

An aerial photograph of Mount Vesuvius erupting. A massive, dark plume of ash and smoke rises from the volcano, filling the sky. Below the volcano, a city with red-tiled roofs is visible, with a large, open public square in the foreground. The scene is dramatic and captures the power of the volcano.

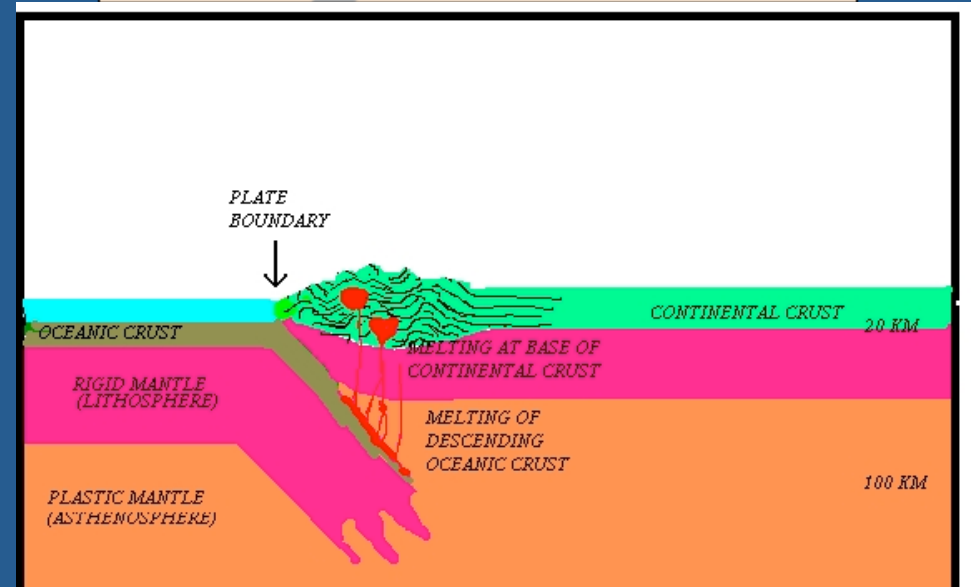
Mt Vesuvius

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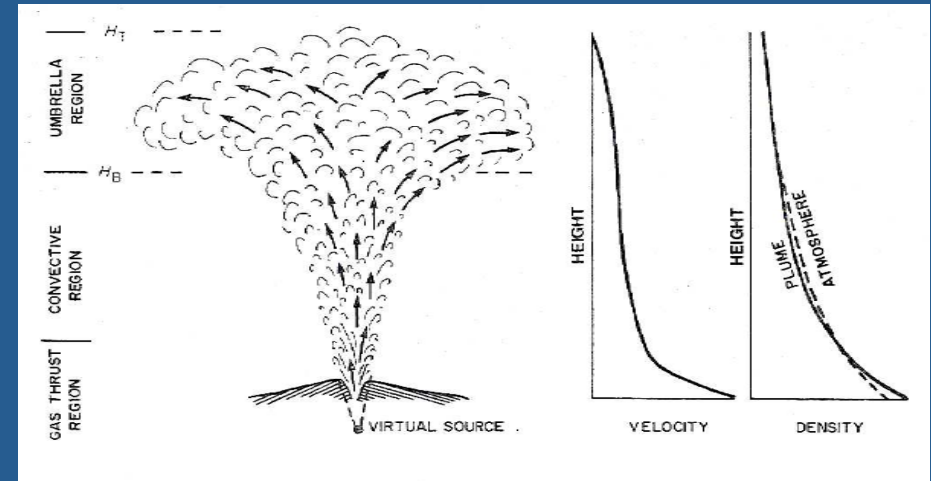
Tectonic Setting

- The volcano is part of the Campanian volcanic arc that is formed from the convergence of the African plate moving northward and the Eurasian plate moving southward (subduction zone). The older, colder, and denser Eurasian plate gets subducted and partially melts. When it melts, its density decreases from the heat and rises, fueling the volcano. At the same time, it gets its gas from Adriatic Sea when it sea assimilates into the Eurasian plate that has yet to be melted. This gas greatly increases the explosivity of the volcano.



