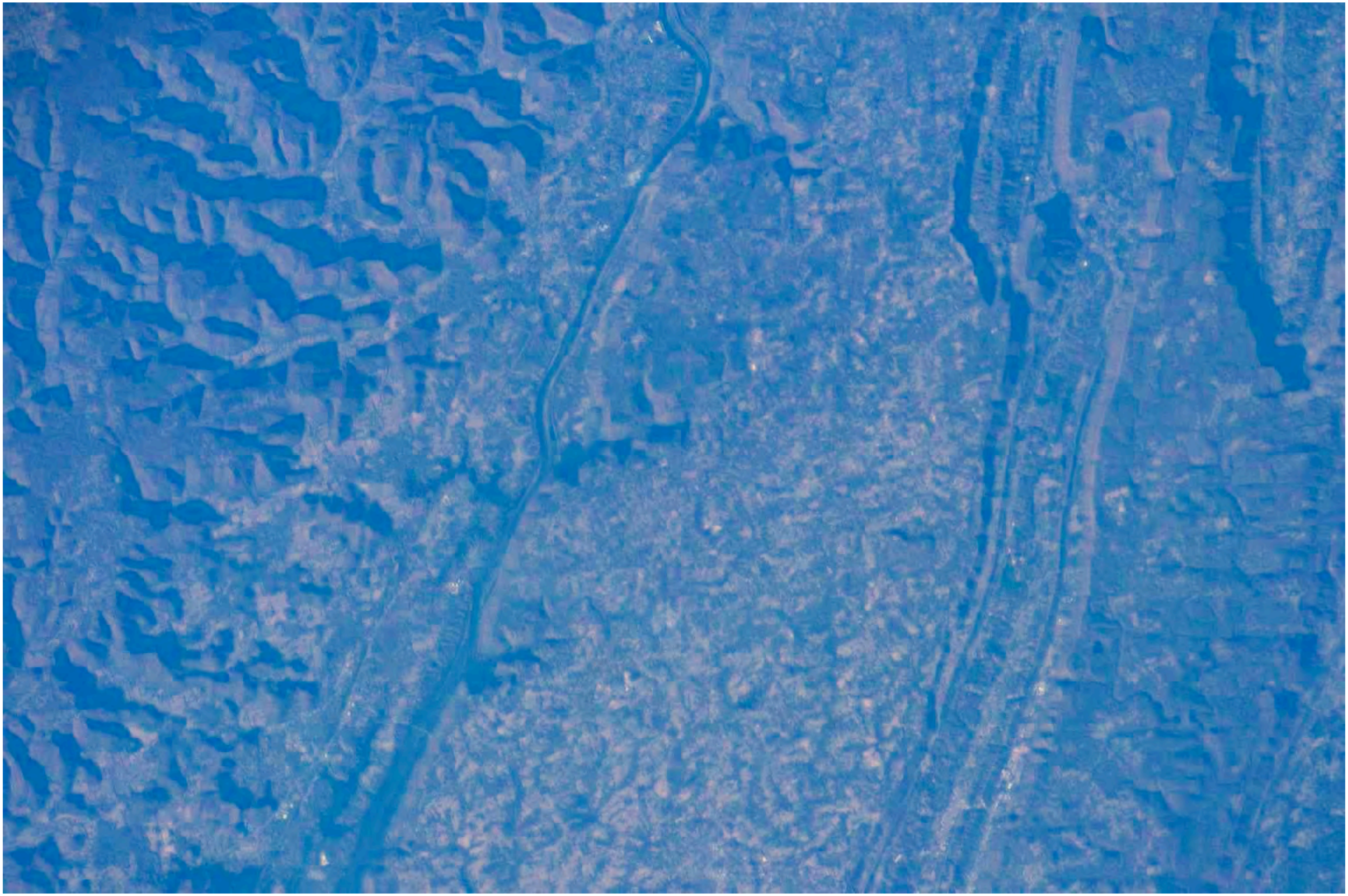
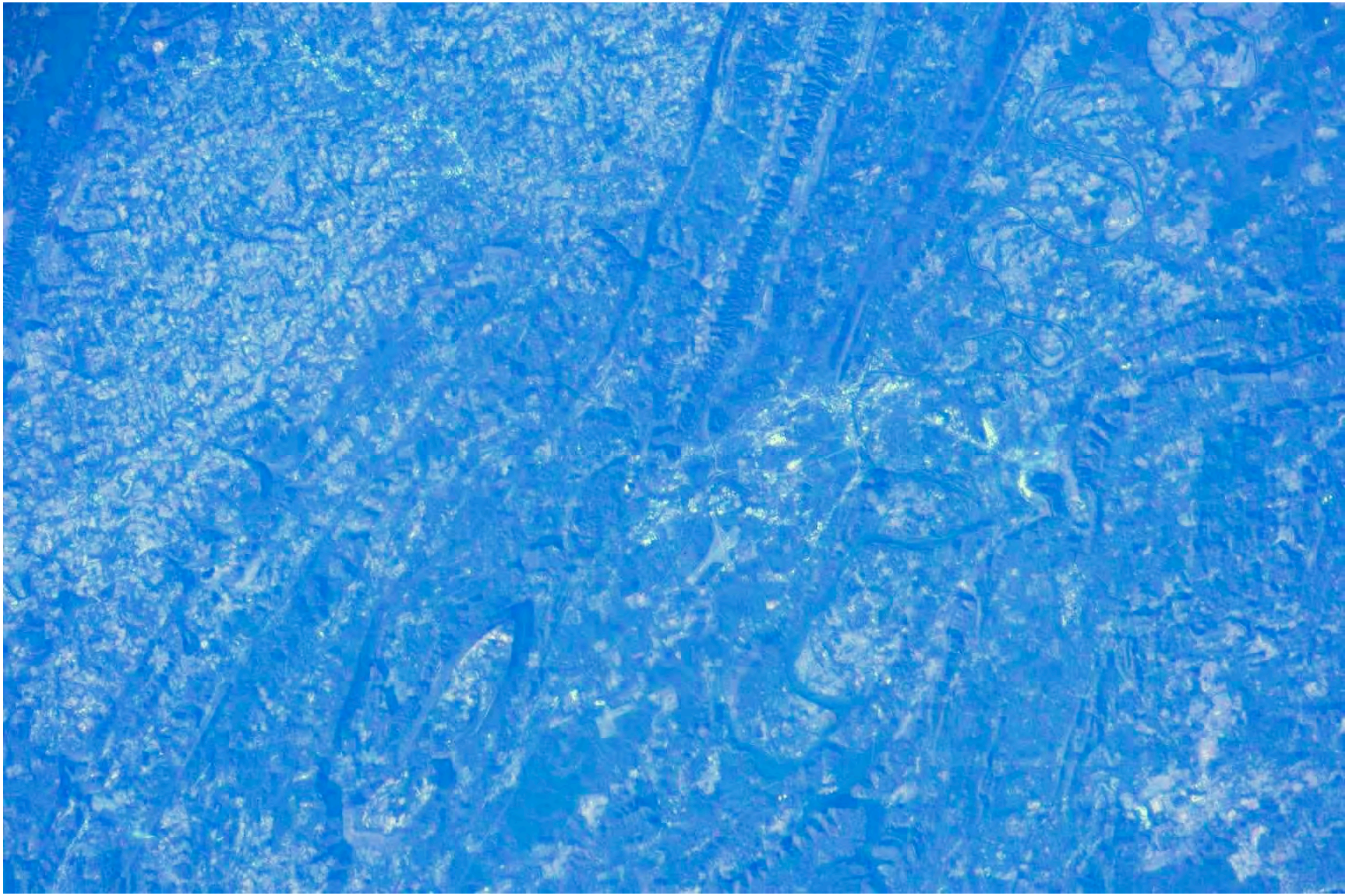
Chattanooga TN: Cumberland Plateau--Valley & Ridge Province

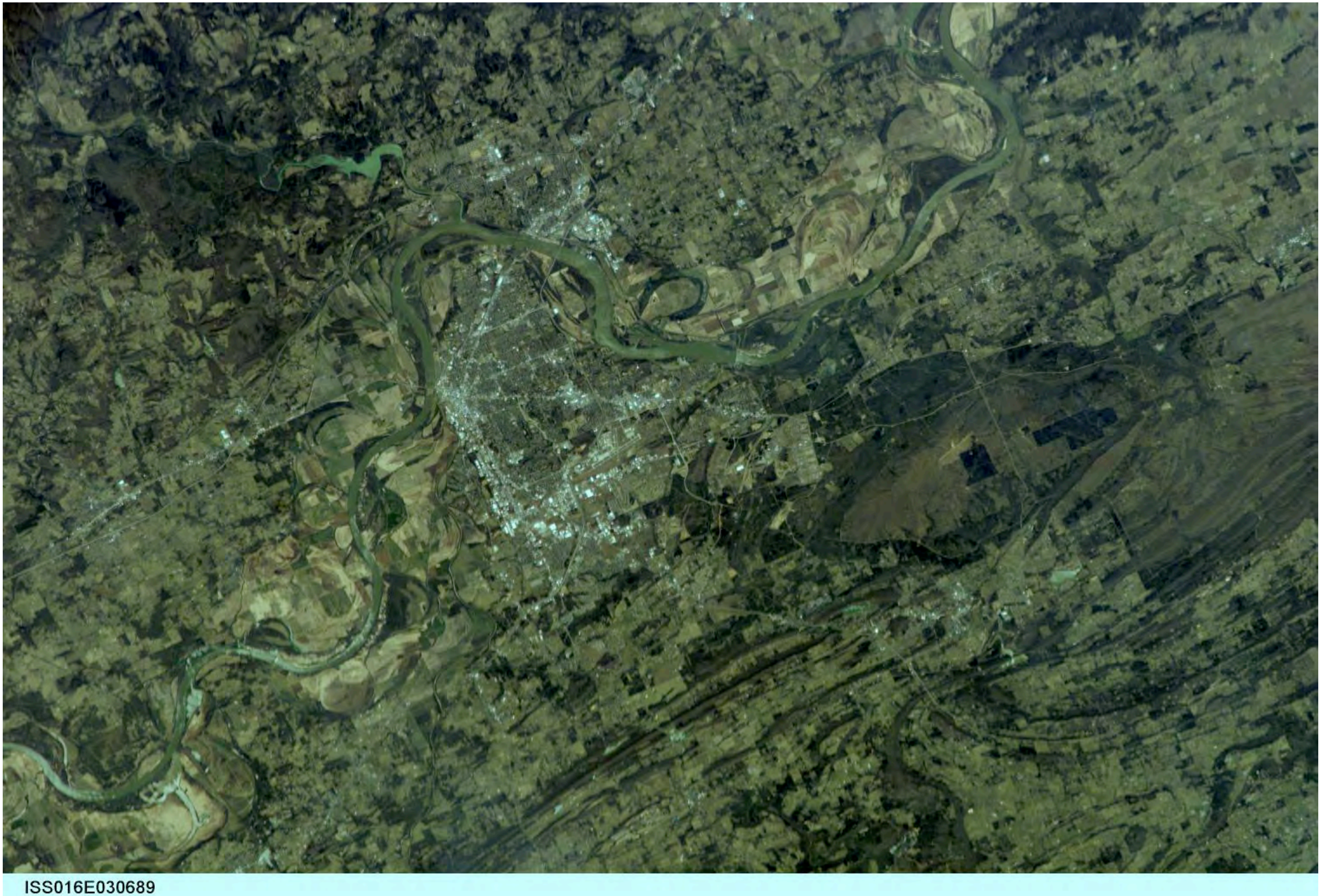


Jackson, TN: Cumberland Plateau--Valley & Ridge Province



Etowa AL: Cumberland Plateau--Valley and Ridge Province

Tuscaloosa, AL: south end of the Appalachian Chain



Fort Smith, AR: Ouachita Province-Ozark Plateau

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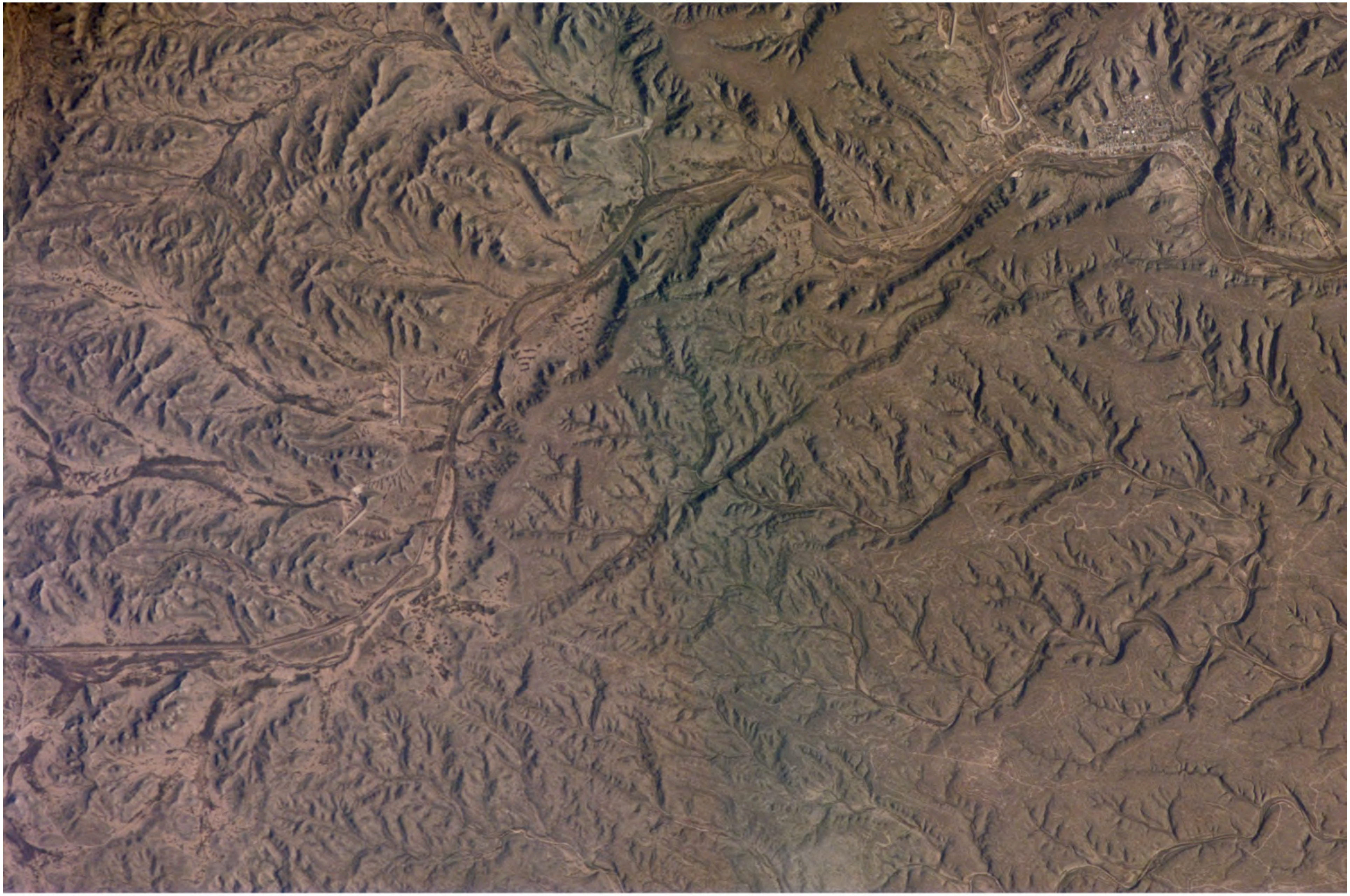
Lake Conway AR: Ouachita Province

