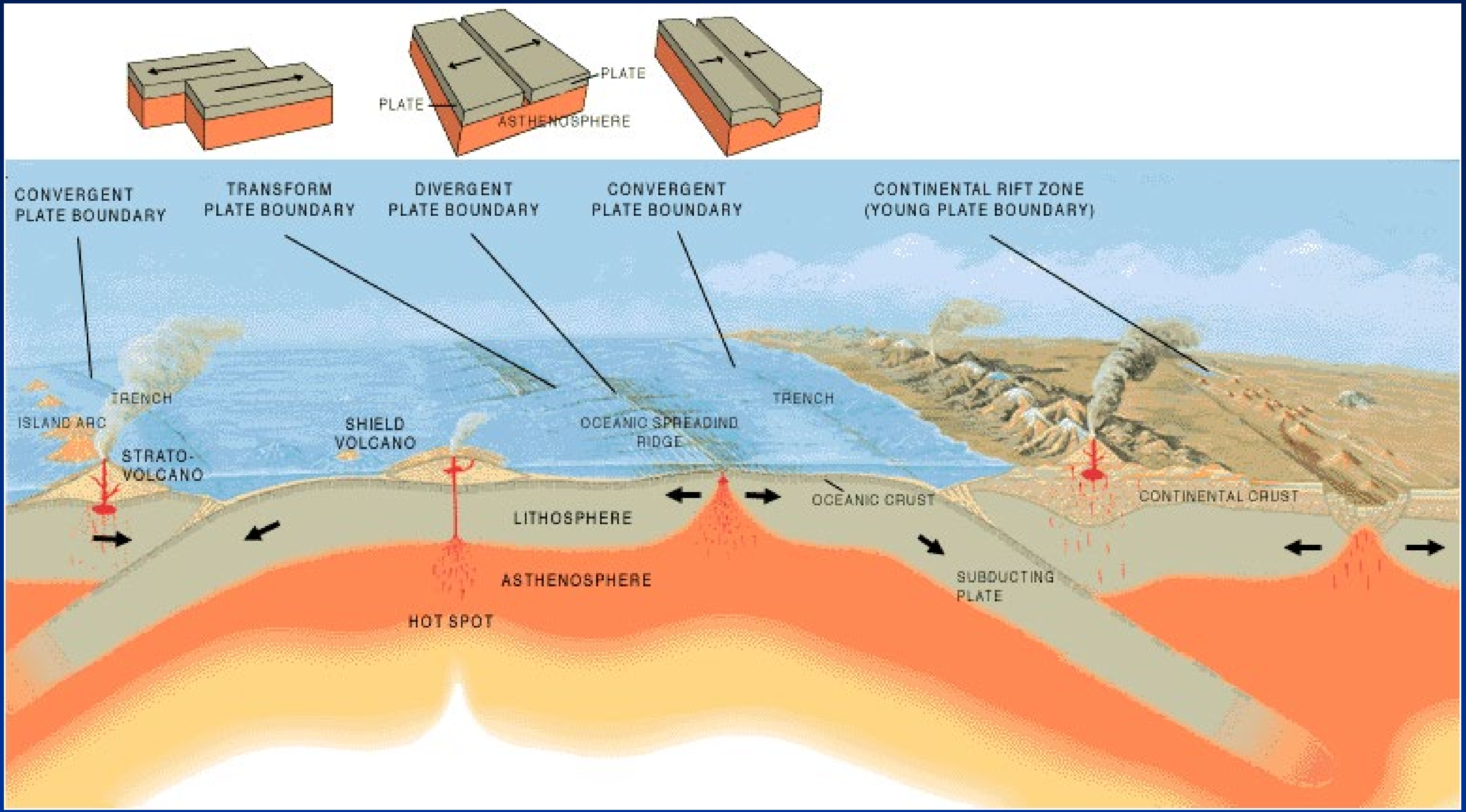
Tettonica a zolle, il sistema e i tipi di margini di placche



Da “The dynamic Earth” in USGS Web Site

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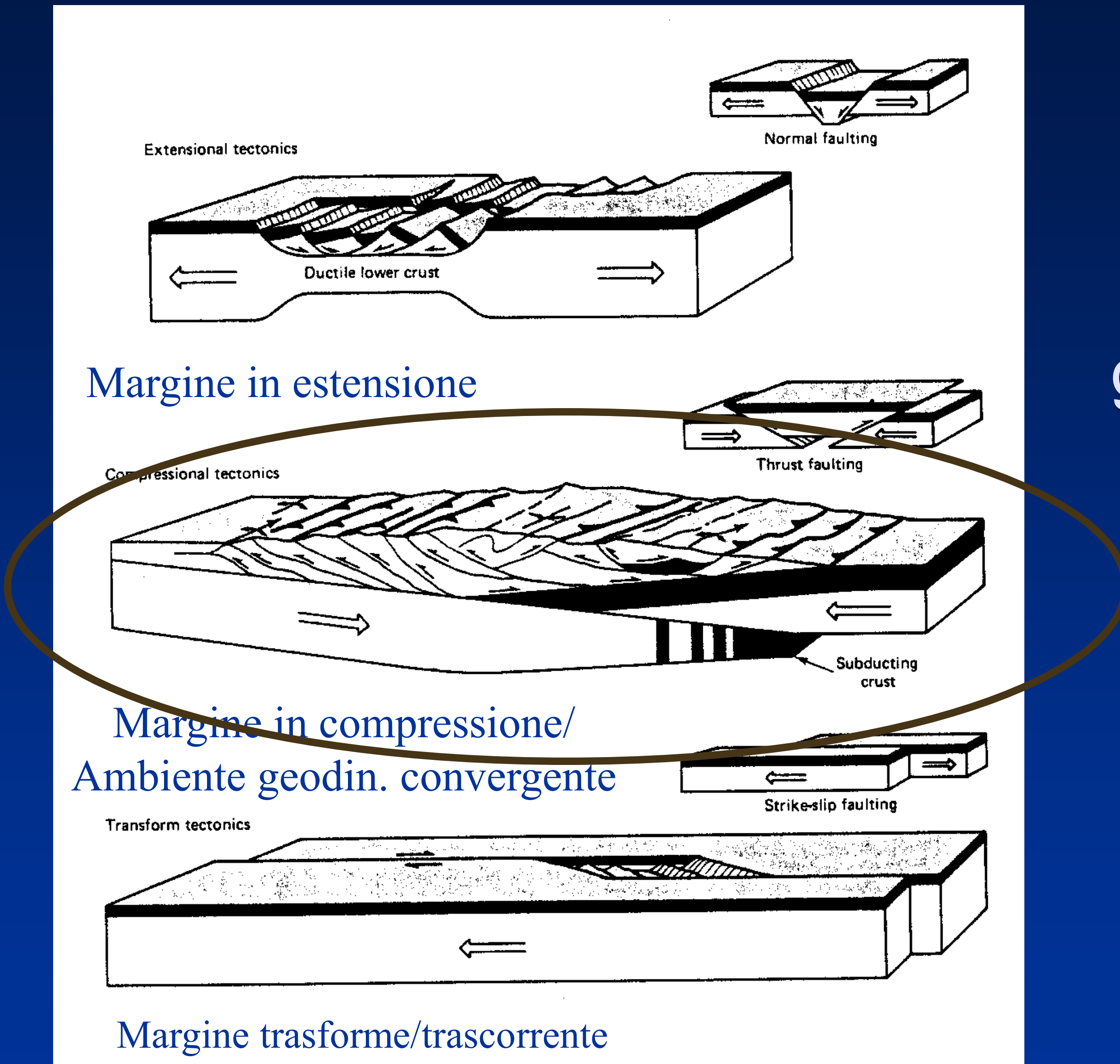
Tipo di margini di placca e ambienti geodinamici



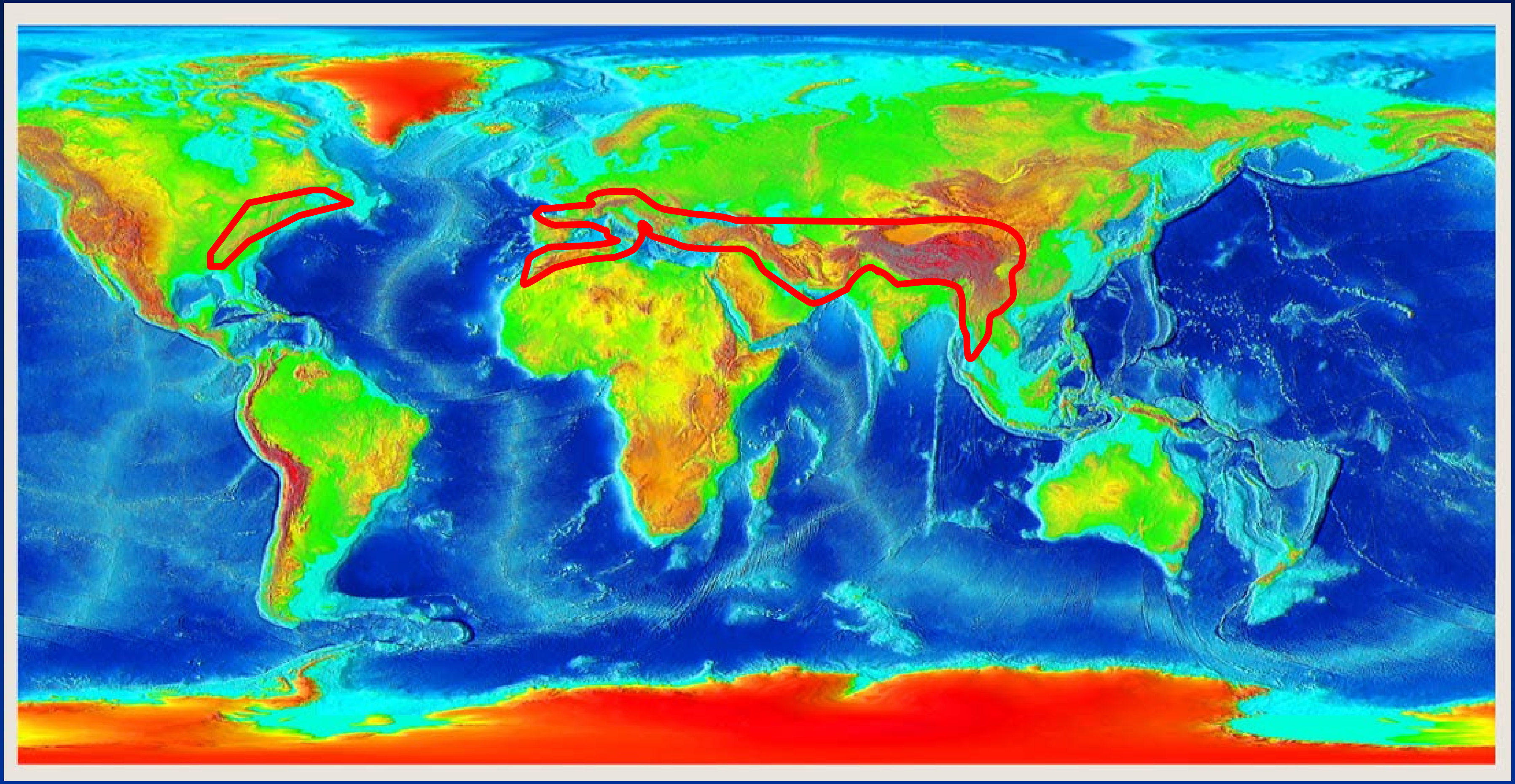
Da Suppe, 1985

Tipi di orogeni

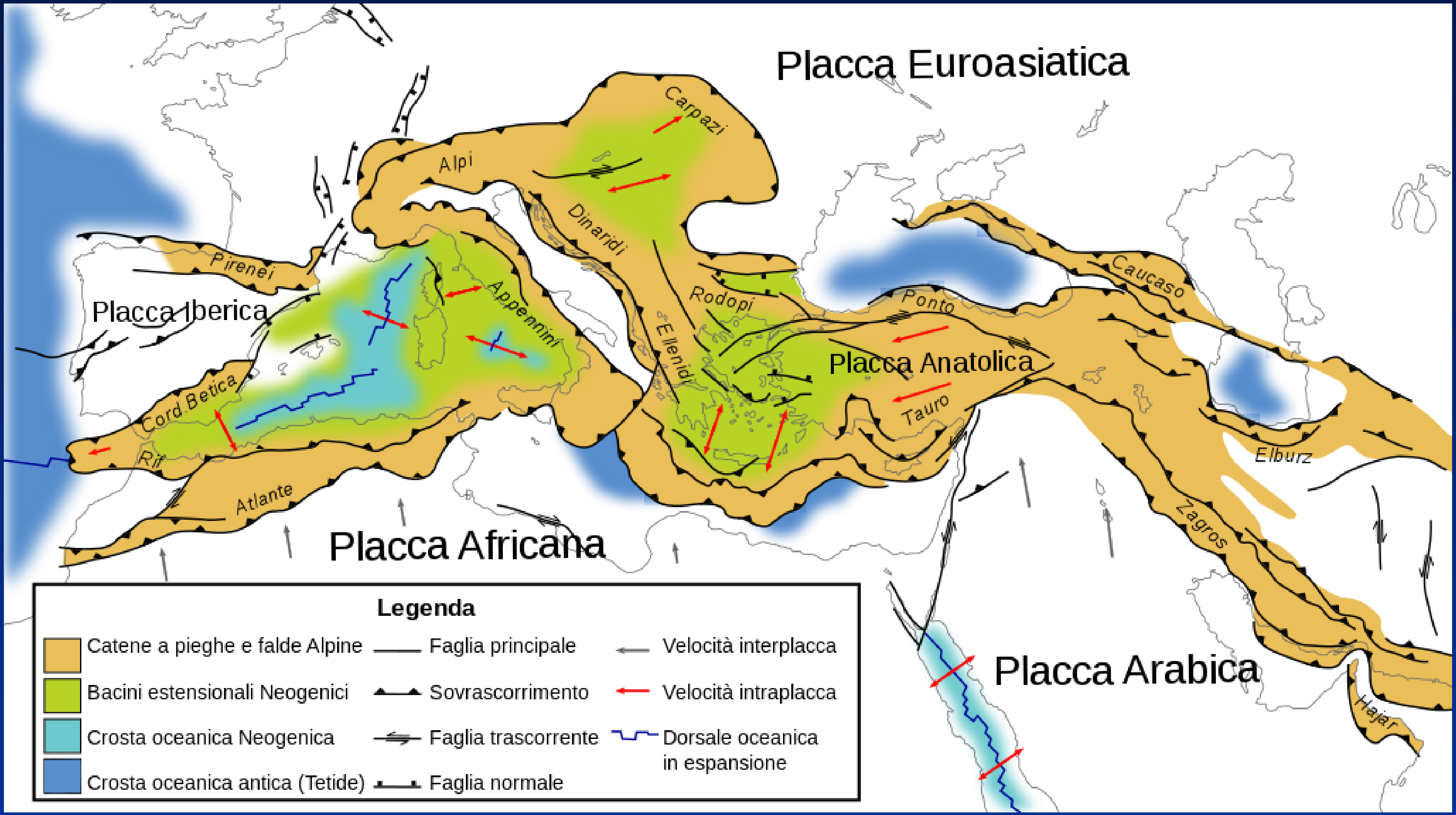
- Catene collisionali

- Prismi di accrezione
  - Tipo cordiliera o andino (margine occidentale delle Americhe)
  - Tipo Barbados-Marianne (arco insulare; es. Barbados, Tonga-Kermadek, Marianne)
  - Tipo ophiolitic back-arc (microcontinente, bacino di retroarco a crosta oceanica; es. Giappone)

Ambiente geodinamico convergente: catene collisionali



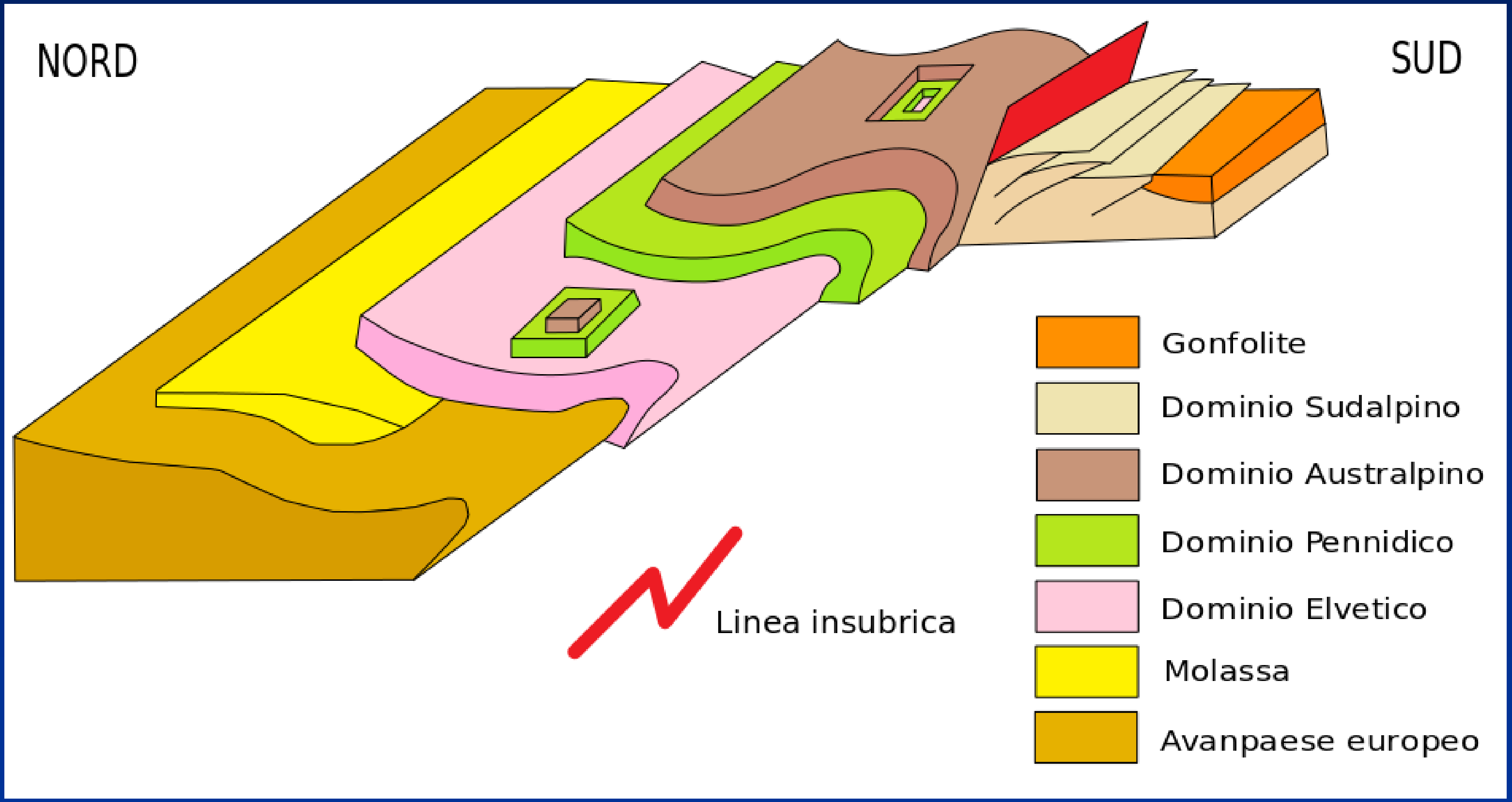
Shaded reliefs e batimetria da NOAA National Centers for Environmental Information (NCEI)



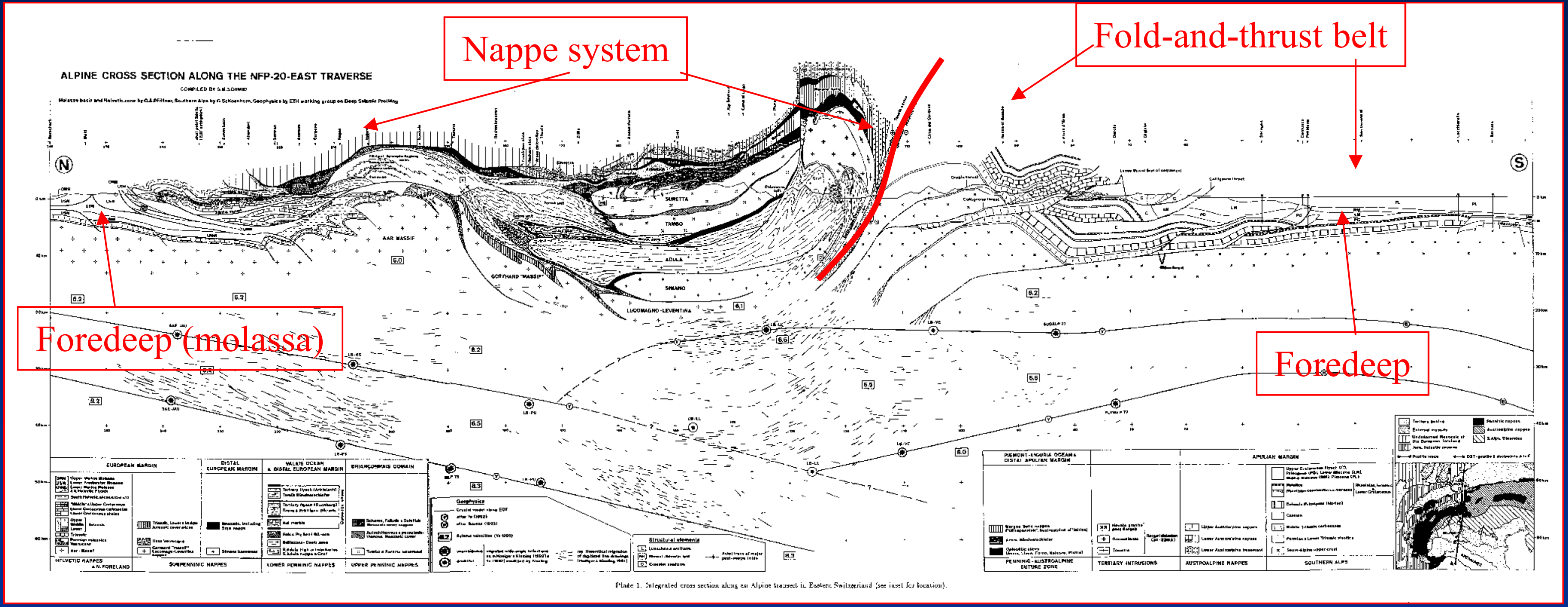
https://it.m.wikipedia.org/wiki/Geologia_delle_Alpi

