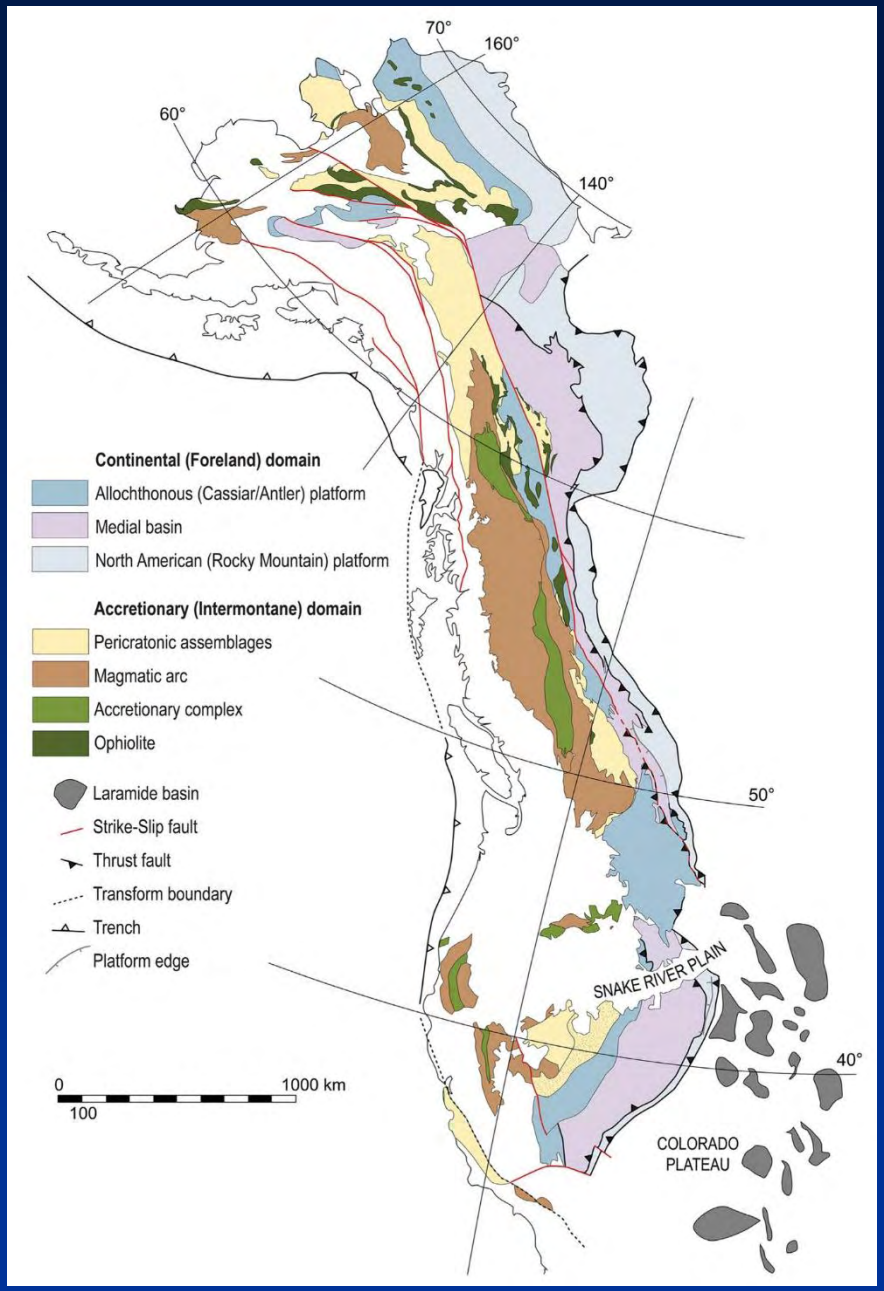
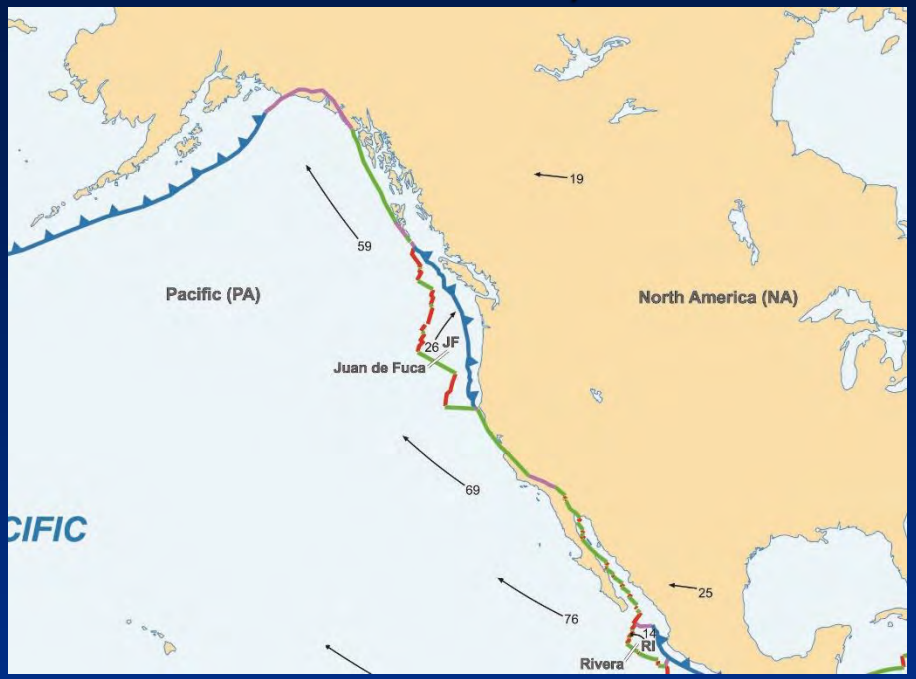
Associazioni di sovrascorrimenti-accavallamenti e pieghe: Le Rocky Mountains

Le Rocky Mountains (e la Cordillera)



Da Shaw & Johnston, 2016



https://commons.wikimedia.org/wiki/File:Tectonic_plates_boundaries_detailed-en.svg

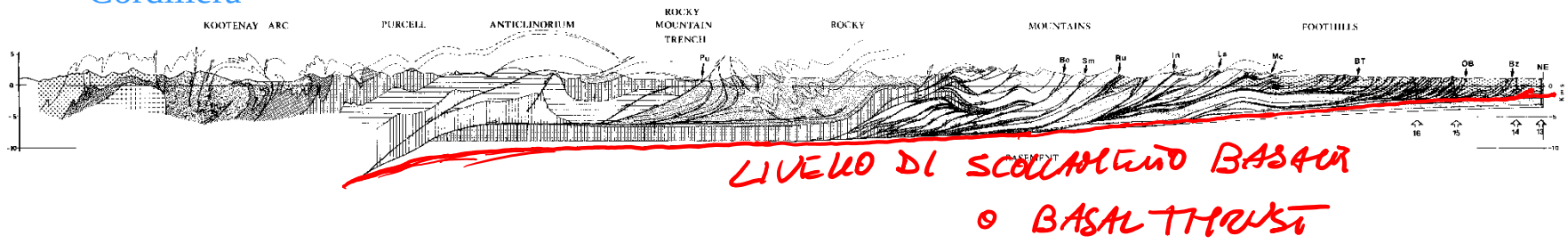
Subduzione di crosta oceanica, sistemi di accrezione (vedi prismi di accrezione), arco magmatico, deformazione del continente, foreland fold and thrust belt

Le Rocky Mountains

Da Price, 1981

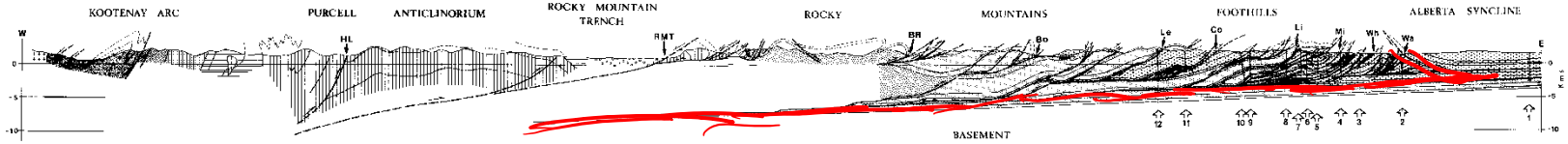
Cordillera

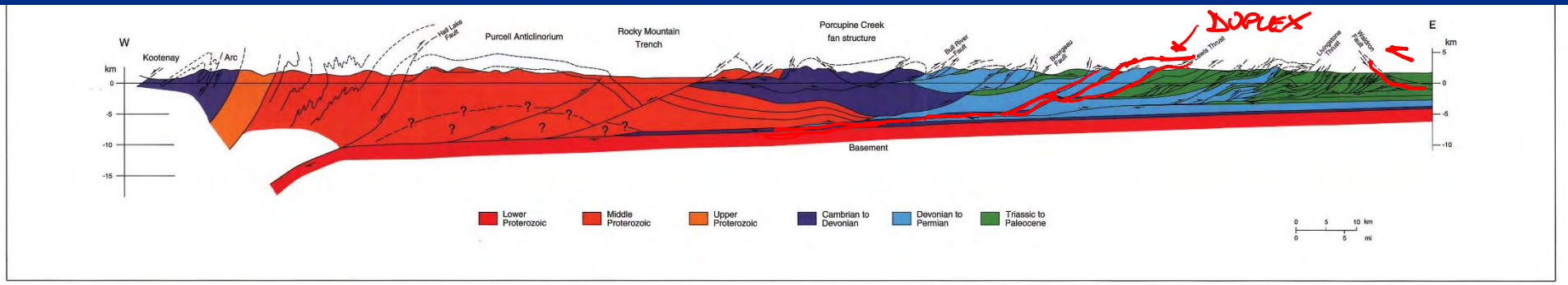
Rocky Mountains



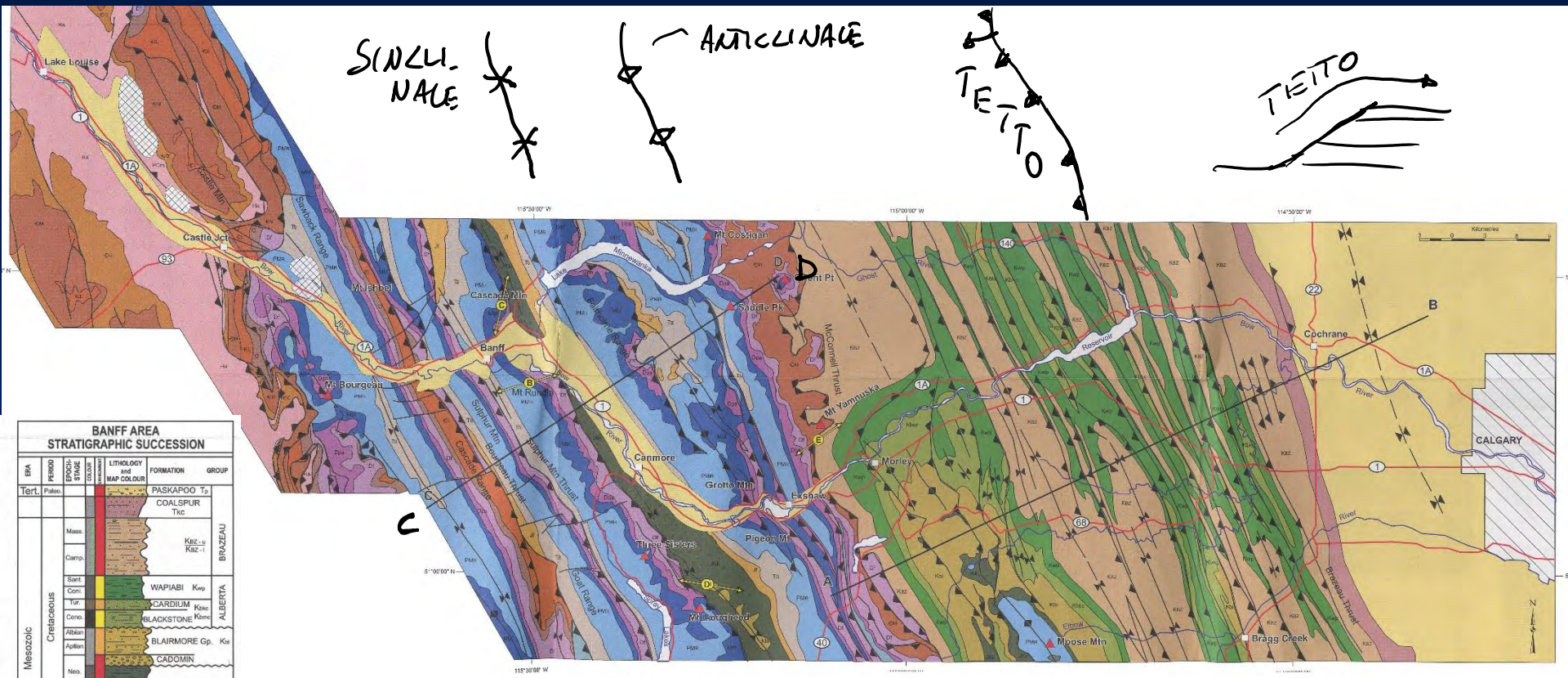
Cordillera

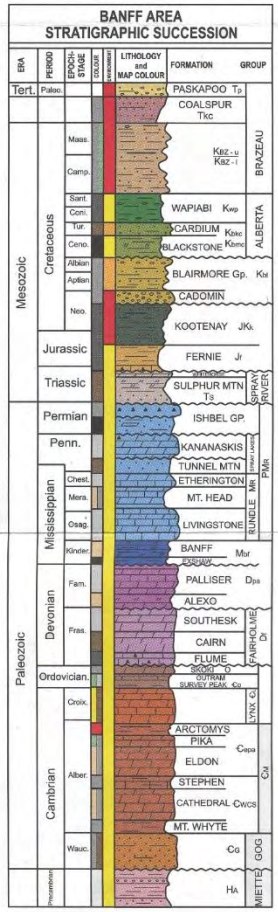
Rocky Mountains



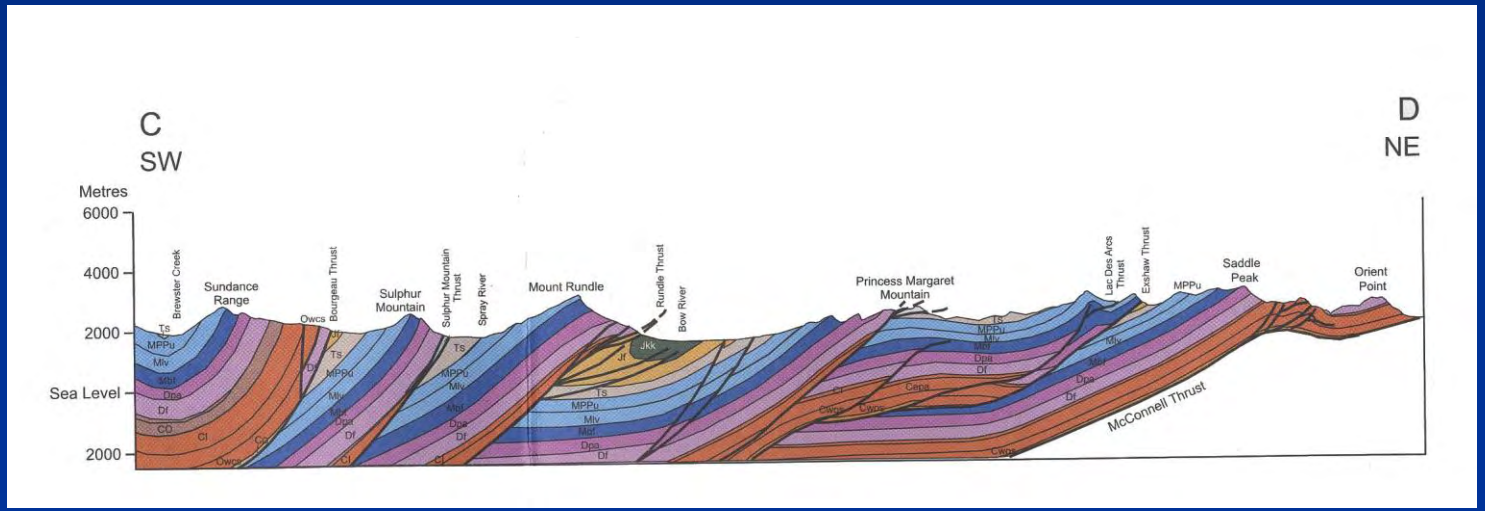


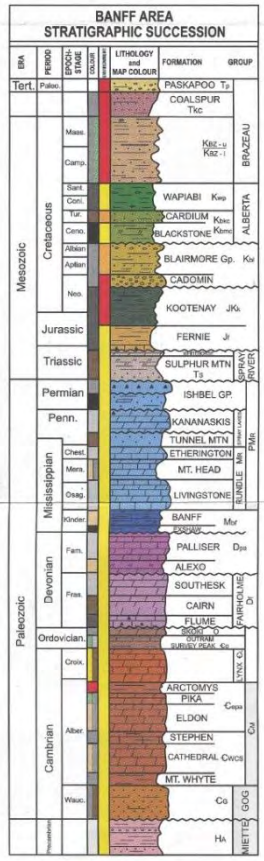
Da Price, Capitolo 2 in «Atlas of the Western Canada sedimentary basin» Alberta Geological Survey.



