

April 14, 2025

News and notes

Before going on to discuss the geology and geopolitics of Italy, here are some news items I thought were interesting.

Geopolitics

- Strategic assets: [UK takes control of British Steel under emergency powers](#); it's the last steel producer in the UK.
- [Oil Nations Scramble to Avert Economic Crisis After Prices Crash](#).
- [Iraq's 7 Million bpd Oil Production Goal Draws Swift Response from Chinese Firms](#).
- [Critical Minerals and Materials Geoeconomics: Lessons and Ideas From Past Wars and Strategic Competitions](#).

Research and News

- [Flexible X-ray computed tomography for multiscale and dynamic imaging of geological materials](#).
- [An Assessment of Monazite Fission-Track Thermochronology as a Proxy for Low-Magnitude Cooling, Catalina-Rincon Metamorphic Core Complex, AZ, USA](#).
- Stratigraphy: [North American Stratigraphic Code](#).
- [Geosciences are Important for Humanity! A Model for Enhancing the Geoscience Narrative across Canada](#).
- [Equilibrium Silicon Isotope Fractionation in Eclogites and Granites Constrained by Single Crystal X-Ray Diffraction and the Force Constants Approach](#).
- [Sedimentation rates control trace element composition of sedimentary phosphorites: Anomalously low uranium and cadmium levels in Paleozoic shelly phosphorites from the Baltica Paleobasin](#).
- [Redox-State and Bioproductivity of the Glaciogenic Early Cryogenian Rapitan Iron Formation \(Cranswick River, Canada\): Constraints From Combined Cadmium—Chromium Isotopes](#).
- [Deep Secrets: Discovery of a giant mega-slide in the North Sea Fan, offshore Norway](#).
- Related to today's posting: [Paleoenvironmental changes in the western Tethys carbonate platforms during OAE-2: Implications from phosphorus, \$\delta^{18}\text{O}\$, \$\delta^{13}\text{C}\$ and facies analysis](#).
- [Topographic Drag at the Core-Mantle Interface](#).

- [Geochemical and tectonic evolution of the Ordovician Bronson Hill arc and Silurian and Devonian Connecticut Valley–Gaspé trough: Eastern Vermont and western New Hampshire, USA.](#)
- [Geolandscapes of the Ciucas Mountains \(Eastern Carpathians, Romania\) - the assessment of geomorphosites and development of geotourism.](#)
- [The Supra-Salt Sedimentary Sequence of the North Caspian Depression: Stratigraphy and Sedimentary History.](#)
- [Scientists map the ocean floor in detail and discover nearly 100,000 submerged seamounts.](#)
- [Prolonged \$^{187}\text{Os}/^{188}\text{Os}\$ excursion implies hydrothermal influence after the Chicxulub impact in the Gulf of Mexico; Phys.org summary \[here\]\(#\).](#)
- [Geophysics: Analysis of Paleointensity Results Under Different Interpretation Approaches: A Case Study on the Korkhi Volcanic Sequence \(Lesser Caucasus, Georgia\).](#)
- [Volcanically modulated micronutrient cycles in the mid-Proterozoic ocean.](#)
- [Dyke emplacement and its interaction with fracture systems and regional stress fields: Combination of a field study and geochronology in Cserhát Hills, Hungary.](#)
- History of geology: [Discovery of the Witwatersrand goldfields – contrasting opinions after 100 years.](#)
- [Wave driven cross shore and alongshore transport reveal more extreme projections of shoreline change in island environments; Phys.org summary \[here\]\(#\).](#)
- [Molecular composition of dissolved organic matter from young organic-rich hydrothermal deep-sea sediments; Phys.org summary \[here\]\(#\).](#)

Plate Tectonics

- Future plate tectonics: [This map shows what Earth might look like in 250 million years.](#)
- [The Role of Microcontinent Strength and Basal Detachment in Accretionary Orogenesis: Insights From Numerical Models.](#)
- [Seismic imaging of a basaltic Lesser Antilles slab from ancient tectonics; Phys.org summary \[here\]\(#\).](#)
- [Southwestern Tian Shan: 1. Deformation of Cenozoic Intra-Montane Basins and Intervening Basement Ranges in Front of the Indian Mantle Indenter and Southwestern Tian Shan: 2. Timing of Cenozoic Mountain Building, Intra-Montane Basin Inversion, and Relation to Lithospheric Mantle Indentation.](#)

Paleontology

- [An update on *Aenocyon dirus* in the interior of North America: new records, radiocarbon dates, ZooMS spectra, and isotopic data for an iconic late Pleistocene carnivore.](#)

- [The first mayfly \(Ephemeroptera, Baetidae\) from Late Cretaceous amber of North Carolina, USA.](#)
- Mitochondrial genomes: [A Million Years of Mammoth Mitogenome Evolution](#): SciNews summary [here](#).
- [The structure of the end-Cretaceous dinosaur fossil record in North America](#); SciTechDaily summary [here](#).
- [Hydrodynamic behaviour of organo-phosphatic bioclastic sediments: An experimental study on linguliform brachiopod shell fragments.](#)
- [Enamel carbon, oxygen, and strontium isotopes reveal limited mobility in an extinct rhinoceros at Ashfall Fossil Beds, Nebraska, USA](#); SciNews summary [here](#).