Catene a doppia polarità: le Alpi

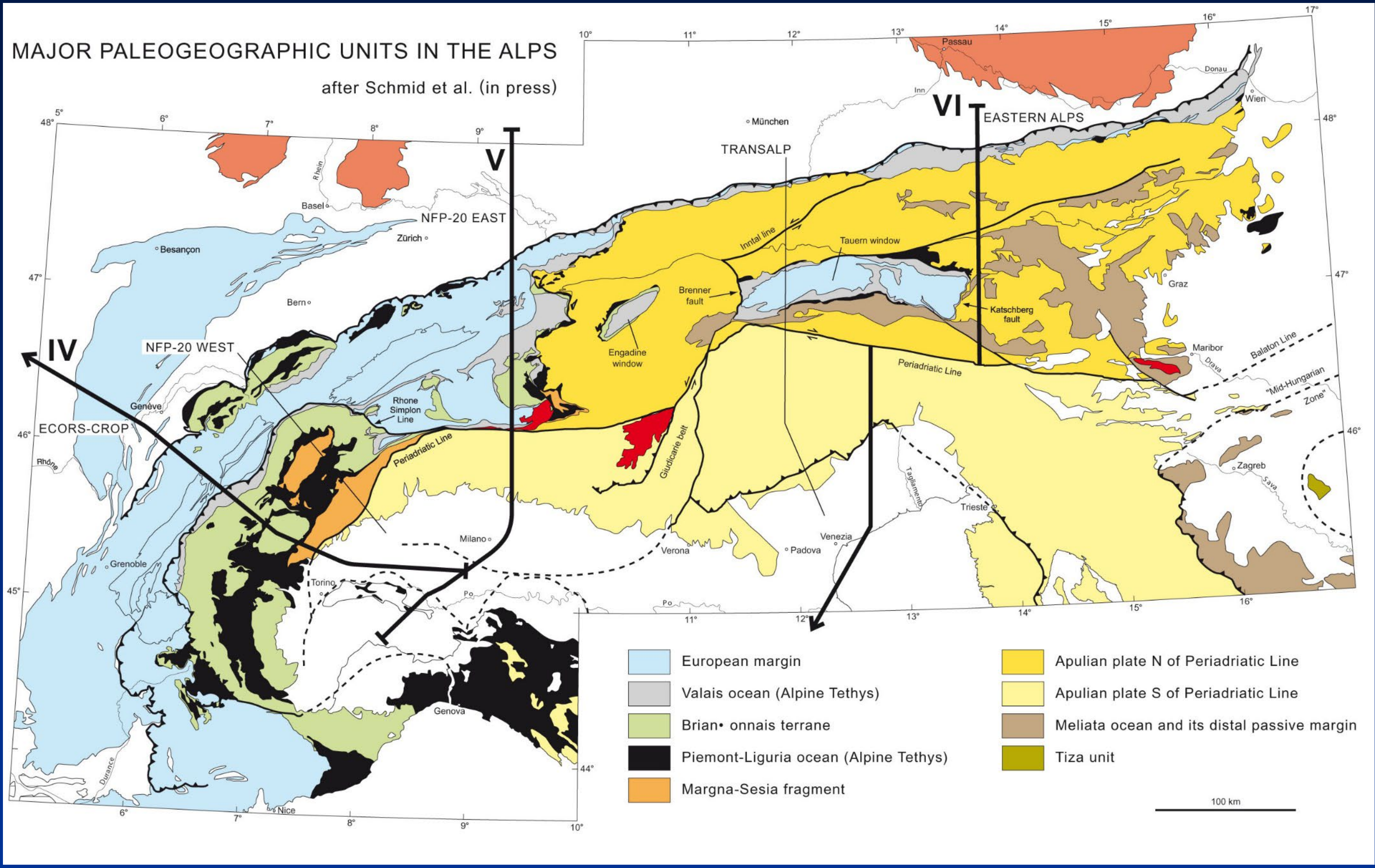
https://it.m.wikipedia.org/wiki/Geologia_delle_Alpi



Catene a doppia polarità: le Alpi

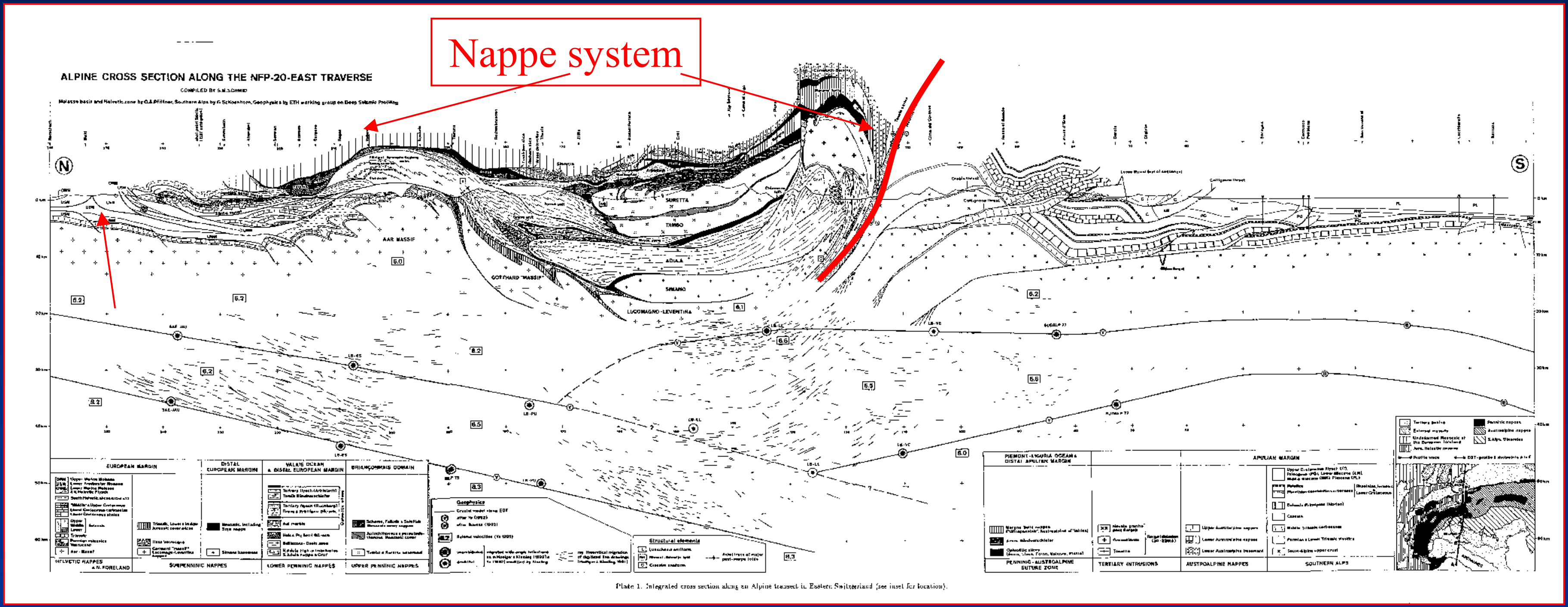


Da Schmid et al., 1996

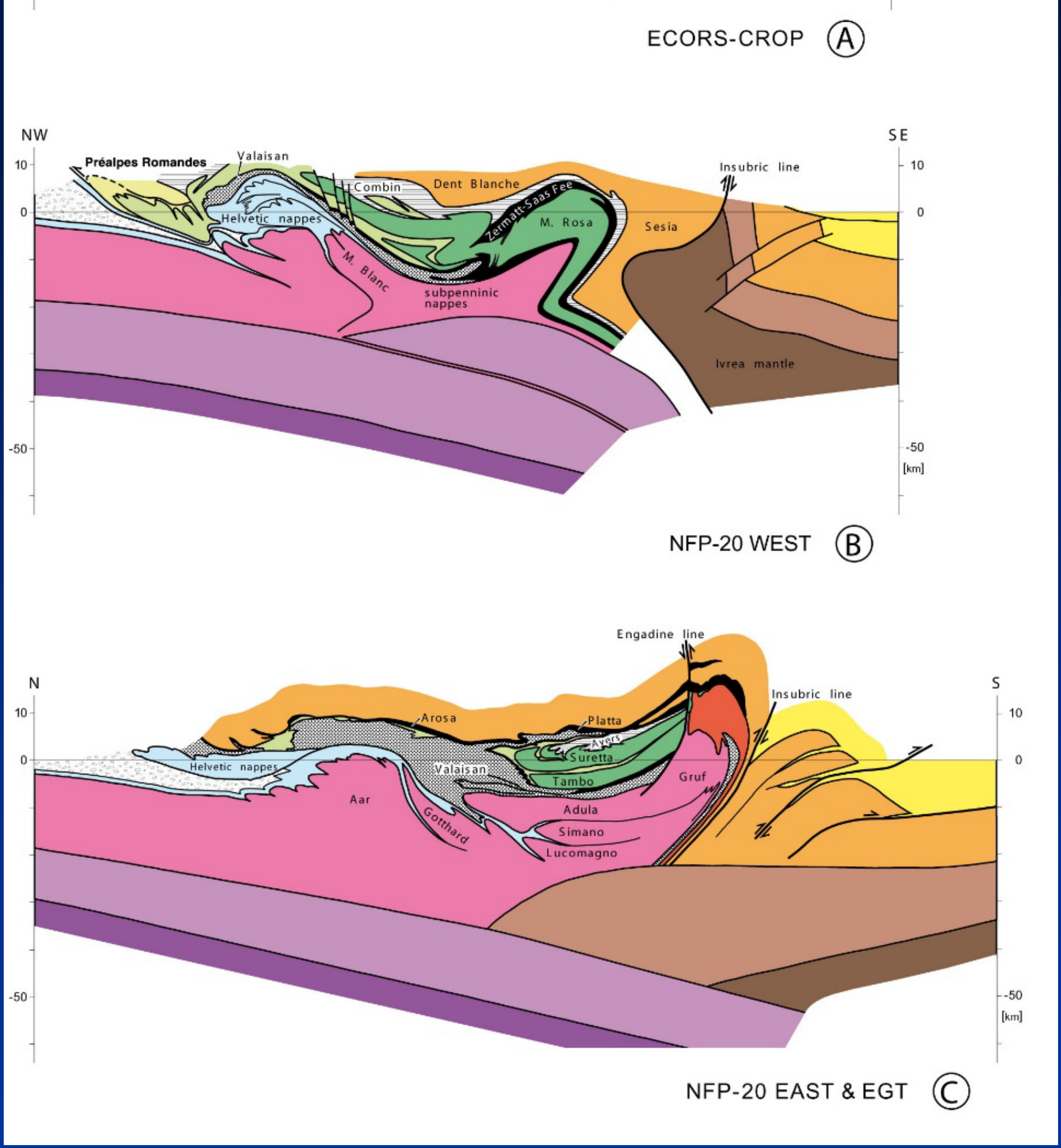


Da Schmid et al 2004

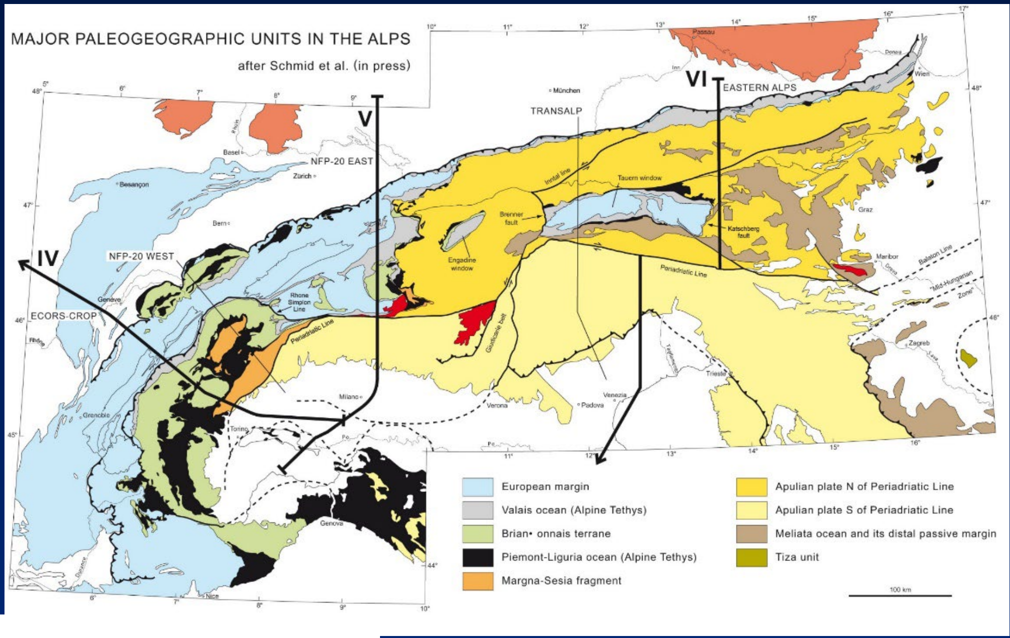
le Alpi: il sistema a falde

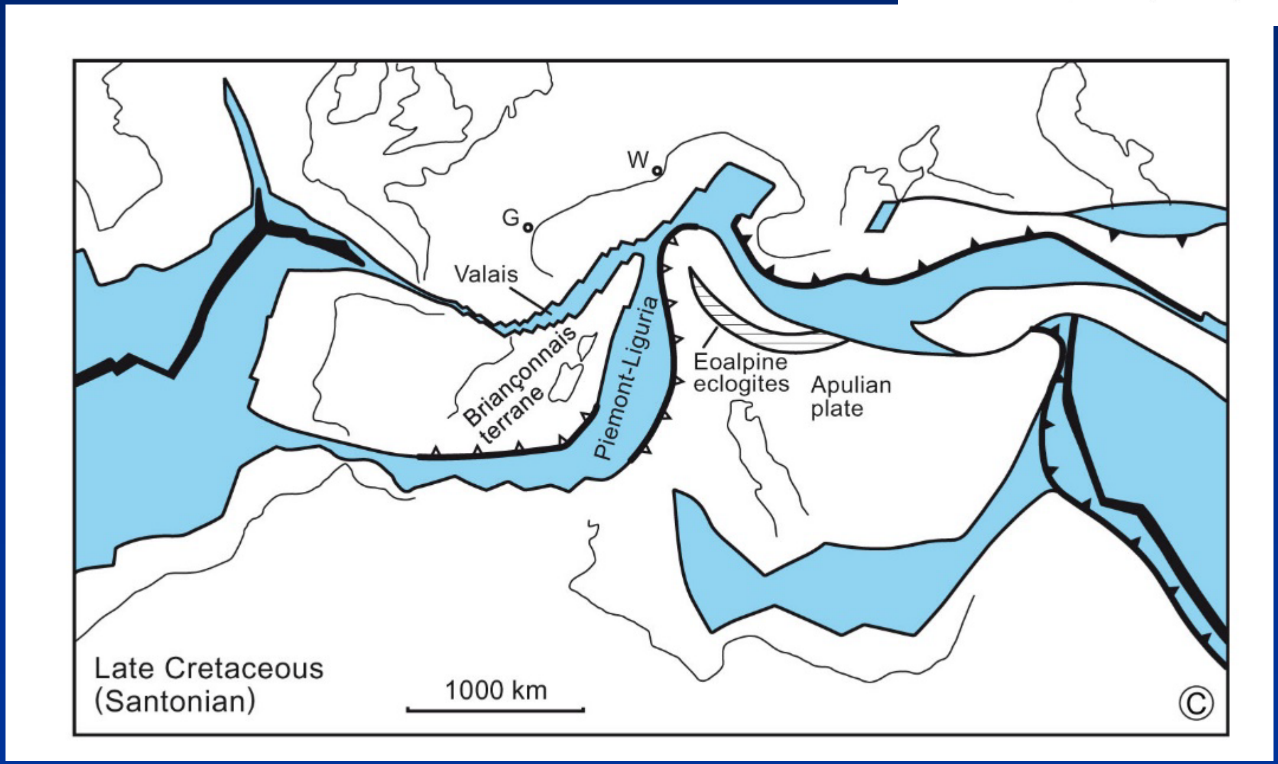


Da Schmid et al., 1996

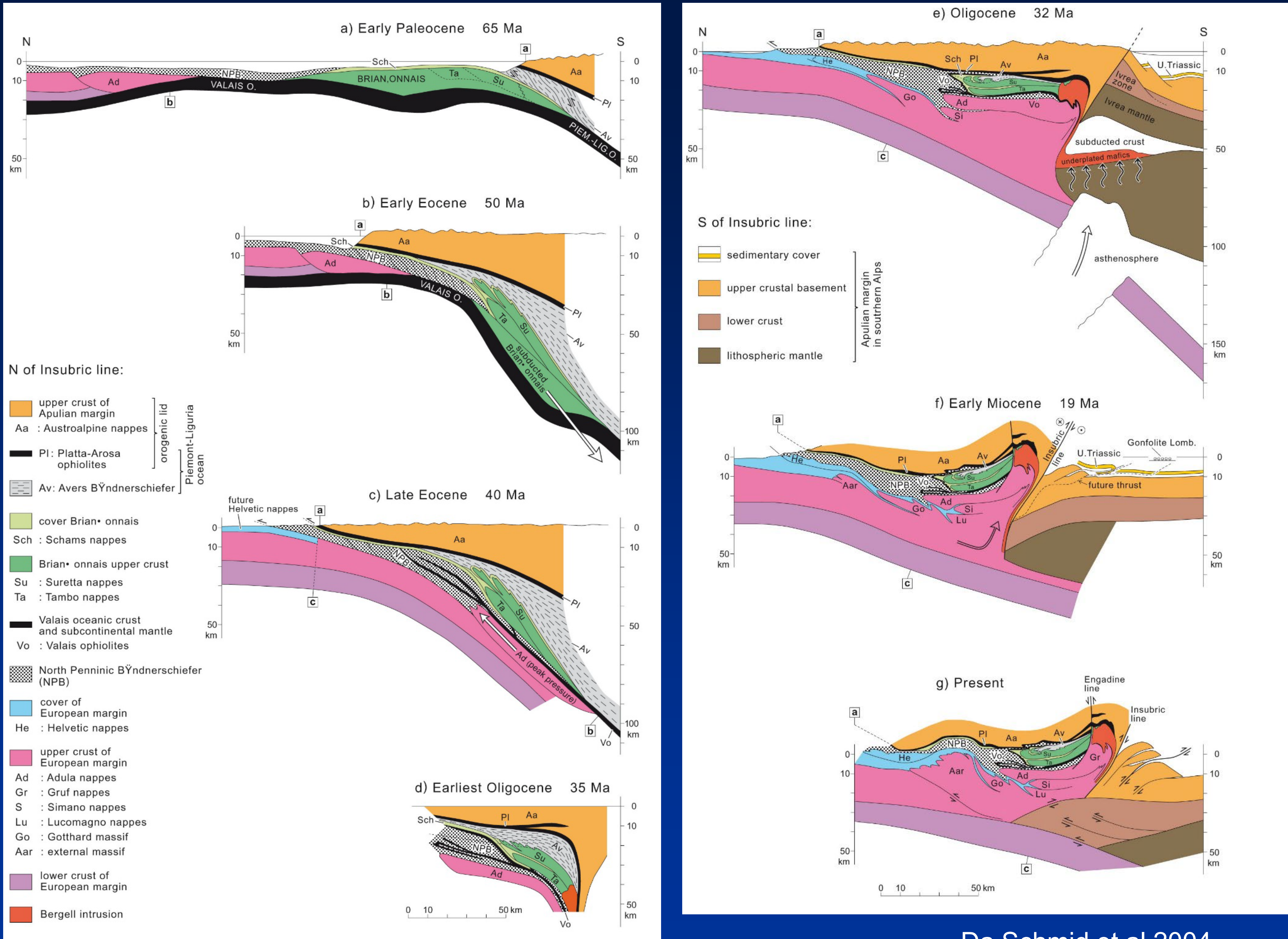


Da Schmid et al 2004

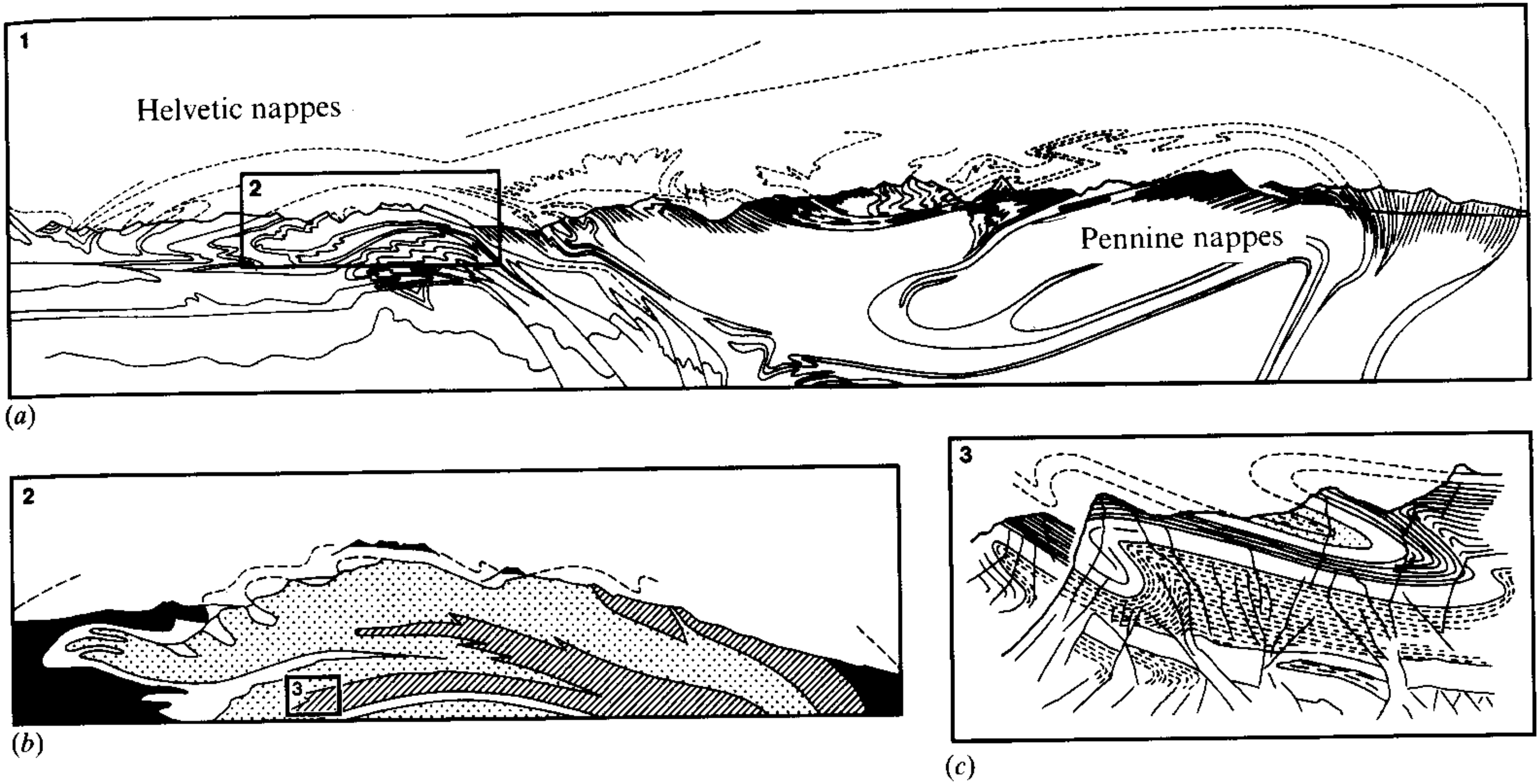




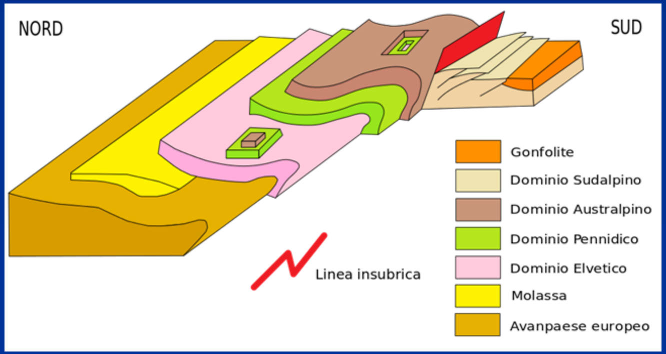
Da Schmid et al 2004



Da Schmid et al 2004



Da Price and Cosgrove, 1990



Le Alpi: sistema di falde (nappe system)

https://it.m.wikipedia.org/
wiki/Geologia_delle_Alpi


Da Ramsay and Huber, 1987

Da Ramsay and Huber, 1987

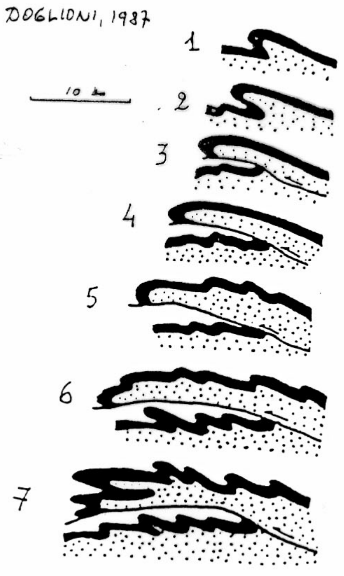


Fig. 113 _ Evoluzione di una nappe per piega coricata

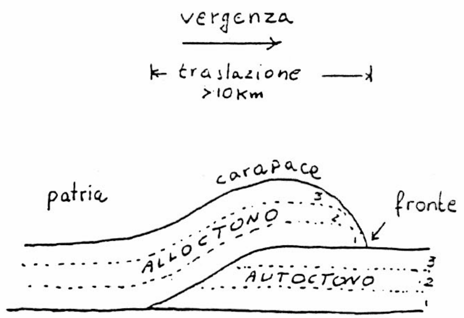


Fig. 114 - Nomenclatura delle coltri di ricoprimento.

