

March 31, 2025

## News and notes

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

### Geopolitics

- [Column: Europe's future metals strategy hindered by current crisis.](#)
- [INSIGHT: Myanmar rebels disrupt China rare earth trade, sparking regional scramble.](#)
- [India Turns Away Russian Oil Tanker As Sanctions Evolve.](#)
- [USAF's B-2 Bombers Have Landed – Is the Next Big War Taking Off from Diego Garcia?](#)
- [Trumpian Geoeconomics.](#)
- [The European Union just issued a dire warning to its 450 million citizens: Stockpile supplies and prepare for disaster.](#)
- [Greenland needs US, EU commitment to buying critical minerals, top banker says.](#)
- [China unveils a powerful deep-sea cable cutter that could reset the world order.](#)

### Research and News

- [Modeling the stratigraphic record of glacioeustatic sea-level rise and sediment starvation following Snowball Earth.](#)
- [NASA Is Watching a Huge, Growing Anomaly in Earth's Magnetic Field.](#)
- [Using Mg isotopes to constrain the formation temperature of dolomite.](#)
- [Astronomically calibrating early Ediacaran evolution.](#)
- [Terrestrial Response to Maastrichtian Climate Change Determined from Paleosols of the Dawson Creek Section, Big Bend National Park, Texas.](#)
- [High Silica Leucogranites Result From Sedimentary Rock Melting – Evidence From Trace Elements and Nd-Hf-B Isotopes.](#)
- [Topographic signature of magmatic emplacement at depth: The case of the Larderello-Travale Geothermal area \(Northern Apennines, Italy\).](#)
- [Intensified bottom water formation in the southwest Pacific during the early Eocene greenhouse – Insights from neodymium isotopes.](#)
- Petrology: [Origins and significance of alteration textures in hydrovolcanic products from active volcanoes.](#)

- [Inferences of Source Lithologies for Chicxulub Microtektites Using a Bayesian Approach.](#)
- Anthropocene Event markers: [These discarded objects will form humanity's lasting geological footprint, paleontologists say](#); link to [referenced book](#).
- [Evolution of carbonate platforms in the northeast Red Sea during the last 23 million years.](#)
- [Applications of machine learning algorithms in lithological mapping of Saint Katherine Neoproterozoic rocks in the South Sinai of Egypt using hyperspectral PRISMA data.](#)
- [Variable Upper Mantle Geochemical Processes Constrained From Independent Component Analysis of the Fizh Massif, Northern Oman Ophiolite.](#)
- Geophysics: [Trans-Crustal Geophysical Responses Beneath the Supergiant Timmins-Porcupine Orogenic Gold Camp, Canada](#); I know one of the authors.
- [USA's Oldest Rock? A Simple Question with a Complex Answer.](#)

## Plate Tectonics

- [A New Approach to Imaging Deep Crustal Structures: Implications for the Crustal Architecture of Southeast Australia's Passive Margin.](#)
- [Contemporaneous Triassic Calc-Alkaline Volcanism and Fast-Spreading Magmatism in the Western Tethys: Implications for the Eastern Mediterranean Palaeogeographic Evolution.](#)
- [Structural analysis of brittle-plastic shear zones in the Sangre de Cristo Range, southern Colorado, USA: Superposition of Rio Grande rift extension on Laramide contraction.](#)
- [An Albian-Cenomanian Salt Canopy and Secondary Minibasins in the Sub-Alpine Fold and Thrust Belt of Haute Provence, France.](#)
- [The Lyngen Magmatic Complex ophiolite: preservation of pre- and syn-collisional structures and implications for the nappe thrusting sequence in the Northern Norwegian Caledonides.](#)
- [1865 Ma tholeiitic magmatism during an extensional episode of the Svecofennian orogeny: the Kaiplo gabbros in Nagu \(Nauvo\), southwestern Finland; \[Electronic Appendix A\]\(#\).](#)

## Paleontology

- [Symbiosis between bryozoans with erect cribrate colonies and rugose corals from the lower Katian \(Upper Ordovician\) of Estonia.](#)
- Microfossils: [The Influence of Diatoms on Hydromechanical Properties of Marine Sediments.](#)
- [Scientists are pleading for more help at southern Utah fossil site. Here's what they've found so far.](#)
- [A new euarthropod from the Soom Shale \(Ordovician\) Konservat-Lagerstätte, South Africa, with exceptional preservation of the connective endoskeleton and myoanatomy.](#)

- [The effectiveness of oxygen isotopes in Spinosaurus tooth dentine for high-resolution palaeoenvironmental reconstructions.](#)
- AI and paleontology: [Enhancing the classification of isolated theropod teeth using machine learning: a comparative study.](#)
- [Didactyl therizinosaur with a preserved keratinous claw from the Late Cretaceous of Mongolia:](#) Phys.org summary [here](#).
- [A new species and new generic synonymy in the family Vietnamellidae \(Insecta: Ephemeroptera\) from mid-Cretaceous Burmese amber with notes on ancient dispersal across East Gondwana.](#)
- Fossilization research: [Experimental maturation of pine resin in sediment to investigate the formation of synthetic copal and amber.](#)
- [Prototaxites was an extinct lineage of multicellular terrestrial eukaryotes;](#) Science Alert summary [here](#).

