

September 22, 2025

News and notes



Geese in the [City Hydro Fountain](#), Memorial Provincial Park, North of the Manitoba Legislature, Winnipeg

This week, before going on to discuss the geology and mineral resources of the [Maldives](#), we will first look at some news items I thought were interesting. If you enjoy my blogs, bookmark the site and check Monday mornings rather than relying on social media postings which can get lost in the shuffle.

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

- Not so stupid after all: [Meet the 'brain rot' generation that toppled the government in Nepal](#).
- Taiwan, China, India: [China's Rival Opens Doors To India: Offers Rare Earth Minerals To Break Beijing's Monopoly](#).
- [Ukraine Strikes Deep Into Russia as Energy War Escalates](#).
- [Britain's Descent Towards Civil War is No Accident](#).

Research and News

- [Here are the 2025 Ig Nobel Prize winners!](#)
- Fluvial geology: [The impact of mangroves development and morphodynamics on channel function shift and flow asymmetry in an estuarine channel-shoal system.](#)
- [Coupled hydrothermal venting and hydrocarbon seepage discovered at Conical Seamount, Papua New Guinea](#); Phys.org summary [here](#).
- [Offshore Record of Explosive Volcanic Eruptions in the Southern Part of the Panamá Basin During the Past 10 Myr: 1. Tephrostratigraphy, Cross-Correlations and Geochemical Characterization.](#)
- [Offshore Record of Explosive Volcanic Eruptions in the Southern Part of the Panamá Basin During the Past 10 Myr: 2. Inferences About the Construction of the Northern Andean Arc and Regional Geodynamics.](#)
- Not the result of an [earth-shattering](#) kaboom: [A possible volcanic origin for the Greenland ice core Pt anomaly near the Bølling-Allerød / Younger Dryas boundary](#); Phys.org summary [here](#).
- [Sedimentology, Volume 72, Issue 6, October 2025.](#)
- [Virtual outcrop modelling and petrography of a heterogeneous gabbroic outcrop in the Ivrea-Verbano Zone, Italy.](#)
- [Small dip, big impact: How 1° strata inclination affects density-driven flow in anisotropic rocks.](#)
- Archean ocean: [Eclogite xenoliths record a constant ocean oxygen isotope composition for 3 billion years.](#)
- [Stable strontium isotopes reveal magma-fluid interaction during the evolution of granitic magma.](#)
- [New Mexico Geology Volume 46, Number 2.](#)
- [Mercury isotopes in North Pacific sediments reveal vegetation expansion in warm climates.](#)
- [High-resolution tephrochronology resolves stratigraphic complexities in archaeologically significant Nariokotome tuffs, Turkana Basin.](#)
- [Zinc isotope constraints on the cycling of carbon in the Bermuda mantle source.](#)
- Fun with [fluorescent](#) lamps: [Hunting for yooperlites: A midnight adventure near Lake Superior.](#)

Mineralogy and Petrology

- [Towards the continuous series of HgS–ZnS solid solutions: Zn-rich metacinnabar assemblages in the Vorontsovskoe gold deposit \(Northern Urals, Russia\).](#)

- [Coupled Diffusion and Stress in Garnet from Holsnøy, Norway: Implications for Mineral Replacement Reactions and the Timescales of Episodic Heating and Fluid Flow during Subduction.](#)
- [Crystal-chemical variations of celadonite: versus glauconite.](#)
- [Experimental hydrogenation of pure and Cr-doped rutile at variable temperature, pressure and oxygen fugacity.](#)
- [A Coral Biomineralization Model for Dual Clumped Isotopes.](#)