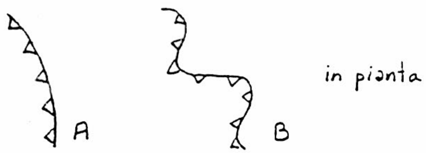


Fig. 115. A _ Fronte cilindrico
B. Digitazioni frontali

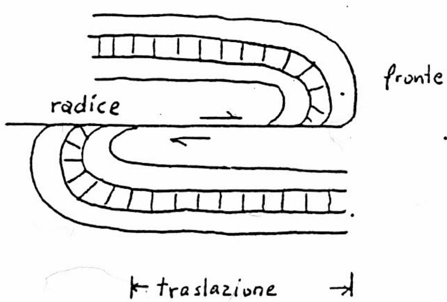


Fig. 116. Zona di radice in piega-faglia coricata

Da Doglioni, 1994

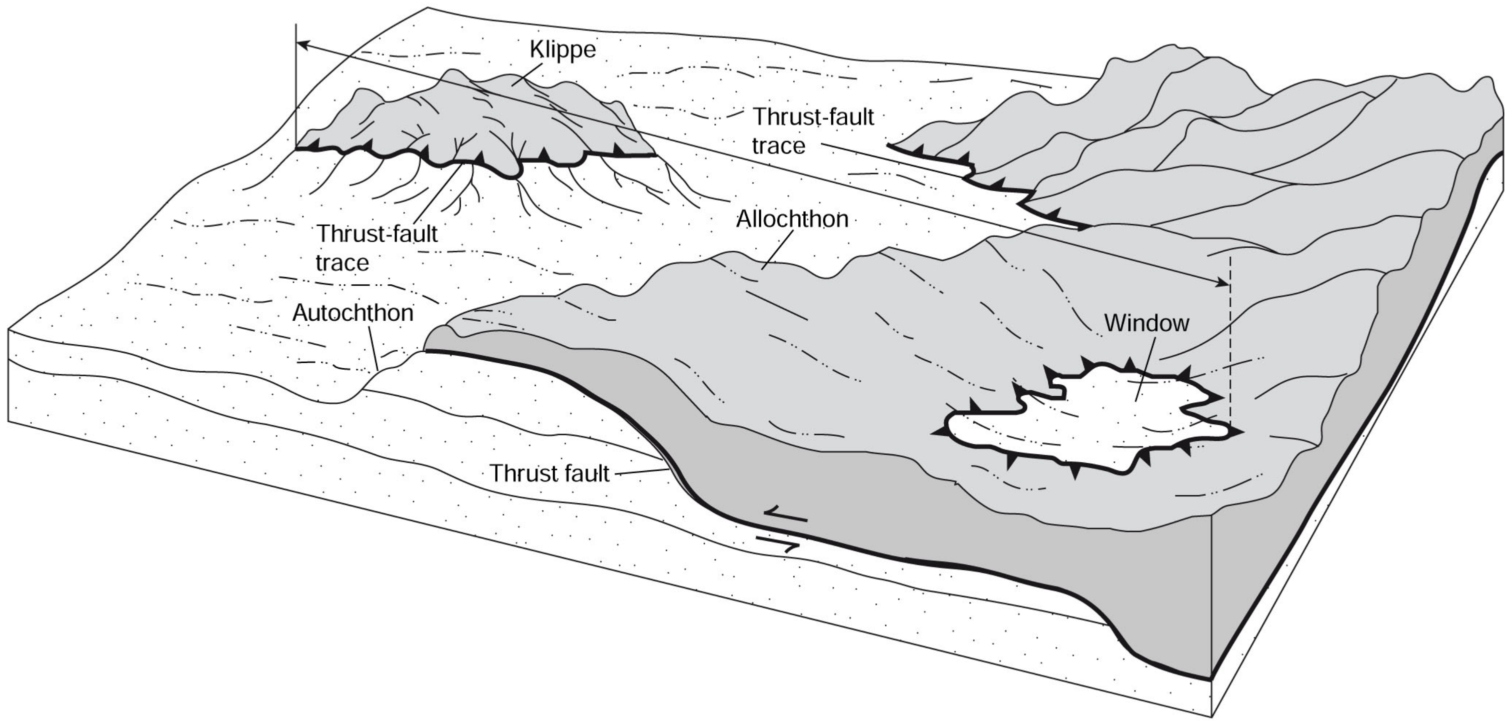
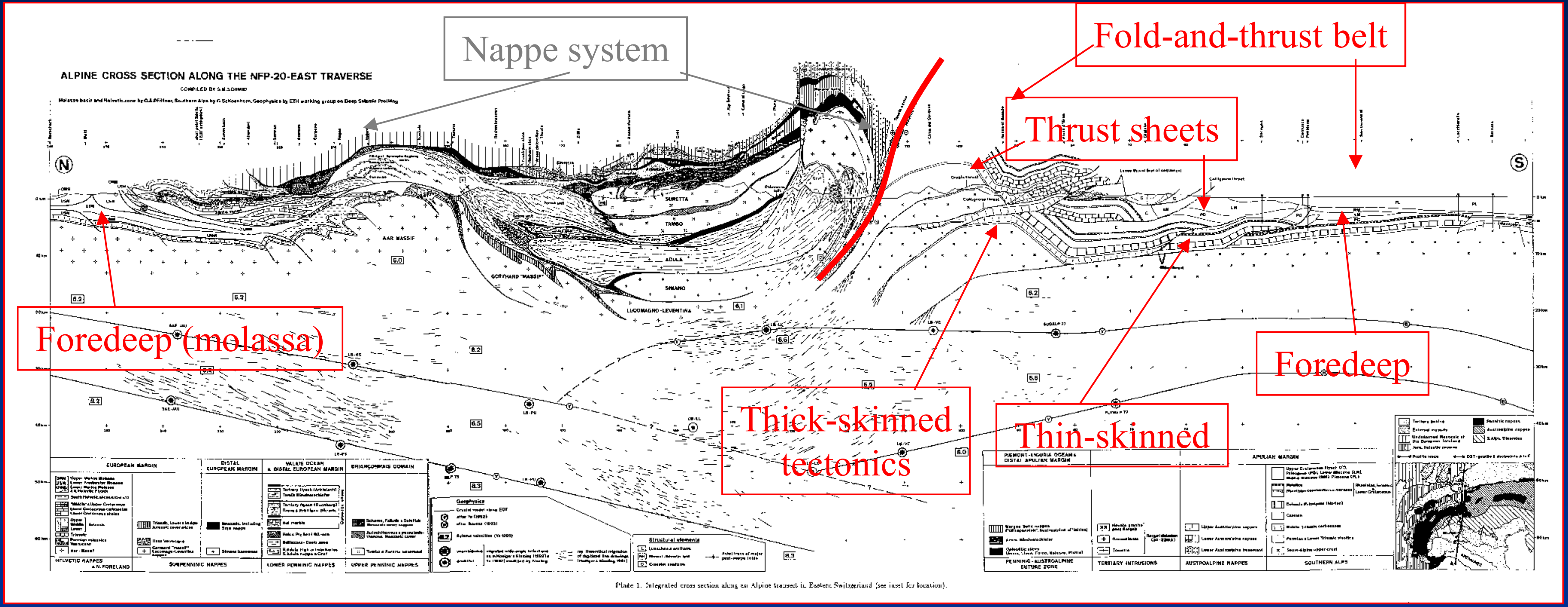


FIGURE 8.8 Block diagram illustrating klippe, window (or fenster), allochthon (gray), and autochthon (stippled) in a thrust-faulted region. Note that the minimum fault displacement is defined by the farthest distance between thrust outcrops in klippe and window.

Da van der Pluim & Marshak, 2004

le Alpi: avanfosse e *foreland fold and thrust belt* meridionale (Alpi Meridionali)



Da Schmid et al., 1996

Thick-skinned e thin-skinned tectonics, sistemi di falde = dicotomia tra basamenti e coperture

Accavallamenti e sovrascorrimenti: Taiwan

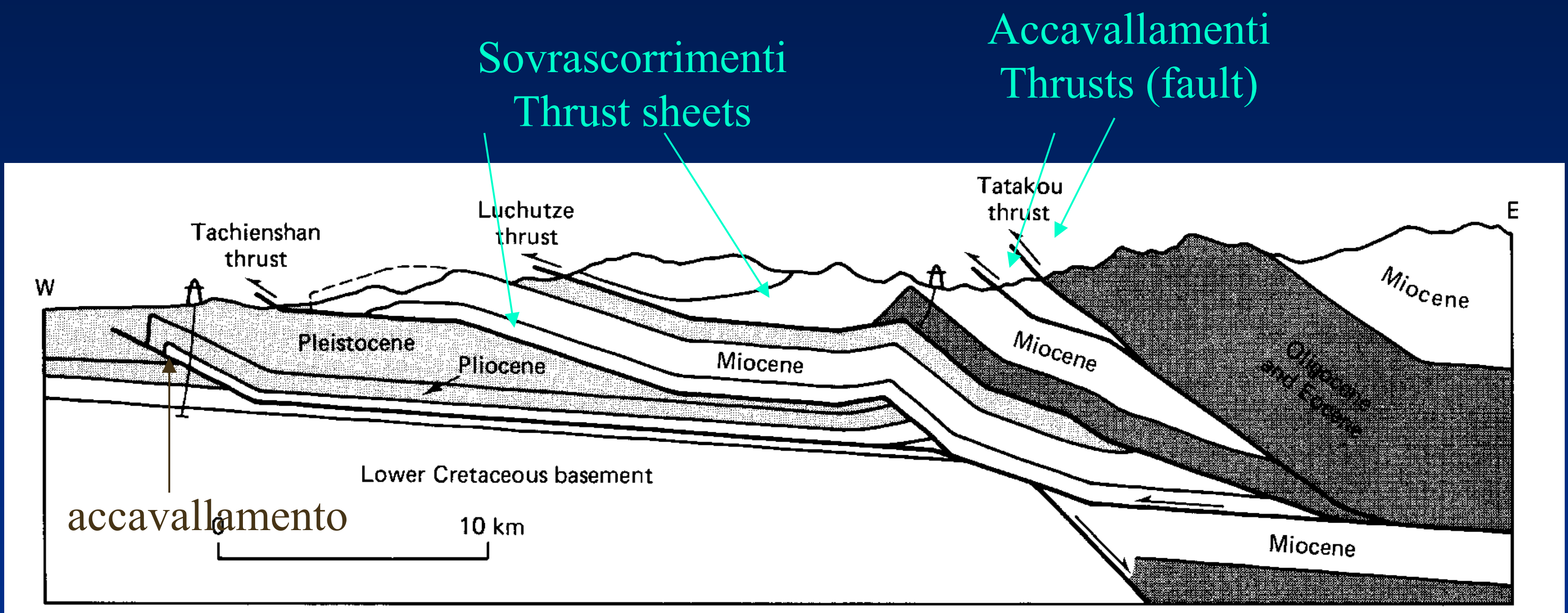
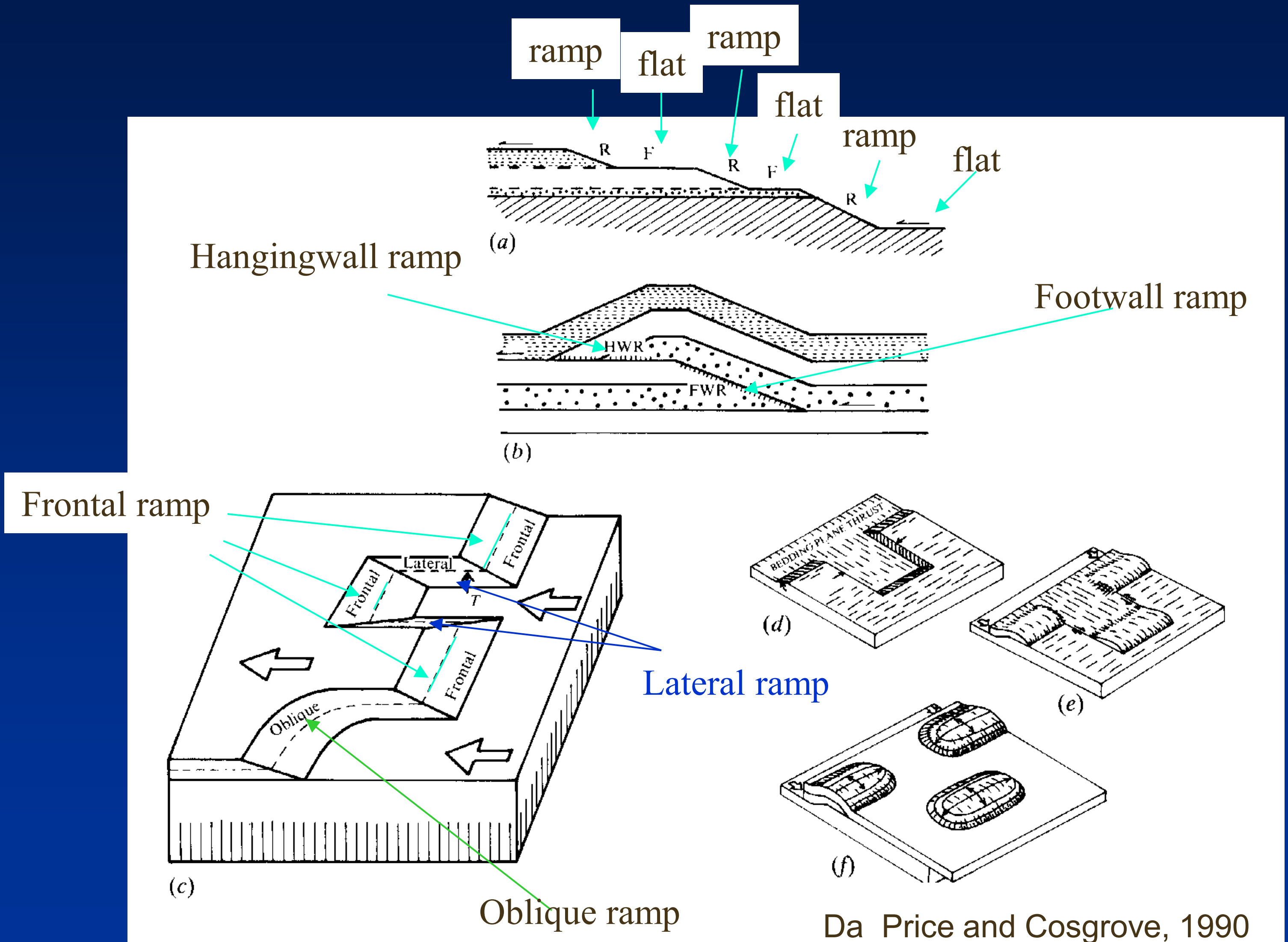


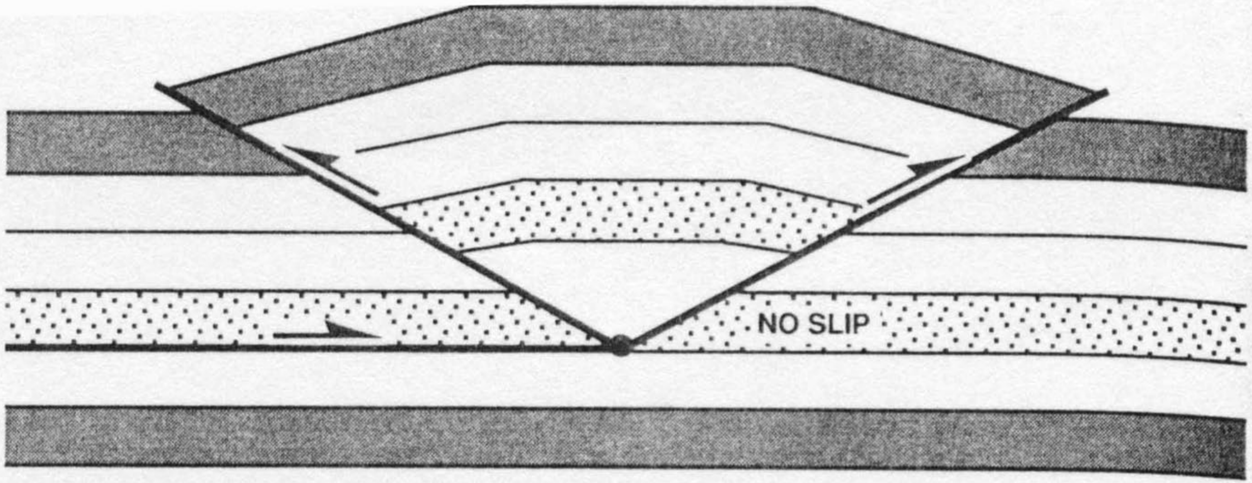
FIGURE 8–25 Cross section of active fold-and-thrust belt of western Taiwan, showing the influence of a preexisting normal fault on the locations of ramps.

Da Suppe, 1985

Accavallamenti, sovrascorrimenti: nomenclatura



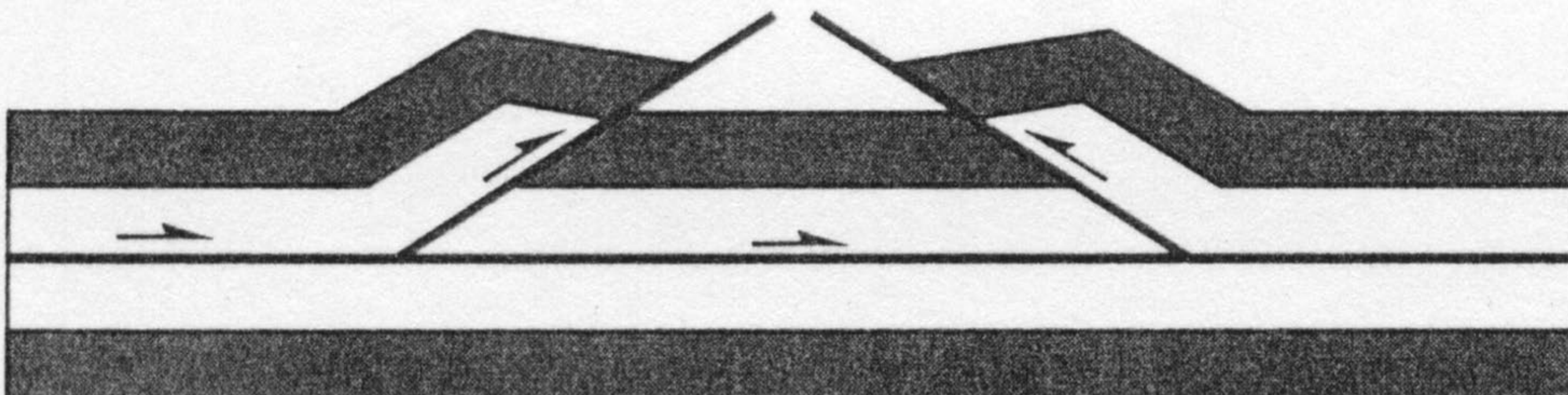
Da Price and Cosgrove, 1990

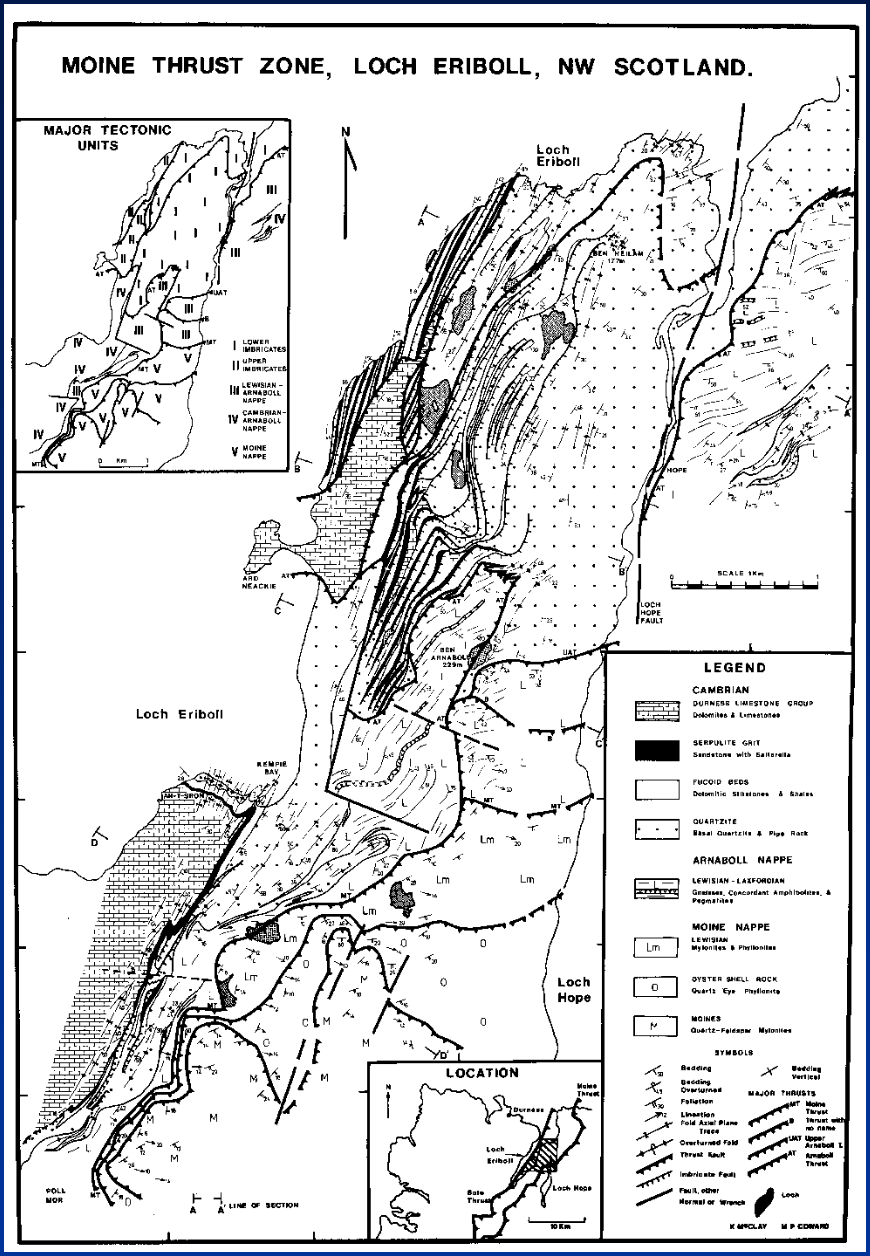


Pop-up' structure.

