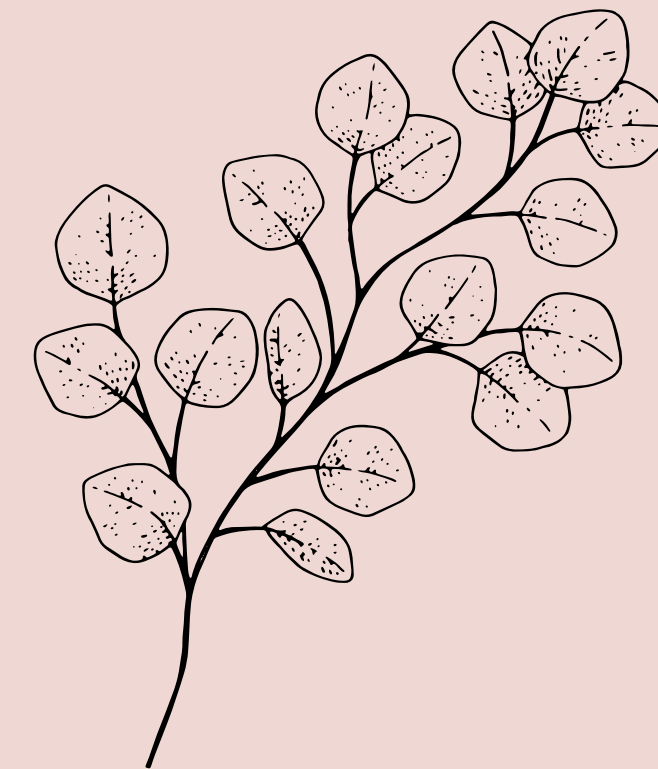
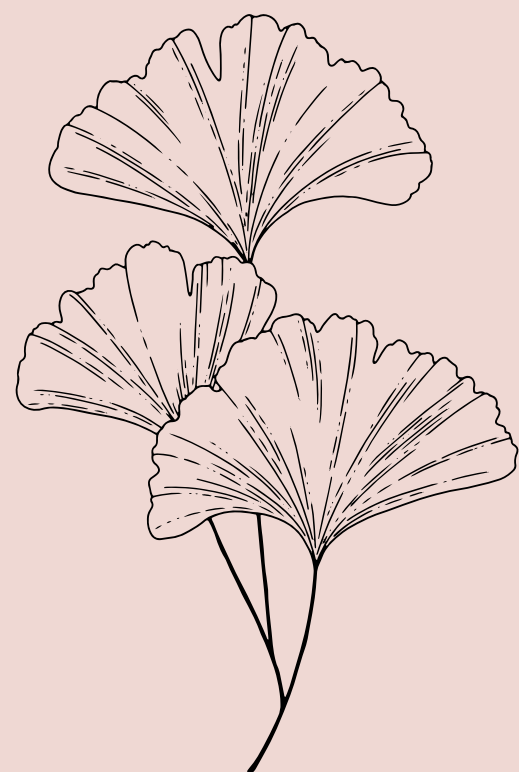