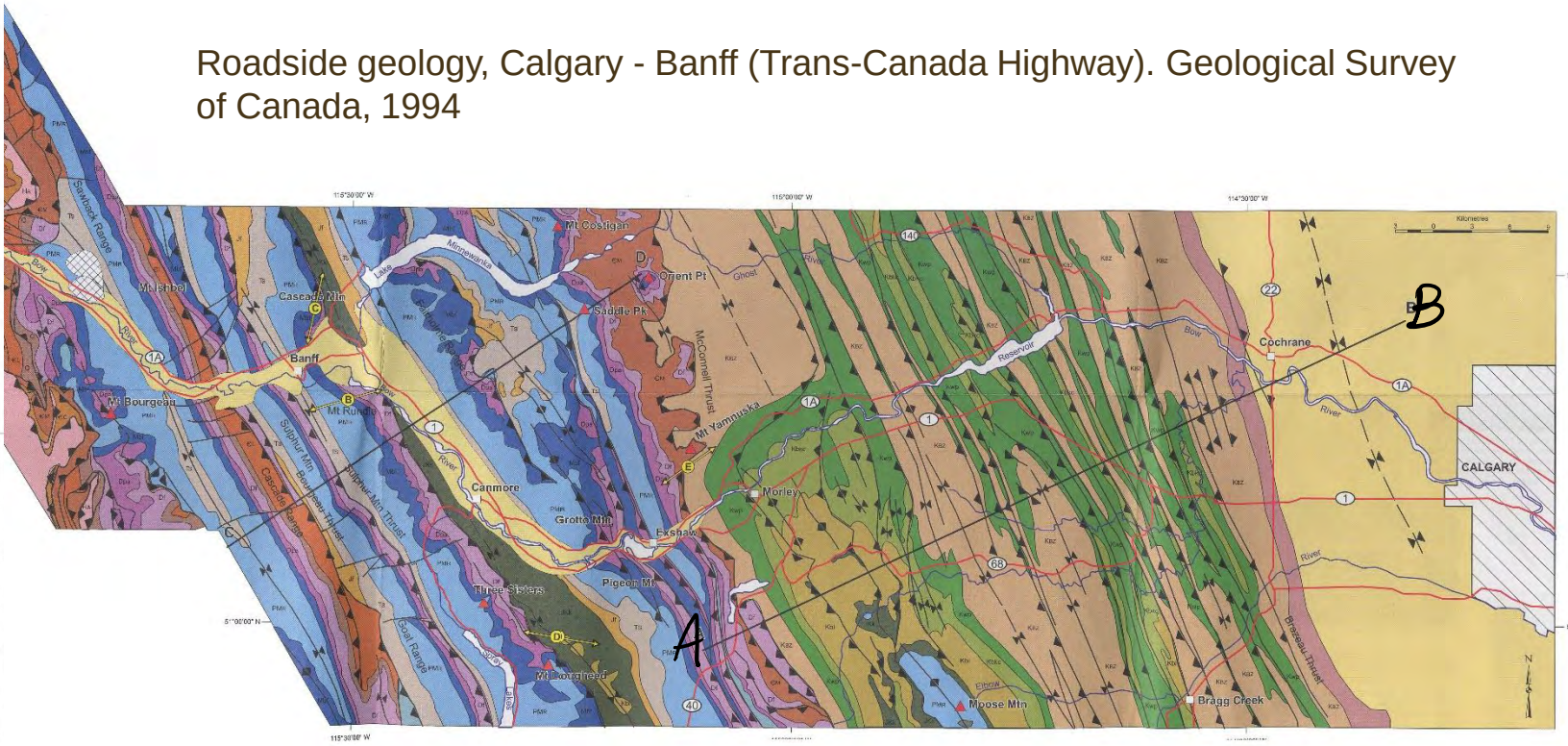


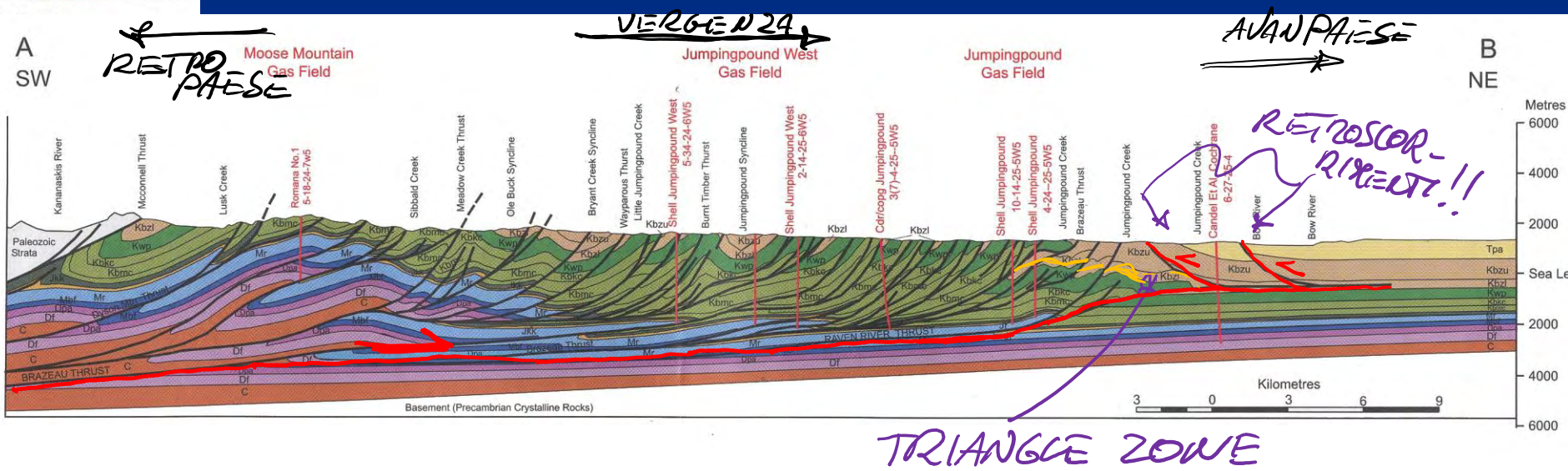
Roadside geology, Calgary - Banff (Trans-Canada Highway). Geological Survey of Canada, 1994





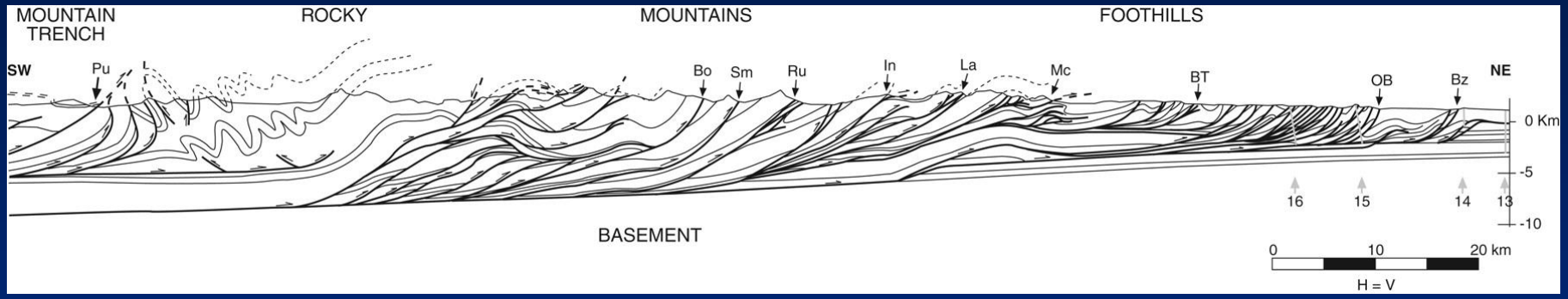
Roadside geology, Calgary - Banff (Trans-Canada Highway). Geological Survey of Canada, 1994





Propagazione degli accavallamenti

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



Da Poblet & Lisle, 2011

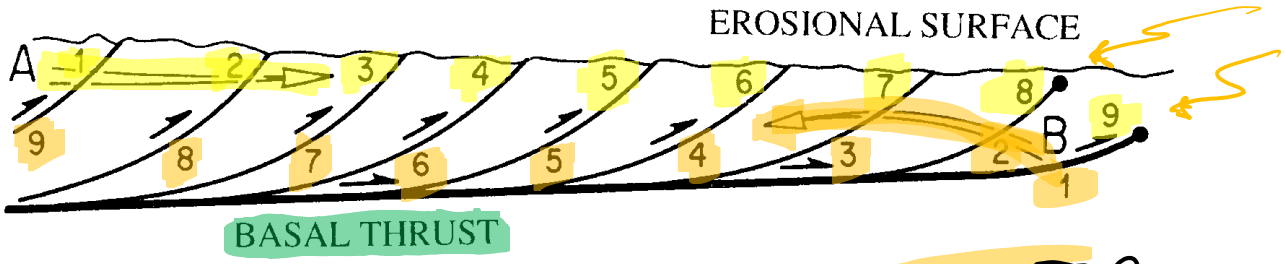
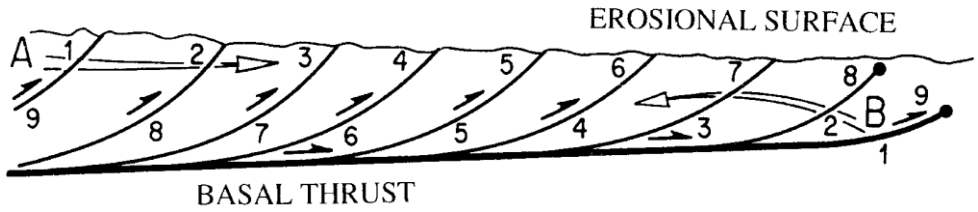


Figure 12 - Imbricate structure and sequential development of thrusts in a piggy-back sequence (foreland propagation; arrow A and numbers indicate the order of development of thrusts). Out of sequence thrust stack (propagation of thrusts in the hanging wall; arrow B and numbers indicating the order of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

ACCAVALCA-MENTI CIECHI

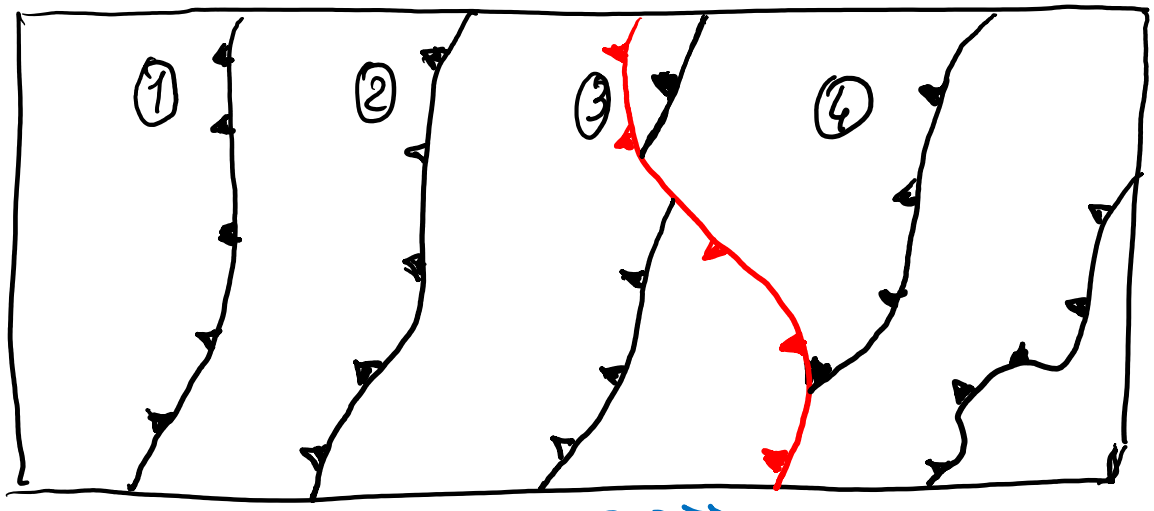
Da Merle, 1998



Da Merle, 1998

"FUORI SEQUENZA"

out-of-sequence thrust



TRACCIA DI ACCAVALLAMENTO (I TRIANGOLI INDICANO IL TETTO)

TRACCIA DI ACCAVALLAMENTO FUORI SEQUENZA (I TRIANGOLI INDICANO IL TETTO)