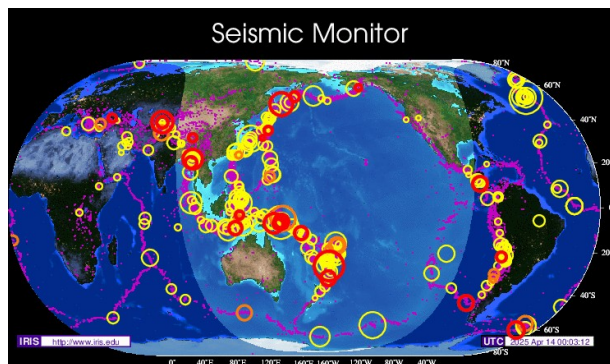
Mining and Energy

- [Trace Element Geochemistry of Li-Rich Pegmatites in the Carolina Tin-Spodumene Belt, North Carolina, USA: Implications for Petrogenesis and Exploration.](#)
- [Nunavut should go nuclear, U.S. industry representative says.](#)
- [USGS releases assessment of undiscovered oil and gas resources in the Los Angeles Basin.](#)
- Fracking research: [Experimental and Numerical Methods for Hydraulic Fracturing at Laboratory Scale: A Review.](#)
- Hydrogen: [It has been resting for a million years — Shocking discovery underneath the Earth's mountain ranges.](#)
- [Manitoba commits \\$2.5M to mineral development projects.](#)
- [Setting a bold ambition, Canada could be the number one exporter of liquefied natural gas to Asia.](#)
- [Trump tariff shock sends oil to four-year low](#); related: [American Shale Chief Tells Peers to Stop Drilling 'Right Away'.](#)
- [Made-in-Canada Fusion Breakthrough Could Change the Future of Global Energy.](#)
- Philippines: [Proposed nickel ore export ban may affect global supply – BMI.](#)
- [Nunavut Mining: Goose mine set to pour first gold in June.](#)
- Mississippi Valley-type (MVT) deposits: [Formation of abnormally high density H₂S fluid in sedimentary basins.](#)
- [Hotter and deeper: how NZ's plan to drill for 'supercritical' geothermal energy holds promise and risk.](#)

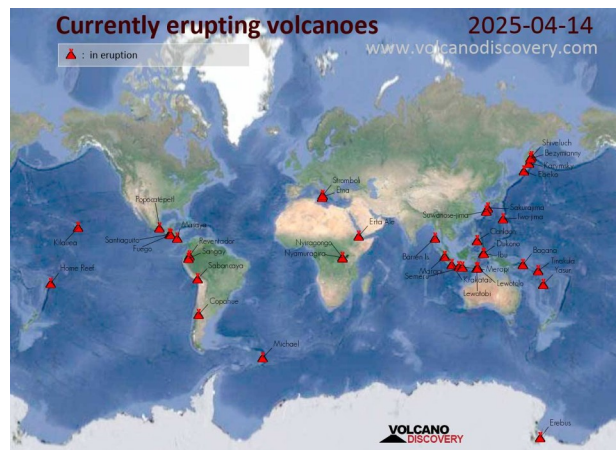
Glaciers and Climate Change

- [High-resolution Holocene record based on detailed tephrochronology from Torfdalsvatn, north Iceland, reveals natural and anthropogenic impacts on terrestrial and aquatic environments.](#)
- [Towards a New Generation of Impulse-Response Functions for Integrated Earth System Understanding and Climate Change Attribution.](#)
- Periglacial environment: [Giant Methane Crater Discovered On Siberia's Arctic Tundra.](#)
- More on the periglacial environment: [Investigation of Submarine Permafrost Conditions in the Canadian Beaufort Sea Using Diving Wave Tomography.](#)
- [Computer models have been accurately predicting climate change for 50 years.](#)
- [Recurrent humid phases in Arabia over the past 8 million years](#); Phys.org summary [here](#).
- [Ancient rocks reveal how ice age weakened the Roman Empire](#); Popular Mechanics summary [here](#).
- [Inter-model differences in 21st century glacier runoff for the world's major river basins.](#)
- [Artificial glaciers boost water supply in northern Pakistan.](#)
- [Rapid and large-scale landscape modification caused by the draining of a glacier-dammed lake in British Columbia, Canada](#); see also this [Geology Bits podcast](#).

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

Volcanoes

- [Smithsonian / USGS Weekly Volcanic Activity Report.](#)
- United States Geological Survey (USGS) Volcano Observatories:

- [Live camera at Kīlauea volcano, Hawaii \(west Halema‘uma‘u crater\).](#)
- [Cascades Volcano Observatory Weekly Update.](#)
- Volcano Watch – [A Focus on the National Volcano Information Service.](#)
- At Yellowstone’s edge: [The Beartooth Mountains and the Stillwater Complex.](#)
- [Inferring 3-D Rheology of Low-Viscosity Zone Around Quaternary Volcanoes of NE Japan From Postseismic Deformation of the 2011 Tohoku-Oki Earthquake.](#)
- [Petrological Evidence for Magma Mobilization Years Before the 2020/2021 Eruption of La Soufrière Volcano, St. Vincent.](#)
- [How Did Westward Volcaniclastic Deposits Accumulate in the Deep Sea Following the January 2022 Eruption of Hunga Volcano?](#)
- [Continuous Subsidence of Dallol Volcano Caused by Magmatic, Hydrothermal, and Salt Dissolution Processes: Insights From InSAR Observations.](#)
- [Ground deformation in and around Jigokudani valley, Tateyama volcano, Japan, during the period of 2021–2022 revealed from combined data of levelling surveys and GNSS observations.](#)
- Video: [Kanlaon Volcano erupts in Philippines](#)
- [Kīlauea Volcanic Ash Induced a Massive Phytoplankton Bloom in the Nutrient-Poor North Pacific Subtropical Gyre](#); Discover Wildlife summary [here](#).