CLIL project



SEISMOLOGY IN OUR TERRITORY



Trincone Mariacristina,
Quagliozi Stefania, Pompeo
Francesco, Rainone Giuliano



CLIL

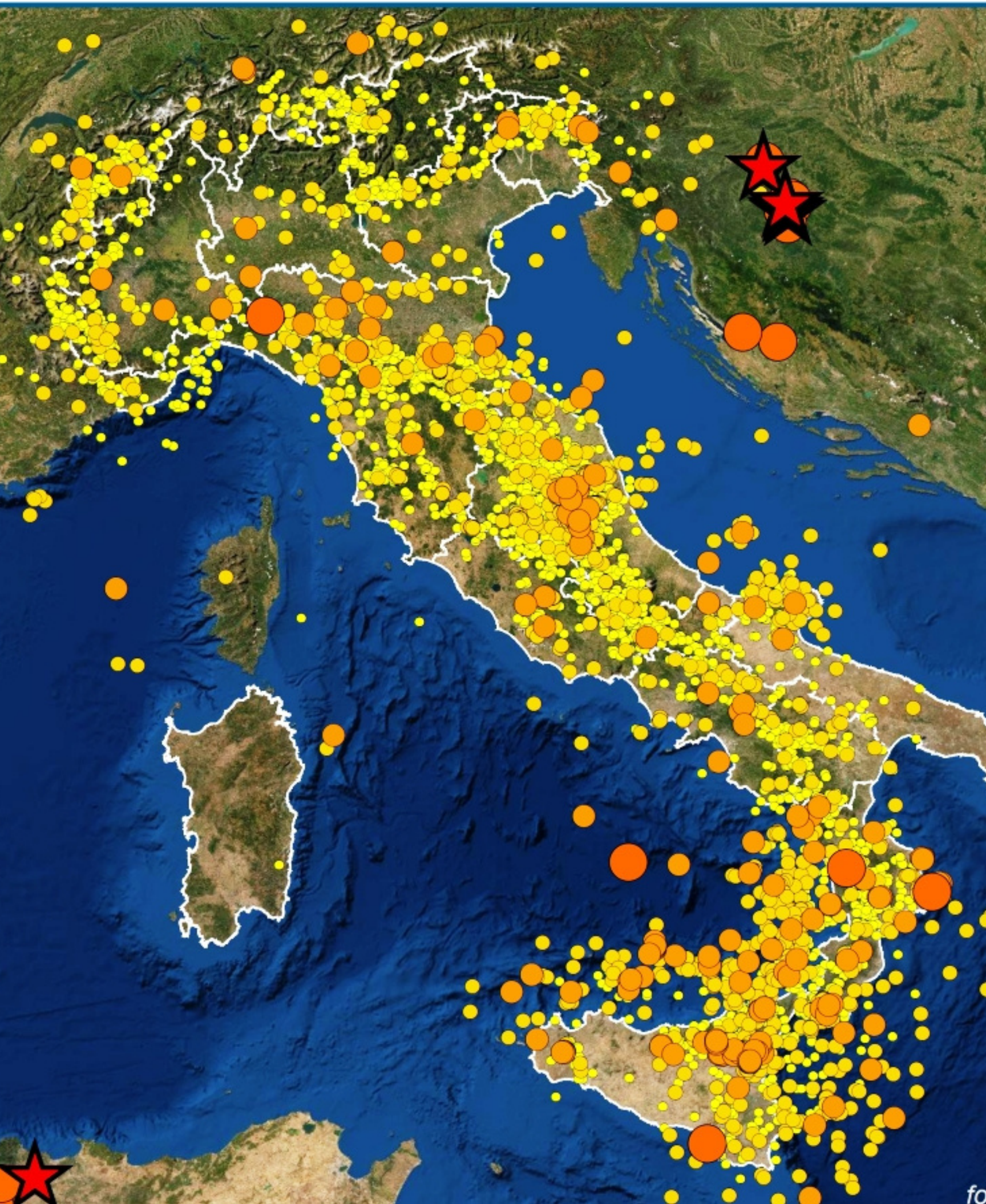
Content and language integrated learning is an approach for learning content through an additional language (foreign or second), thus teaching both the subject and the language.

CONTENT
AND

LANGUAGE

INTEGRATED

LEARNING



THE EARTHQUAKES:

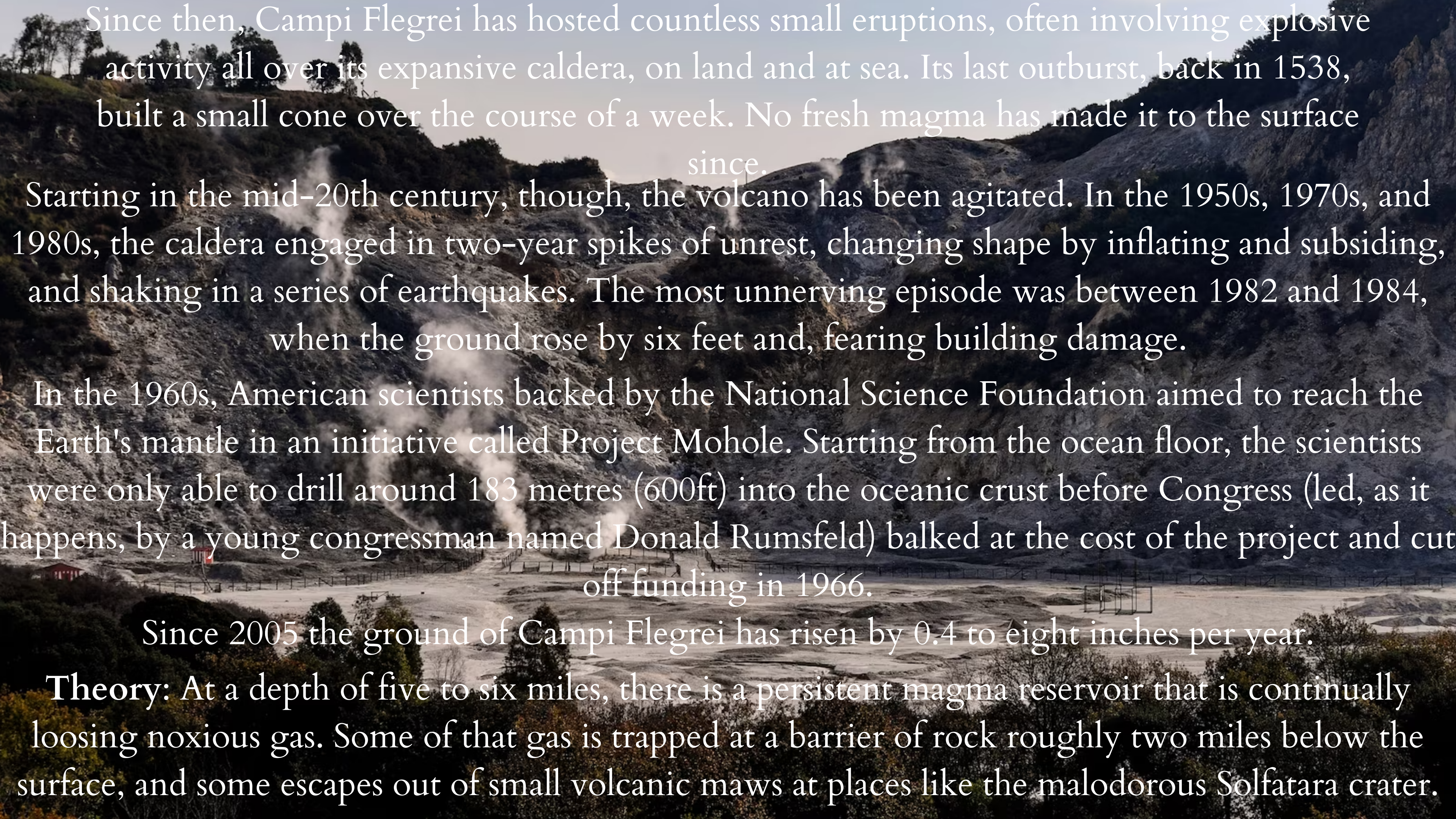
- What is an earthquake?
- Volcanic earthquakes and tectonic earthquakes
- hypocenter and epicenter
- Primary waves and secondary waves
- Magnitude and Mercally scale, Richer scale
- effects and distribution of the earthquakes