U Miss Jackfork Fm, Ouachita Mountains, near Little Rock, AK

Marathon
Marathon, Texas
90
N
Housetop Mountain
Lightning Hills
Wood Hollow Mountains
Peña Blanca Mountains
Panther Peaks
Hells Half Acre
Horse Mountain
Shely Peaks
Three Mile Hill
Tinaja Mountains
© 2009 Tele Atlas
Google
6.90 mi
Pointer 30°02'41.51" N 103°05'29.20" W
Streaming |||||||||| 100%
Eye alt 23.82 mi

Marathon, TX: Caballos Novaculite, Marathon Fold Belt



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Forth Stockton, TX: Stockton Plateau

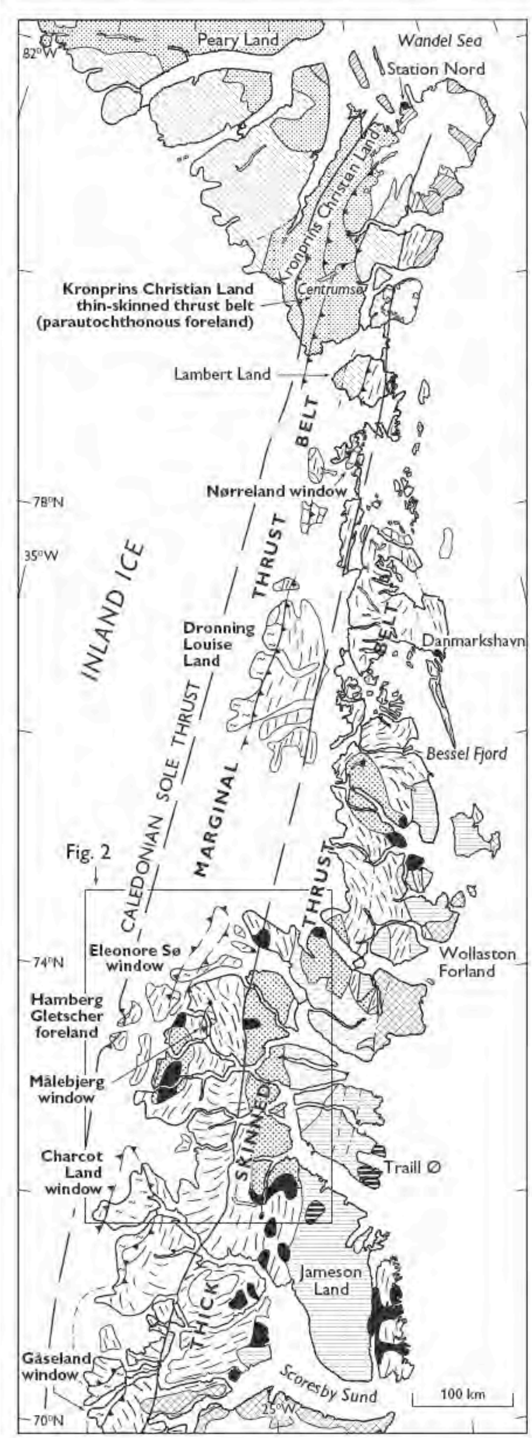
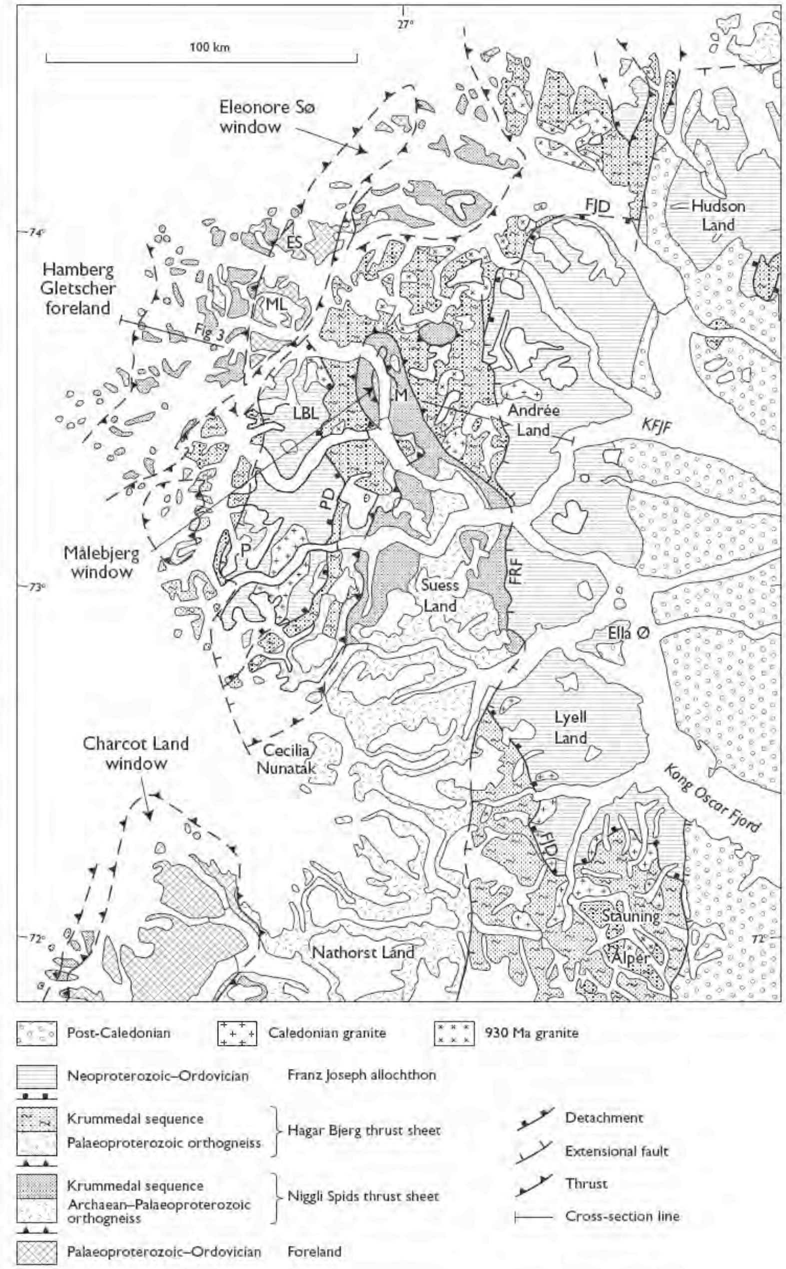



Fig. 1. Geological map of the East Greenland Caledonides, showing location of the foreland windows in the western marginal thrust belt. The frame indicates the region between 71°50′ and 74°30′N, shown at a larger scale in Fig. 2, which includes the Målebjerg and Eleonore Sø windows. Modified from Higgins & Leslie (2000).

Fig. 2. Geological map of North-East Greenland 71°50′–74°30′N, showing location of the Eleonore Sø, Målebjerg and Charcot Land windows, and the Hamberg Gletscher foreland. The legend depicts the units contained in the two thrust sheets and Franz Joseph allochthon overlying the windows. The Målebjerg and Eleonore Sø areas are shown in more detail in Figs 5 and 6. **ES**, Eleonore Sø; **FJD**, Franz Joseph detachment; **FRF**, Fjord region fault; **KFJF**, Kejser Franz Joseph Fjord; **LBL**, Louise Boyd Land; **M**, Målebjerg; **ML**, J.L. Mowinckel Land; **P**, Petermann Bjerg; **PD**, Petermann detachment. The line of the cross-section shown in Fig. 3 is indicated.



Higgens and Leslie 2004

Fig. 4. The west face of Målebjerg in western Andrée Land (for location see Fig. 5). Light coloured folded quartzites (< 200 m thick) of the Slottet Formation (**SF**) unconformably overlie grey gneisses (**G**) that are probably of Palaeoproterozoic age. The unconformity is strongly folded. A few metres of grey dolomite (Målebjerg Formation) occur immediately beneath the Niggli Spids thrust (**NST**). Overlying units of the Niggli Spids thrust sheet are dominated by massive mica schists with pale coloured carbonate-rich units (Krummedal supracrustal sequence). The summit of Målebjerg at right is 1873 m high, about 1500 m above the glacier surface in the foreground.

Higgens and Leslie 2004

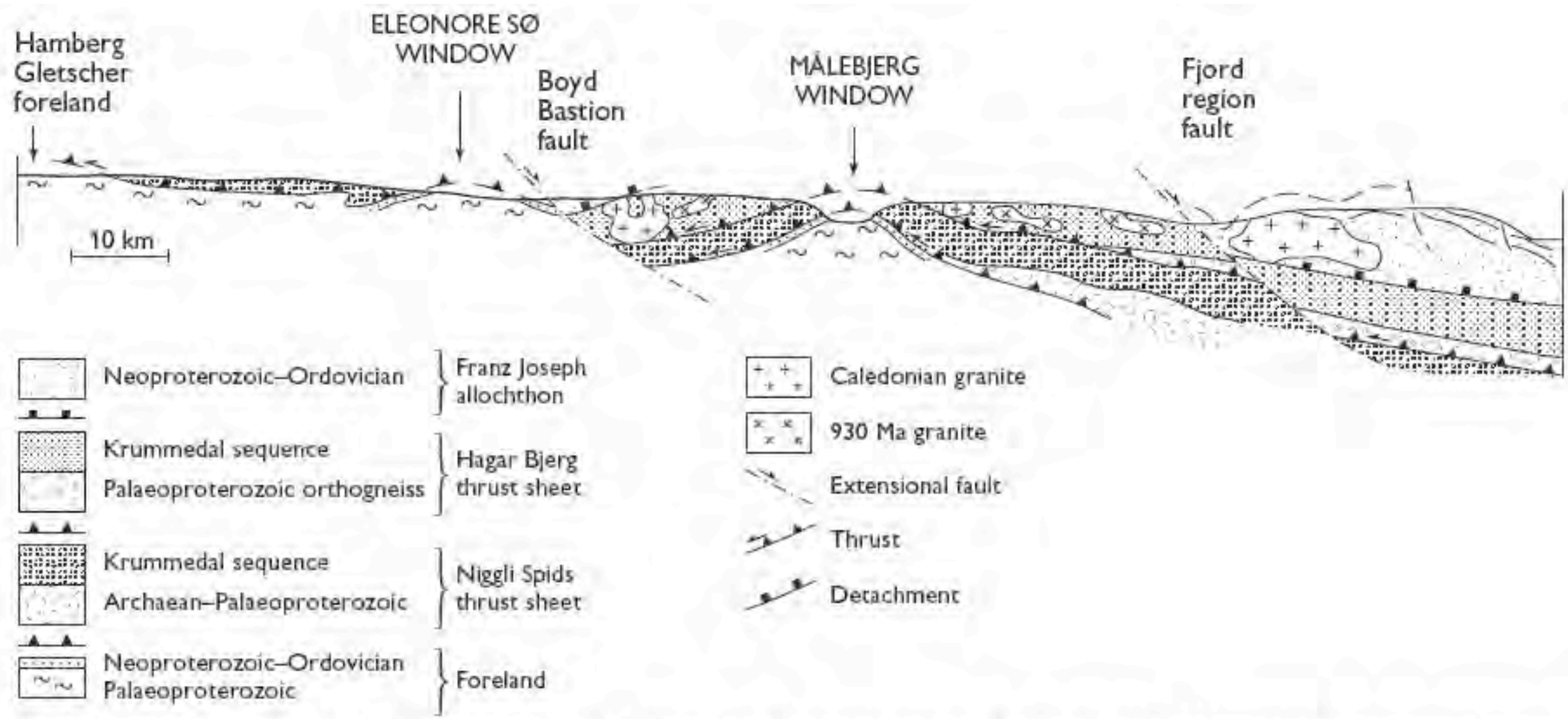


Fig. 3. Cross-section through the Eleonore Sø and Målebjerg windows showing the foreland windows overlain by two thrust sheets and the Franz Joseph allochthon. Section line is indicated on Fig. 2.

