

Feb 5, 6 2023
M 7.8, 7.5
Turkey (Türkeyi)-Syria
EQ sequence



Feb 13, 2023

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Figure 1.2-1: Global seismicity, 1963-1995.

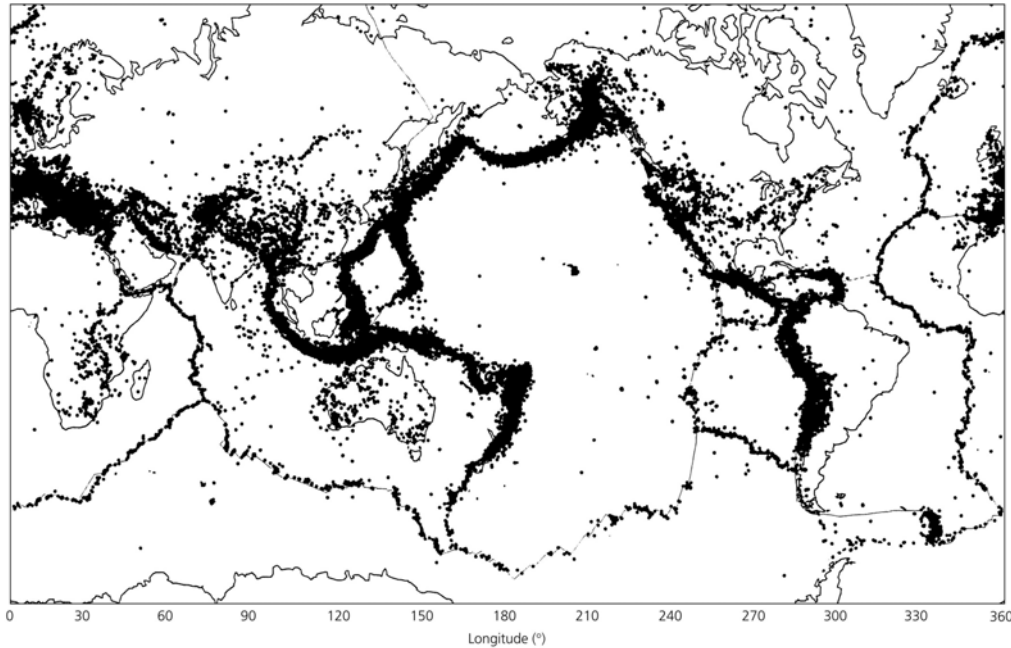


Figure 5.2-4: Relative plate motions and diffuse plate boundary zones.

