December 29, 2025

News and notes

Rainbow Mountain in Vinicunca, Quispicanchis, Cusco Department, Peru,
Credit: Yifan Wang, Creative Commons Attribution 2.0 Generic license

This week, before going on to my year end review, we will first look at some news items I thought were interesting. The picture above was referenced in this news item; the article on visiting the phenomena is here. Long story short, it's a long hike and you are only allowed to view it from a neighbouring mountain.

If you enjoy my blogs, bookmark the site and check on Mondays rather than relying on social media postings which can get lost in the shuffle. For my news items, I try to stick to open access papers.

Comments

If anyone has comments on any of my postings, please leave a comment on the Linkedin page for the posting or email me at raymondreichelt@gmail.com.

Geopolitics

- Sanctions Push Russian LPG South, Not Offline.
- The US or China? The Nation That Wins the Nuclear Fusion Race Wins Global Primacy.
- Venezuela: Russian foreign ministry begins evacuating families of diplomats from Venezuela as situation grows 'grim' for ally; I don't expect anything until after the New Year.
- Demographics is destiny, Mapped: Every Country by Total Fertility Rate.

Research and News

- Olivine-Ahrensite Phase Relations in the Mg2SiO4-Fe2SiO4 System as a Function of Temperature.
- Plate tectonics: Cenozoic Evolution of the North-Eastern Mediterranean Basins.
- Fun things that geologists do in the lab: Brittle and Crystal-Plastic Defect Dynamics of Calcite Single Crystals.
- Petrographic and Geochemical Characterization of the Fianga Granitoids (Mayo Kebbi) in the Pan-African Range of Central Africa in Chad: Geodynamic Implication.

- Deepwater deposition: Intermittent behavior of bottom currents: The complexity of channels and moats.
- Melting the myth: Prograde garnet dissolves during early crustal melting.
- Weathering, sediments, and climate: Nd Isotope Response to Precipitation Variability in the Western Tropical Pacific Over the Last 30 kyr.
- Early Earth history: Earth's foundational geological events stored in the fundamental mantle source of hotspots.
- More history: Water-Induced Mantle Overturn Explains High Archean Paleointensities.
- New Geological Data on the Inselbergs of Anié, Togo (West Africa).
- Ultrahigh-pressure elasticity of dense hydrous SiO_2.
- Oxygen isotope and trace element mapping of growth and deformation of hematite single crystals from enriched banded iron-formations.
- Cyclic Pockmark Formation Linked to Plio-Pleistocene Sea-Level Rise on the Chatham Rise, New Zealand.
- Facies analysis provides new insights into event bed deposition in a hadal trench environment.

Geophysics

- Magmatic and Tectonic Structures in the Crust Beneath Armenia and Surrounding Regions of Lesser Caucasus Inferred From Body-Wave Earthquake Tomography.
- Crustal Heterogeneity Onshore Spitsbergen: Data Integration and Forward Modeling of Potential Field Data.
- Experimental evidence for superionic Fe–C alloy revealed by shear softening in Earth's inner core; Science Alert summary here.
- Dr. Velikovsky, your office called: Morphological Signatures of Planetary Fusion: A Unifying Framework for Earth's Deep Heterogeneities; summary from Ugo Bardi here.

Paleontology

- The first documented co-occurrence of conodonts and graptolites in Silurian (Telychian) black shales of the Prague Synform, Czech Republic, and its stratigraphical and palaeoecological significance.
- Delayed skeletal maturity in dwarf, medium and giant Pleistocene insular deer (*Candiacervus*) indicating a slower life history regardless size shift.
- A reassessment of the species *"Podocnemis" brasiliensis* (Pleurodira, Pelomedusoides) from the Late Cretaceous Bauru Group.

- Decades-long quest leads to first scholarly accurate fossil replica of 'dinosaur-killer' croc.

Mining and Energy

- Silver price tumbles from new record above $83; previously Silver Price Nears $79 For First Time Amid Record-Breaking Surge.
- Axis sues Guinea for $29B over bauxite permit revocation.
- ‘You can’t see China now as a reliable supply-chain partner’: Graphite mines forsaken for 70 years come back into fashion.
- Codelco, SQM seal lithium venture in Chile’s Atacama desert.
- Precious metals craze prompts China fund to turn away investors.
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- Texas Launches $350 Million Nuclear Energy Initiative
- 60,000 feet above Earth, NASA is hunting for the minerals that power phones, EVs and clean energy.
- Potential for mineral plays: Incorporation of Geospatial Data and Multi-Criteria Analysis for Mapping and Assessing the Mineral Potential of the Baïbokoum Pluton (Southern Chad).
- Energy and minerals: Trump’s plan to secure North American resource dominance through trade talks.
- Japan Dives Deep: Rare Earth Mud, High Stakes, and the Reality Beneath the Seabed.
- Investor Attention Drifting North: What Canada’s Critical Minerals Push Means For Emerging Explorers.