Earthquakes

- [Euro-Mediterranean Seismological Centre \(EMSC\).](#)
- [Earthquakes Monitoring Live Worldwide.](#)
- Alaska earthquake monitoring: [Metal mushrooms pop up at seismic stations.](#)
- [Aftershock analysis and forecasting for the crustal seismicity in Romania.](#)
- Chinese earthquakes: [Research on seismic activity and seismic structural characteristics of the Shandong region.](#)
- 04/08 [Seismic fault slip at depths simulated by high-velocity friction experiments under hydrothermal conditions.](#)

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.

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.
- 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>.

Upcoming Events

- [Williston Basin Petroleum Conference, April 28-30, Regina Saskatchewan](#)
- European Geosciences Union: [EGU General Assembly 2025, Vienna, Austria & Online 27 April–2 May 2025](#).
- [ISMAR 2025](#) – International Symposium on Controlled Aquifer Recharge April 28 – May 2, 2025 – Stellenbosch, South Africa
- [The USGS David A. Johnston Cascades Volcano Observatory will be hosting an Open House for the public on May 10, 2025!](#)
- [Geoscience Beyond Borders, GAC-MAC-IAH-CNC 2025 Ottawa, Ontario, May 11-14, 2025](#).
- [Sedimentary Geology and the Energy Transition Conference, June 2-5, 2025 – Salt Lake City, UT USA](#).
- [Society for Sedimentary Geology conference, Mountjoy IV – August 10-13, 2025, in Montreal, Canada](#).
- [Copper to the World Conference, Tuesday 26 – Wednesday 27 August 2025](#), in Adelaide, Australia; report on 2024 conference [here](#).
- [GeoManitoba 2025 78th Annual Canadian Geotechnical Society Conference & 9th Canadian Permafrost Conference, RBC Convention Centre, Winnipeg, Manitoba, September 21 – 24, 2025](#).
- [29 September -1 October 2025, Stuttgart, Germany, Nature Conference on Advancing Perovskite-Based Photovoltaics](#).
- [5th International Professional Geology Conference \(IPGC\), November 5 to 7, 2025, Zaragoza, Spain](#).
- 2025 [Society of Petroleum Engineers Distinguished Lecturer Schedule](#).
- [List of geoscience events in 2025 from the International Union of Geological Sciences](#).
- [American Geophysical Union List of Upcoming Meetings](#).
- The Geological Society: [Events & Courses](#).

April 14, 2025

Geology and the Fate of Societies – Italy



Figure 1a – Italy

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



Figure 1b – Location of Italy

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

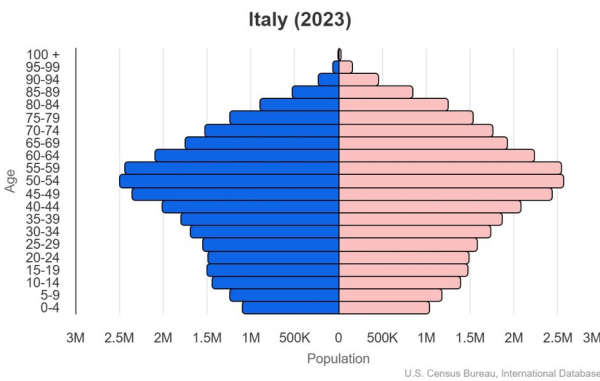
The [Republic of Italy](#) is on the [Italian Peninsula](#) in [Southern Europe](#). Italy includes the major islands of [Sicily](#) and [Sardinia](#) as well as almost [800 smaller offshore islands](#). Italian seashores are on the [Mediterranean Sea](#) as well as its smaller extensions in the [Adriatic Sea](#), the [Ionian Sea](#), [Ligurian Sea](#), and the [Tyrrhenian Sea](#). Italy has land borders with: [Slovenia](#) to the east; [Switzerland](#) and [Austria](#) to the north; and [France](#) to the west. Within Italy are two sovereign mini-states: [Vatican City](#) and [San Marino](#).

According to the [Central Intelligence Agency](#)'s [World Factbook on Italy](#), the country has a total area of 301,340 square kilometres (km²), of which 294,140 km² is land and 7,200 km² is water. Also according to the World Factbook, 60,964,931 people live in Italy, 72% of whom live in urban areas. Of the approximately 61 million people in Italy, 91% are ethnic [Italian](#); the rest are a mixture of ethnic [Germans](#), [French](#), and [Slovenes](#) in the north and ethnic [Albanians](#), Croats, and [Greeks](#) in the south. [Italian](#) is the official language, with other languages spoken in the minority areas.

Most, 80.8%, are [Christians](#), predominately [Roman Catholics](#) with very small groups of [Jehovah's Witnesses](#) and other [Protestants](#). Of the remainder, 4.9% are [Muslim](#), and 14.3% are unaffiliated or other. In terms of education, 99.2% of the total population aged 15 and over can read and write; people can expect to stay in school for 16 years.

Economically, the per capita [GDP \(PPP\)](#) is \$60,992; the [Gini](#) coefficient is 32.5 indicating medium inequality; and the [Human Development Index](#) is very high at 0.906. The top [exports of Italy](#) were machinery and equipment (€20.6b), basic pharmaceutical products and pharmaceutical preparations

(€12.2b), food products (€9.38b), chemicals (€8.47b), and metallurgy products (€7.89b). Meanwhile, the [top imports of Italy](#) were crude oil and natural gas (€12.2b), metallurgy products (€11.2b), chemicals (€11.2b), motor vehicles, trailers and semi-trailers (€10.3b), and basic pharmaceutical products and pharmaceutical preparations (€8.84b). In 2024-Q3, Italy [exported](#) mostly to Germany (€17B), United States (€14.8B), Spain (€7.95B), Switzerland (€7.56B), and United Kingdom (€6.25B), and [imported](#) mostly from Germany (€20.1B), China (€13.6B), Netherlands (€8.8B), Spain (€8.2B), and Belgium (€6.24B). The [major Italian cities](#) for exports are [Milan](#) (€12.6B), [Turin](#) (€4.82B), [Florence](#) (€4.77B), [Vicenza](#) (€4.68B), and [Bologna](#) while the [major cities for imports](#) are [Milano](#) (€19B), [Rome](#) (€5.57B), [Turin](#) (€4.97B), and [Naples](#) (€4.47B) with €4.95B worth of goods coming in through diverse provincial ports.