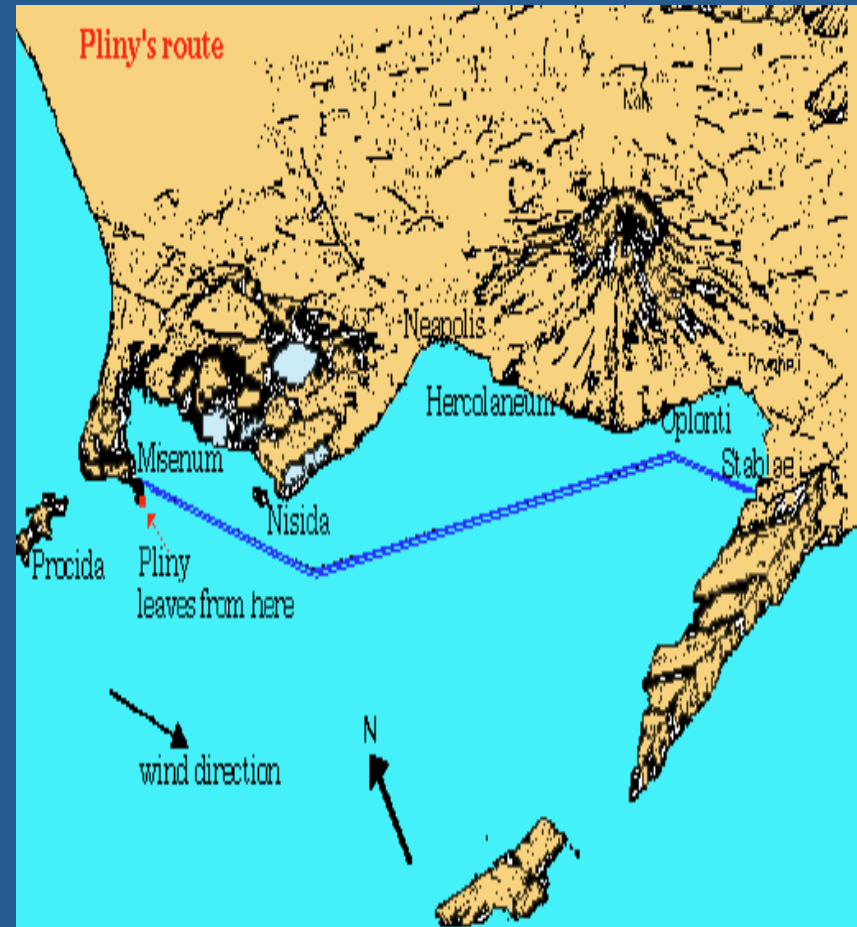
Geologic Hazards

- The eruptions generally get as high as a VEI 5 (Pompeian) and VEI 6 (Avellino). The reason it never reaches a VEI 7 or 8 is because it frequently erupts and constantly releases it's pressure. Regardless, at VEI 5 and even in the 1944 VEI 3, it often gives a plinian eruption with the full gas thrust, convection, and umbrella region. Because of this, tephra fall is a major hazard depending on the wind direction. Likewise, pyroclastic surge and flows are a concern when the a) the venting source widens or b) the gas thrust region weakens . Because of the high population density, especially with Naples today, it's a very dangerous volcano.