Higgens and Leslie 2004

Thomas 2006

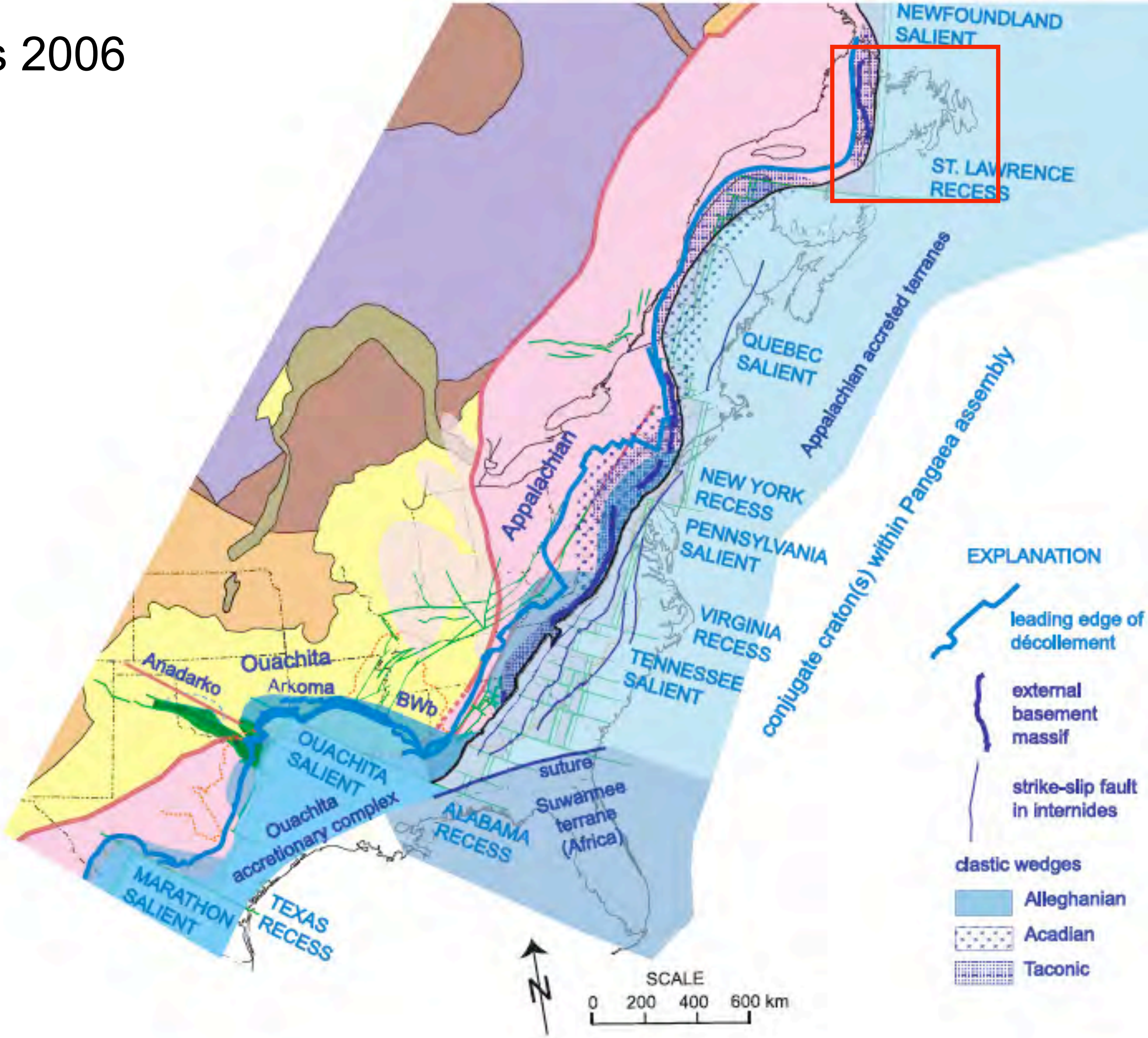


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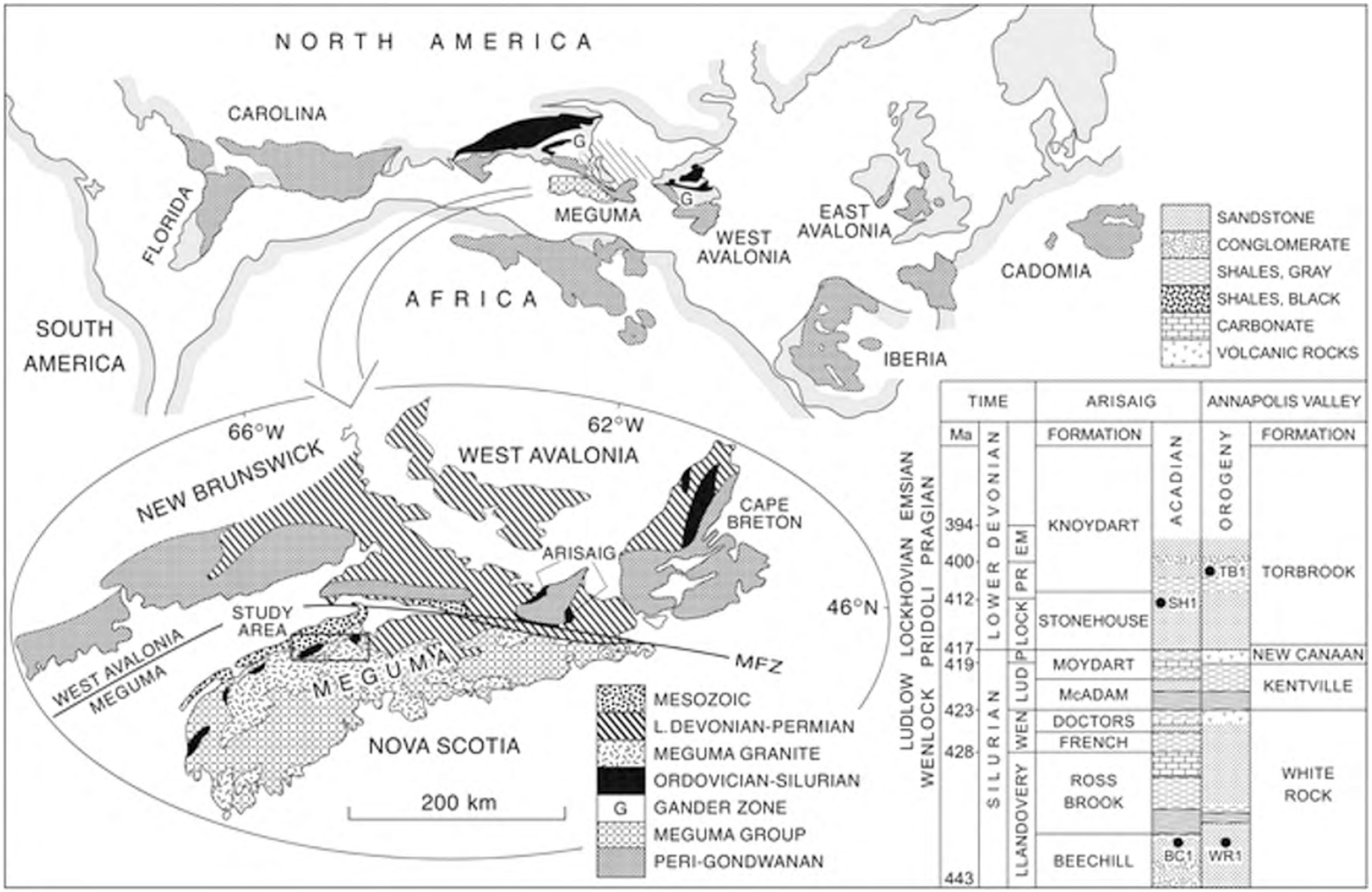
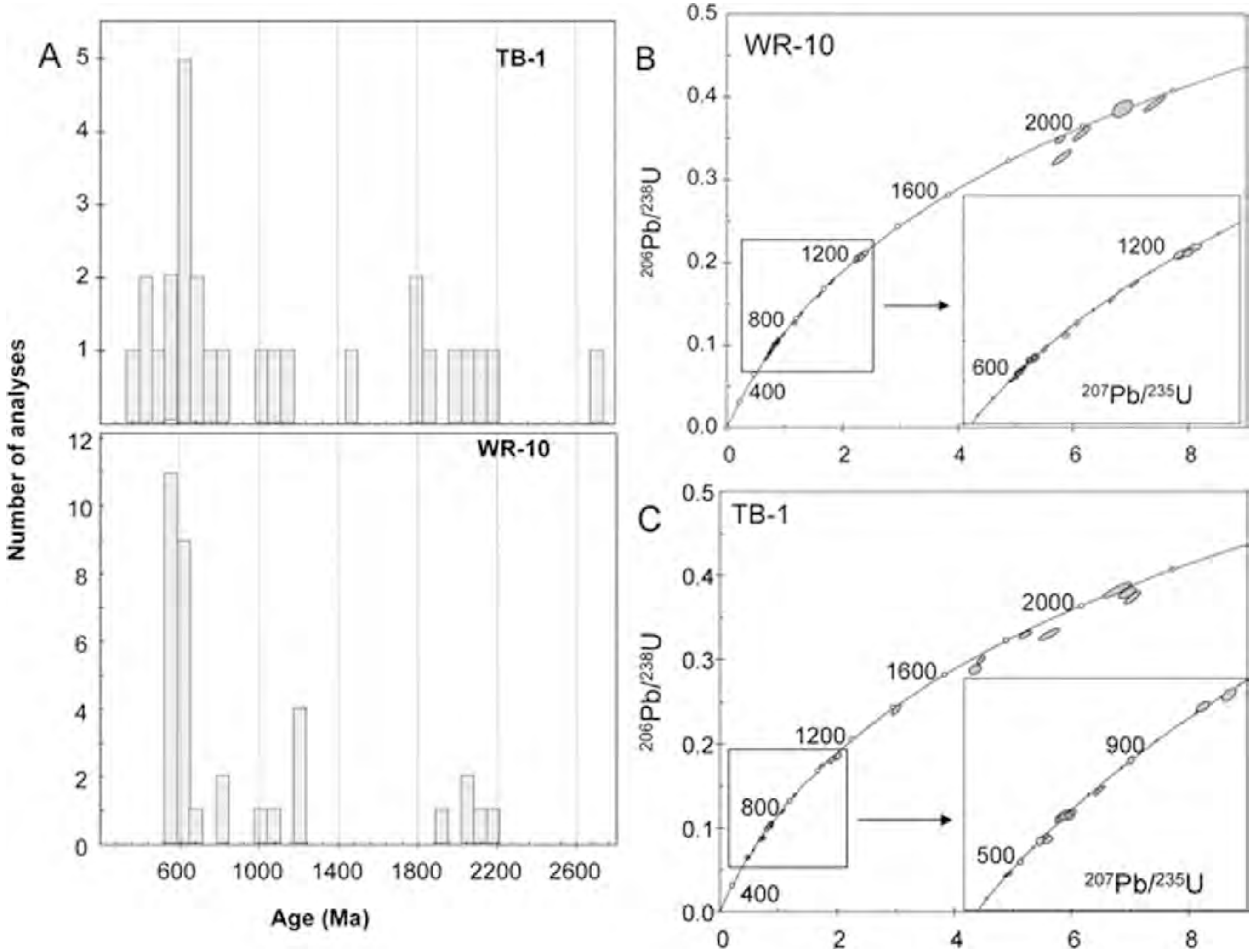
Figure 1. Early Mesozoic location of West Avalonia, Meguma, and related peri-Gondwanan terranes and location of Ordovician–Silurian sequences.



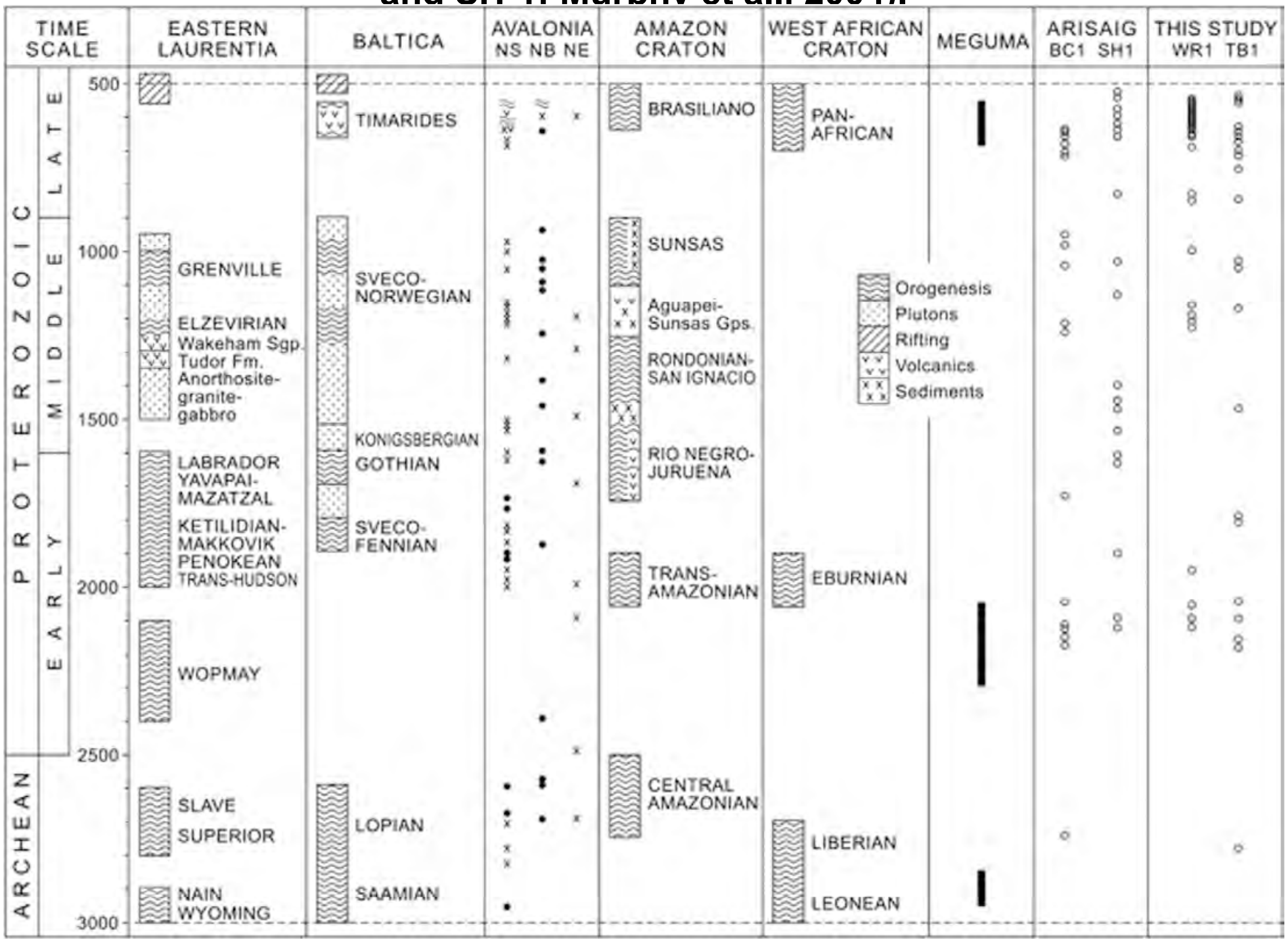
Murphy J B et al. Geology 2004;32:585-588

Figure 2. Laser-ablation–inductively coupled plasma–mass spectrometry data from WR-10 and TB-1.



Murphy J B et al. Geology 2004;32:585-588

Figure 3. Detrital zircon ages (open circles) from Upper Ordovician and Lower Devonian clastic rocks in Meguma terrane (WR-10 and TB-1) and Avalon terrane (Arisaig Group, BC-1 and SH-1; Murphy et al., 2004).



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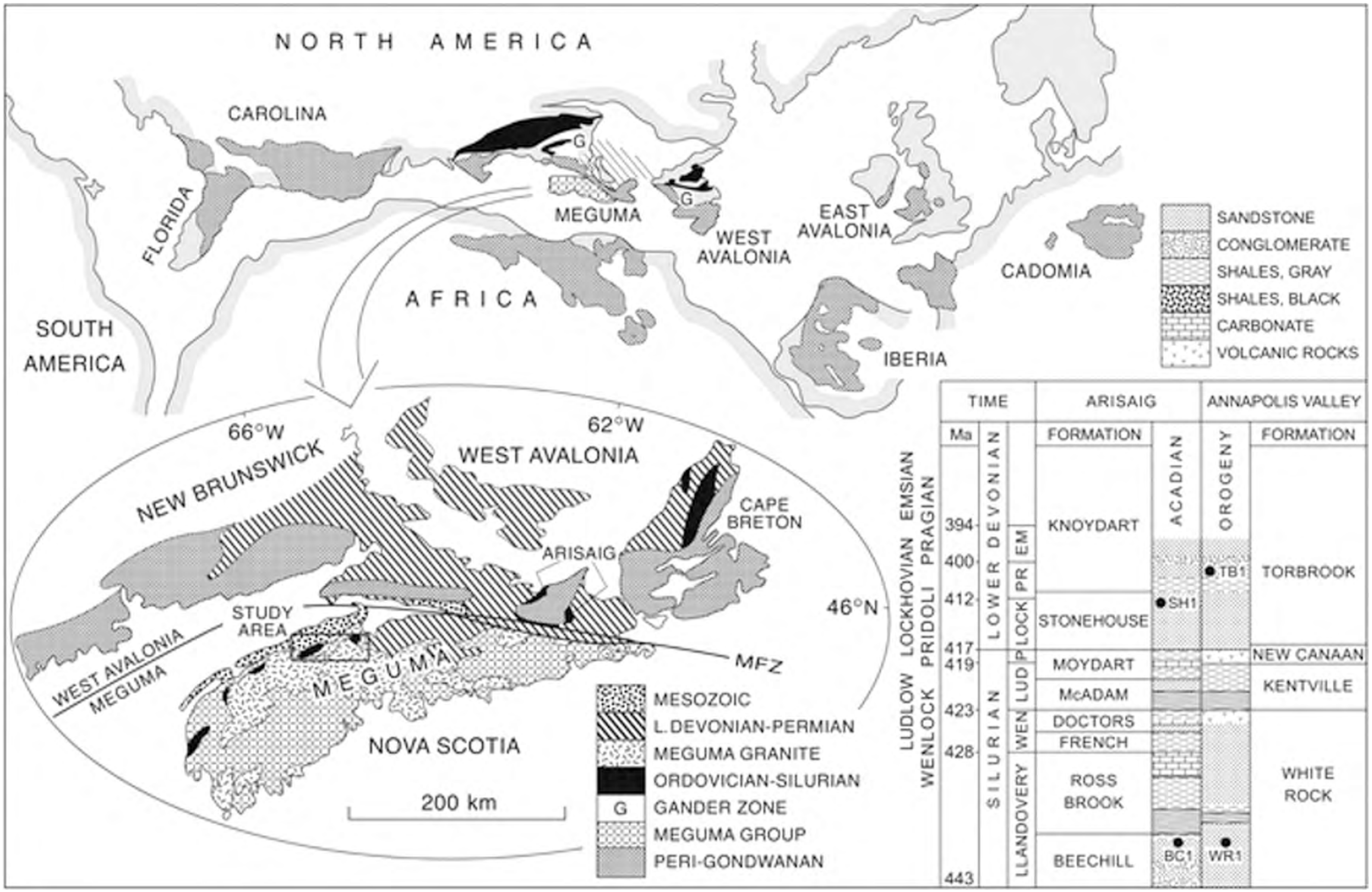