EARTHQUAKES CHARACTERISTIC OF THE PHLEGRAEAN FIELDS

Italy's Campi Flegrei is nothing like your average volcano. It's not a mountain, but an eight-mile-wide, bowl-shaped caldera centered on the Gulf of Pozzuoli, just outside Naples. The unsubmerged mouth of the volcano is home to more than 360,000 people, and in total, 2.3 million people live on or around it.

Campi Flegrei has been gradually inflating since 2005. But in August, according to a notice from Italy's National Institute of Geophysics and Volcanology (INGV), the volcano's seismic activity became more frequent and intense. Then on September 27, a magnitude-4.2 temblor, the most powerful quake in almost 40 years, struck the caldera. Since Roman times, people have noticed the ground in the area has risen and fallen, and by digging into its geologic history, scientists have uncovered this volcano's violent past. The caldera as it appears today was carved out by two unimaginably massive paroxysms—one 36,000 years ago and another 15,000 years ago—that excavated the earth and smothered the region in volcanic debris.



Since then, Campi Flegrei has hosted countless small eruptions, often involving explosive activity all over its expansive caldera, on land and at sea. Its last outburst, back in 1538, built a small cone over the course of a week. No fresh magma has made it to the surface since.

Starting in the mid-20th century, though, the volcano has been agitated. In the 1950s, 1970s, and 1980s, the caldera engaged in two-year spikes of unrest, changing shape by inflating and subsiding, and shaking in a series of earthquakes. The most unnerving episode was between 1982 and 1984, when the ground rose by six feet and, fearing building damage.

In the 1960s, American scientists backed by the National Science Foundation aimed to reach the Earth's mantle in an initiative called Project Mohole. Starting from the ocean floor, the scientists were only able to drill around 183 metres (600ft) into the oceanic crust before Congress (led, as it happens, by a young congressman named Donald Rumsfeld) balked at the cost of the project and cut off funding in 1966.