Environmental Geology and Hydrogeology

- Waterloo region cites water capacity issues amid population boom, aging infrastructure.

Glaciers and Climate Change

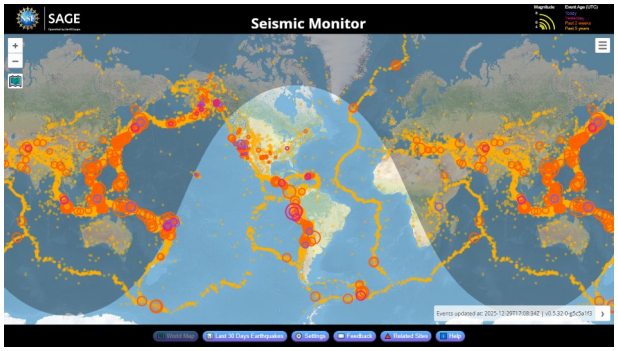
- Disappearing glaciers of the Oregon Cascades, USA.
- Comparing the Last Interglacial (MIS 5e) with the present interglacial period (MIS 1) using a multidimensional functional diversity analysis: The marine molluscs from Santa Maria Island (Azores Archipelago, central Atlantic) as a case study.
- Repeated major inland retreat of Thwaites and Pine Island glaciers (West Antarctica) during the Pliocene; Phys.org summary here.

Bad Science

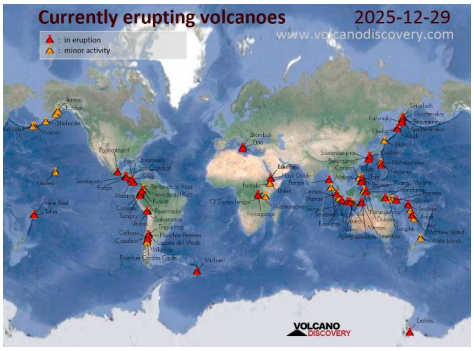
- A bibliography of genAI-fueled research fraud from 2025.

- AI Is Inventing Academic Papers That Don’t Exist — And They’re Being Cited in Real Journals.

Volcanoes, Earthquakes and Geohazards



Seismic Monitor



Active Volcano Map

Volcanoes

- Smithsonian / USGS Weekly Volcanic Activity Report.
- United States Geological Survey (USGS) Volcano Observatories:
  - Yellowstone Caldera Chronicles: Idaho’s forgotten eruptions – the Challis volcanics.
  - Cascades Volcano Observatory Weekly Update.
  - Volcano Watch – "It's a twister! Or is it?" Unraveling Kīlauea's Volcanic Whirlwinds.
- Candidates for the Darwin Awards: Watch: Skiers glide down slopes as Mount Etna erupts.
- Video: Stage Is Set For Iceland's Next Eruption Or Intrusion: Geologist Analysis.

Earthquakes

- Euro-Mediterranean Seismological Centre (EMSC).
- Earthquakes Monitoring Live Worldwide.
- Taiwan rattled by 7.0-magnitude earthquake; the USGS says M 6.6, summaries here and here.
- Research: Rupture Directivity From Energy Envelope Deconvolution: Theory and Application to 58 Ridgecrest *M* 3.5–5.5 Earthquakes.
- Earthquake swarm rattles San Ramon, CA for over a month.
- Alaska Earthquake Center: Testing an array setup for earthquake early warning.
- Earthquakes and mineralogy: Feldspar reduces fault frictional healing rate under hydrothermal conditions.

- Research: A Possible Tsunamigenic Near-Trench Strike-Slip Fault, Offshore North Ecuador–South Colombia.

Geohazards

- More rain expected in Southern California after flooding, mudslides batter region.
- A satellite caught a tsunami live-and what it recorded shocked scientists.