Plate Tectonics

- [Boron isotopes trace an increase in subduction-driven recycling of fluid-mobile elements in the Neoproterozoic.](#)
- [New detrital zircon U-Pb and Hf isotope constraints for the Kluane Schist, southwestern Yukon, Canada, and their implications for Cretaceous Insular terrane accretion.](#)
- [Phase equilibria modeling constraints on channel flow of metasedimentary crust beneath the southeastern Tibetan Plateau.](#)
- [Subduction-Driven Reworking of Craton and Accretionary Orogen: Evidence From Integrated Geophysical Imaging in Western North China Craton.](#)
- [Lithospheric Structure of the Dinarides-Adriatic Region From Ambient Noise Eikonal Tomography.](#)
- [Thermomechanical Analysis of the Louisville Seamount Chain: Implications for Late Cretaceous Pacific Plate Evolution.](#)
- [SS Precursor Imaging Reveals a Global Oceanic Asthenosphere Modulated by Sea-Floor Spreading.](#)
- [Structural Data and Thermometry Indicate That the Tso Moriri UHP Nappe \(Indian Himalaya\) Was Emplaced as a Large-Scale, Structurally Coherent Sheet.](#)
- [Structural controls on post-rift magmatism in the Ceduna Sub-basin, Great Australian Bight.](#)

Paleontology

- [Mineralization Controls Informative Biomarker Preservation Associated With Soft Part Fossilization in Deep Time; Phys.org summary \[here\]\(#\).](#)
- [A problematic soft-bodied fossil from the Cambrian \(Miaolingian, Wuliuan\) of Utah.](#)
- [The effects of sensitive environmental indicators in interpreting faunas of the past: a case study from the Jurassic of China.](#)
- [The oldest diverse jellyfish fauna reinterpreted as sessile polypoid dinomischids \(stem-group Ctenophora\).](#)

- [Earliest gobioid fishes were coral-reef associated dwarfs: New evidence from the Eocene of Monte Bolca, Italy.](#)
- Life's origins: [Deep microbial colonization during impact-generated hydrothermal circulation at the Lappajärvi impact structure, Finland.](#)
- [Further insight into an unnamed, medium-sized crouzeioid pliopithecoid from the Vallès-Penedès Basin \(NE Iberian Peninsula\).](#)
- [New insights into the graptolite biostratigraphy of the Floian \(Lower Ordovician\) Acoite Formation at El Moreno, Cordillera Oriental of Argentina.](#)
- [Digitized endocasts and brains: a perspective on measurements and historical analyses of the evolution of 172 fossil and extant amniote specimens.](#)
- [Azhdarchid pterosaur diversity in the Bayanshiree Formation, Upper Cretaceous of the Gobi Desert, Mongolia.](#)
- [Dinosaur extinction can explain continental facies shifts at the Cretaceous-Paleogene boundary.](#)
- [Cariocecus bocagei, a new basal hadrosauroid from the Lower Cretaceous of Portugal.](#)
- [What Led Life to Flourish Roughly 520 Million Years Ago?](#)

Mining and Energy

- [Interfacial solar evaporation transforms brine mineral recovery.](#)
- [Oil Pipeline Lifeline for Canada Comes Under Siege in Michigan.](#)
- Saskatchewan: [One of largest deposits of critical minerals in the world sits in the Northeast.](#)
- [Sweden Looks to Lend \\$23 Billion to New Nuclear Power Projects.](#)
- [Colombia's Ecopetrol to Drill More New Oil Wells.](#)
- Ooh, shiny: [Rio Tinto ends diamond era with historic final auction.](#)
- [China's rare earth product exports surge to highest since 2012.](#)
- [U.S. Northeast is relying less on electricity imports from Canada.](#)
- [Electricity demand is surging across the Middle East and North Africa, driven by cooling and desalination needs; related: Middle East Nations Are Shifting Away From Oil in Power Production.](#)
- [New map reveals the locations of the largest gold deposits in the US.](#)
- [Director of Brazil's Mining Agency Arrested in \\$300M Corruption Probe.](#)
- [Canada's \\$43-billion subsidy scheme for critical minerals misses supply chain steps.](#)