## Mining and Energy

- [The Recovery of the Strategic Metals from the Nitrate Solutions of Zn-Pb Tailings Using a Solvent Extraction Process.](#)
- [Talks on restarting Iraqi Kurdish oil exports hit snag, two sources say.](#)
- Alaska: [Canadian company pushes forward with plans for new gold mine in Juneau.](#)
- [The United States remained the world's largest liquefied natural gas exporter in 2024.](#)
- Minnesota: [Talon Metals shares rise on massive sulphide discovery at Tamarack project.](#)
- Deep sea mining: [Long-term impact and biological recovery in a deep-sea mining track;](#) behind a paywall, IFL Science summary [here](#).
- Stripper wells: [Why a tiny bit of oil can be a big deal.](#)
- [Bjorn Lomborg: Solar and wind power are expensive.](#)
- [Glencore to cut coal output in attempt to halt price slump.](#)
- Lynn Lake: [Premier calls northern Manitoba gold mine a 'generational expansion project'.](#)
- Oh no, the high tech green economy requires mining: ['Metals are the new oil': B.C. fast-tracks critical minerals projects to counter tariffs.](#)
- [Ottawa provides \\$304M loan to company formerly known as SNC-Lavalin for nuclear reactor redesign.](#)
- [Controversy flares as Panama greenlights copper export from closed Canadian mine.](#)



- [Ash plume heights, hazards, and ashfall projections, oh my! What do volcanologists learn from ashfall maps?](#)
- Research: [Seismic Imaging of the Reykjanes Peninsula, Iceland: Crustal-Scale Context of Geothermal Areas and Ongoing Volcano-Tectonic Unrest.](#)
- [Japan issues guidelines telling public what to do if Mount Fuji erupts.](#)
- [Inferring Eruption Dynamics From Seismometer Tilt: A Case Study of Erebus and Augustine Volcanoes.](#)
- [Alaska's Largest Eruptions in the Past 10,000 Years.](#)

### **Earthquakes**

- [Euro-Mediterranean Seismological Centre \(EMSC\).](#)
- [Earthquakes Monitoring Live Worldwide.](#)
- Myanmar:
  - [Updates on the M7.7 Myanmar earthquake;](#)
  - [Scientists explain why Myanmar quake was so deadly.](#)
  - [Desperate search for survivors in Myanmar as death toll surges past 1,600.](#)
  - [Catastrophic M7.7 earthquake caused by rupture of Sagaing Fault in Myanmar;](#)
  - USGS summary [here](#).
- Research: [Lower-Crustal Earthquakes: Strain Rate Controls the Magnitude and Rate of Stress Amplification in Rigid Blocks.](#)
- [Not just the Internet: Foresight uses fiber optics to detect structural damage after earthquakes.](#)
- Test of early warning system: [Performance of bEPIC Through the 2024 M 7.0 Mendocino Earthquake Sequence.](#)
- [M6.8 earthquake rattles New Zealand's South Island, raises minor tsunami;](#) USGS summary [here](#).

### **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](mailto: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](#); the last day to book rooms at the [hotel hosting the venue](#) is Wednesday, April 2, 2025
- [4th Annual MPDA Reconciliation Forum & Gala, April 10, 2025, Winnipeg](#).
- 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](#).

March 31, 2025

## Geology and the Fate of Societies – Ireland



**Figure 1a – Ireland**

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



**Figure 1b – Location of Ireland**

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

The [Island of Ireland](#) lies off the [northwest shore of Europe](#). To the west, is the [Atlantic Ocean](#). Across the [North Channel](#), the [Irish Sea](#), and [St. George's Channel](#), is [Great Britain](#). The [Island](#) has a total area of 84,421 square kilometres. The Island is divided into two jurisdictions: The [Republic of Ireland](#) and [Northern Ireland](#).