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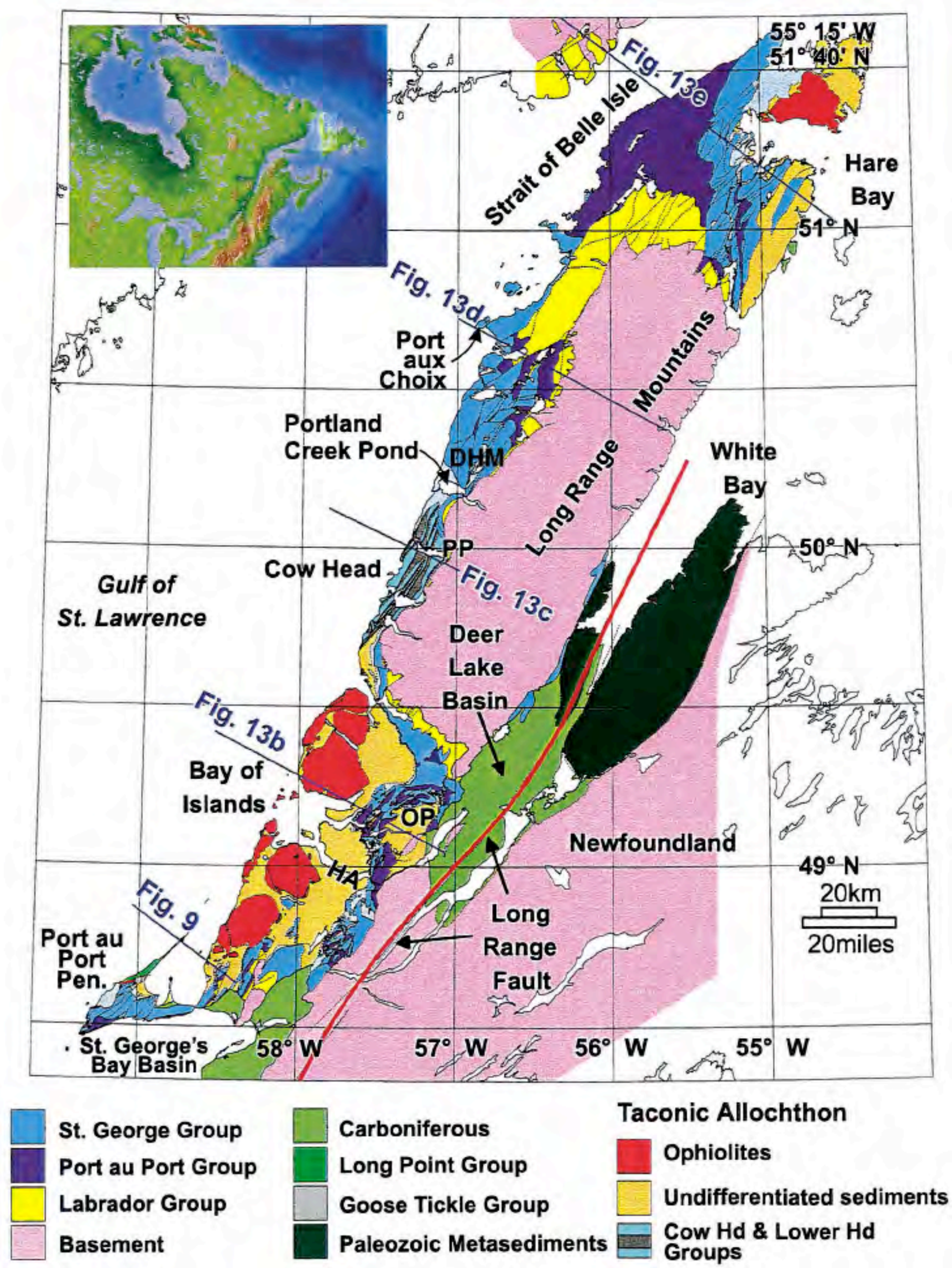
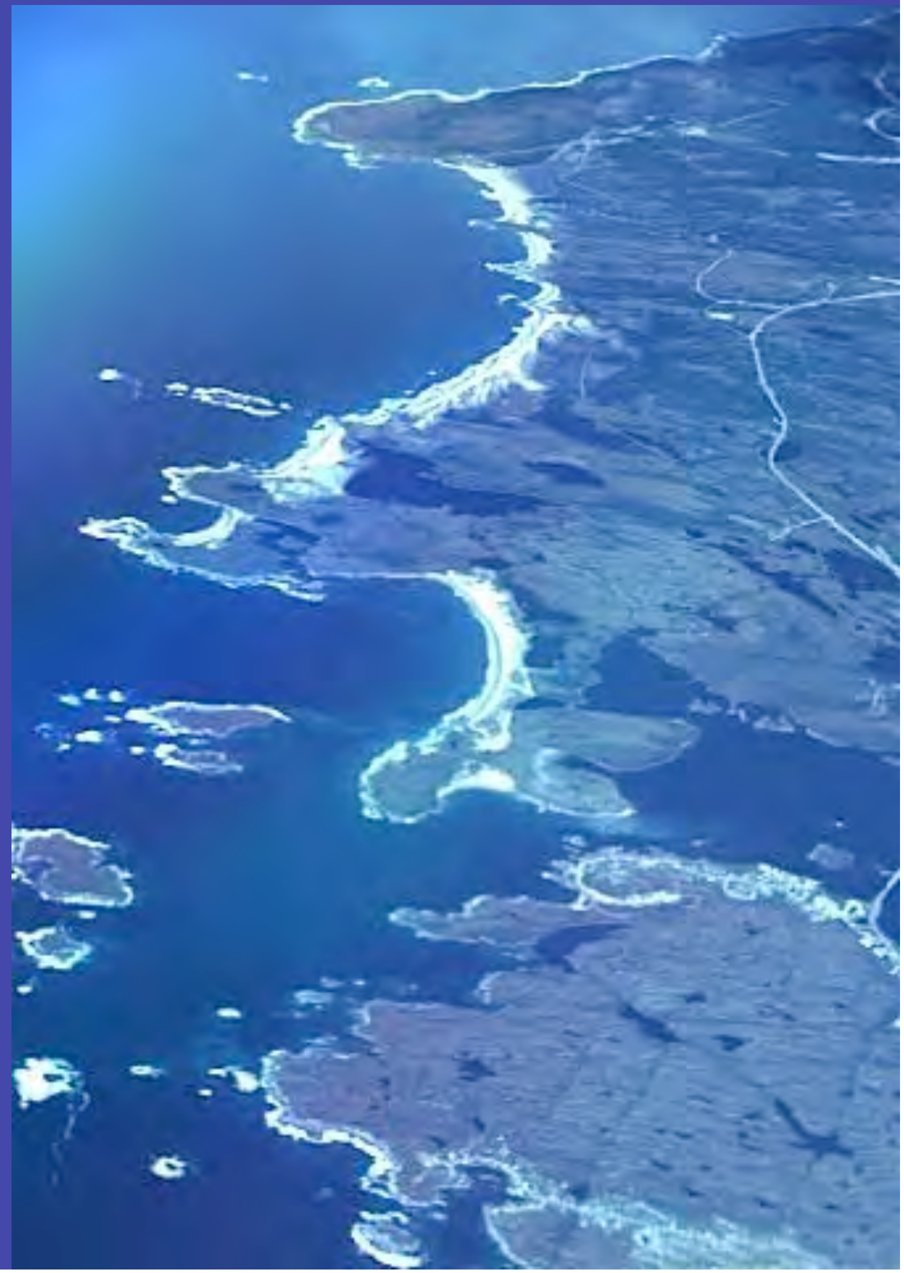