- [Who Really Controls U.S. Electricity Prices?](#) Hat-tip Rob M.
- 09/16 [Declines in output from existing oil and gas fields have gathered speed, with implications for markets and energy security.](#)
- [EU-Japan Eye Greenland Rare Earths: Vision, Friction, and the Map Ahead.](#)
- [Goodbye to chargers forever-scientists unveil diamond battery that can run 5,700 years without recharging.](#)
- [Density Constrains Environmental Impacts of Fluid Abstraction in Closed-Basin Lithium Brines;](#) Phys.org summary [here](#).
- [What you must know about Canada's critical minerals.](#)
- [How Much Metal Can \\$10K Buy?](#)

Environmental Geology and Hydrogeology

- France: [Groundwater tables as of September 15, 2025.](#)
- Groundwater contamination: [TCE Gets Compliance Date Extension from EPA.](#)
- [Groundwater Pumping Gets Restricted in Exceptional Drought in Central Texas.](#)
- Carbon capture research: [From Hydrocarbon to CO2 Storage: Unveiling the Potential of the Miocene Lille John Member in the Danish North Sea.](#)
- [The Colorado River is running dry, and scientists think they know why.](#)
- [Campbell Soup admits to dumping waste into Maumee River, violating Clean Water Act 5,400 times.](#)

Glaciers and Climate Change

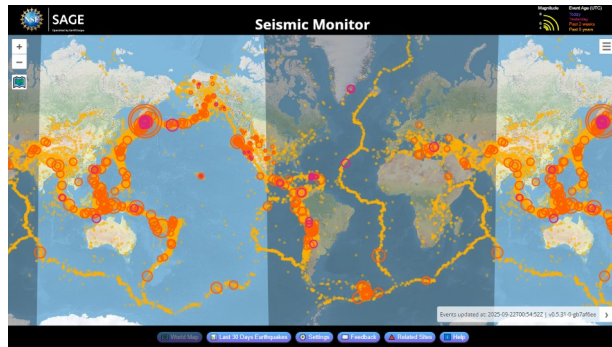
- [Detection of 85 new active subglacial lakes in Antarctica from a decade of CryoSat-2 data;](#) Phys.org summary [here](#).
- [Climate change linked to landslide that buried Swiss village.](#)
- [In Nepal, Scientists and Spiritual Leaders Honor a Dying Glacier.](#)
- [Side-by-Side Glacier Photos Show Extent of Retreat Over The Decades.](#)
- On the Atlantic Meridional Overturning Current (AMOC): [If Not Now, it Will Come Later.](#)

From Out of this World

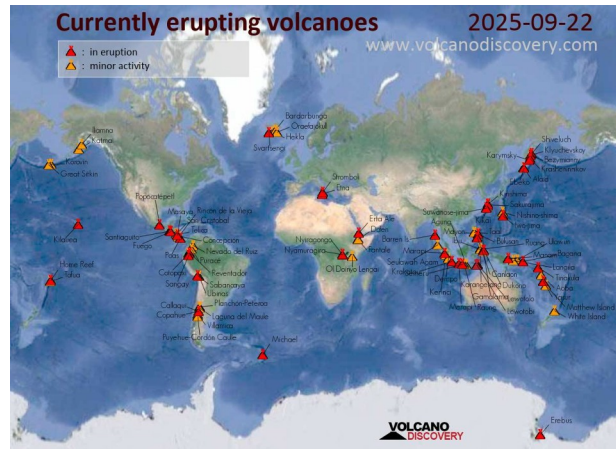
- [Multiple lines of evidence for a hypervelocity impact origin for the Silverpit Crater.](#)
- [Catastrophic disruption of asteroid 2023 CX1 and implications for planetary defence;](#) Phys.org summary [here](#).

- Samples from asteroid Ryugu: [Ge, Te, and Zn isotopic link between Ryugu and CI chondrites](#).
- [Doomed 'cannibal' star could soon explode in a supernova so bright it would be visible during the day](#).
- [The glass-ceiling convective regime and the origin and diversity of coronae on Venus](#).