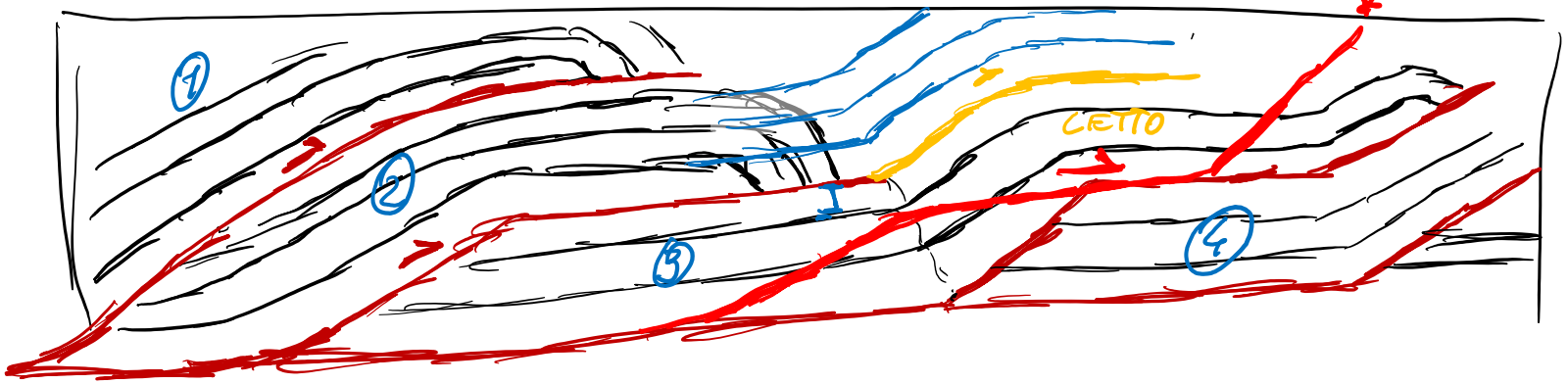
+ VECCHIO

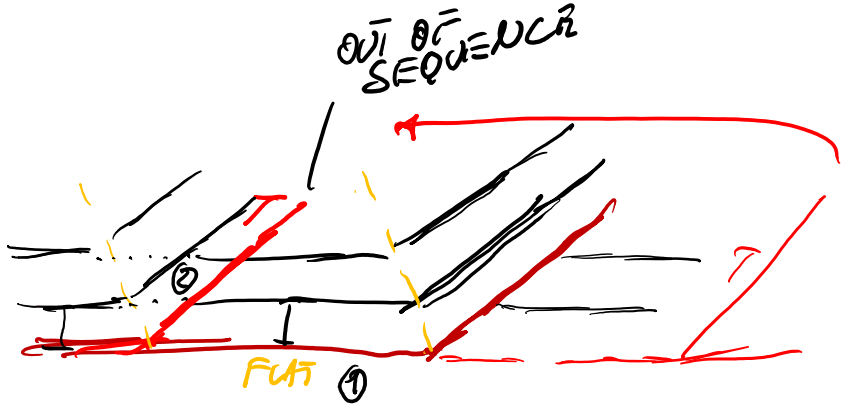
+ RECENTE

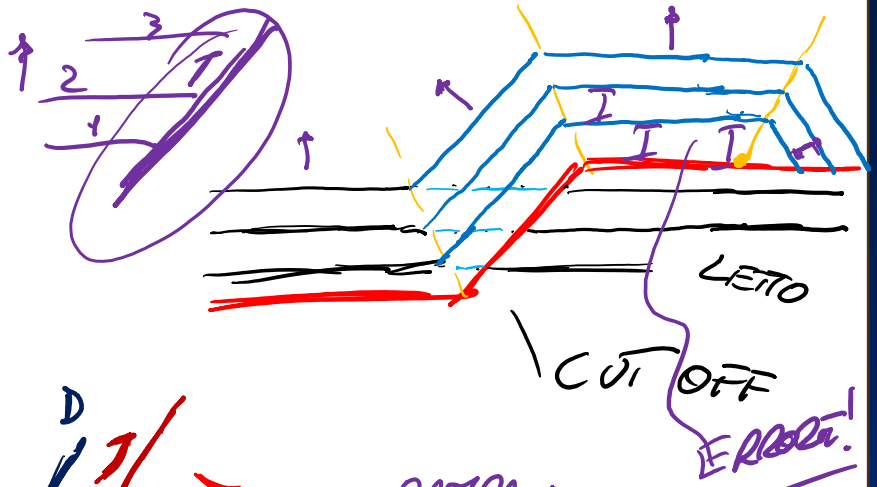
1 → 2 → 3 → 4

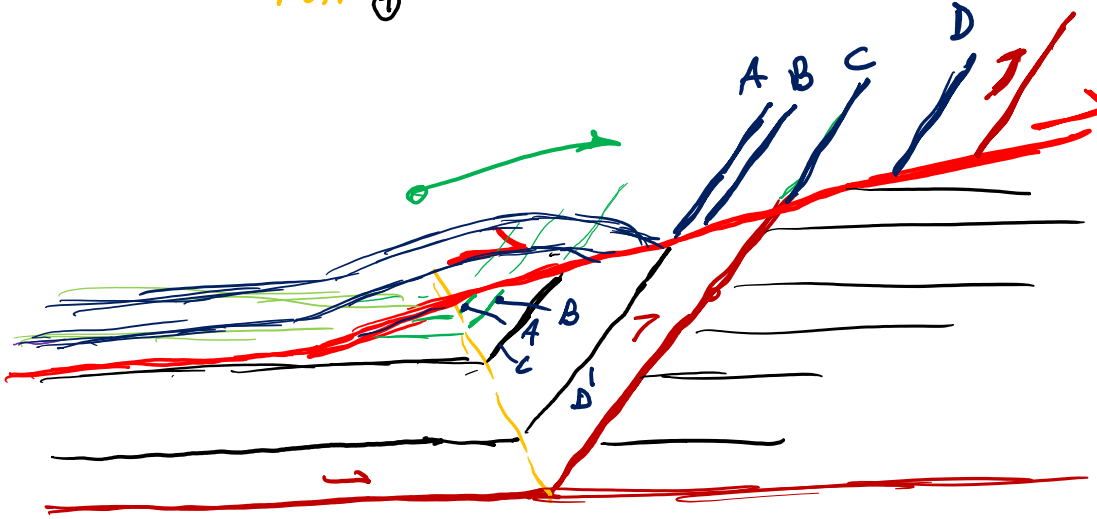
PIGGY-BACK "CLASSICA"

FUORI SEQUENZA

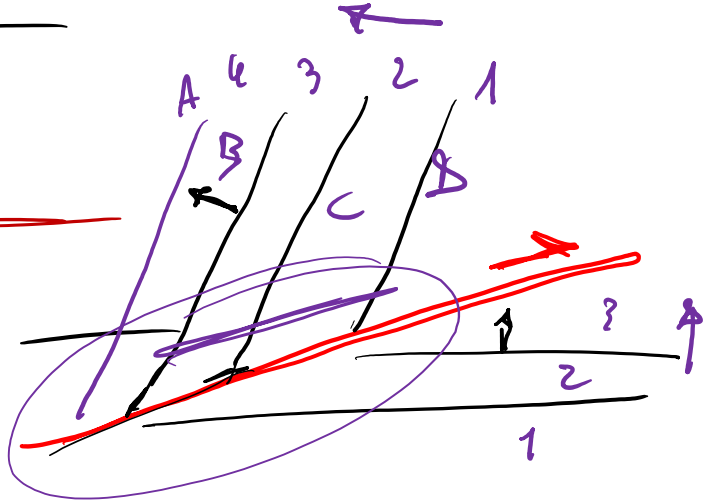








RAMPA DI LETTO OUT OF SEQUENCE



!! SBAGLIATA .. UNA FAGLIA .. NORMALE !!

DOWN OF SEQUENCE

Duplex nelle Rocky Mountains (Mt. Grandell and Lewis Thusts

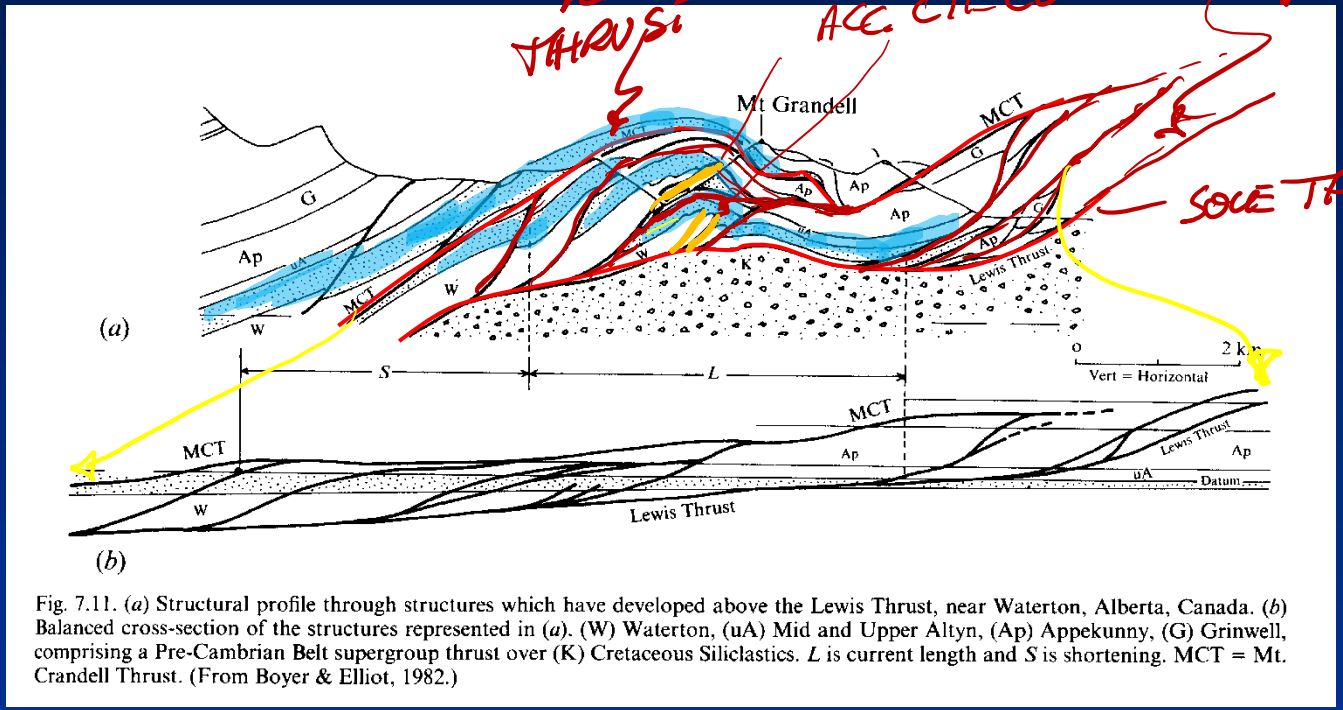
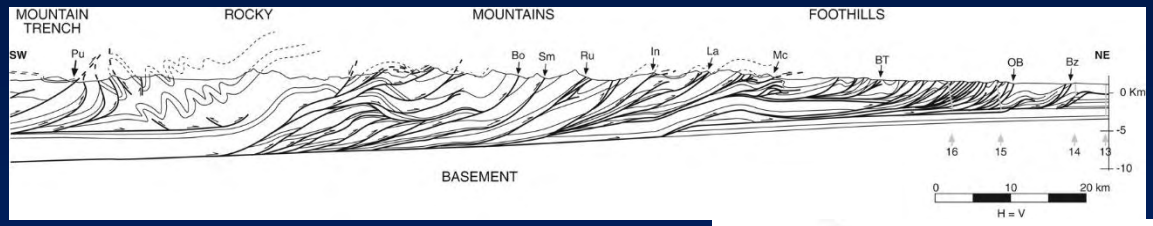
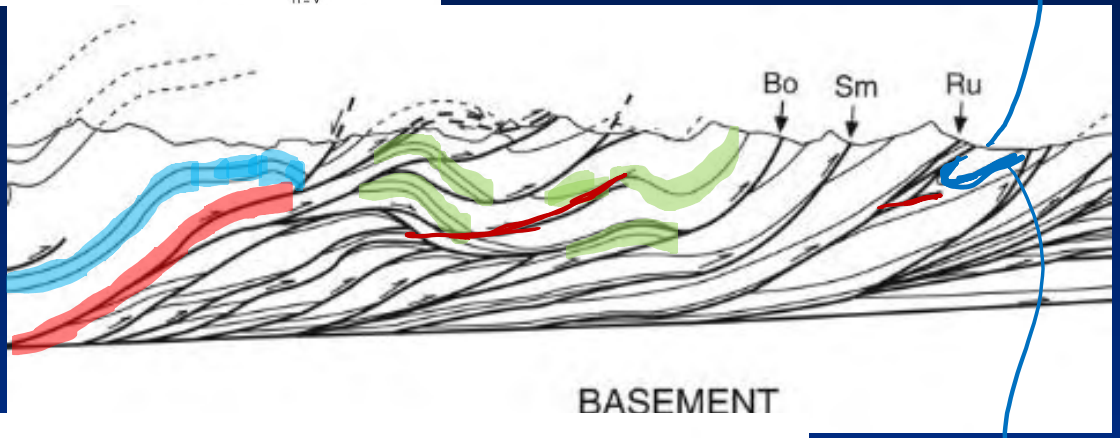


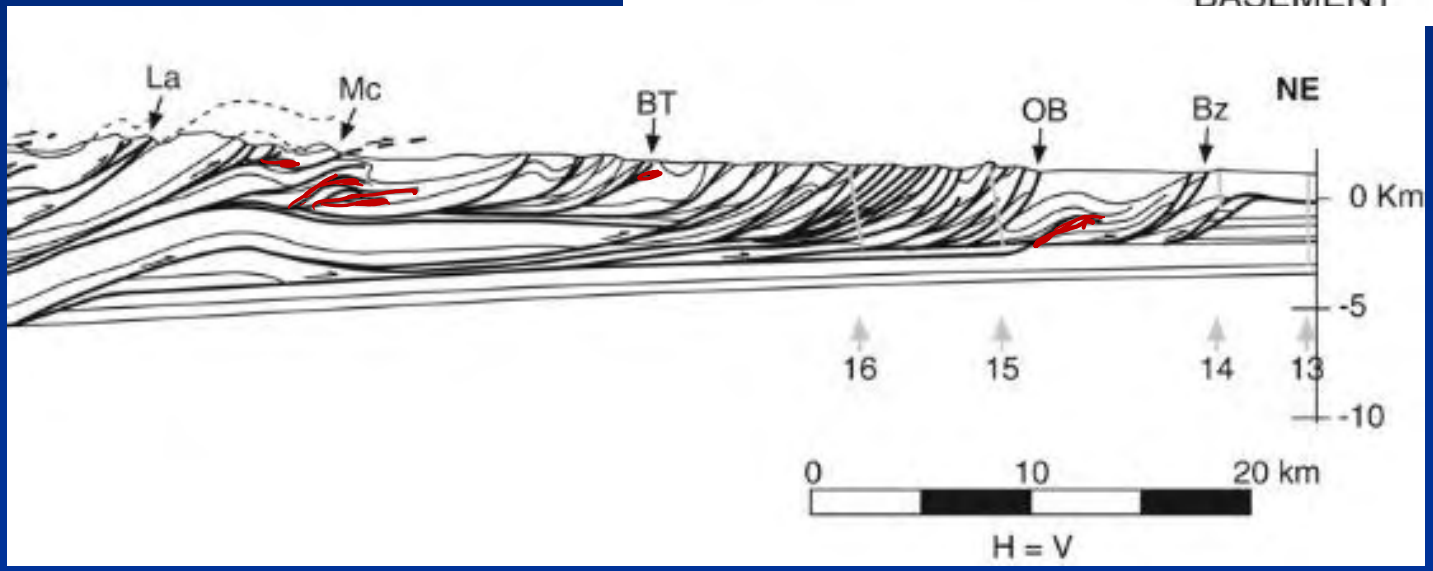
Fig. 7.11. (*a*) Structural profile through structures which have developed above the Lewis Thrust, near Waterton, Alberta, Canada. (*b*) Balanced cross-section of the structures represented in (*a*). (W) Waterton, (uA) Mid and Upper Altyn, (Ap) Appekunny, (G) Grinwell, comprising a Pre-Cambrian Belt 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



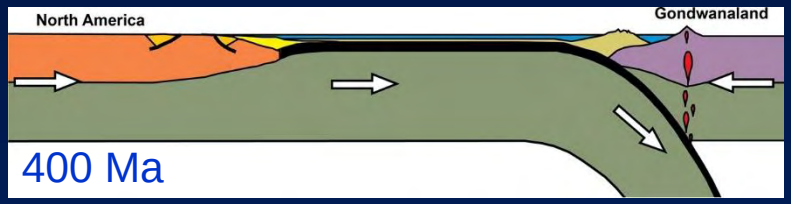


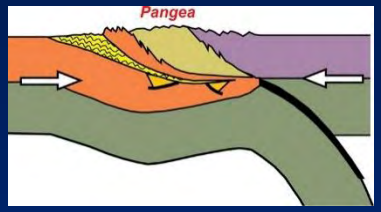


PIEGA NEL LETTO!!?

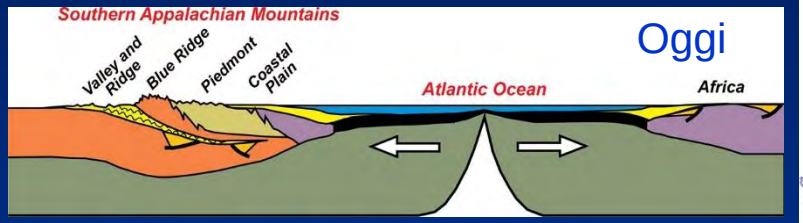
QUITE A FOLDED!