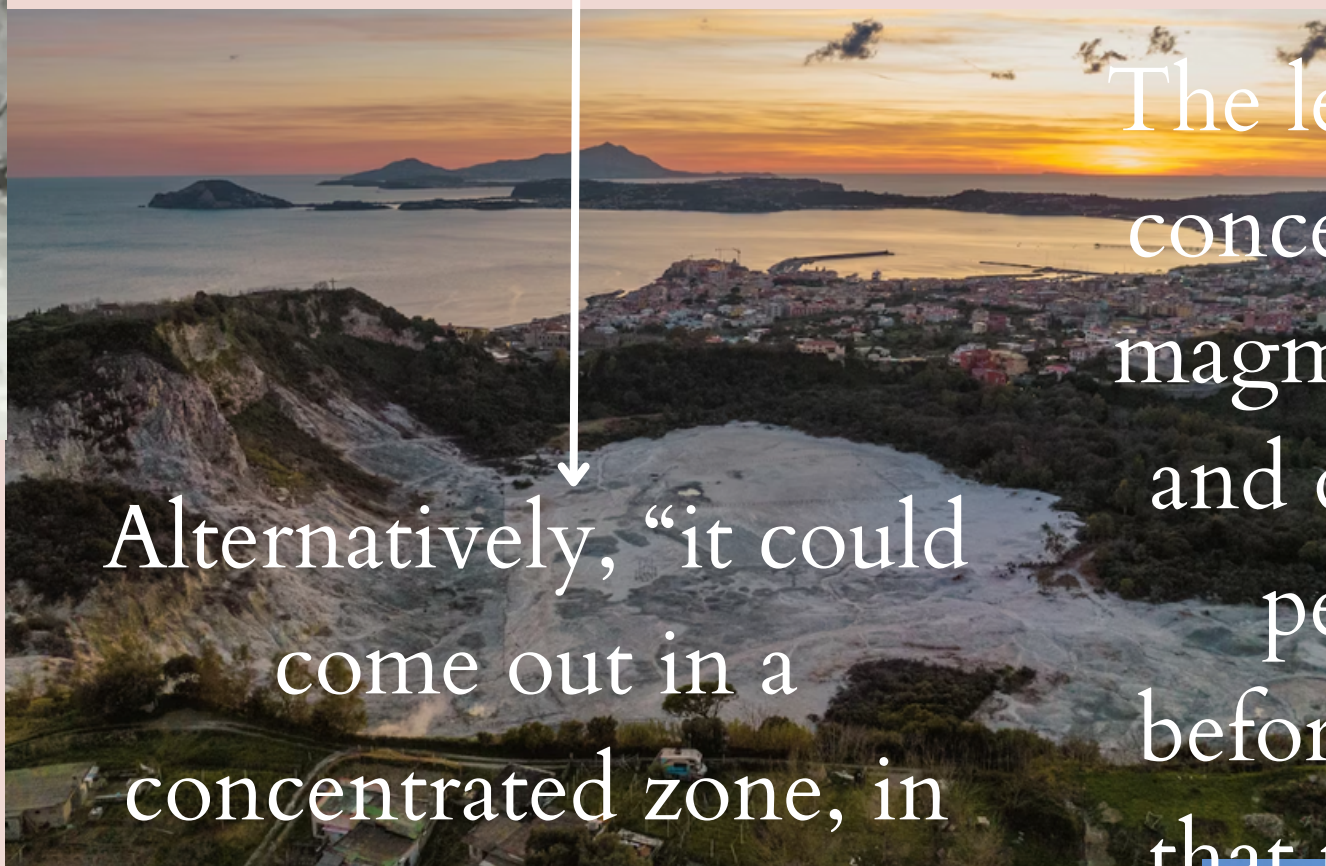
Since 2005 the ground of Campi Flegrei has risen by 0.4 to eight inches per year.

Theory: At a depth of five to six miles, there is a persistent magma reservoir that is continually loosing noxious gas. Some of that gas is trapped at a barrier of rock roughly two miles below the surface, and some escapes out of small volcanic maws at places like the malodorous Solfatara crater.

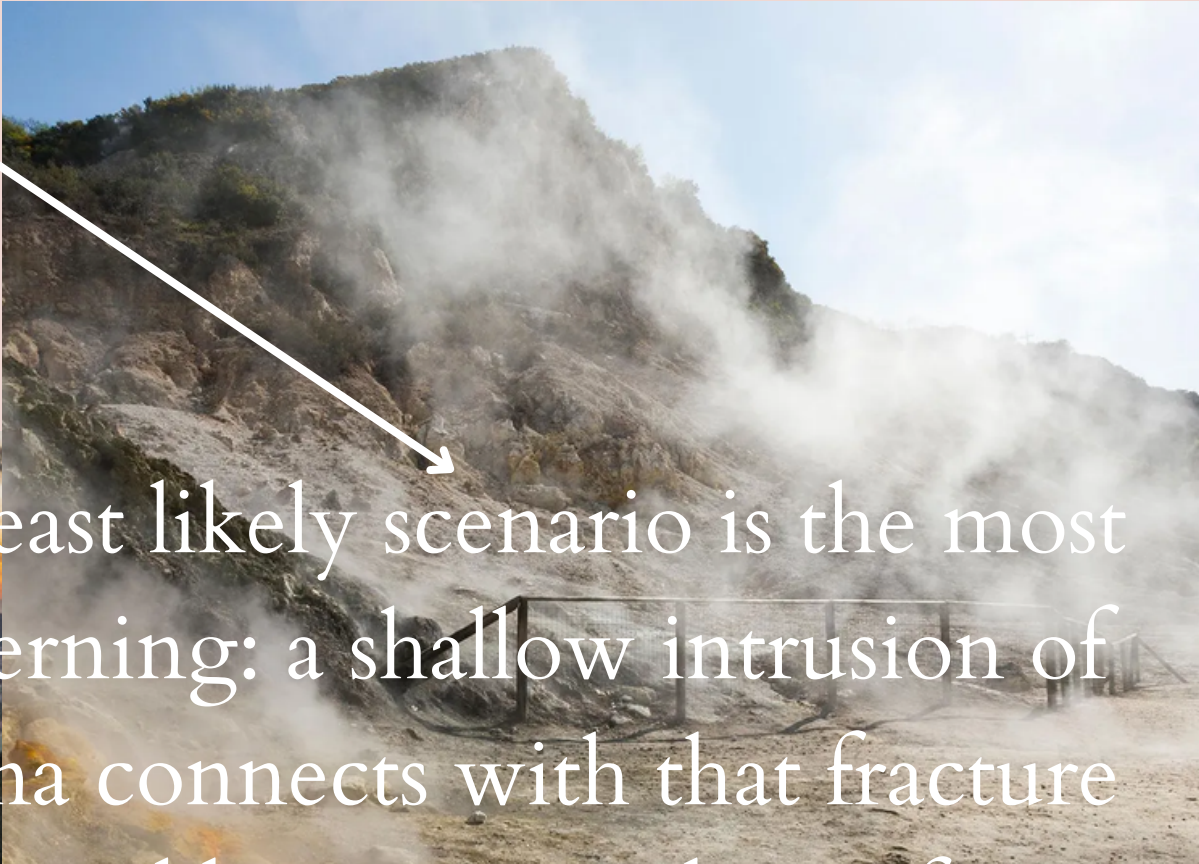


The first, and likeliest, is that volcanic gas is expelled over a large area, doing no harm.