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

Volcanoes

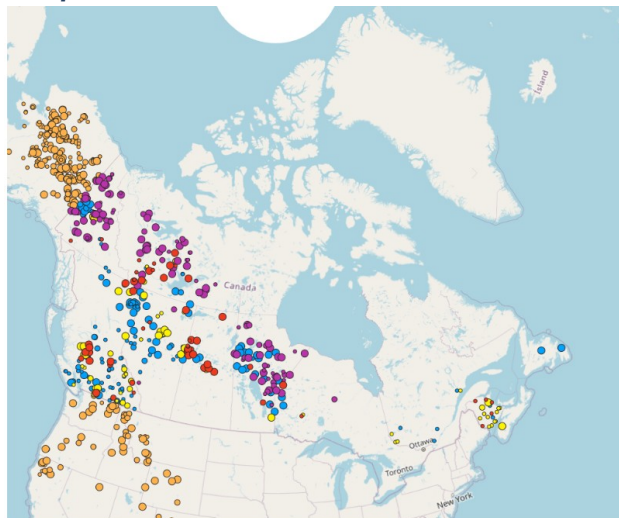
- [Smithsonian / USGS Weekly Volcanic Activity Report](#).
- United States Geological Survey (USGS) Volcano Observatories:
 - [Cascades Volcano Observatory Weekly Update](#).
 - Volcano Watch – [Volcano and earthquake monitoring in American Samoa](#).
 - Yellowstone Caldera Chronicles: [How to Take a Volcano's Temperature](#).
 - [Mount St. Helens Webcam at Johnston Ridge Observatory](#).
- [Reykjanes Peninsula, Iceland, activity updates - new eruption since 21 Nov 2025](#).
- [Etna volcano - eruption update](#).

Earthquakes

- [Euro-Mediterranean Seismological Centre \(EMSC\)](#).
- [Earthquakes Monitoring Live Worldwide](#).
- [M 7.8 strikes offshore Kamchatka](#); USGS summary [here](#).

- [Three-dimensional resistivity structure and its relationship to the rupture of the 1997 Kagoshima earthquake doublet \(Mw 6.1 and 6.0\), Japan.](#)
- [Exploring the Effects of Hydraulic Fracturing on the 2019 Mw 5.0 Weiyuan Earthquake in Sichuan, China.](#)
- [To Heal or Not to Heal?: 1. The Effect of Pore Fluid Pressure on the Frictional Healing Behavior of Lithologies in Oklahoma](#) and [To Heal or Not to Heal?: 2. The Moment–Recurrence Time Behavior of Repeating Earthquakes in the 2011 Prague, Oklahoma Aftershock Sequence Is Consistent With Laboratory Healing Rates.](#)
- [Statistical Characteristics of Seismicity Correlated With Crustal Fluids in the Noto Region.](#)

Wildfires and Other Geohazards



Interactive Wildfire Map September 22, 2025
Credit: ©[Canadian Wildland Fire Information System](#)

- [Spain's Northwestern wildfires prompt evacuations; firefighting efforts intensify.](#)
- [US faces wildfire death toll surge in next 25 years, researchers warn.](#)
- India: [29 landslides and counting - From building collapses to uprooted trees, Shimla sees it all this monsoon.](#)
- Foundation hazard map from the USGS: [CT, MA aerial survey maps geology, pyrrhotite hazard;](#) i.e. don't mix aggregate with [iron sulphides](#) into cement.
- Malaysia: [At least 12 dead in Malaysia landslides after week of heavy rain.](#)

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; also they now have a [Free Online Learning Module: Pumping Test Analysis](#).