Pieghe, duplex e sovrascorrimenti: Appalachians

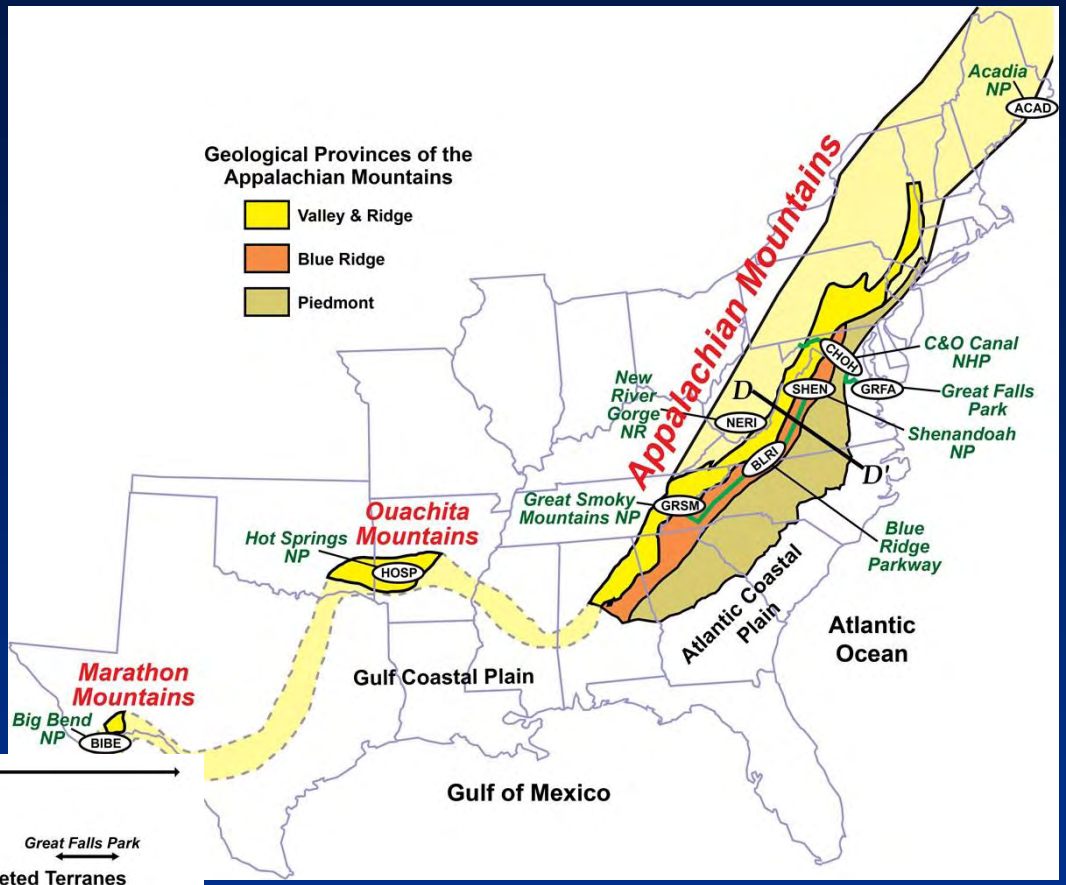




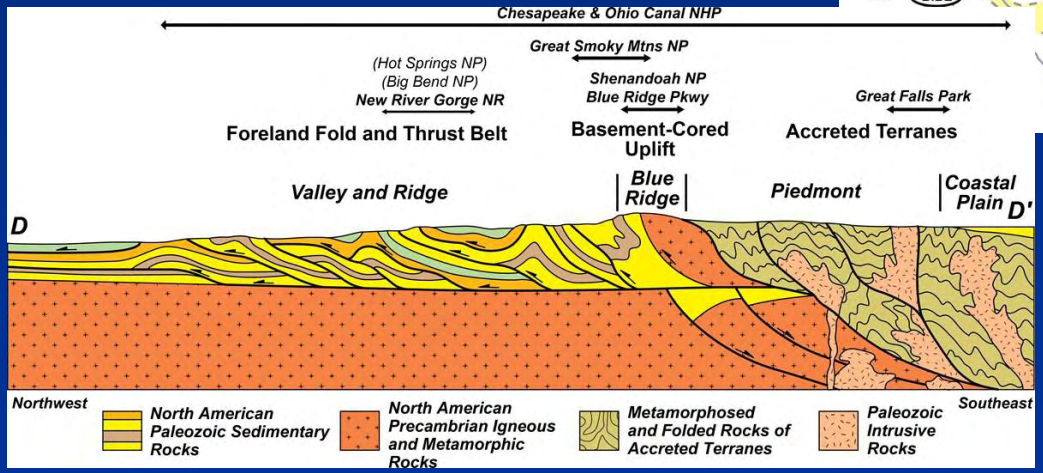
300 Ma



Da National Park Service, tratto da Marshak, 2001



Da National Park Service, tratto da Lillie, 2005

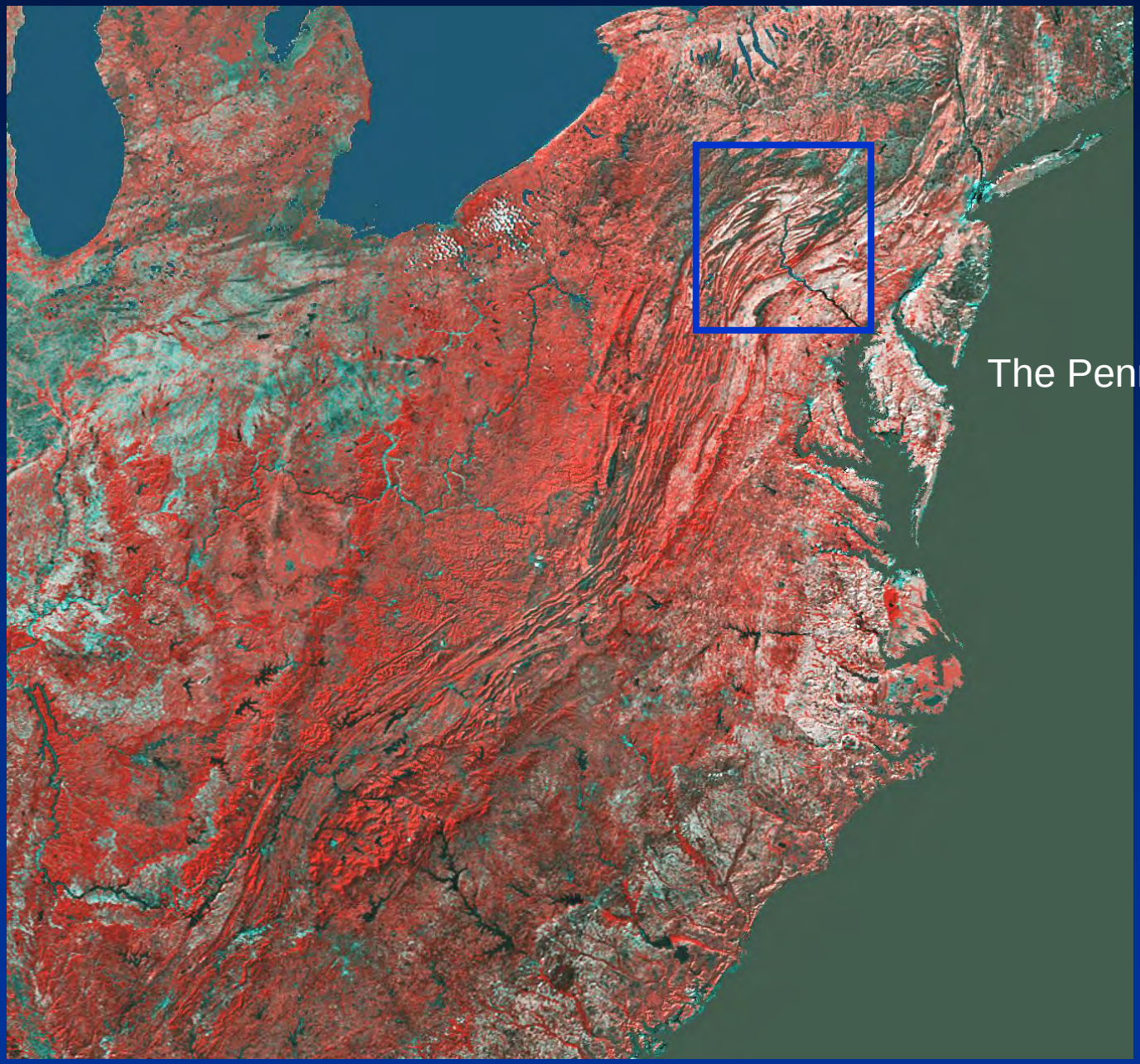


Da National Park Service, tratto da Lillie, 2005

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

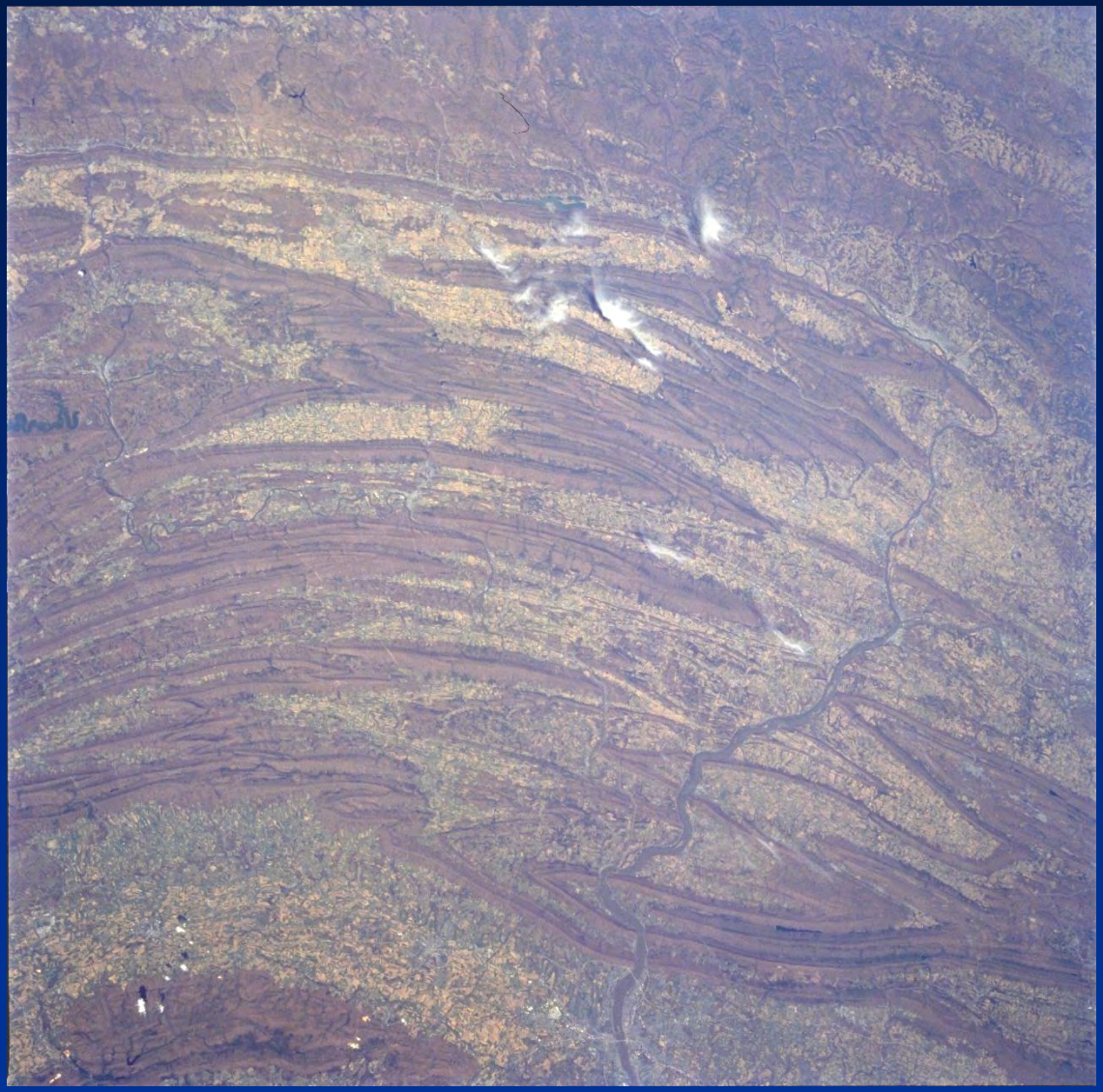


The Pennsylvania Salient

Da USGS
Mosaico dati satellitari AVHRR, falsi colori

Pieghe: Appalachians

Quale origine?



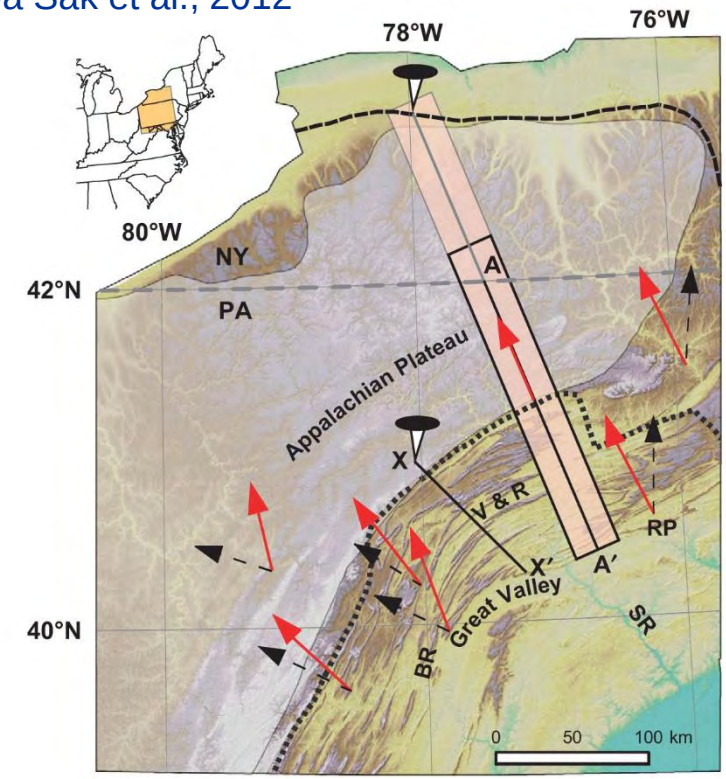
Da NASA-JPL Photo Directory

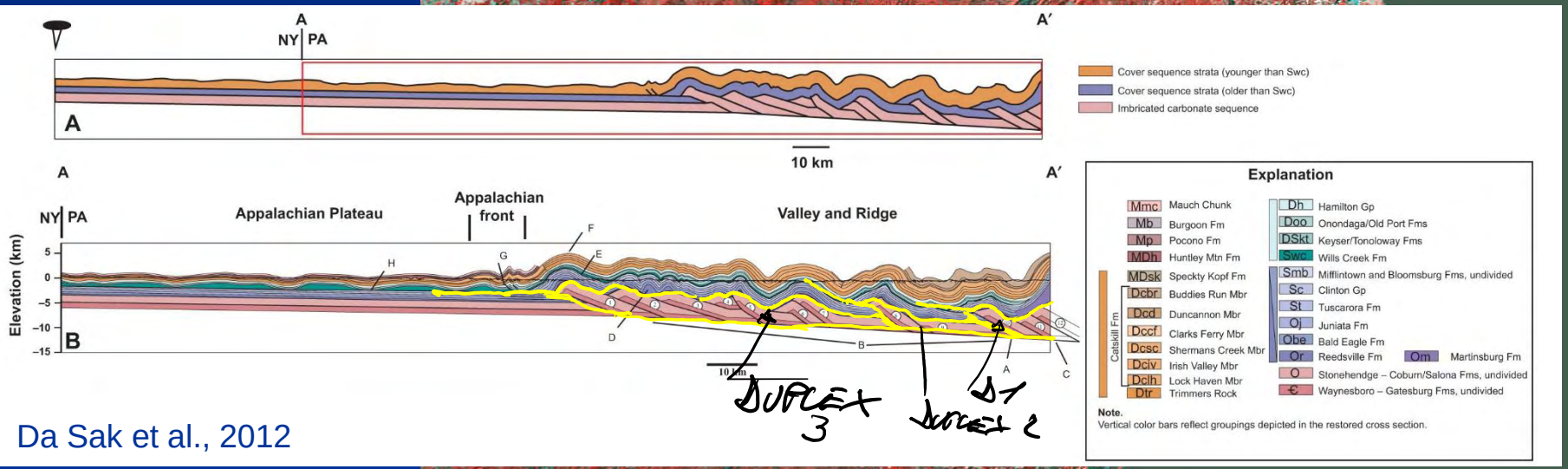
Pieghe: Appalachians

Quale origine?

