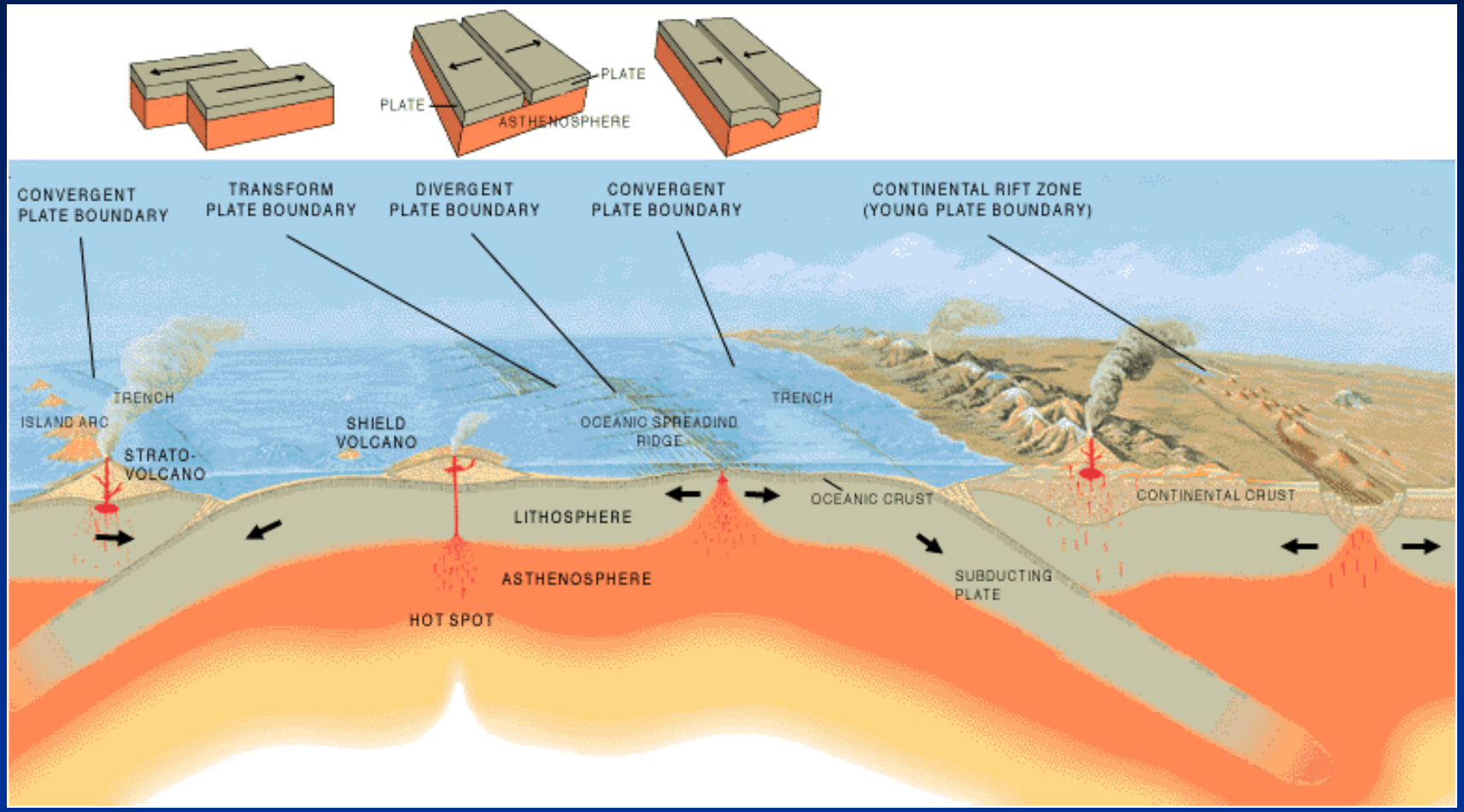
Tettonica a zolle, il sistema e i tipi di margini di placche



Da "The dinamic Earth" in USGS Web Site

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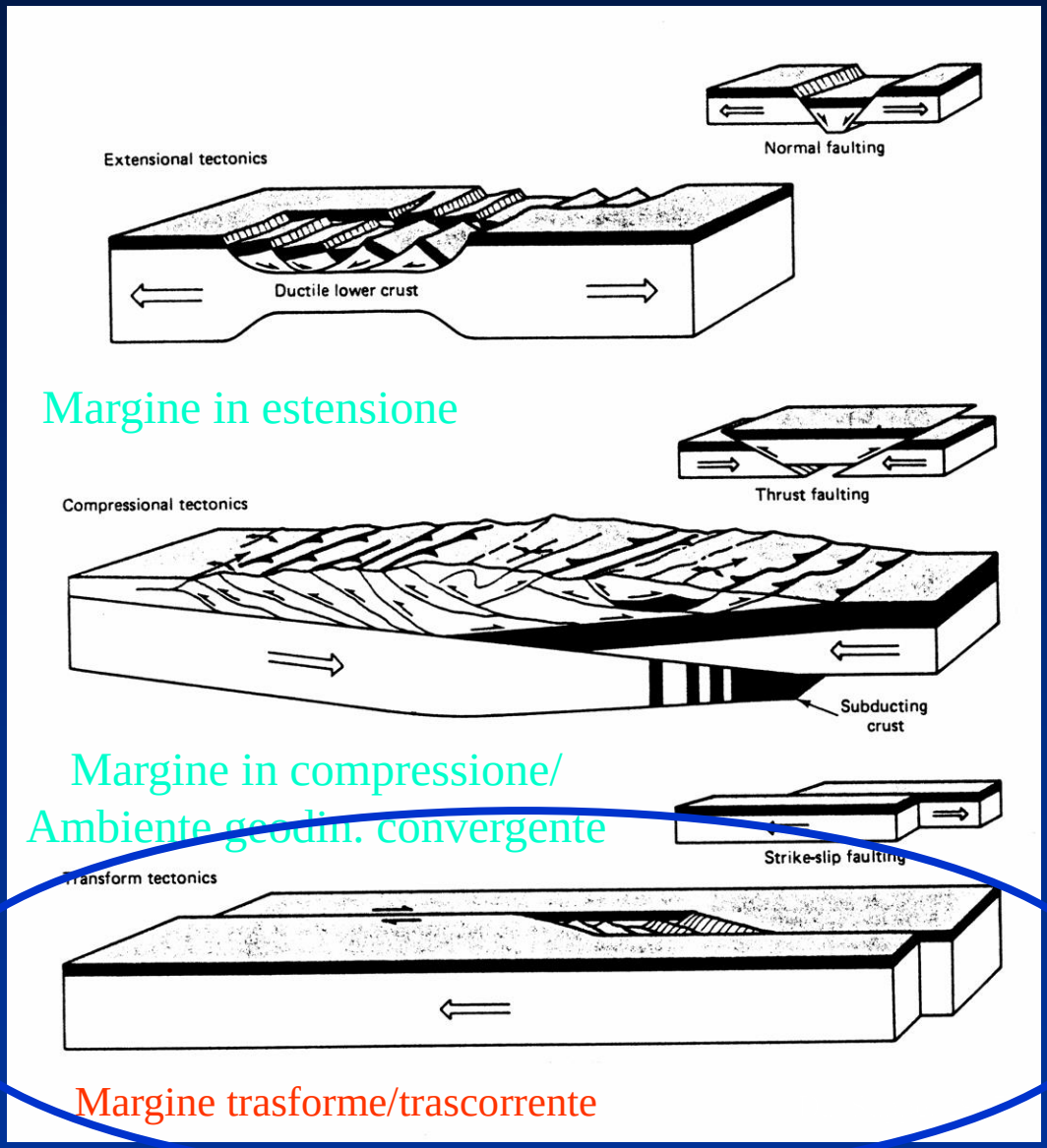
Tipo di margini di placca e ambienti geodinamici

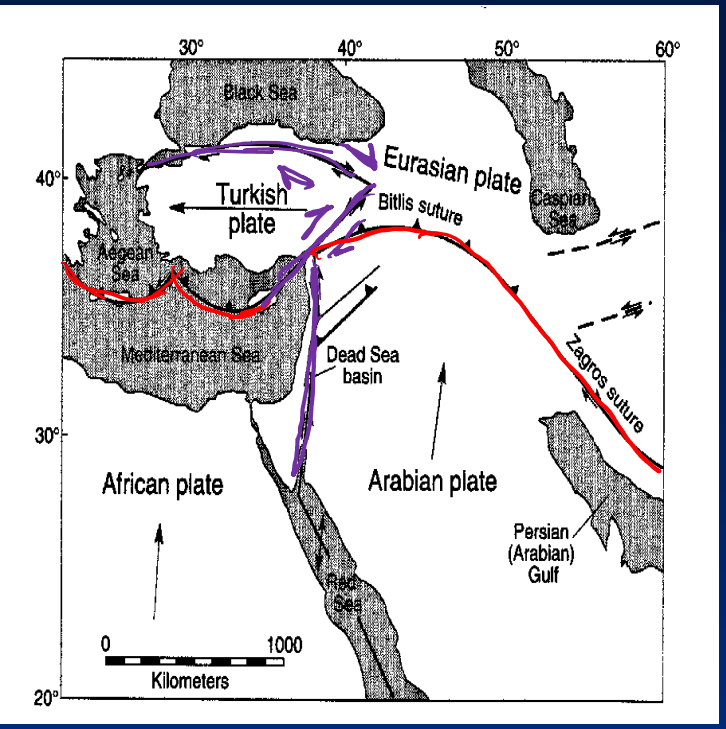


Margine in estensione

Margine in compressione/
Ambiente geodin. convergente

Margine trasforme/trascorrente

Da Price & Cosgrove, 1990



Margini in trascorrenza

Ambienti geodinamici in trascorrenza;

tettonica di trascorrenza e trasforme

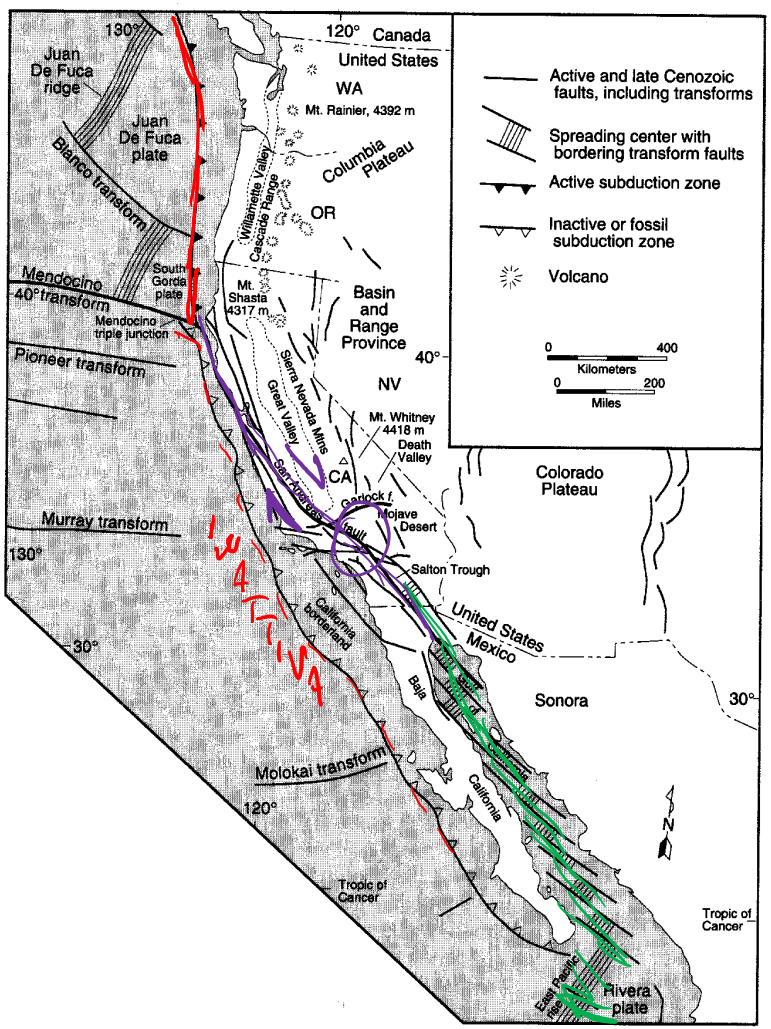
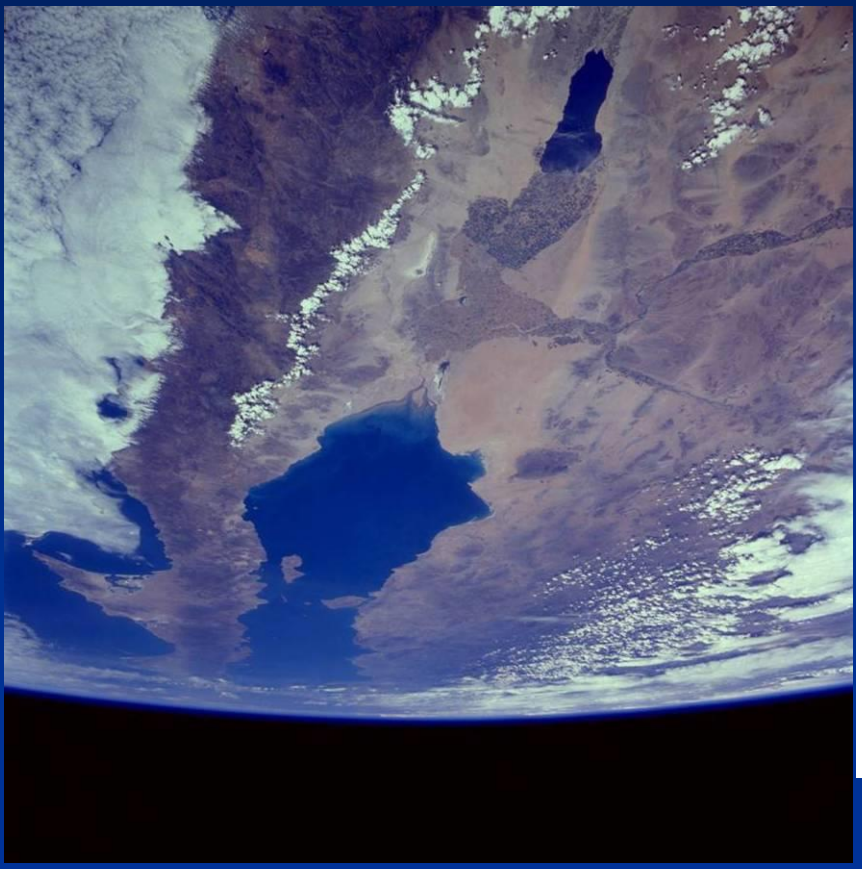


FIGURE 12–12
San Andreas and related fault systems in California, northern Mexico, and in the adjacent Pacific Ocean. (After J. C. Crowell, 1987, *Episodes*, v. 110.)



Da Earth from Space, NASA (eol.jsc.nasa.gov)

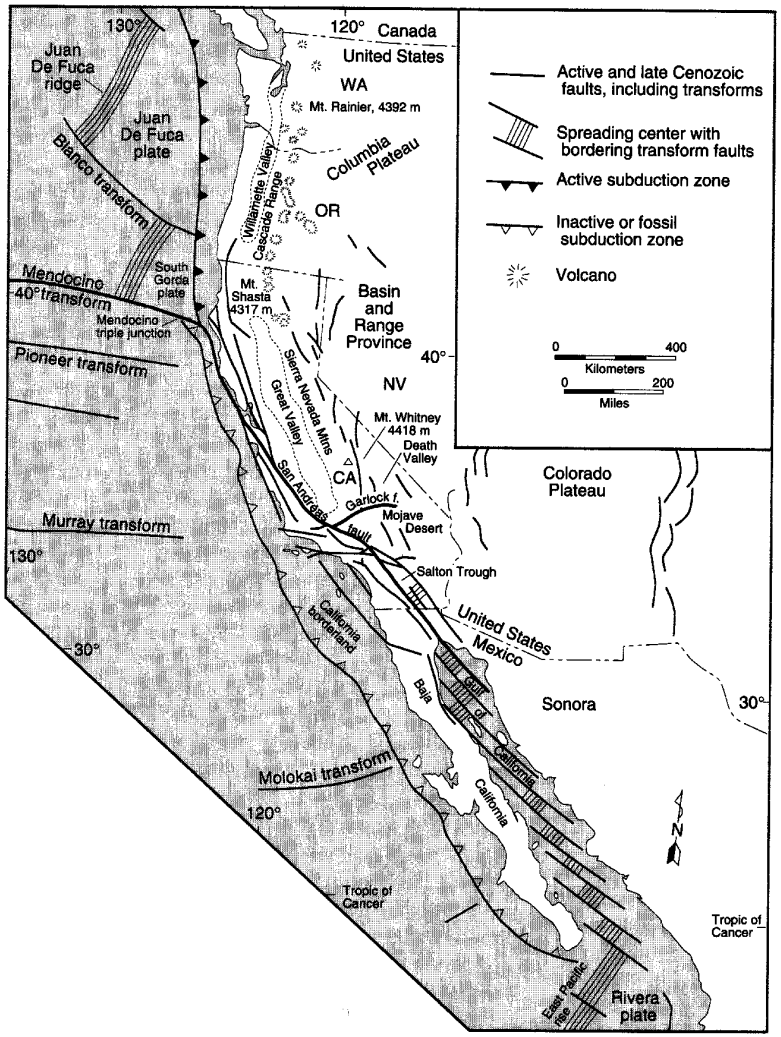
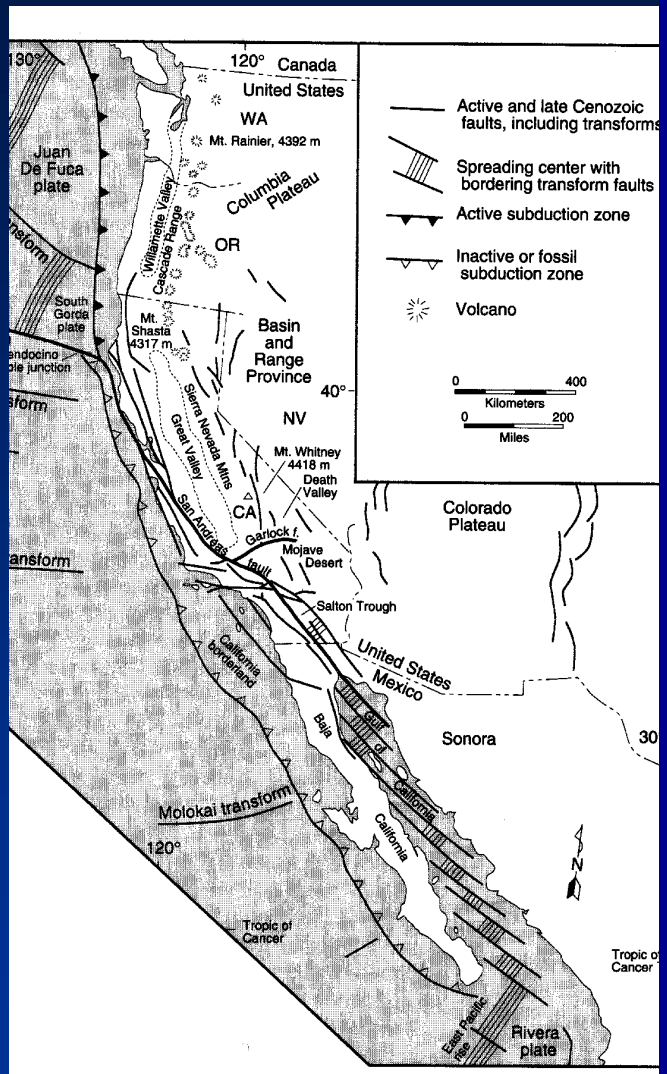


FIGURE 12–12
San Andreas and related fault systems in California, northern Mexico, and in the adjacent Pacific Ocean. (After J. C. Crowell, 1987, *Episodes,* v. 110.)