Cooper et al
2001

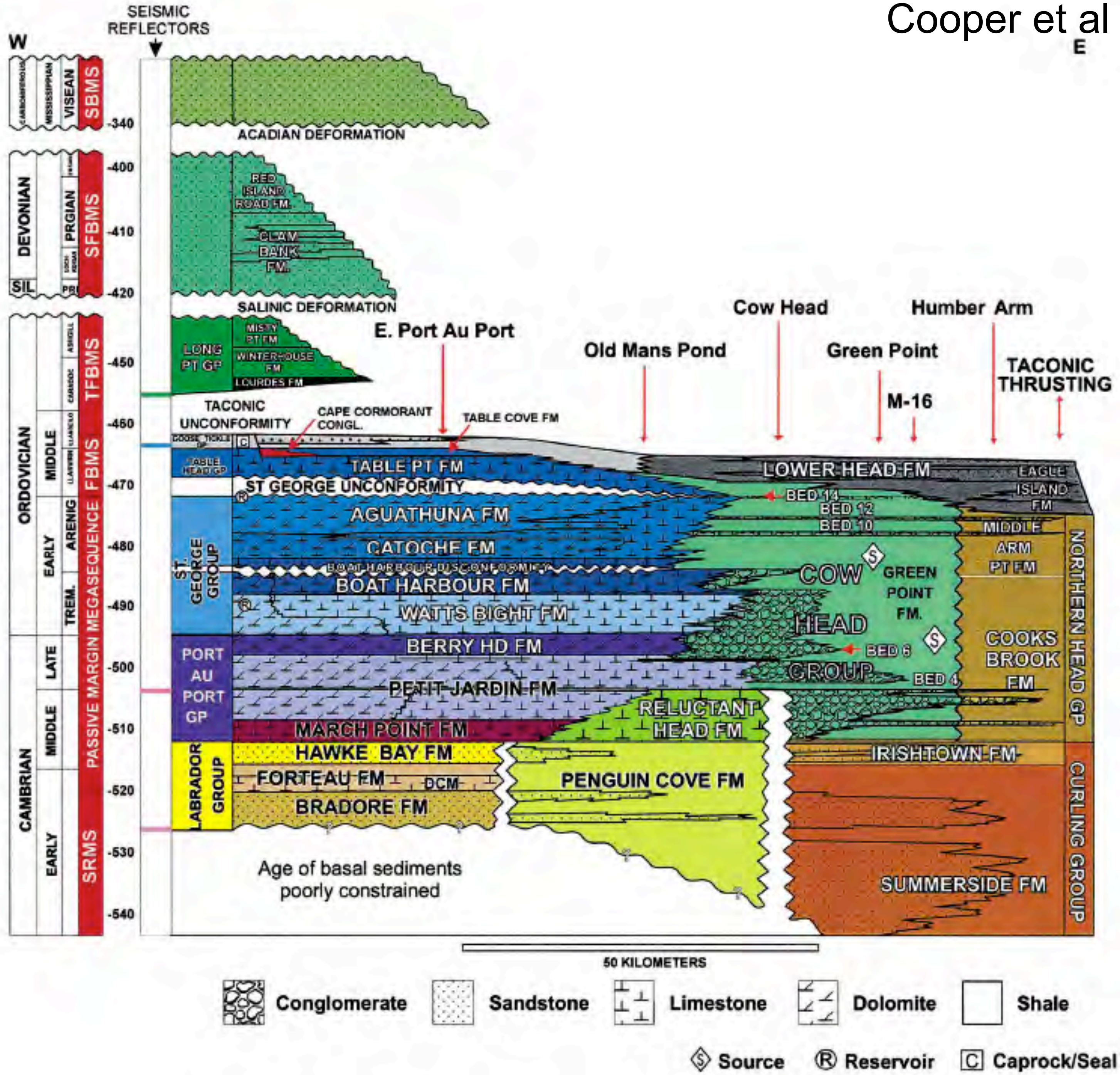
The Long Range Escarpment, Newfoundland

Gros Morne NP, Newfoundland

Cape Ray, Porte aux Basques, Newfoundland



Cooper et al 2001



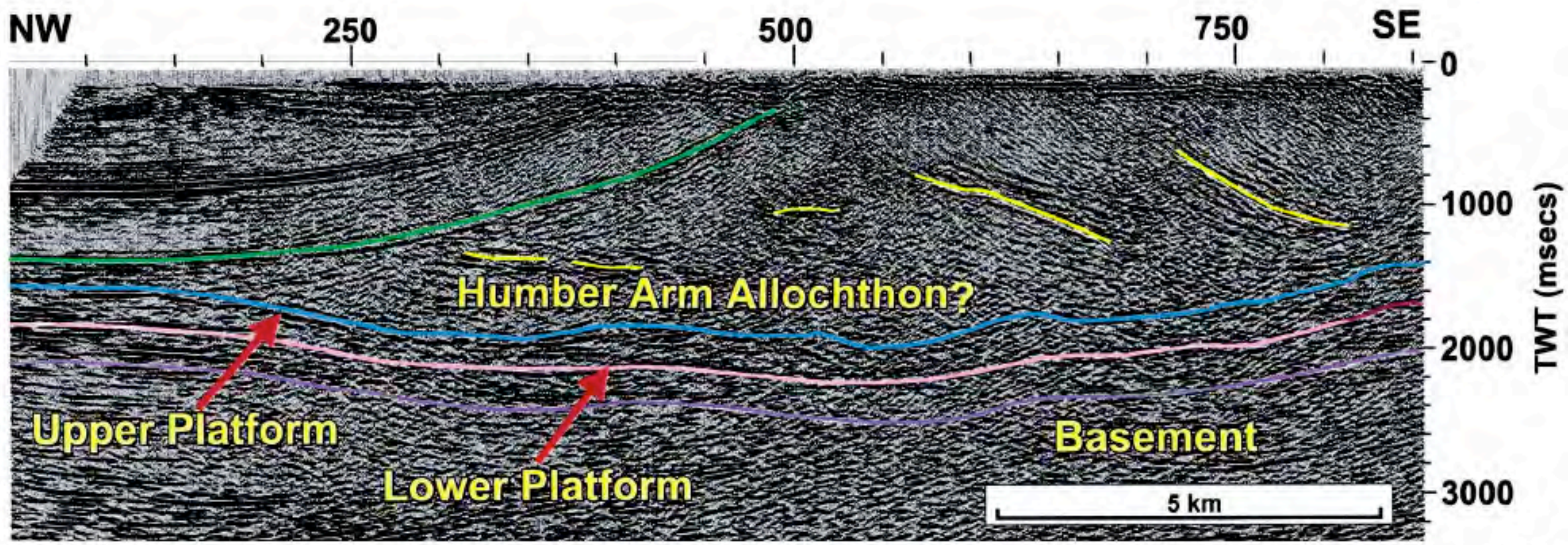
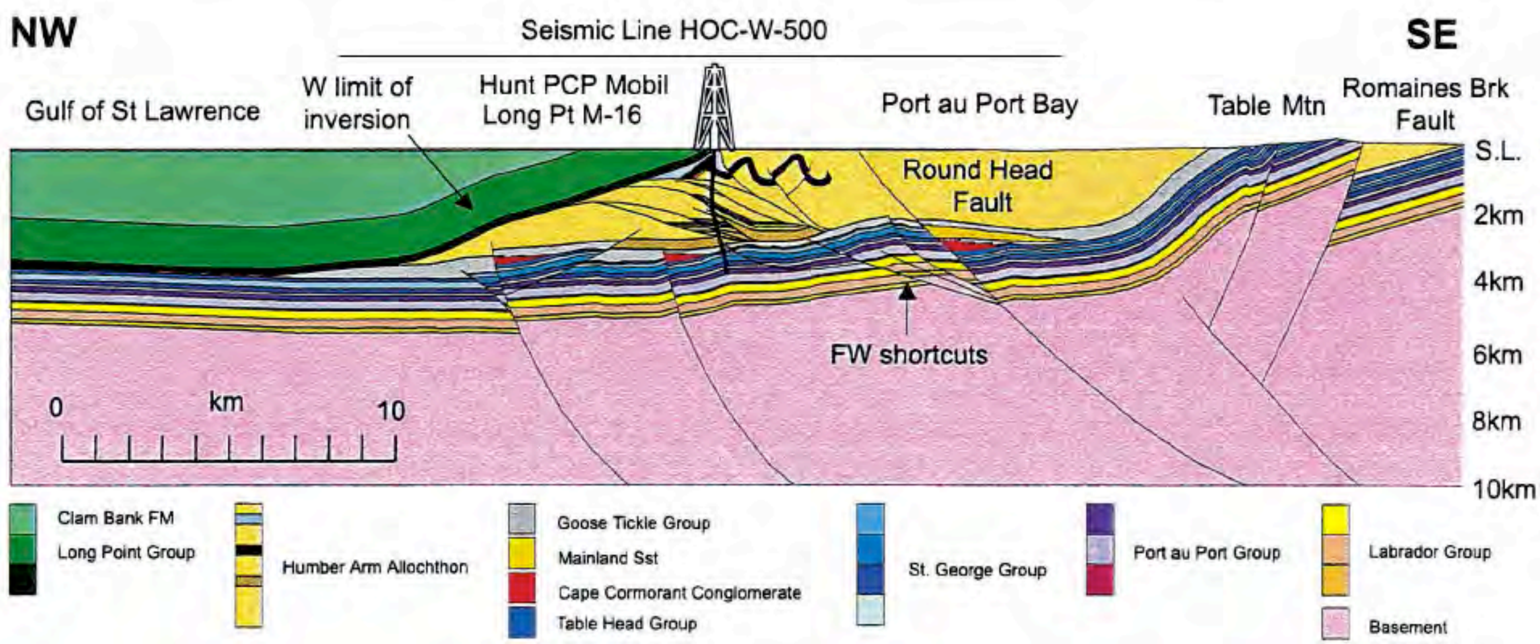
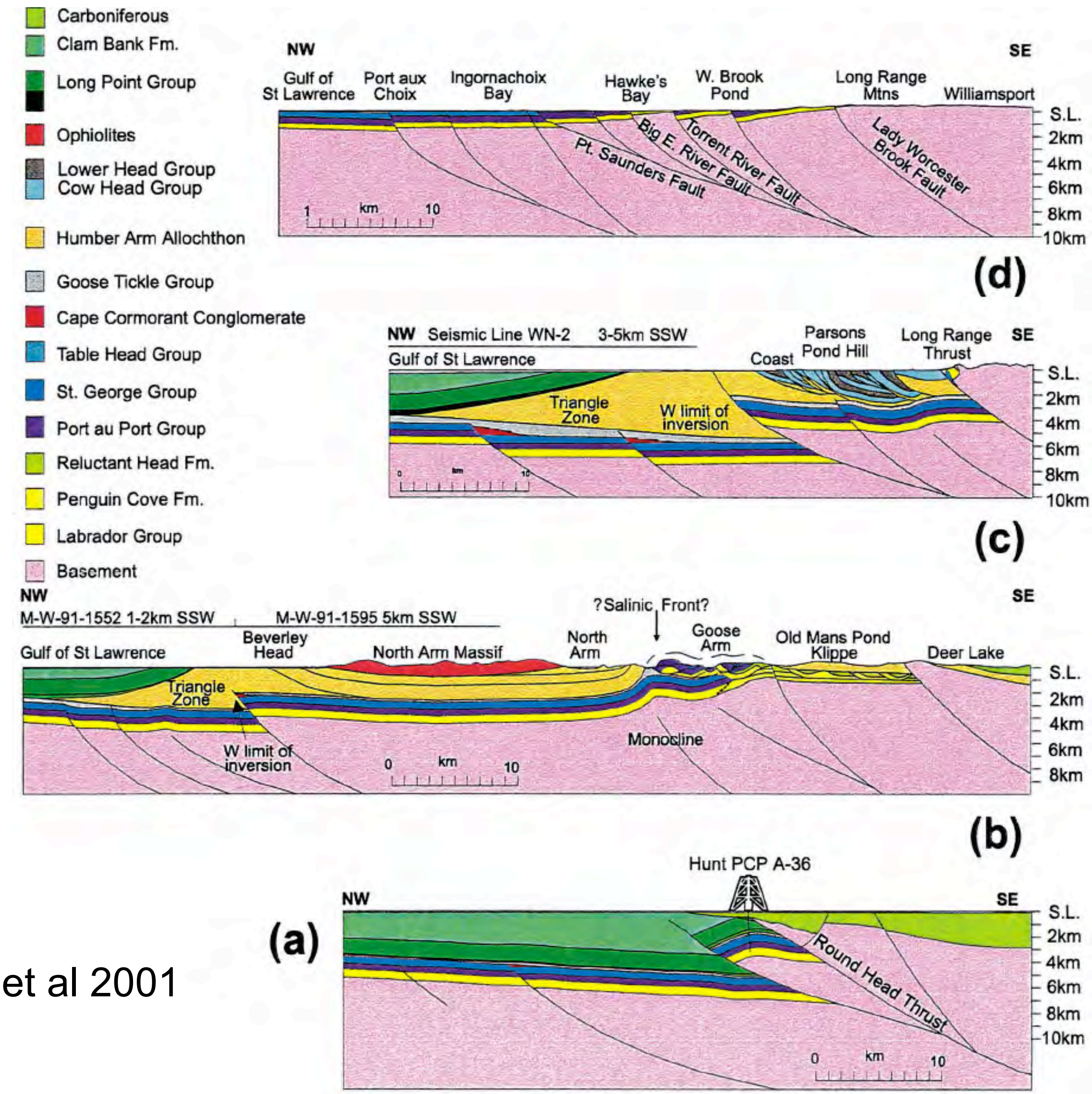


Figure 8. Seismic line CHA-92-1B; for location see Figure 5 and for legend see Figure 6 caption. The yellow horizons are unknown seismic events in the Humber Arm allochthon that are included to show the internal geometry of the triangle zone.

Cooper et al 2001





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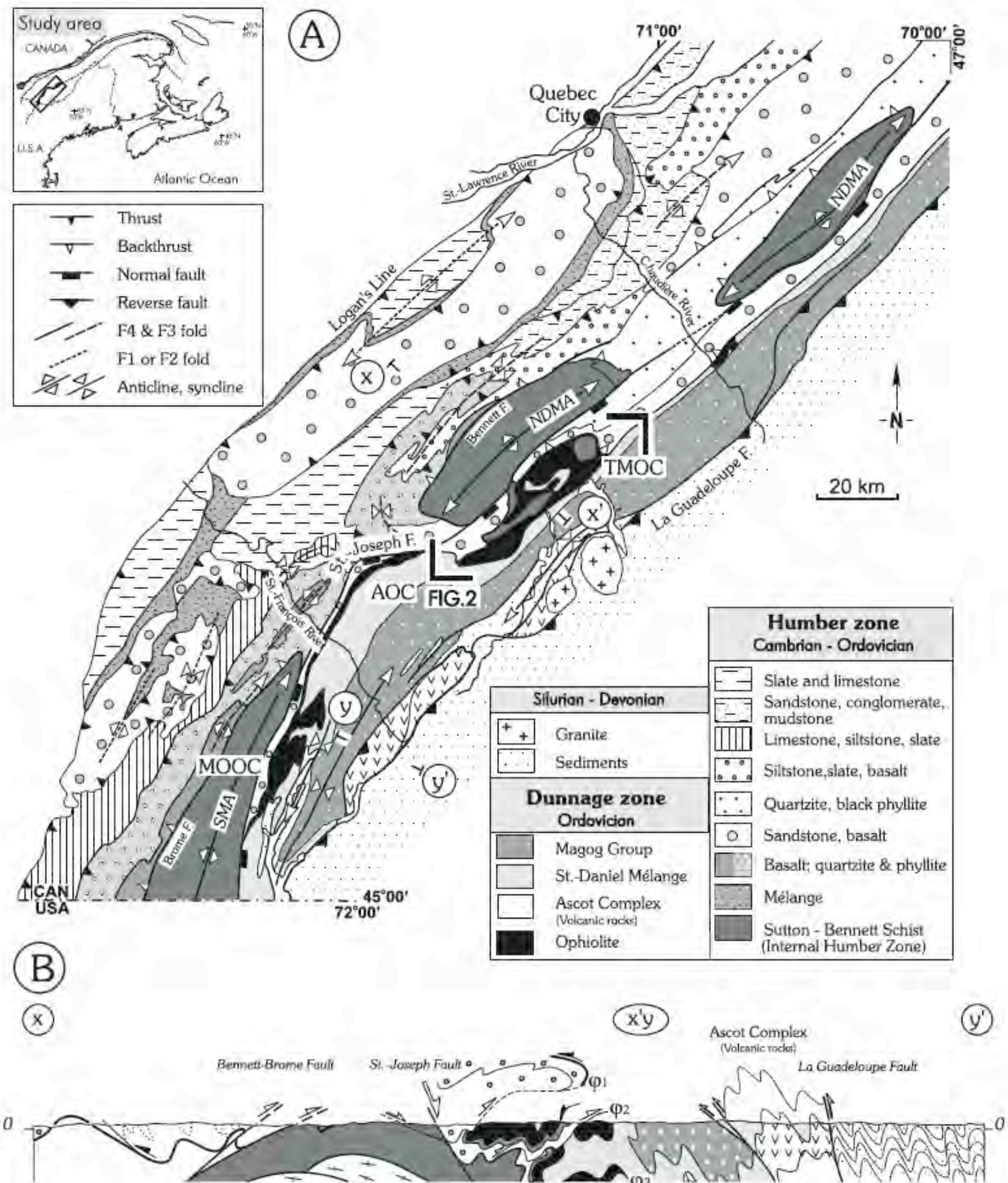


Schroetter et al 2006

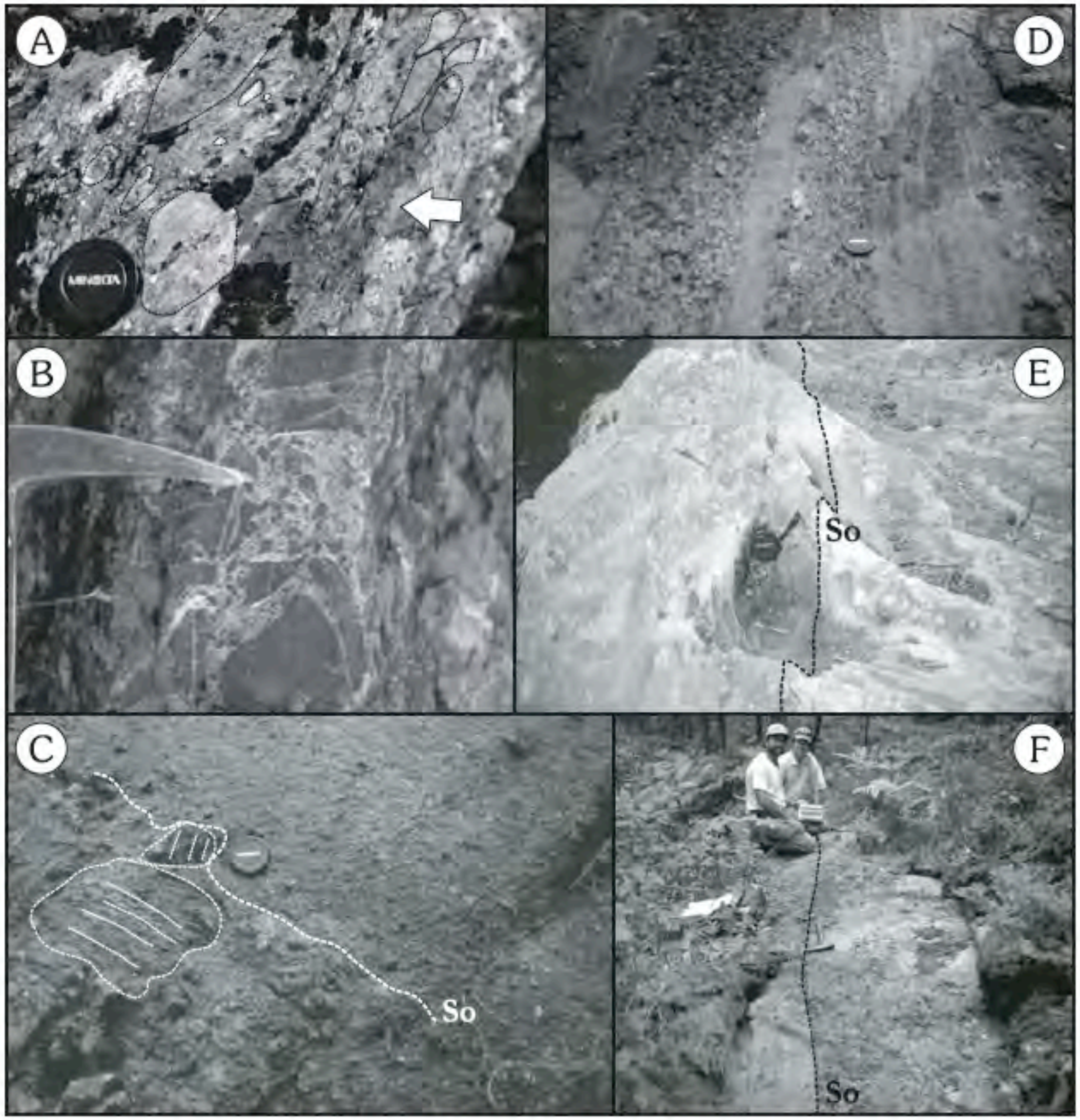


Figure 4. (A) Basal breccia with small amount of red argillite matrix (arrow) in the Rivière-de-l'Or section. (B) Fragments of serpentinized dunite and pyroxenite in breccia, Rivière-de-l'Or section. (C) Centimeter-size fragments of continental metamorphic rocks in breccia of the Rivière-de-l'Or section. (D) Interbedded breccia and coarse-grained sandstone of similar composition. Rivière-de-l'Or section. (E) Scoured contact between coarse-grained sandstones (left) and greenish siltstones, Petit-Lac–Saint-François section. (F) Erosional contact between polygenetic breccia (right) and sandstones (left), Petit-Lac–Saint-François section.