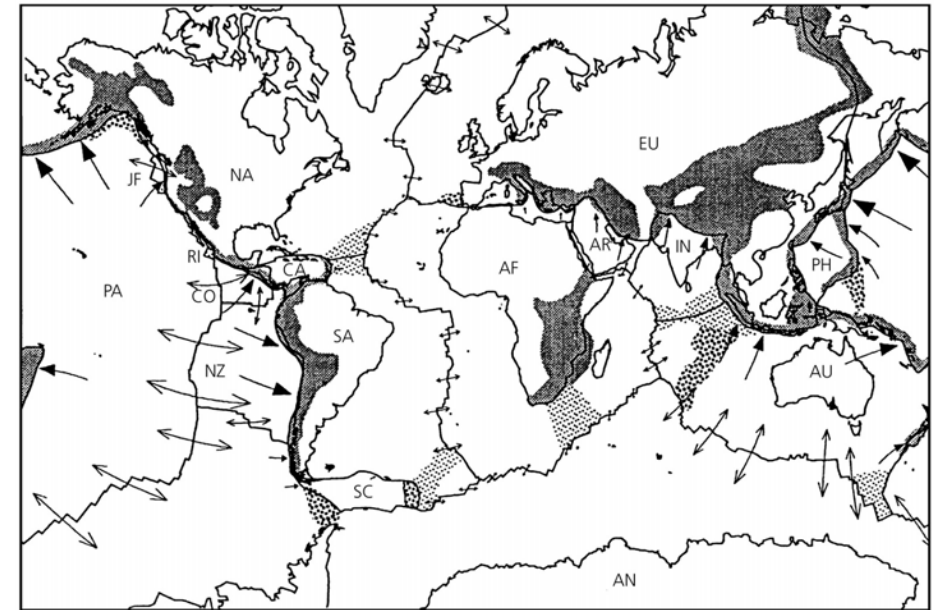


Plate & Microplate Motions, EQs, Faults