Pieghe, duplex e sovrascorrimenti: Appalachians

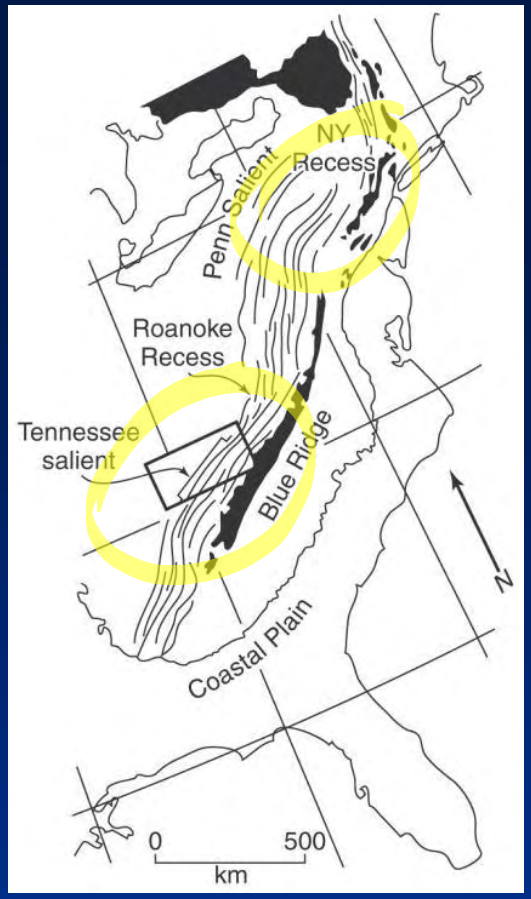
Da Sak et al., 2012

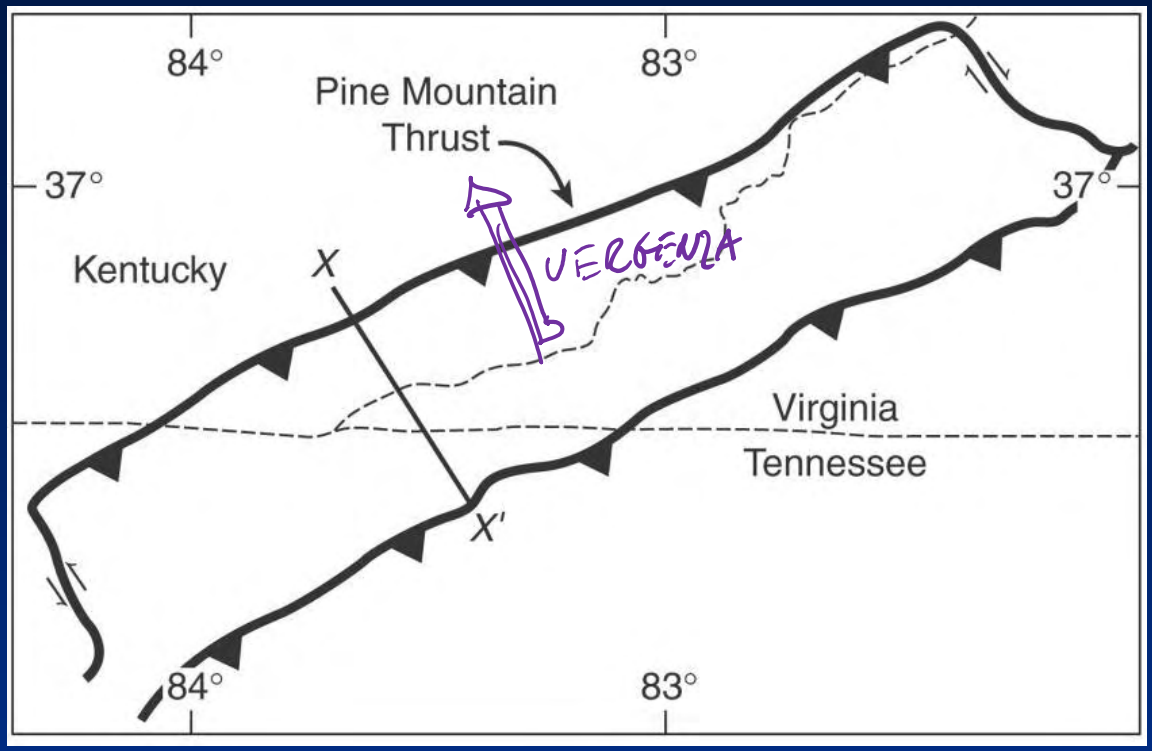




Da Sak et al., 2012

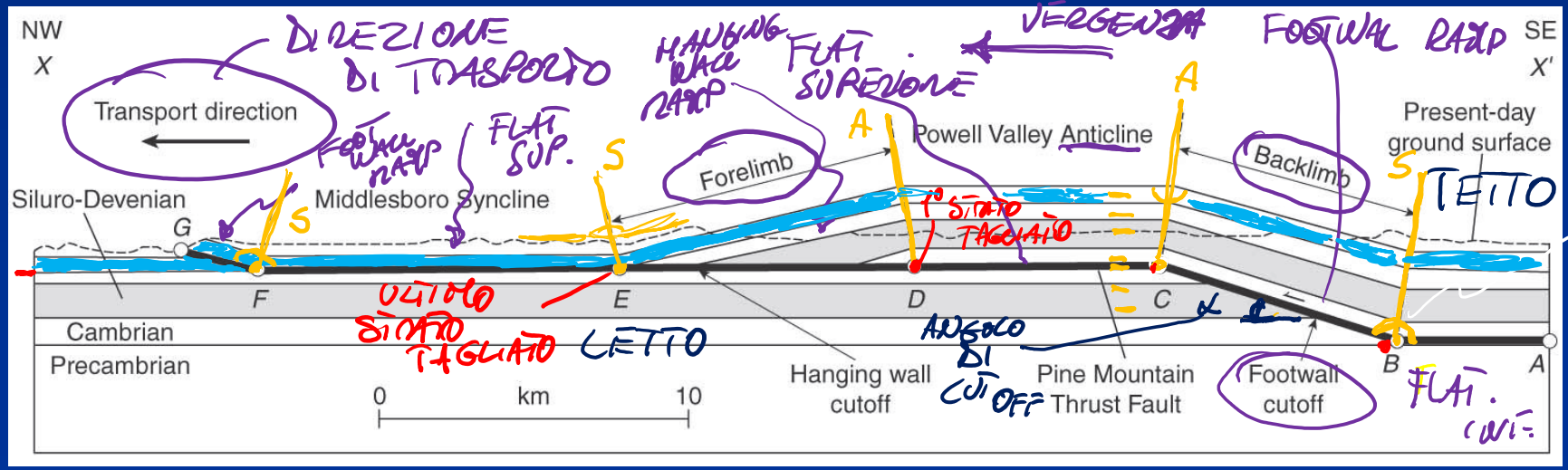
Pieghe e sovrascorrimenti: Appalachians



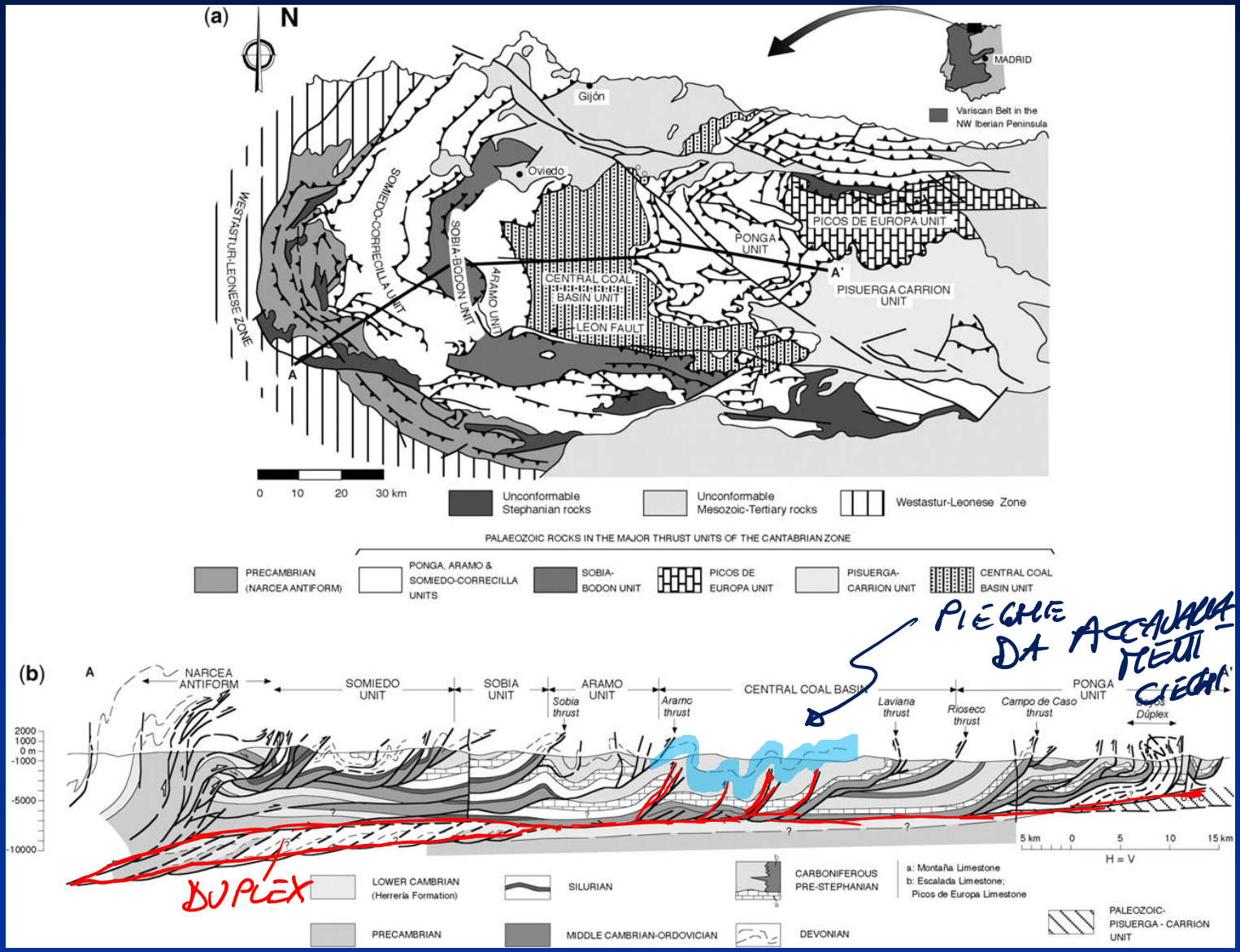


Da van der Pluim & Marshak, 2004

STAIR CASE THRUST



Pieghe, duplex e accavallamenti chiechi: i Pirenei



Da Poblet & Lisle, 2011

Accavallamenti e pieghe, altri termini

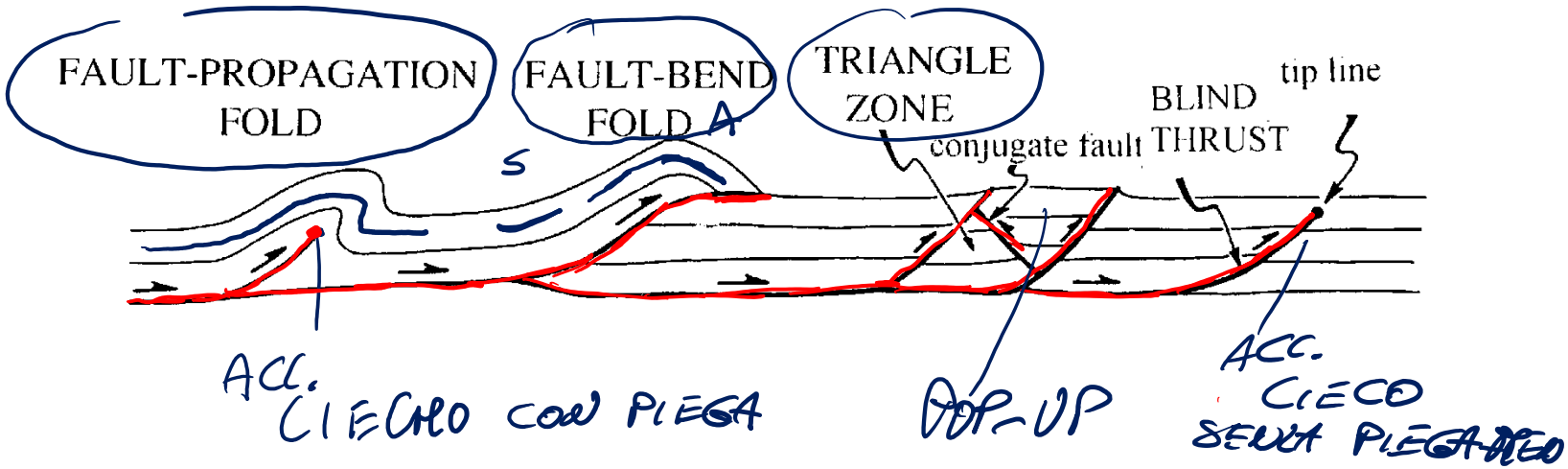


Figure 11 - Structures associated with the formation of reverse faults in thrust belts.