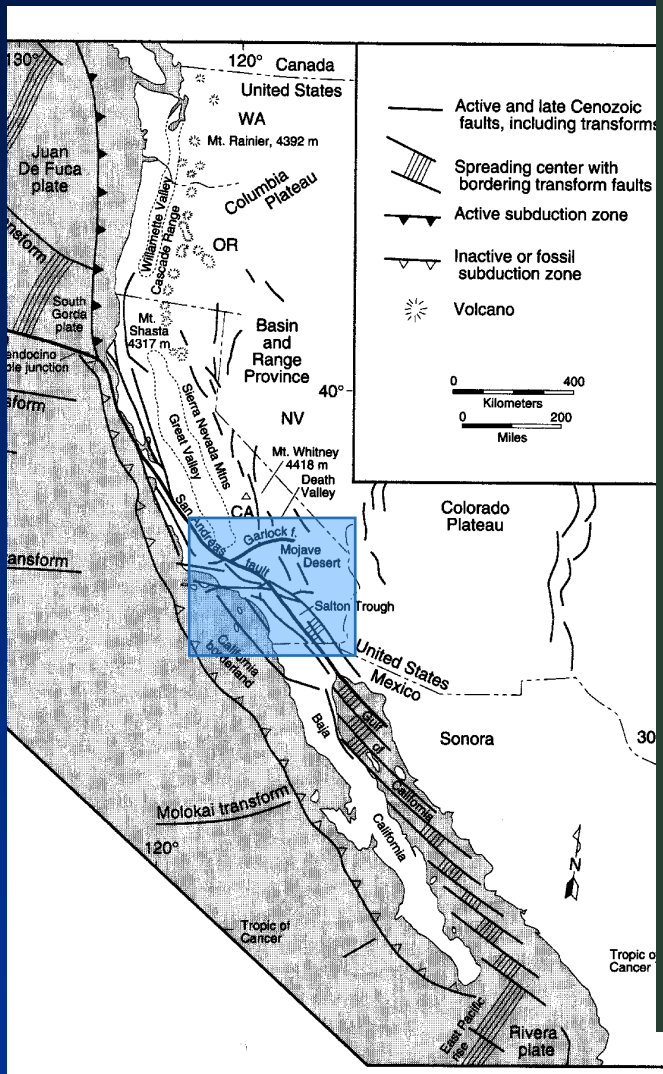
Da Hatcher, 1995

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



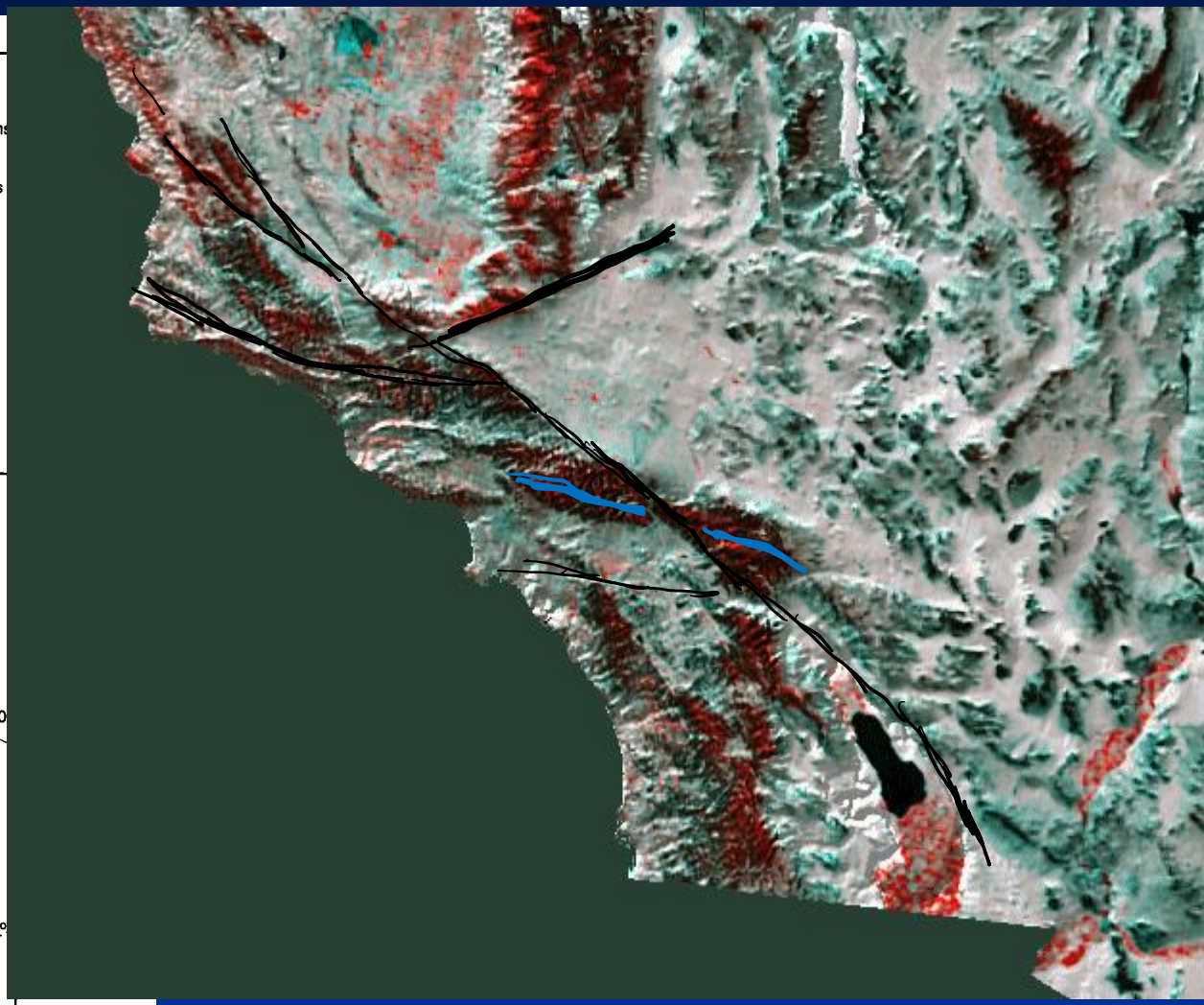
systems in California, northern Mexico, and in the adjacent Pacific Ocean. (Aft

Da Hatcher, 1995

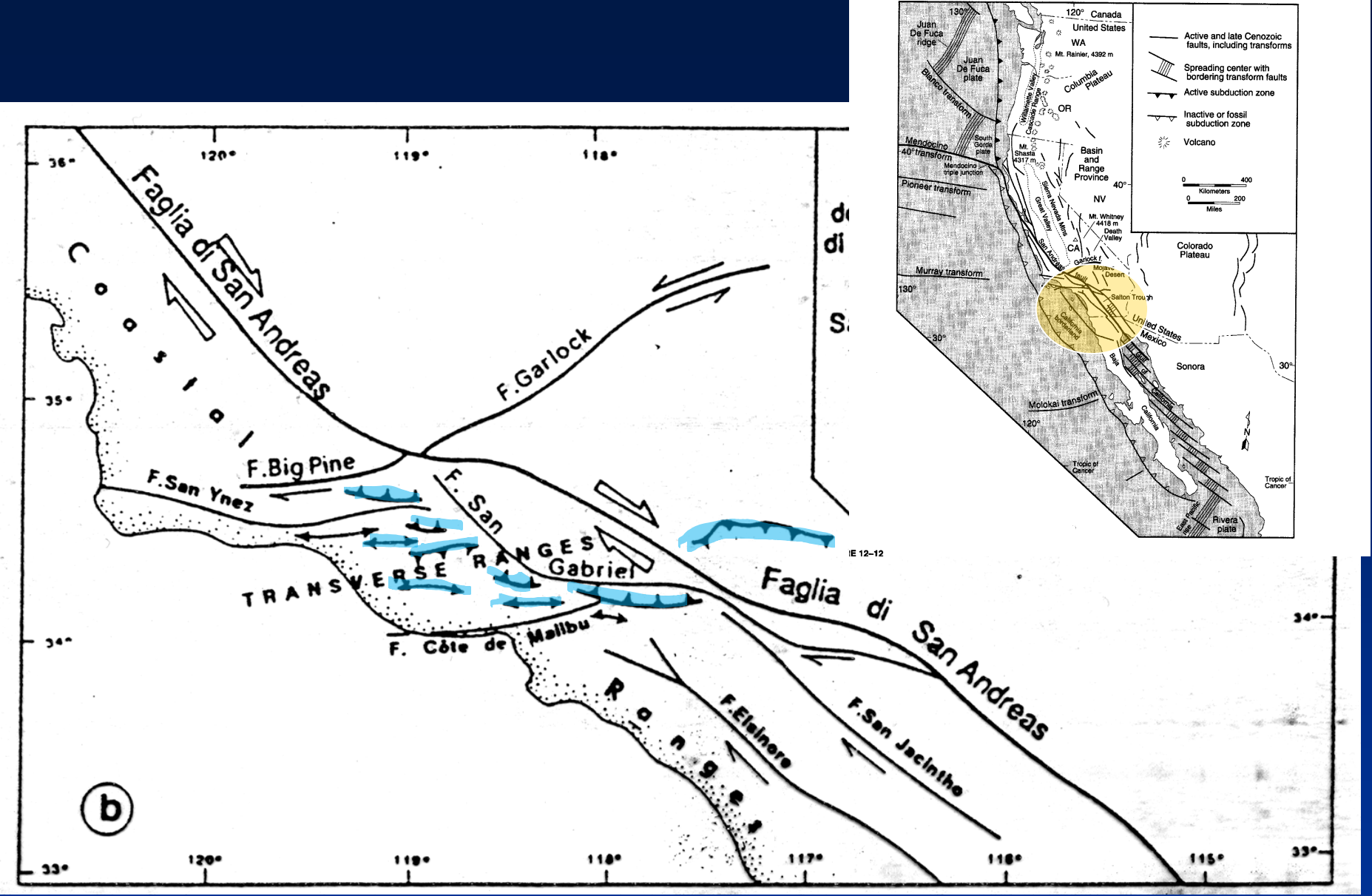


systems in California, northern Mexico, and in the adjacent Pacific Ocean. (After J. C. Crowell,

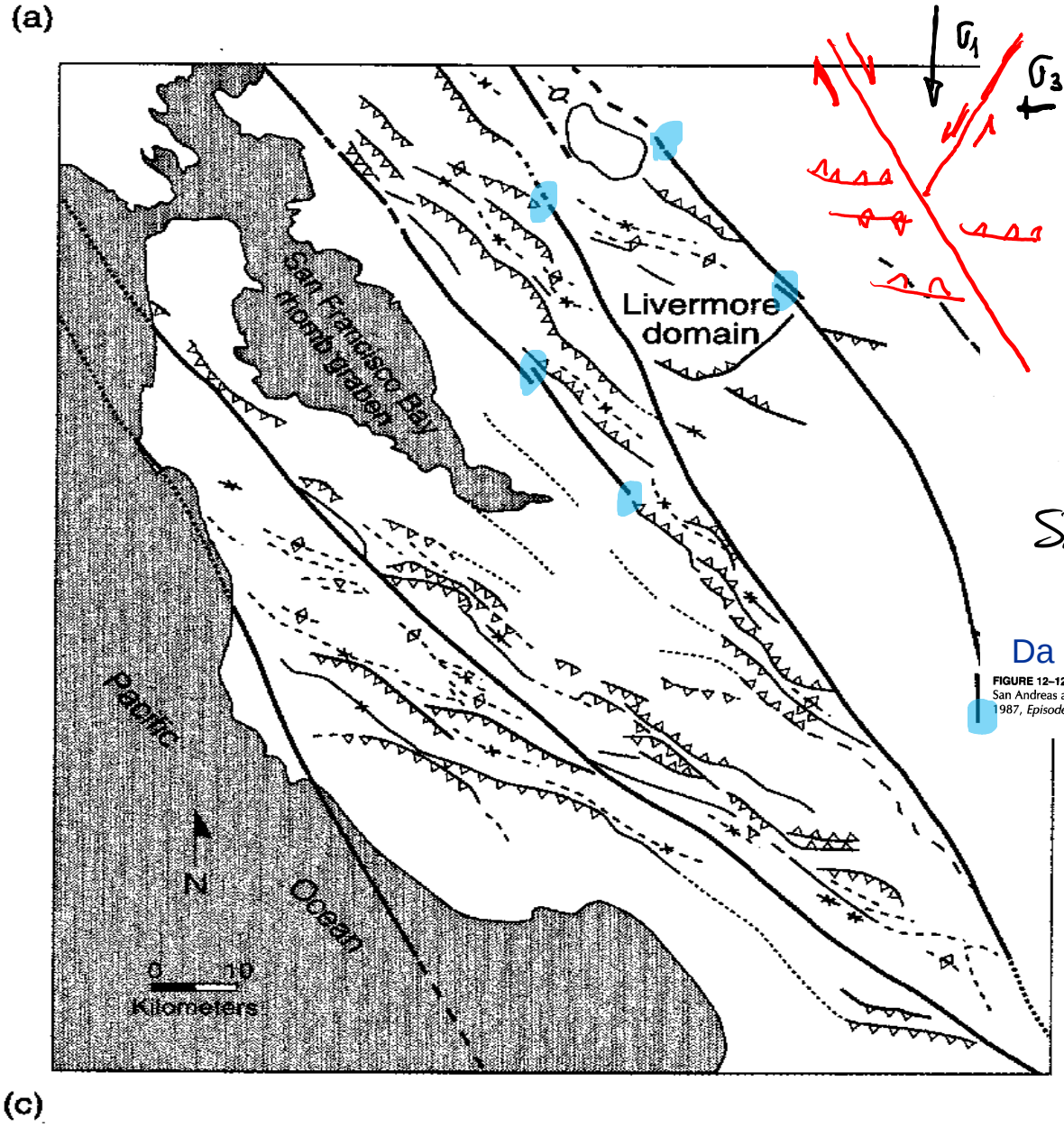
Da Hatcher, 1995

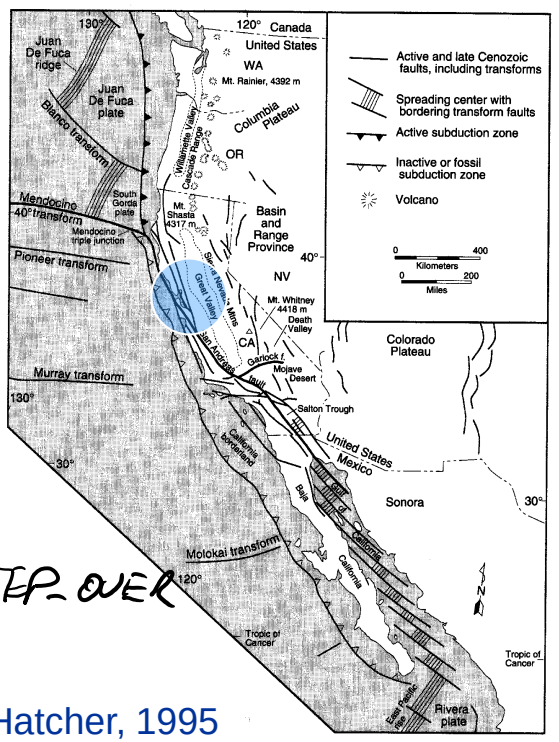


Da USGS
Mosaico dati satellitari AVHRR, falsi colori



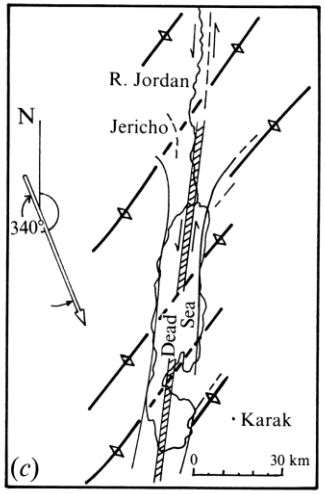
Da Mercier & Vergely, 1996





Da Hatcher, 1995

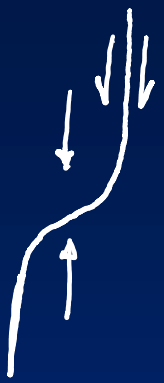
FIGURE 12–12
San Andreas and related fault systems in California, northern Mexico, and in the adjacent Pacific Ocean. (After J. C. Crowell, 1987, *Episodes*, v. 110.)



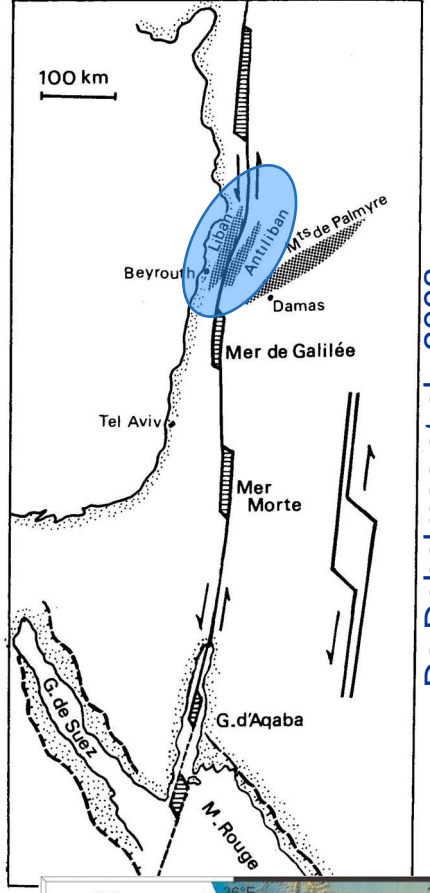
Da Price & Cosgrove, 1990

Da Hatcher, 1995

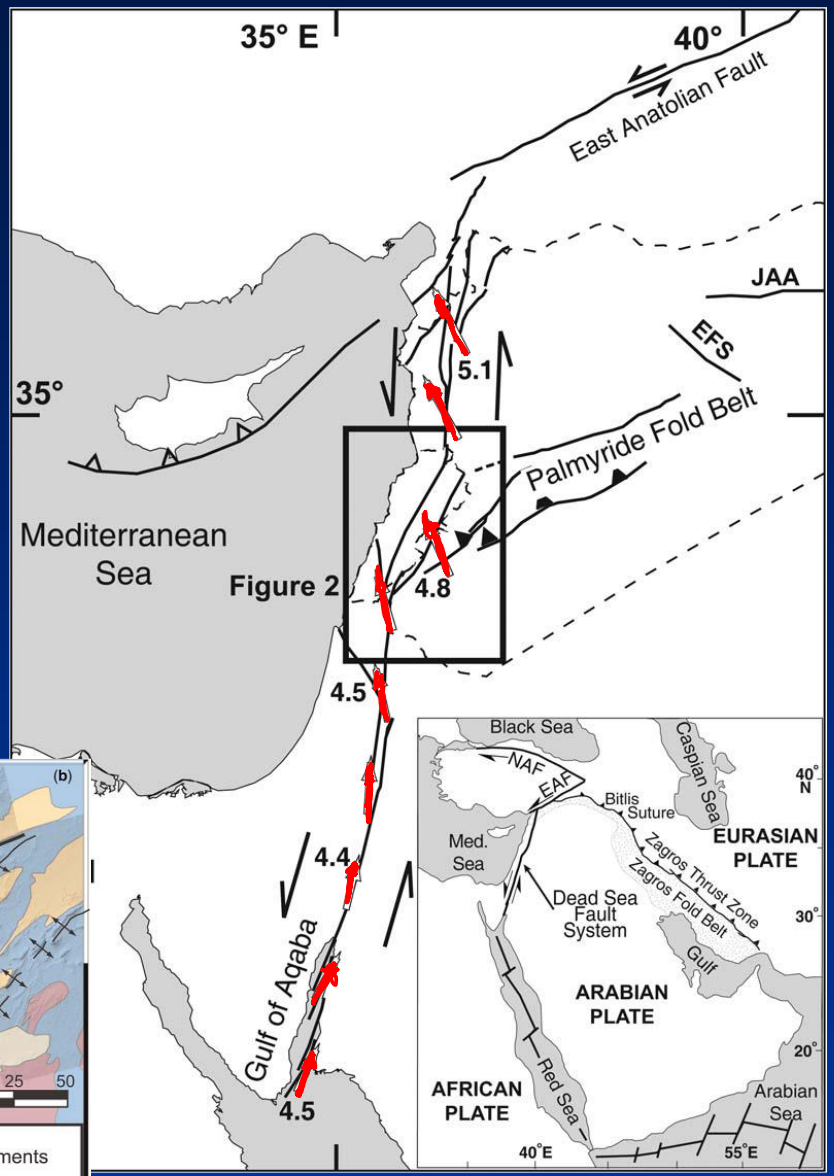
Variazioni di direzione (bend),
bacini pull-apart e faglie vicarianti (step over)

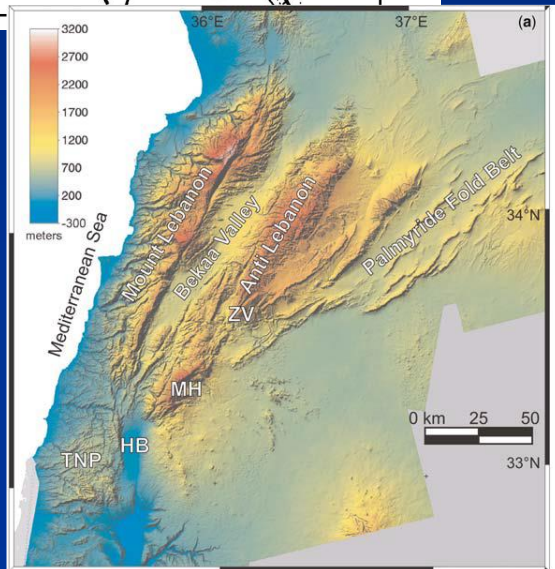


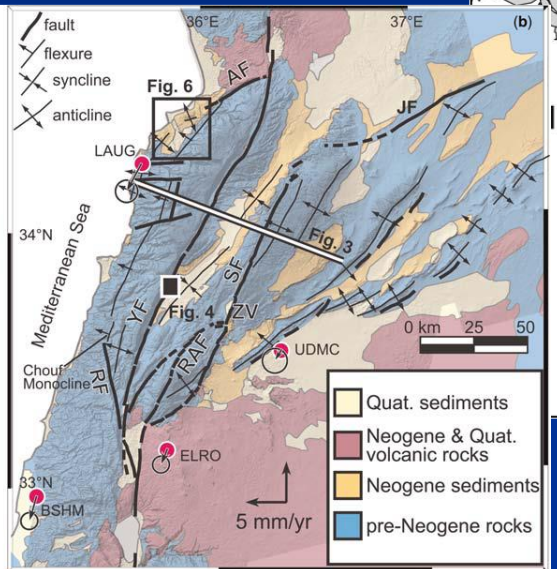
Restraining bend



Da Debelmas et al., 2008



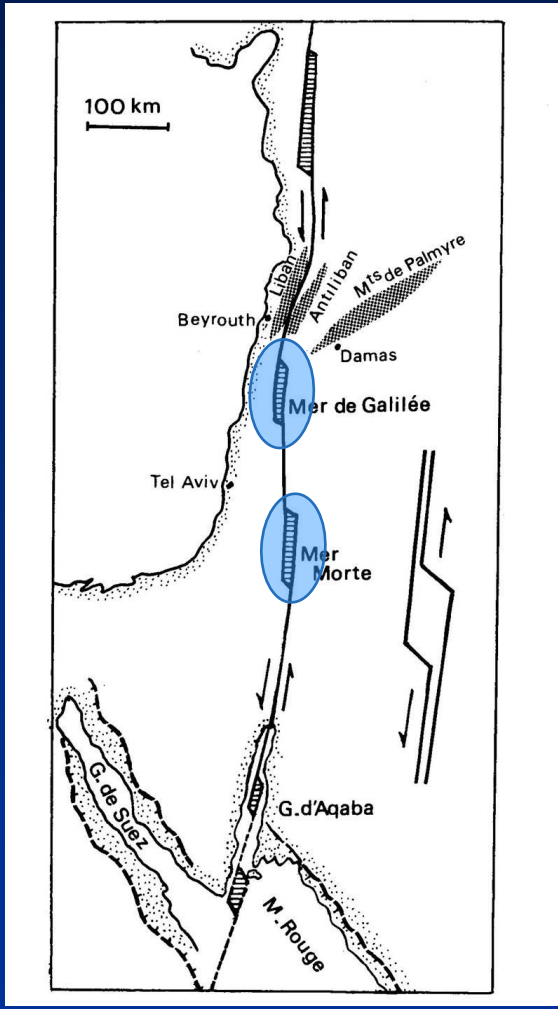




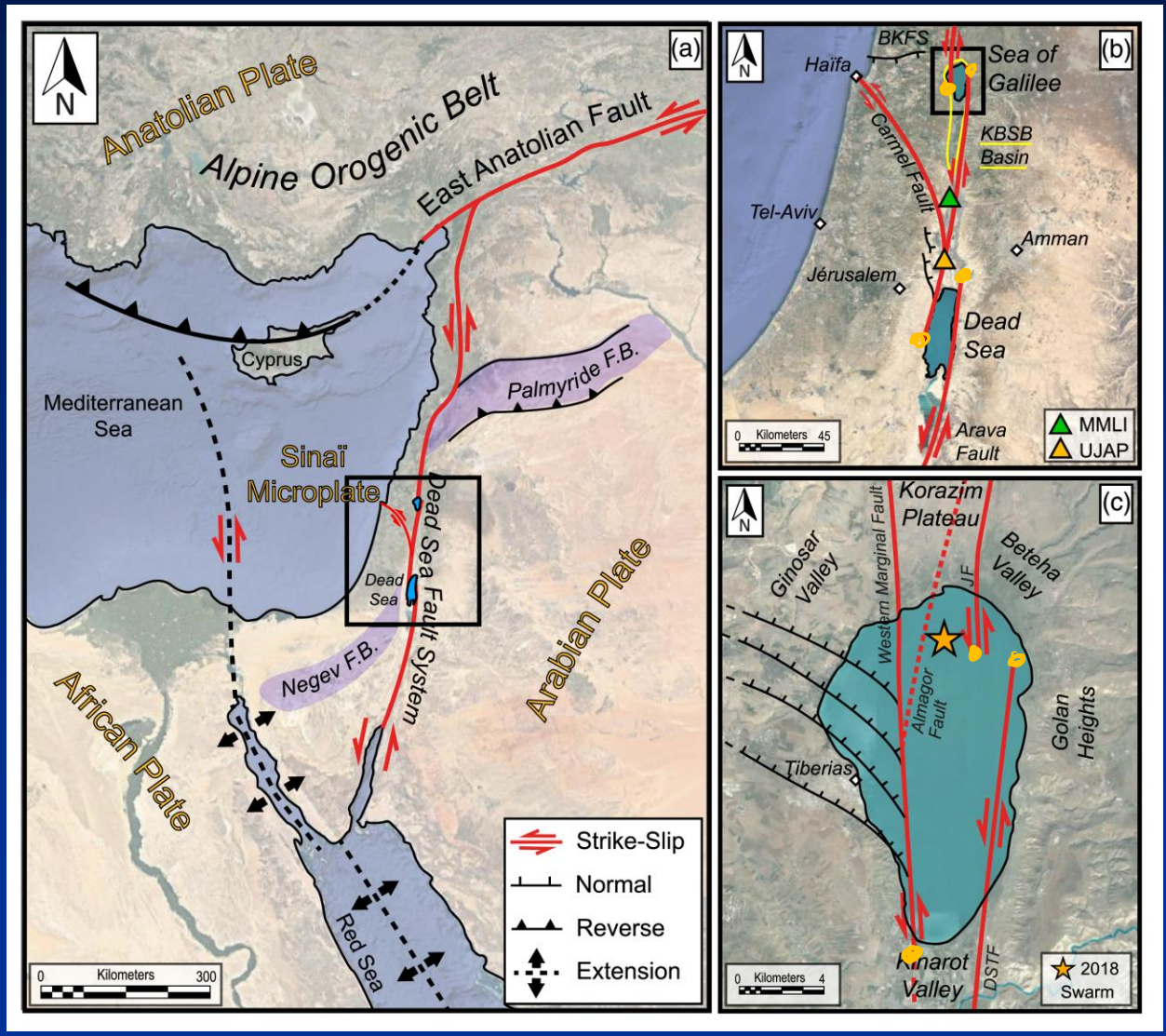
Da Gomez et al., 2007

Variazioni di direzione (bend),
bacini pull-apart e faglie vicarianti (step over)