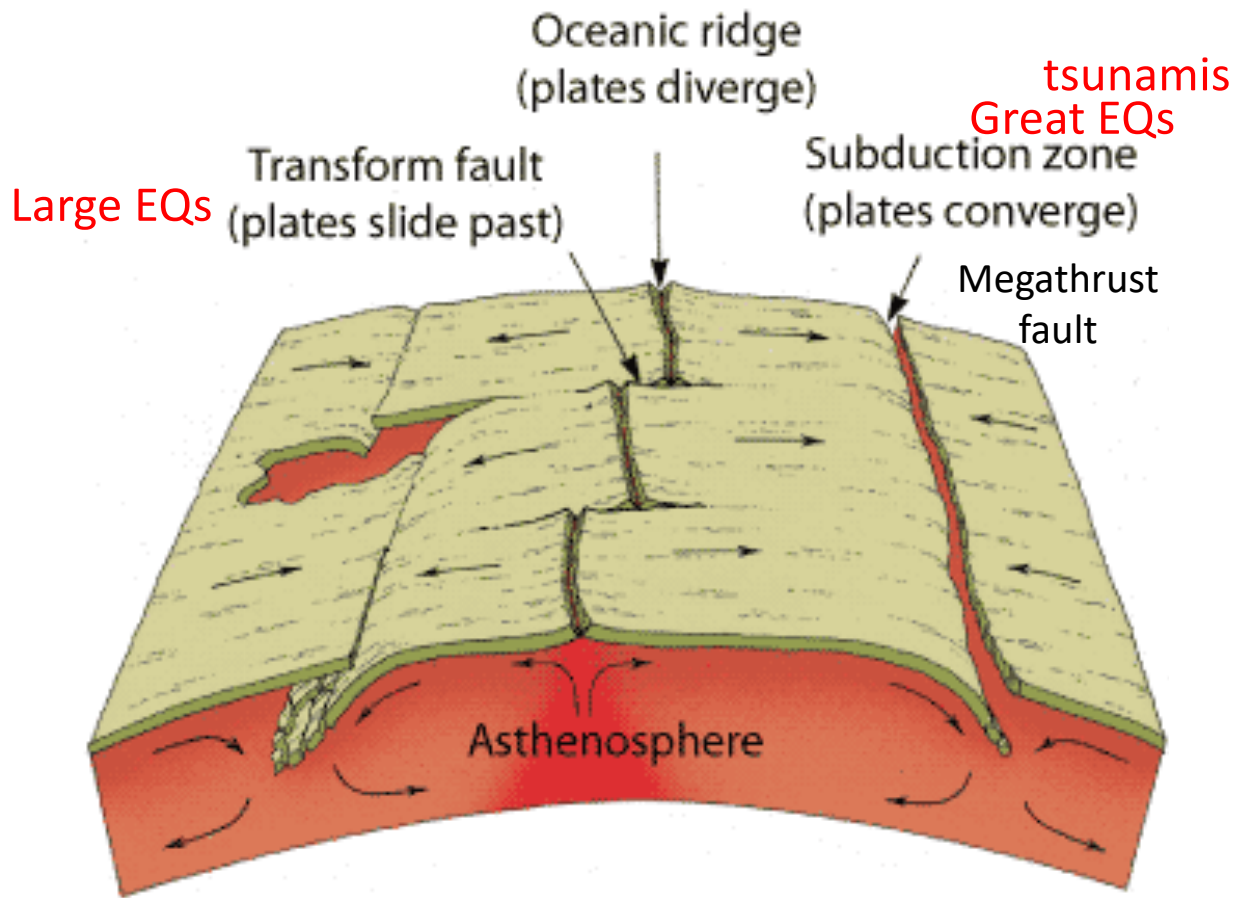
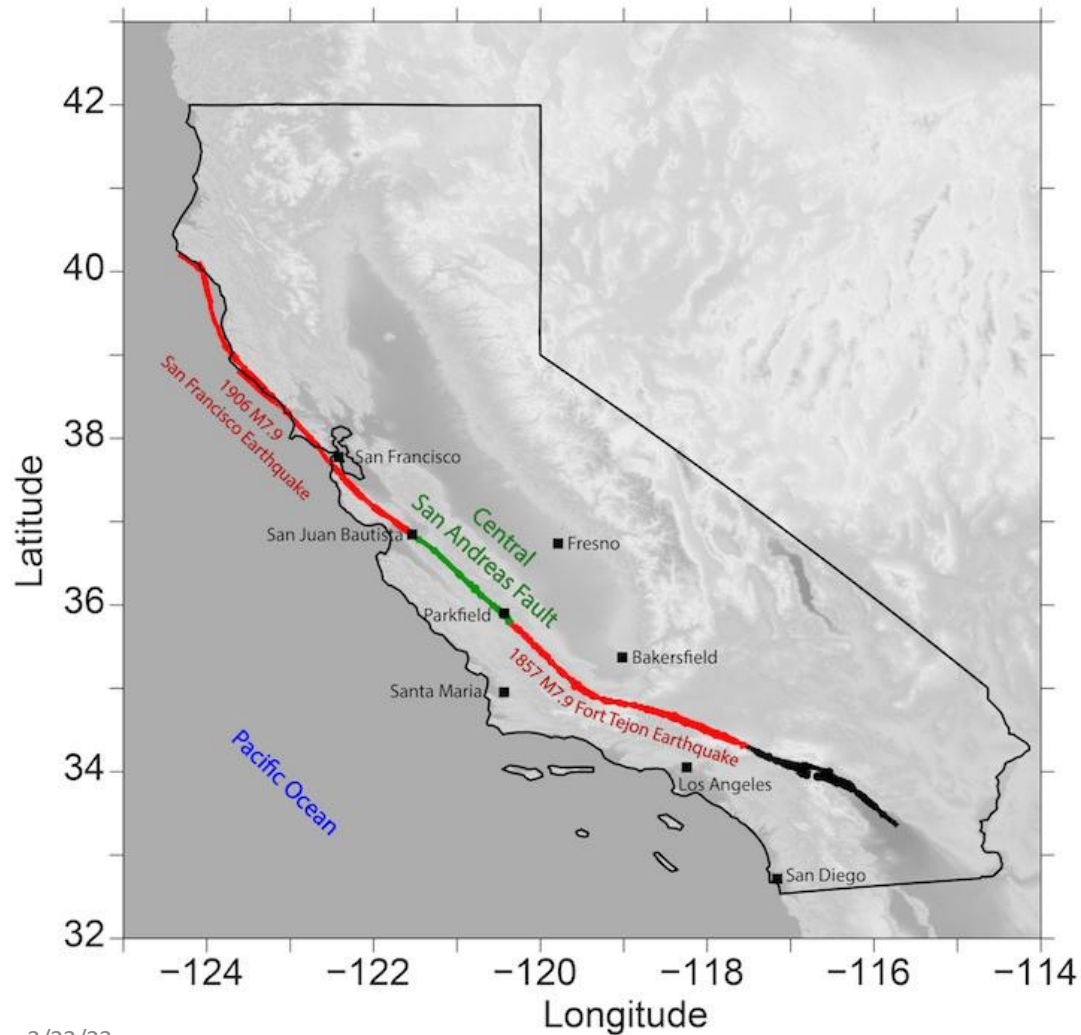