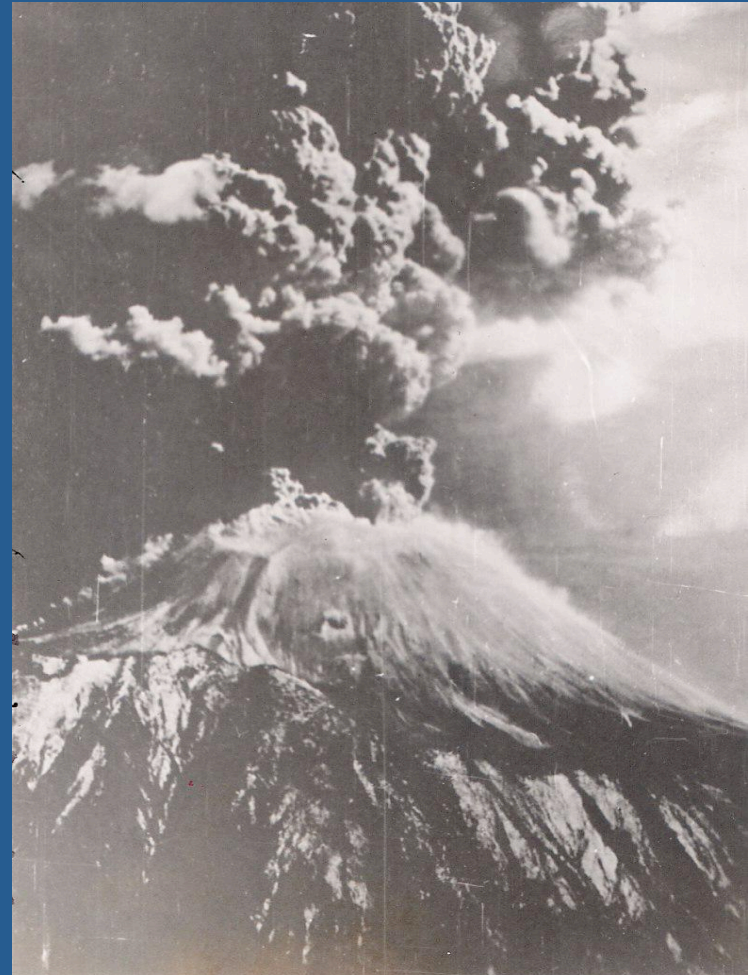
79 A.D Eruption

- The 79 Eruption was a VEI 5 eruption. The reason it was so famous was not because of its size, but rather because a) it buried Pompeii and Herculaneum b) because it was so well documented by Pliny the Younger from Misenum and Pliny the Elder gave 2 separate accounts with different experiences from 2 places. By converging the 2 accounts, we know that the order was first a) eruption b) an earthquake felt as far as Misenum c) the pyroclastic flow and surge due to dome collapse or lack of buoyancy. The surge covered Herculaneum and even threatened people as far as Misenum d) intermediate earthquake e) multiple smaller surges in the order of surge/flow/surge. e) a phreatic explosion.



Other Eruptions

- There were at least 4 other VEI 5 or 6 eruptions before the 79 eruption. During that period, eruptions were less frequent, but more explosive. After 79 A.D., eruptions were more frequent but less explosive.
- In particular, it erupted roughly 2 dozen times between 1660 and 1944. Due to this, the eruptions were weakened. For example, the 1944 eruption was only a VEI 3 (minimum for a plinian eruption).
- The last major one- the one in 1944- started with lava flows, some small explosions, and then the big one.



Damages/Lessons

- For the 79 eruption, all cities in the southern areas were covered, meaning any citizen still remaining were dead. Anyone who was in the way of surges and flows were dead. And tephra caused roof collapses that most likely killed or trapped citizens for the surges or flows. Overall, casualties were 1100 and 300 bodies were found, but that's a conservative death toll.
- For the 1944 eruption, 3 major villages were destroyed, roof collapses, 28 deaths, and the destruction of a US military base.



- a) For safety measures, officials now have to balance the timing (there are precursors such as harmonic tremors) because Vesuvius is such an unpredictable volcano.
- b) The next best precaution is simply prevent anymore people in the red zone.

The END

- **The Eruption of Vesuvius in A.D 79: Reconstruction from Historical and Volcanological Evidence. American Journal of Archaeology . Haraldur Sigurdsson.**
- **Impact of the AD 79 explosive eruption on Pompeii, I. Relations amongst the depositional mechanisms of the pyroclastic products, the framework of the buildings and the associated destructive events. Journal of Volcanology and Geothermal Research. Giuseppe Luogo.**
- **The eruption of Vesuvius of 79 AD and its impact on the human environment. Lisetta Giacomelli.**
- **<http://vulcan.fis.uniroma3.it/vesuvio/1944eng.html>**