Releasing step-over – bacini pull-apart



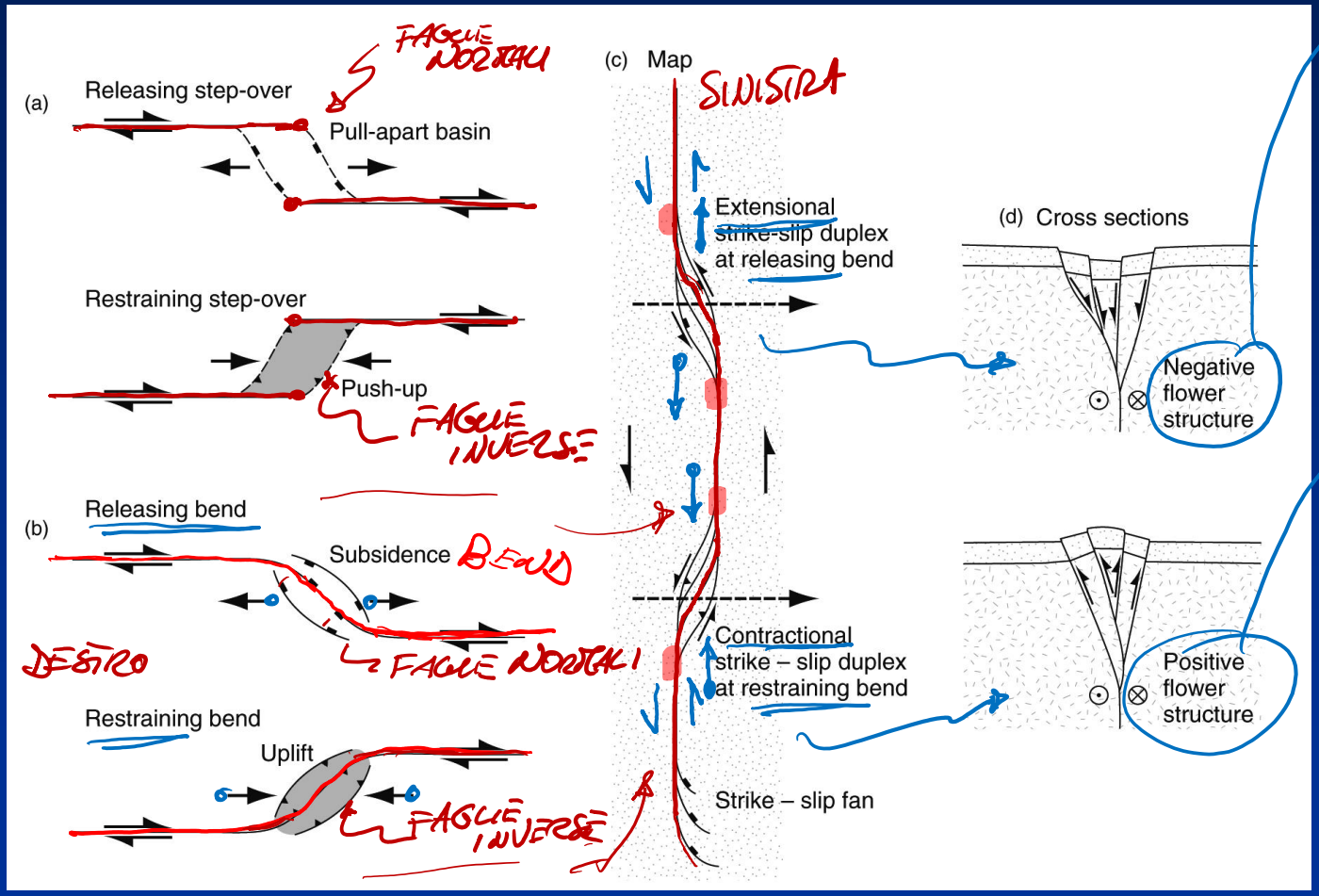
Da Debelmas et al., 2008



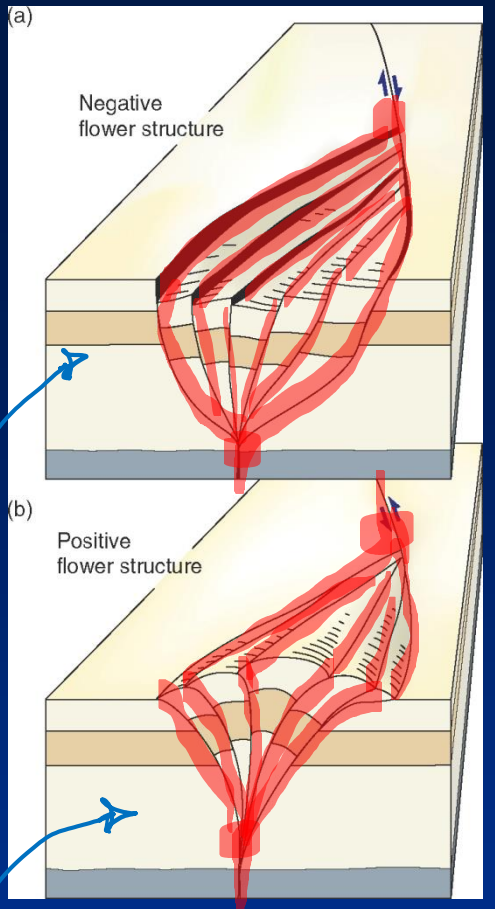
Da Hadad et al., 2020

Variazioni di direzione (bend) e strutture a fiore

Faglie vicarianti (step-over)



•Da Kearey, Klepeis, Vine, 2009



•Da Fossen, 2010

Strutture a fiore

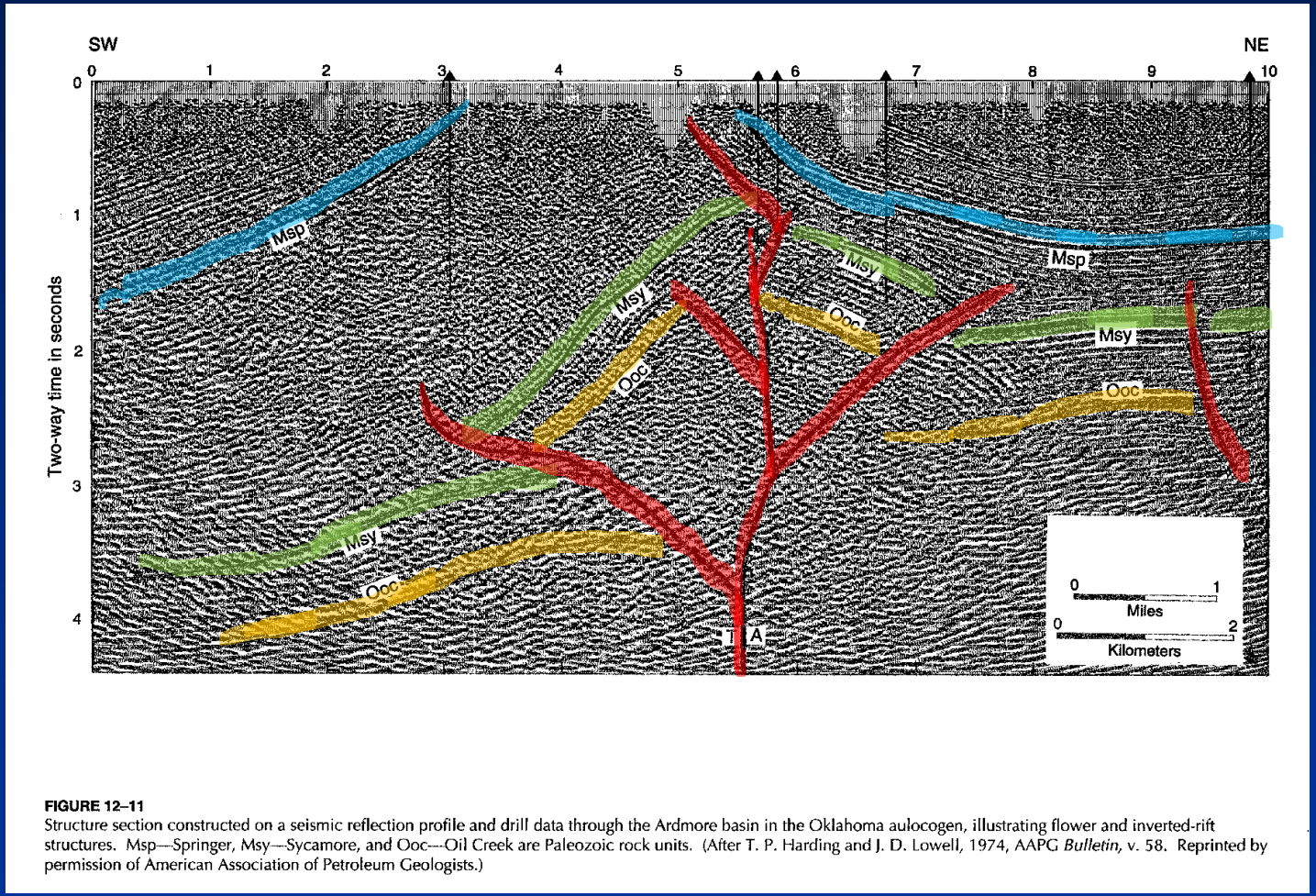
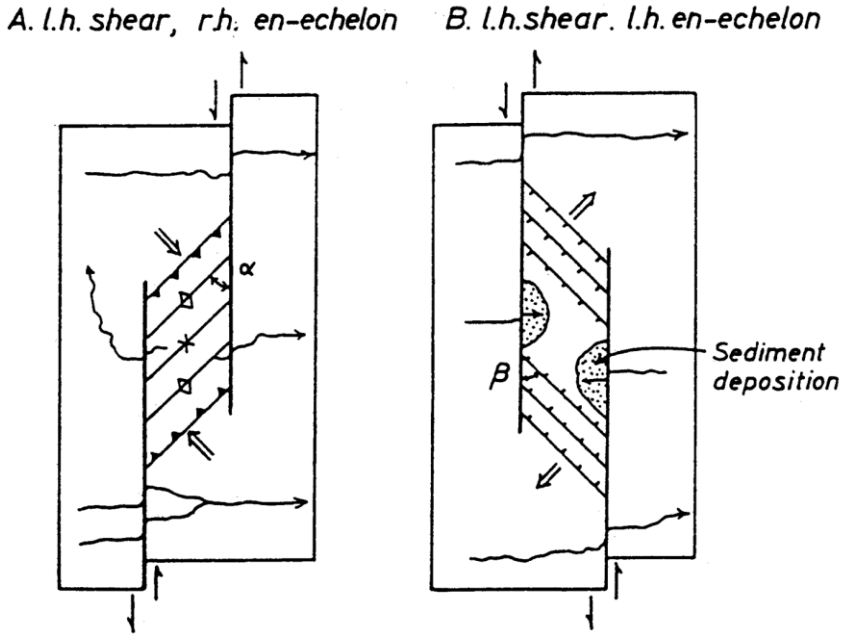
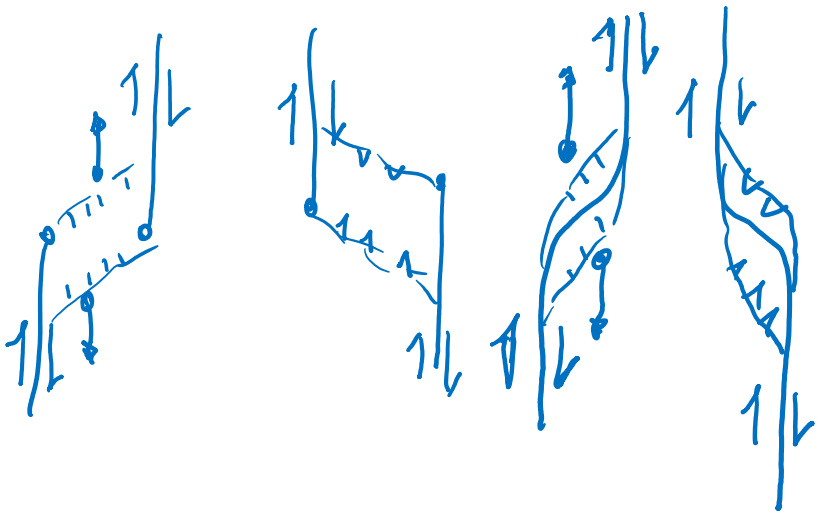


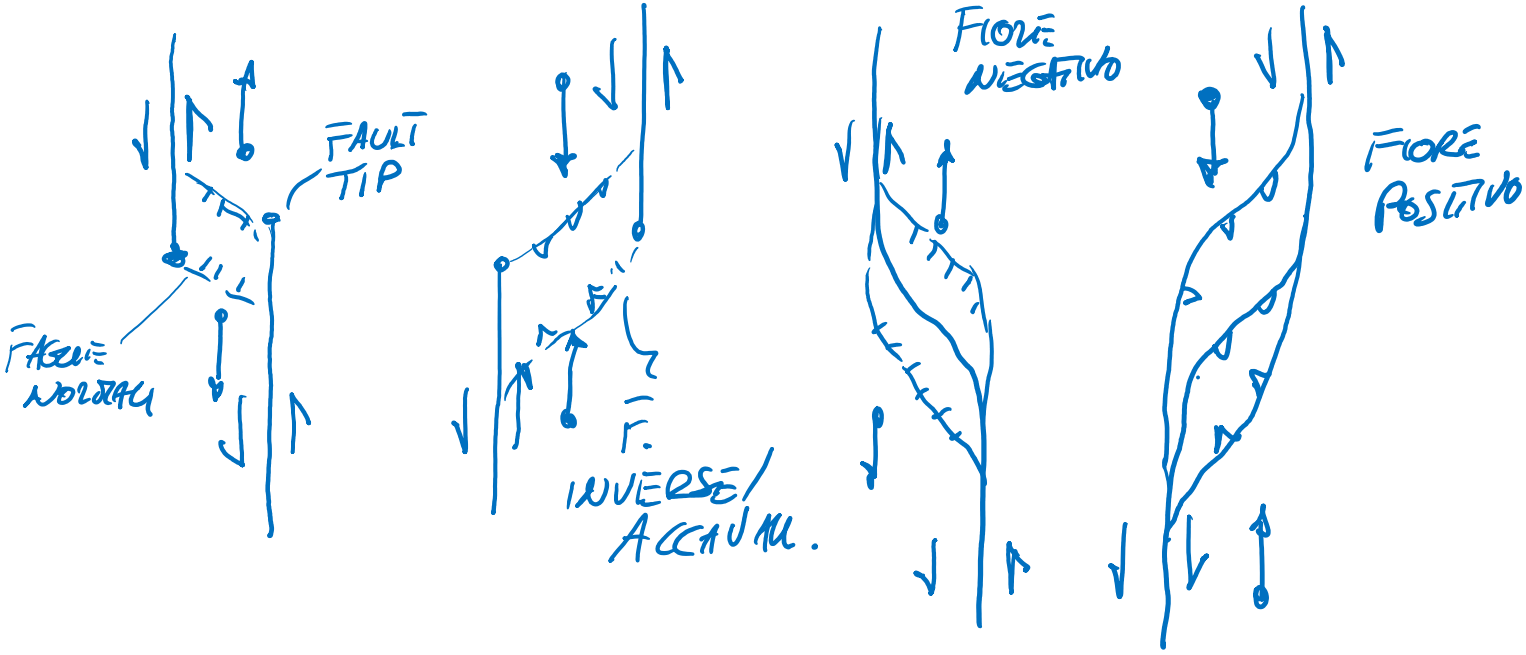
FIGURE 12–11
Structure section constructed on a seismic reflection profile and drill data through the Ardmore basin in the Oklahoma aulocogen, illustrating flower and inverted-rift structures. Msp—Springer, Msy—Sycamore, and Ooc—Oil Creek are Paleozoic rock units. (After T. P. Harding and J. D. Lowell, 1974, AAPG *Bulletin*, v. 58. Reprinted by permission of American Association of Petroleum Geologists.)