Da Suppe, 1985

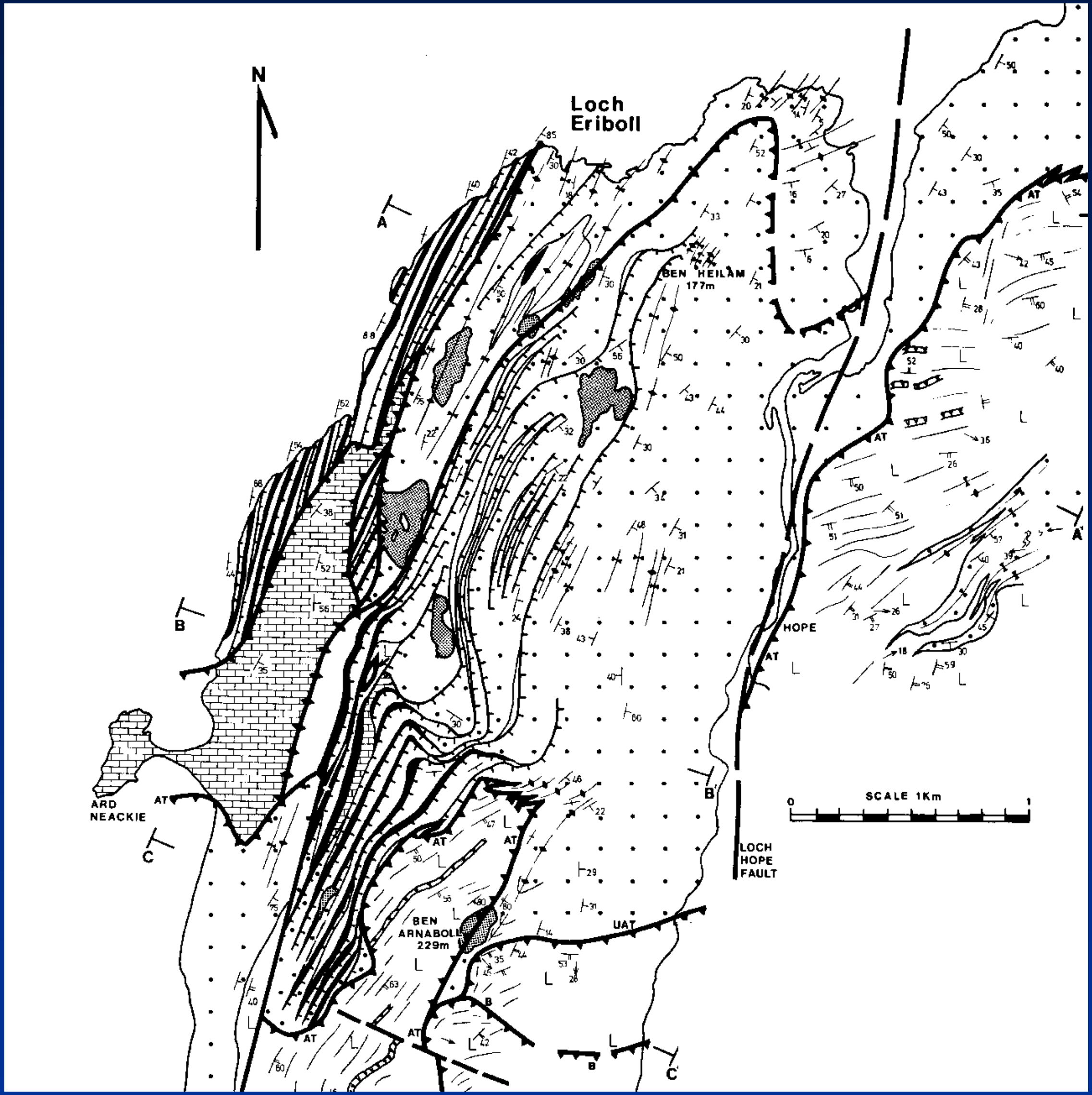
I. TRIANGLE ZONE





Thrust sheets e Sistemi di duplex Moine thrust, Scozia

Da McClay & Coward, 1981



Sistemi di duplex, Moine thrust

Da McClay & Coward, 1981

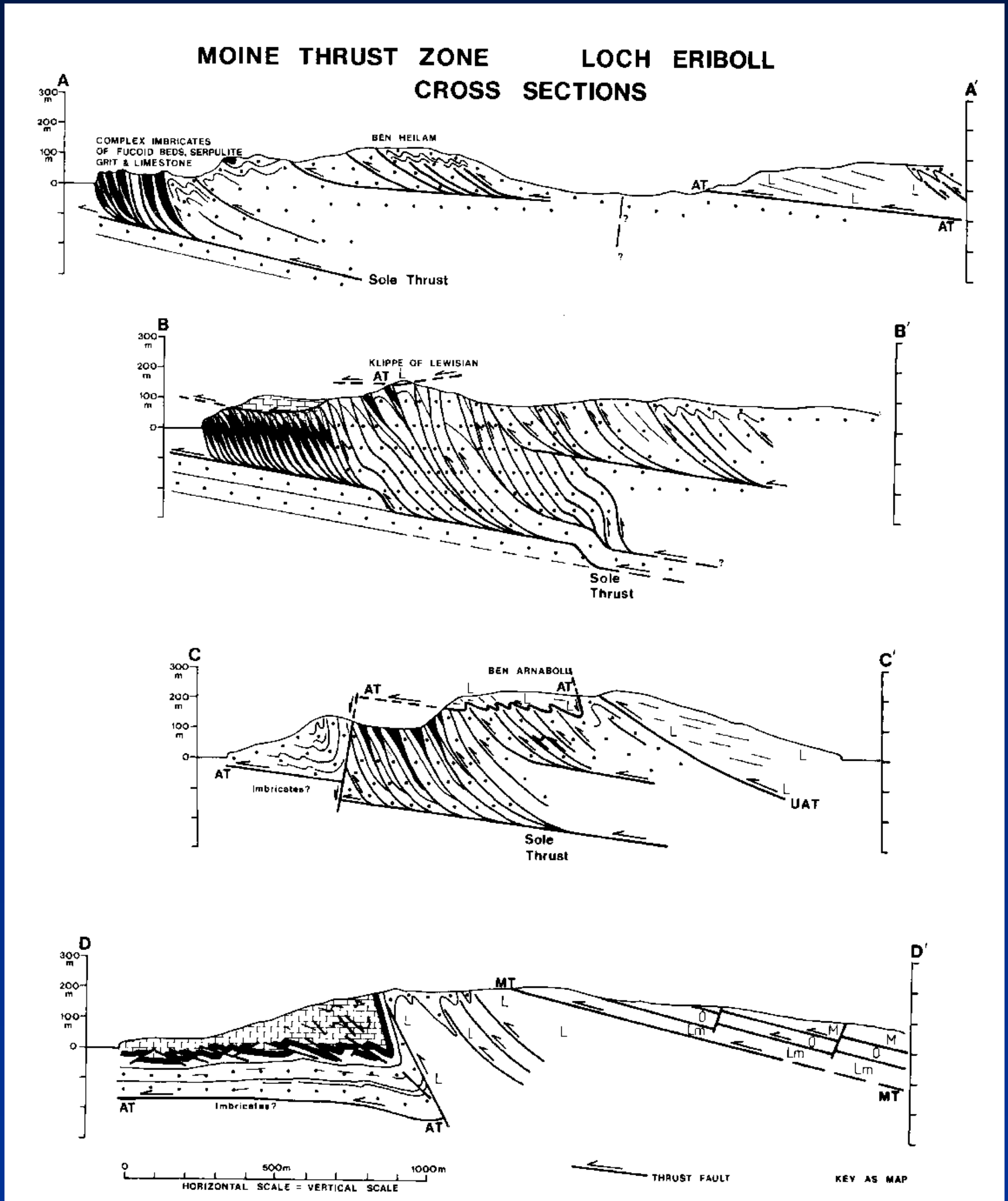


FIG. 3b. Cross sections A–D across the Moine Thrust Zone at Loch Eriboll.

Sistemi di duplex, Moine thrust

Da McClay & Coward, 1981

Geometria dei duplex, Moine thrust

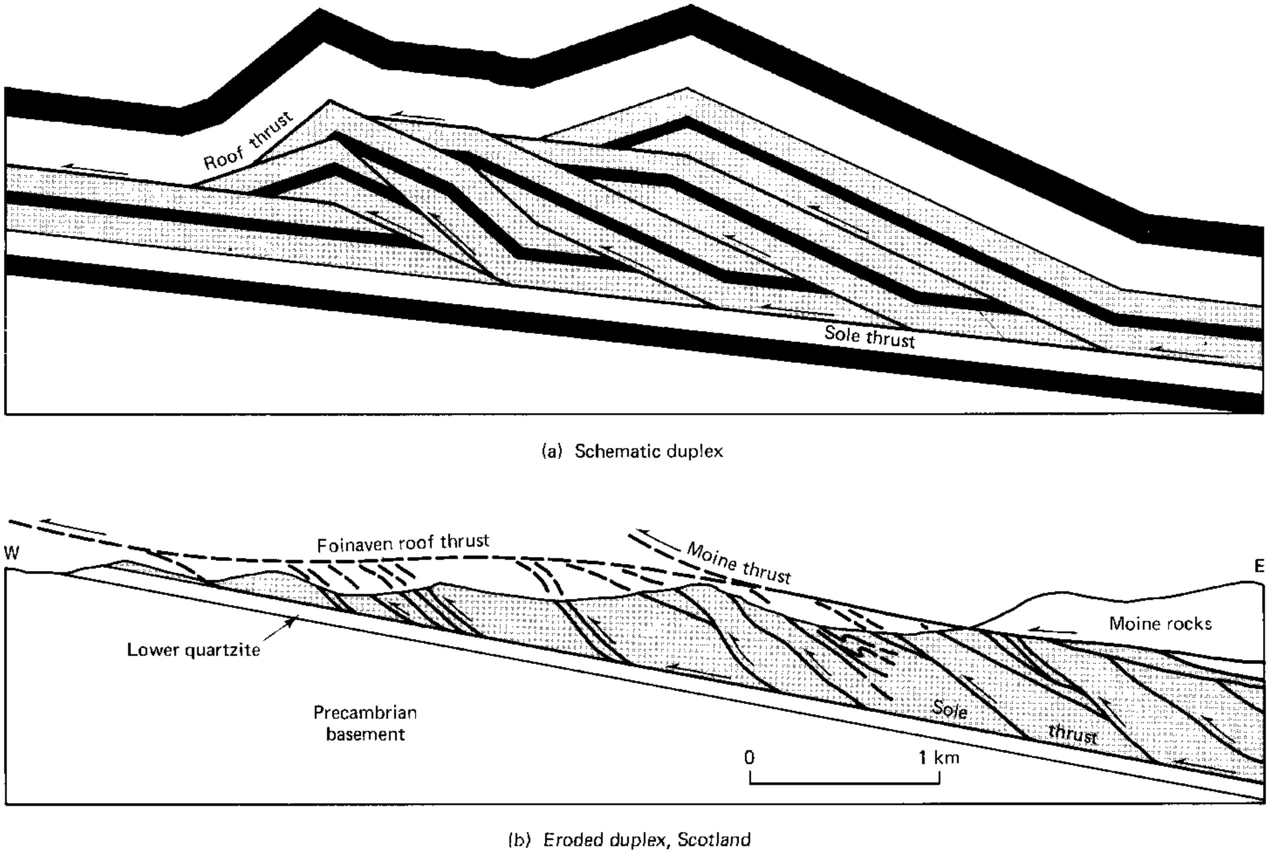


FIGURE 8–27 (a) Schematic drawing of a duplex structure. (b) Example of a duplex structure of the Moine thrust system, Scotland. (Cross section simplified after Elliott and Johnson, Trans. Roy. Soc. Edin., **71**, 69–96, 1980.)

Da Suppe, 1985

Sistemi di duplex: evoluzione

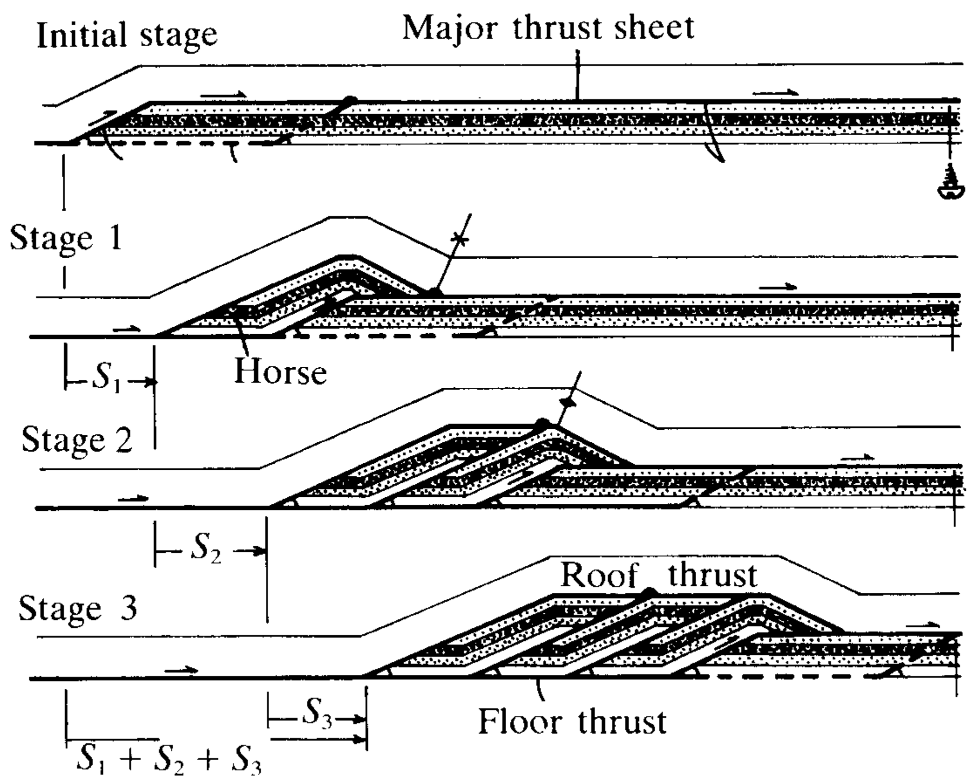
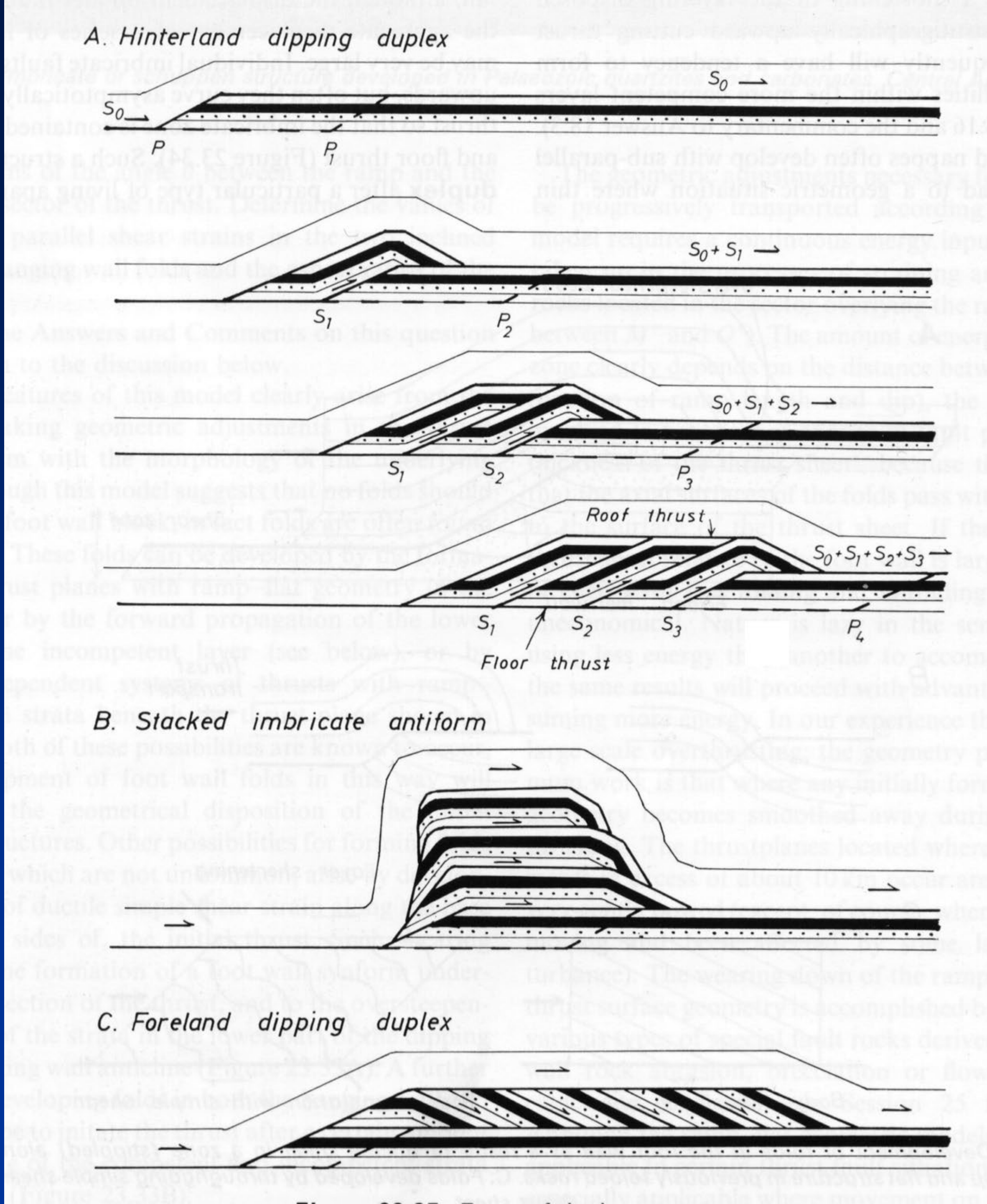


Fig. 7.6. The formation of a duplex by the progressive collapse of a footwall ramp. The roof thrust sheet undergoes a sequence of folding and unfolding. (After Boyer & Elliot, 1982.)