Free Geology Books and Other Stuff

Free geology books can be downloaded from these sites:

- OreZone Readers and Experts Telegram Channel; the Ore Zone channel also shows employment opportunities for geologists.
- The Groundwater Project has many groundwater geology books for free download together with free online courses, listed here.
- Free Groundwater Modeling Courses from the HydroGeoCenter: Transfer Of Conceptual Site Model (CSM) To Numeric Groundwater Flow Model and Applied Groundwater Flow Modeling With Advanced Tools.
- From Western Australia: Carbonatite, lamprophyre and host rocks in the northern Aileron Province.
- The Geology of Indonesia: Volume 1 and Volume 2.
- Brett Davis' book on veins in a deforming rock mass: "The Veining Bible"; also at this site.
- From the Mineralogical Society of America: Handbook of Mineralogy.

Upcoming Events

- January 14, 2026 from 9am to 4:30pm GMT, IAH (Irish Group) CPD Course: Groundwater, Hydrology and Climate Change.
- Feb. 16-18, 2026, Inaugural Mineralogical Society of America Annual Meeting, Tuscon AZ
- GAC-MAC 2026 St. John's NL, St. John's Convention Center, May 25-28, 2026.
- PEG2026: 11th International Symposium on Granitic Pegmatites; 16th–19th August 2026, in Perth, Western Australia.
- 14-18 September 2026 , IAH 2026, 53rd Congress of the International Association of Hydrogeologists; Budapest Congress Center.
- Society of Petroleum Engineers Distinguished Lecturer Schedule.
- American Geophysical Union List of Upcoming Meetings.
- The Geological Society: Events & Courses.

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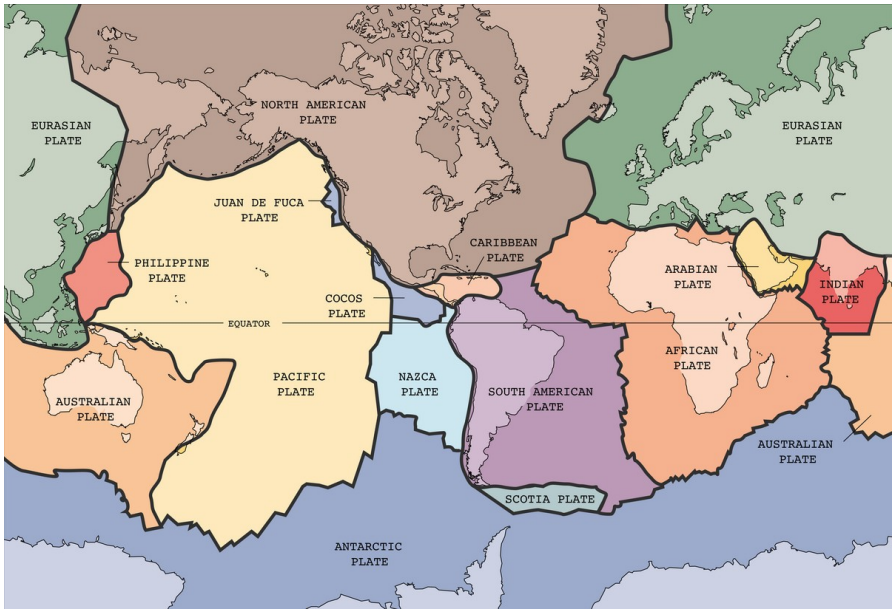
Year End Review – 2025

Introduction

It's the last week of the year and I thought that it would be worthwhile to look at a few major stories from the world of geological science from the past year. Unlike previous years, I will not delve too deeply into the geopolitical situation, frankly it's too depressing. In my blog over the past year I dropped the geopolitical analyses mostly for that reason.

So let's look at the stories that I think were important in the world of geological sciences.

Academic Basic Research



Tectonic Plates
Credit: USGS, public domain

All science relies on the on-going efforts of researchers to ask new questions of nature and work to find the answers. There are many, many, really interesting research projects going on and if I miss your favourite, let me apologize in advance. That being said, here are the areas of research that I think are most interesting:

When did Plate Tectonics begin? While this line of inquiry has been underway for quite a while now, it remains a lively subject for academic debate and inquiry – the science is not "settled". This paper by Turner *et al*., suggests that the beginning of Plate Tectonics was fairly early, i.e. during the Hadean.

In other research on plate tectonics, we have evidence of the Earth's continents peeling and further research into subduction zone activity beneath the Pacific Northwest.