There are three possibilities



Alternatively, "it could come out in a concentrated zone, in which case there may be some explosions, locally," says Christopher Kilburn.

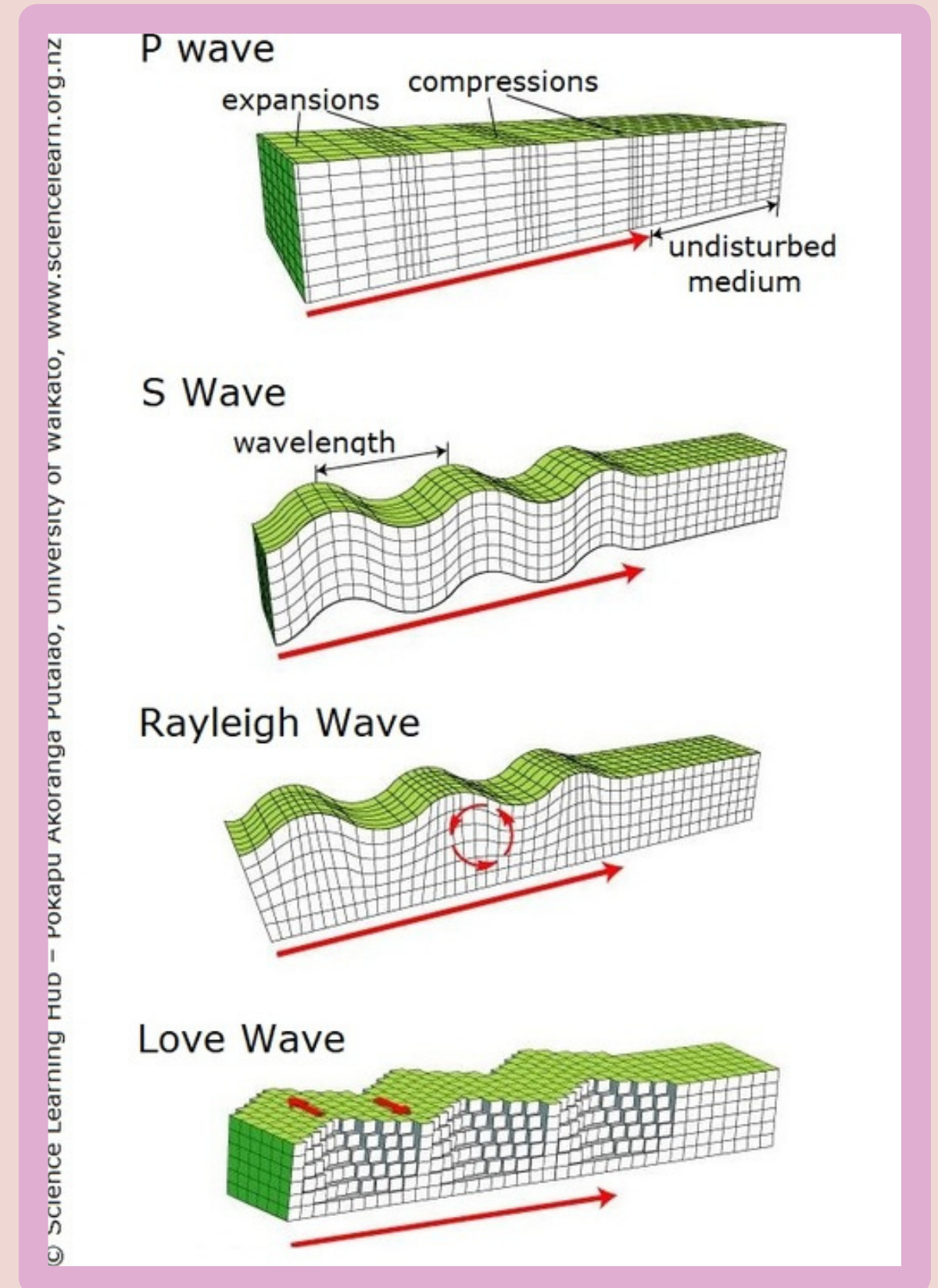


The least likely scenario is the most concerning: a shallow intrusion of magma connects with that fracture and quickly erupts to the surface, perhaps with little warning beforehand. It has been suggested that the present uplift and quakes could be caused by recent injections of magma at shallow depths, but measurements of the volcano's gravity field suggest no major magmatic incursions have happened in recent months