Da Merle, 1998

Pieghe e accavallamenti: tre tipi

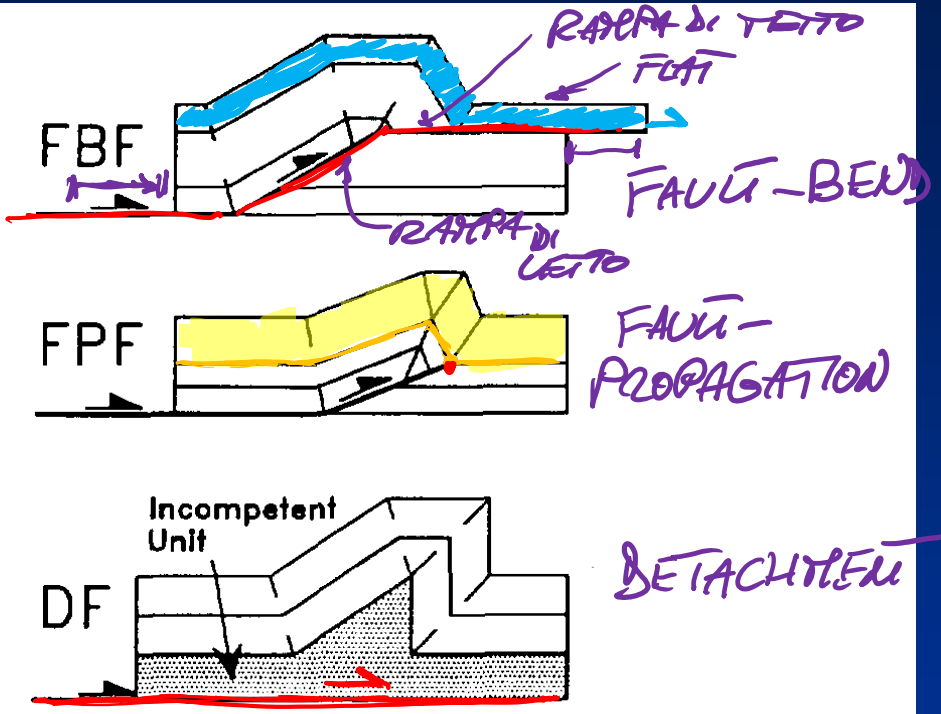


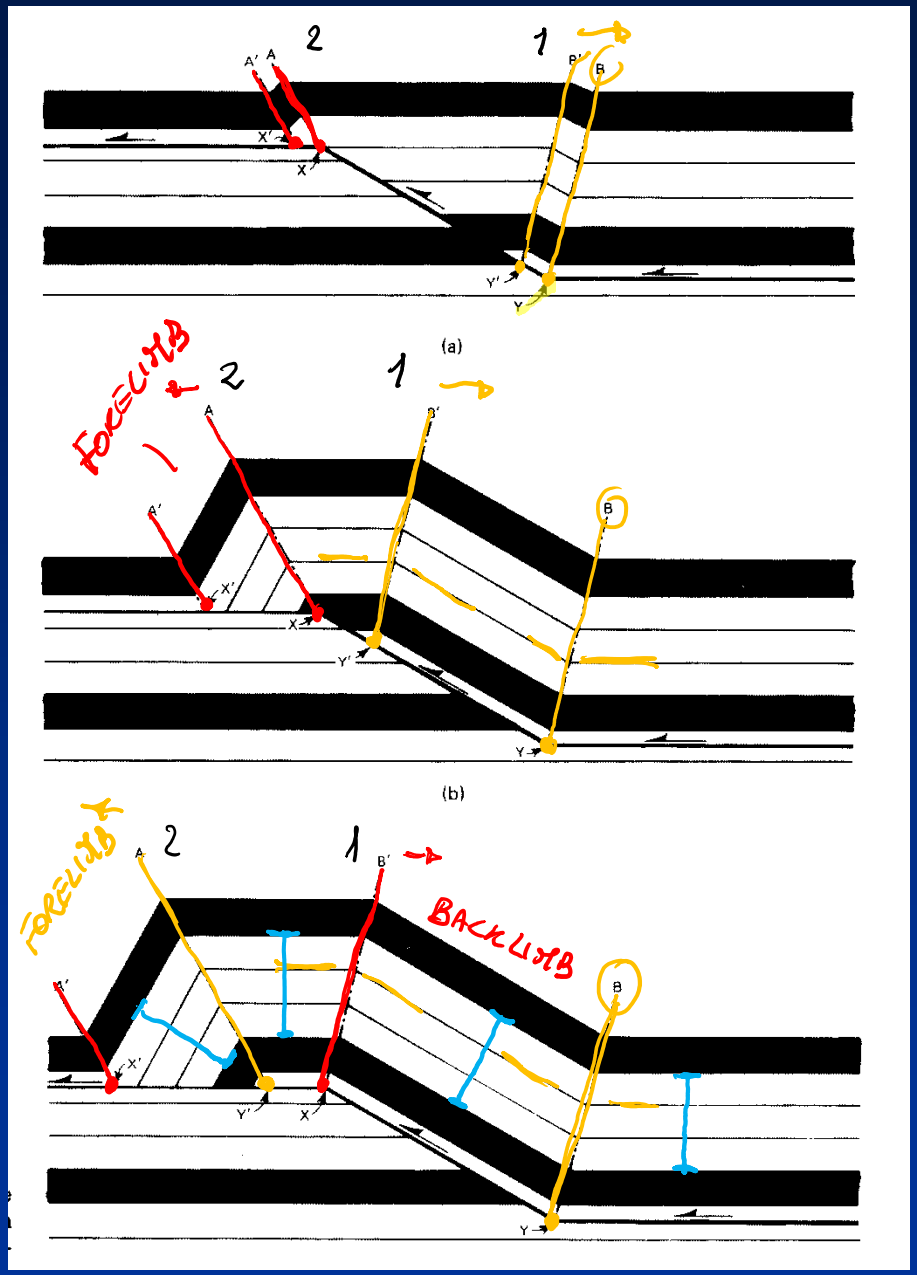
Fig. 1. Three major types of thrust-related folds in fold-and-thrust belts: fault-bend fold (FBF), fault-propagation fold (FPF), and detachment fold (DF).

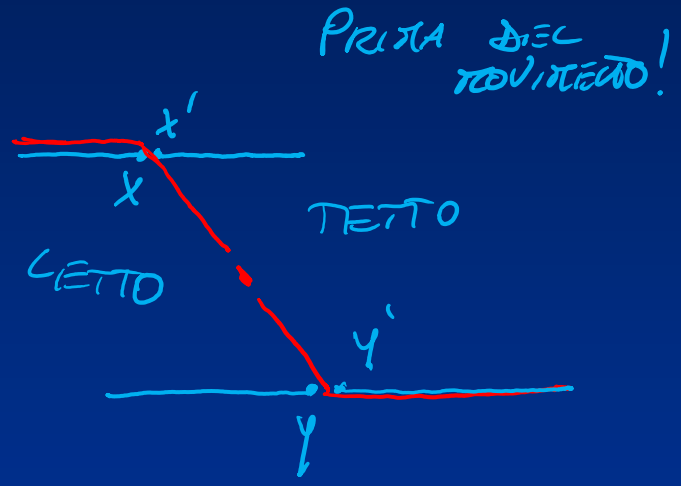
Da Homza and Wallace, 1995

"FAULT-(THRUST-) RELATED FOLDS"

"PIEGHE ASSOCIATE (DETERMINATE DA) AD ACCAVALLAMENTI E SOVRASCORRIMENTI."

Pieghe e accavallamenti: fault-bend folds





Da Suppe, 1985

Fault-propagation fold, Meilin anticline, Taiwan

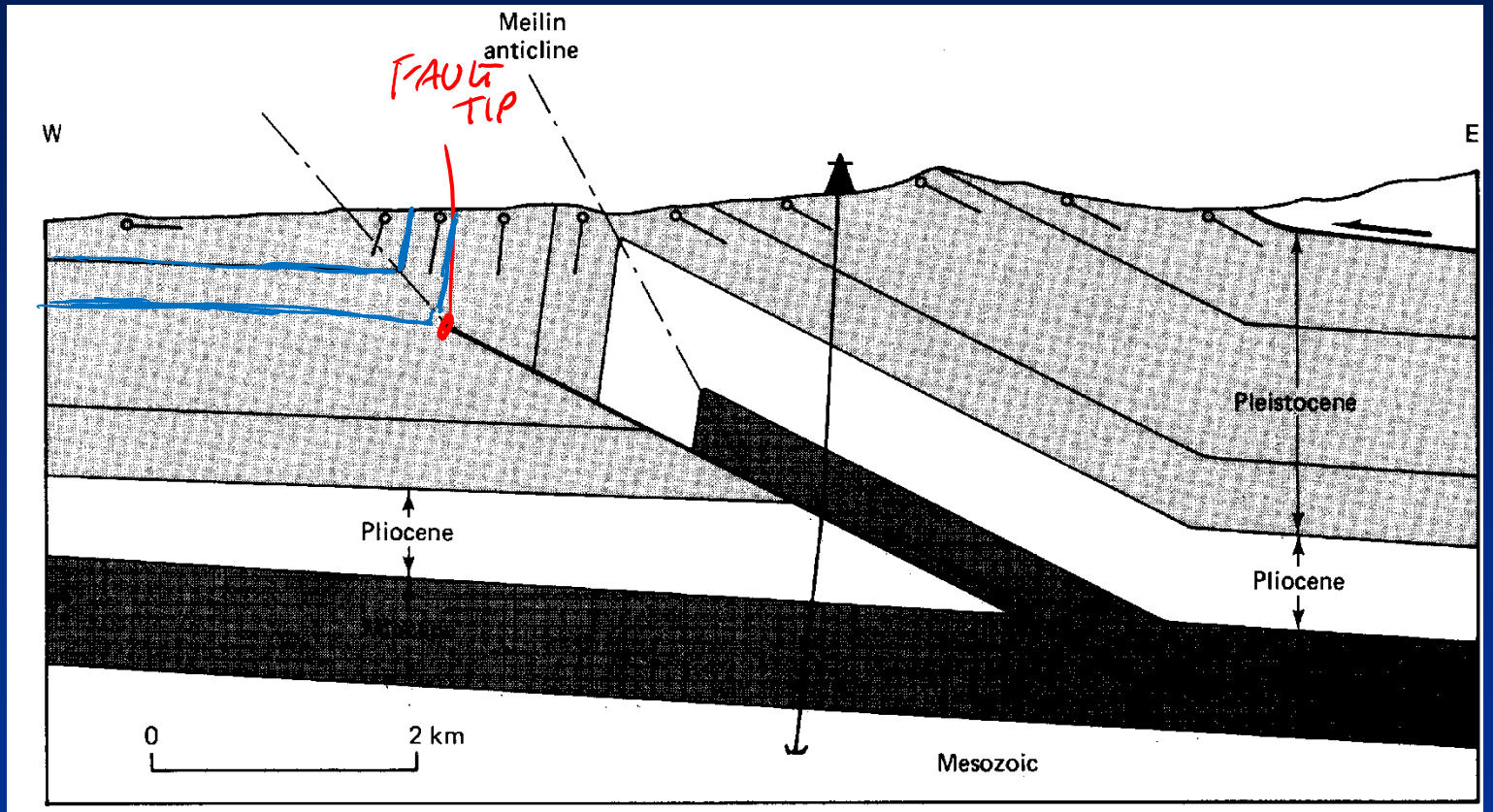
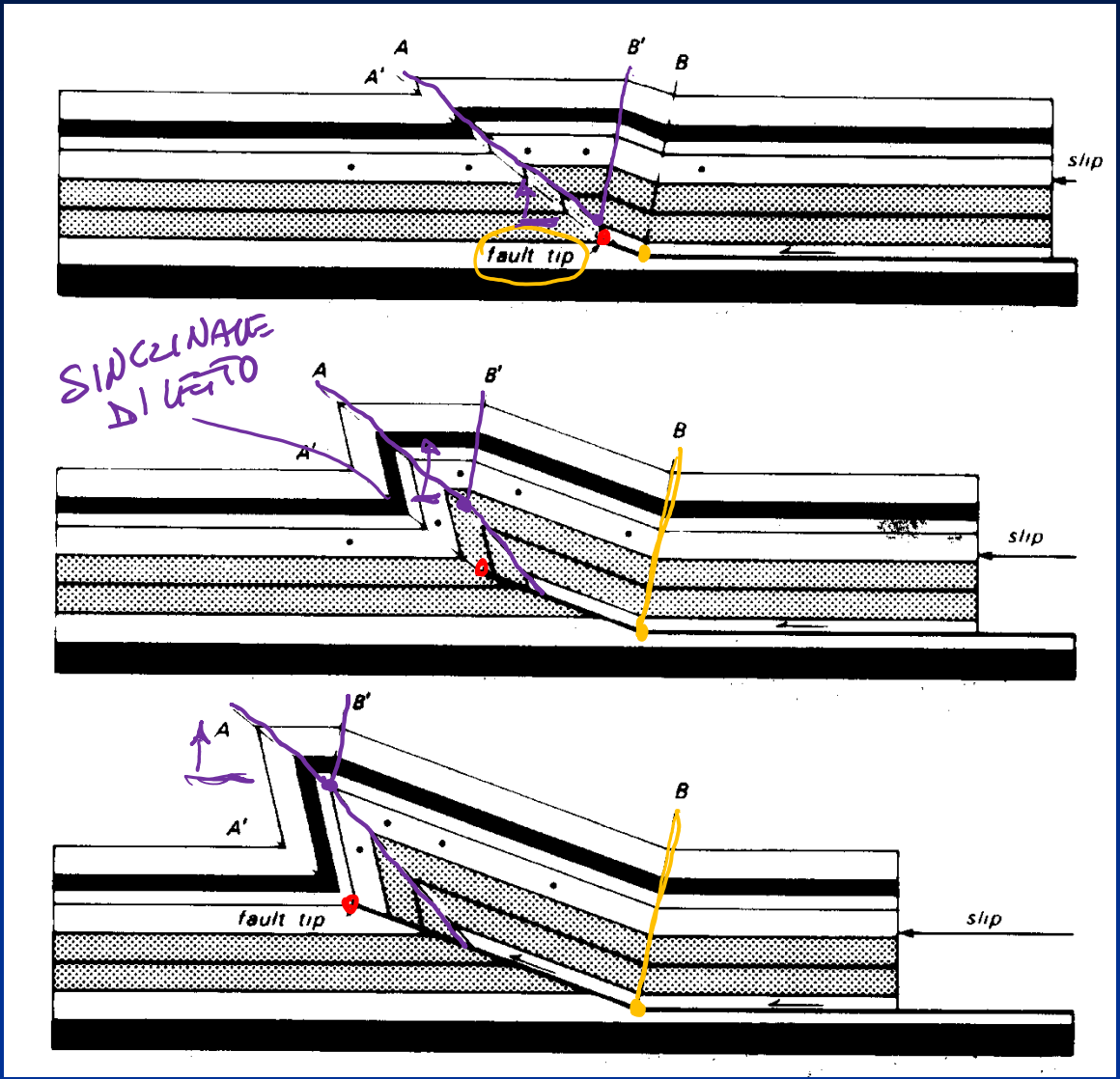


FIGURE 9–48 Cross section of a fault-propagation fold similar to the schematic diagram in Figure 9-47. Meilin anticline, western Taiwan.