- Free Groundwater Modeling Course – [HydroGeoCenter](#).
- From Western Australia: [Carbonatite, lamprophyre and host rocks in the northern Aileron Province](#).
- Two volumes of Geology of Indonesia now can be accessed for [FREE/GRATIS](#). The books can be accessed from: vol 1 <https://lnkd.in/eH6Gcka4>; vol 2 <https://lnkd.in/egTYmpjk>.
- 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

- This week: [GeoManitoba 2025 78th Annual Canadian Geotechnical Society Conference & 9th Canadian Permafrost Conference, RBC Convention Centre, Winnipeg, Manitoba, September 21 – 24, 2025](#).
- "[The Art of Inquiry – Art Meets Science Showcase](#)"; Monday, September 22nd, 5:00 PM; [Astrogeology building, USGS Flagstaff Science Campus, 2255 N. Gemini Dr., Flagstaff, AZ; free and open to the public](#).
- [29 September – 1 October 2025, Stuttgart, Germany, Nature Conference on Advancing Perovskite-Based Photovoltaics](#).
- [Thursday 2nd October 2025, Early Career Hydrogeology Conference 2025, Leeds U.K.](#)
- Australia: [12–18 October 2025, Earth Science Week](#).
- November 3 – 4, 2025 [Central Canada Mineral Exploration Convention 2025](#) Victoria Inn Hotel & Convention Centre, 1808 Wellington Avenue, Winnipeg, Manitoba R3H 0G3, Canada, Early Bird pricing is in effect until midnight October 1.
- [5th International Professional Geology Conference \(IPGC\), November 5 to 7, 2025, Zaragoza, Spain](#).
- [Saskatchewan Geological Open House, December 1 to 3, 2025, Delta Bessborough Hotel, Saskatoon](#); Registration for the 2025 Conference now open.
- [Groundwater Week 2025, December 9-11, 2025 in New Orleans](#).
- [Society of Petroleum Engineers Distinguished Lecturer Schedule](#).
- [American Geophysical Union List of Upcoming Meetings](#).
- The Geological Society: [Events & Courses](#).
- [International Union of Geological Sciences calendar of geoscience events](#).
- "[Geology Hour](#)" [Online](#), evenings on the 3rd Monday of the Month from the Geological Society of the Oregon Country.
- [Canadian Energy Geoscience Association Upcoming Events](#).