Da Price and Cosgrove, 1990

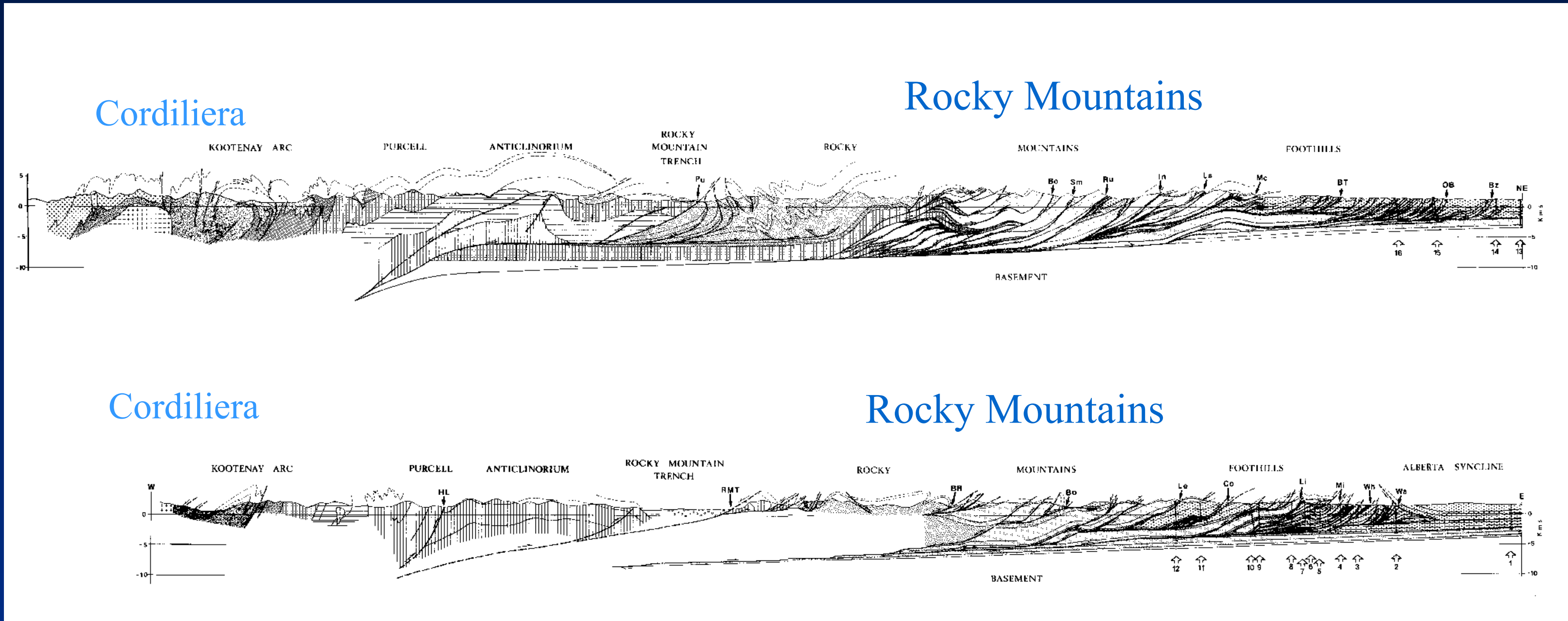


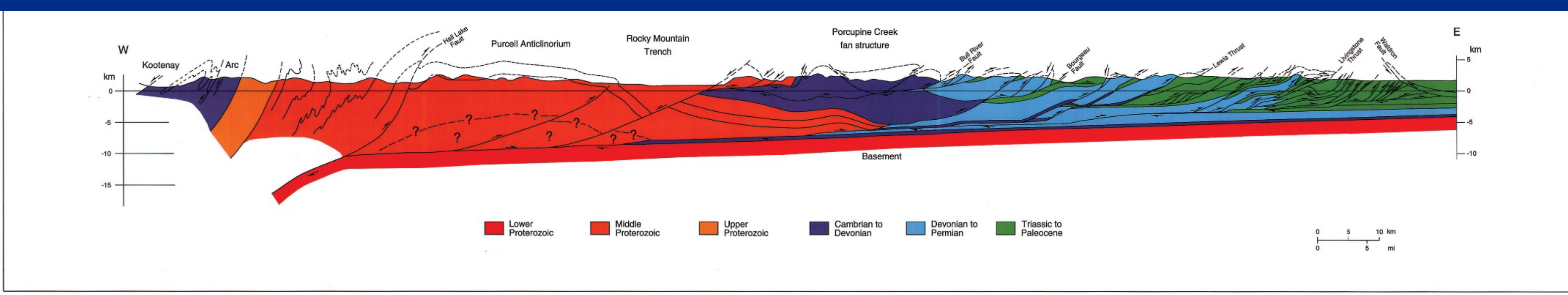
Da Ramsay and Huber, 1987

Associazioni di sovrascorrimenti-accavallamenti: Le Rocky Mountains

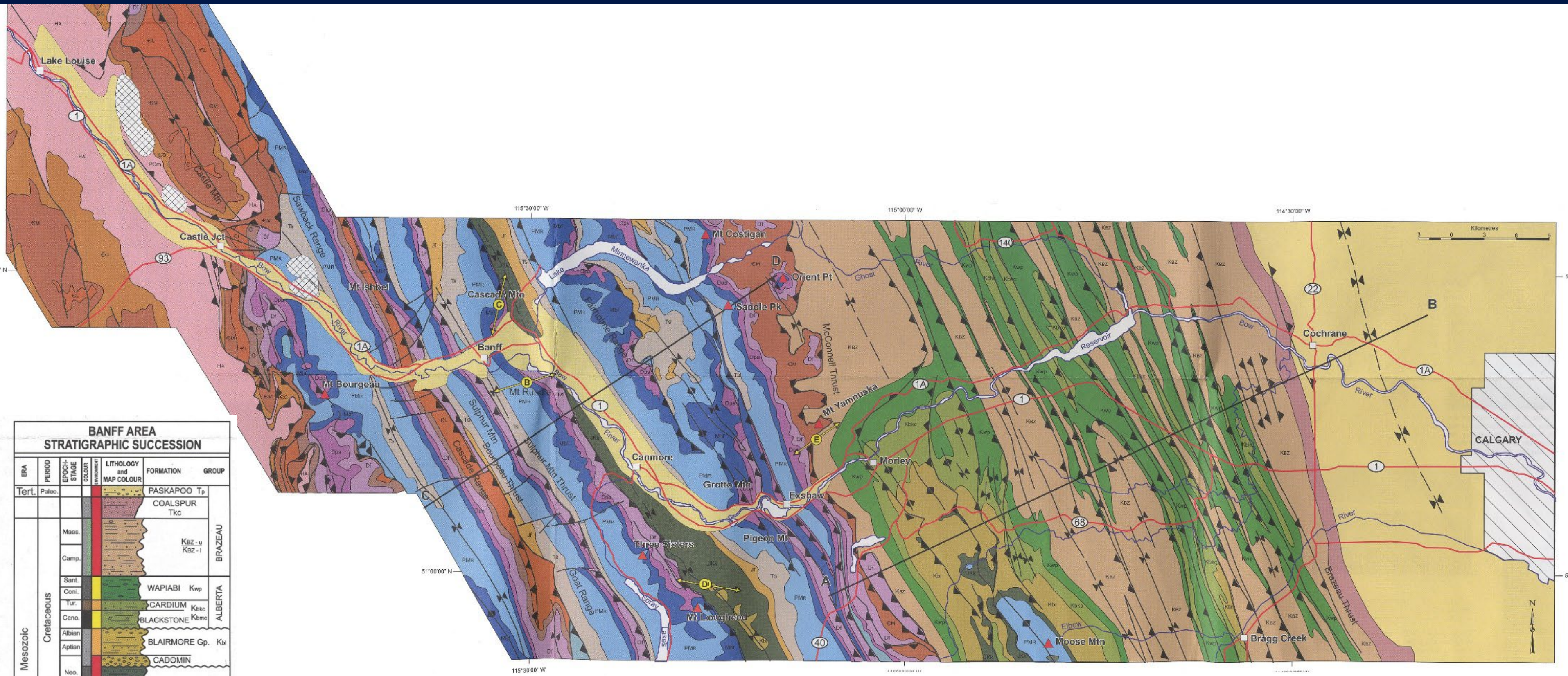
Le Rocky Mountains

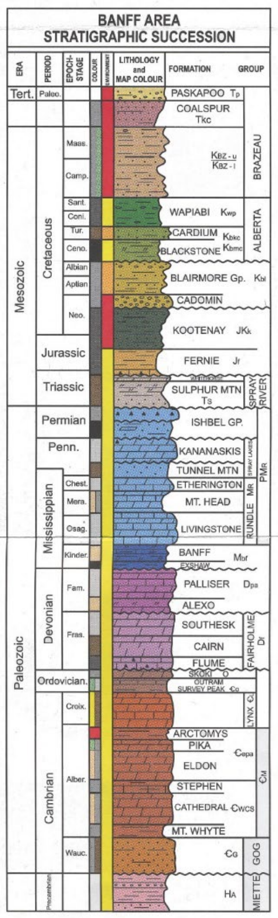
Da Price, 1981



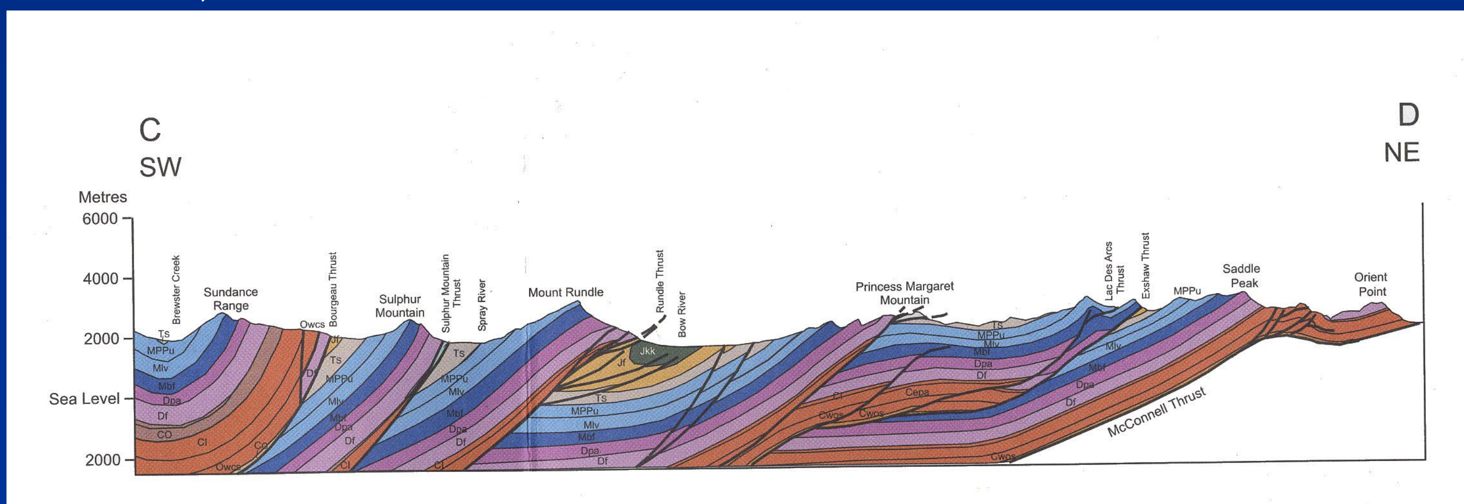


Da Price in Atlas of the Western Canada sedimentary basin, Alberta Geological Survey.

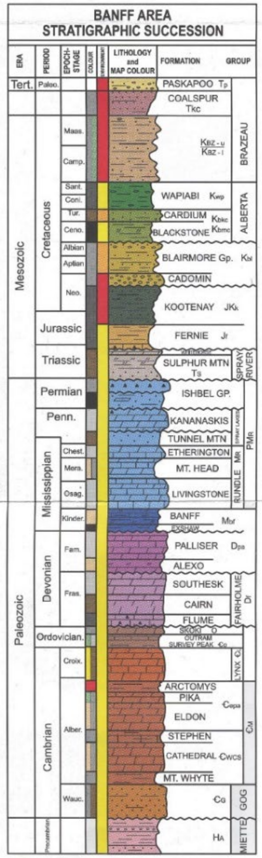


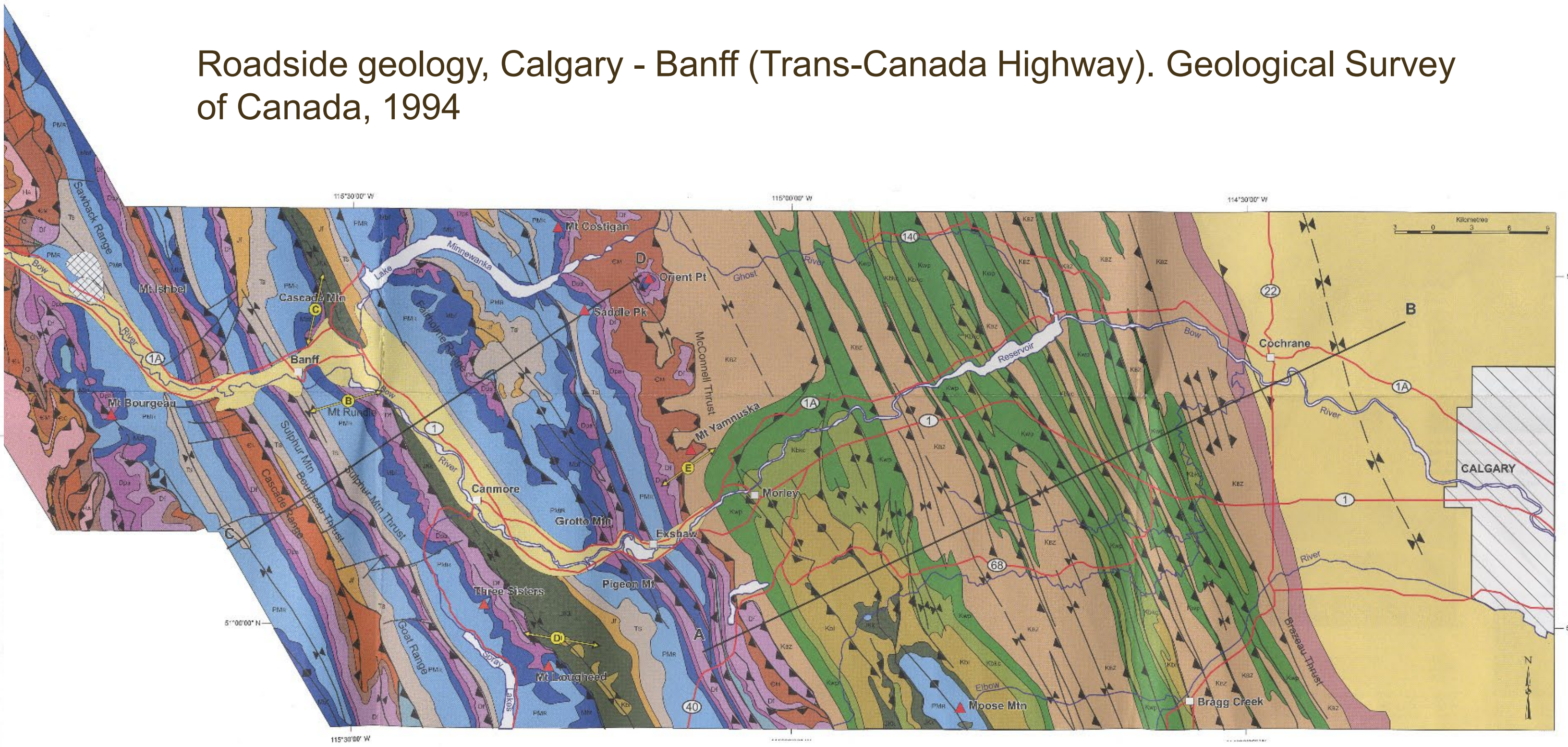


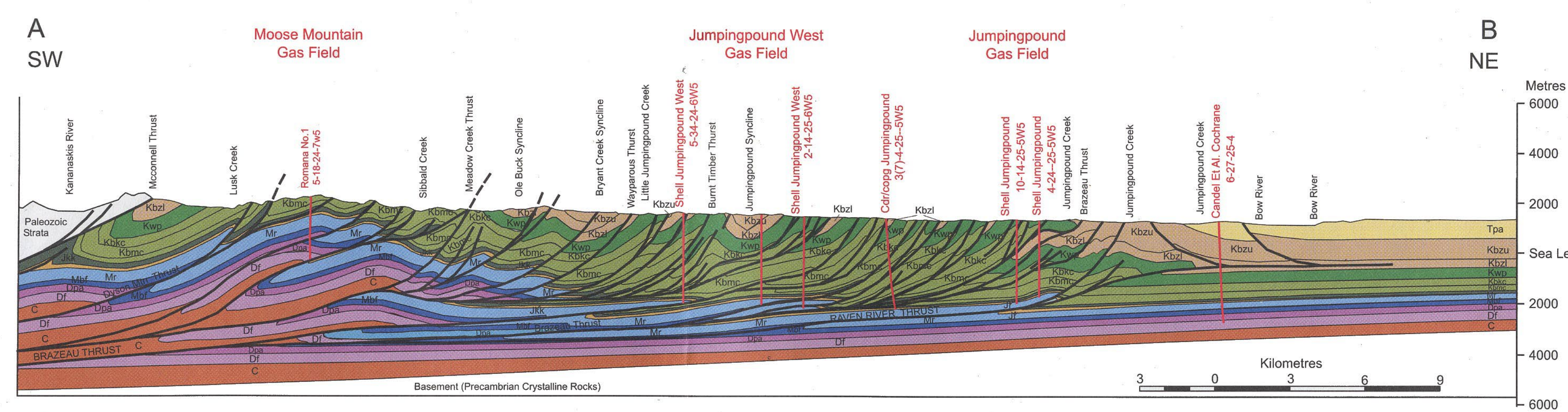
Roadside geology, Calgary - Banff (Trans-Canada Highway). Geological Survey of Canada, 1994



Roadside geology, Calgary - Banff (Trans-Canada Highway). Geological Survey of Canada, 1994

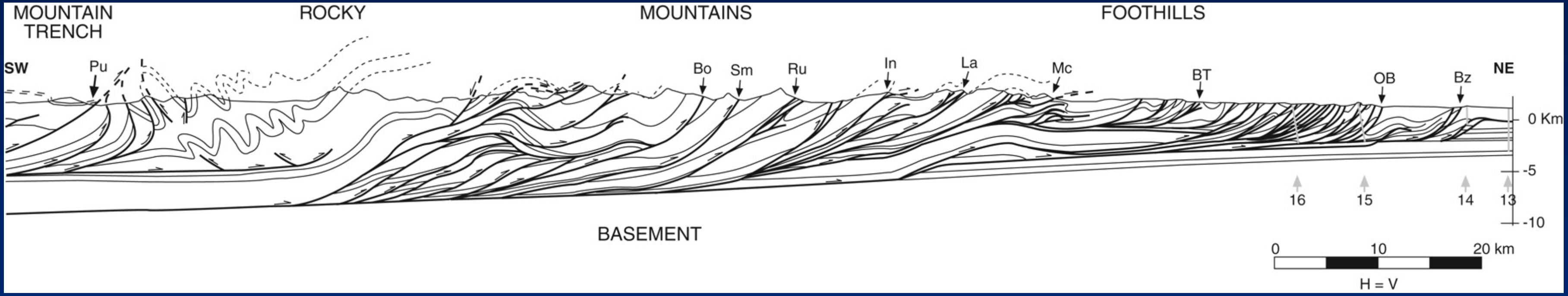






Propagazione degli accavallamenti

“piggy-back”, “overstep (o back-step)”, out-of-sequence



Da Poblet & Lisle, 2011

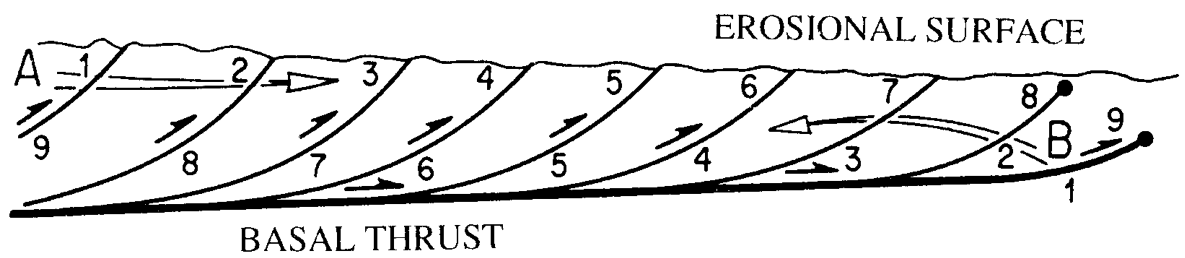


Figure 12 - Imbricate structure and sequential development of thrusts in a piggy-back sequence (foreland propagation; arrow A and numbers indicate the order of development of thrusts). Out of sequence thrust stack (propagation of thrusts in the hanging wall; arrow B and numbers indicating the order of development of thrusts).

Da Merle, 1998

Duplex nelle Rocky Mountains (Mt. Grandell and Lewis Thusts

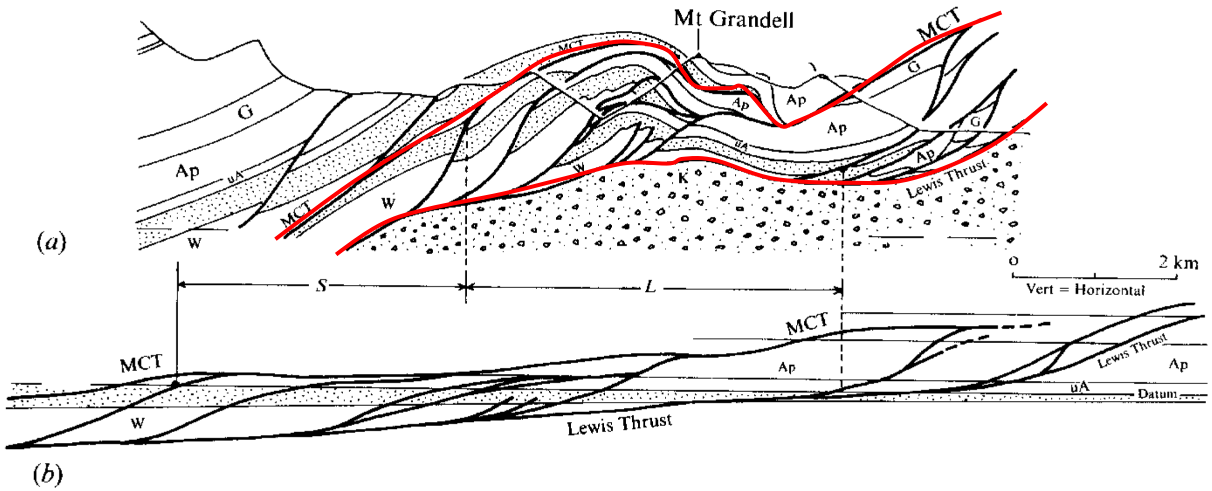
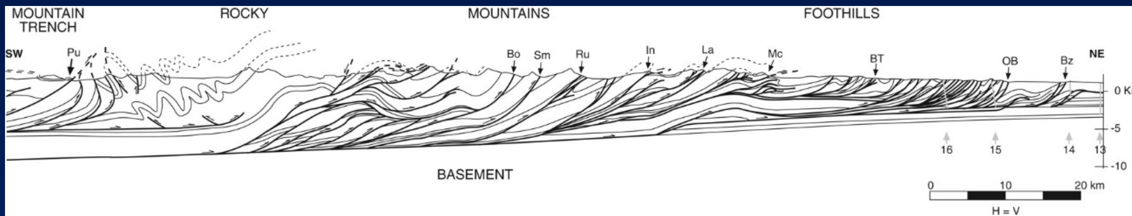
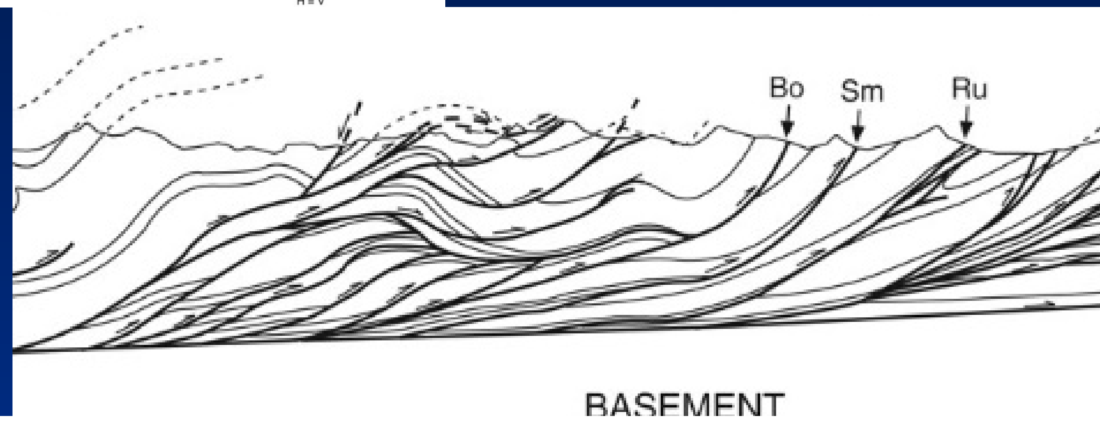


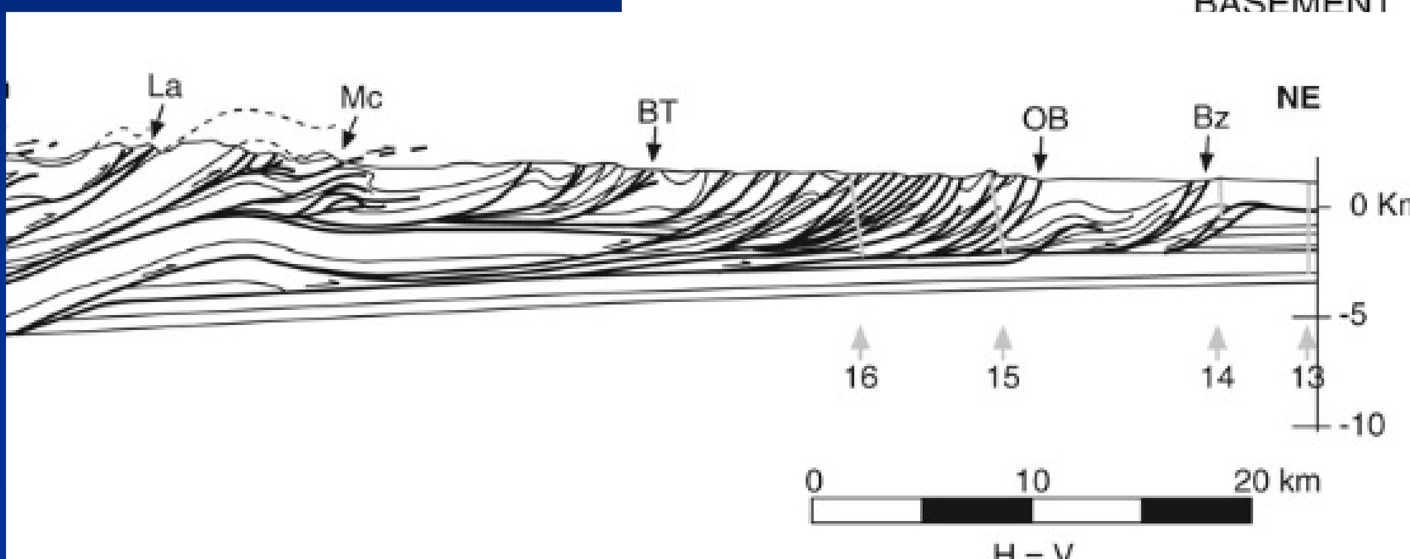
Fig. 7.11. (*a*) Structural profile through structures which have developed above the Lewis Thrust, near Waterton, Alberta, Canada. (*b*) Balanced cross-section of the structures represented in (*a*). (W) Waterton, (uA) Mid and Upper Altyn, (Ap) Appekunny, (G) Grinwell, comprising a Pre-Cambrian Belt supergroup thrust over (K) Cretaceous Siliclastics. *L* is current length and *S* is shortening. MCT = Mt. Crandell Thrust. (From Boyer & Elliot, 1982.)

