



A little science...A touch of fiction...A lot of adventure...

## News from the Den

We have big news this month! The new publishers will release *The Paris Contagion* on 15 March. eBook, audio, and hardcover will be available from your favorite booksellers.

Fellow author and host of [The Book Lover's Companion podcast](#) will host a book launch party for the new release on 16 March at 14:00 MDT. Links to join the live-streaming party will be sent to our list of subscribers. CA participated in several of her podcasts, see the links on our website. They are fun, informative and a wonderful introduction to new authors and their works.

## Latest and Greatest - Science News

**What happens when four major tectonic plates and one minor plate interact?**  
**Answer: Earthquakes**

This is what occurred on 6 February along the border of Turkey and Syria within the the East Anatolia fault zone. The EQ occurred near the triple-junction between the Anatolia, Arabia, and African plates. This fault zone accommodates the westward motion of Turkey. The India and Arabian plates are moving north, colliding with the Eurasian plate. This northward motion is 'pushing' Turkey to the west or 'out of the way' to create space for the mass of these two large plates. This westward motion is called 'extrusion'. The extrusion has created a strike-slip fault-bounded border along which movement occurs.

The first EQ was 7.8 magnitude and occurred at a depth of 17.9 kilometers. It ruptured the East Anatolia fault in a failure swath ~100km long and 25km wide. The shallow rupture exhibited strike slip motion—one plate sliding past the others horizontally. This is the same fault type as the San Andreas fault in California. The cumulative ground slip associated with this EQ was 3.4m of horizontal motion. As of 19 February, more than 40,000 souls have been lost.

Six minutes after the initial EQ, a 6.7 magnitude aftershock occurred at a depth of 14.5km. Aftershocks occur as the ground along the fault rupture continues to settle/move as the accumulated strain continues to be released from the rupture. To date more than 200 aftershocks have occurred along this fault zone. Swarms of aftershocks occur after any EQ, they typically diminish in magnitude over time. For example, more than 5,000 aftershocks occurred after the 2011 Great Tōhoku EQ in Japan over a time span of a year.

Approximately 9 hours after the initial 7.8 EQ, another EQ occurred 95km to the southwest. This 7.5 magnitude EQ occurred along another branch of the East Anatolia fault zone at a depth of 10km. The swath of ground motion for this separate EQ was 50km long and 30km wide.

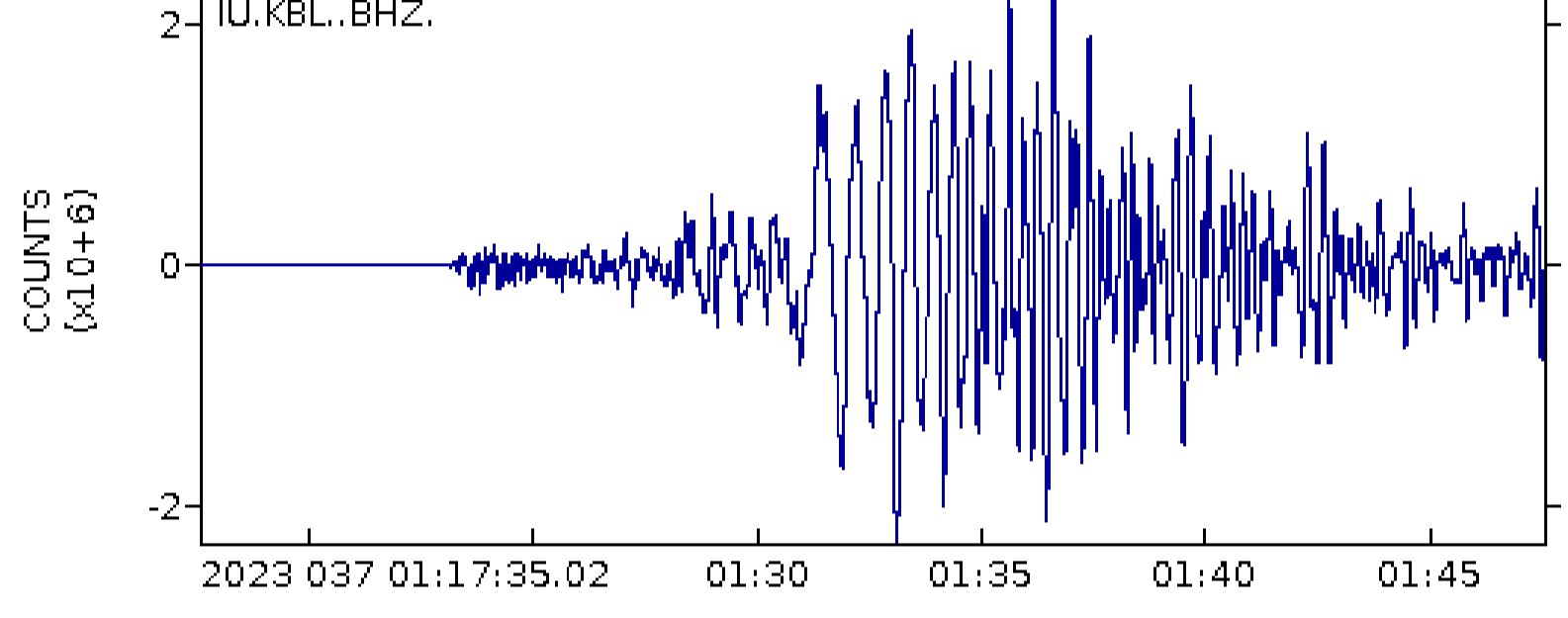
This tectonic border is seismically active and has recorded numerous EQs greater than 6.0 magnitude over the millennia. Only three EQs greater than 6.0 have been recorded in this region since 1970 however. We mustn't be fooled by a long period of seismic quiescence, the region has and will again experience EQs great than 7.0 with significant loss of infrastructure and human life. Read more from [Nature](#).