Plate Boundary Fault Types

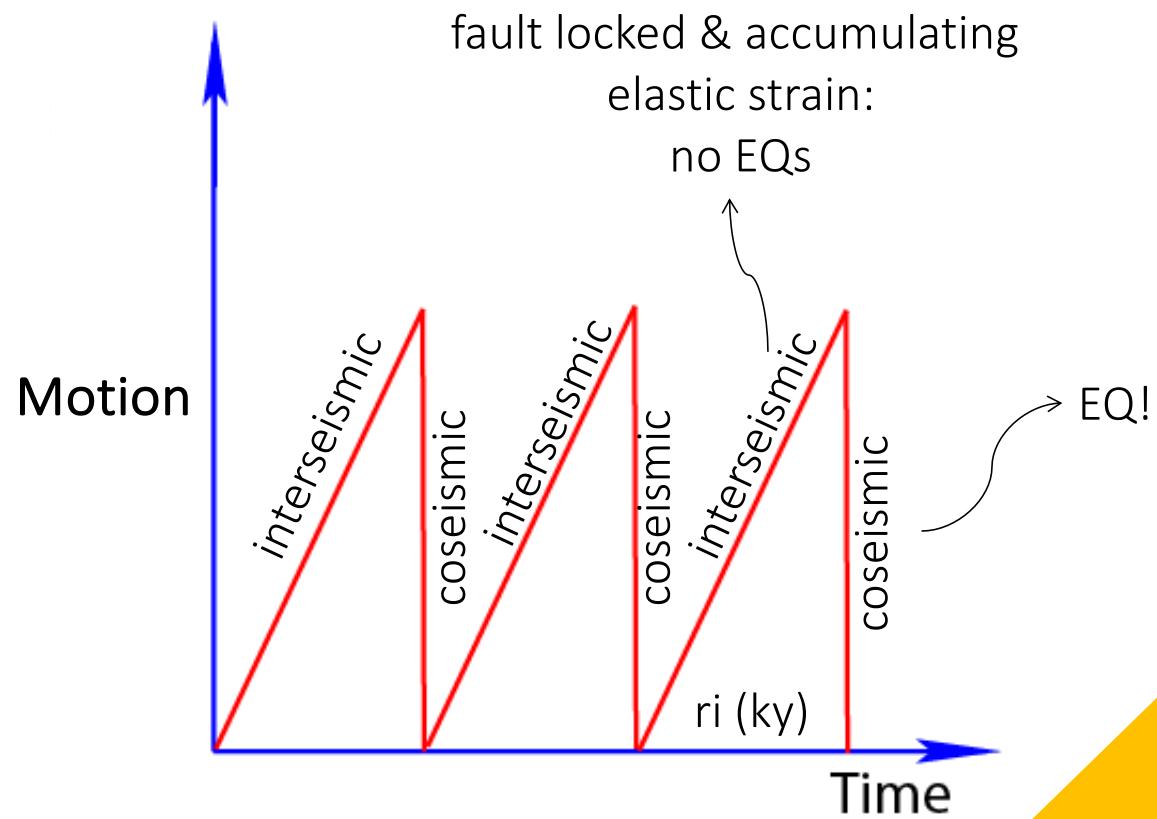


2/22/23

Locked
versus
 Creeping
 (Transform)
 Faults: SAF
 38 mm/yr

THE EARTHQUAKE CYCLE FOR LOCKED FAULTS

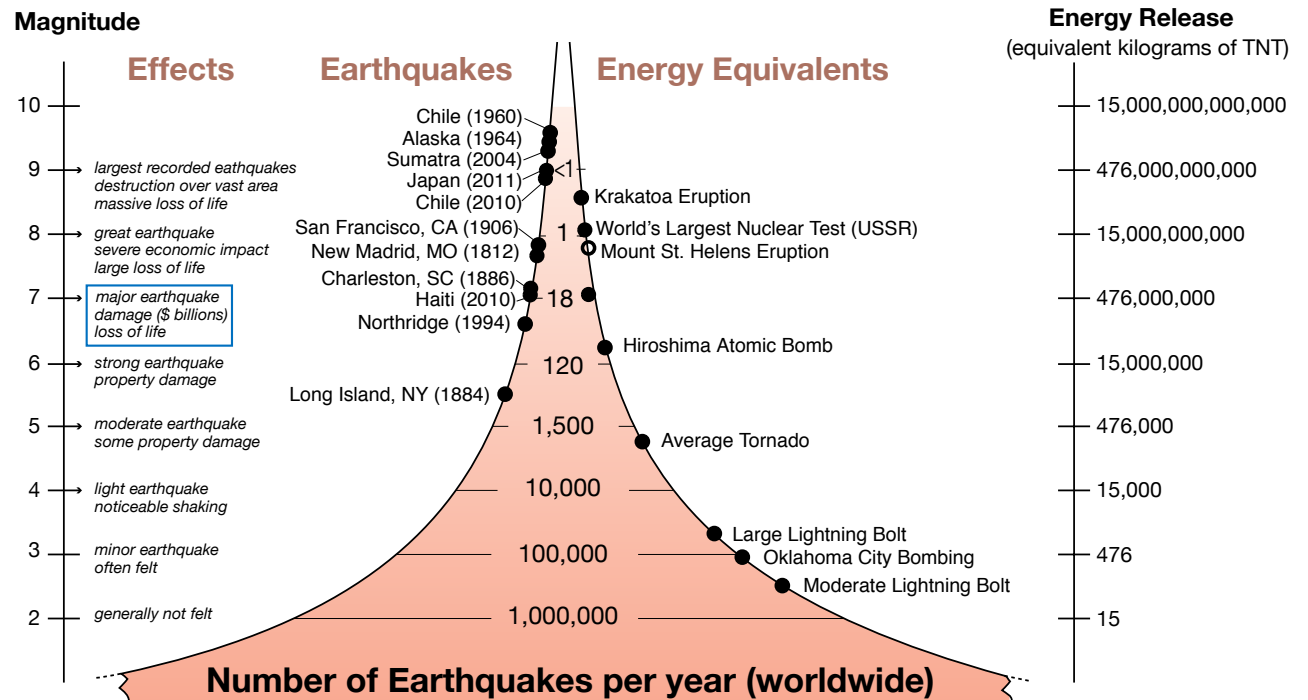
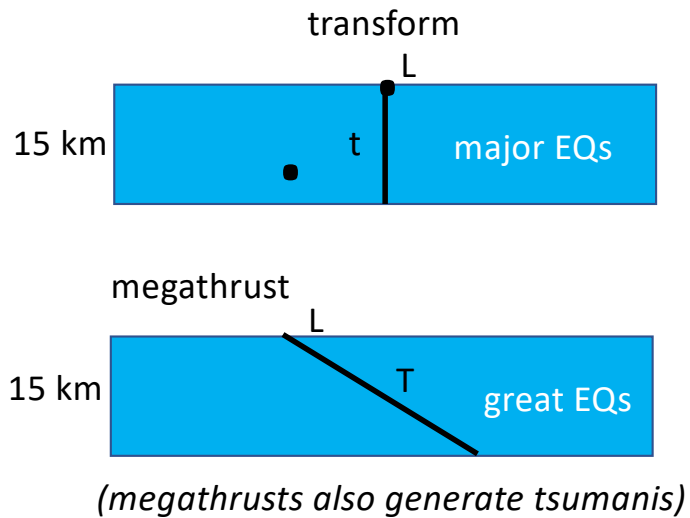
Reid (1910)