September 22, 2025

Geology and Mineral Resources – Maldives

Introduction

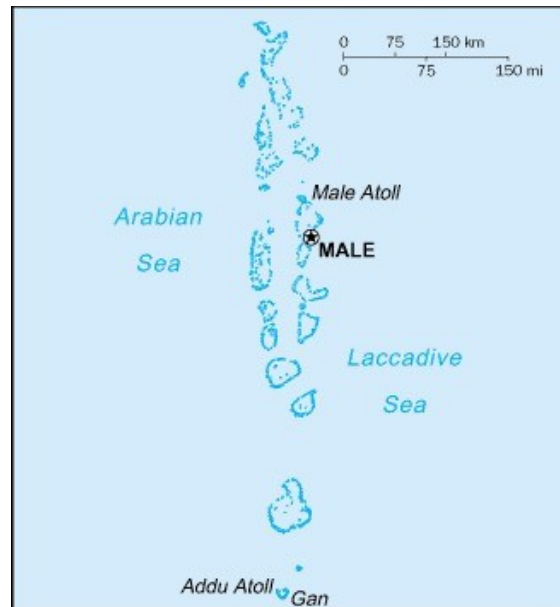


Figure 1a – Maldives

Credit: [CIA World Factbook](#), public domain

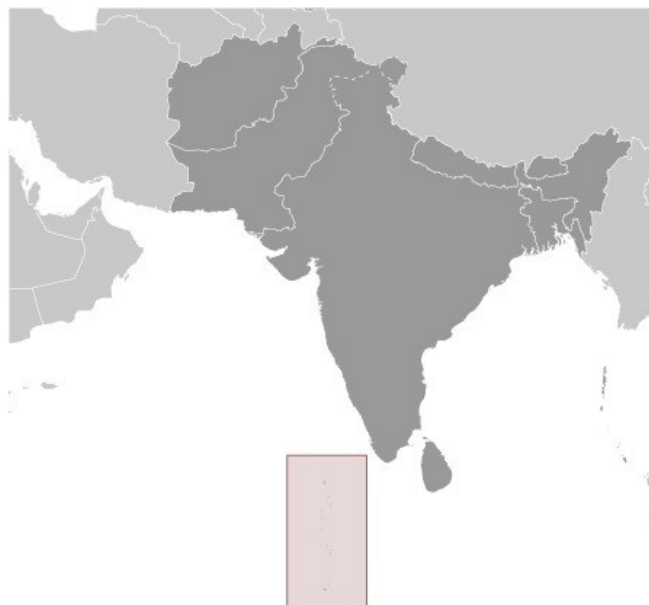


Figure 1b – Location of Maldives

Credit: [CIA World Factbook](#), public domain

The [Republic of Maldives](#) is a country of 388,858 people living on 1,192 islands grouped into 26 atolls in the [Indian Ocean](#), southwest of [India](#) and [Sri Lanka](#). The country has an area of 298 square kilometres, most of it barely above sea level. It is a moderately prosperous country with a per capita [GDP \(PPP\)](#) of

\$34,322 and a high [Human Development Index](#) of 0.766. The main industries are [tourism](#) and [fishing](#). For more details on the country, check out the CIA [World Factbook](#) on the Maldives as well as the [Wikipedia article](#).