Da Hatcher, 1995

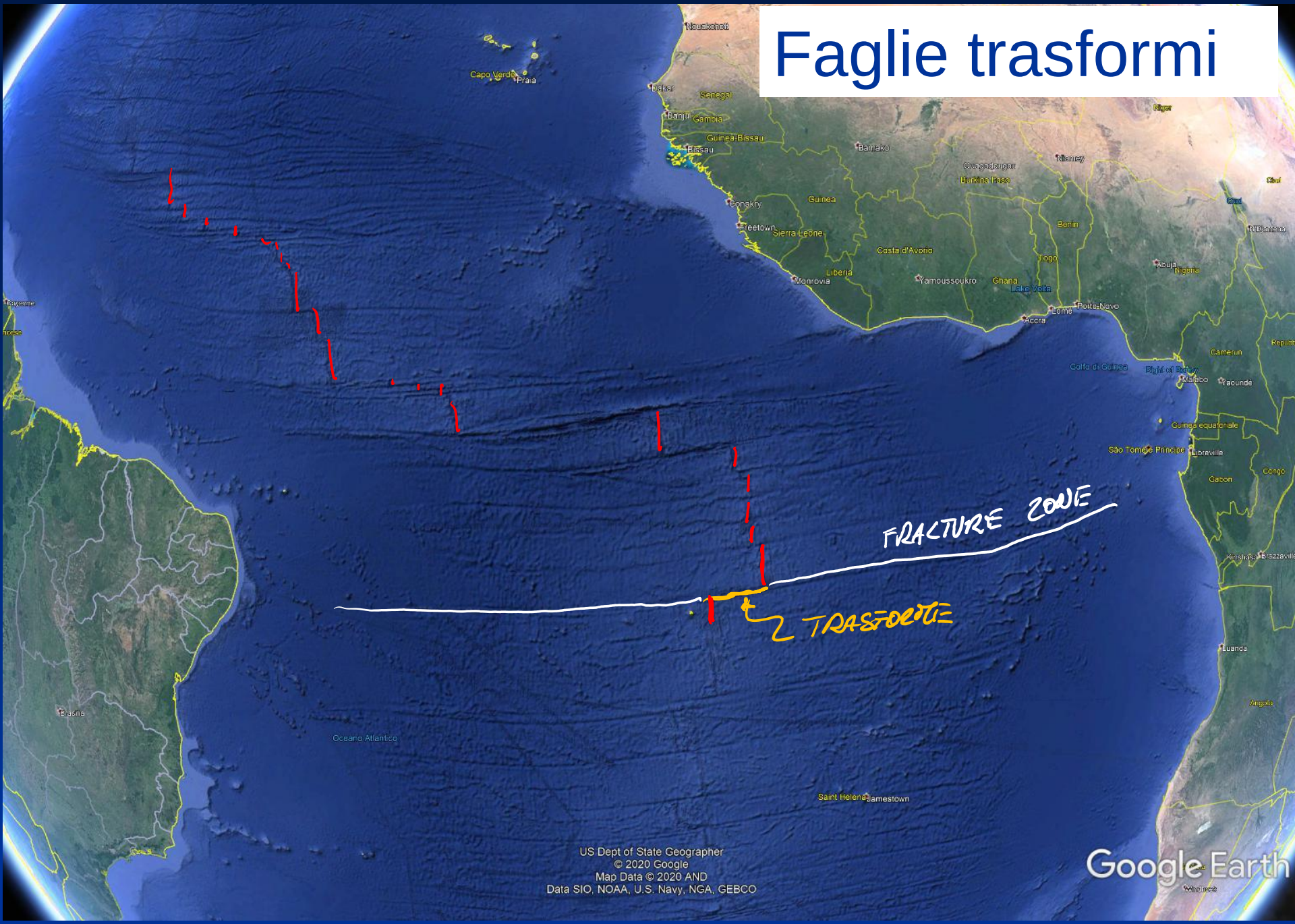
Da Ramsay & Huber, 1987



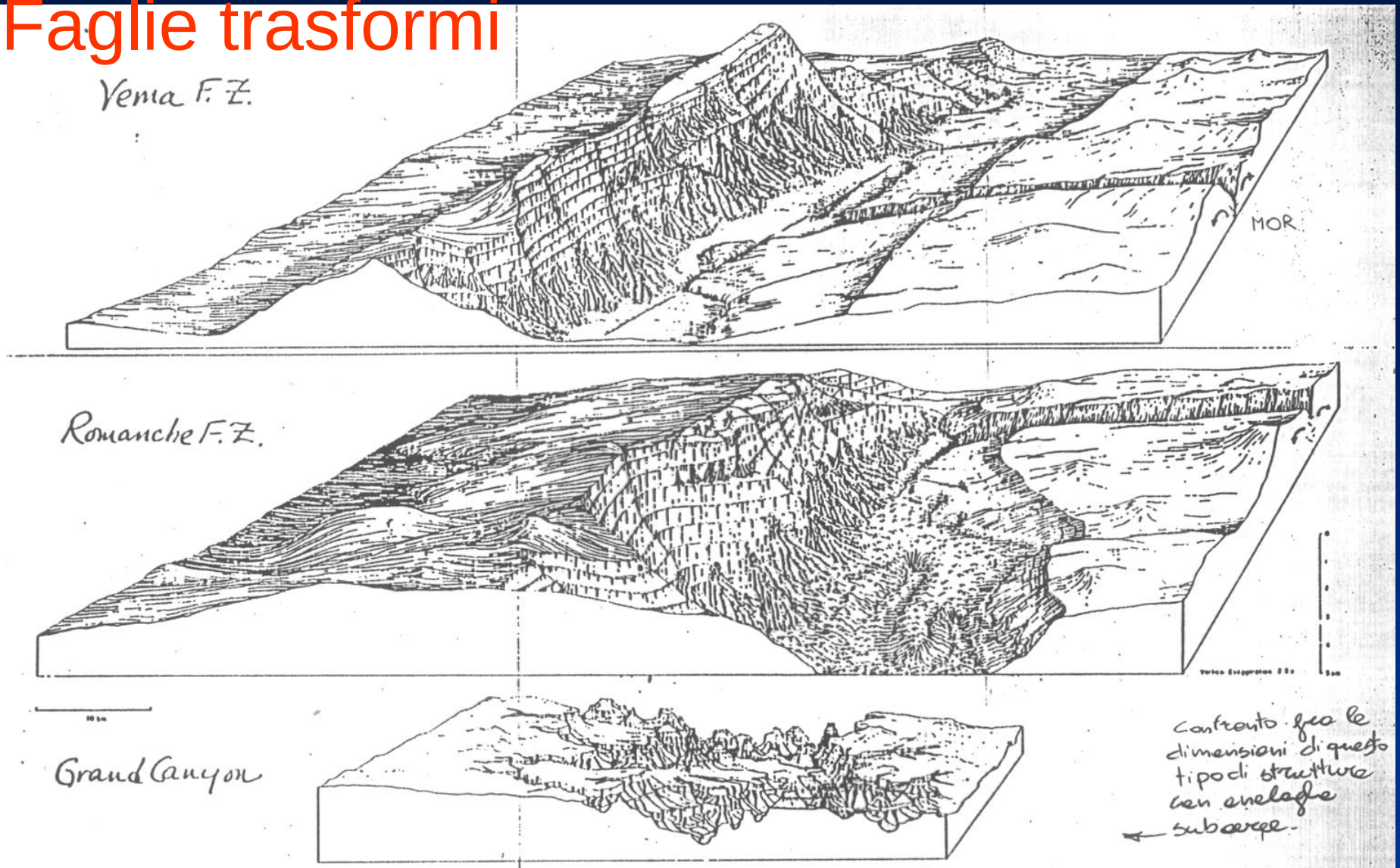




Faglie trasformi



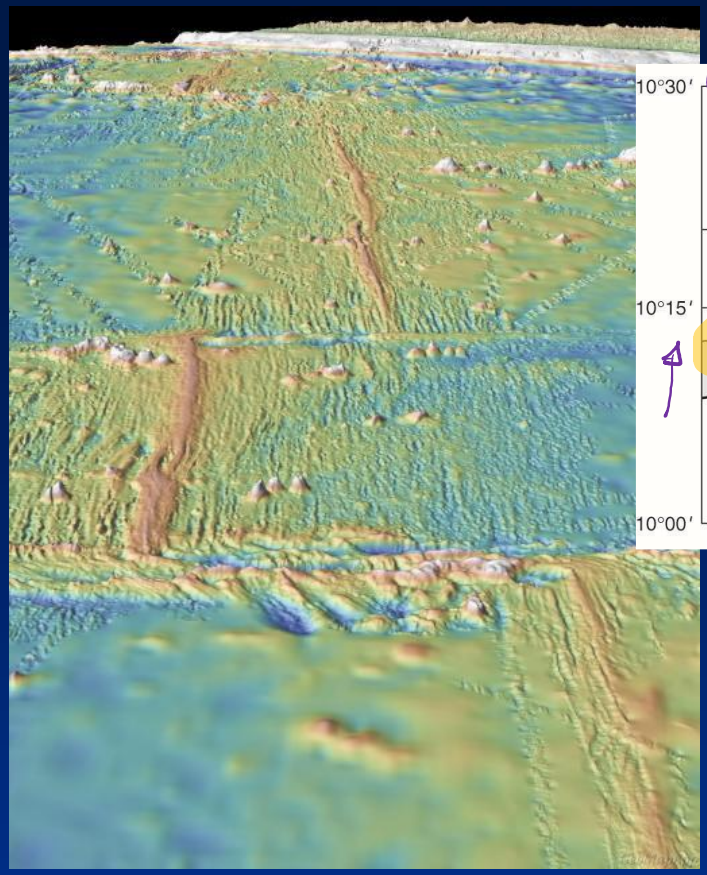
Faglie trasformi



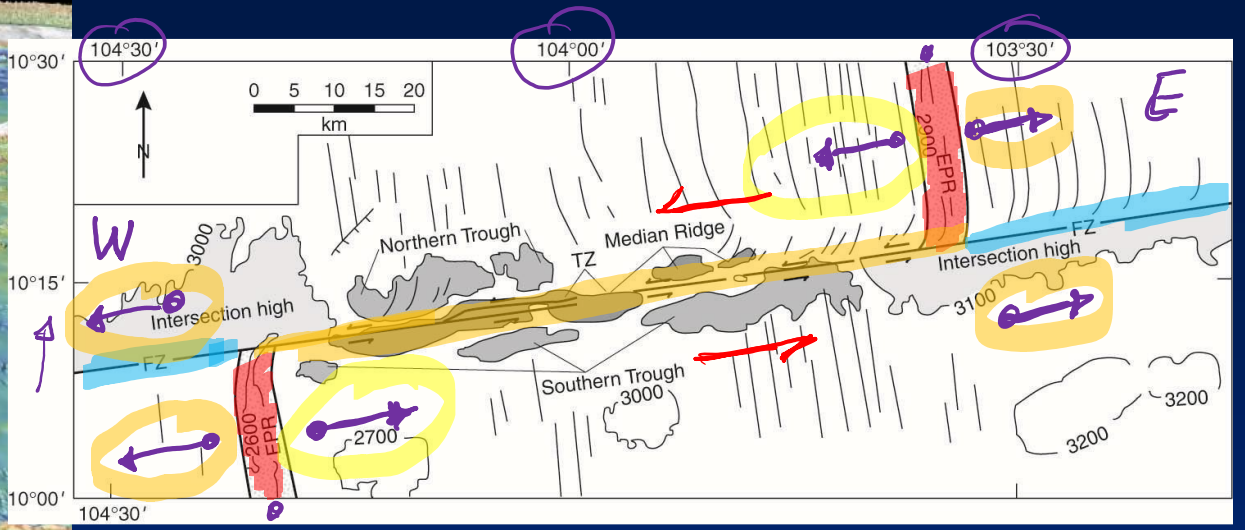
Confronto fra le dimensioni di questo tipo di strutture con analoghe subaeree.

Figure 1: Large-offset and/or slow-slipping transform faults and fracture zones rank among the major landforms of the earth. In this drawing, the transform valleys of the Vema and Romanche Fracture Zones dwarf the Grand Canyon. Such enormous relief cannot result from passive strike-slip sliding of adjacent lithospheric blocks, but rather must involve rapid and extreme vertical motions.

da KASTENS et al. Progr. ric. 1986

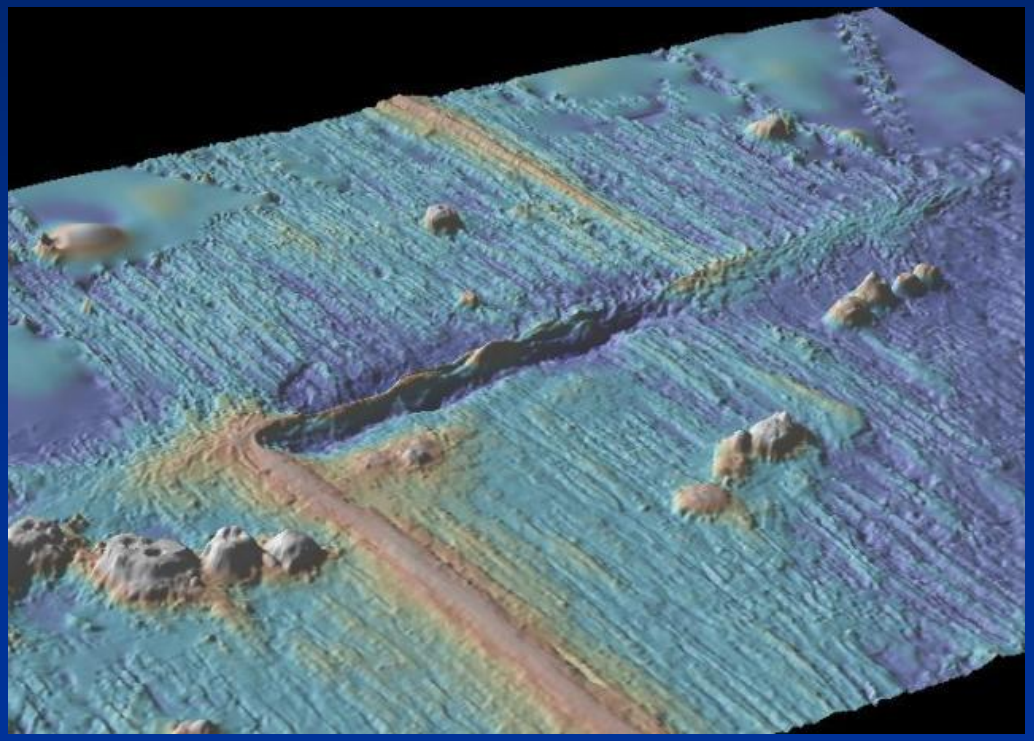


East Pacific Rise, Siqueiros and Clipperton Transform Faults
Da MGDS Media Bank, 2007
http://media.marine-geo.org/image/



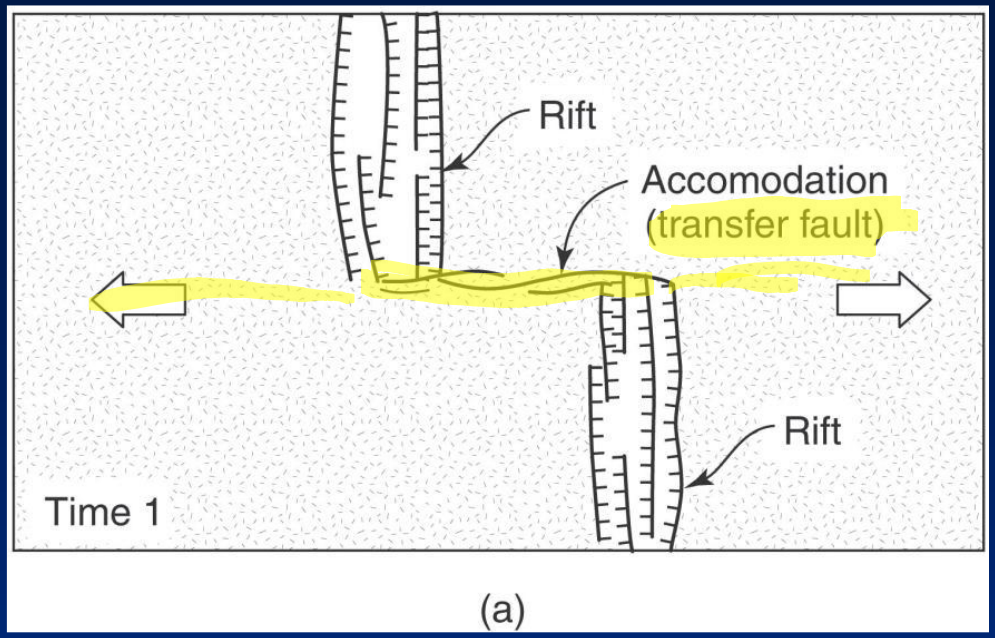
Da van der Pluijm B., Marshak S., 2004

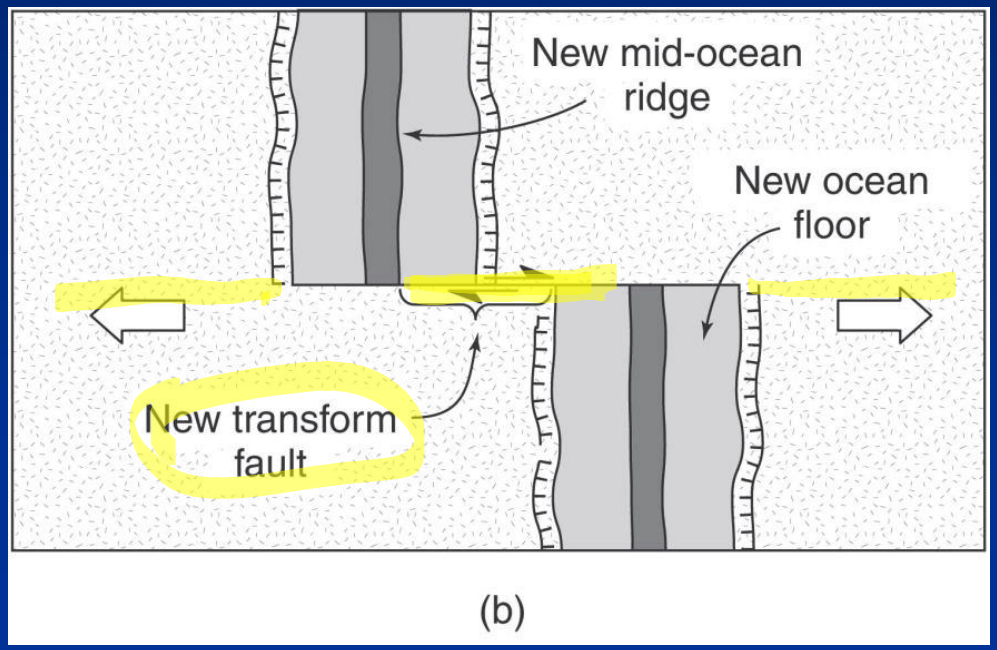
VELOCITA' DI ESPANSIONE=K

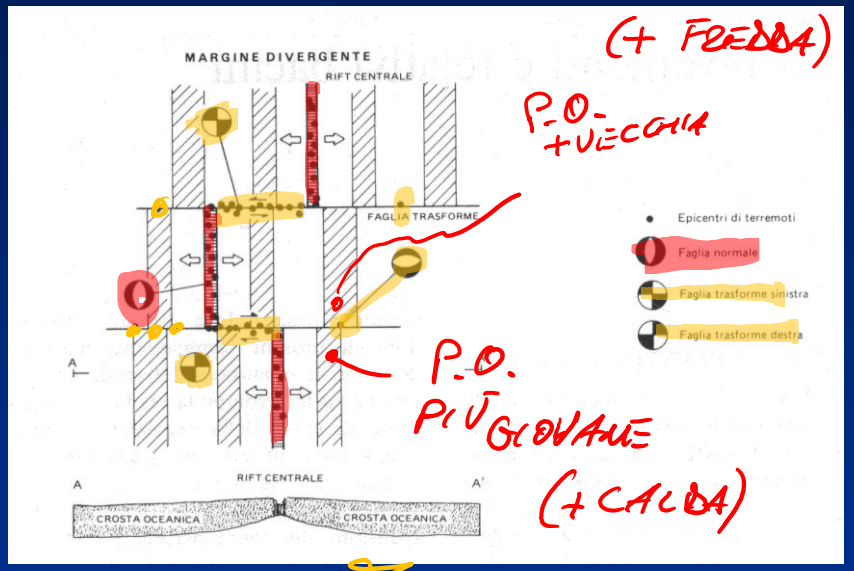


Clipperton Transform Fault
Da MGDS Media Bank, 2007
http://media.marine-geo.org/image/

Faglie trasformi



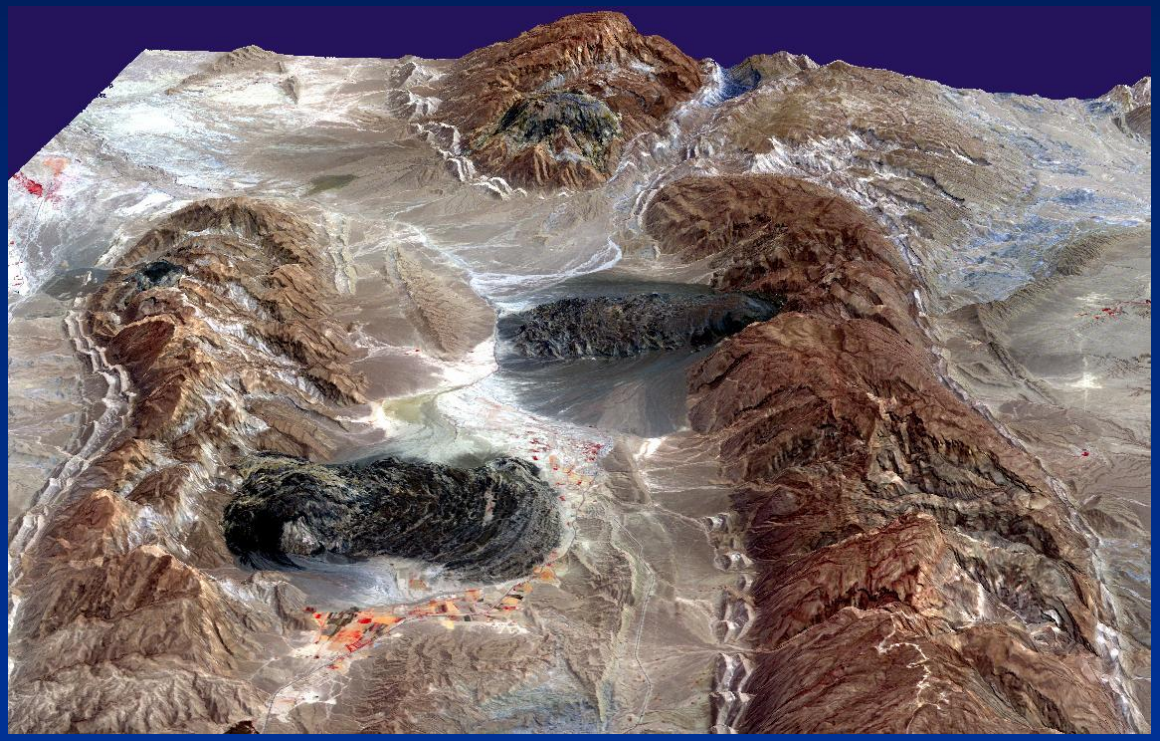




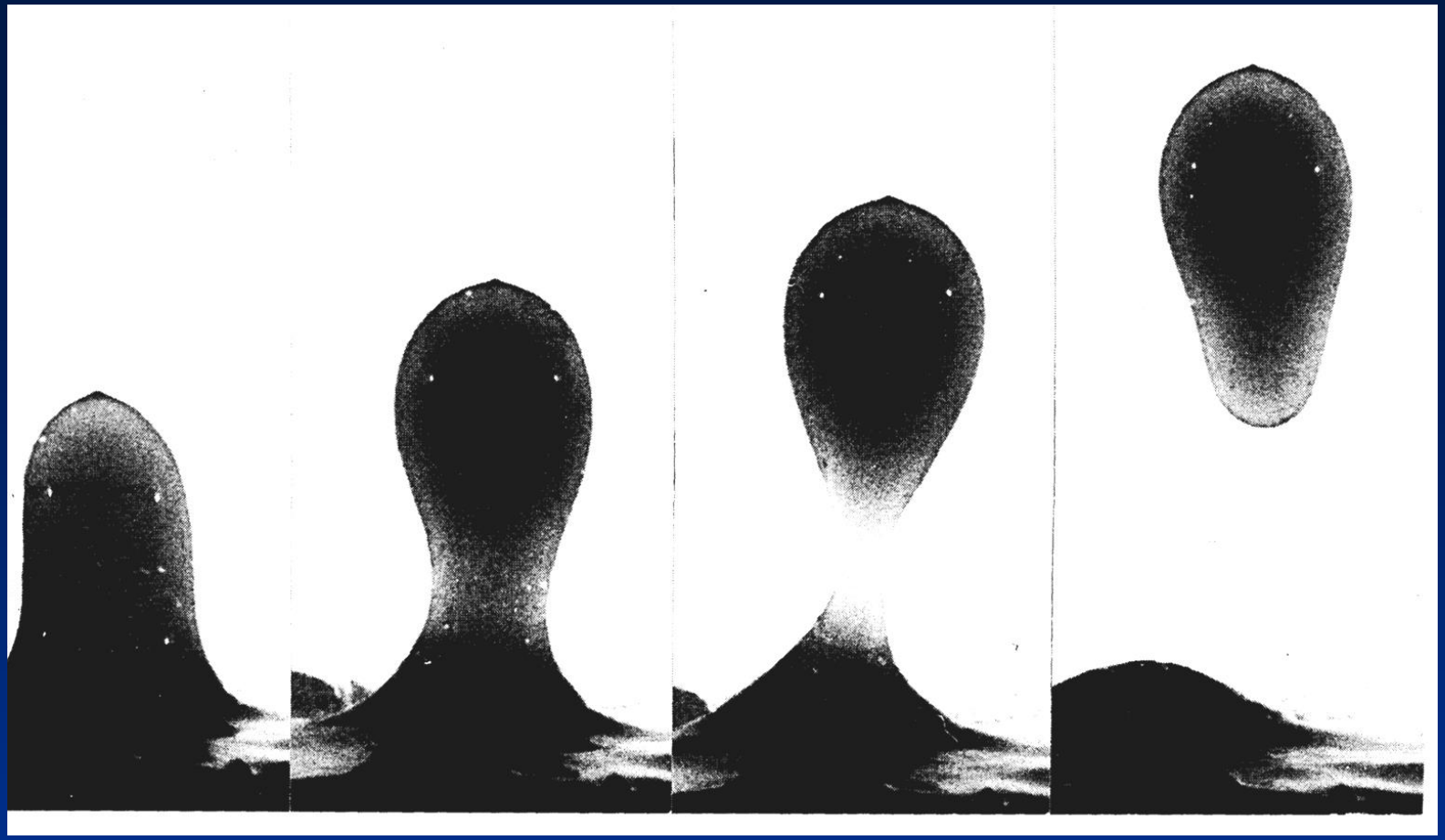
FRATTURE ZONE =
MOVIMENTI VERTICALI (POCHI)
CAUSATI DA DIFFERENZE
ELEVAZIONI LITOSF

Da van der Pluijm B., Marshak S., 2004

Tettonica diapirica



Salt glacier da diapiri salini
Da Earth observatory NASA
Immagine da NASA/GSFC/MITI/ERSDAC/JAROS, and U.S./Japan ASTER Science Team



Da Price & Cosgrove, 1990

Si innesca per differenziale di carico quando si attua inversione di densità in profondità. Esempio di risalita di gocce meno dense del liquido chiaro.