## A Shout Out to Valentine's Day

A research team from the University of Leeds has determined the physical processes which occur when we eat chocolate and why it feels sooo... good. It's all down to changes in physical state as the solid chocolate melts into an emulsion and then our saliva interacts with fats in the molten chocolate. The solid cocoa particles then join the fun and increase our tactile sensation. Their research is all about making chocolate healthier without losing the 'feel'. Frankly, I don't care about how heathy it is, I just love it in any and all forms. Read more from [Science Daily](#).

## Photo of the Month - East Anatolia Fault Zone Tectonic Map and 7.8 Magnitude EQ Seismogram

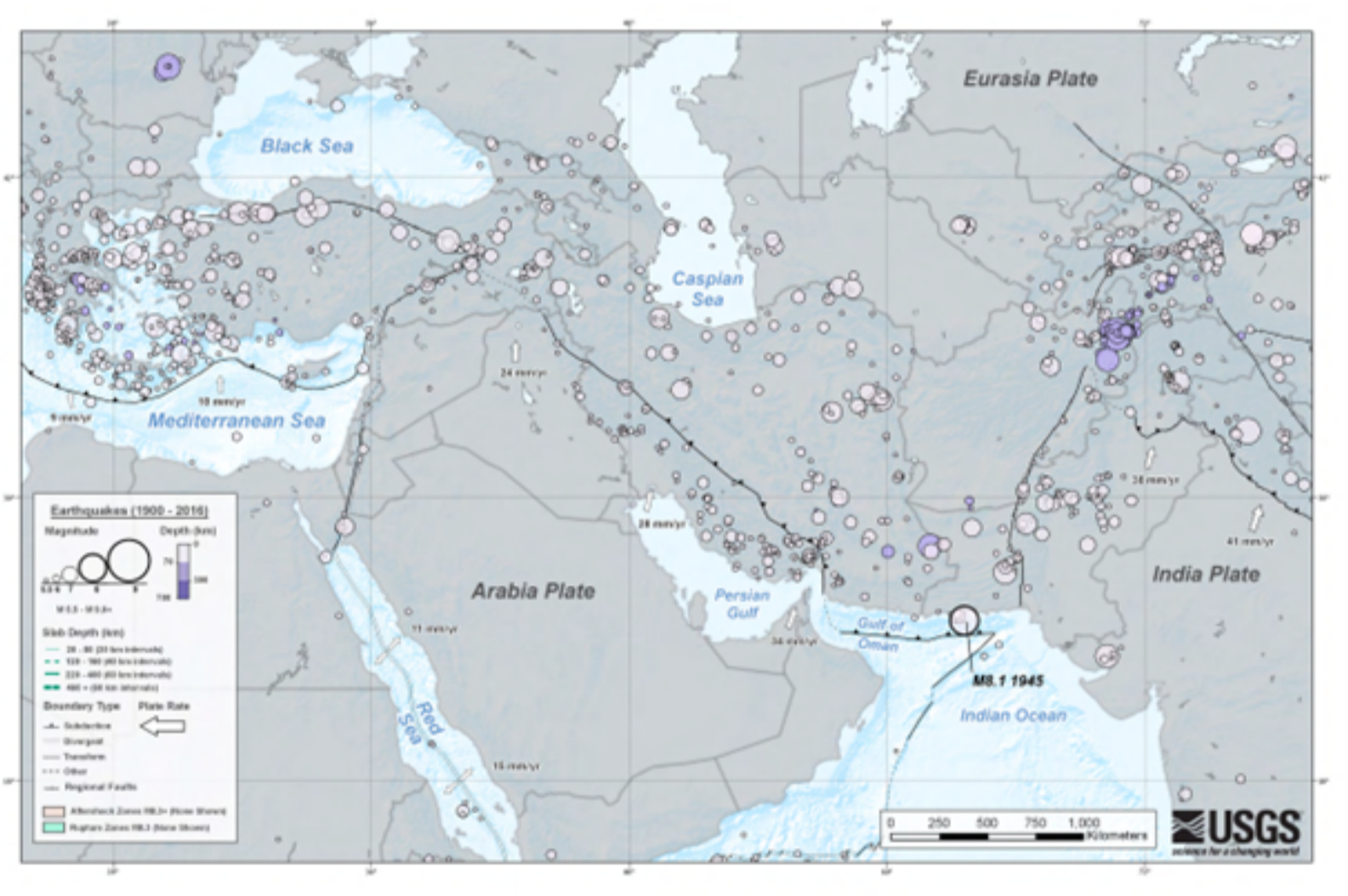
IU\_KBL\_??\_BHZ, 72000 samples, 40.0 sps, 2023-02-06T01:17:35.020