Italy is a middle aged country with a shrinking, aging, [demographic profile](#). The median age is 48.4 years and only 11.9% of the population is under 15 years of age; 64.5% are between 15 and 64 years old and 23.6% are over 65. The total fertility rate is 1.24 births per woman, well below replacement rate of 2.1. The population is shrinking at 0.11% per year, and the net immigration rate is 3.4 migrant(s)/1,000 population. Life expectancy is 82.8 for both sexes.

Figure 2 – Italian Demographics

Credit: [U.S. Census Bureau, International Database, public domain](#)

Geology

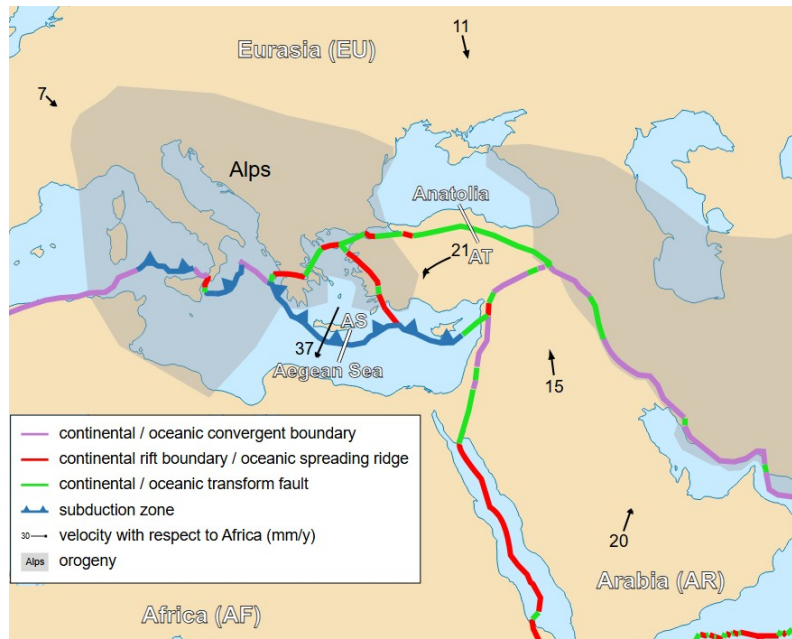


Figure 3 – Tectonic Background

Credit: [Eric Gaba \(Sting – fr: Sting\); Creative Commons Attribution-Share Alike 2.5 Generic license](#)

Peninsular Italy and Sardinia sit on the [Eurasian Plate](#) whereas Sicily sits on the [African Plate](#). The two plates are [converging](#) with the African Plate [subducting](#) under the Eurasian Plate with a [rift boundary](#) immediately east of the [Strait of Messina](#). The whole set of tectonic movement is part of the current [Alpine Orogeny](#).

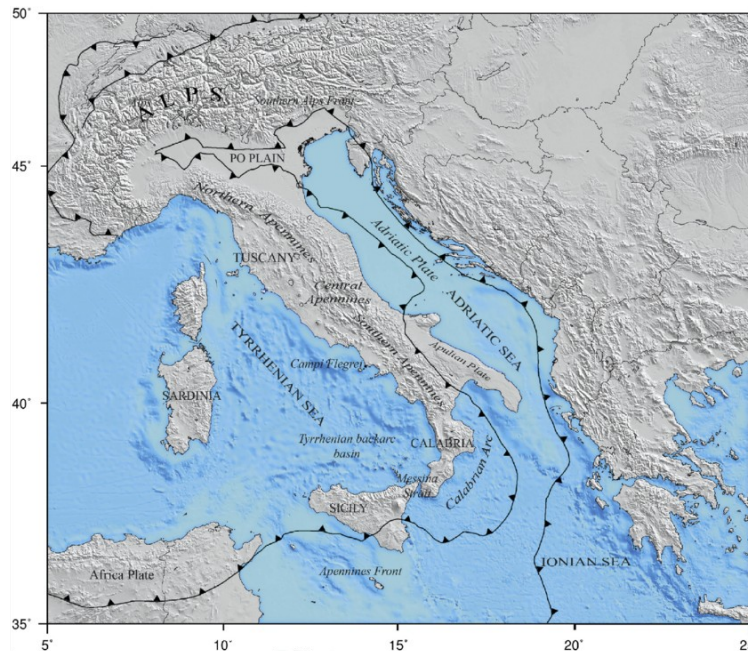


Figure 4 – Geodynamic Map of the Italian Peninsula
Credit: Figure 3 in [Casula & Bianchi, 2016](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

Digging down deeper into the tectonic framework of Italy, we see that a tectonic microplate, the [Adriatic Plate](#) is found under the Adriatic Sea and is being squeezed out by different arms of the Eurasian plate. The Adriatic plate connects to the African plate and extends under the [Po Valley Plain](#), a [foreland basin](#). Pushed up by the tectonic movement of the Alpine Orogeny are the [Apennine Mountains](#), divided into the [Northern Apennines](#), the [Central Apennines](#) and the [Southern Apennines](#). Plate boundaries include the [Southern Alps Front](#) and the [Apennines Front](#). Also shown on Figure 4 are the [Calabrian Arc](#), [Tyrrhenian backarc basin](#), and the major volcanic hot spot of [Campo Flegrei](#).