The [Republic of Ireland](#) (The Republic) is a [unitary parliamentary republic](#). The President is [Michael D. Higgins](#), the head of the government, the [Taoiseach](#), is [Micheál Martin](#); the deputy head of the government, the [Tánaiste](#) is [Simon Harris](#); and the Chief Justice is [Donal O'Donnell](#). The legislature is called the [Oireachtas](#) and consists of an upper house, the [Seanad](#), and a lower house, the [Dáil](#). The Capital and largest city in The Republic is [Dublin](#) (pop. 1,534,900 is the urban area). Approximately 5,380,300 people live in The Republic, 64.5% in urban areas. Of the approximately 5.4 million people in The Republic: 76.6% are ethnic [Irish](#); 10.8% are other [Whites](#); 3.3% are [Asians](#); 1.5% are [Black](#); and 1.7% are something [other](#). [English](#) and [Irish](#) are the two official languages of Ireland. When reporting for the [2022 Census](#) of of The Republic, 75.7% respondents said that they were [Christians](#): 69.1% [Catholic](#); 2.5% [Church of Ireland \(Anglican\)](#); 4.1% [other Christian](#); 14.5% state that they have [no religion](#); 3.1% have some [other faith](#); and 6.7% did not state a religion. Economically, the [nominal per capita GDP](#) is \$103,500; and the [Human Development Index](#) is very high at 0.950. [The top exports of The Republic of Ireland](#) are vaccines, blood, antisera, toxins and cultures (\$51.3b), packaged medications (\$36.3b), nitrogen heterocyclic compounds (\$22.4b), integrated circuits (\$11.7b), and hormones (\$11.3b), exporting mostly to United States (\$67.4B), Germany (\$26.7B), United Kingdom (\$20.5B), Belgium (\$18.7B), and China (\$18B). In 2023, The Republic was the world's biggest exporter of hormones

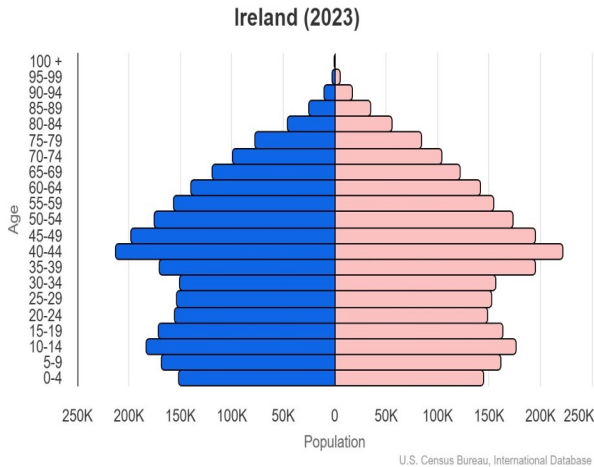
(\$11.3b), scented mixtures (\$10.1b), unpackaged medications (\$3.03b), sulfonamides (\$2.15b), and other isotopes (\$1.42b). The top [imports of The Republic](#) are planes, helicopters, and/or spacecraft (\$16.8b), nitrogen heterocyclic compounds (\$15b), vaccines, blood, antisera, toxins and cultures (\$6.95b), packaged medications (\$5.48b), and integrated circuits (\$4.69b), importing mostly from United Kingdom (\$29.1B), United States (\$24.1B), France (\$14.2B), China (\$10.8B), and Germany (\$10.3B). In 2023, The Republic was the world's biggest importer of planes, helicopters, and/or spacecraft (\$16.8b) and developed exposed photographic material (\$270m).

[Northern Ireland](#) (The North) is a [consociational](#) part of the [United Kingdom](#). A [constitutional monarchy](#), the Head of State is [King Charles III](#). The [local legislature](#) is the [Northern Ireland Assembly](#) (often called Stormont); the [First Minister](#) is [Michelle O'Neill](#) and the [Deputy First Minister](#) is [Emma Little-Pengelly](#). Northern Ireland also has representation in the [Parliament of the United Kingdom](#) with 18 [Members of Parliament from the Northern Ireland](#); [Hilary Benn](#) is the [Secretary of State for Northern Ireland](#). The largest city and Capital is [Belfast](#) (pop. 348,005). 1,910,543 people live in The North, about 1/3 of whom live in Belfast. Of the approximately 1.9 million people in The North: 96.8% are [White](#); 1.6% are [Asian](#); 0.8% are [Mixed](#); 0.6% are [Black](#); and 0.3% are something other. The official languages of Northern Ireland are English and Irish, although [Ulster Scots](#) is spoken in some areas. In a [2023 statistical report](#): 79.7% of the Northern Irish reported that they were [Christian](#) ([The 2021 census recorded that 42.3% of the population identifies as Catholic, while 30.5% identifies as Protestant](#)); 17.4% [no religion](#); 0.6% [Moslem](#); 0.2% [Hindu](#); 0.4% [other](#) (including [Sikhs](#), [Jews](#) and [Buddhists](#)); and 1.6 did not state a religion. Economically, the [nominal per capita GDP](#) is £29,674 (\$38,247); and the [Human Development Index](#) is very high at 0.907. Most of The North's "international" trade ([27% of exports and 23% of imports](#)) is with The Republic. Figure 2 [graphically illustrates](#) the patterns in Northern Irish trade.