Geology

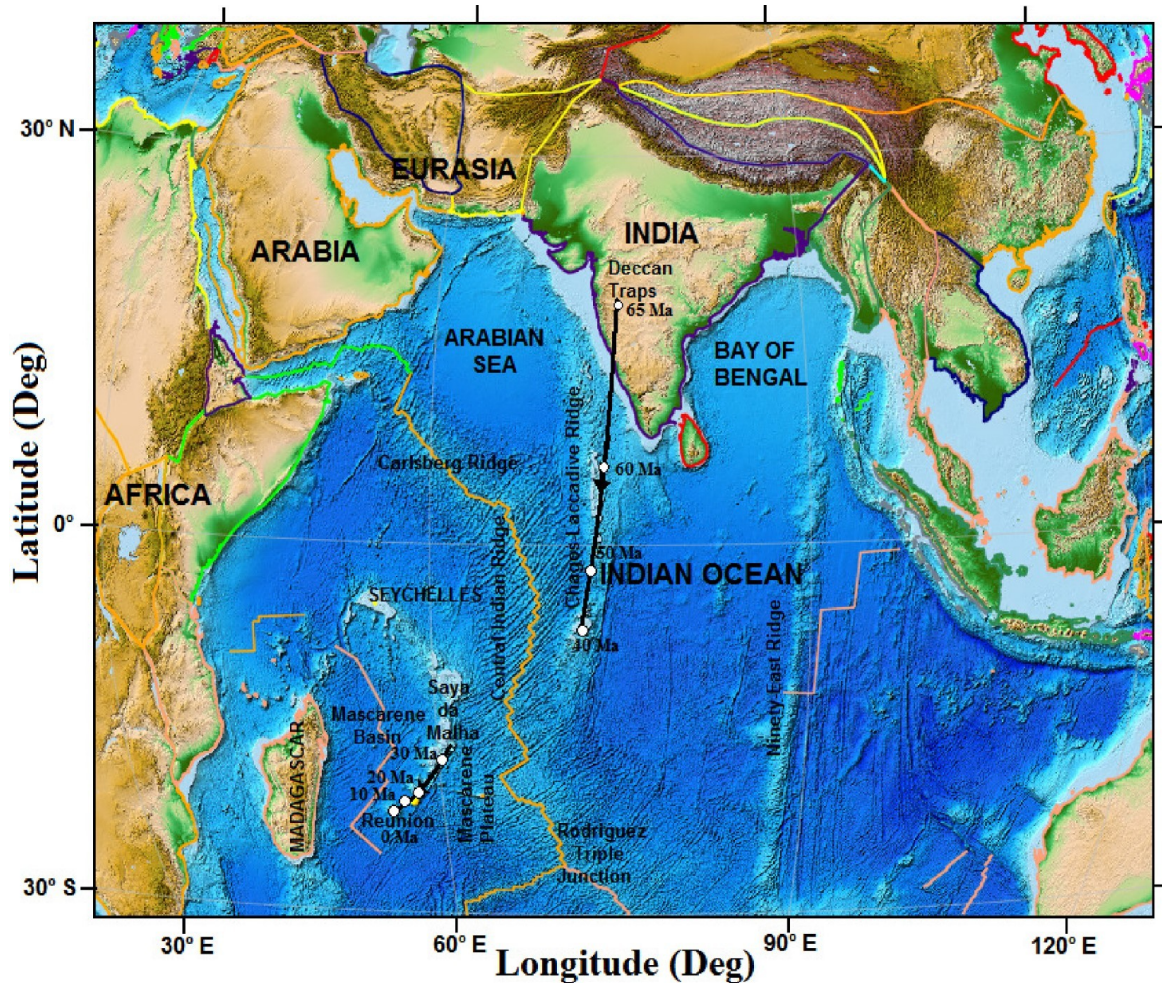


Figure 2 – Track of the Reunion Hotspot

Credit: Figure 3 in [Behera & Sen 2014](#)

The origin of the Maldives Archipelago lies in the movement of the [Indian Plate](#) over the [Reunion Hotpot](#) and the creation of a [volcanic seamount](#) approximately [57.2 million years ago \(\$\pm 1.8\$ m.y.\)](#), during the [Paleocene](#). This seamount formed the [basement](#) on which the [carbonate platform](#) grew during the [Cenozoic](#). From the Paleocene to the [Quaternary](#), the growth of coral reefs on the volcanic basement [created](#) the modern Maldives Islands.

I've discussed carbonate platforms before in my discussions of the [Bahamas](#) and [Kiribati](#), so I won't repeat it here. The surficial [geology of the Maldives](#) shows predominately Quaternary aged [limestones](#) derived from [coral](#).

For further information; [Mindat.org](#) suggests the following references on the geology of the Maldives:

- [Duncan, R.A., Hargreaves, R.B. \(1990\) \$^{40}\text{Ar}/^{39}\text{Ar}\$ geochronology of basement rocks from the Mascarene plateau, the Chagos Bank, and the Maldives Ridge. Proceedings Ocean Drilling Programme, Scientific Results, 115, 43–51.](#)
- [Aubert, O., and Droxler, A. \(1992\) General Cenozoic evolution of the Maldives carbonate system \(equatorial Indian Ocean\). Bulletin des Centres de Recherches Exploration-Production Elf Aquitaine, 16, 113-136.](#)
- [Purdy, E.G., and Bertram, G.T. \(1993\) Carbonate concepts from the Maldives, Indian Ocean. American Association of Petroleum Geologists Studies in Geology, 34, 56 pp.](#)
- [Belopolsky, A. and Droxler, A. \(2003\) Imaging Tertiary carbonate system – the Maldives, Indian Ocean: insights into carbonate sequence interpretation. The Leading Edge, 22, 646-652.](#)
- [Gischler, E., Hudson, J.H., and Pisera, A. \(2008\) Late Quaternary reef growth and sea level in the Maldives, Indian Ocean. Marine Geology, 250, 104-113.](#)
- [Kench P.S., Smithers S.L., McLean R.F. and Nichol S.L. \(2009\) Holocene reef growth in the Maldives: evidence of a mid-Holocene sea level highstand in the central Indian Ocean. Geology, 37, 5, 455-458.](#)