Da Price and Cosgrove, 1990

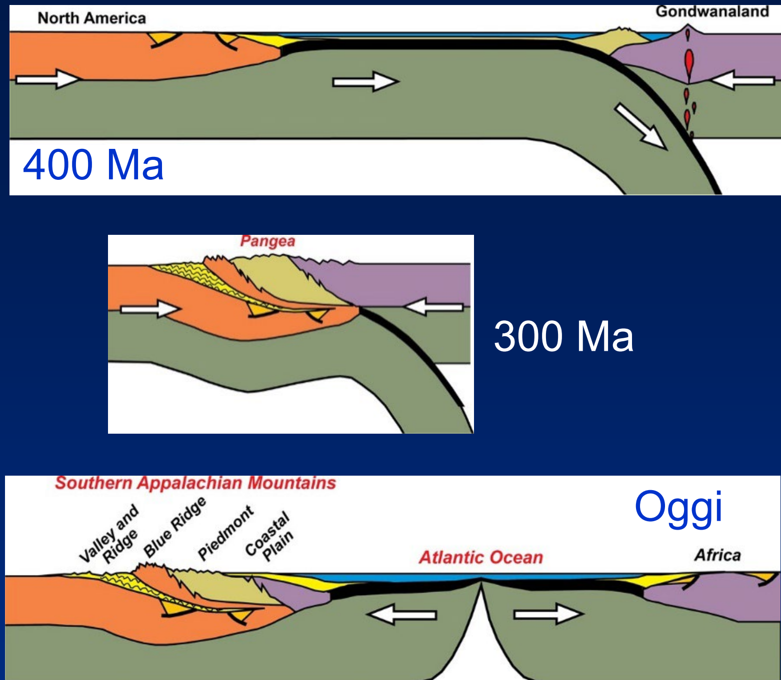
Rocky Mountains:
pieghe associate ai sovrascorrimenti e duplex, accavallamenti ciechi



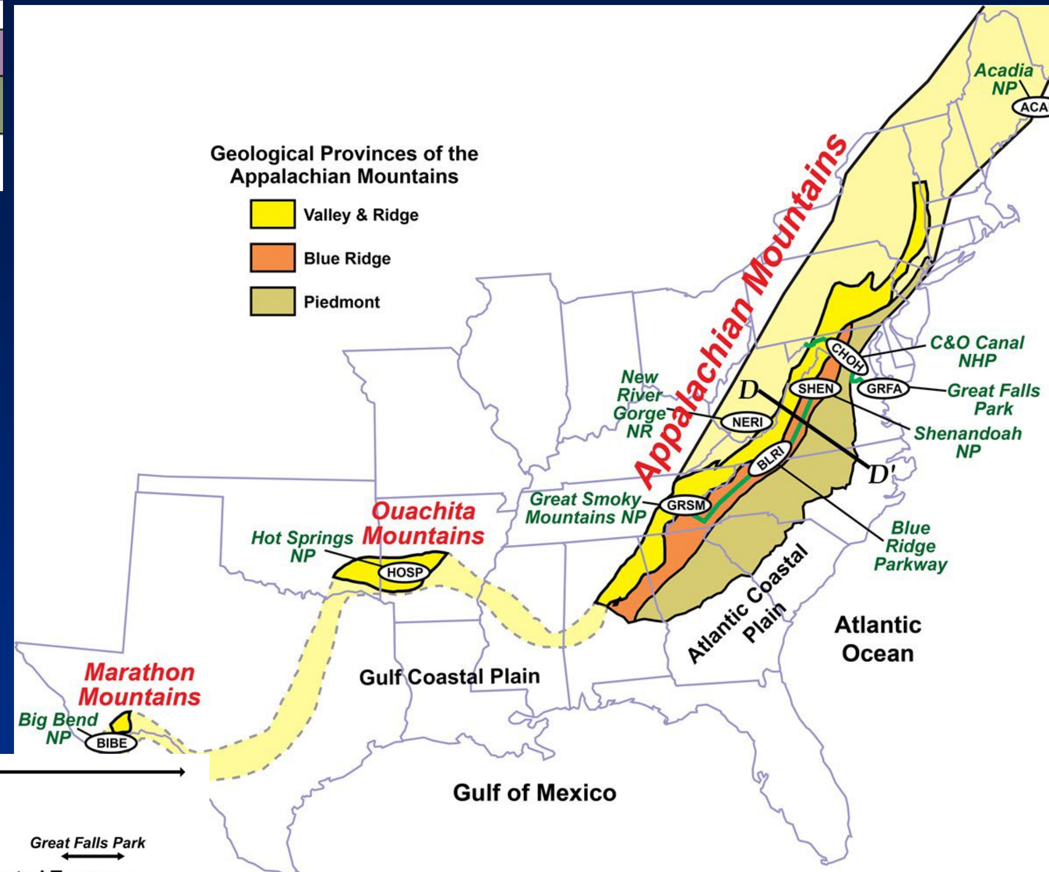




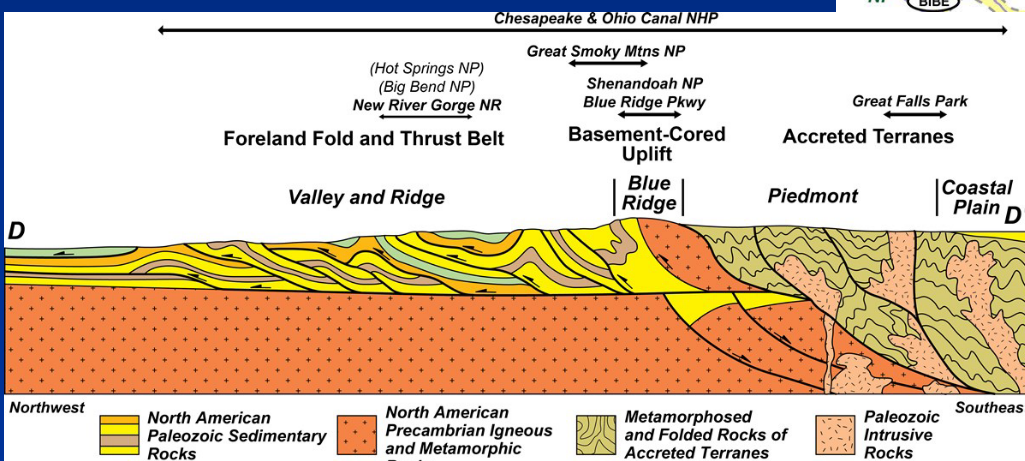
Pieghe, duplex e sovrascorrimenti: Appalachians



Da National Park Service, tratto da Marshak, 2001



Da National Park Service, tratto da Lillie, 2005

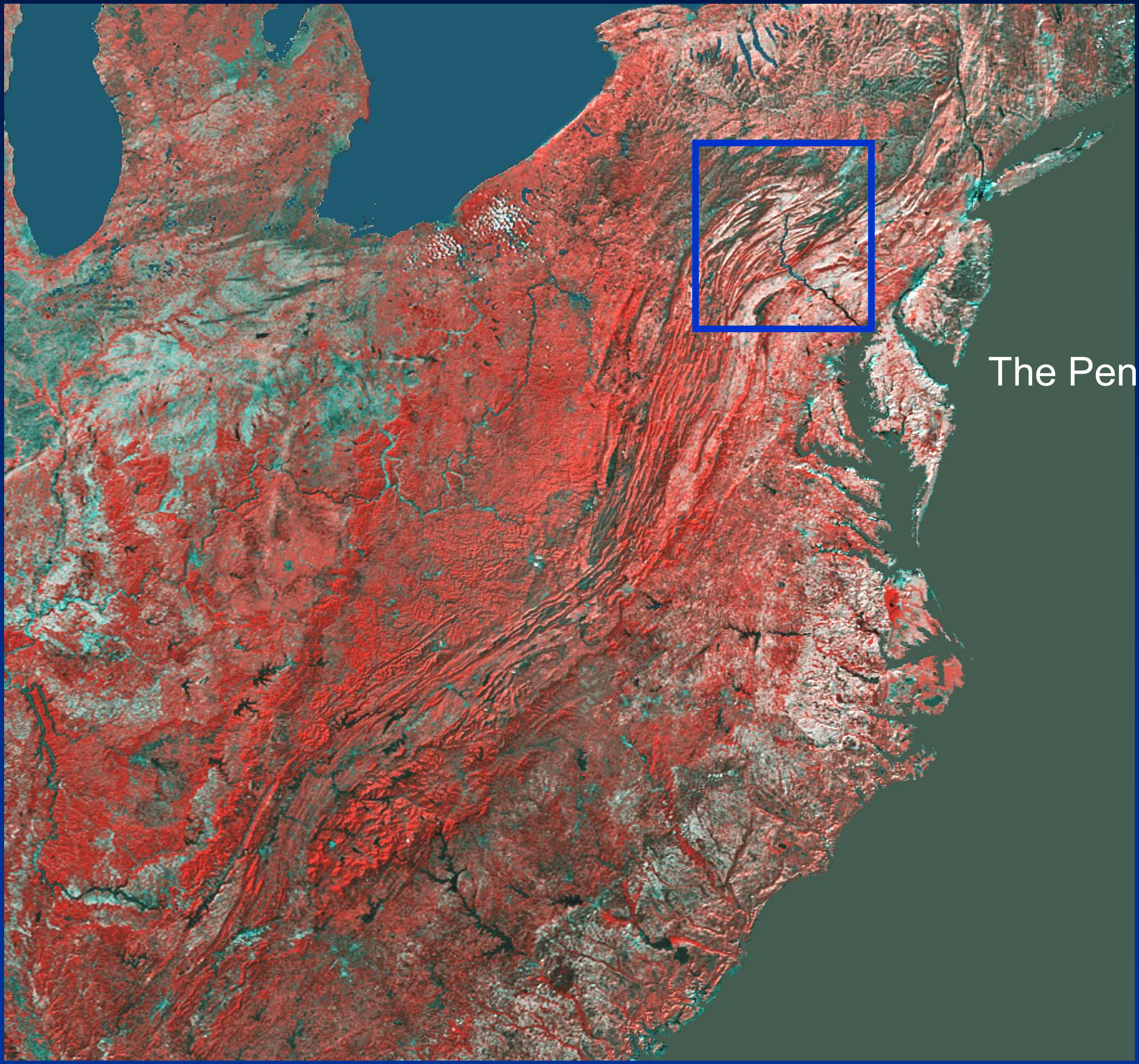


Da National Park Service, tratto da Lillie, 2005

Sistema di catene da prismi di accrezione e collisione continentale (400-300 Ma)

https://www.nps.gov/subjects/geology/plate-tectonics-collisional-mountain-ranges.htm

Pieghe, duplex e sovrascorrimenti: Appalachians

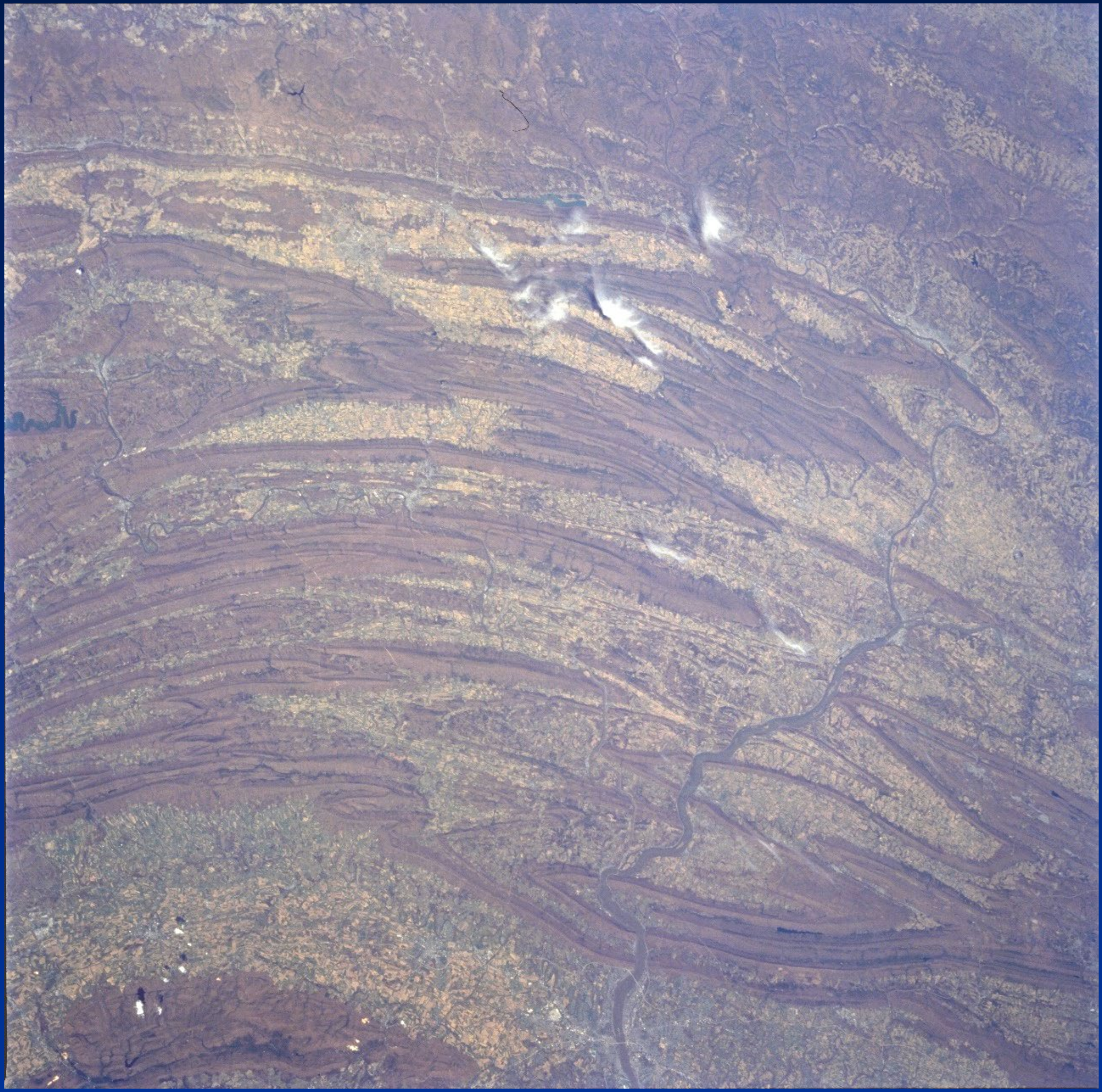


The Pennsylvania Salient

Da USGS
Mosaico dati
satellitari AVHRR,
falsi colori

Pieghe: Appalachians

Quale origine?



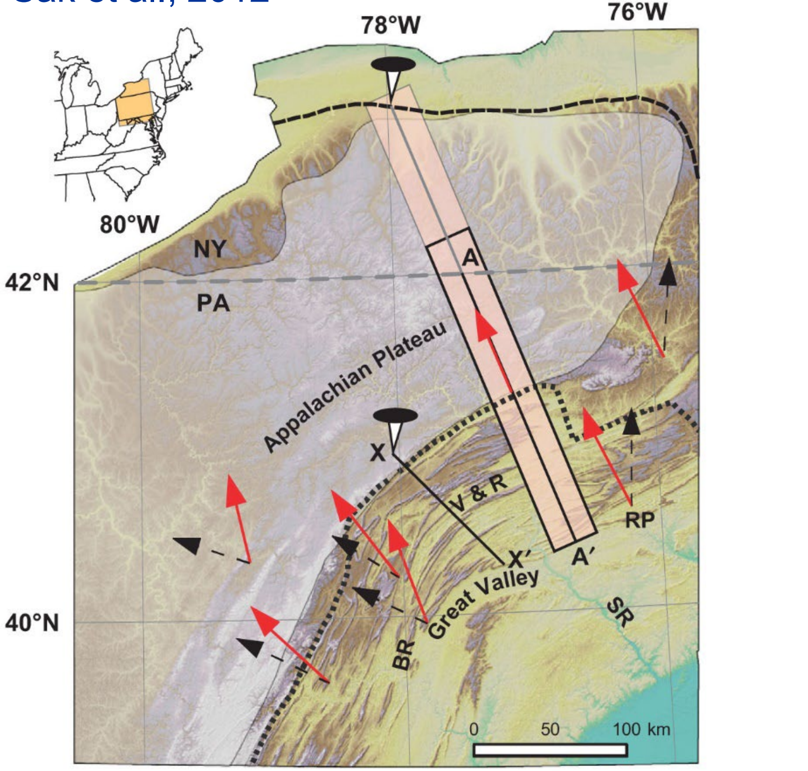
Da NASA-JPL Photo Directory

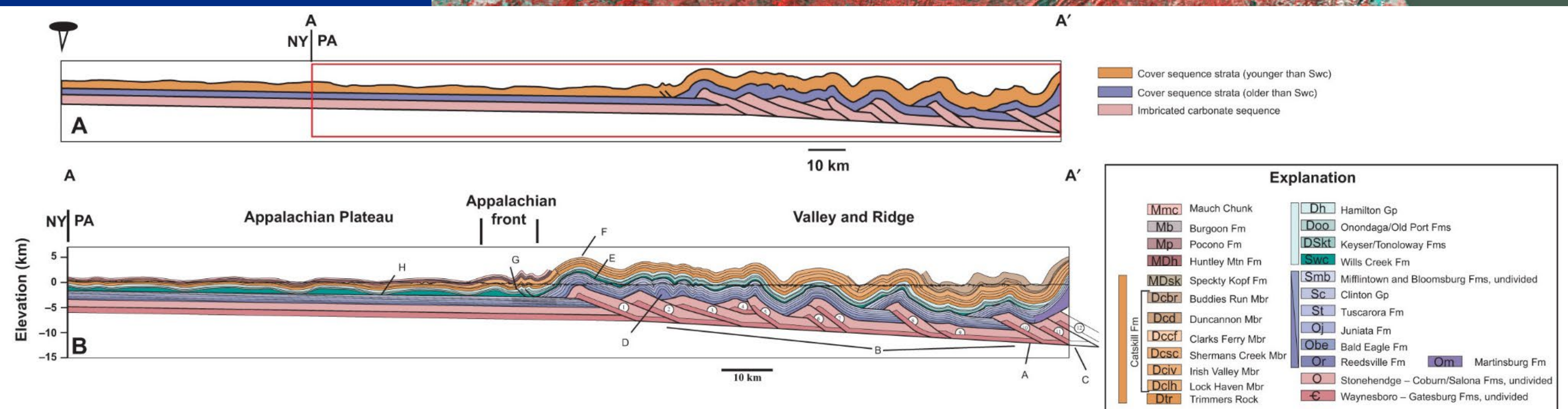
Pieghe: Appalachians

Quale origine?