Tettonica diapirica

Salgemma = diapirismo o halocinesi, legata alla densità e alla mobilità del salgemma.

Gesso = diapirismo reale?, legato alla densità, ma mobilità del gesso è limitata (roccia fragile, sino a quando non si trasforma in anidrite), con sensibile influenza della sovrappressione dei fluidi interstiziali.

Fango = “pseudodiapirismo” governato da sovrappressione dei fluidi interstiziali.

+ PRESENZA DI GAS (METANO) "GAS CHARGED FLUIDS"


N
Image © 2011 GeoEye
Image © 2011 DigitalGlobe
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2011 Cnes/Spot Image
27°17'24.43" N 54°38'29.65" E elev 1661 ft
©2010 Google
Eye alt 154.27 mi


N
Image © 2011 GeoEye
Image © 2011 DigitalGlobe
© 2011 Cnes/Spot Image
©2010 Google
Imagery Dates: Mar 13, 2006 - Sep 6, 2009
27°56'19.95" N 54°54'22.85" E elev 2309 ft
Eye alt 26.96 mi


Image © 2011 DigitalGlobe
Image © 2011 GeoEye
© 2011 Cnes/Spot Image
Imagery Dates: May 16, 2003 - Sep 6, 2009
27°59'28.47" N 54°56'12.02" E elev 3094 ft


Image © 2011 DigitalGlobe
Image © 2011 GeoEye
© 2011 Cnes/Spot Image
Google
Imagery Dates: Mar 13, 2006 - Sep 6, 2009
28°00'00.95" N 54°54'35.91" E elev 4281 ft
Eye alt 10.84 mi

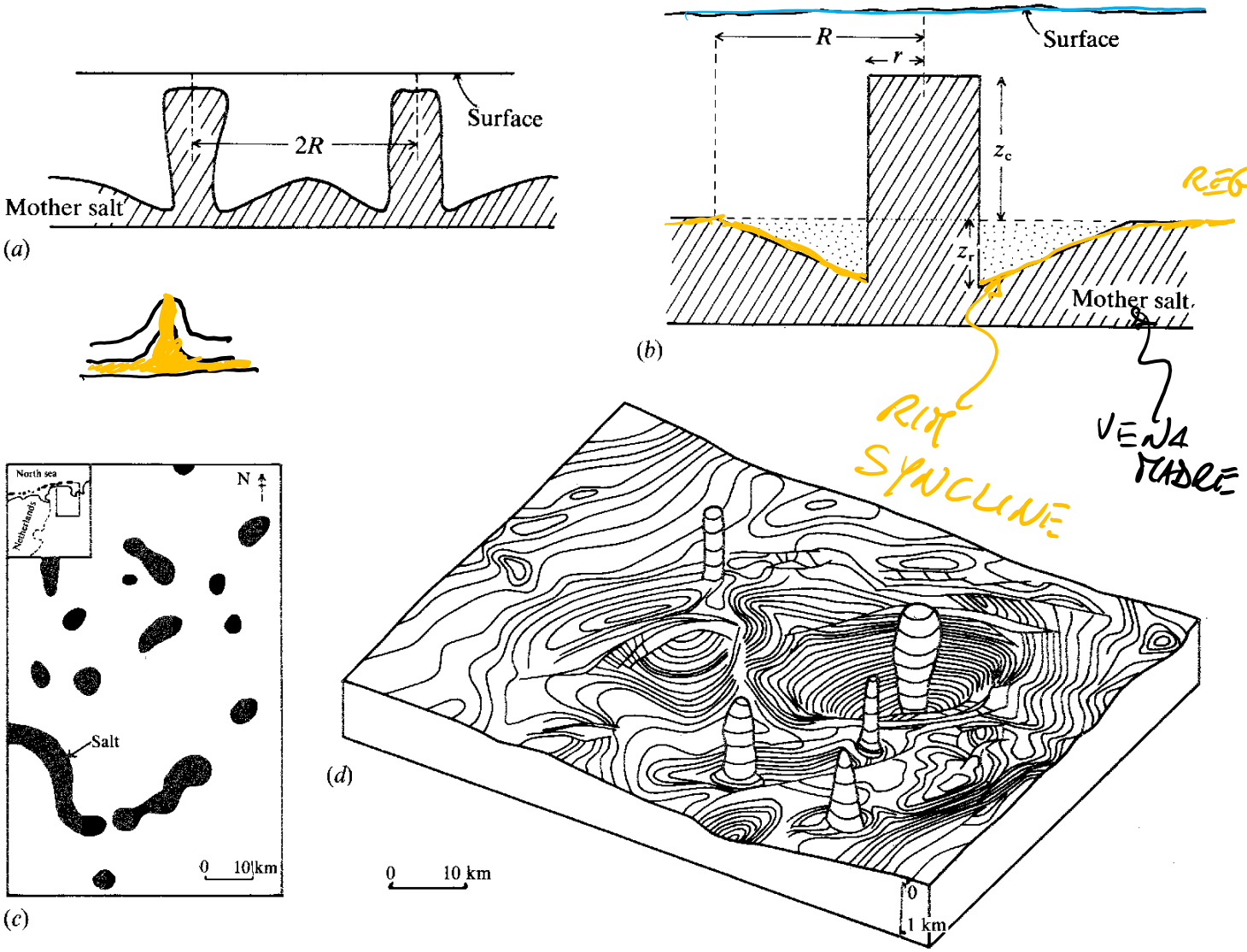
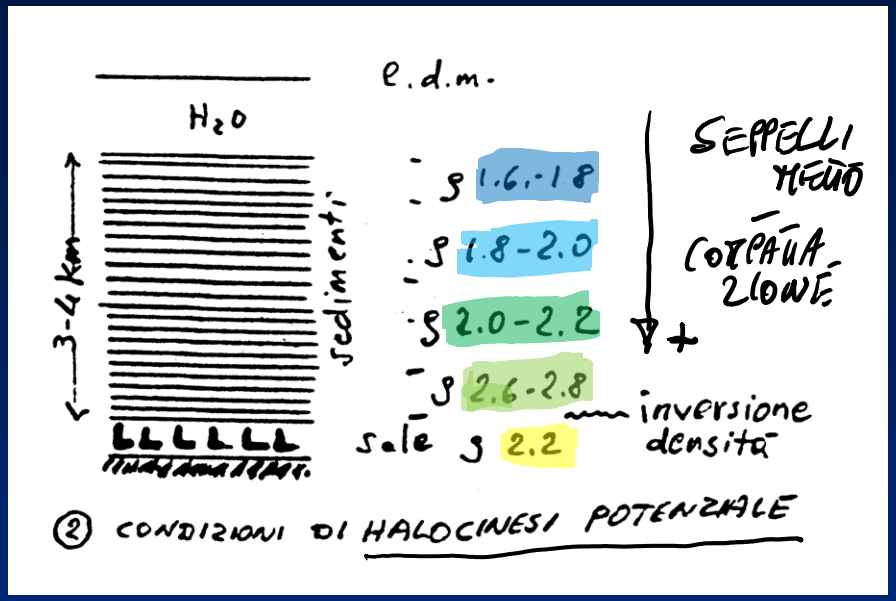
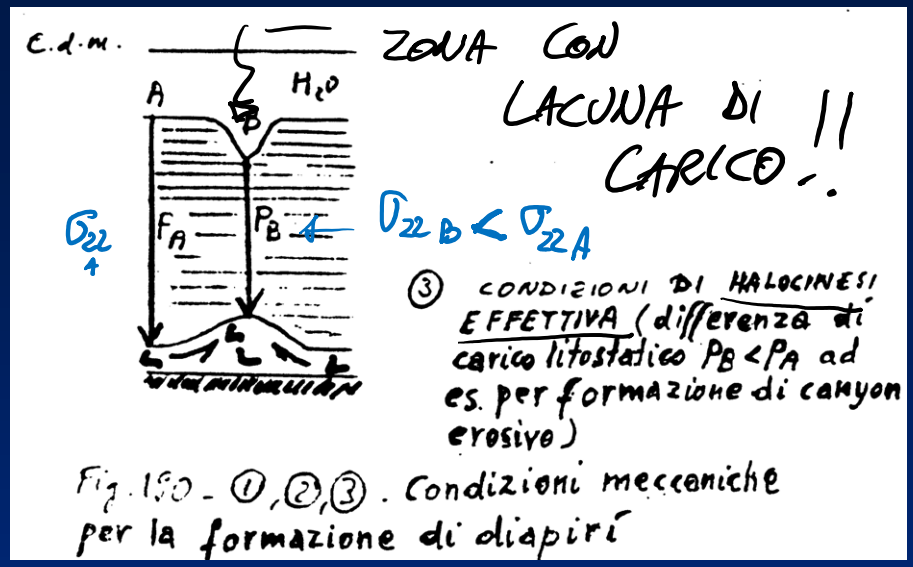


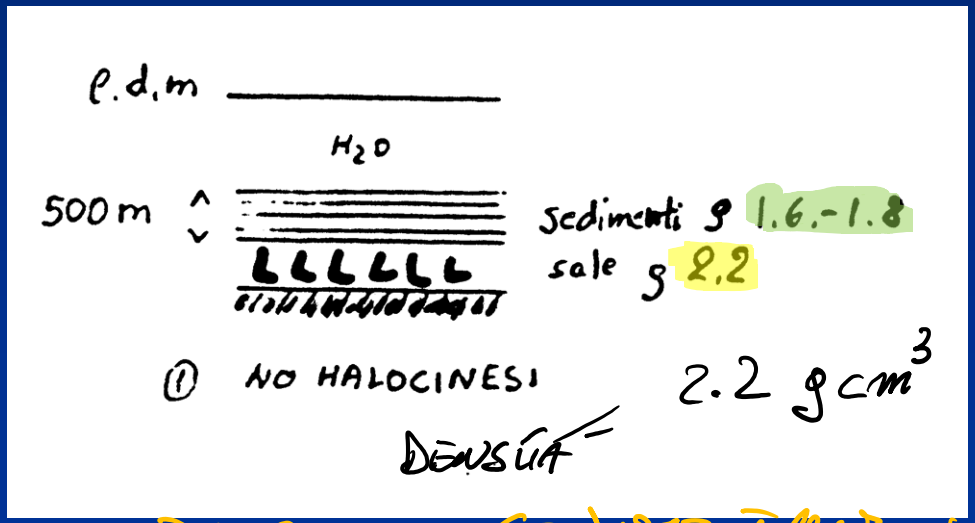
Fig. 4.13. (*a*) Schematic representation of section through two adjacent, bollard-type plugs. (*b*) Simplified geometry of salt layer and plug. (*c*) Distribution of Salt Domes in a small area of N. Germany. (After Turcotte & Schubert, 1982.) (*d*) Block diagram of salt plugs piercing the top of the Woodbine whose structure contours are shown. (After Jackson & Seni, 1983.)

Da Price & Cosgrove, 1990





Da Selli L., appunti dalle lezioni di Geologia Strutturale

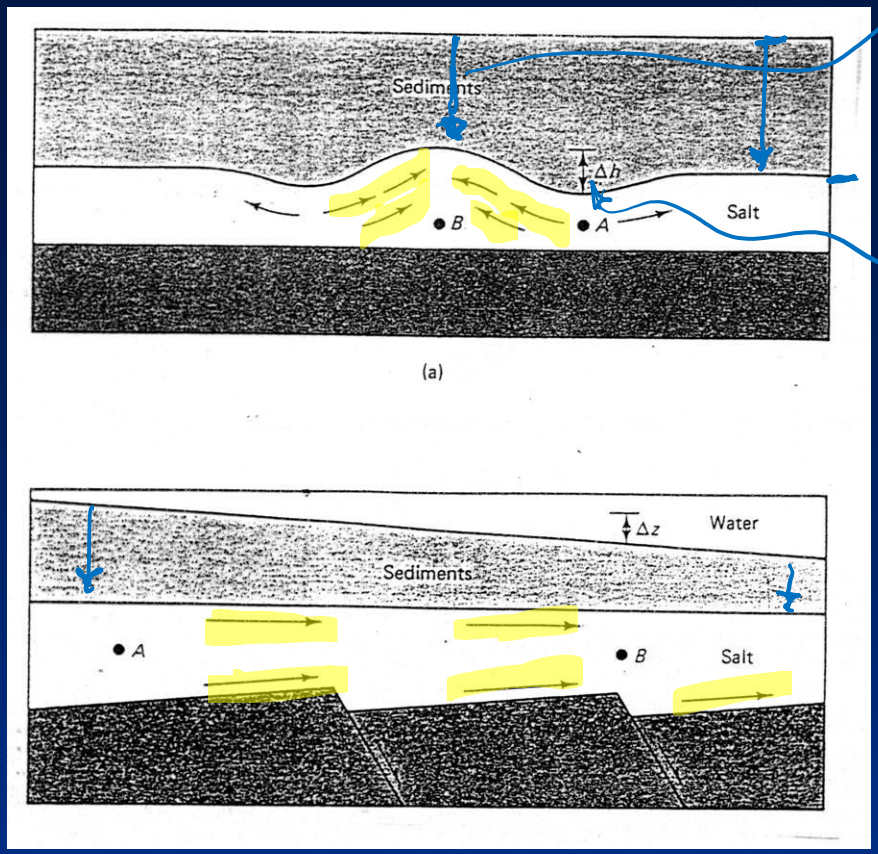


GESSO E HALITE (SALGEMMA)

$CaSO_4 + 2H_2O$ — $NaCl$

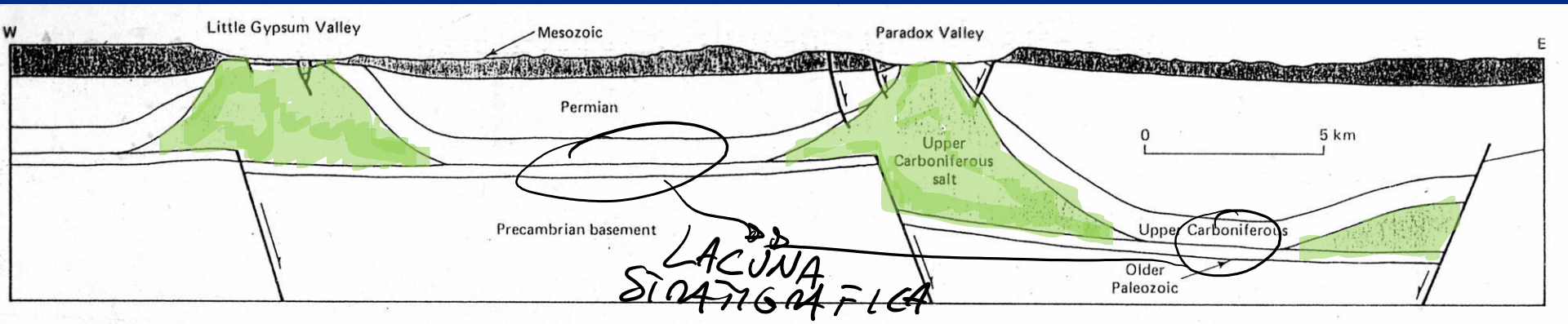
ROCCE EVAPORITICHE

ALCUNE ROCCE SEDIMENTARIE SUBISCONO COMPATTAZIONE CRESCENTE | SI SEDIMENTANO COME ROCCE (NON SUBISCONO CRESC. E COMPATTAZIONE)



Migrazione del sale vero le zone con meno carico litostatico

Da Suppe, 1985



Da Suppe, 1985

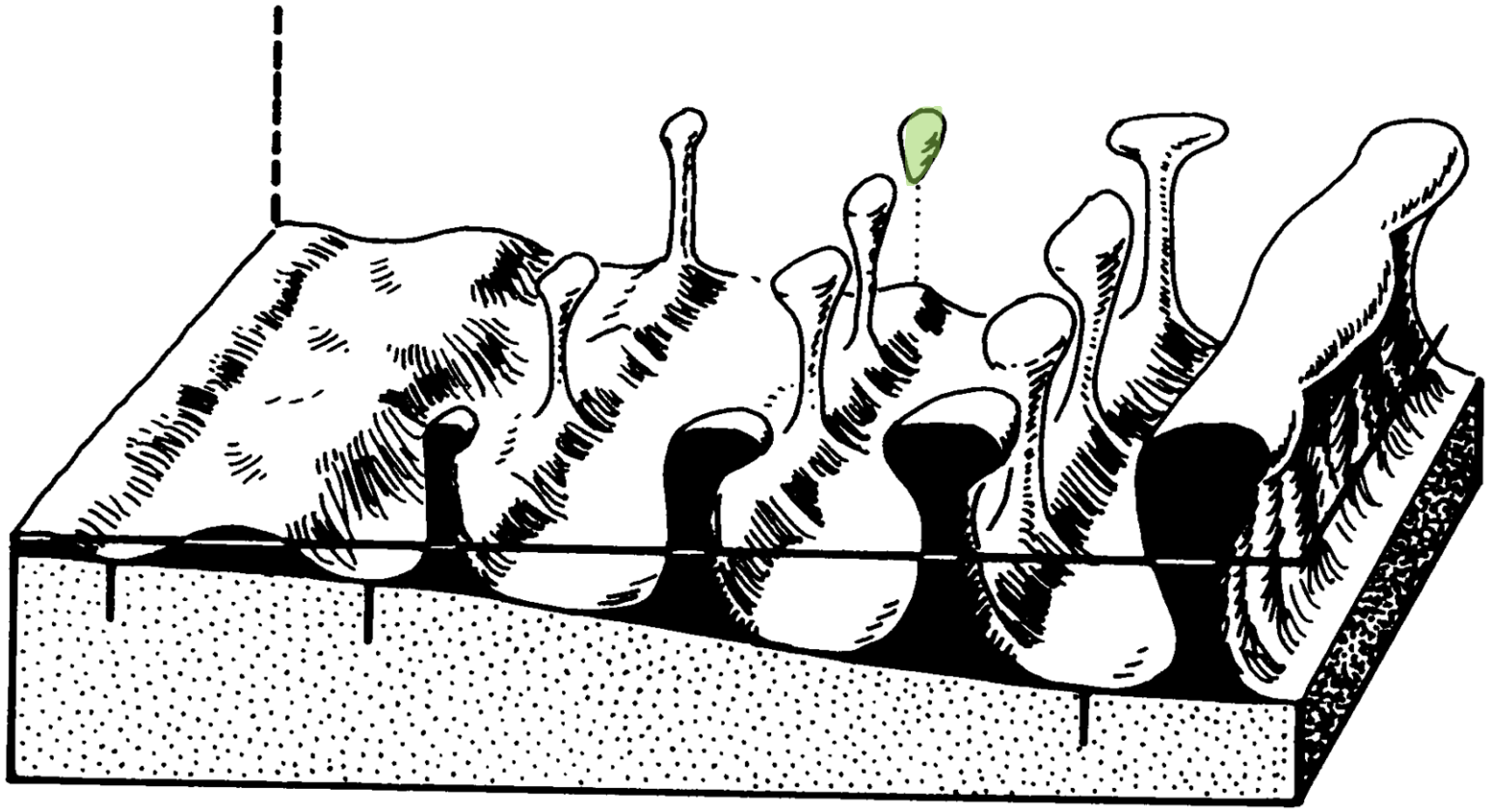
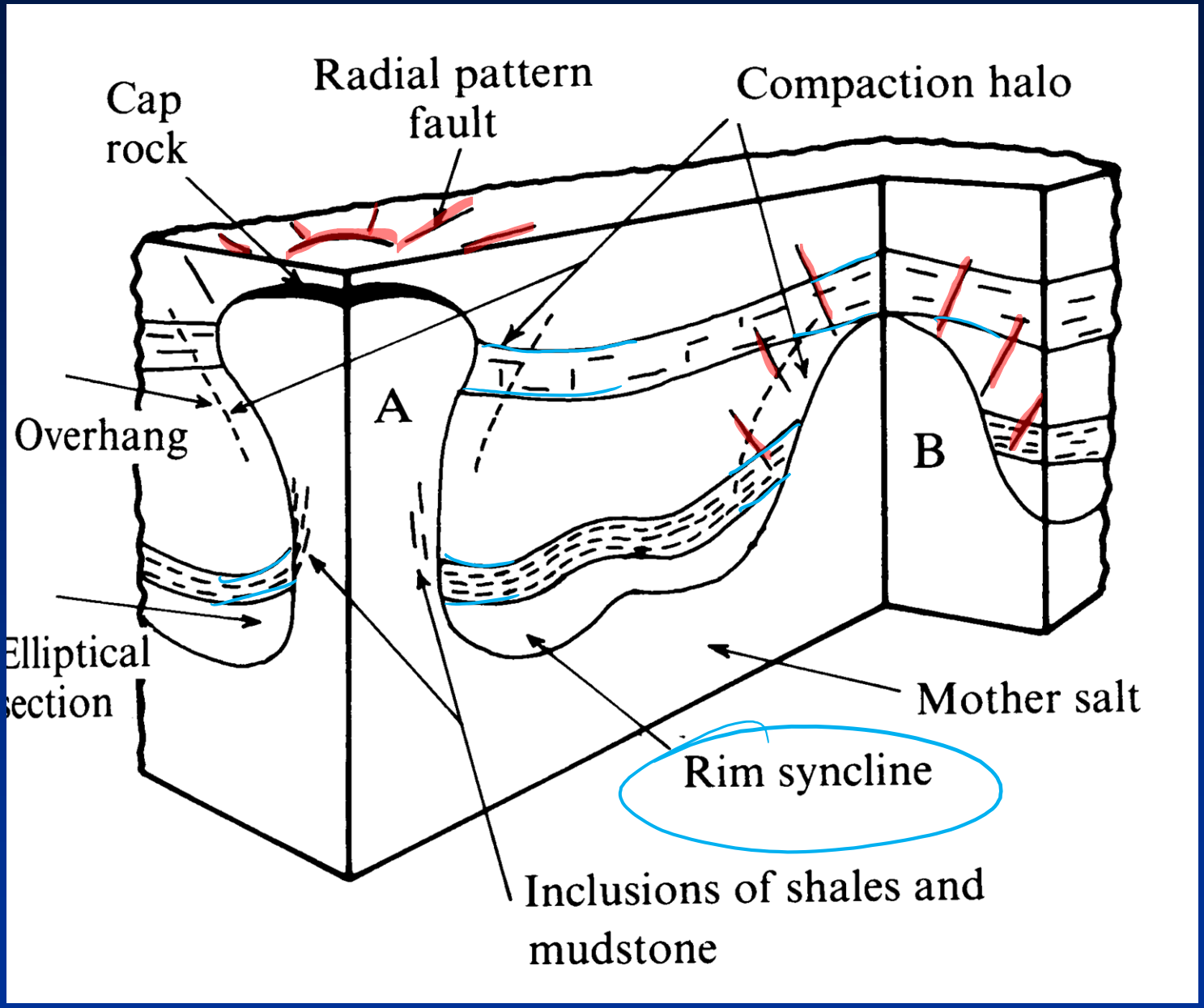


Fig. 4.7. General morphology of salt pillows, walls and domes. (After Trusheim, 1960.)