The [geology of Italy](#) includes rocks ranging in age from the [Paleozoic Era](#) to the current [Cenozoic Era](#). Paleozoic rock formations include [oceanic crust](#) subducted during the [Caledonian Orogeny](#) and [Ordovician](#) aged granite found at the bottom of an [Agip Assunta exploration well offshore of Venice](#) and metamorphosed into orthogneiss during the [Hercynian orogeny](#). Other rocks formed during the Hercynian are in the Alps, Sardinia, the [Apuan Alps](#) of Tuscany, and the [Peloritani Mountains](#) of Sicily and Calabria. Metamorphism during the Hercynian orogeny produced rocks such as gneiss, phyllite and amphibolite. [Metamorphic facies](#) range from high-pressure kyanite to low-pressure andalusite.

[Carboniferous](#) and [Permian](#) aged granite batholiths are found in the [Western Alps](#) at [Mont Blanc](#) and [Monte Rosa](#), the [Southern Alps](#) at Braveno, Brixen, Cima d'Asta, Doss del Sabion and the Barbagia and Gallura. Also found in the Southern Alps are [ignimbrite](#) deposits from volcanic eruptions. Metamorphic rocks range in degree of metamorphism the Southern Alps from essentially

unmetamorphosed [Paleocarnian chain](#) in the eastern Southern Alps to amphibolite grade in the [Orobic Alps](#) and granulite grade in the [Ivrea-Verbano Zone](#) to greenschist grade phyllite and gneiss in the basement rocks in the [Dolomites](#). In Calabria, the [Dioritic-Kinzigitic](#) unit contains outcrops of biotite and sillimanite-rich gneiss.

Also during the Permian and Carboniferous, the Tethys Ocean opened, reorienting the Adriatic Plate and creating the [Ligure-Piemontese ocean basin](#) where carbonates, evaporites and red beds were deposited. Formations in this basin include the Middle to Upper Permian [Valgardena Sandstone](#), the [Bellerophon Formation](#), the Late Permian to [Triassic](#) aged [Servino Formation](#), and the Triassic aged the [Werfen Formation](#).



Figure 5 – Geological Map of Italy

Credit: © [ISPRA Istituto Superiore per la Protezione e la Ricerca Ambientale](#)

The Triassic aged carbonate rocks in the Dolomites are former [carbonate platforms](#), up to 2 km thick, now called the [Dolomia Principale](#). Formations from this time include the [Zorzino Limestone](#), the [Choncodon Dolomite](#), the [Riva di Solto Shale](#) and the [Zu Limestone](#) in the [Lombard Basin](#).

Limestones are also found in the Late Triassic to [Jurassic](#) aged [Lagonegro Basin](#) together with chert and marl. [Horst and graben](#) formation opened up basins in which the evaporites of the [Burano Anhydrite](#) in what are now the Apennine Mountains were deposited.

Other Jurassic aged rocks deposited in the Ligure-Piemontese, Lombard, and [Belluno](#) basins include limestones, marls and turbidite. Formations from these basins include [Vajont Limestone](#), [Fonzaso Formation](#), [Selcifero Lombardo Formation](#), and the [Pietra Verde Sandstones](#).

Tectonic activity during the Jurassic and Cretaceous resulted in the deposition of peridotite, gabbro, prasinite, serpentinite and pillow lava of Jurassic to [Cretaceous](#) age in Liguria, Tuscany, Val d'Aosta and Piemonte.

Sedimentary deposition continued in the above noted basins during the Cretaceous, with a shift towards deep water sediments due to rising sea levels. Also, tectonic activity during the Cretaceous resulted in the deposition of [flysch](#) and [molasse](#) sediments in the Lombard Basin in formations such as the [Lombard Flysch](#).

During the [Paleogene](#), the Tethys Ocean closed in the Alpine Orogeny. Volcanic activity resulted in the placement of [Paleocene](#) aged basalt dykes in the Dolomites and volcanoclastic rocks in the [Lessini Mountains](#). Various trachyte, tonalite and syenite batholiths were also intruded during the Paleocene. During the Eocene, turbidite deposits and flysch deposits accumulated in the [Dinaric Alps](#). Also during the Eocene, the tectonic changes in the Apennines began to operate independently of those of the Alps in a process sometimes called the [Apennine Orogeny](#). Part of this change was the continental collision between [Corsica-Sardinia block](#) and [Adria microplate](#).

The formation of new basins during the Paleogene and [Neogene](#) are shown in the [Oligocene-Miocene](#) aged [Macigno Formation](#), the [Cervarola Sandstone](#) foredeep basin, and the Miocene aged [Marnoso-Arenacea](#) foredeep basin in the Northern Apennines. Also in the Northern Apennines, oceanic sediments were deformed and later thrust upon the [Tuscan](#) and [Umbria-Marche](#) basins. In Central-Southern Italy, carbonate platforms such as in [Lazio-Abruzzi](#) and [Apulia](#) continued during the Oligocene and Miocene together with turbidite filled basins such as the [Lagonegro](#). In the Southern Apennines, flysch deposits with ophiolite such as the [Cilento Flysch](#), [Flysch Rosso](#) and [Frido Flysch](#) were formed in an orogenic arc during the Miocene. These units show alternating shale, sandstone and conglomerate. In Sicily, the Oligo-Miocene aged [Numidian Flysch](#) and Miocene [Gorogione Flysch](#) were deposited.