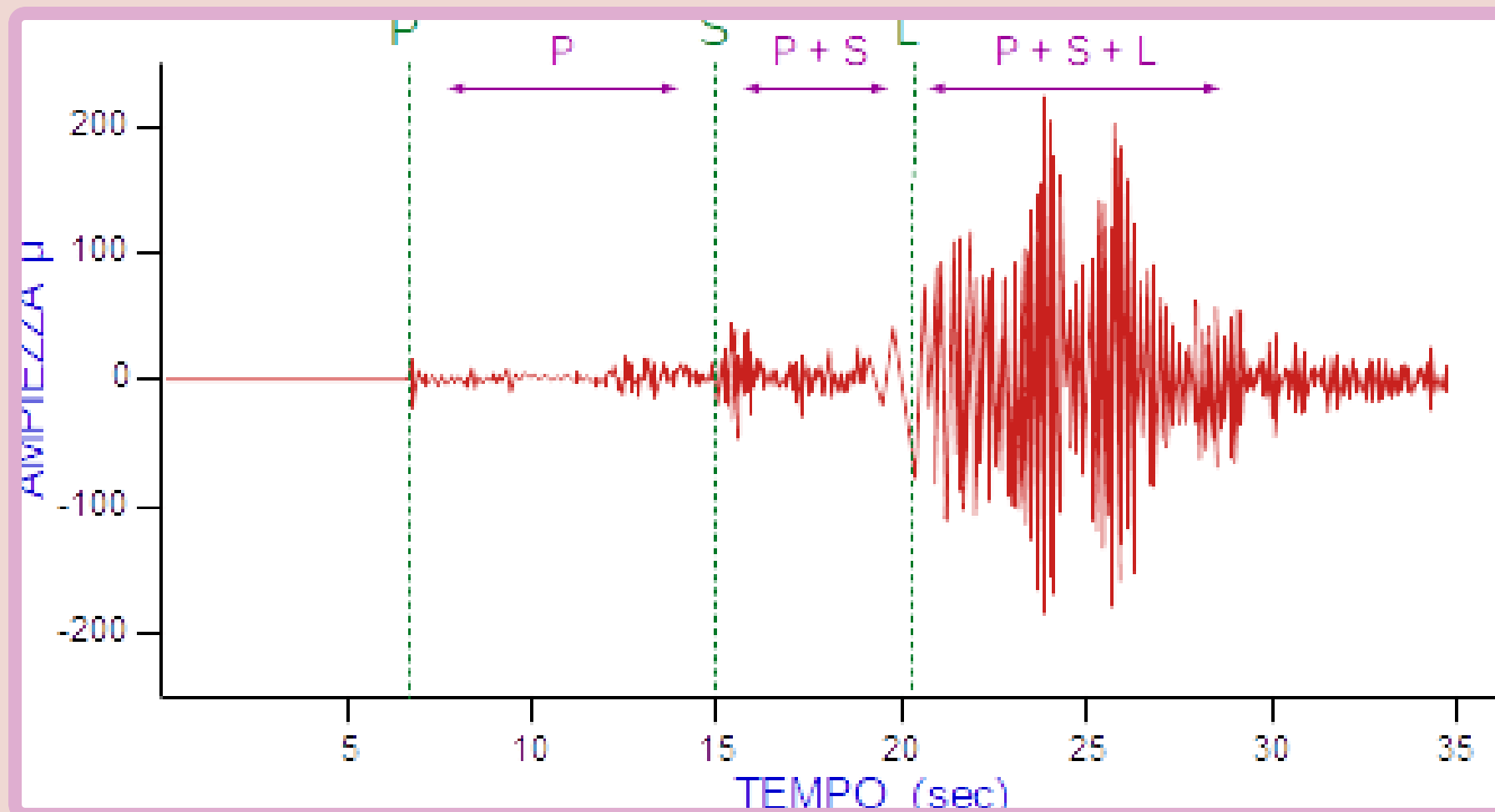


SEISMIC WAVES:

- The primary, or P waves, also called compressional or longitudinal waves.
- The secondary, or S, waves, also called shear or transverse waves.
- Surface waves