Da Price & Cosgrove, 1990

Densità del salgemma 2,16
gesso 2,3



Da Price & Cosgrove, 1990

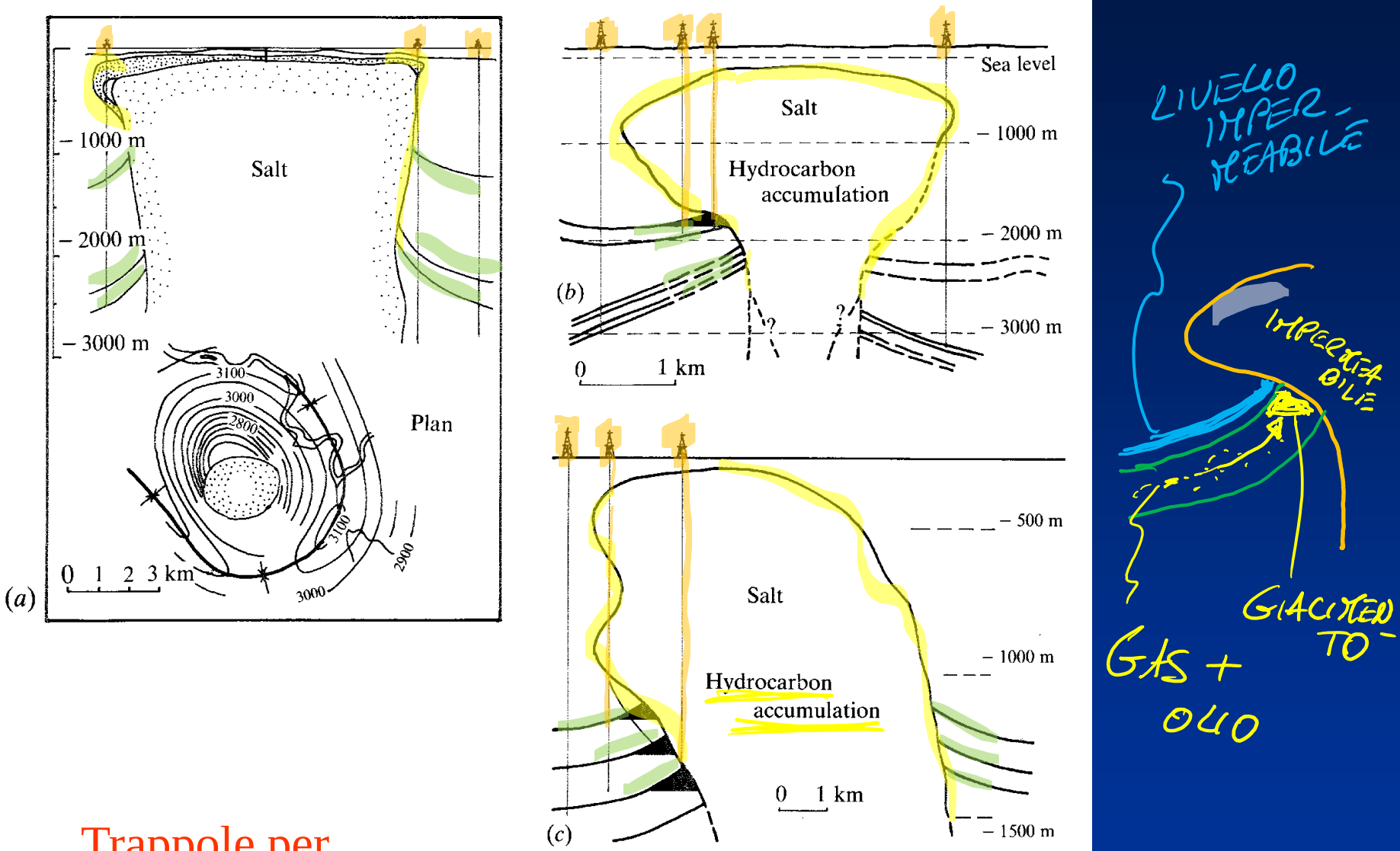


Fig. 4.8. Profiles indicating morphology of a variety of real salt domes or plugs (*a*) Zanapa Dome, Mexico. (*b*) Bethel Dome, Texas, U.S.A. (*c*) Cote-blanche Dome, Louisiana, U.S.A. ((*b*) and (*c*) after Halbouty, 1967).

Trappole per idrocarburi

Da Price & Cosgrove, 1990

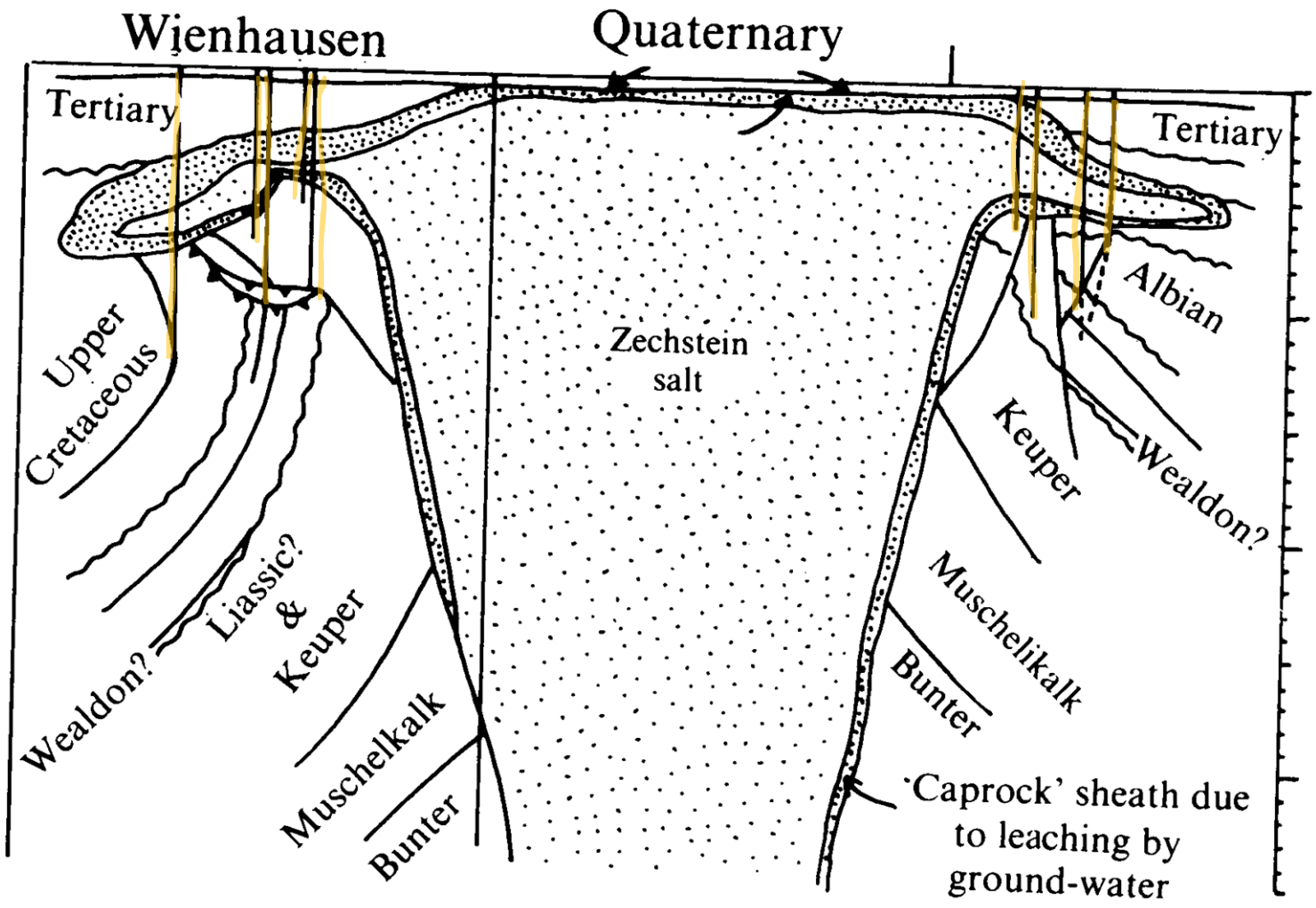
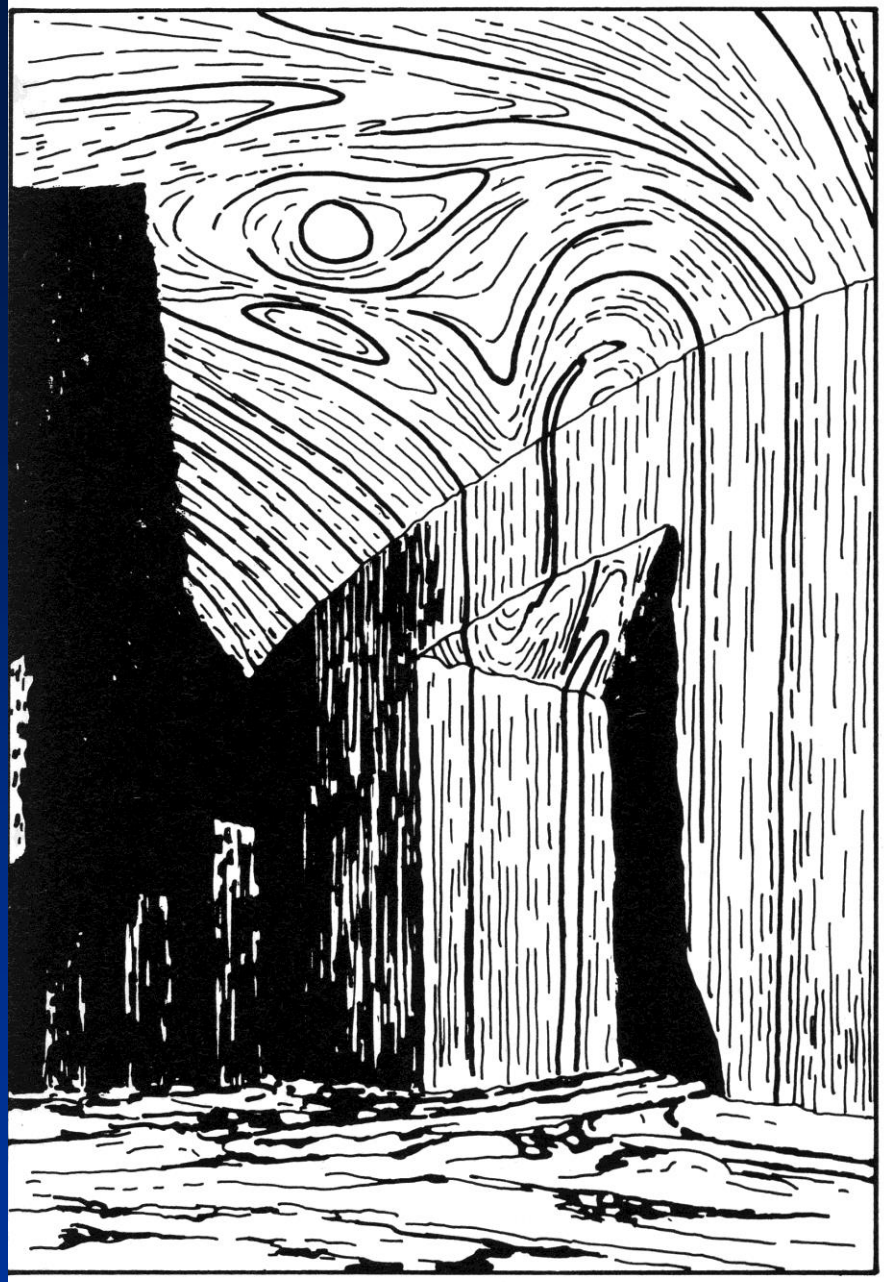


Fig. 4.25. Section through the Wienhausen Salt Plug, N.W. Germany. (From Gussow, 1968; after Schott, 1956.)

Da Price & Cosgrove, 1990



. 4.10. Sketch of vertically plunging folds revealed in the gal-
es of a salt mine. (After Balk, 1953.)

HALITE

DIFF. TOTALMENTE

DUTTILE

QUANDO RISALE

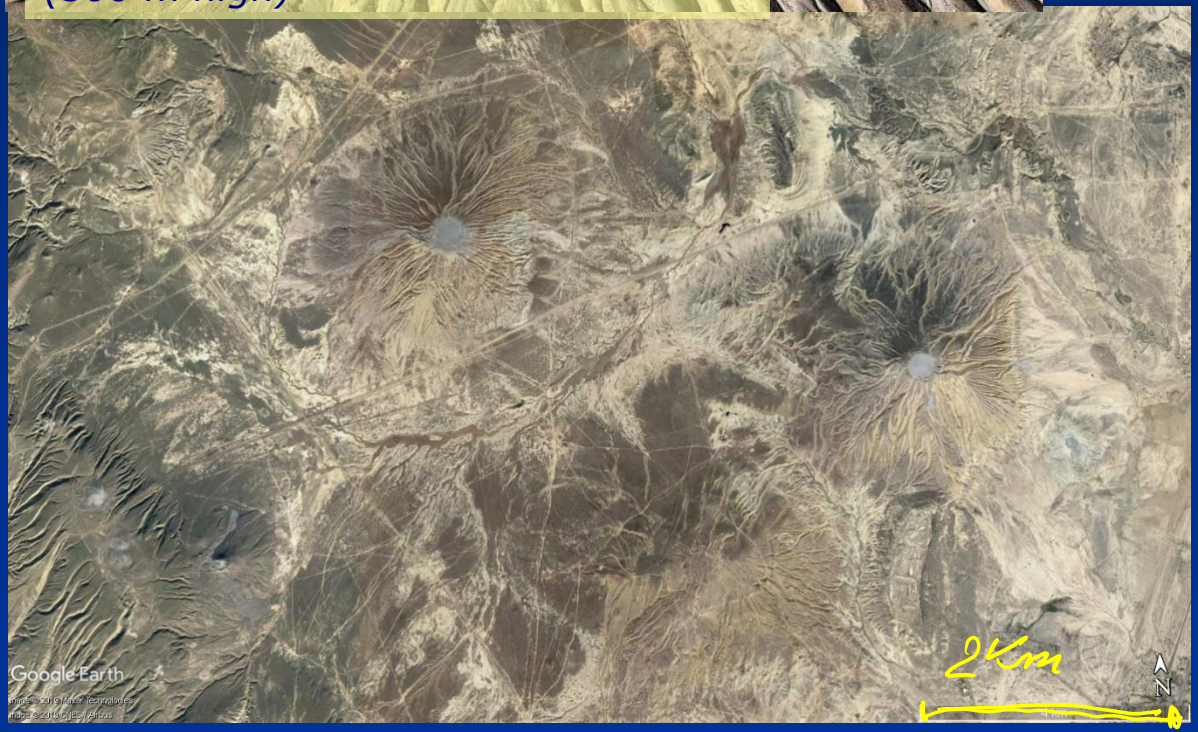
Da Price & Cosgrove, 1990

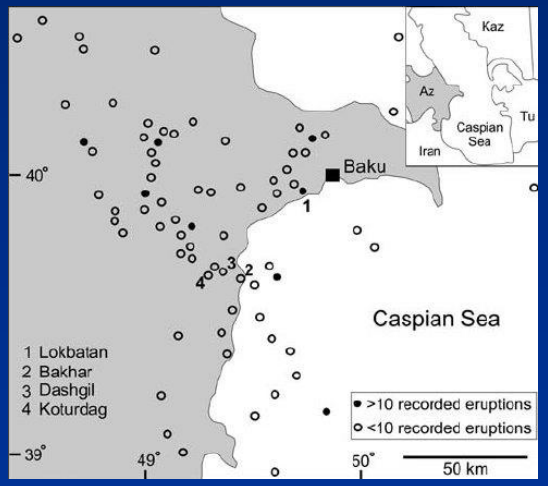

N
Image © 2011 DigitalGlobe
Image © 2011 GeoEye
© 2011 Cnes/Spot Image
Google
Imagery Dates: Mar 13, 2006 - Sep 6, 2009
28°00'00.95" N 54°54'35.91" E elev 4281 ft
Eye alt 10.84 mi