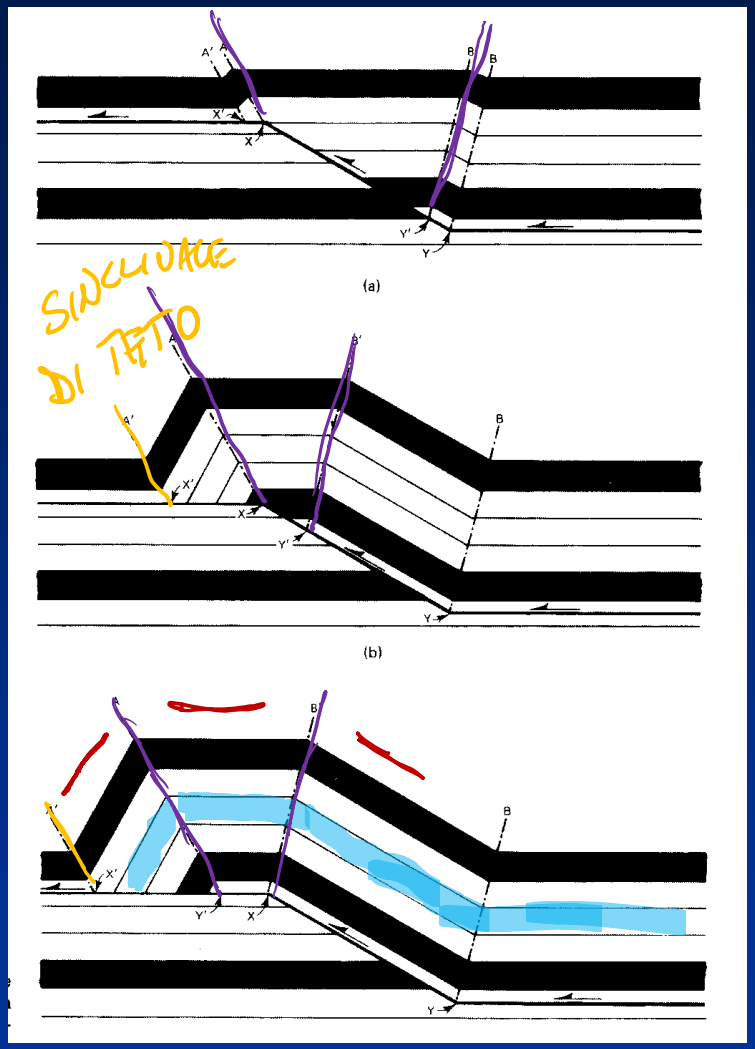
Da Suppe, 1985

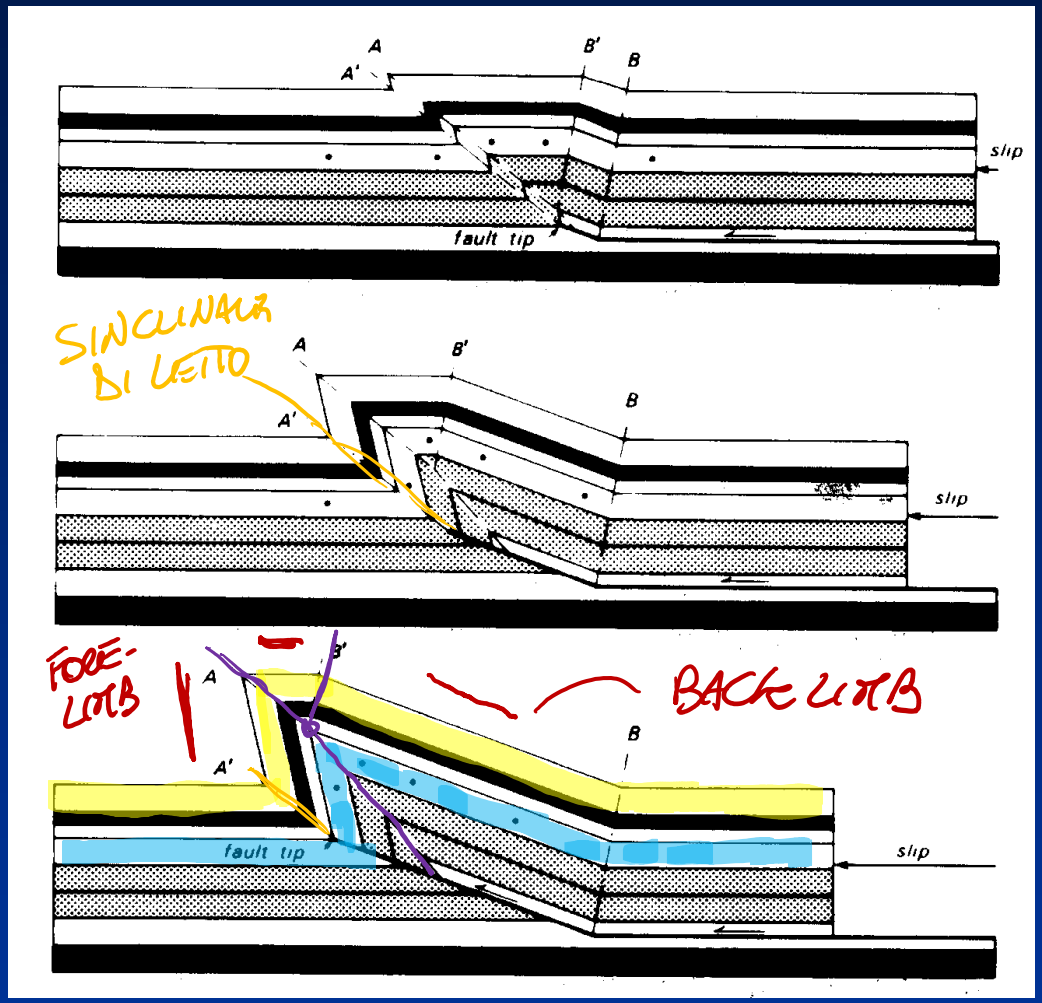


Pieghe e accavallamenti: Fault-propagation folds

Da Suppe, 1985

Pieghe e accavallamenti:
Fualt-bend fold Vs. fault-propagation folds





Da Suppe, 1985

Pieghe e accavallamenti: detachment folds

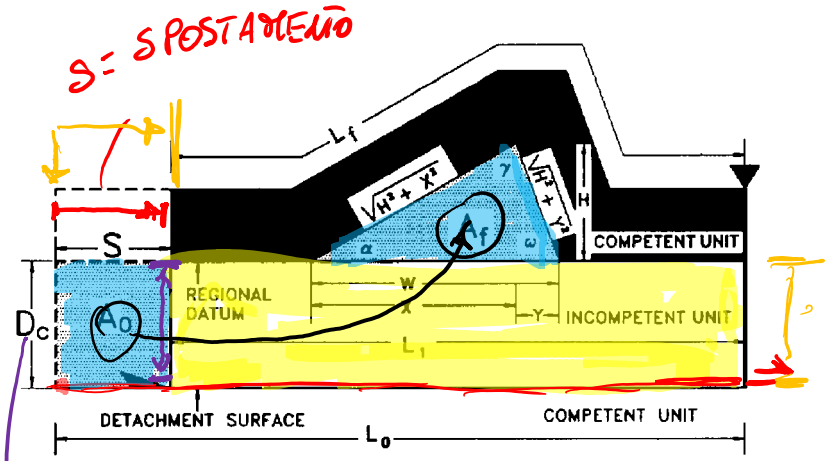
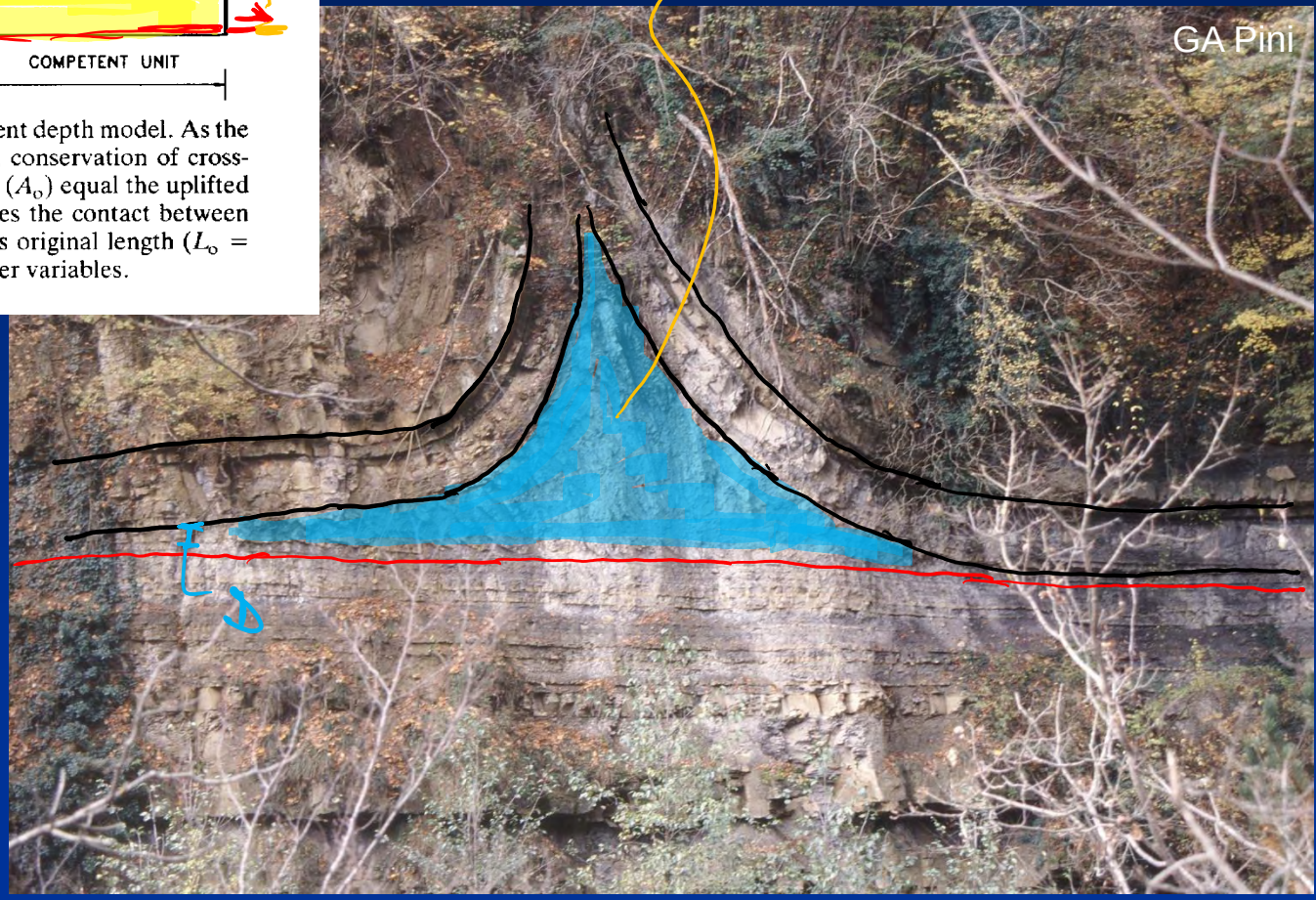


Fig. 2. Geometric basis for the fixed detachment depth model. As the incompetent unit is displaced and shortened, conservation of cross-sectional area requires that the displaced area (A_o) equal the uplifted area (A_f). Conservation of line-length requires the contact between competent and incompetent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

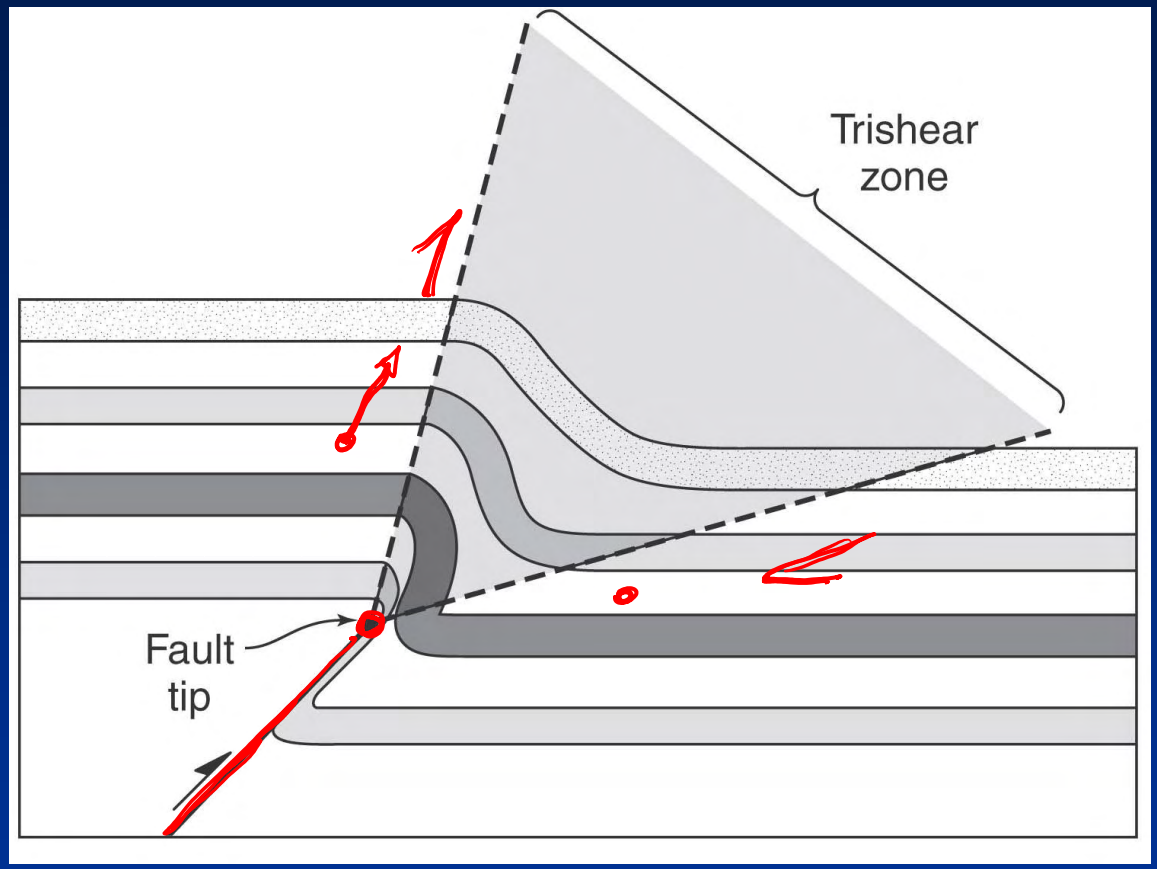
Da Homza and Wallace, 1995

$A_f / D = S$

D = SPESSORE LIVELLO INCOMPETENTE



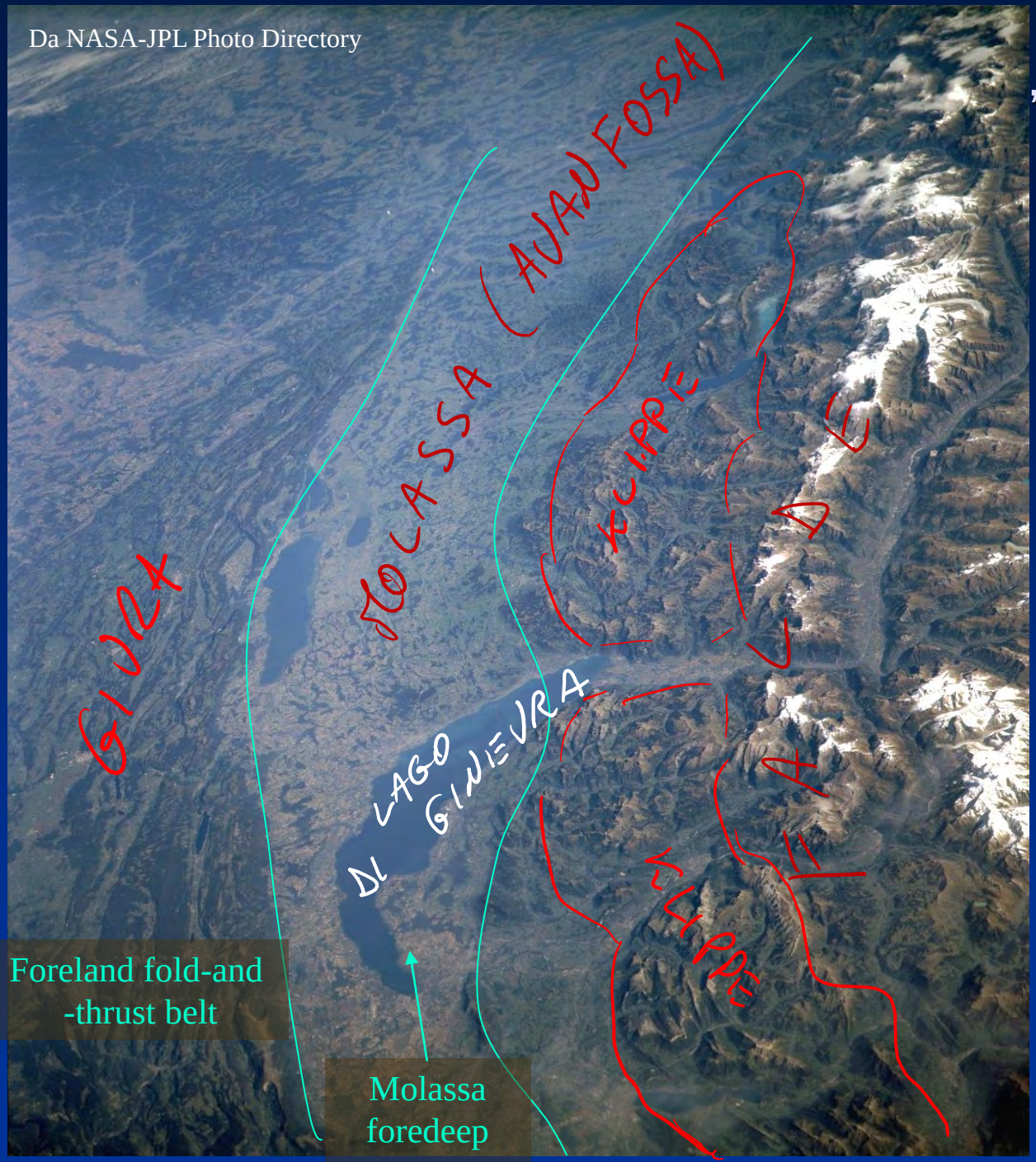
Fault-propagation fold: modello di trishear