Schroetter et al 2006

Schroetter et al 2006

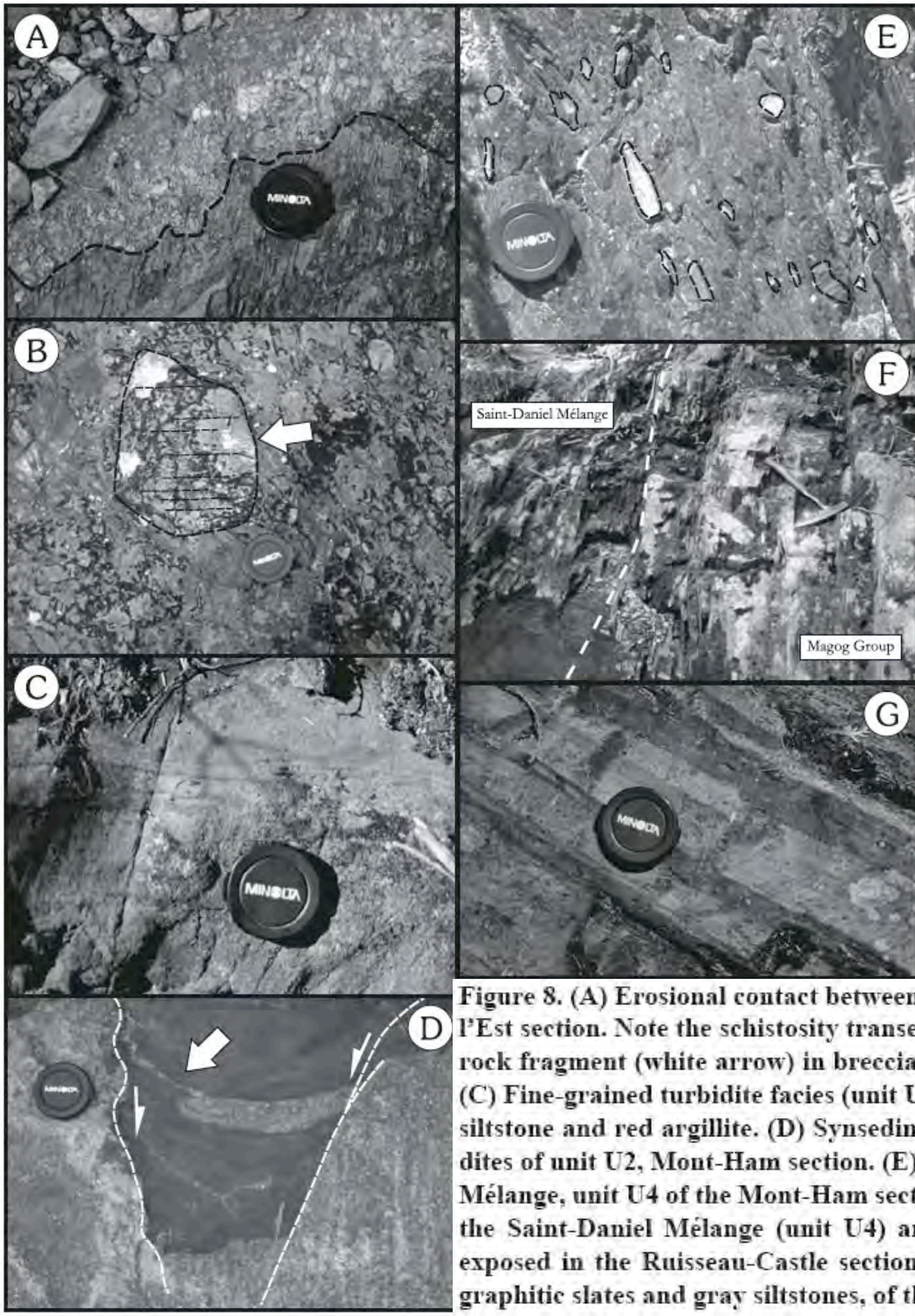
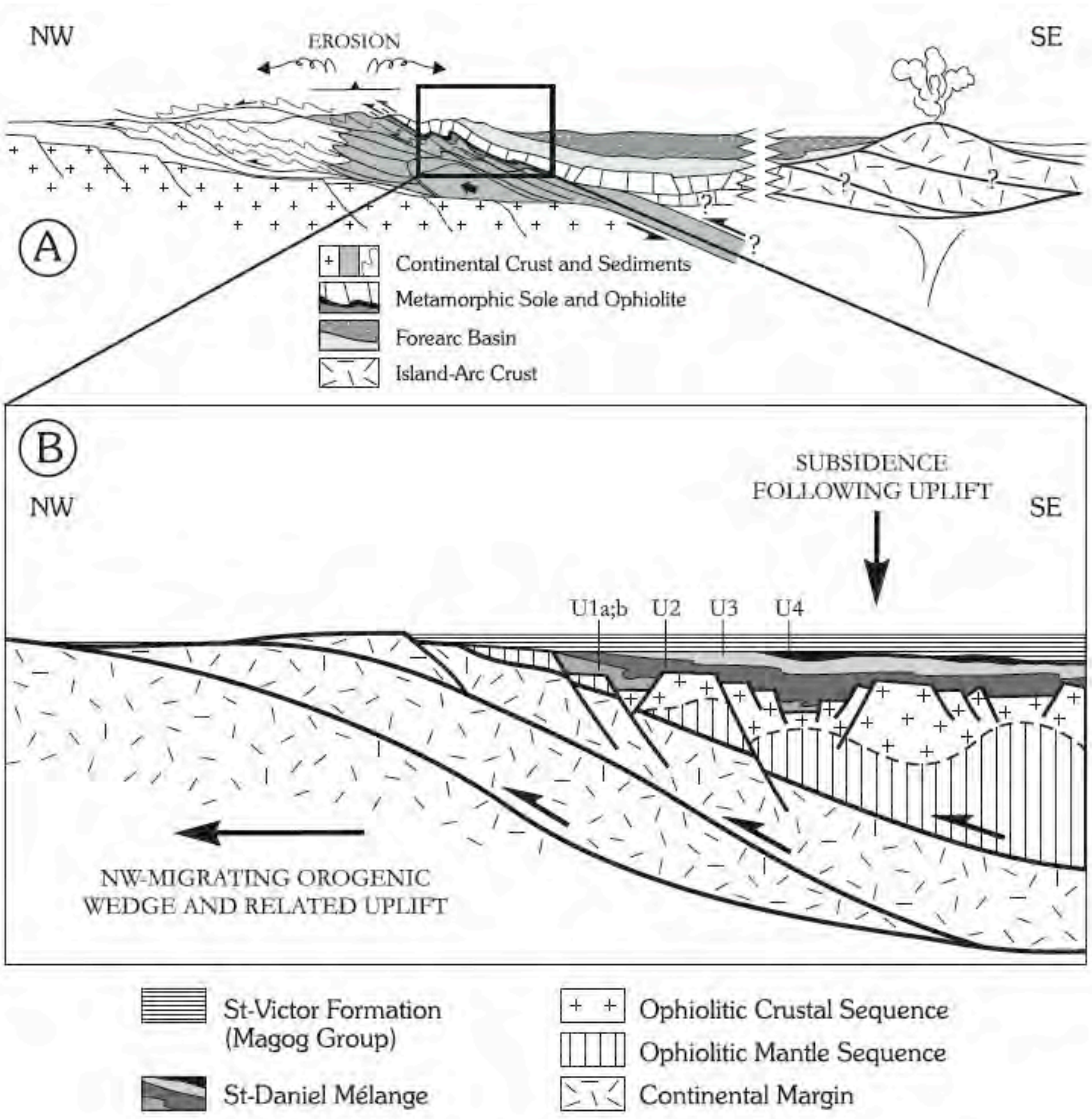


Figure 8. (A) Erosional contact between polygenetic breccia and red argillite of the Lac-de-l'Est section. Note the schistosity transecting the bedding at a high angle. (B) Metamorphic rock fragment (white arrow) in breccia with a matrix of red argillite, Lac-de-l'Est section. (C) Fine-grained turbidite facies (unit U1a) of the Lac-de-l'Est section, showing alternating siltstone and red argillite. (D) Synsedimentary deformation (slump, white arrow) in turbidites of unit U2, Mont-Ham section. (E) Typical pebbly mudstone facies of the Saint-Daniel Mélange, unit U4 of the Mont-Ham section. (F) Conformable contact (broken line) between the Saint-Daniel Mélange (unit U4) and the Saint-Victor Formation (Magog Group) as exposed in the Ruisseau-Castle section. (G) Typical lithologies, consisting of fossiliferous graphitic slates and gray siltstones, of the Saint-Victor Formation near Disraeli.



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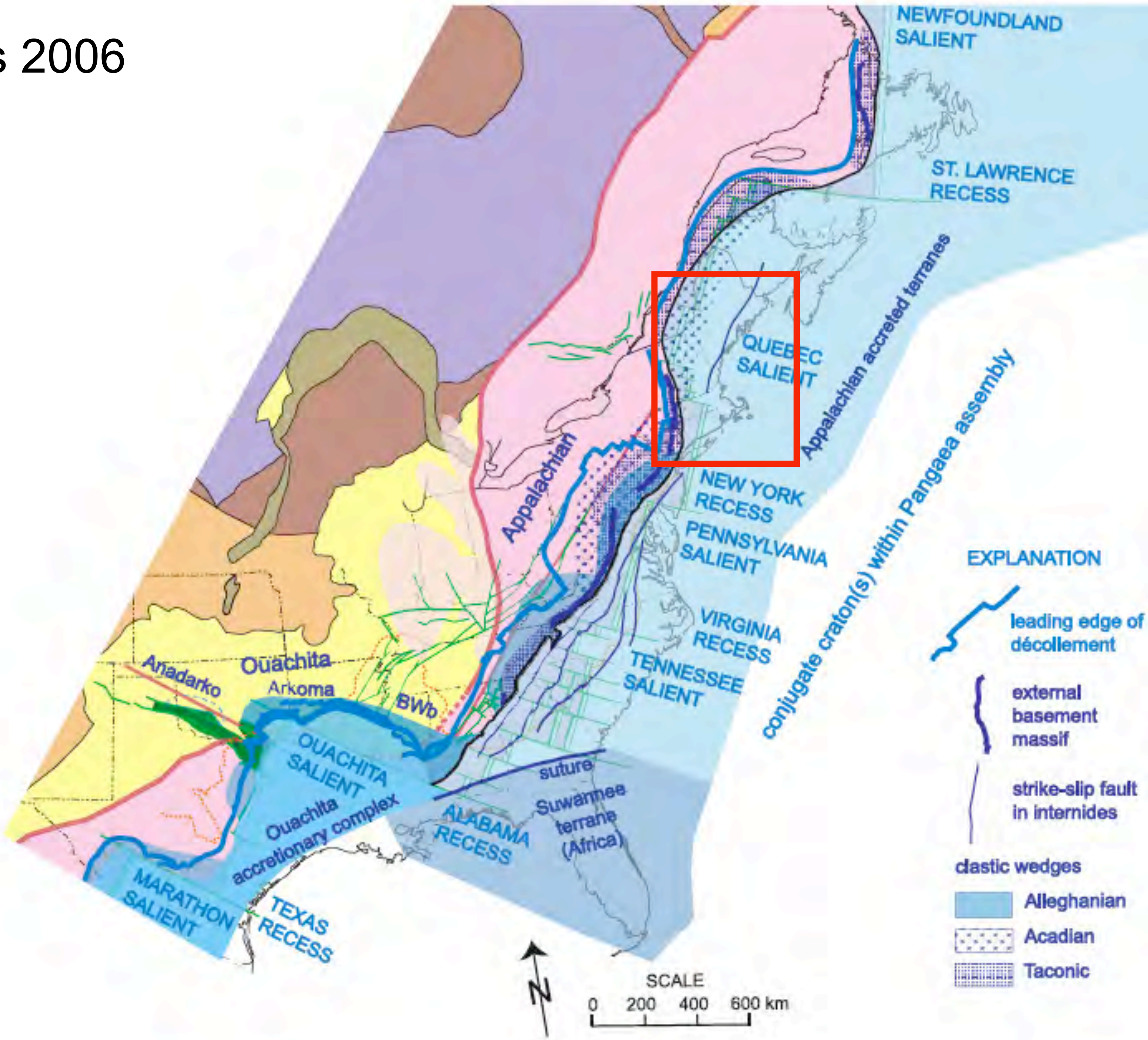
Thomas 2006



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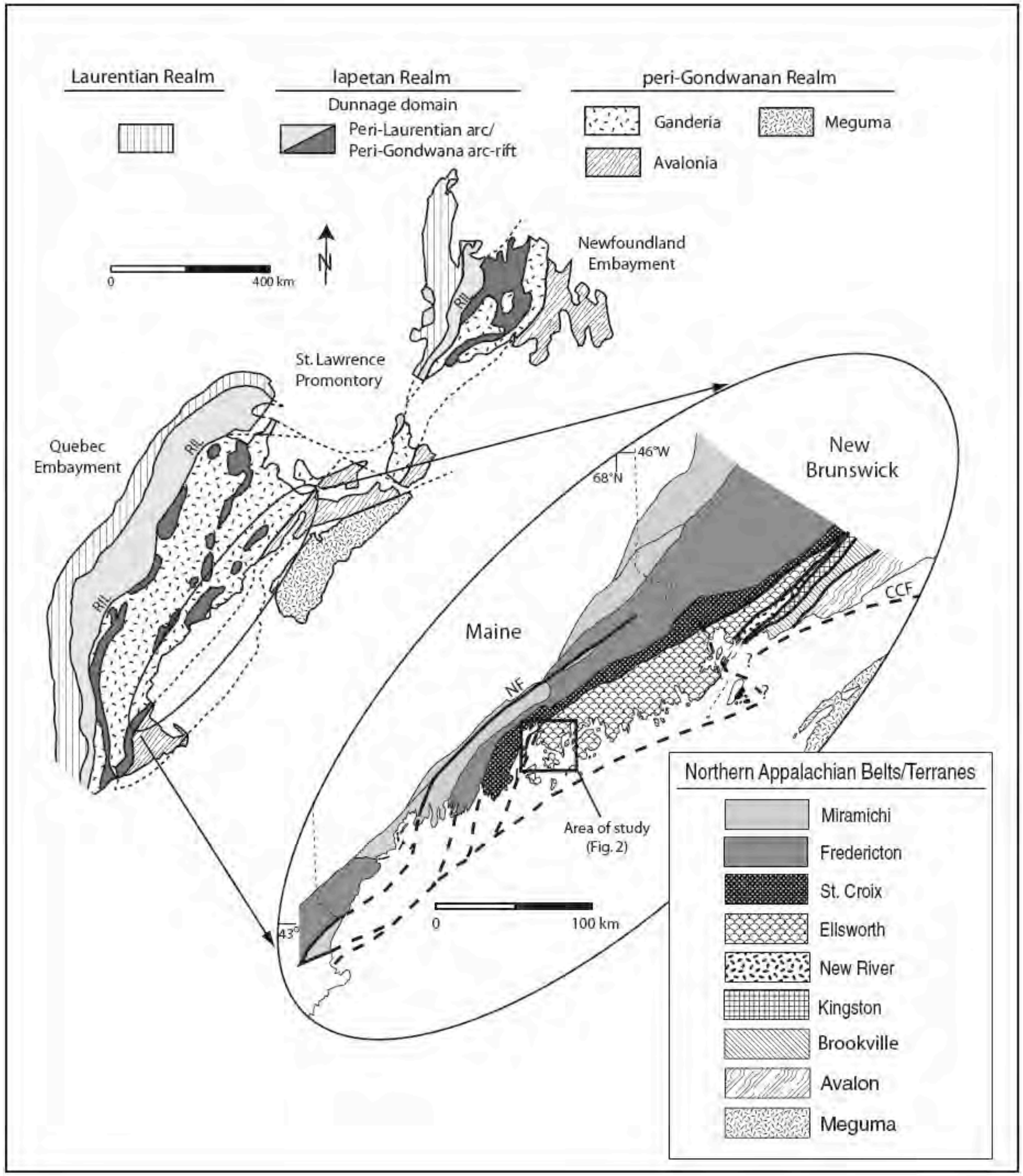