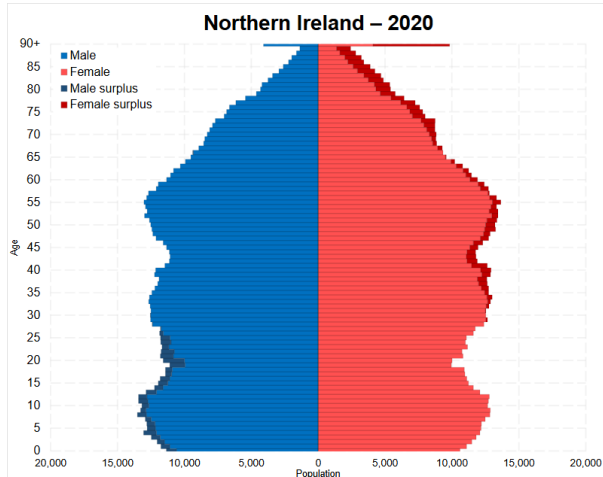


**Figure 2 – Northern Ireland Trade Infographic**

**Credit: [Northern Ireland Statistics and Research Agency](#), ©Crown Copyright**



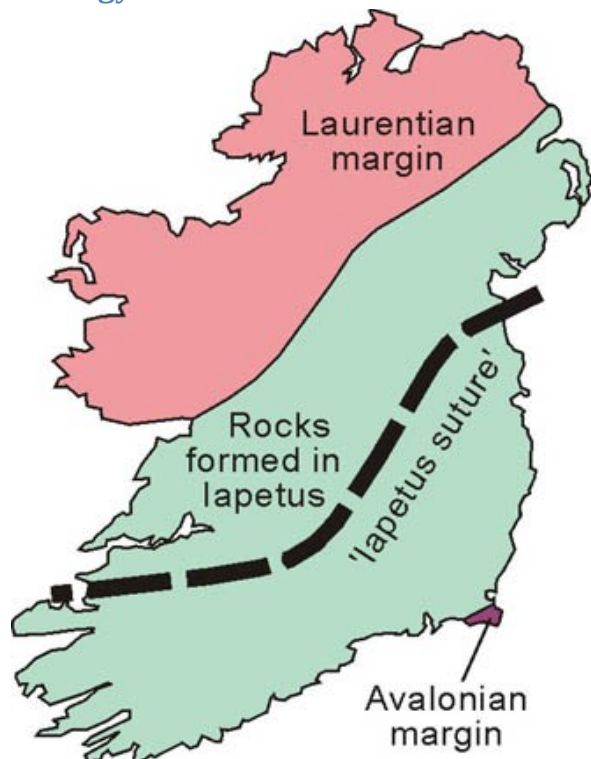
**Figure 3a – Demographics of the Irish Republic**  
**Credit: US Census Bureau, International Database**  
**public domain**



**Figure 3b – Demographics of Northern Ireland**  
**Credit: Tweedle, Creative Commons Attribution-Share Alike 4.0 International license**

The demographic profiles for [The Republic](#) and [The North](#) are similar, in that they show fairly stable middle-aged populations. In The Republic: 65.5% are aged 15 to 64 years; the total fertility rate is 1.72 births per woman (below replacement rate of 2.1); the annual growth rate is 1.09%; and the life expectancy for both sexes is 82.2 years. In The North: 64% of the population is between 15 and 64 years; the total fertility rate is 1.64 births per woman (below replacement rate of 2.1); the annual growth rate is 0.9%; and the life expectancy is 78.4 years for men and 82.3 years for women.