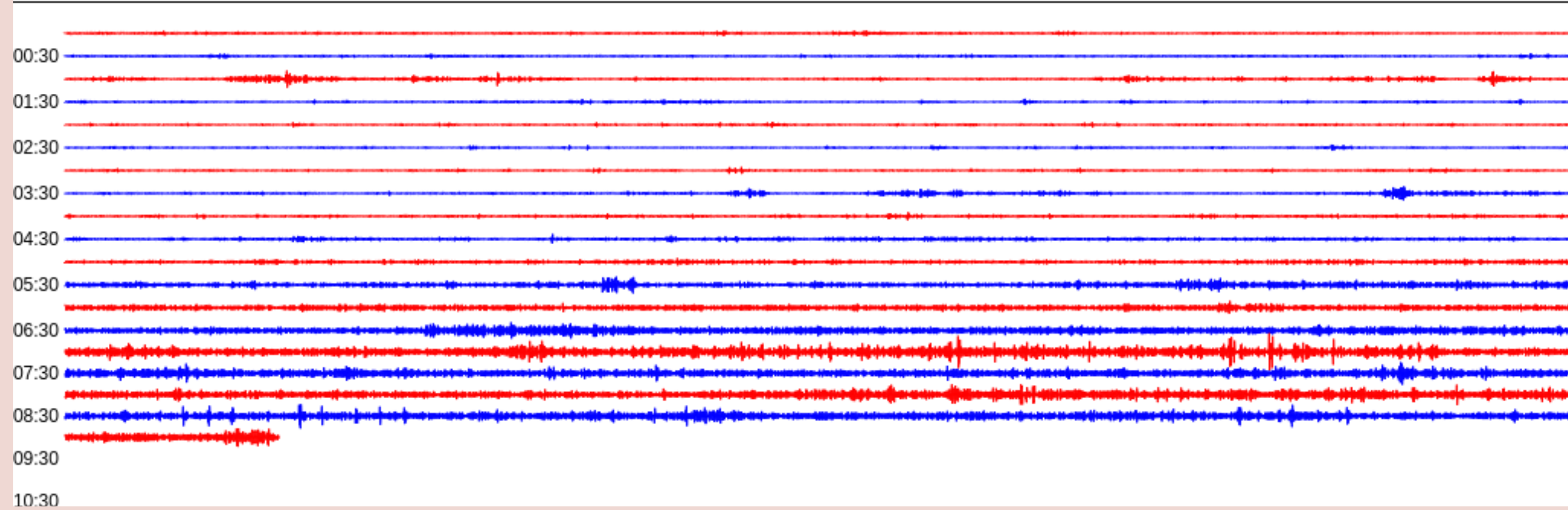
WHAT IS A SEISMOGRAM AND A SEISMOMETER?



- **A seismogram** is the recording of the ground shaking at the specific location of the instrument.
- **Seismometer** are instruments used to record the motion of the ground during an earthquake.