Schulz et al 2008

Schoonmaker and Kidd 2006

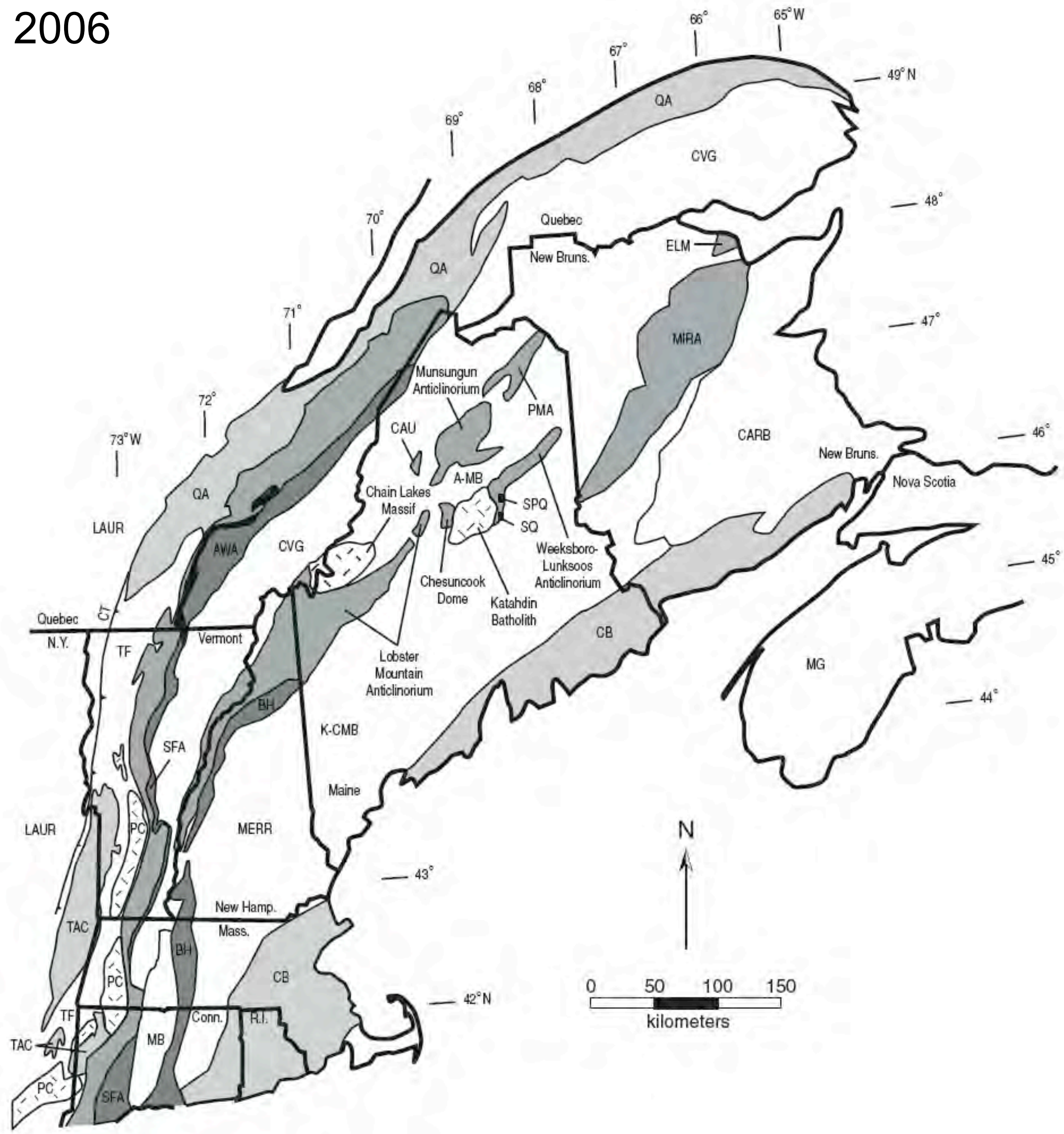
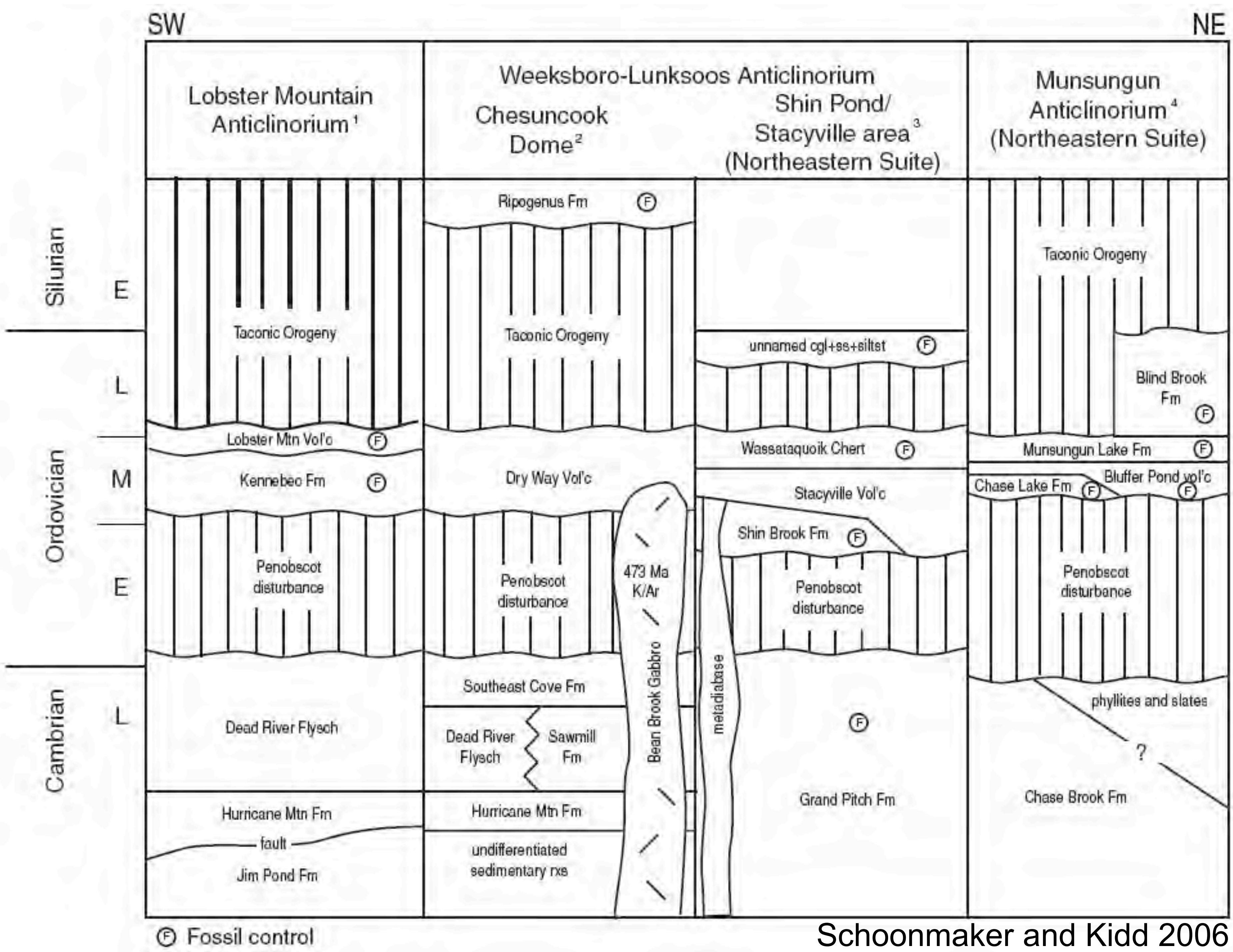


Figure 1. Generalized geology of the northern Appalachians. Pre-Devonian units are shaded. LAUR—autochthonous Laurentian margin, QA—Quebec allochthons, TAC—Taconic allochthons, TF—transported Laurentian margin and basin deposits, PC—Precambrian massifs, SFA-AWA—Shelburne Falls arc, Ascot-Weedon arc, and related oceanic rocks, including ophiolitic fragments, MB—Mesozoic basin, CVG—Connecticut Valley Gaspé synclinorium, BH—Bronson Hill arc, MERR—Merrimack synclinorium, CAU—Caucomgomoc inlier, A-MB—Aroostook-Matapedia belt, SPQ—Shin Pond quadrangle, SQ—Stacyville quadrangle, PMA—Pennington Mtn. anticlinorium, MIRA—Miramichi Highlands, K-CMB—Kearsarge-Central Maine belt, ELM—Elmtree-Belledune inlier, CARB—Carboniferous cover rocks, CB—Coastal belt, MEG—Meguma terrane (adapted from Williams, 1978; Osberg et al., 1985; and Robinson et al., 1998).



Schoonmaker and Kidd 2006

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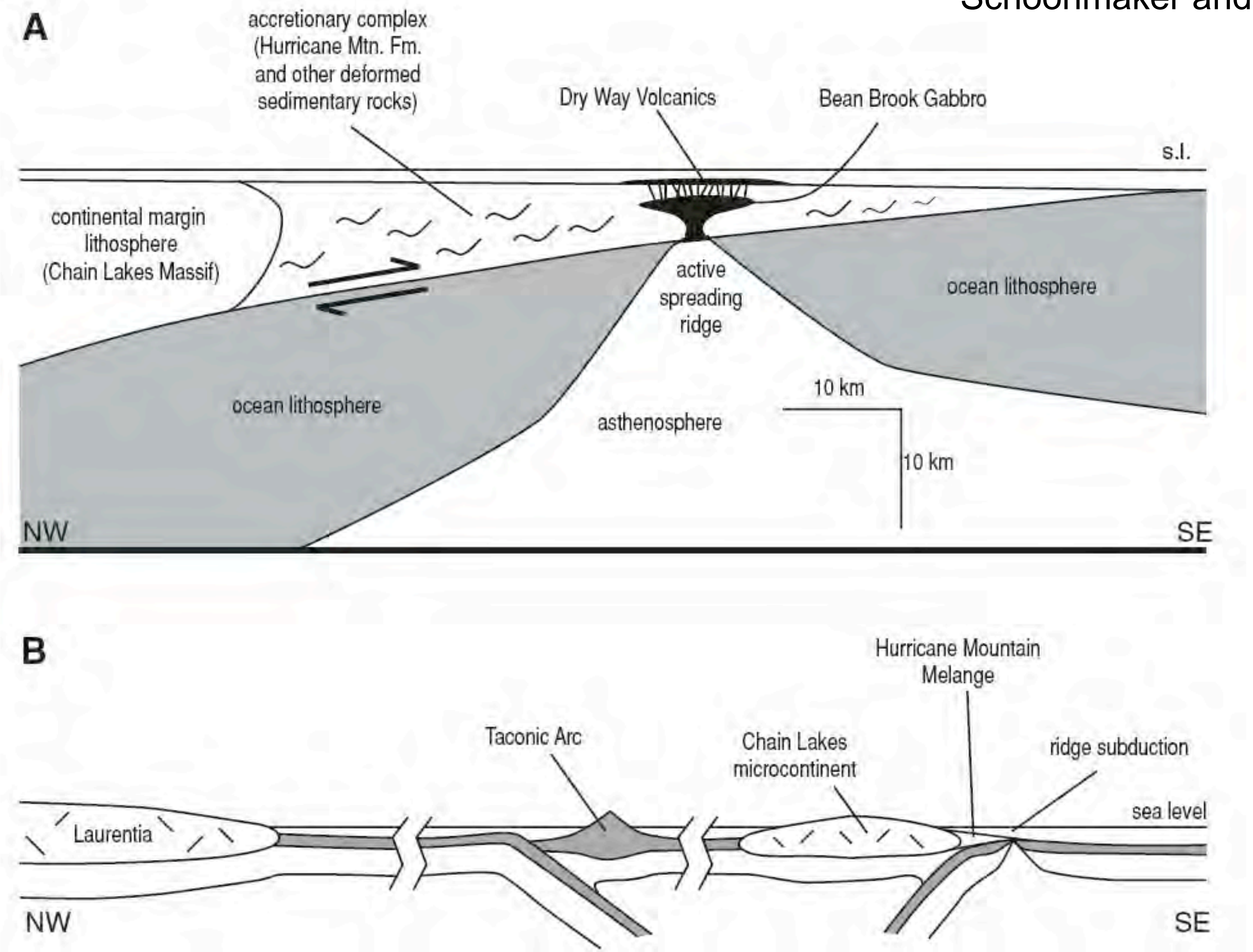
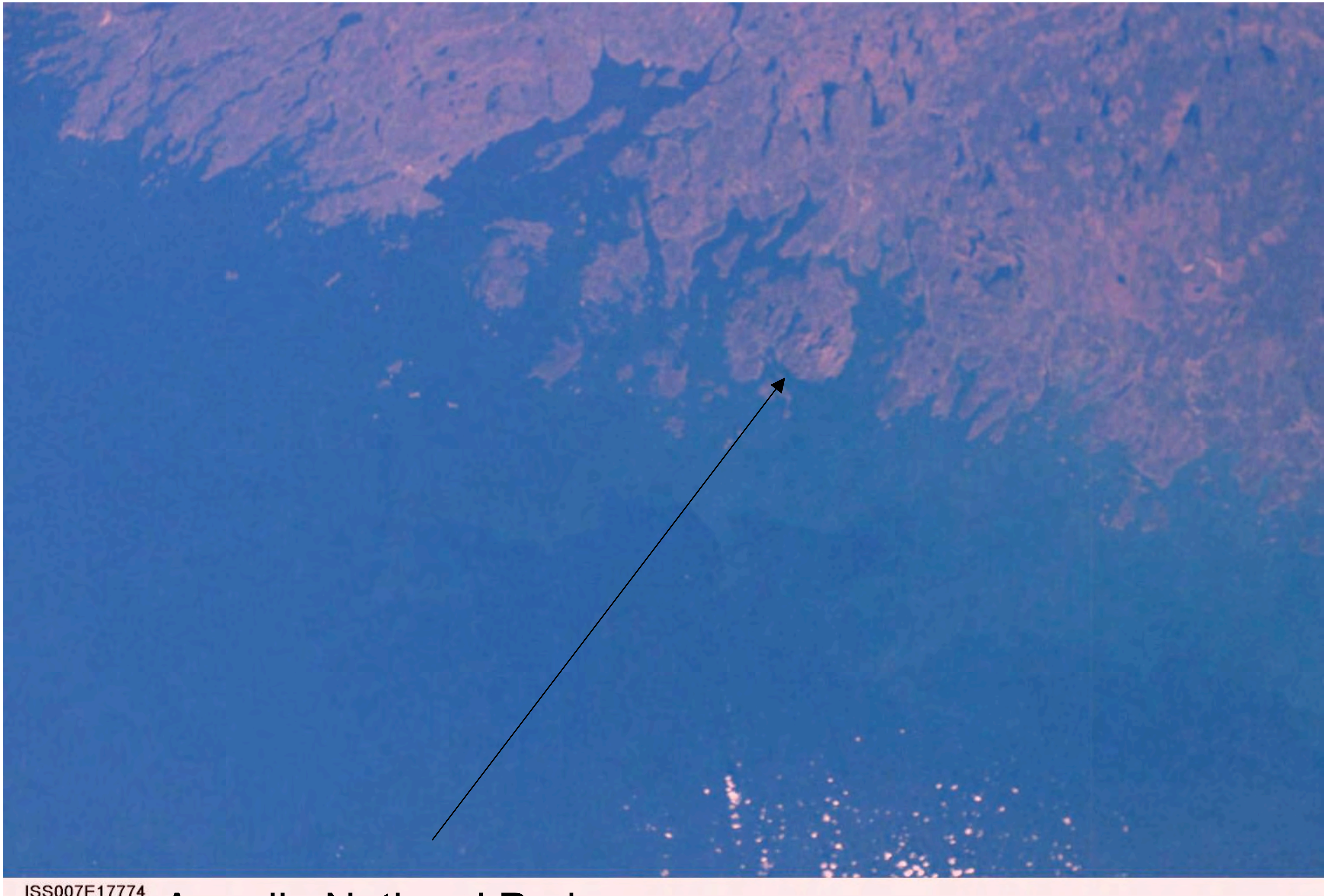


Figure 8. Schematic cartoons of the Early to Middle Ordovician Taconic ocean illustrating: (A) Ridge subduction beneath Chain Lakes Massif (s.l.—sea level), and (B) relationship of Chain Lakes microcontinent to pre-Taconic Laurentian margin and Taconic arc.