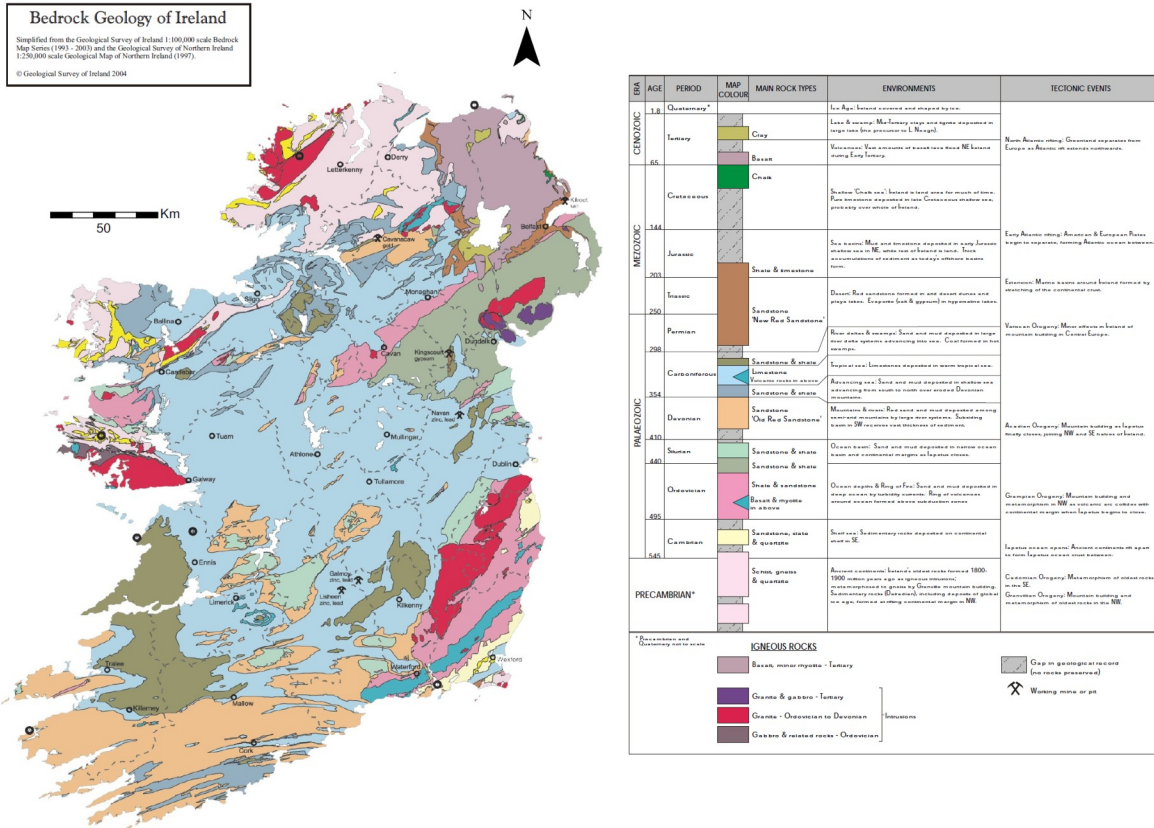
## Geology



Tectonically, Ireland can be divided into three main zones:

1. The [Laurentian Margin](#) includes the oldest rocks in Ireland, those formed during [Proterozoic Eon](#) as part of the [Laurentia](#), together with those that [accreted onto Laurentia](#) during the early [Palaeozoic Era](#);
2. The rocks deposited in the [Iapetus Ocean](#) during the [Ediacaran](#) and [Cambrian](#) together with those marked by the [closure of the Iapetus](#) from the [Ordovician](#) to the [Devonian](#) in the [Iapetus Suture Zone](#);
3. Rocks formed originally part of the [Avalonia Plate](#) and that are now in the [Avalonian Margin terrane](#) of Ireland.

**Figure 4 – Tectonic Framework of Ireland**  
**Credit: ©Geological Survey of Ireland**



**Figure 5 – Bedrock Geology of Ireland**  
Credit: ©Geological Survey of Ireland

The oldest rocks in Ireland are [Neoproterozoic](#) aged gneiss of the [Pre-Dalradian Group](#). The next oldest are the gneisses and amphibolites of the [Rosslare Complex](#), Neoproterozoic in age and metamorphosed during the [Cadomian Orogeny](#). The next oldest rocks are the psammite, quartzite, semipelite, pelite, limestone, and diamictite of the [Dalradian Supergroup](#), ranging in age from Neoproterozoic through to early Ordovician and metamorphosed during the [Grampian Orogeny](#).

[Cambrian](#) aged rocks deposited in the Iapetus Ocean include greywacke, slates, and quartzites found in [Bray](#) and [Howth](#); as greywacke, mudstone, siltstone, and quartzite found in [South Wexford](#).

[Ordovician](#) aged rocks in Ireland include: lava, tuff, greywacke, and mudstone deposited in the [South Mayo Trough](#); mudstone, siltstone, and volcanic rocks deposited in [Wexford](#) and the [Wicklow](#); volcanic rocks in the [Dublin](#) and [Kildare](#) region; and the [Longford-Down Inlier](#).

[Silurian](#) rocks in Ireland include: mudstone and sandstone on the [Dingle Peninsula](#); sandstone and turbidites in [North Galway](#); and the mudstone, siltstone and sandstones of [Clew Bay](#) including [Croagh Patrick](#).

[Devonian](#) rocks in Ireland include granites formed during the [Caledonian Orogeny](#); these include the [Donegal Batholith](#) as well as those intruded in [Mayo](#), [Sligo](#), [Carlow](#), [Wicklow](#), [Dublin](#), [Armagh](#), and [Down](#). Also of Devonian age, are the deposits of the [Old Red Sandstone](#) and the Devonian aged

[sedimentary basins](#), such as the [Munster Basin](#). Interbedded volcanic rocks are also found in the Old Red Sandstone of Ireland.

[Lower Carboniferous](#) aged rocks in Ireland include sandstone, sandy limestone, mudstones, and shale in areas of southern Ireland such as at [Hook Head, Wexford, Old Head of Kinsale](#). Limestone deposited during the Lower Carboniferous in Ireland have developed [karst topography](#); these include those deposited in the [South Munster Basin](#). Volcanic activity during the Lower Carboniferous formed volcanic rock in [Limerick](#) and [Croghan Hill](#).