Research on the ancient Earth has revealed evidence of the proto-Earth, suggesting that some materials from the early planet remain unchanged despite significant geological transformations. Researchers have

also found ancient gases trapped in 1.4-billion-year-old salt crystals, providing data on historical atmospheric conditions during the "Boring Billion".

Paleontology

Exposing a Fossil, Credit: Christopher Amrich, Creative Commons Attribution 2.0 Generic license

Another area of academic research that deserves attention in its own right has been the world of fossils and ancient life. I publish links to new paleontological discoveries every week but here are three stories worth highlighting in this year end review:

- Miocene aged sea cow species discovered in Qatar that lived in the ancient Tethys Sea.
- 6 incredible new dinosaurs we discovered in 2025.
- An armoured fish from the Middle Devonian discovered in Manitoba's Interlake district.

Economic Geology

Panning for Gold at Bonanza Creek, Dawson, Yukon, Credit: Creative Commons Attribution-Share Alike 3.0 Unported license

While gold and silver bugs (like the fellow panning for gold, above) continue to emphasize the importance of precious metals, two other stories continue to dominate the world of economic geology: the evolving oil industry and critical minerals.

Oil, and other hydrocarbons, have been, and remain, a significant part of what drives our industrial economies. The changes in the oil industry are significant and will have long term geopolitical

consequences, as described in Dr. Tim Morgan's recent analysis. The basic story is that while mature oil fields are approaching or well within the depletion side of their production histories, new sources have to be brought on line to meet demand. Some of these unconventional sources, such as the shale oil of the Bakken Shale and Permian Basin may already be in steep, terminal, decline, although some dispute this. Others, such as deep offshore oil, are proving to be difficult and expensive to develop. Meanwhile, the price of oil remains volatile, adding uncertainty to investment decisions. Boom and bust has been the norm in the oil business since the early days, so some of this is nothing new. Also not new are geopolitical events that are driven by the need to secure oil supplies – keep an eye on Venezuela in the coming year.

Another important area in economic geology has been the search for so called critical minerals: copper, lithium, graphite, silica sand, and rare earth elements (REE). I publish links to news items on these commodities almost every week, so I won't repeat them here. I think that we should note that many geologists are diligently searching for these minerals and researching their geology. One such example is my friend Marcus Sweetapple who has been a consistent supporter of this blog. Critical minerals like lithium, copper and graphite have come to the fore through their role in high-tech batteries – e.g. lithium ion batteries and the like. The demand for REE stems from their use in the specialized magnets in electric vehicle motors. High quality silica sand is needed for a wide variety of electronic applications to produce silicon wafers – right now there is only one commercial source, in North Carolina.

I see lots of demand for further research into pegmatites and other sources of critical minerals. There are also proposals to develop other sources of silica sand, such as in Manitoba. I also expect further geopolitical shenanigans around the subject as various political jurisdictions seek to secure supplies of these commodities.

Climate Change

Hubbard Glacier in Alaska Calving and Iceberg Credit: Bernard Spragg. NZ, Creative Commons CC0 1.0 Universal Public Domain Dedication

While there continues to be a lot of excellent research into past climates such as these ones into ancient atmosphere and the vulnerability of Greenland's glaciers, the really big story in climate change is that the political class, led by people like Bill Gates, is moving on from the climate change story. While some will continue to push for earlier narrative on climate change, there seems to be a move away from the more apocalyptic view of climate change in the public arena.

For real science – i.e. the actual hard study of climate change past, present, and future – this is a good thing. The hyperbolic claims of our imminent demise due to climate change, where every severe weather

event becomes a portent of evil things to come, has been harmful to the actual pursuit of the truth about our changing climate. A look back in geological history shows that the climate is always changing, an we we have no reason to believe that will ever change. The windbags who previously touted an world ending event due to climate change will probably follow people like Bill Gates and move onto to other causes. It should be interesting theatre.

New Years Fireworks in Banff
Credit: Wilson Hui, Creative Commons Attribution 2.0 Generic license

That kind of wraps up my year-end review. Please continue to read my upcoming blogs and a Happy New year to you all.

Standard Caveat

J. Robert Oppenheimer on freedom and scientific inquiry

The purpose of my weblog postings is to spark people's curiosity in geology. Don't entirely believe me until you've done your own research and checked the evidence. If I have sparked your curiosity in the subject of this posting, follow up with some of the links provided here. If you want to, go out into the field and examine some rocks on your own with the help of a good field guide. Follow the evidence and make up your own mind.

In science, the only authority is the evidence.