Arcadia National Park-
Mt Desert Island, Ellesworth Maine: the Ellesworth Terrane

Schulz et al 2008

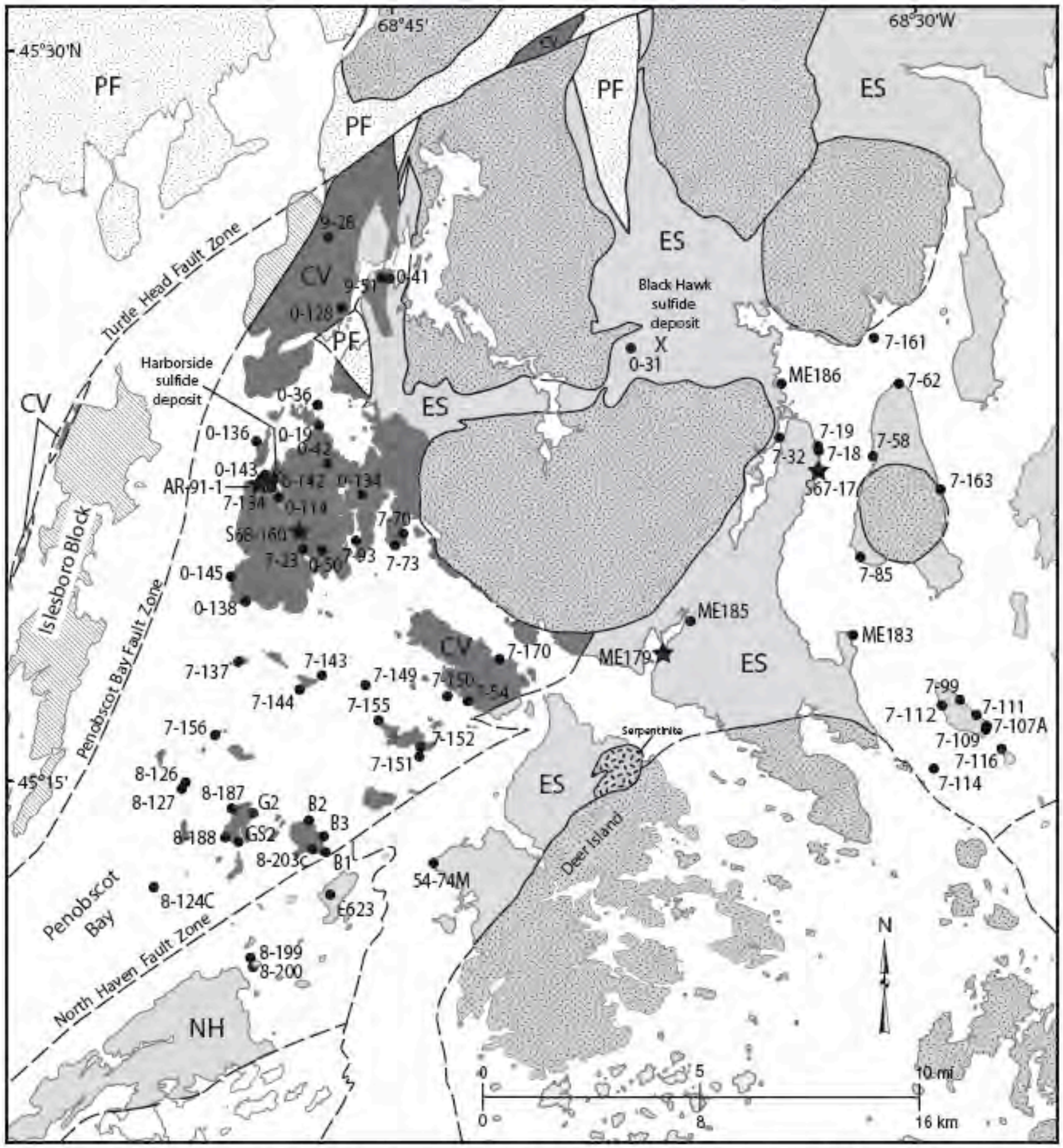
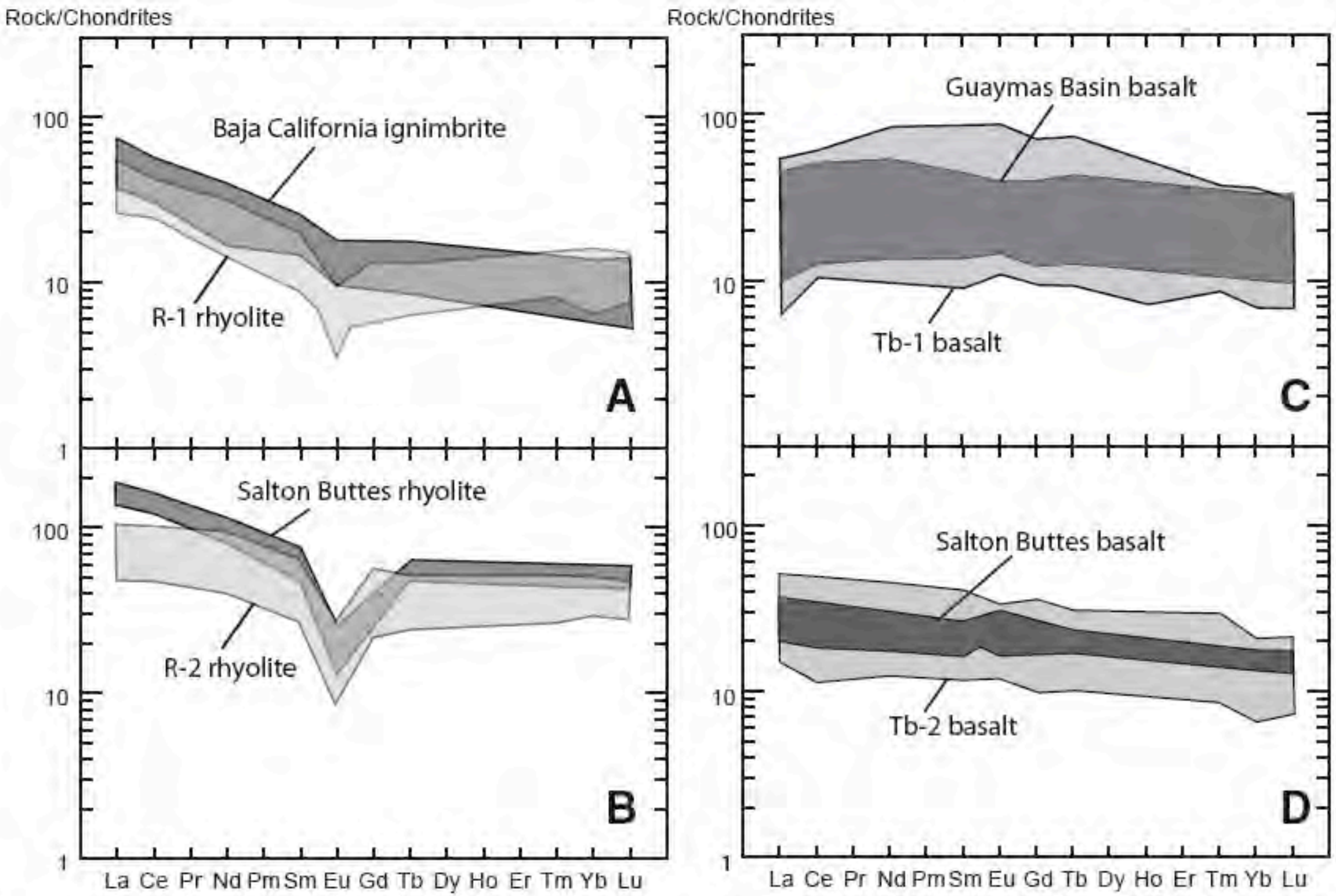


Figure 2. Simplified geologic map of the Penobscot Bay area showing locations of samples analyzed in this study. Stars mark samples used for age dating. CV—Castine Volcanics; ES—Ellsworth Schist; NH—North Haven Greenstone; PF—Penobscot Formation; dark stipple—Silurian and Devonian granitic intrusions. Fault-bounded Islesboro block consists of the older Neoproterozoic Seven Hundred Acre Island Formation deposited on unknown basement and unconformably overlain by the platformal Islesboro Formation. Geology is after Stewart (1998).



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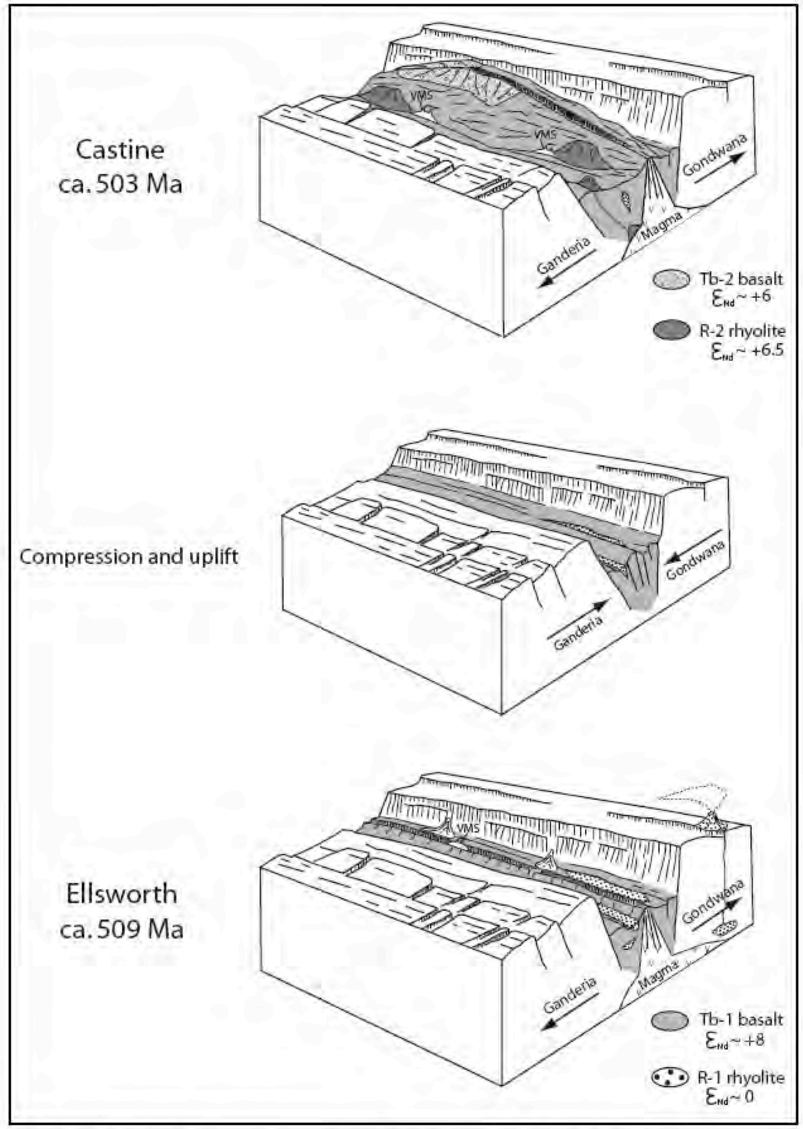


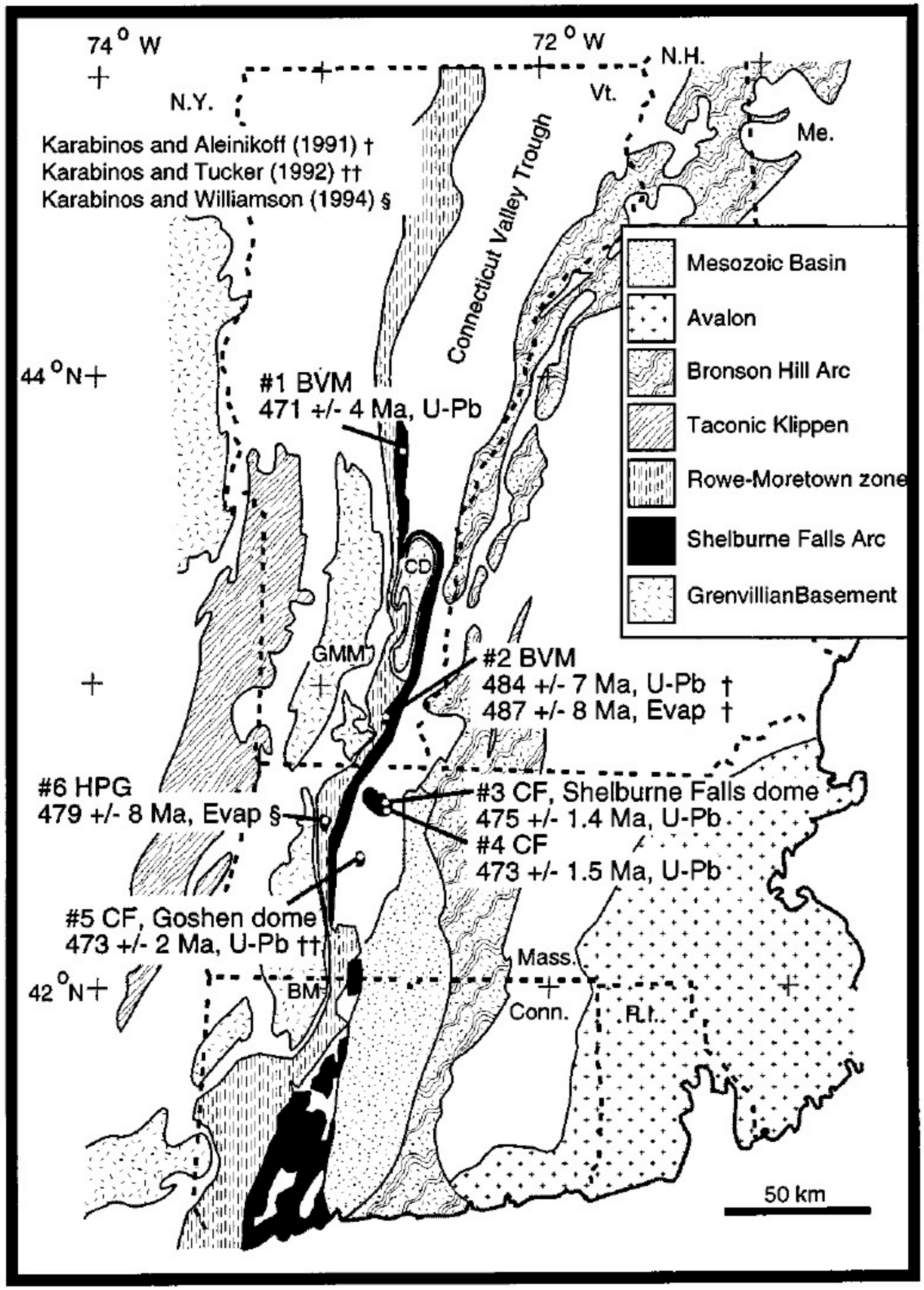
Figure 18. Schematic diagram showing the petrotectonic evolution of the Ellsworth terrane. Extension led to rifting and eruption of Tb-1 basalt from asthenospheric mantle by ca. 509 Ma. Basalt underplating along the rift margin may have led to crustal melting and mixing with basalt to produce the calc-alkaline R-1 rhyolite. Occasionally, clastic sediments derived from adjacent crustal blocks were deposited in the evolving rift. Sometime later, extension ceased, and compression led to folding and uplift along the rift. This may have been in response to far-field changes in plate interactions and/or crustal block rotation associated with strike-slip faults. Extension and the eruption of Tb-1 basalt had resumed by ca. 503 Ma and was accompanied by more enriched Tb-2 basalt locally. Buildup of swells along the rift and/or shield volcanoes helped to promote partial melting of the hydrothermally altered Tb-1 basalt crust and the production of tholeiitic R-2 rhyolite. Hydrothermal systems associated with rhyolite domes led to development of volcanogenic massive sulfide (VMS) deposits locally. See text for

Schulz et al 2008


Shelburne Falls, MA


Shelburne Falls MA outcrop

Karabinos et al 1998



Karabinos et al 1998