[Upper Carboniferous](#) rocks in Ireland include sandstones, limestones and turbidites of the [Shannon Trough](#); sandstone around [Loop Head](#); and coal deposits in [Tipperary, Tyrone, Leinster](#), and [Ballycastle](#). The Upper Carboniferous and early [Permian](#) were also marked by a period of [continental glaciation](#) and the [Variscan Orogeny](#). Permian deposits in Ireland include: the [New Red Sandstone](#). Other Permian deposits in Ireland include [gypsum, anhydrite and salt deposits](#).

[Triassic](#) aged deposits in Ireland include [terrestrial sandstone, conglomerates, mudstones](#) and marl. Thick halite deposits are also found in the offshore [Larne Basin](#). [Jurassic](#) aged deposits in Ireland include the [Lias Clays in the Belfast Hills](#) and [limestones](#). [Ammonite fossils](#) are found in Jurassic and [Cretaceous](#) aged deposits in Ireland. Cretaceous sediments in Ireland include chalk such as the [Ulster White Limestone Group](#). Natural gas is produced in the off-shore [Corrib field](#) and petroleum deposits may also be found offshore in the [Celtic Sea Basins, North Porcupine Basin](#), and the [Slyne Trough](#).



[Paleogene](#) and [Neogene](#) rocks in Ireland include those associated with the [opening of the Atlantic](#) during the [Paleocene](#) and [Eocene](#), such as the [columnar basalts](#) exposed at [The Giant's Causeway](#), part of the larger [Antrim Lava Group](#). Intrusions were also emplaced during the Paleocene at [Slieve Gullion, Carlingford](#), and the [Mourne Granite Intrusion](#). [Dykes](#) and [sills](#) were also intruded during the Paleocene.

Later on in the Paleogene, the [Lough Neah Group](#) and [Ballymacadam Clays](#) were deposited during the [Oligocene](#).

During the Neogene, the [Hollymount Solution Pipe Fill](#) was deposited during the [Miocene](#) and the [Pollnahallia Lignite](#) and [silica sand karst fills](#) were deposited during the [Pliocene](#).

[Quaternary](#) deposits in Ireland include drumlins and eskers; map of the Quaternary features in Ireland can be found [here](#).

**Figure 6 – [Giant's Causeway, Paleocene](#) Basalt**  
Photo by Raymond Reichelt

This is only a short summary of the [Geology of Ireland](#). For further reading, check out:

- Sleeman, A., McConnell, B. & Gatley, S., 2004, *Understanding Earth Processes, Rocks, and the Geological History of Ireland*, Geological Survey of Ireland, [https://www.gsi.ie/documents/UnderstandingEarth\\_bookmarked.pdf](https://www.gsi.ie/documents/UnderstandingEarth_bookmarked.pdf);
- [Ireland through geological time](#), also from the Geological Survey of Ireland; and
- Holland, C. H. & Sanders, I. S., 2009, *The Geology of Ireland, 2nd Edition*, Liverpool University Press, <https://doi.org/10.2307/jj.12638997>.

## Resources

### *Food Production, Agriculture and Fisheries*



Figure 7 – Fields and a farm in [County Laois](#)

Credit: [Zindor](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

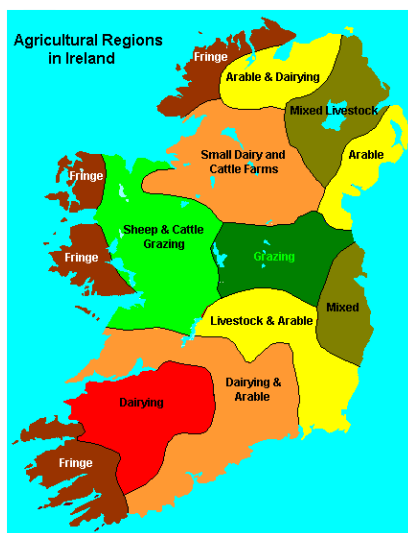


Figure 8 – Agricultural map of Ireland

Credit: [wesleyjohnston](#), [public domain](#)

According to the [World Factbook on The Republic](#), 63.1% of the land is used for agricultural, most of which, 56.6% of the total, is permanent pasture and only 6.5% is arable land. The major agricultural product of The Republic is livestock: beef cattle, dairy cattle (and dairy products), pigs, sheep (lots of sheep), and poultry. Much of The Republic's beef and dairy production is exported to other countries in the [European Union](#) (EU) and especially to the United Kingdom (UK). The Republic imports around 80 percent of its animal feed, food, and beverage needs, mostly from the UK and the EU. As a member of the EU, agriculture in The Republic is subject to the [Common Agricultural Policy](#). Statistics on agricultural production in The Republic from the [United Nations Food and Agriculture Organization](#) (FAO) can be found [here](#).