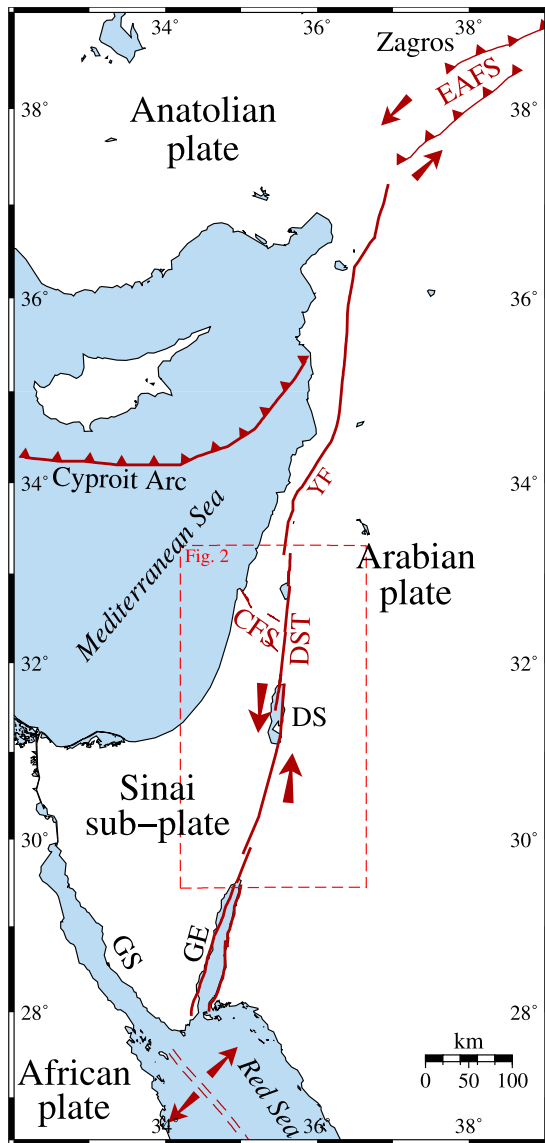


Magnitude of EQs

$M = \text{area (thickness} \times \text{length) of fault patch rupture} \times \text{fault slip} \times \text{constant}$