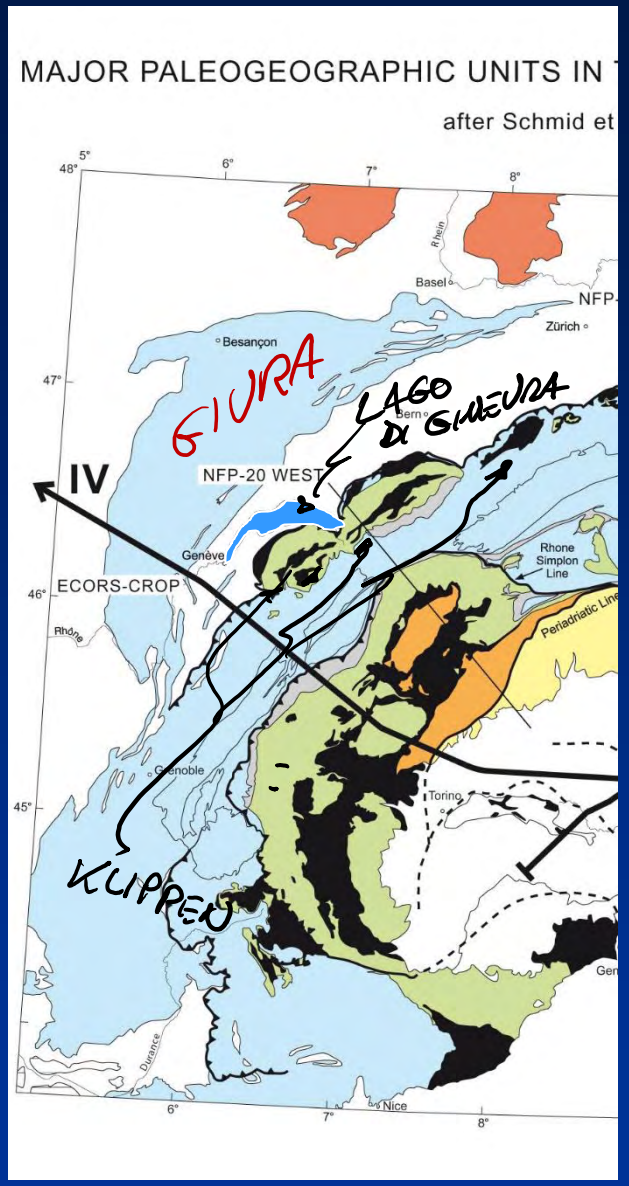


Da van der Pluim & Marshak, 2004

, la Molassa e il Giura

Da NASA-JPL Photo Directory





Da Schmid et al., 2004

Il Giura: tettonica di scollamento

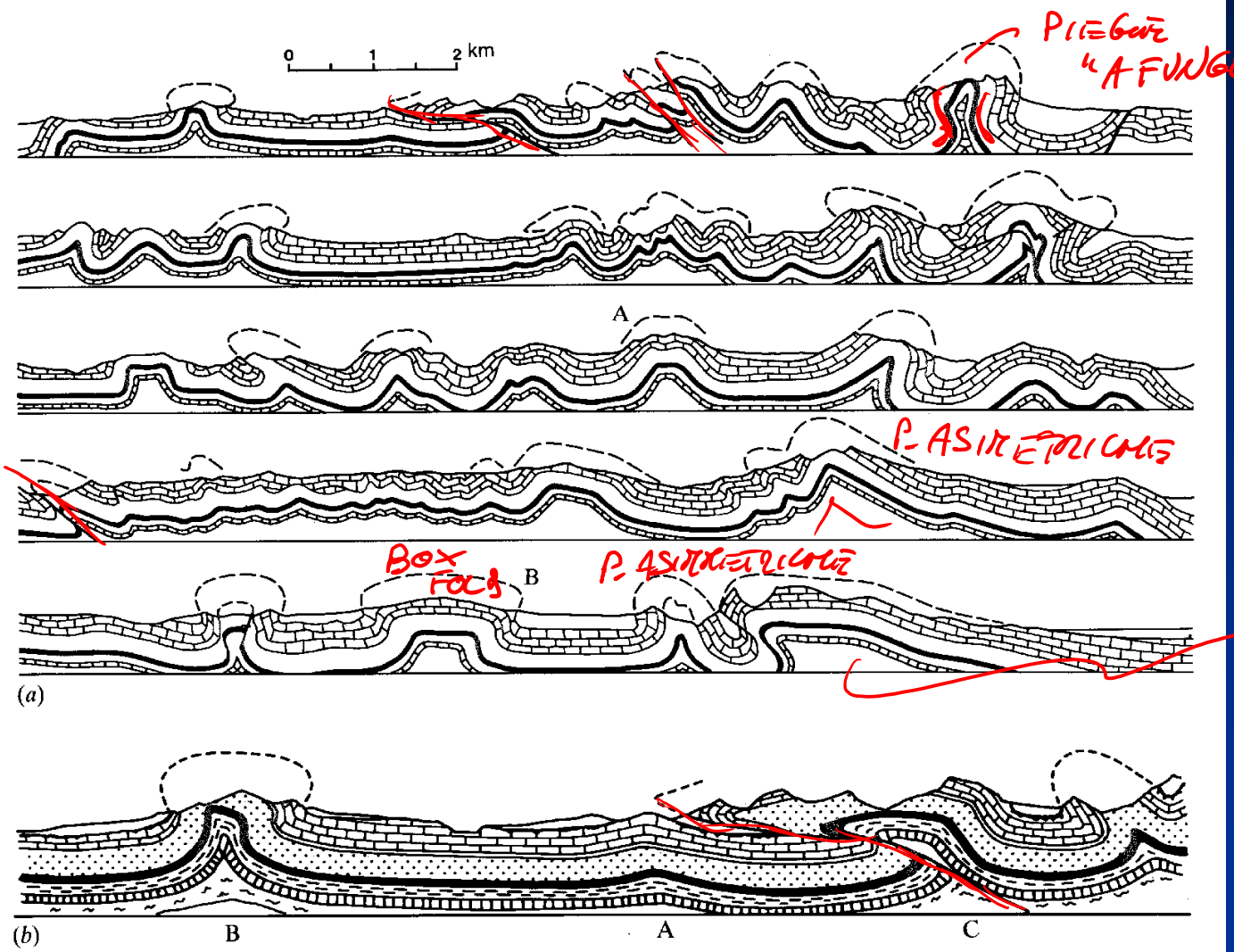
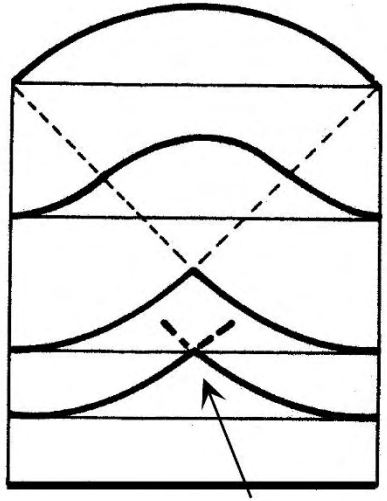
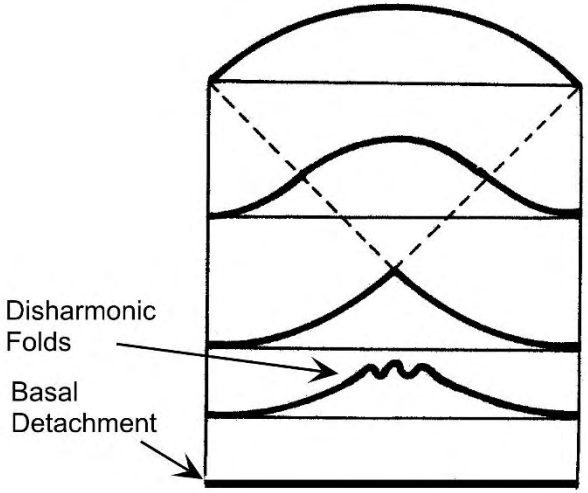


Fig. 13.2. (*a*) Profile sections of fold structures in the Jura Mountains after Heim (1921). (*b*) Detail of (*a*) showing three stages in the formation of a thrust from an originally symmetrical fold.

Da Price & Cosgrove, 1990





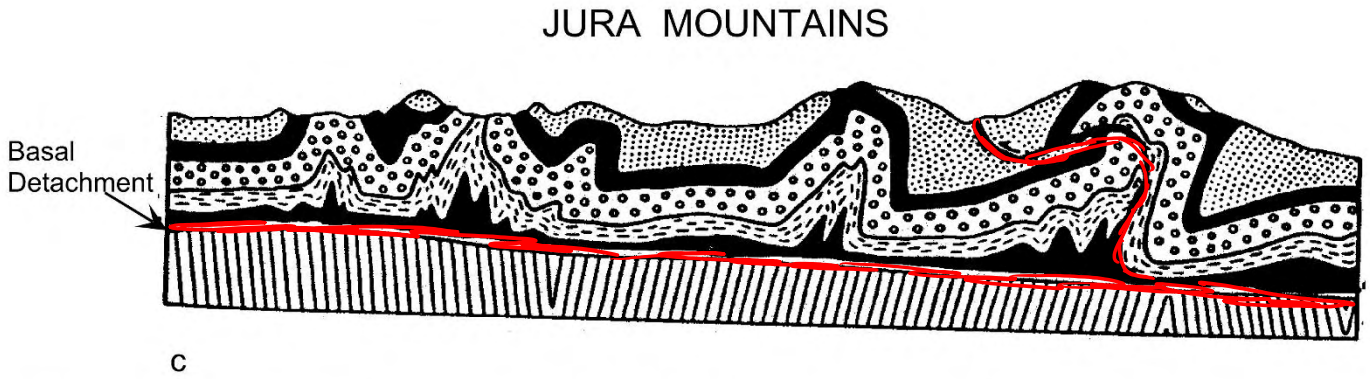


Fig. 1. Geometry of disharmonic detachment folds. a. Space problems in the core of a concentric fold resulting from convergence of radii of curvature to form cuspate geometry. b. Space problems resolved by the formation of disharmonic folds (modified from De Sitter, 1964). c. Example of disharmonic detachment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

Da Mitra, 2003

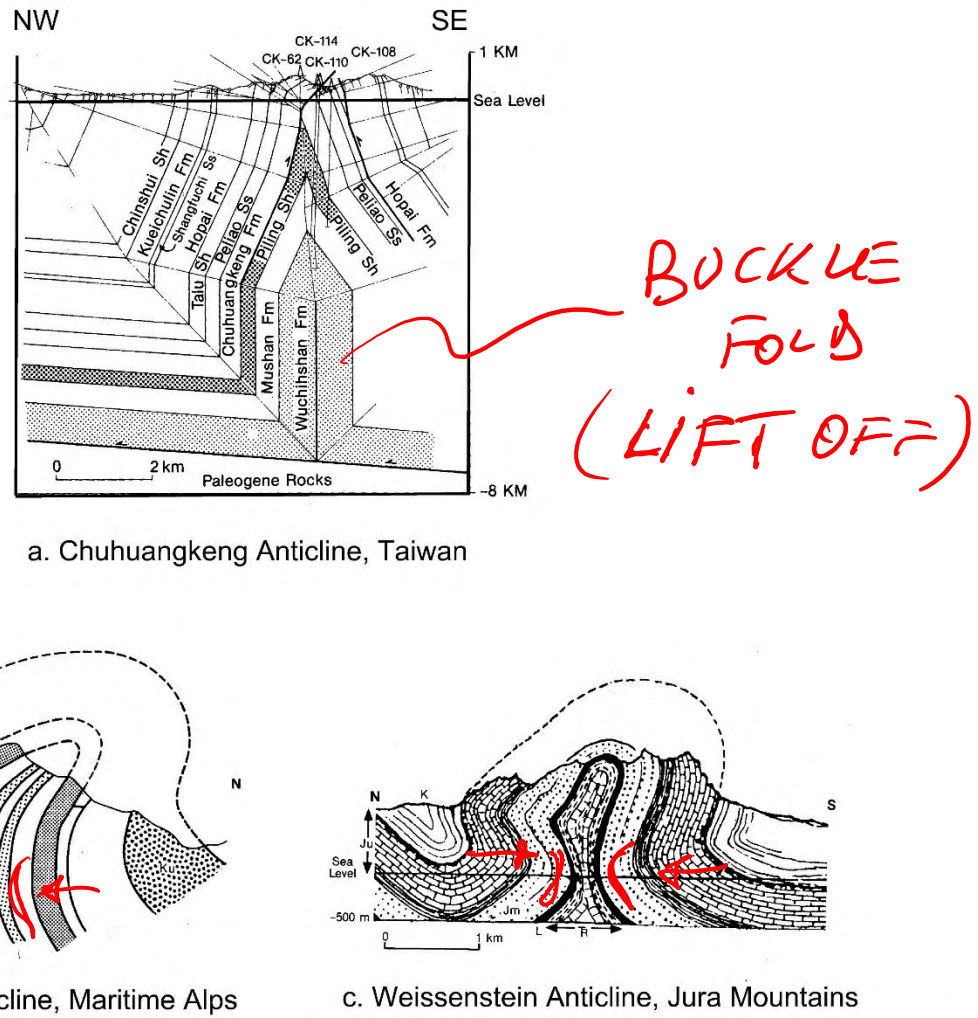
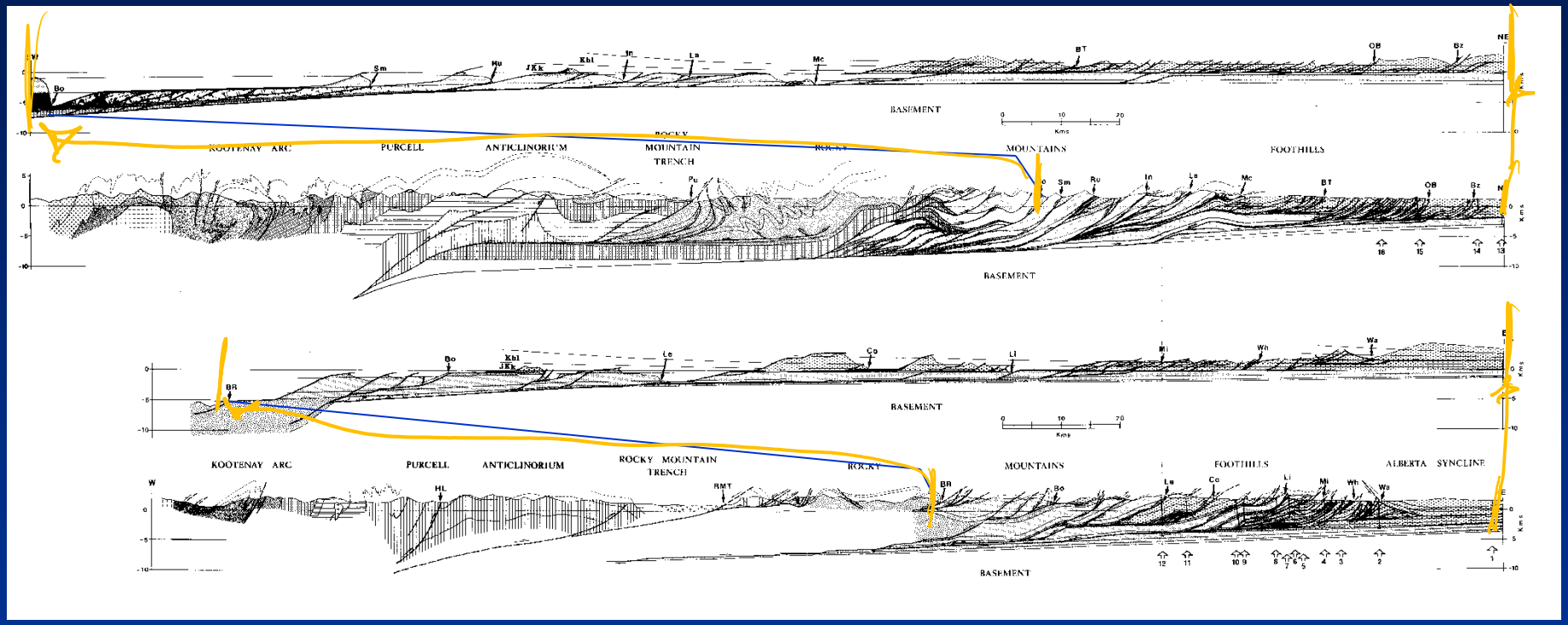


Fig. 2. Examples of lift-off folds from (a) the Taiwan belt (from Namson, 1981), (b) the Maritime Alps (Goguel, 1962), and (c) the Jura Mountains (Buxtorf, 1916).

Da Mitra, 2003

Retrodeformazione delle catene, Rocky Mountains



Da Price, 1981