Pieghe, duplex e sovrascorrimenti: Appalachians

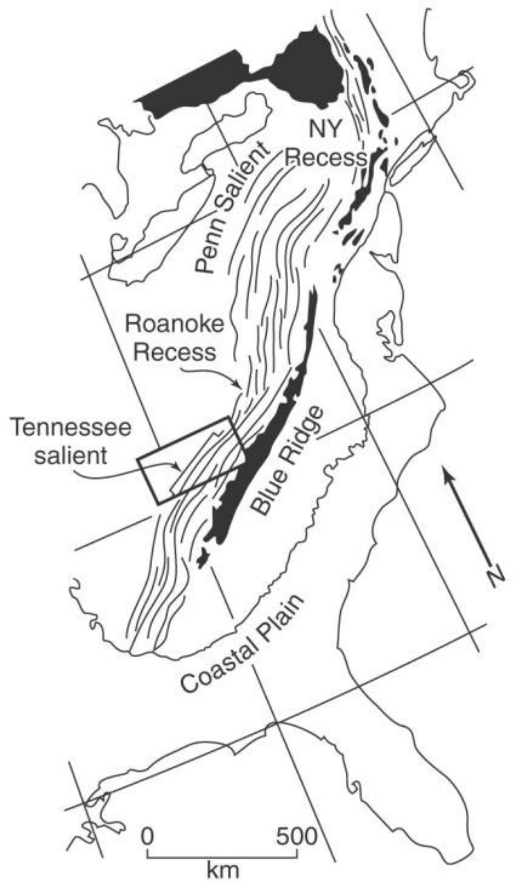
Da Sak et al., 2012

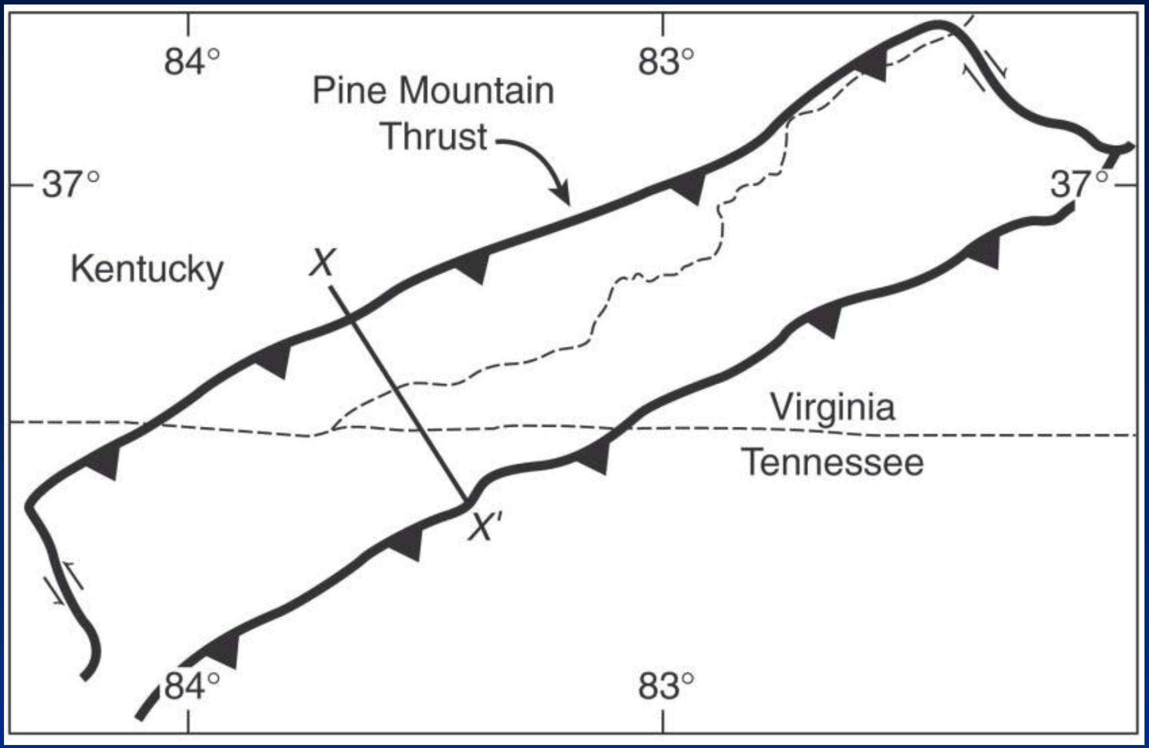




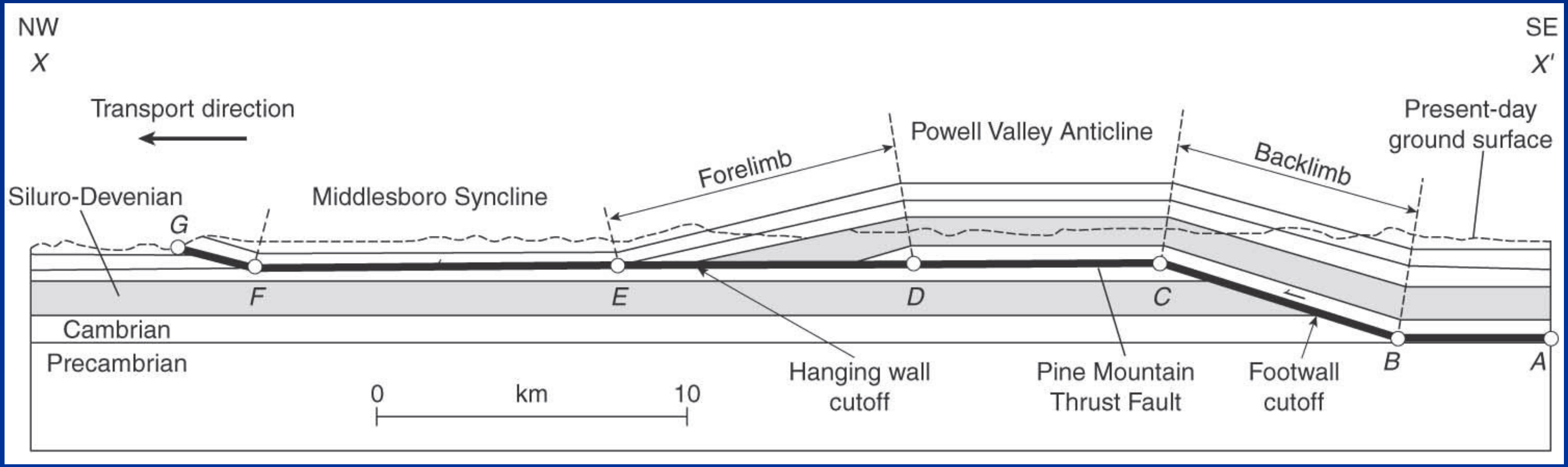
Da Sak et al., 2012

Pieghe e sovrascorrimenti: Appalachians

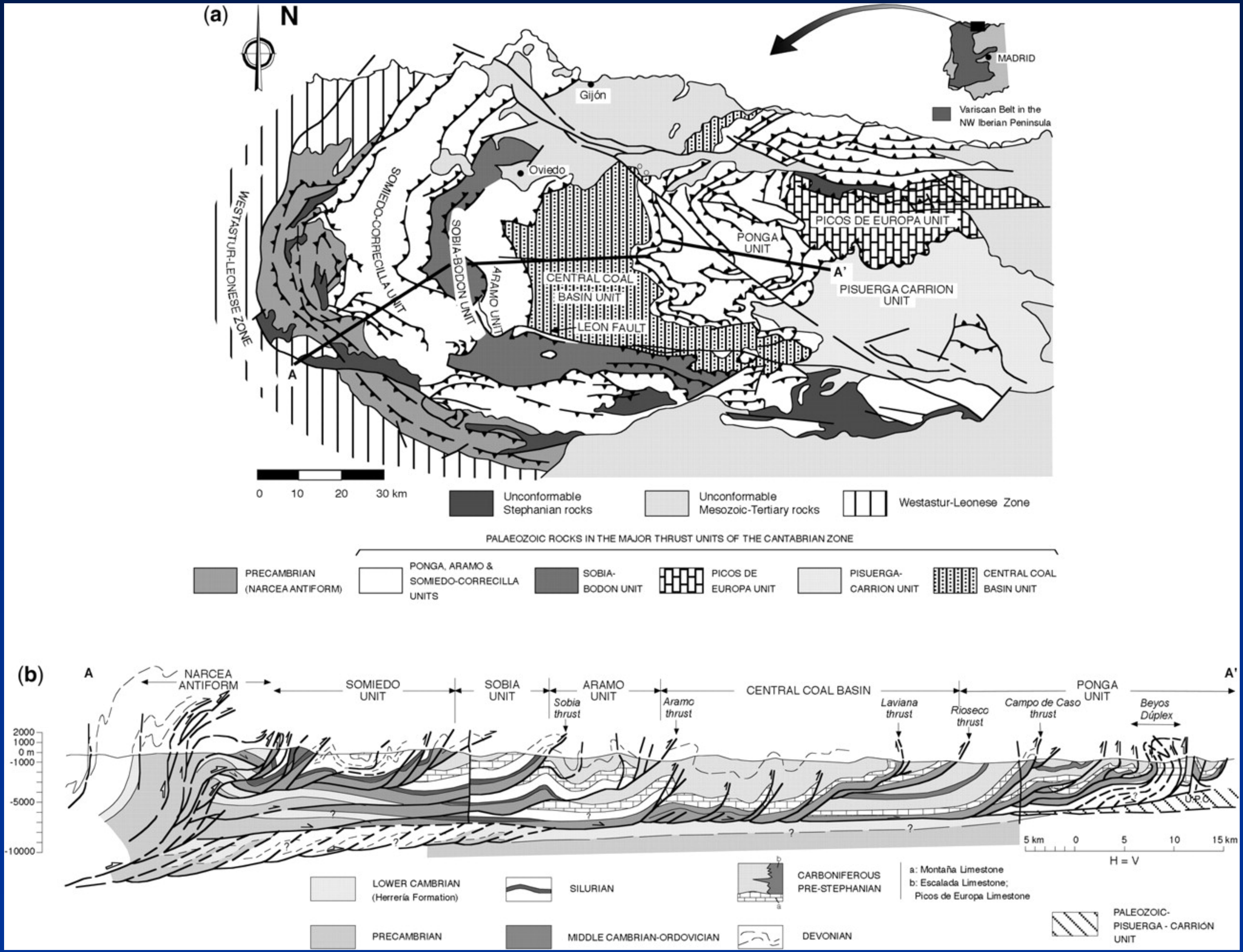




Da van der Pluim & Marshak, 2004



Pieghe, duplex e accavallamenti ciechi: i Pirenei



Da Poblet & Lisle, 2011

Accavallamenti e pieghe, altri termini

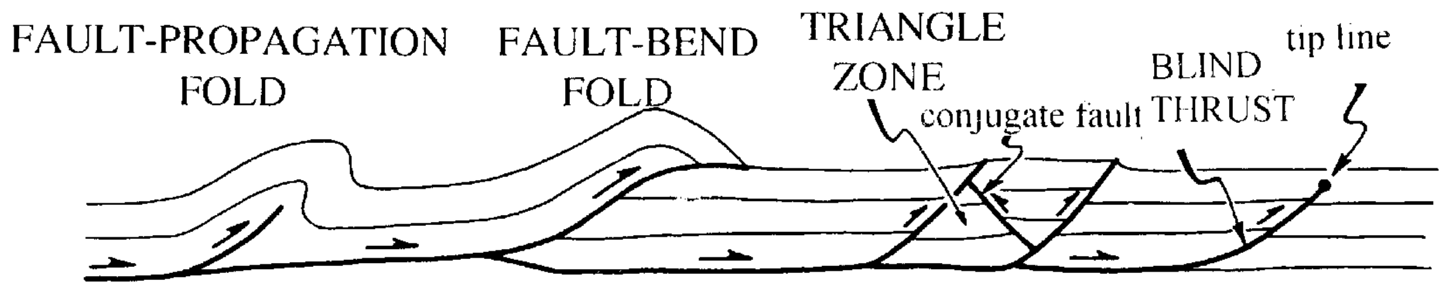


Figure 11 - Structures associated with the formation of reverse faults in thrust belts.

Da Merle, 1998

Pieghe e accavallamenti: tre tipi

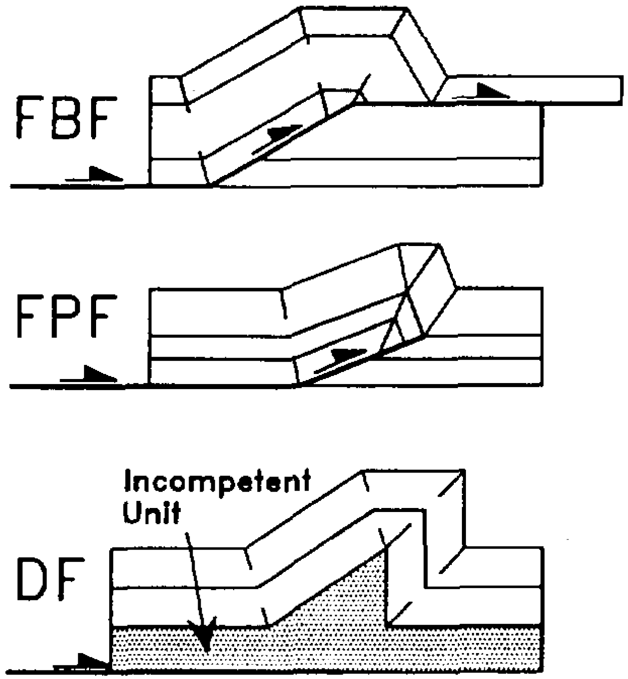
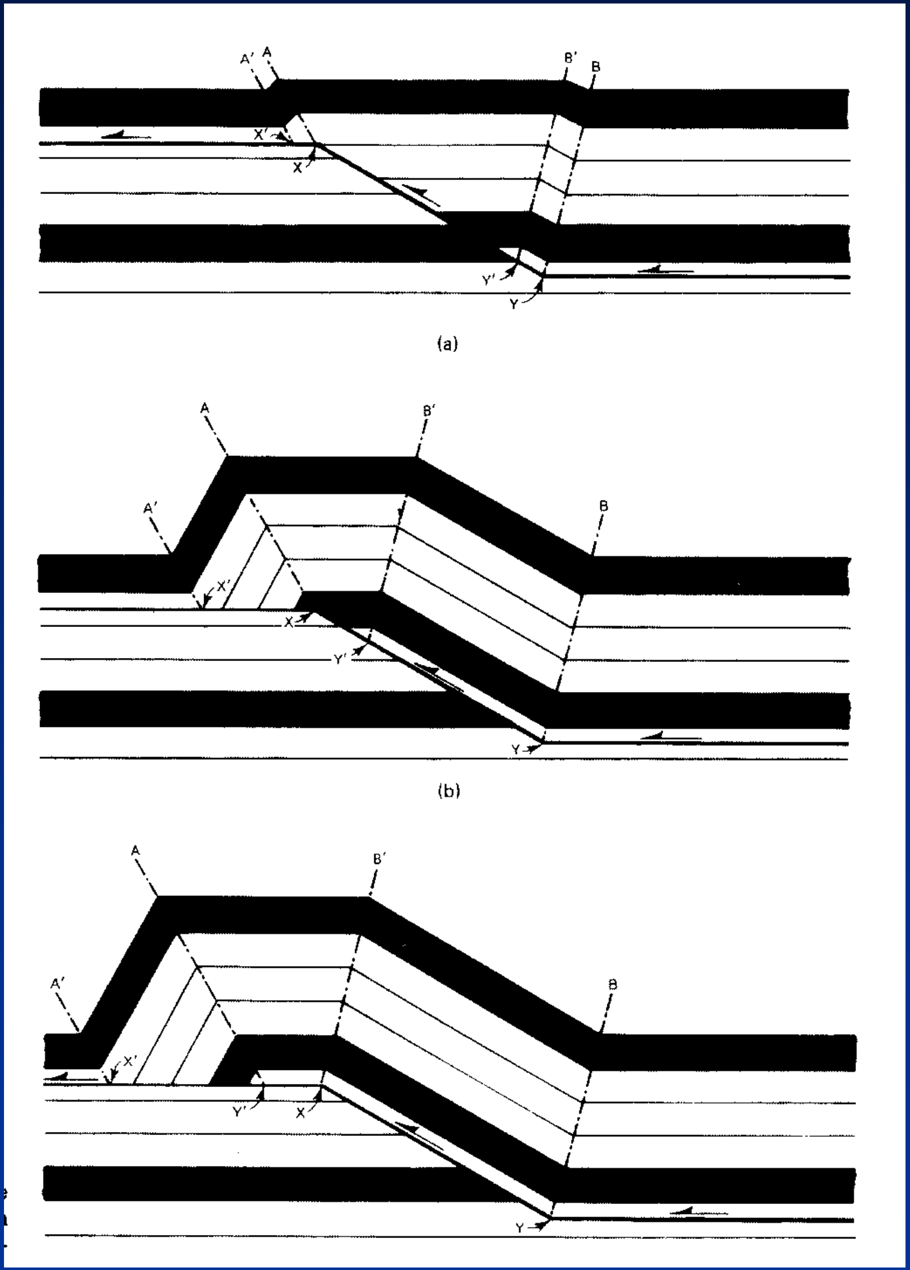


Fig. 1. Three major types of thrust-related folds in fold-and-thrust belts: fault-bend fold (FBF), fault-propagation fold (FPF), and detachment fold (DF).

Da Homza and Wallace, 1995

Pieghe e accavallamenti: fault-bend folds



Da Suppe, 1985

Fault-propagation fold, Meilin anticline, Taiwan

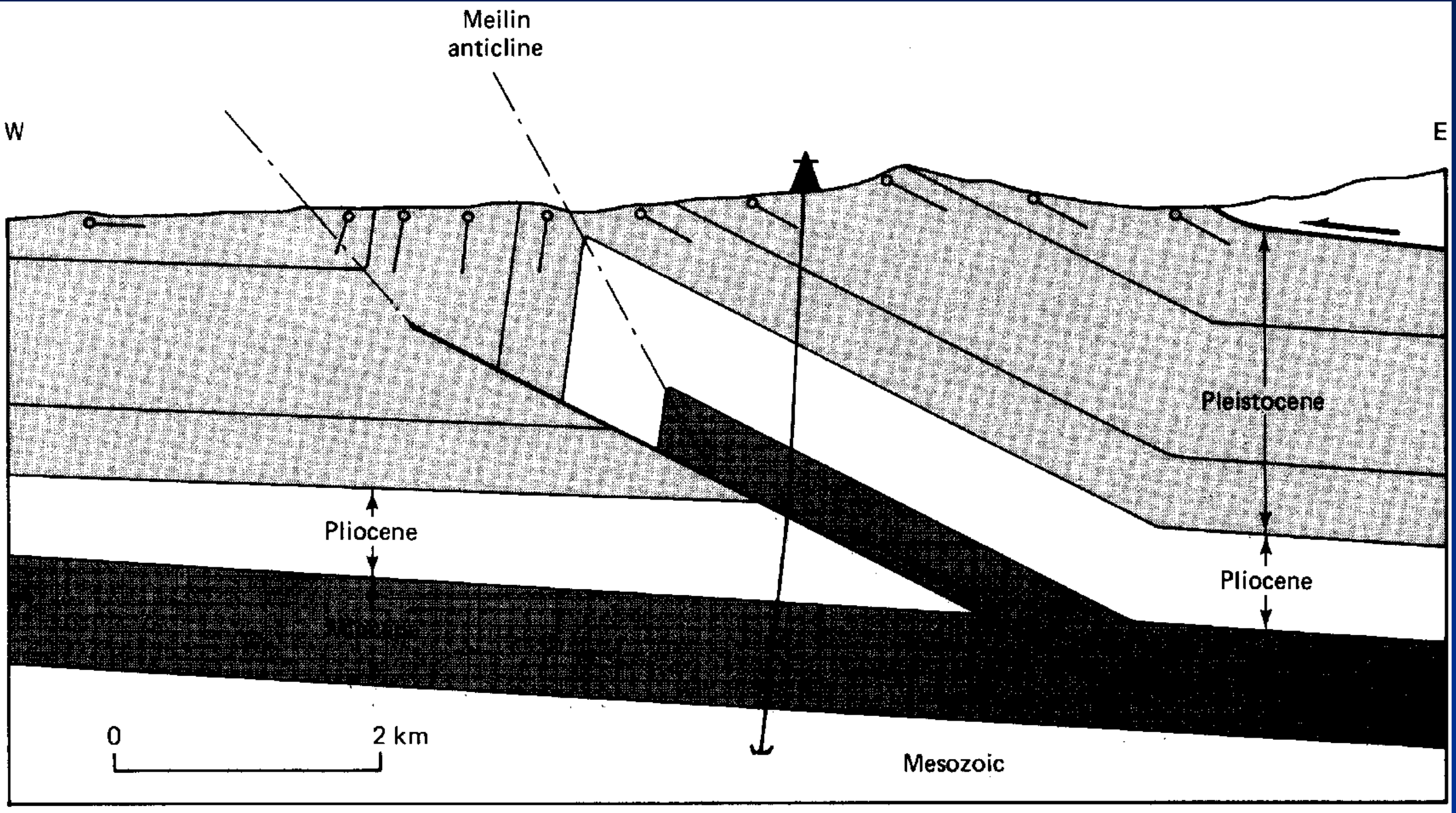
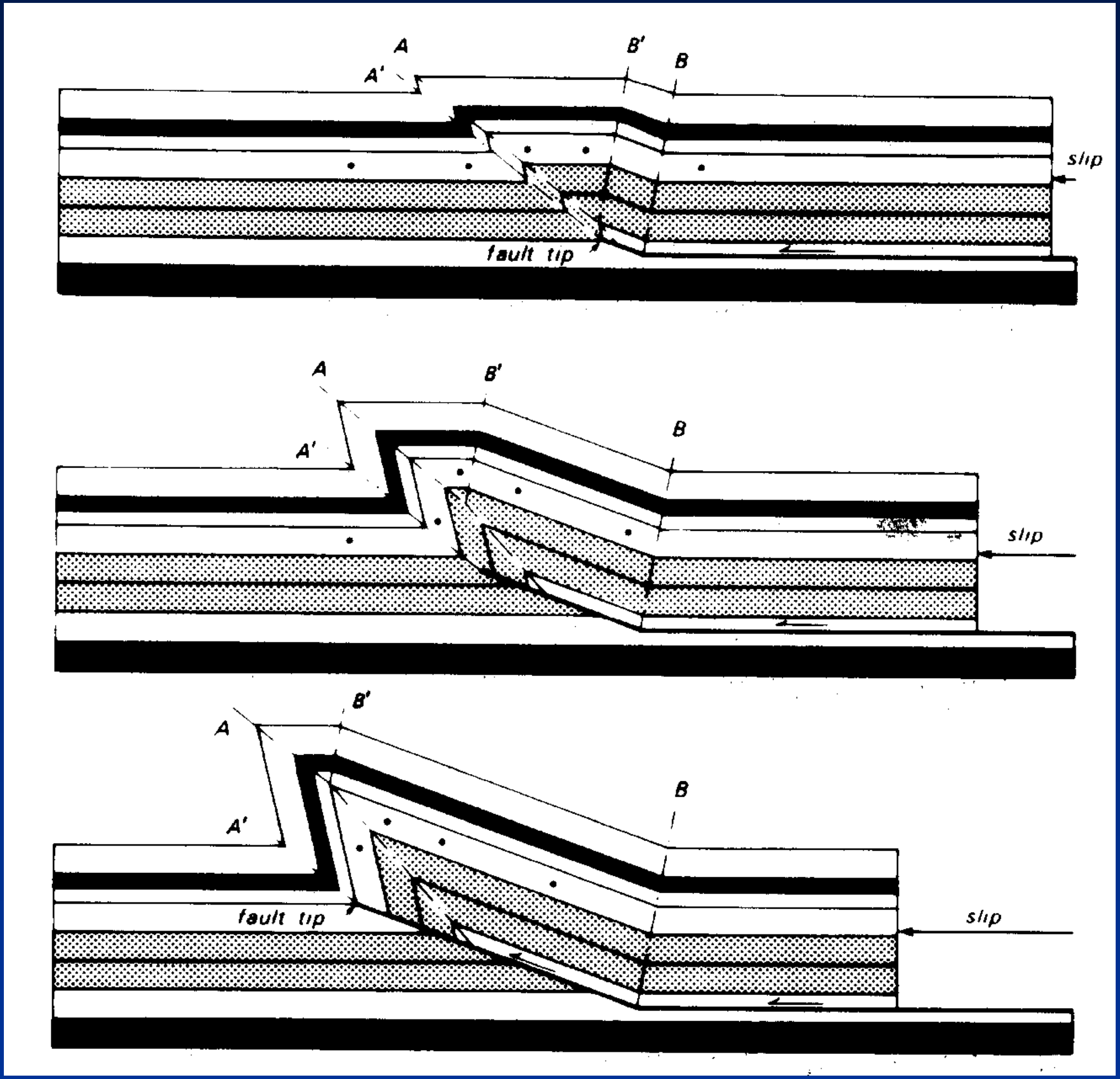


FIGURE 9–48 Cross section of a fault-propagation fold similar to the schematic diagram in Figure 9-47. Meilin anticline, western Taiwan.