Brittle crust =
 "EQ" generation zone →
 thickness 15km





EAFS – East
Anatolia
Fault
System

DST – Dead
Sea
Transform
(Fault) 3 mm/yr

Sinai
Microplate &
Dead Sea
Transform
Fault

2/22/23

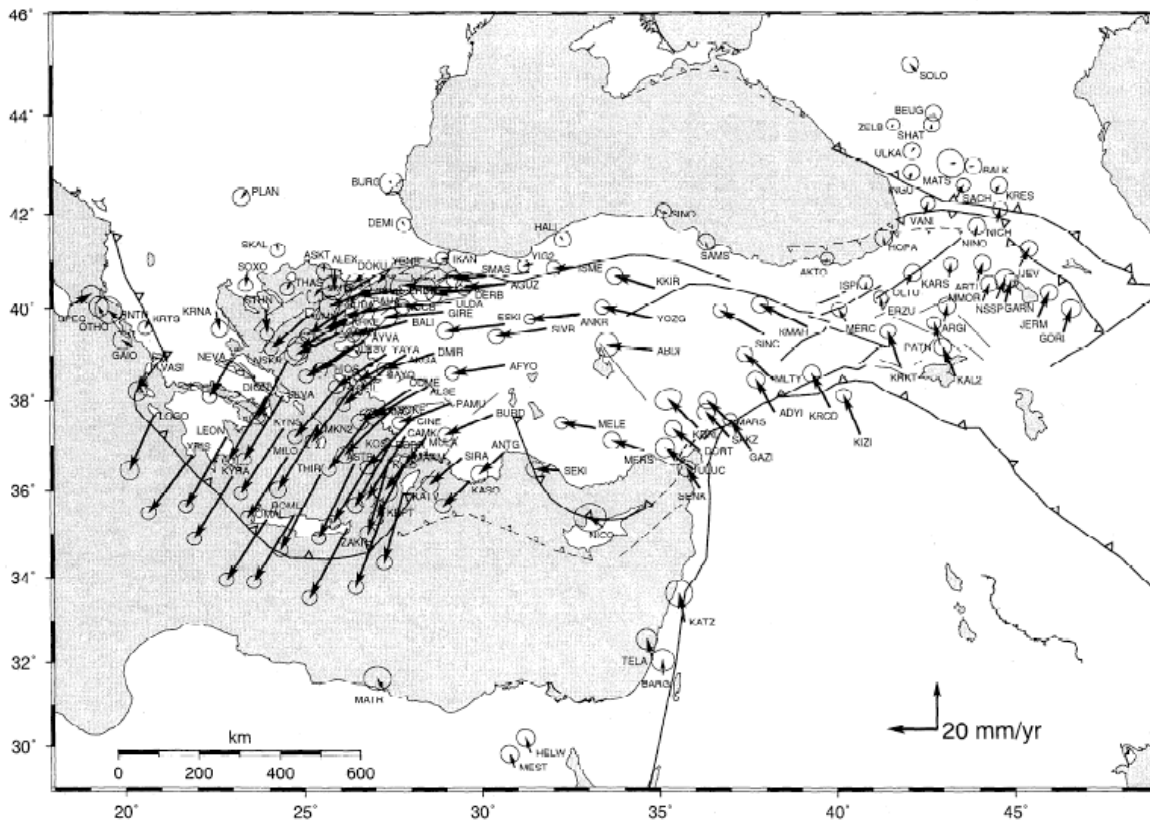
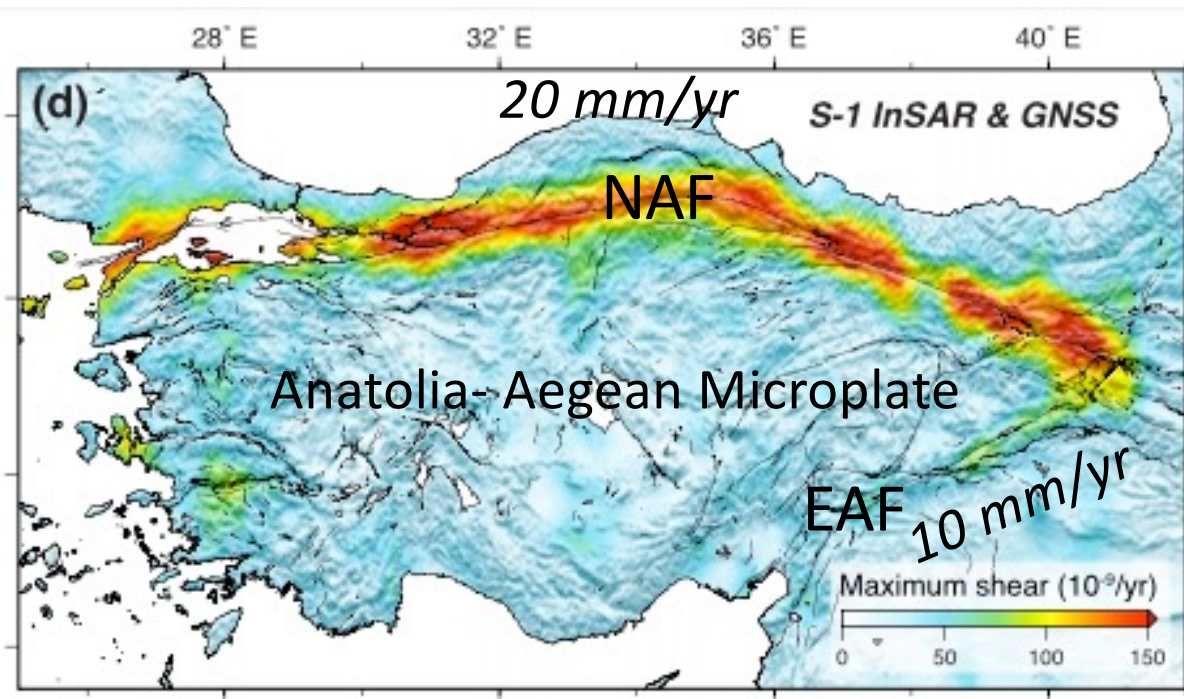


Figure 2. GPS horizontal velocities and their 95% confidence ellipses in a Eurasia-fixed reference frame for the period 1988–1997. To avoid clutter, we have omitted plotting some sites in the Marmara region, but in Table 1 we list velocities for all sites. Tectonic symbols are as in Plate 1.