Mineral Resources

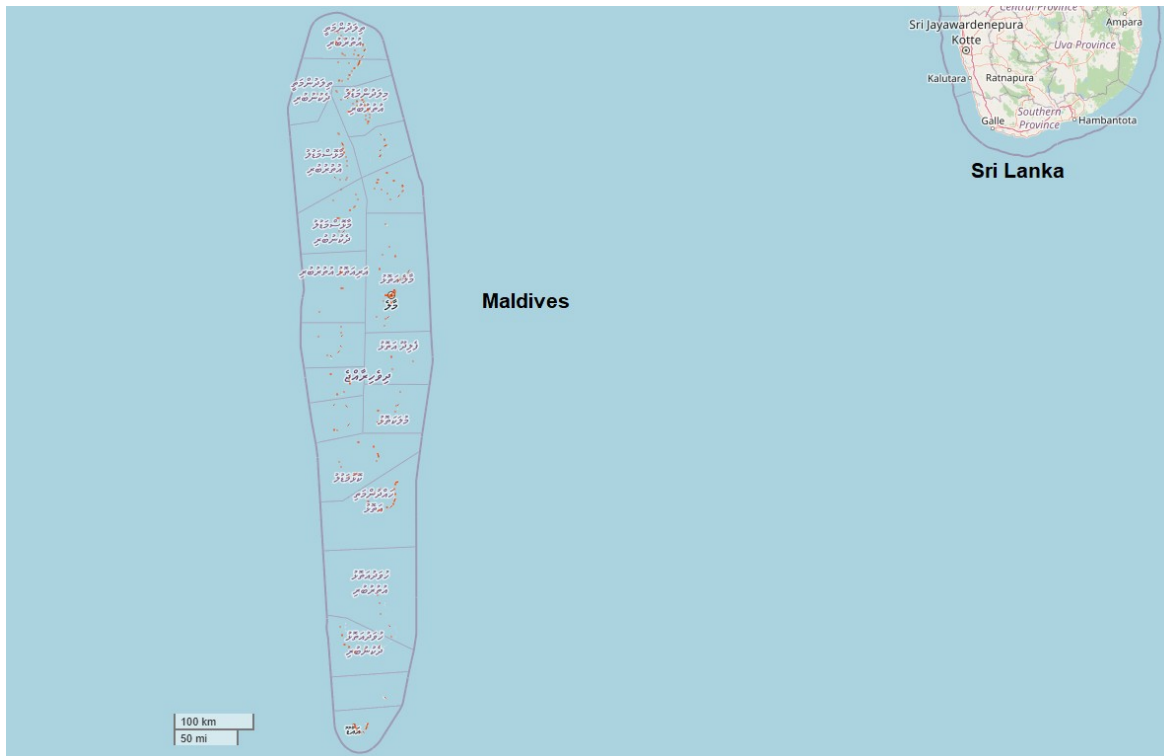


Figure 3 – Mineral Occurrence Map, Maldives
Credit: ©Mindat.org

The USGS does not list the Maldives in their [International Minerals Statistics and Information](#), not surprising for a country whose surficial geology is exclusively coral limestone. [Mindat.org](#) indicates that [phosphorite](#) is known to occur on the islands. There have been [oil exploration](#) activities in the vicinity of [the Maldives](#), however there [does not appear to be an interest](#) in developing these potential resources.

Summary



Figure 4 – [Malé, Capital of Maldives](#)

Credit: [Shahee Ilyas](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

The Maldives appear to be a wonderful place to take a vacation, but is unlikely to provide much opportunity for a geologist to explore mineral resources. Any exploration for minerals such as off-shore oil and gas is currently seen as a threat to their main industries of tourism and fishing. Still, they could change their minds on that (they say that [they need development](#)) and there would be no end of geologists, especially from cold climates, who would love to work there.

If you want to go to the Maldives, you might want to go soon. Whatever its [cause](#), climate change and sea-level rise are going to [adversely affect small islands](#) like the [Maldives](#). To make the point about the dire threat of climate change, in 2022 the Cabinet of the Maldives Government held a [Cabinet meeting – underwater](#). Recently, the Maldives government published an [action plan](#) for adapting to the projected changes in sea-level.

Stunts and [climate-science soap opera aside](#), there is very real potential for disaster in the Maldives. Prayers and thoughts may not be enough, the people on the Maldives will need a place to go if and when the sea swallows their [island paradise](#) since it is [unlikely that we can prevent](#) the inexorable process of climate change anytime soon. Guess what? [Mother Nature is a bitch](#).

That wraps it up for this short take on the Maldives. Followup on the links if any of this interests you.

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.