**Figure 9 – Apple Orchard near [Loughgall, Northern Ireland](#)**  
**Credit: [Brian Shaw](#), [Creative Commons Attribution-Share Alike 2.0 Generic](#) license**

Agriculture in The North is similar to that of The Republic. Mixed farming is common; about half the farms raise only sheep and beef, and about 20% are dairy farms. On the mixed farms, the main crops include potatoes, barley, wheat, and oats together with turnips being grown to feed livestock. Also important are the [orchards in the County Armagh](#), south of [Lough Neagh](#); if you visit at the beginning of September, you can partake in the [Armagh Food & Cider Weekend](#) (just don't partake [too much](#)). Statistics on agriculture in The North can be found [here](#).



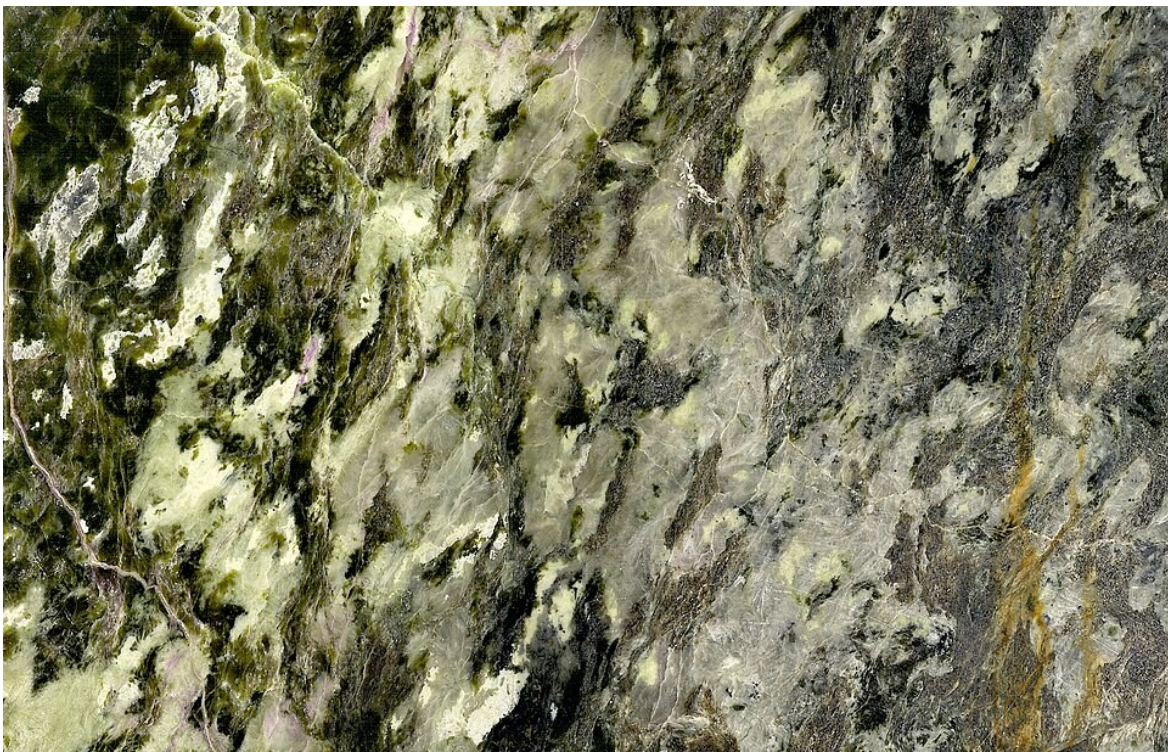
**Figure 10 – Fishing trawler in harbour [Cheekpoint](#), County Waterford**  
**Credit: [Terence wiki](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license**

The [fishing industry in The Republic](#) includes marine, freshwater, and [aquaculture](#) fisheries. In 2023, Ireland had 1,988 registered fishing vessels, 282 aquaculture sites and 103 seafood processors. Major species caught in The Republic include mackerel, herring, and tuna and shellfish. Fishery production statistics from the FAO can be found [here](#).

[Fishing in The North](#) is similar to that of The Republic. Trawlers from catch prawns, cod, whiting, and herring in the Irish Sea. Freshwater inland fishing includes traditional salmon and eel fishing. The [aquaculture industry](#) includes mussels, oysters and salmon. Statistics on the fishing industry in The North can be found [here](#).

Ireland (both in The Republic and The North) also has a sports fishery, if that interests you, check out these sites [here](#) and [here](#).