Anatolia-Aegean Microplate



North & East Anatolia Faults: Microplate Boundaries

The Economist Feb 5, 6 EQ Sequence



Source: USGS

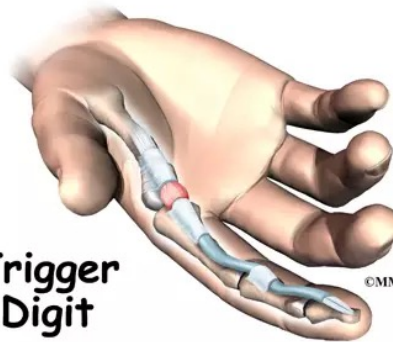
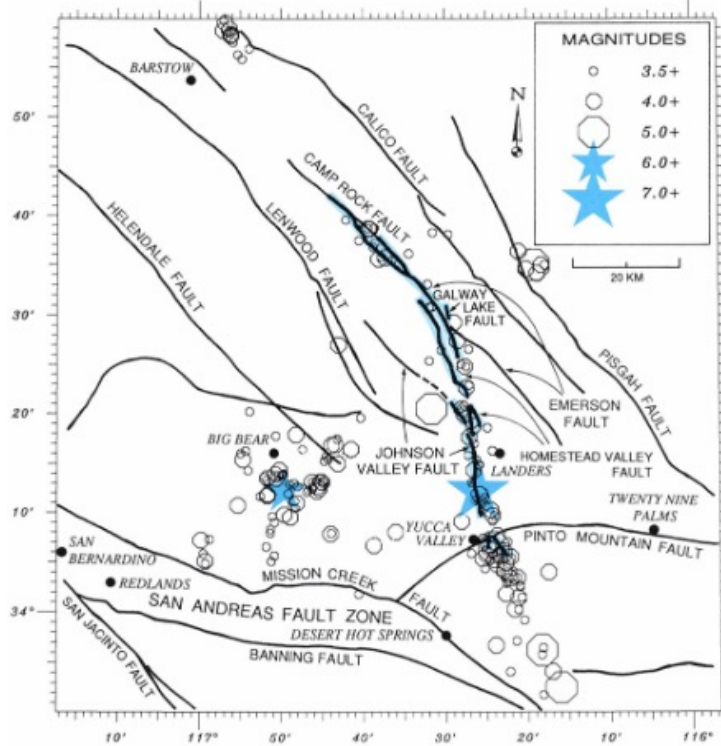
3 meters of slip



15 km x 200 km x 3 m x constant = M 7.5-7.8

Source: Dr. Hasan Sözbilir

Triggered EQs and EQ Sequences

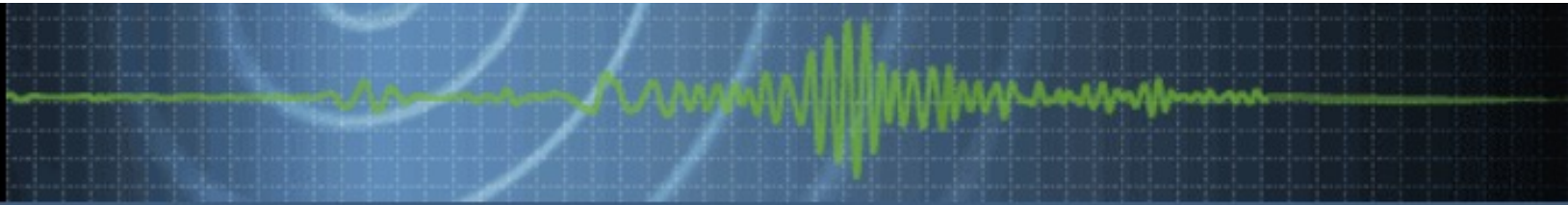


Trigger
Digit

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- Landers (M 7.5) - Big Bear (M 6.6) CA USA 1992:

<https://www.conservation.ca.gov/cgs/earthquakes/landers-bigbear>



Feb 5, 6 EQ Sequence

USGS NEIC

Feb 5 (M7.8): <https://earthquake.usgs.gov/earthquakes/eventpage/us6000jllz/executive>

Feb 6 (M7.5): <https://earthquake.usgs.gov/earthquakes/eventpage/us6000jlqa/executive>

Feb 20 M6.3 aftershock: <https://earthquake.usgs.gov/earthquakes/eventpage/us6000jqcn/executive>

History of EQs – North & East Anatolia Faults

The Attributes of God Displayed.

MM 1822

DREADFUL EARTHQUAKE AT ALEPPO.