The ongoing uplift of the Alps as well as the Apennines during the Miocene led to the development of backarc and foredeep basins. Among the deposits in these basins were the [Gonfolite Lombarda](#) and [Molassa Bellunese](#) flysch of the Po basin.

Another important deposit from the Miocene were the evaporites, such as the [Gessosso-Solfifera Formation](#), laid down during the [Messinian salinity crisis](#). During the [Messinian Age](#) of the Miocene, tectonic activity closed off the entrance to the Mediterranean Sea, the sea then largely evaporated, leaving behind massive evaporite deposits. The crisis ended with a [spectacular re-filling of the Mediterranean](#) at

the beginning of the [Zanclean Age](#) of the [Pliocene Epoch](#). Also throughout the Pliocene and continuing till the present, volcanic activity occurs at many places in Italy such as [in this list](#). Among the most famous of volcanic eruptions in Italy was the eruption of [Mount Vesuvius](#) in 79 AD, and the subsequent destruction of [Pompeii](#) and [Herculaneum](#).

This is just a very brief summary of [Italian geology](#), for further reading, check put these sites:

- [The Geology of Italy: tectonics and life along plate margins](#), Volume 36, 2010 of [Journal of the Virtual Explorer](#).
- [Doglioni, C. & Flores, G., 1994, An Introduction to the Italian Geology, Lamisco, Potenza, Italy.](#)
- A very detailed geological map of Italy from the *Istituto Superiore per la Protezione e la Ricerca Ambientale* is found [here](#).

Resources

Agriculture and Fisheries



Figure 6 – Tomato Farm in [Casalvecchio di Puglia](#)
Credit: [Michael Celozzi](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

According to the CIA, agriculture uses 44% of the land in Italy (24% arable land, 8.1% permanent crops 11.9% permanent pasture). Of the rest, forest is 32.7% and other uses is 23.3%. There is 24,460 km² of

irrigated land in the country. As a member of the [European Union](#) (EU), Italian is governed by the [Common Agricultural Policy](#).

Also according to the CIA, the top ten agricultural products in Italy, based on tonnage, are milk, wheat, grapes, tomatoes, maize, olives, apples, oranges, sugar beets, rice. Agriculture constitutes 1.9% of the Italian GDP and Italians spend 14.7% of their household budgets on food. Production statistics from the [United Nations Food and Agriculture Organization](#) (FAO) can be found [here](#).



Also according to the [FAO](#), only 2% of the Italian population suffers from moderate to severe food insecurity. In fact, like most other developed countries, obesity affects a fair amount of adults – 19.9%. (For comparison in my country, [Canada](#), 29.4% are affected by obesity). However, I suspect that most Italians agree with [Sophia Loren](#) on subject of food and health.

Figure 7 – Sophia Loren on the Subject of Food
Credit: [A-Z Quotes](#)

The [FAO production statistics](#) have some interesting statistics. Among the commodities associated with Italian cuisine, in 2023 Italy produced 6,016,050 tonnes of tomatoes and 2,397,880 tonnes of olives. Italians also produce [world famous wines](#), in 2024 [Italy produced](#) 47,994 hectolitres (= 33,515 British wine barrels) of wine. As for that other famous product, pasta, [production](#) totalled 6.2 million tonnes in 2023.



Figure 8 – Fishing vessels in [Bosa](#) 1996
Credit: [JopkeB](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

With a coastline of 9,136 km, Italy has a plenty of access to the sea for fishing. In [2022](#), 132,800 tonnes of fish were caught by 12,231 registered vessels. Species caught include: various crustaceans, shrimp, various cephalopods, anchovy, whitefish, and flatfish. Production statistics from the FAO can be found [here](#).

Italy also has been producing fish and shellfish by aquaculture for a [long time](#). The most common fish raised in Italian aquaculture are: Mediterranean mussel, Japanese carpet shell, rainbow trout, European sea bass, and gilthead sea bream. Italy also has a [sports fishery](#) for tourists.

As part of the EU, Italian fishing is governed by its [Common Fisheries Policy](#).

Forestry



Figure 9 – Italian Forest
Credit: [Società Italiana di Selvicoltura ed Ecologia Forestale](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

Italian forests cover 32.7% of the land in Italy. The [Italian forest industry](#) consists of largely small scale operators on a mix of private and public land. Statistics on production can be found [here](#) and [here](#).

[Italian forests](#) are considered part of the [Mediterranean forests, woodlands, and scrub biome](#). Typical species of trees found in this biome include: various species of oak (*Quercus sp.*), *Fraxinus ornus*, *Ostrya carpinifolia*, *Celtis australis*, *Acer monspessulanum*, *Carpinus orientalis*, *Pinus pinaster*, *Pinus pinea*, *Pinus halepensis*, *Crataegus monogyna*, *Castanea sativa*.

Mineral Resources



Figure 10 – Native Sulphur, Aragonite and Celestine, Floristella Mine, Valguarnera, Enna Province, Sicily, Credit: [Didier Descouens](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

The USGS Report on the [mineral industry in Italy](#) indicates that, in 2019, mineral industry production accounted for 0.3% of the GDP. The Italian mineral industry includes the [mining](#) and refining of metallic minerals, the quarrying of industrial minerals, and the production of mineral fuels.