Vulcani e diapiri di fango, grifoni, salse

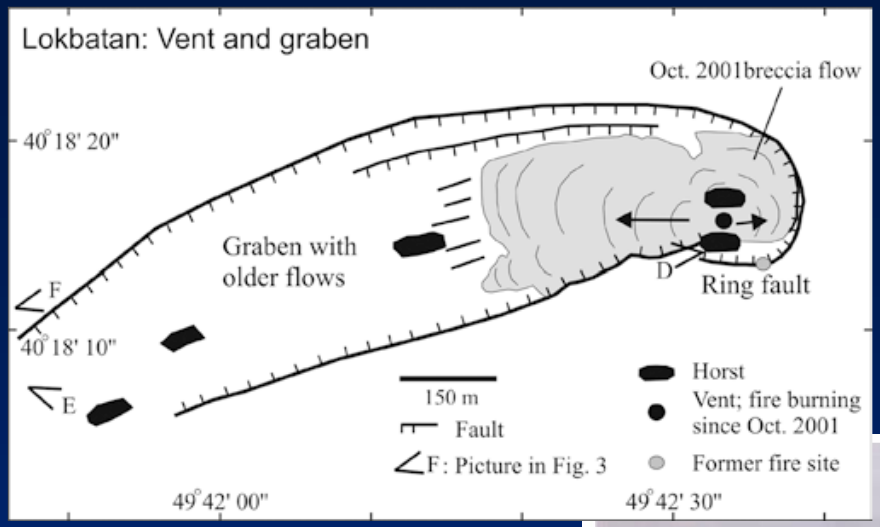
SALSE
DI
NIRANO

Da Phil Hardy, BBC, 2001

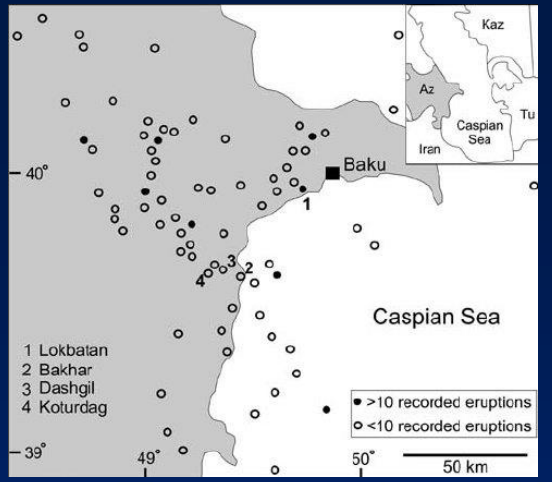


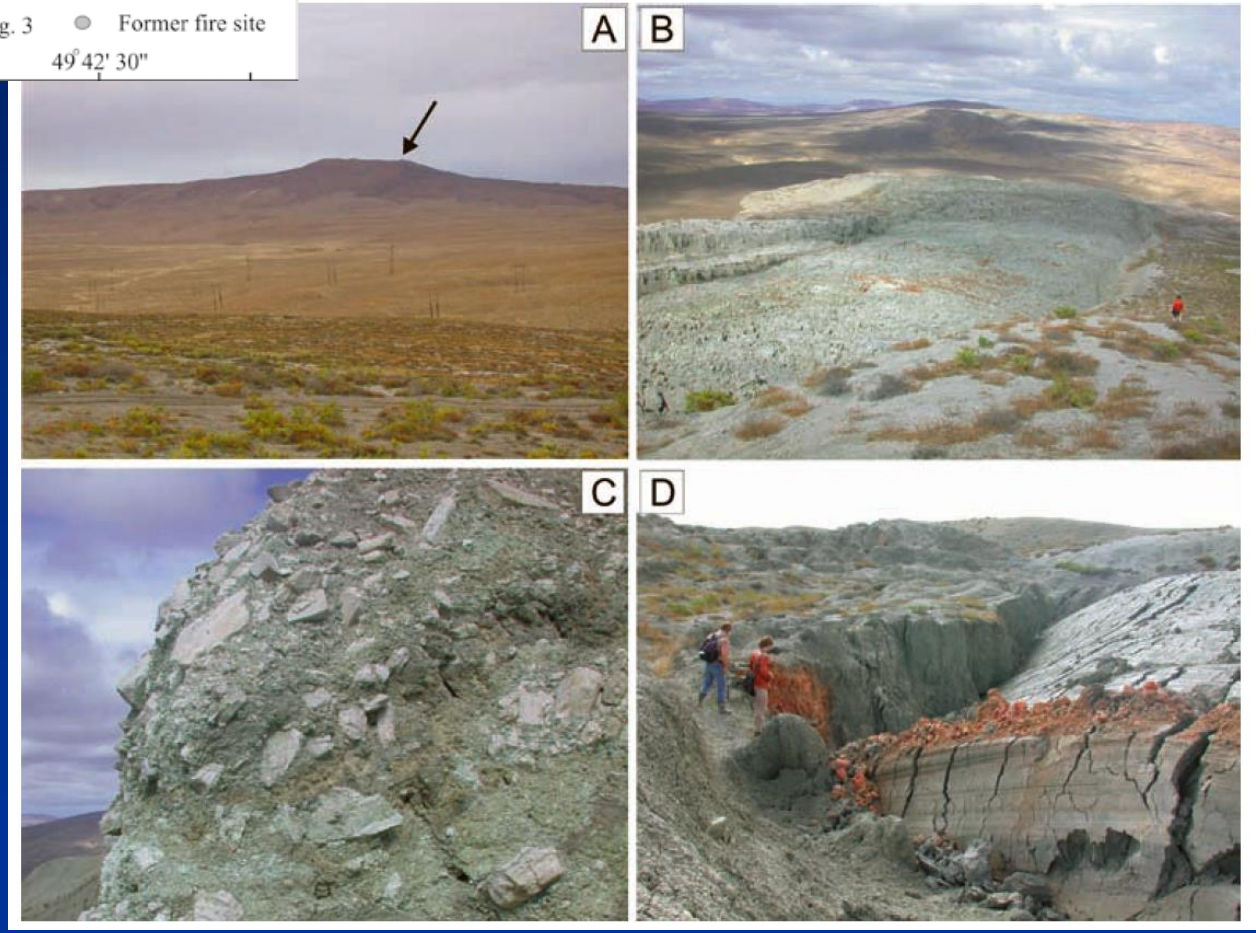


Qobustan National Park, Azerbaijan



Da Planke et al., 2003



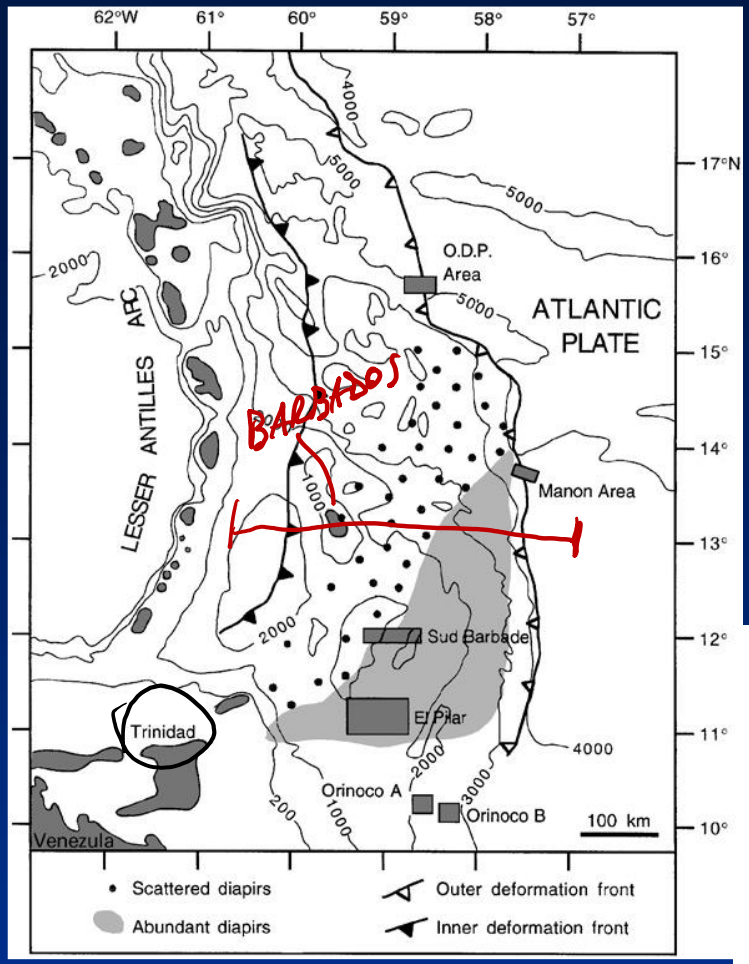


Qobustan National Park, Azerbaijan

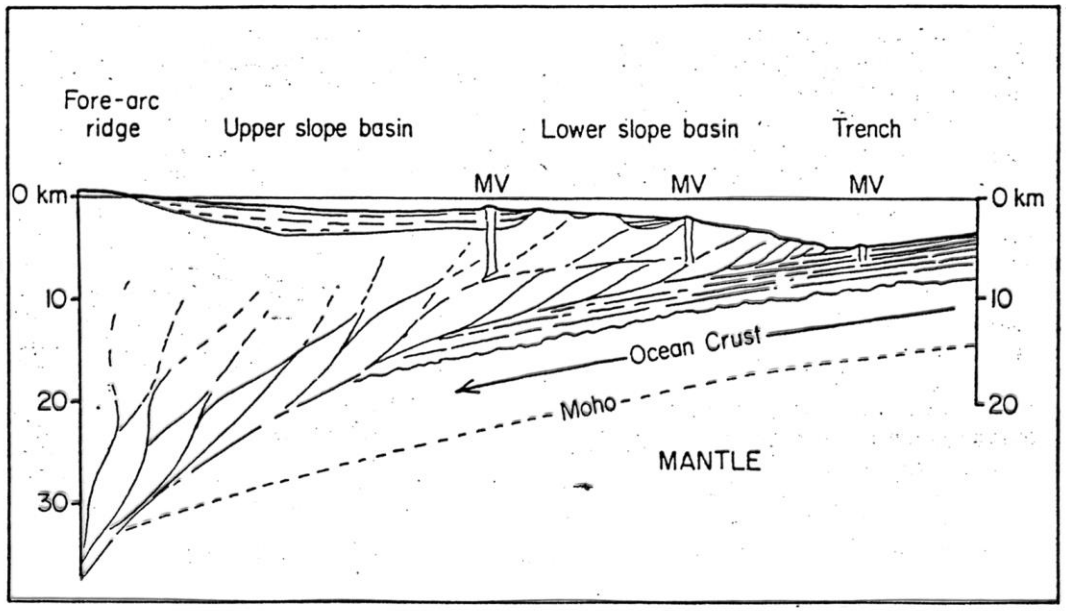
Vulcani di fango nel prisma di accrezione, Barbados

PRISMA ESTREMAMENTE RICCO DI SEDIMENTI

SOVRALIMENTATO (DAL SUDAMERICA)

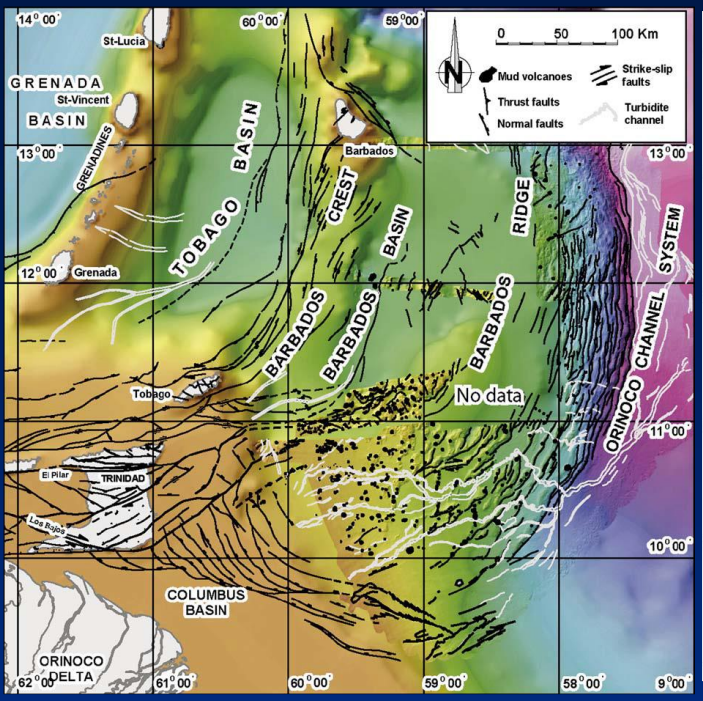


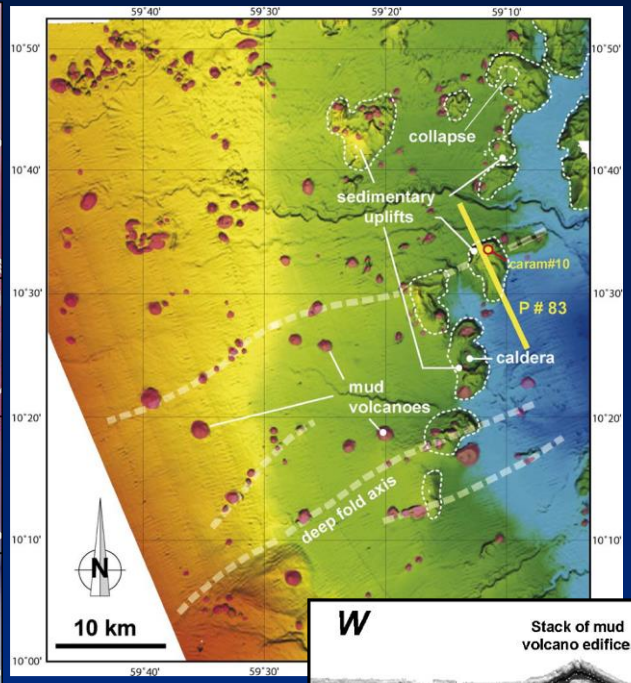
Da Aloisi et al., 2002

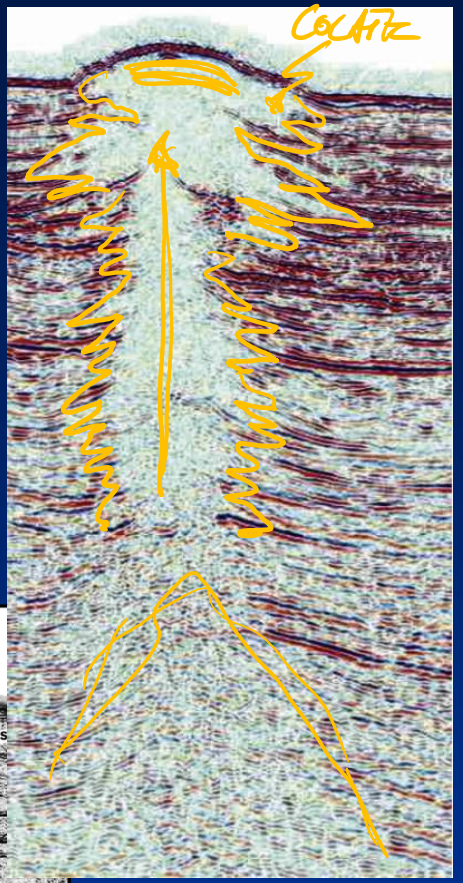


Da Barber & Brown, 1988

Vulcani di fango nel prisma di accrezione, Barbados







Da Wood, 2012

Da Deville, 2009

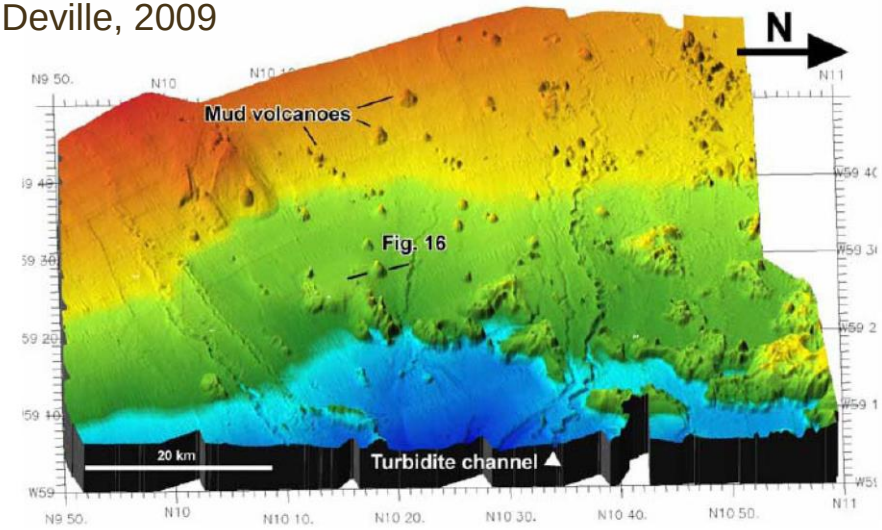
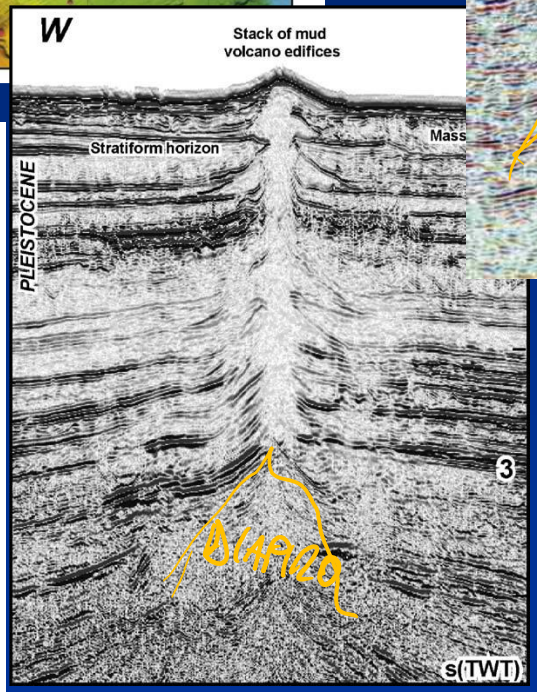
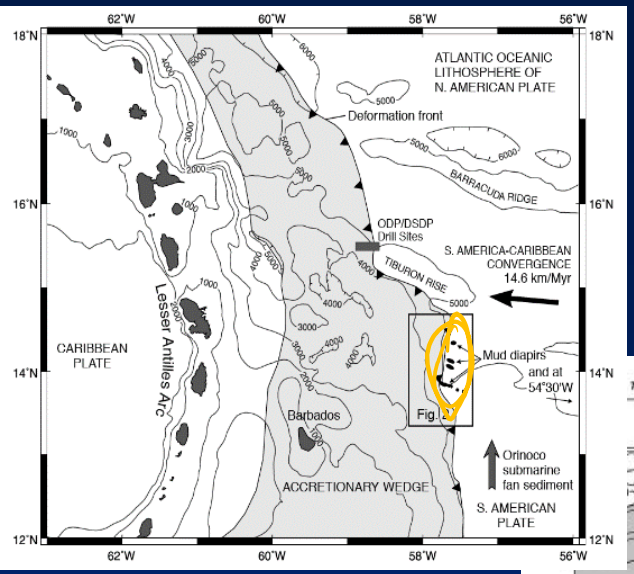


Figure 2. Field of mud volcanoes in the eastern continental slope of the offshore of Trinidad.

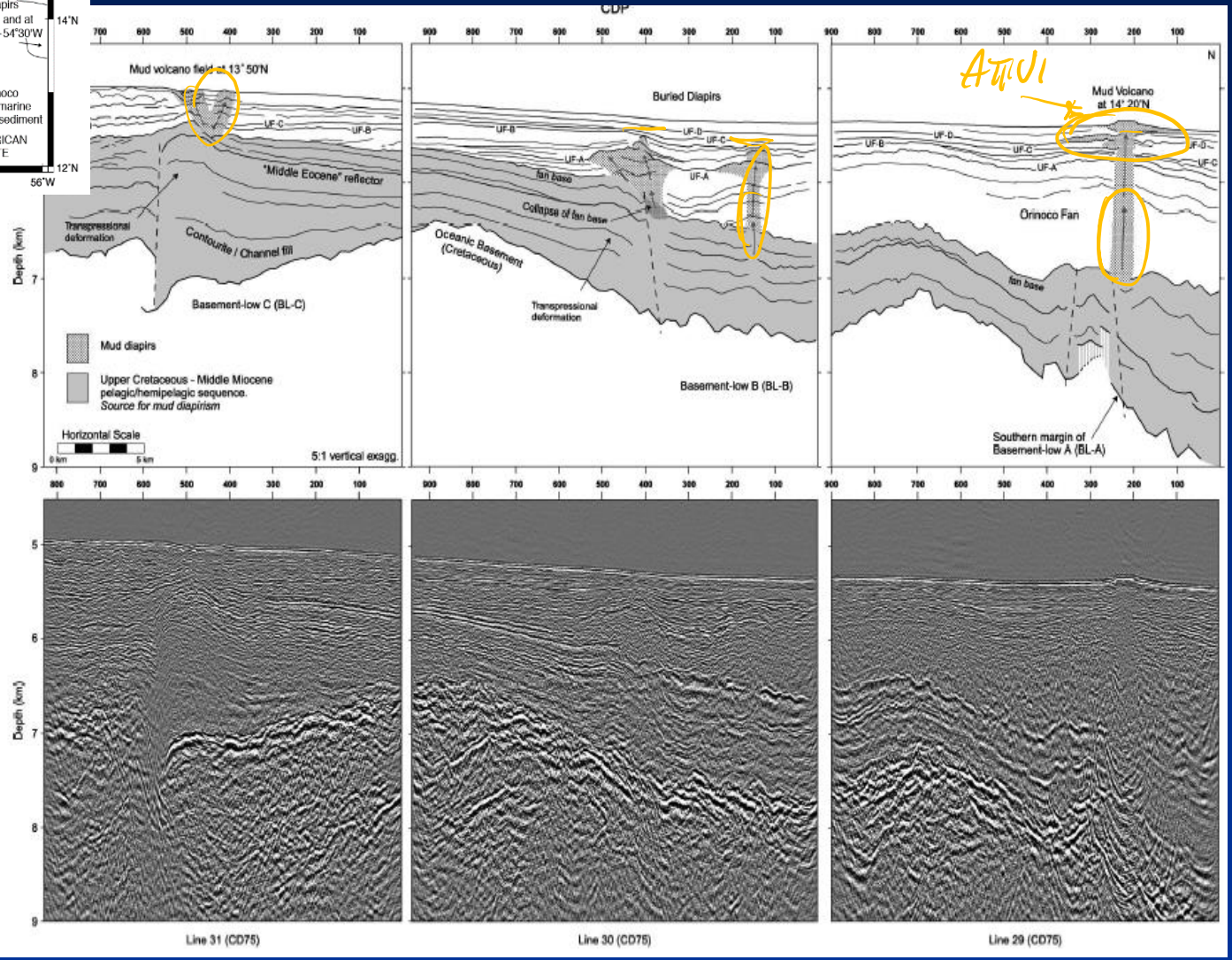


Da Deville et al. 2007

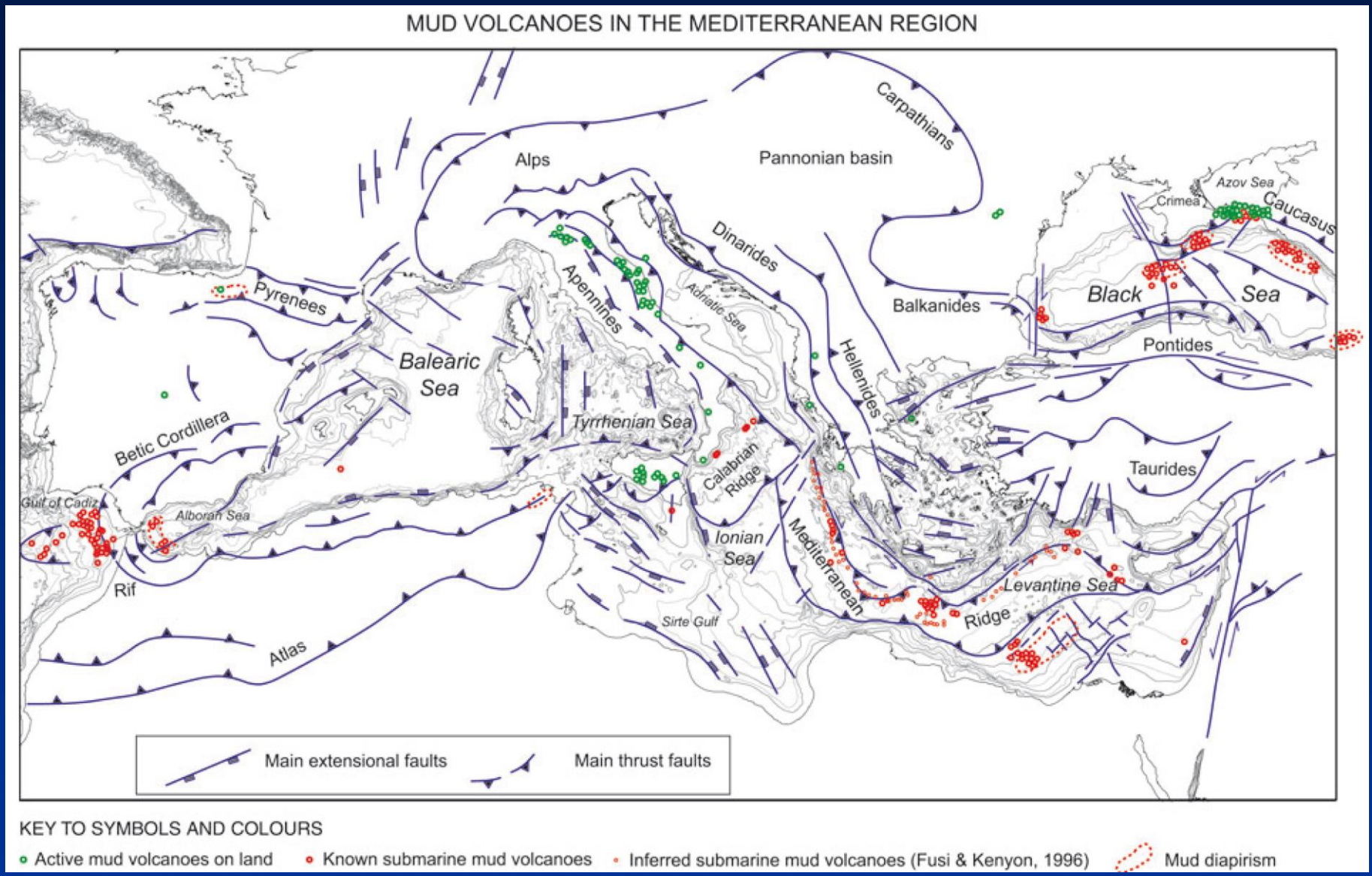
Diapiri di fango in avanfossa, Barbados



Sumner & Westbrook, 2001. Marine and Petroleum Geology, 18, 591-613.