We copy from the Religious Intelligencer the following account of this tremendous scene of devastation and confusion.

Aleppo, or **Haleb**, is one of the principal cities of the Ottoman empire, situated in an extended plain, but built on several little hills, on the highest of which the castle is erected, about 250 miles north of Jerusalem. Its population is estimated at about 250,000. The houses are large and commodious, all nearly of the same height, having terraces on the top, so that persons may pass from house to house without descending into the streets. It is encompassed with walls of hewn stone, about three miles in circumference, but including the suburbs, especially those to the north, the circuit of the city is not less than five miles. It is one of the cleanest and best built cities in the Turkish dominions; the houses are of hewn free stone, and some of the mosques rise to elegance and magnificence; these, contrasted with the tall cypress trees, give the whole a most picturesque appearance. But, "In one hour is so great riches brought to naught."

The following narrative of this most awful calamity is from the pen of Mr. Benjamin Barker, an agent of the British and Foreign Bible Society, who was preserved almost miraculously from the general destruction.

Garden of Ibrahim, Aga, near the ruins of Aleppo, Aug. 23, 1822.

"With a heavy heart I take up my pen to trace anew in my dejected mind the most dreadful of all events.* The wounds of affliction must bleed afresh when I recal to my memory the lamentations of fathers for their children, of children for their fathers, of husbands for their wives, and of wives for their husbands, running naked from place to place, imploring the protection of the Almighty; or with their feeble hands trying, amidst the falling ruins, to extricate themselves and their relations.

"On the night of the 13th of August, about half-past nine o'clock, **Aleppo**, the third city of the Ottoman empire, built entirely of stone, was, in the space of a few seconds, brought down to its foundations.

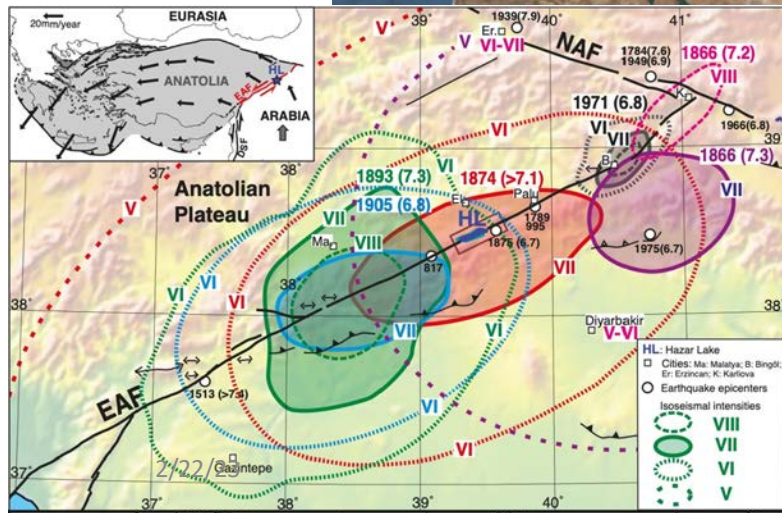
"I was at that time asleep on the terrace of my particular friend Mr. Maseyk, who, by the help of the Almighty, was mercifully saved, with all his family.

"About half an hour previous to the great shock a light one was felt, when I took the precaution to draw my bed from under

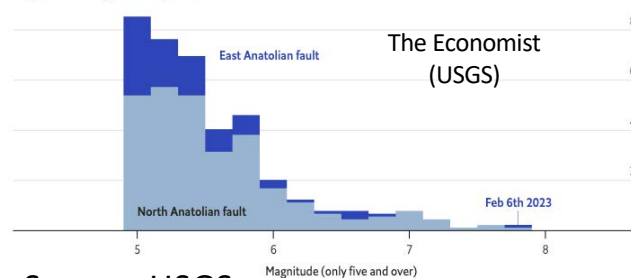
*Only a few weeks previous to the earthquake, Mr. Barker had disposed of, by cheap sale, no less than 499 Arabic New Testaments, and 640 Arabic Psalters. Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.



H-F 2020



Earthquakes since 1900, near selected fault lines
 Largest in a moving seven-day period



Source: USGS

1933 Long Beach M6.4 CA USA EQ ← CA, Chile, Japan



Jefferson High School after the 1933 Long Beach Earthquake.

CA SSC 2000

- 115 deaths
- \$60mill = \$1.5bill (2023)
- 70 schools destroyed
- 120 schools suffered major damage
- 41 deemed unsafe & remained closed
- school was not in session

- the “Field Act” (1933)
1st CA EQ building code
Legislation
- “Altquist Seismic Safety Act”
(1973) ← 1971 M6.6 Sylmar
EQ → hospitals damaged