AM.RBBBF.00.EHZ
40.82 N 14.17 E

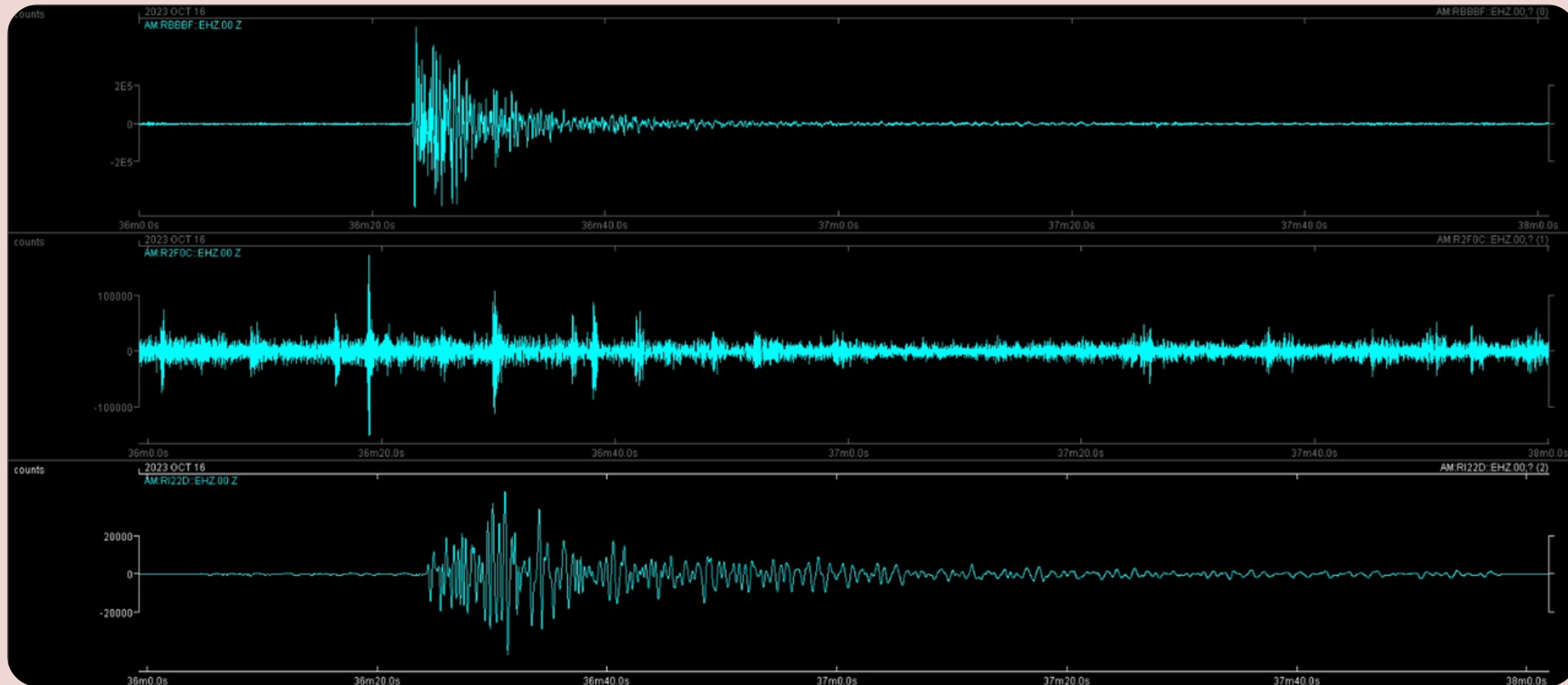
2023-11-13



THE SEISMOMETER OF LICEO ARTURO LABRIOLA



DIFFERENT SEISMOGRAPHS COMPARED



A.LABRIOLA

D: 3,36km

T:2,46s

Time: 10,36,23,461

V: 1,36 km/s

L.B. ALBERI

D: 7km

T:3,006s

Time: 10,36,24

V: 2,42 km/s

SAN SEBASTIANO

D: 19,3 km

T: 7,5s

Time: 10,36,28,597

V: 2,7 km/s

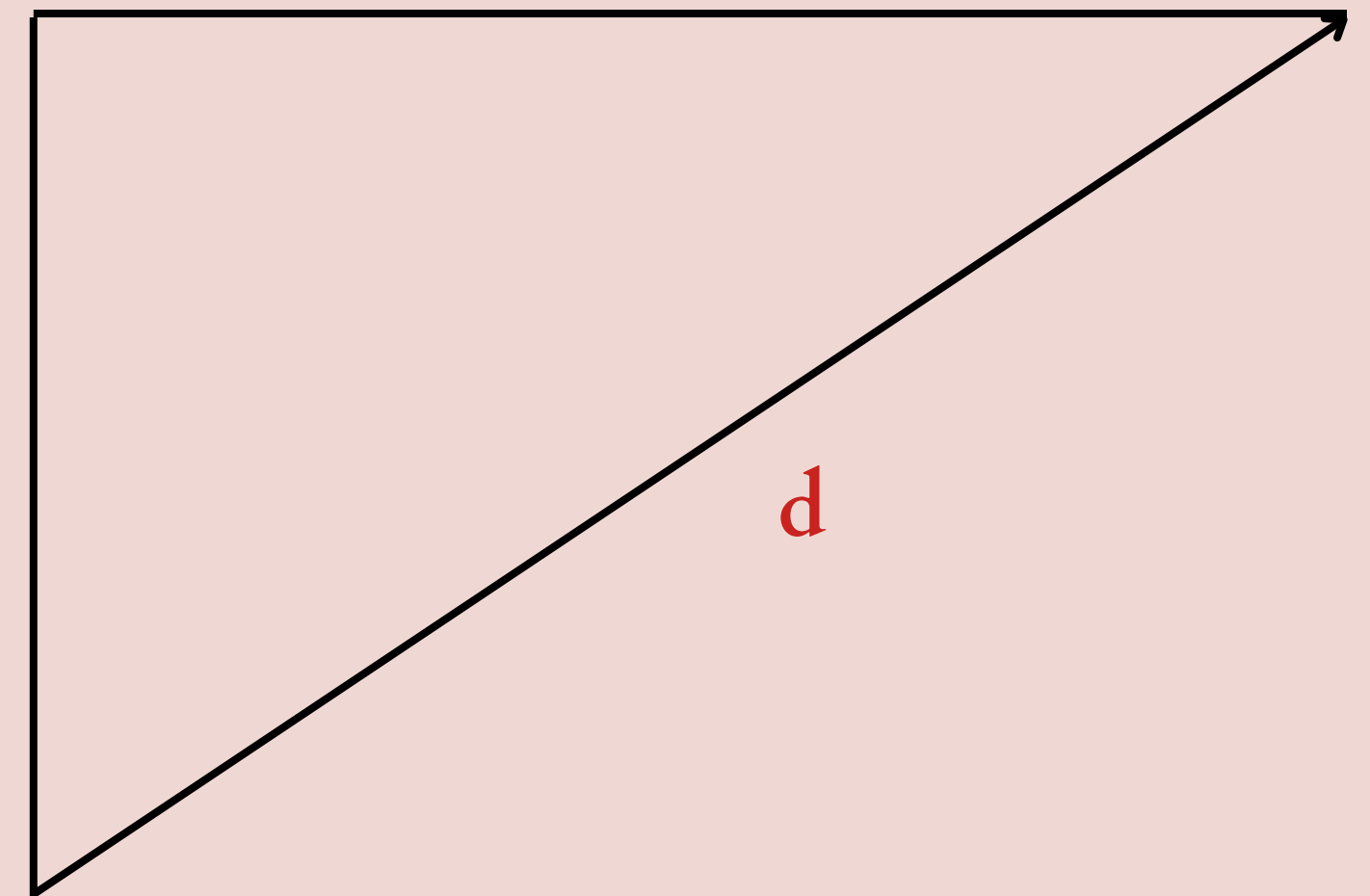
LOOKING AT AN EARTHQUAKE FROM GOOGLE EARTH



$$d = \sqrt{4 + 7,29} = 3,36$$
$$T = 10,36,21 \text{ s}$$
$$v = d/t = 3,36 / 2,461 = 1,36 \text{ km/s}$$

EPICENTER

SEISMOGRAPH



FOCUS

d

THANK YOU FOR PAYING ATTENTION