Da Suppe, 1985



Pieghe e accavallamenti: Fault-propagation folds

Da Suppe, 1985

Pieghe e accavallamenti: detachment folds

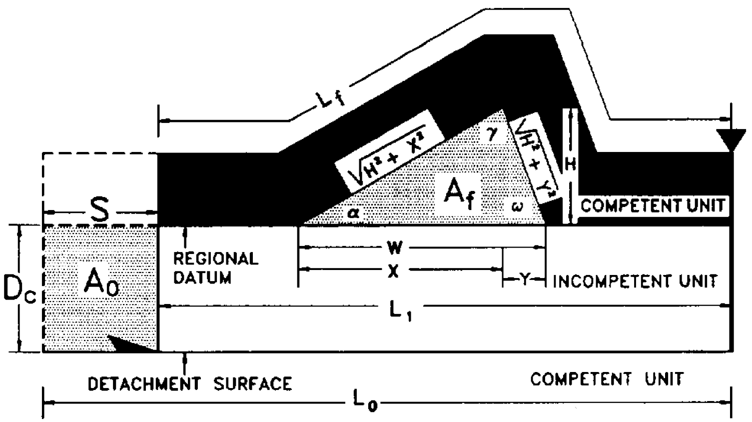
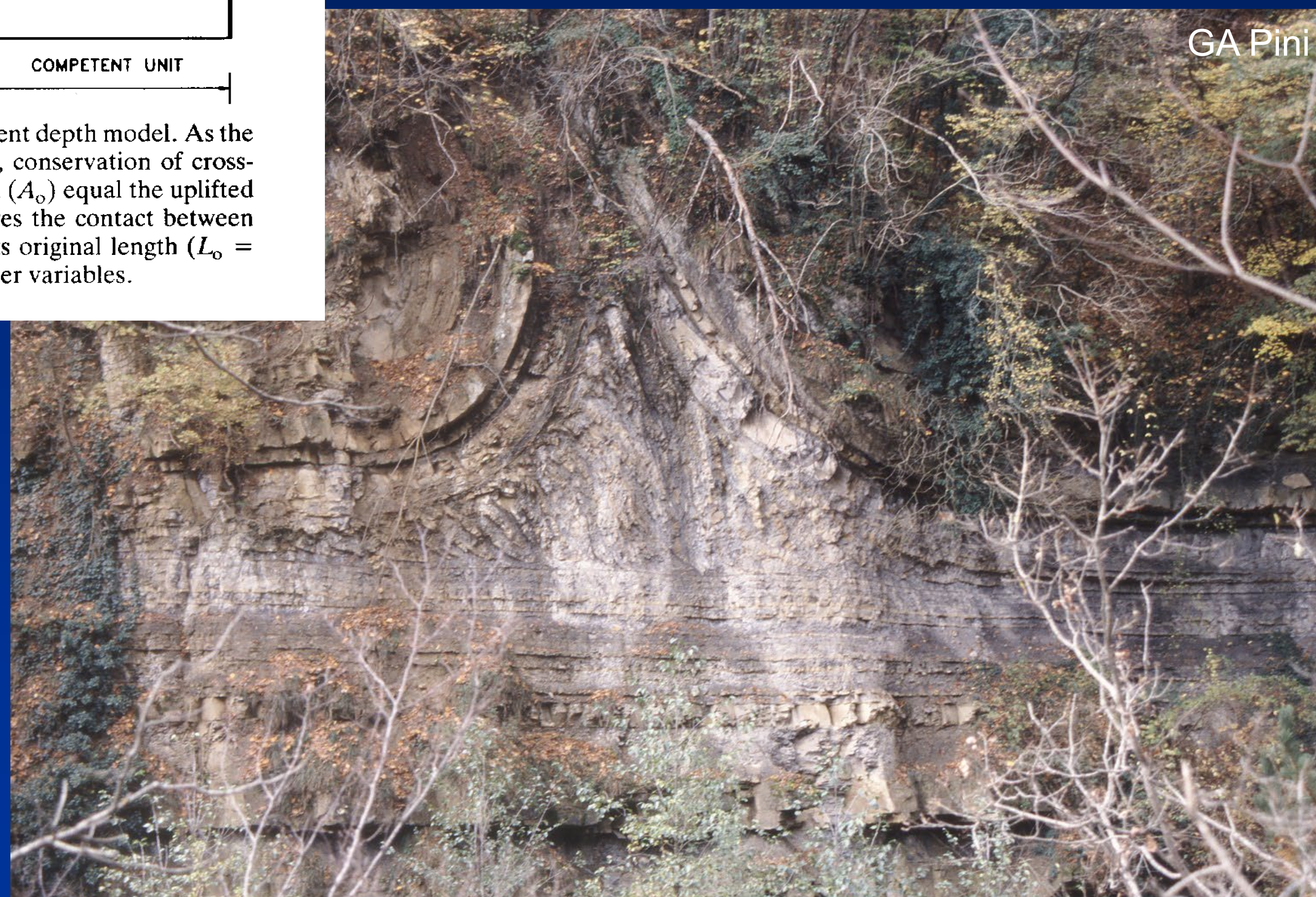
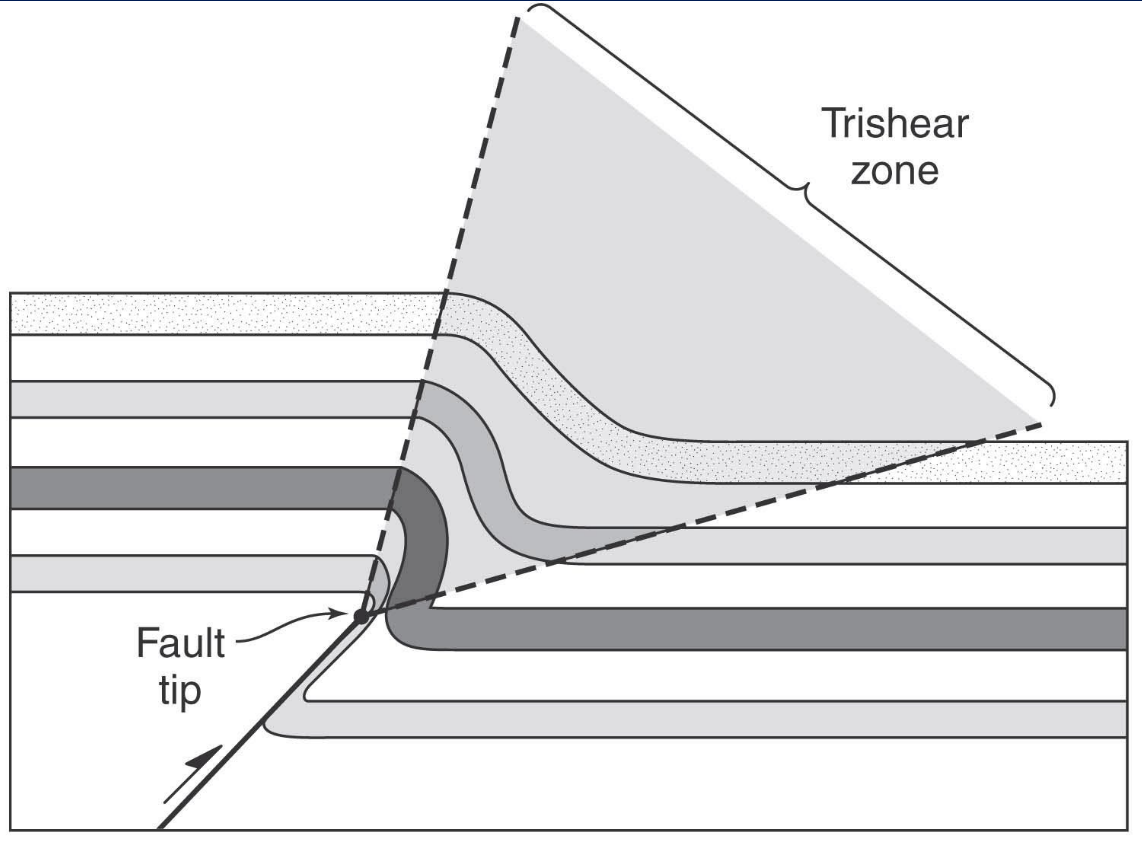


Fig. 2. Geometric basis for the fixed detachment depth model. As the incompetent unit is displaced and shortened, conservation of cross-sectional area requires that the displaced area (A_o) equal the uplifted area (A_f). Conservation of line-length requires the contact between competent and incompetent units to retain its original length ($L_o = L_f$). See text for explanation of other variables.

Da Homza and Wallace, 1995

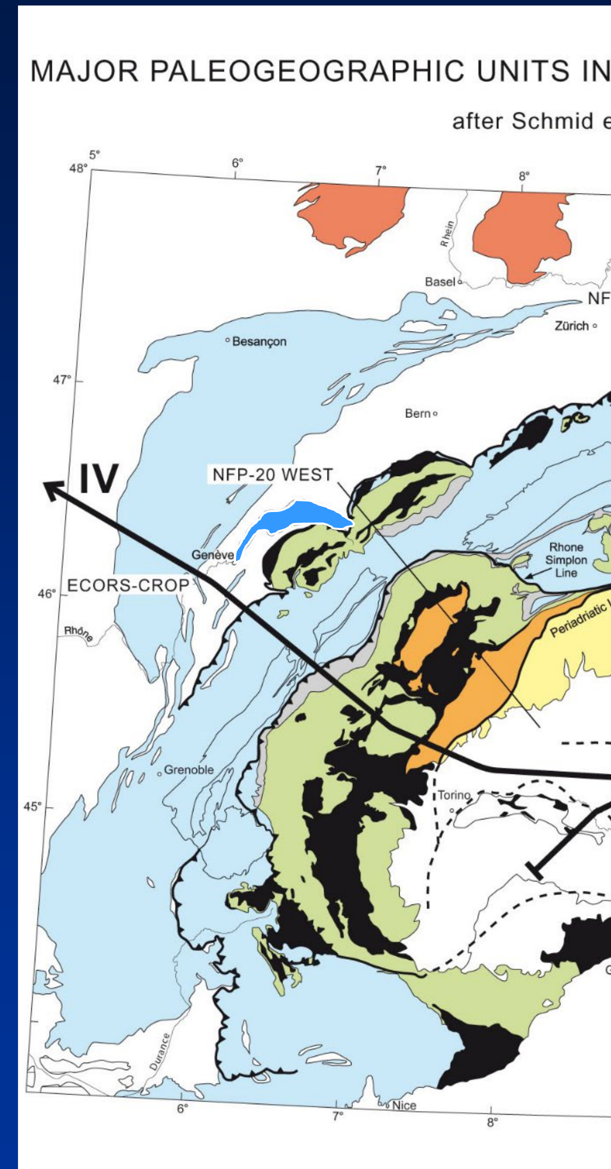


Fault-propagation fold: modello di trishear



Da van der Pluim & Marshak, 2004

, la Molassa e il Giura



Da Schmid et al., 2004

Il Giura: tettonica di scollamento

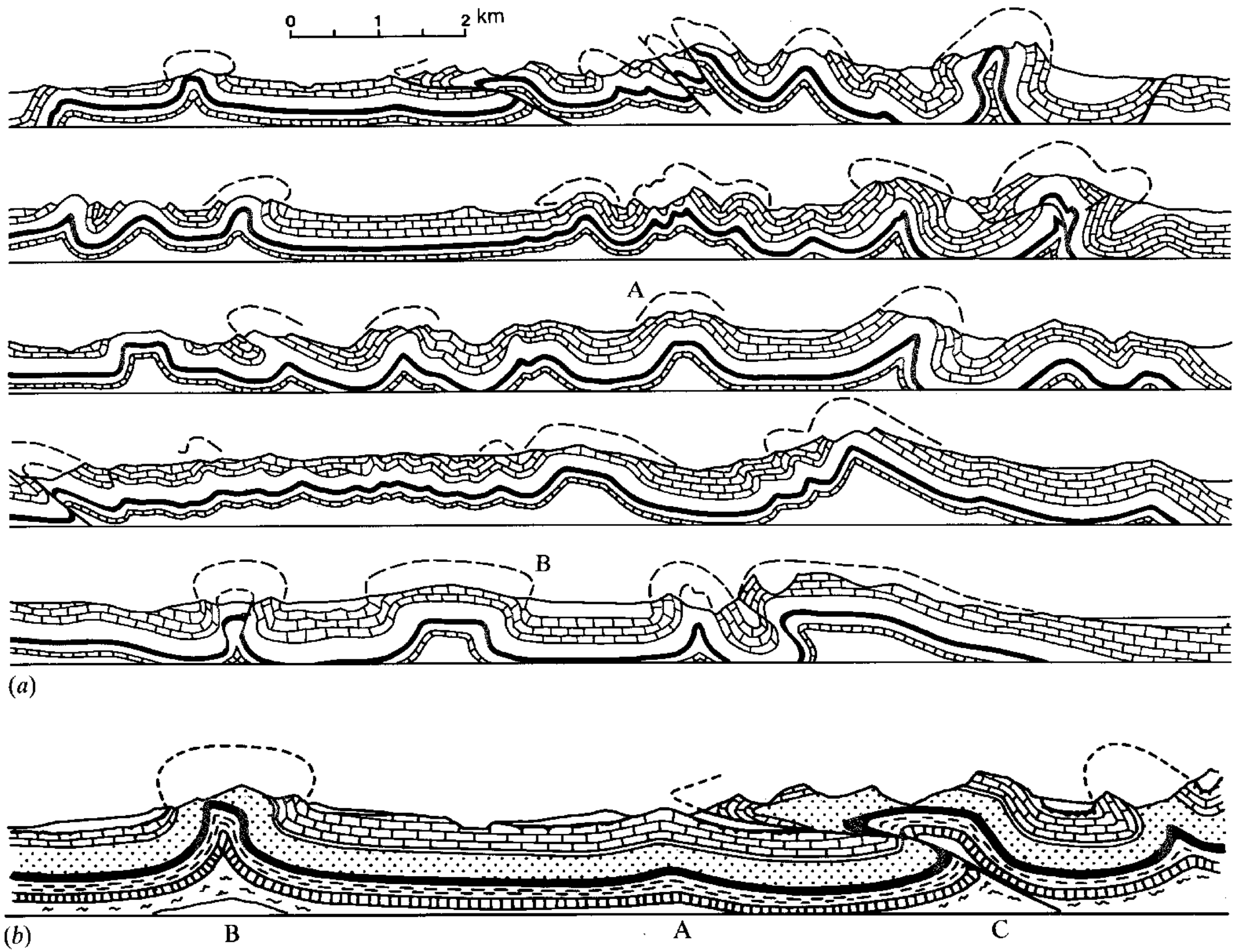


Fig. 13.2. (*a*) Profile sections of fold structures in the Jura Mountains after Heim (1921). (*b*) Detail of (*a*) showing three stages in the formation of a thrust from an originally symmetrical fold.

Da Price & Cosgrove, 1990

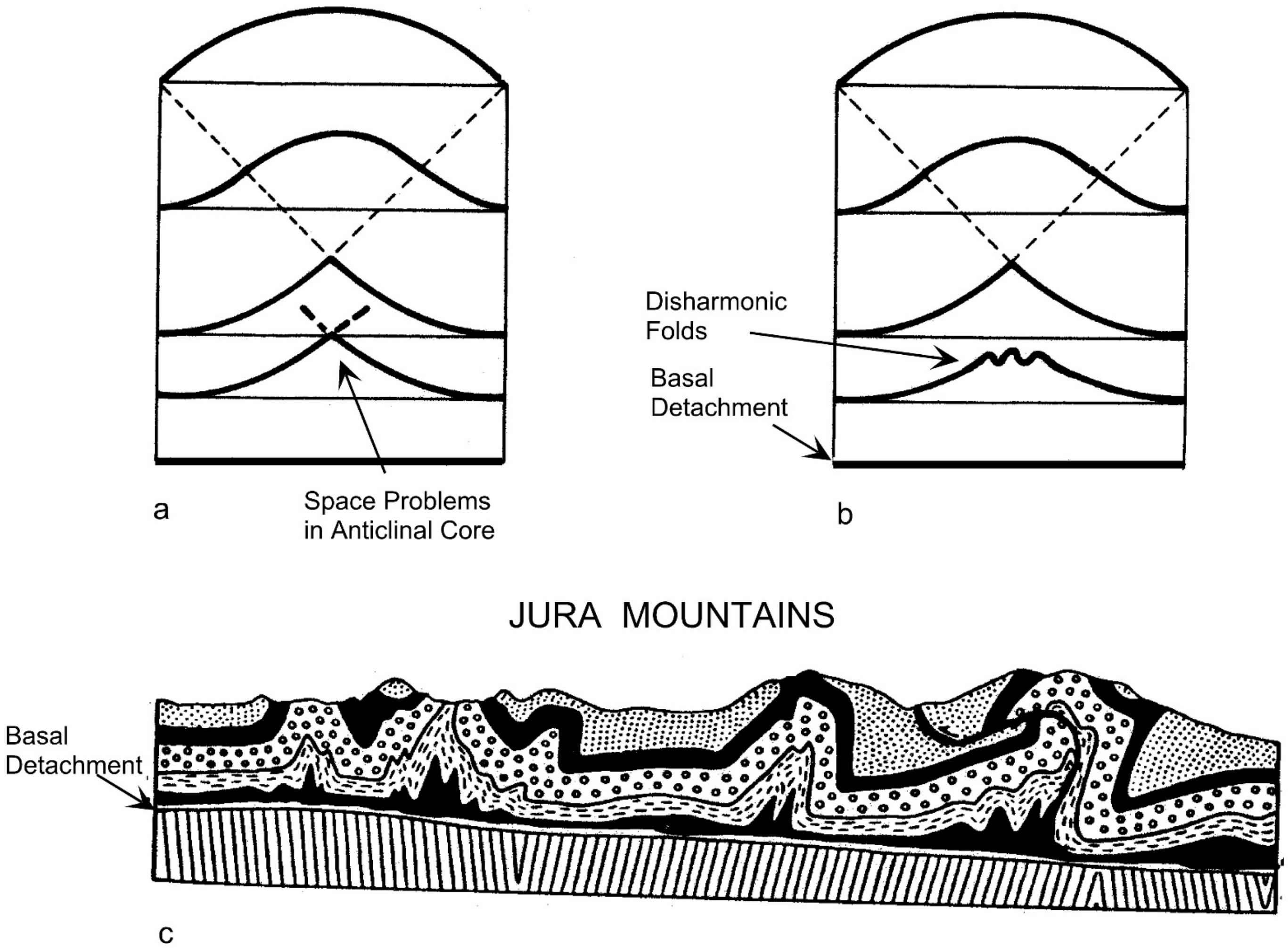
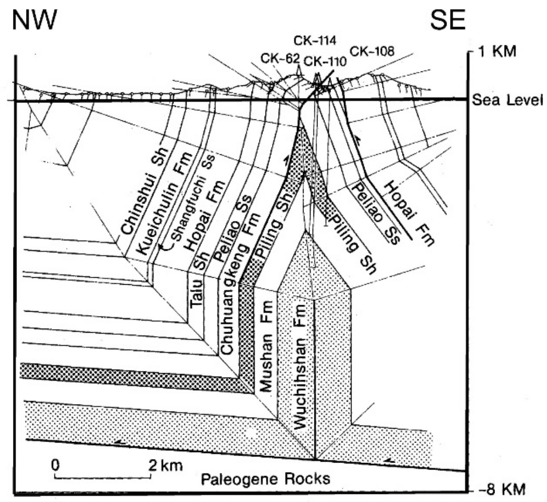
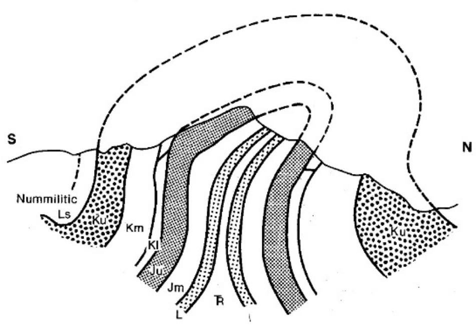


Fig. 1. Geometry of disharmonic detachment folds. a. Space problems in the core of a concentric fold resulting from convergence of radii of curvature to form cuspate geometry. b. Space problems resolved by the formation of disharmonic folds (modified from De Sitter, 1964). c. Example of disharmonic detachment folds from the Jura Mountains, Switzerland (modified from Buxtorf, 1916).

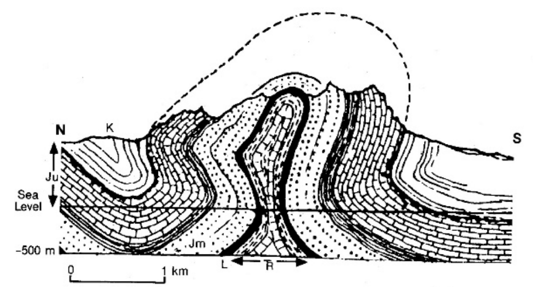
Da Mitra, 2003



a. Chuhuangkeng Anticline, Taiwan



b. Gourdan Anticline, Maritime Alps

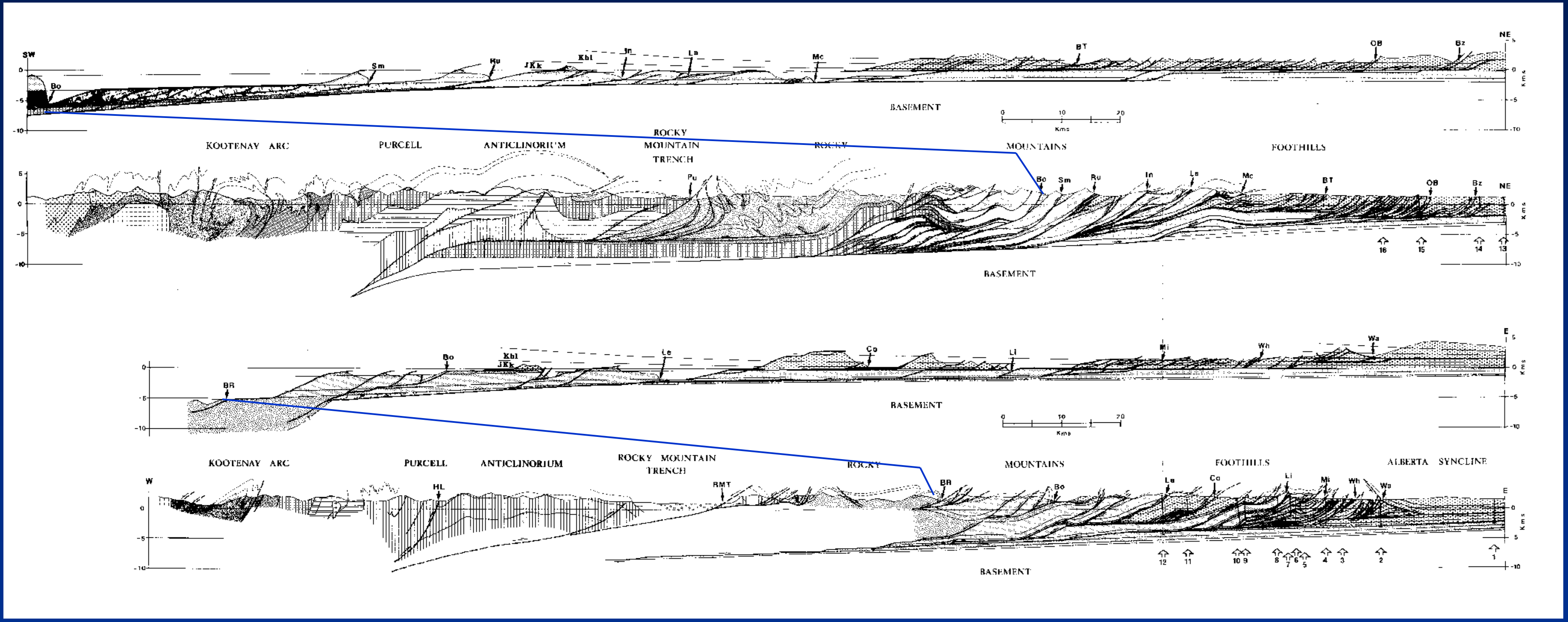


c. Weissenstein Anticline, Jura Mountains

Fig. 2. Examples of lift-off folds from (a) the Taiwan belt (from Namson, 1981), (b) the Maritime Alps (Goguel, 1962), and (c) the Jura Mountains (Buxtorf, 1916).

Da Mitra, 2003

Retrodeformazione delle catene, Rocky Mountains



Da Price, 1981