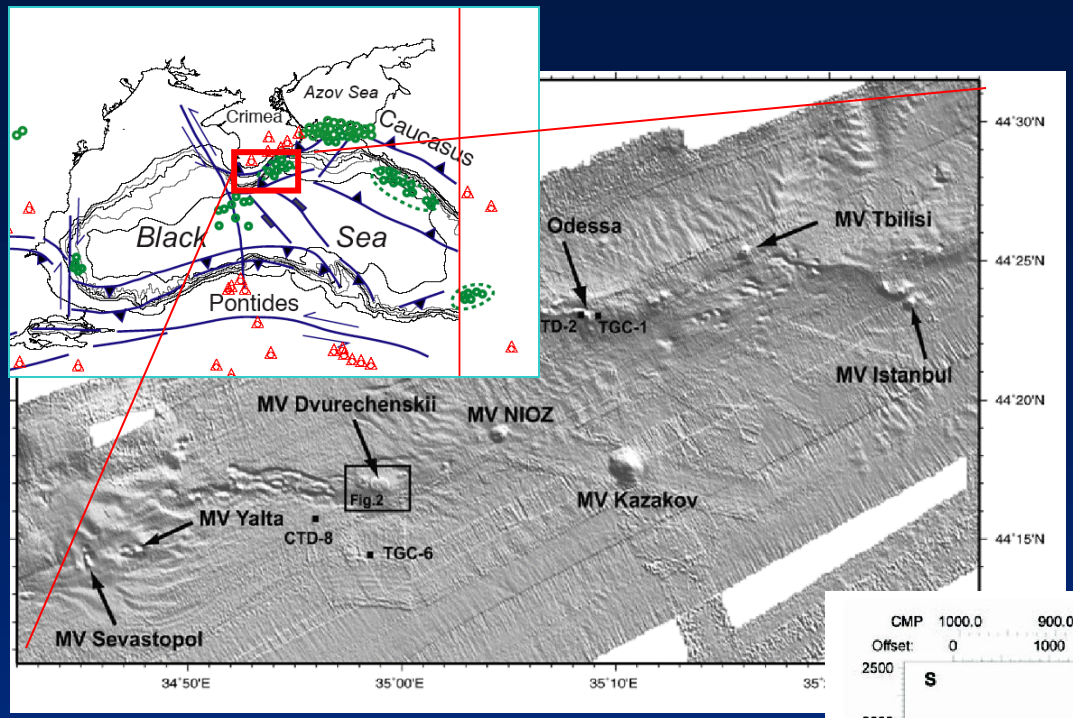


Diapiri e vulcani di fango



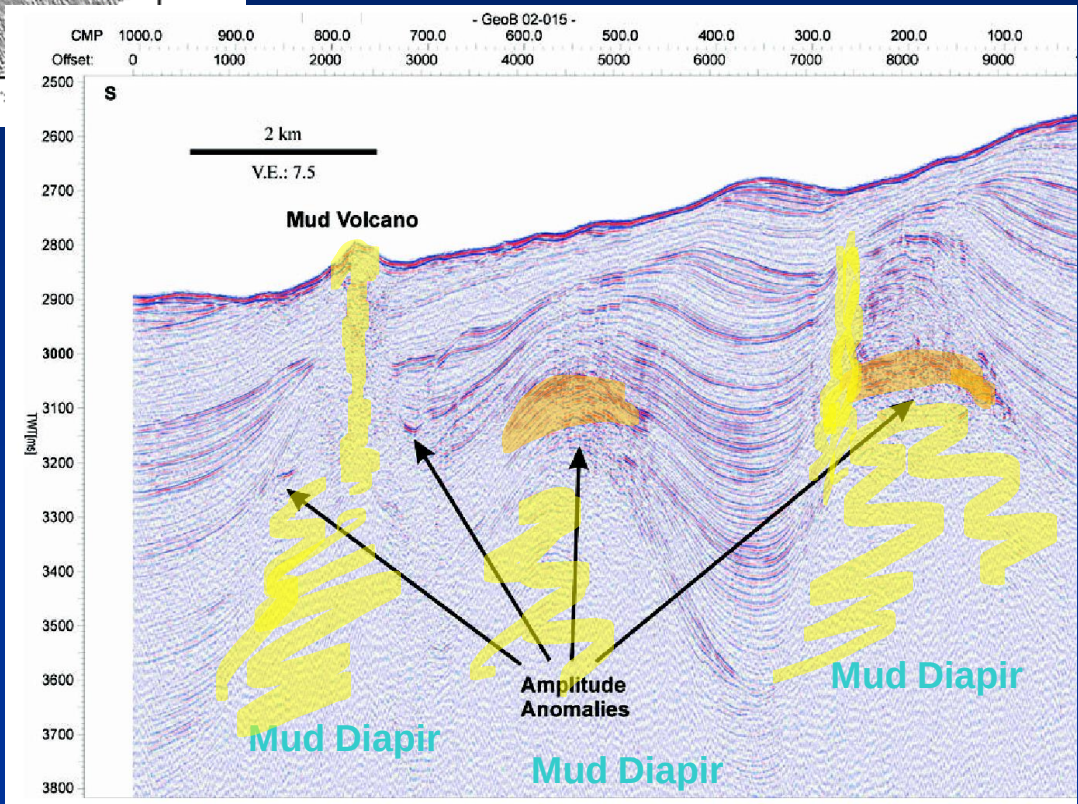
Da Camerlenghi & Pini, 2009

BLACK SEA MUD VOLCANOES

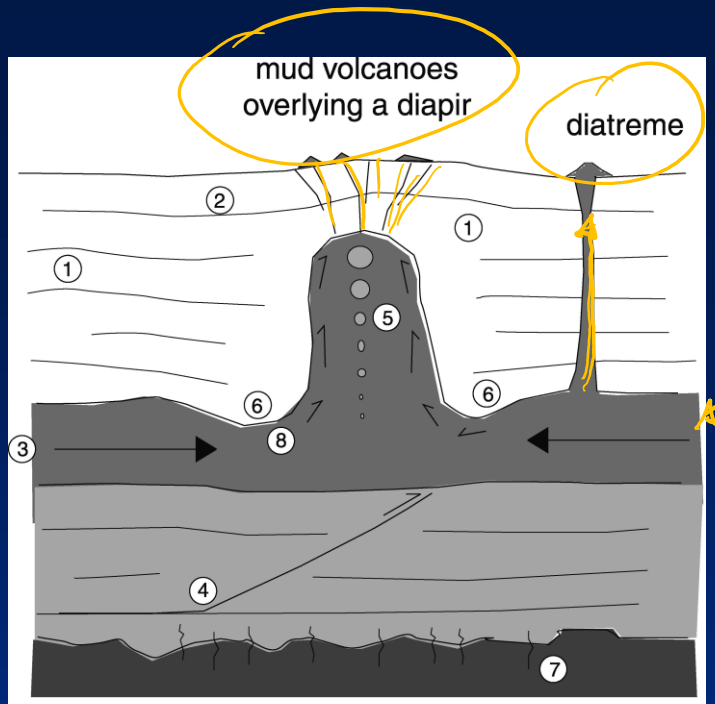


Da Bohrmann et al., 2003

Da Krastel et al., 2003



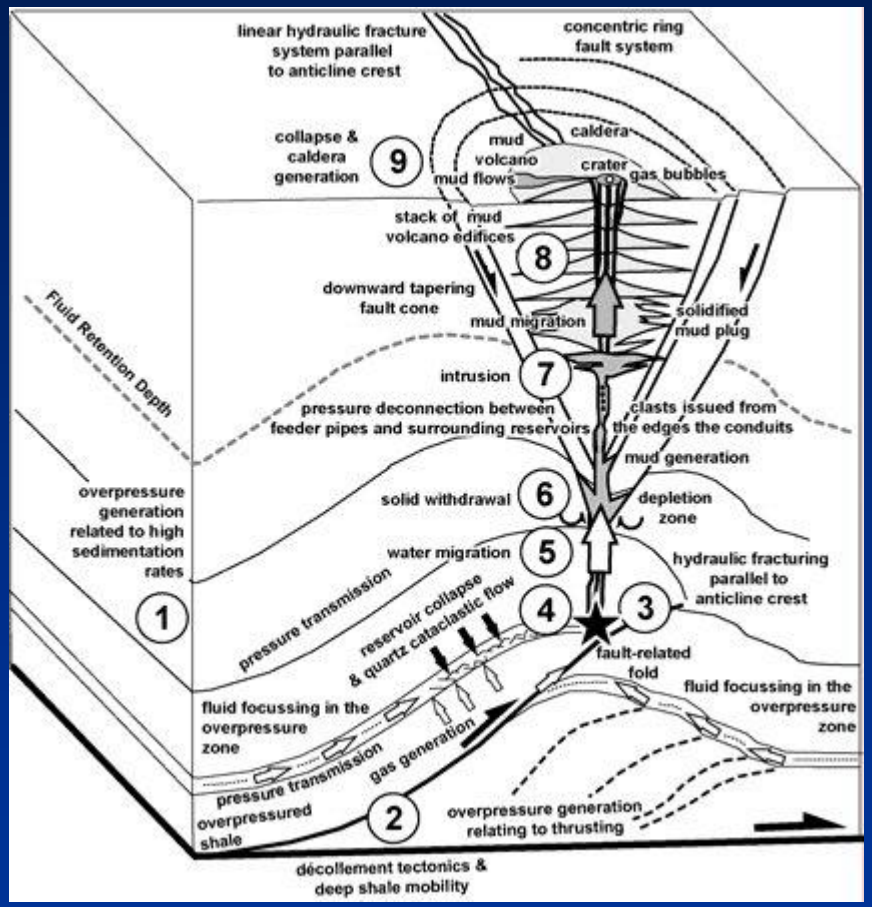
Courtesy of A. Camerlenghi



fluid sources for overpressuring and mud extrusion:

(1) pore fluid expulsion from compaction
(2) biogenic methane from degradation of organic matter
(3) lateral fluid flux through stratigraphic horizons or fault zones
(4) fluid migration along deep seated thrusts
(5) thermogenic methane and higher hydrocarbons
(6) fluids from mineral dehydration (opal, smectite)
(7) hydrothermal fluids, alteration of crustal rock
(8) fluid expulsion from internal deformation within the diapiric intrusion

Da Kopf, 2002



Da Deville, 2009

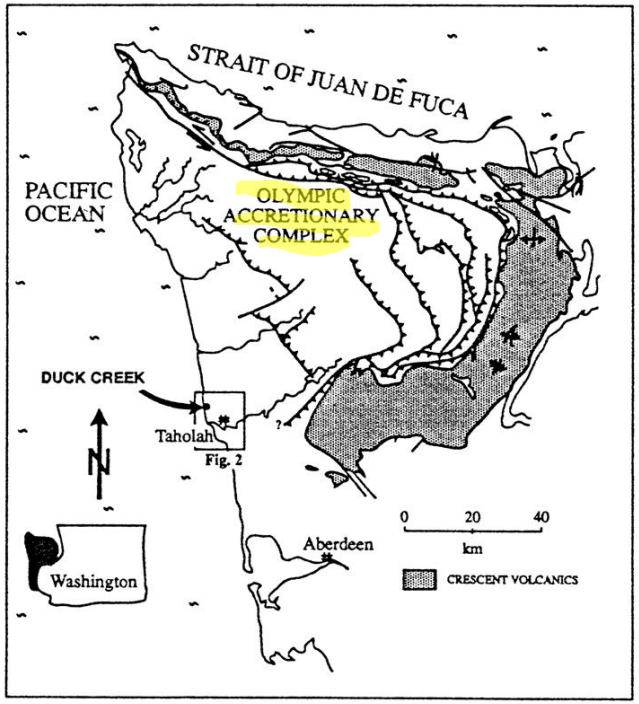
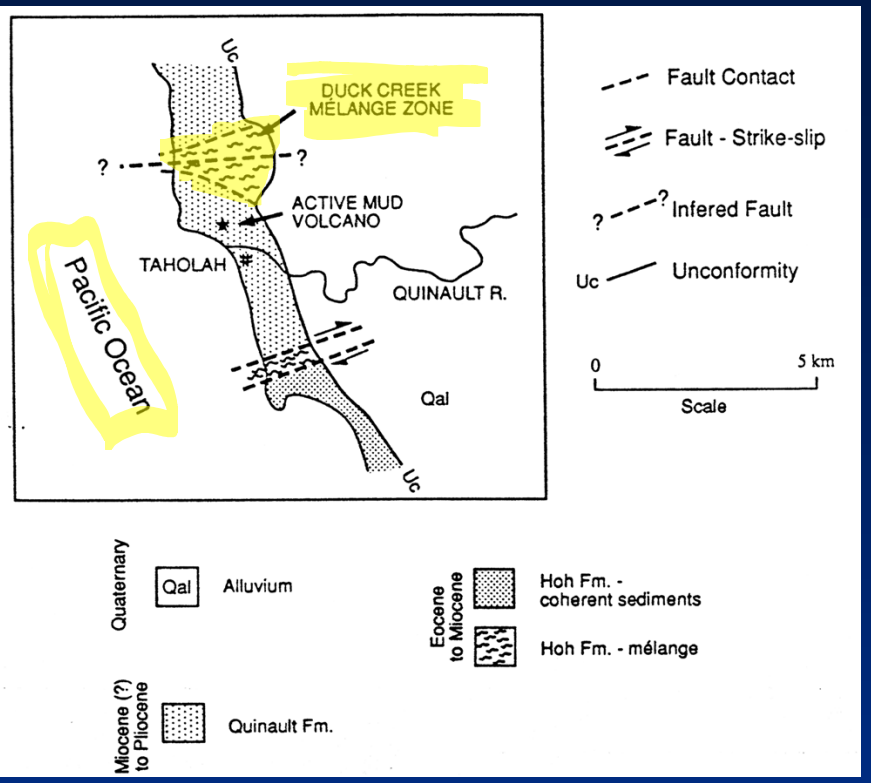


Fig. 1. Location of the Olympic Peninsula, Washington, U.S.A. The Duck Creek mélange is located on the coast of the Peninsula approximately 10 km north of Taholah, near the southern limit of the exposed Olympic accretionary complex (after Tabor & Cady 1978, Snavley & Kvenvolden 1988).



Brown & Orange, 1993

Duck Creek mélange: un diapiro di fango

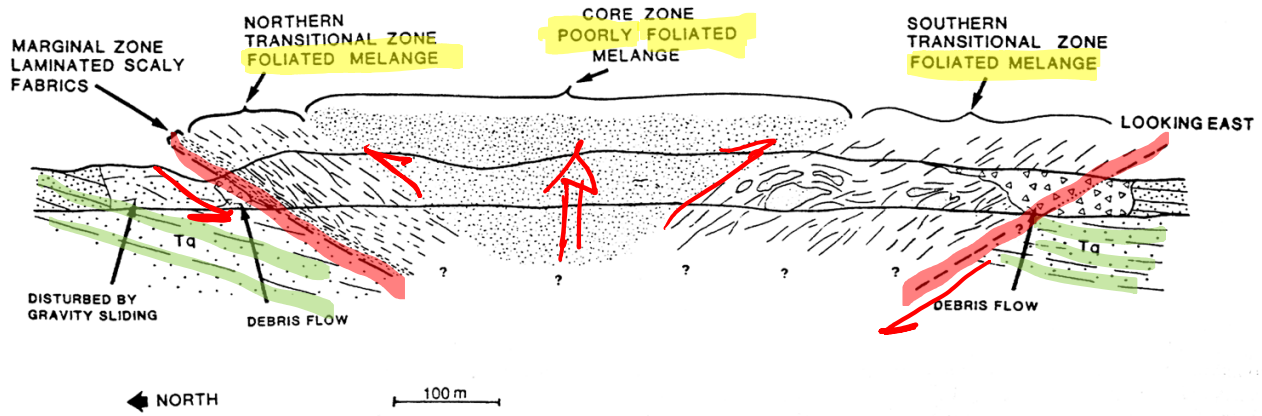
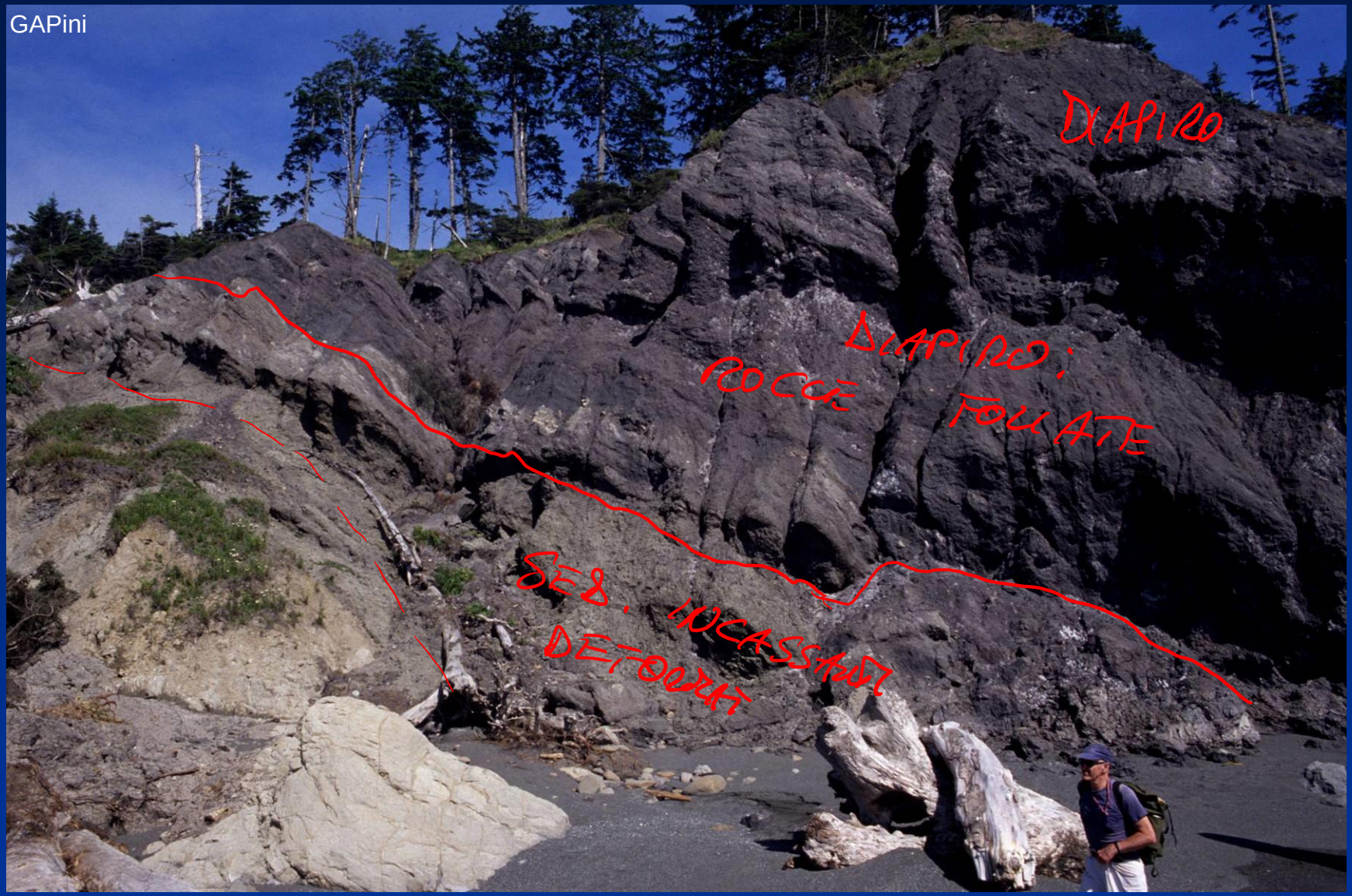


Fig. 4. Cross-section though the Duck Creek mélange, view is to the east. With the exception of the slumped contacts, the mélange has near 100% exposure along the steep 20 m sea cliffs. These steep exposures have the advantage of corresponding to a cross-section of the mélange.


GAPini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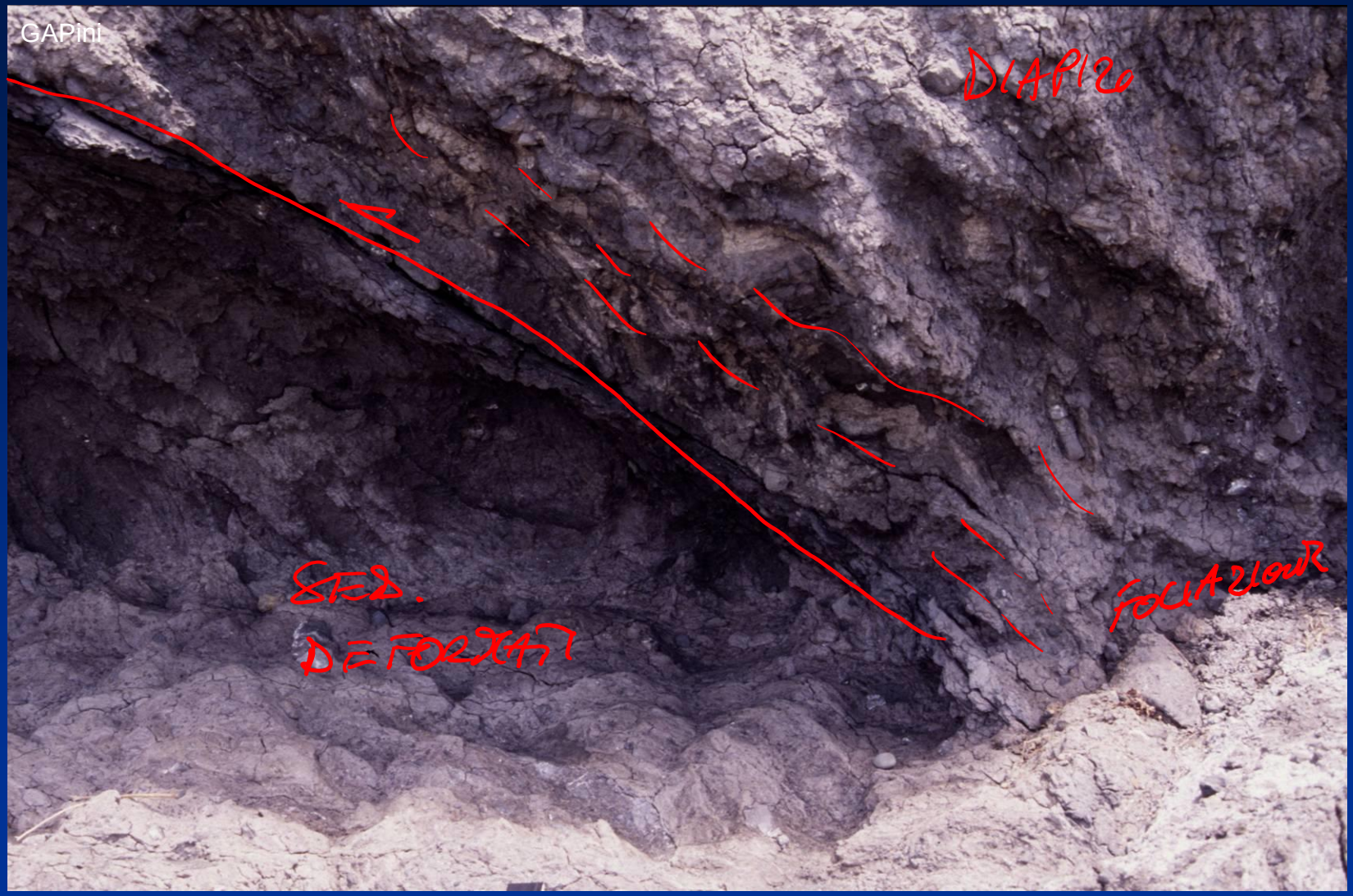
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