Among metallic minerals, the main mines in Italy are the [Gorno](#) lead, silver, and zinc project in the Lombardy region of northern Italy. Industrial minerals mined or quarried in Italy include:

- Barite from mines in [Cagliari](#), [Carbonia-Iglesias](#), and [Nuoro](#);
- Cement ([an Italian invention](#)) from [various manufacturers](#);
- Dimension stone such as [Carrara Marble](#) and other building stones;
- Gypsum quarries in [Monte Tondo](#) and [Moncalvo](#);
- Fluorite mines in [Brescia](#), [Cagliari](#), [Carbonia-Iglesias](#), and [Nuoro](#);
- Potash mines in [Casteltermini](#), [Pasquasia](#), and [Racalmuto](#);
- [Pumice](#) from various volcanoes;
- Salt from production facilities at many facilities including [Locatelli](#), [Marsala](#), [Realmonte](#), [Trapani](#), and [Volterra](#);
- Sulphur from [mines in Sicily](#) such as the [Floristella Mine](#); and
- Talc from mines in [Orani, Sardinia](#) and [Postalesio, Sondrio](#).

Fuel minerals, petroleum and natural gas are extracted by Eni S.p.A. at the [Argo and Cassiopea Gas Fields](#). The most recent production statistics, from the USGS, for mineral production in Italy is found [here](#). Figure 11, below, leads to an interactive map of mineral occurrences in Italy.

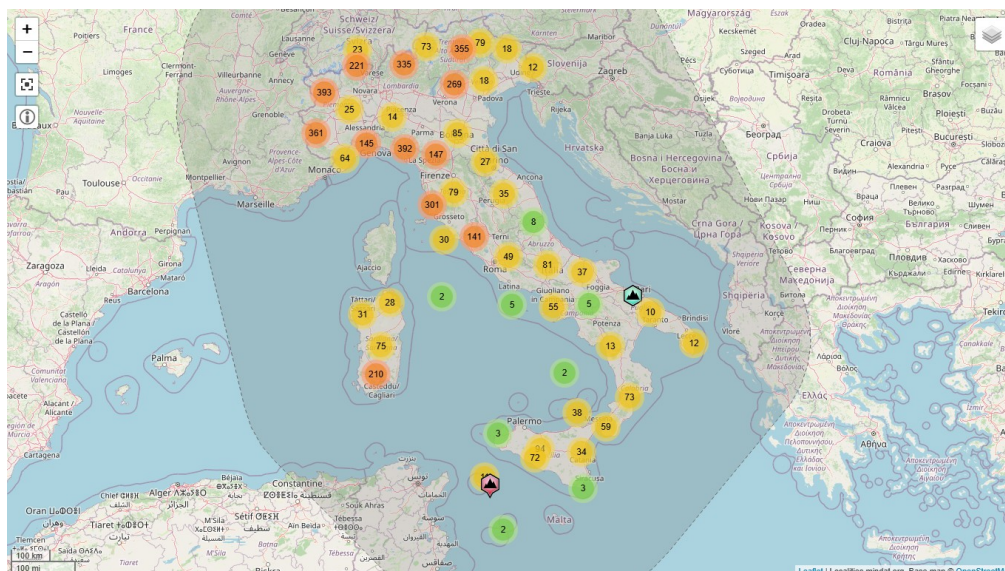


Figure 11 – Interactive Mineral Occurrences Map of Italy
Credit: ©Mindat.org

Climate

Köppen climate types of Italy

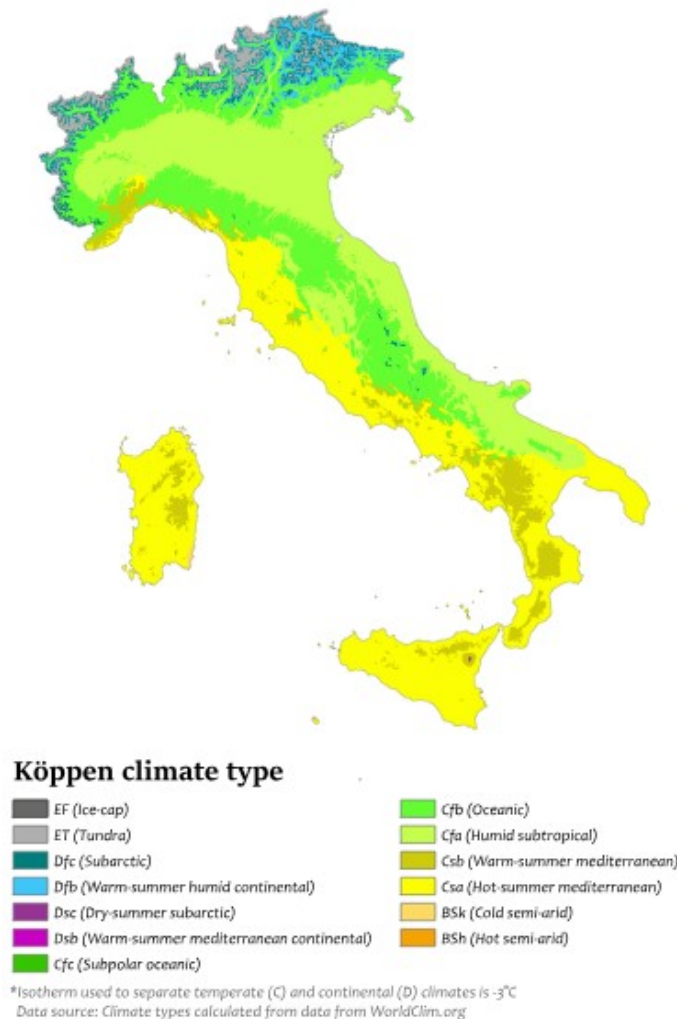


Figure 12 – Köppen Climate Map of Italy

Credit: Adam Peterson, Creative Commons Attribution-Share Alike 4.0 International license

The CIA World Factbook describes the climate of Italy as predominantly Mediterranean; alpine in far north; hot, dry in south. As you can see on Figure 12, the climate varies with distance from the sea and elevation.