Seismogram of the 7.8 Magnitude EQ

**Correlation of geologic activity?** I've always seen the Earth as one huge science experiment. We didn't see the beginning, nor will we see the end. We're just viewing a snapshot in time. But how do all the real-time events we experience correlate to geologic-time events? Real-time events would be EQs, volcanic eruptions, asteroid impacts, mega climate happenings. Events we can see and measure in human-time. Geologic events would be mass-extinctions, ice ages, continental drift, deposition of stratigraphic layers, metamorphism, events covering millions of years. After the Great Tōhoku EQ the Earth was quiet for an extended period. From 2011 to last year not many large-scale (>6.0) EQs occurred. Then swarms of >6.5 EQs began around the globe. Now, we have the EQs between Turkey and Syria. Did the Earth release enough energy during that immense quake in 2011 to 'settle' or was something else occurring?

Two Chinese researches are studying the inner core—the solid iron marble spinning within the molten outer core. They have determined the spin is changing, not just changing but stopping. (<https://www.nature.com/articles/d41586-023-00167-1>) We don't understand the dynamics of motion or composition of the mantle and core of our planet. We can't see them or visit them, we must study them remotely. How seismic waves travel through the interior of the planet is one way. Upper mantle rocks that crop-out at the surface in ophiolite zones is another.



Tectonic Map of the East Anatolia Fault Zone

But I can't help wonder since it's all one big system—how does action cause reaction. Inner core motion changes and we have an increase in EQs?

## In Memoriam - Otto von Guericke, The Remarkable Emptiness of Existence

In 1654, this German scientist and inventor demonstrated the power of 'nothing'. He invented the vacuum pump and was able to evacuate all the air from a copper spherical vessel. Thirty horses in two teams of fifteen were unable to pull the vessel's two halves apart. He is quoted as saying "'Nothing' contains all things. It is more precious than gold, without beginning or end, more joyous than the perception of bountiful light, more noble than the blood of kings, comparable to the heavens..." In December 2022, a team of astronomers confirmed that the vacuum of spacetime is wreaking havoc on the universe. They determined most of the universe's energy is contained within the vacuum of empty space not in the material interactions we observe. Read more from [Nautilus](#).

## Historical Foundations - Galileo Galilei

Born on 15 February 1564 at the beginning of the scientific revolution, Galileo Galilei believed all science could be broken down into mathematics. A hypothesis known to be true today. He studied speed, gravity and astronomy. With a hand-made telescope, he discovered four moons of Jupiter (there are now 92 known moons), the rings of Saturn, and verified the phases of Venus. His philosophy of 'first observe, then explain, follow with more observation' would lay the ground work for the modern scientific method.

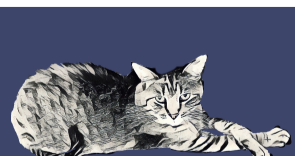
## Book of the Month - *The Martian* by Andy Weir

I know this has been made into a movie and is a bit of a cult favorite but as NASA expands its ARTEMIS mission objectives, the James Webb Space telescope continues to wow us, as the Perseverance rover still trundles around the Jerzero crater, and LUCY prepares to fly by trojan asteroids orbiting out by Jupiter, along with 80 other current NASA missions, one should enjoy a good read about space and a neighboring planet. Andy Weir is a computer programmer and originally released *The Martian* as a free-serialized series on his website.

## Minutiae

Unfortunately, the groundhog saw his shadow and six more weeks of winter are predicted for the northern hemisphere. But if you live in the Rocky Mountains, you should welcome the continuing cold. We need extreme cold for an extended period to reduce the parasitic invaders destroying our natural habitat. Pine bark beetles, Japanese beetles, and Spruce beetle populations would be decreased with long, cold winters. But cold winters are a thing of the past as climate change warms our environs.

Stay warm. Be kind.



keep being curious

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