Italy is a modern, industrialized country and looks like a pleasant place to visit. As usual, before you go, check out the travel advisories [here](#) and [here](#), together with the advice from [Climates to Travel](#) and [Lonely Planet](#). I have it on good authority that pickpockets and other petty criminals target tourists in major cities, so keep on your guard if you go. Otherwise, enjoy the sites and fine Italian cuisine.

History and Geopolitics

History



Figure 13 – Italy ca. 1494

Credit: [User: Shadowxfox](#), [User: Enok](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

The history of Italy goes back to the [Paleolithic](#) and continues through to the [Ancient Rome](#), the fall of the [Western Empire in 476](#), the [barbarian kingdoms in Italy](#), the [Medieval](#) and [Renaissance](#) periods, [early modern Italy](#), [Italian unification](#), [the rule of Mussolini](#), and [post-war Italy](#). There is lot to read and if that

interests you, check out the links as well as these ones [here](#) and [here](#). What I will do here is a few comments on Italian history.

One thing that is clear is that history casts a long shadow in Italy. The ruins of buildings erected by previous cultures and rulers are everywhere. The Roman Empire also casts a long shadow over politics and culture. Modern [Italians are not Romans](#), but they have not forgotten their heritage. [Mussolini's ambitions](#) came to grief, in part, because modern fractious Italians are not disciplined Romans.

One theme, pointed out by [Fernand Braudel](#) in his masterwork [The Mediterranean and the Mediterranean World in the Age of Philip II](#), the Mediterranean world was perpetually short of food. More often than not, grain had to be imported, sometimes from as far away as Poland, and in modern times, from America and Australia. The perpetual problem of ensuring that their subjects had food was a major concern. Modern agricultural techniques, such as the use of artificial fertilizers, have somewhat alleviated the problem, but limited agricultural productivity is a fact of life in Italy. Perhaps that is why Italians make such good food, it is a precious commodity.

Natural disasters have also presents challenges [throughout Italian history](#). Besides the already noted eruption of Vesuvius in 79 AD, Italy regularly experiences destructive earthquakes and weather events. Being an earthquake geologist in Italy has its own hazards, if you fail to predict an earthquake, you might [end up in jail, for while](#).

Another theme is that in the post Roman development of Italy, various regional cultures developed. For example, in Southern Italy, the ancient traditions of authoritarian rule, and quiet resistance to that rule, continued on in the [Kingdom of Naples](#), [Sicily](#), and the [Papal States](#). On the other hand, the polities of Northern Italy developed traditions of self-government in places like Venice, Milan, and Florence. They haven't forgotten those traditions and many of Italy's modern rulers come from northern Italy. The division between north and south Italy [persists to this day](#).

Finally, there is the effect of Italy on the rest of Western Civilization. Renaissance Italy gave the world great artists and thinkers such as [Galileo](#), [Michelangelo](#), and [Leonardo da Vinci](#). They also gave us the thinking of [Machiavelli](#). Italian merchants pioneered [modern accounting techniques](#) and helped re-establish international trade in Europe following the fall of Rome (as pointed out by Braudel in his other masterwork, [Civilization and Capitalism, 15th-18th Century](#)). Italian bankers were also pioneers in international finance, sometimes to their grief. In modern times, Italian emigrants have contributed to the culture of the overseas extensions of Western Civilization in the Americas and Oceania. Who doesn't like Italian food, and who hasn't heard of the [Cosa Nostra](#)?

Geopolitics – In the Middle of the Mediterranean Sea

Internally, history has bequeathed a [significant divide](#) between the politics and economics of north and south Italy. This divide has its roots in the different cultures and economic opportunities found in north and south Italy. The northerners are more prosperous, and resent those they see as freeloaders in the south. Every once in a while, [northern enthusiasts](#) lobby for an independent north Italian state. This tension seems to be an enduring feature of Italian politics and well worth keeping an eye on.

Internationally, Italy is a member of both the [EU](#) and [NATO](#). Economically, Italy is fully integrated into the EU system and gains [significant advantages](#) with some loss of sovereignty. One definite advantage

for Italians is the mobility of labour and capital within the EU. Italian firms buy and sell throughout the EU, individuals travel to wherever their skills are in demand. You can find Italian restaurants operated by Italian emigrés in many European cities. [The EU has been good for Italy](#), although, being Italians, some are [skeptical of those benefits](#).



Figure 14 – [USS Porter, DDG 78](#), in the Mediterranean, April 2016
Credit: [Commander, U.S. Naval Forces Europe-Africa/U.S. 6th Fleet](#), public domain

Italy's membership in NATO ensures that the alliance maintains control of the Mediterranean sea lanes. The [American 6th Fleet](#) is [headquartered in Naples](#), Italy and tasked with patrolling the Mediterranean, among other things. As long as the [United States is interested in maintaining a presence in the Mediterranean](#), Italy will be a vital part of that mission. It also means that in any conflict between the USA and any other Great Power, NATO members like Italy will be drawn into that conflict whether they like it or not. Its an uncomfortable geopolitical reality for Italy.

That wraps up this quick look at Italy. I am optimistic for their future, they have every reason to make the best of their situation and smooth over their internal divisions. Of course, reason often has little to do with politics. If they can't make a go of a unified Italy, they will return to the past arrangements of many separate polities on the Italian peninsula, perhaps within the overall umbrella of the EU.

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.