### *Mineral Resources*



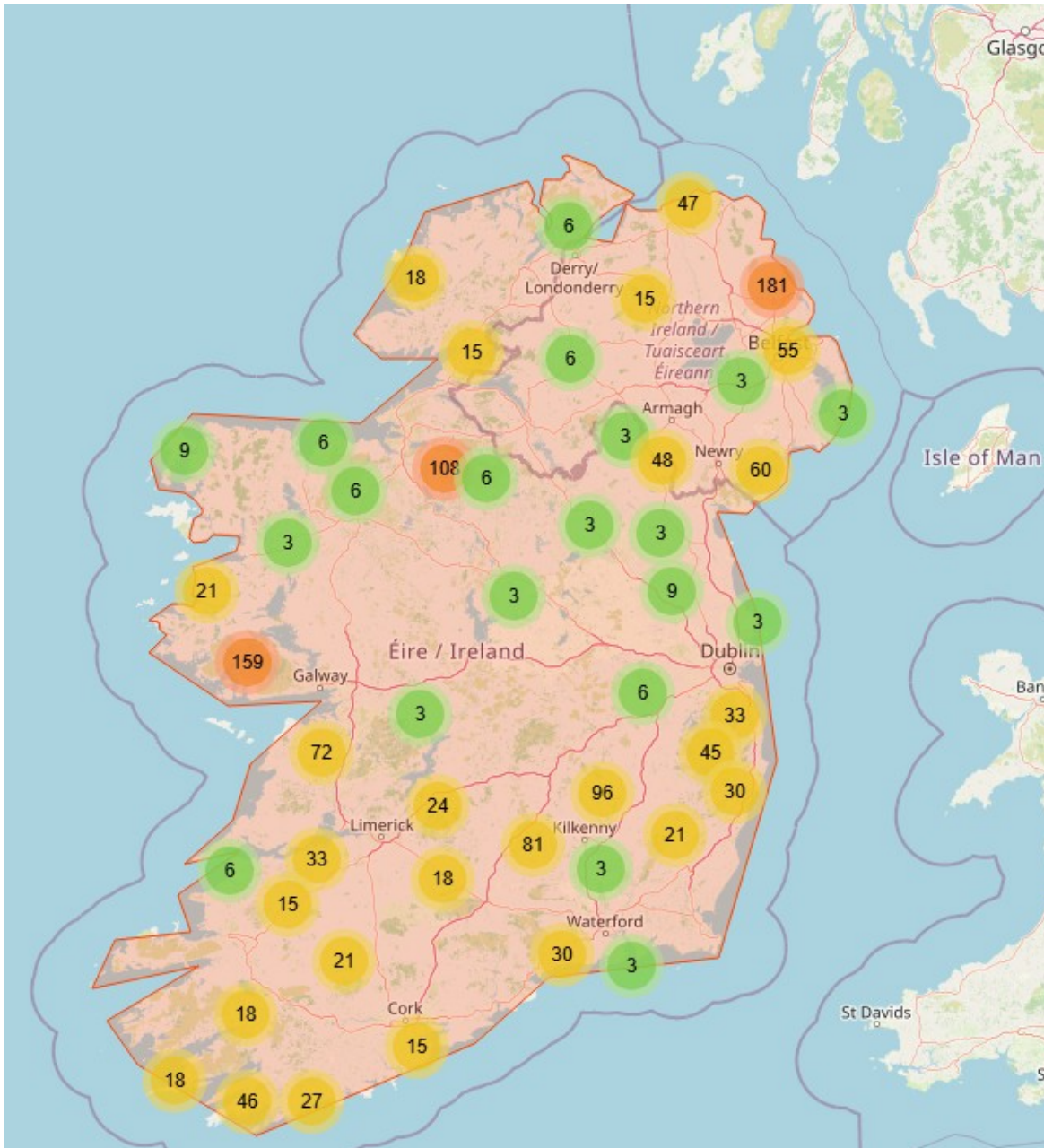
**Figure 11 – [Connemara Marble](#), Galway, Ireland**

**Credit: [James St. John, Creative Commons Attribution 2.0 Generic license](#)**

The mineral industry in [The Republic](#) includes metallic mining, industrial minerals and mineral fuels. The main metallic mining operations are the [Tara Mine, near Navan, Co. Meath](#) and [Galmoy Mine, Co. Kilkenny](#); both of which are for lead/zinc with silver as a byproduct. The Tara mine is currently in operation whereas the Galmoy Mine is currently closed, although there are plans to re-open it. Industrial minerals include [gypsum production](#) and dimension stone, especially [Connemara Marble](#). Mineral fuels include natural gas from the off-shore [Corrib](#) field and from [peat extraction](#). Statistics for mineral production in The Republic, from the USGS, can be found [here](#).

Although The North has a [long history of mineral extraction](#), only [salt](#) and building aggregate are currently exploited.

Figure 12, below, links to an [interactive map](#) of mineral occurrences on the Island of Ireland.



**Figure 12 – Mineral Occurrence Map of Ireland**

**Credit: ©Mindat.org**

One interesting mineral product from Ireland that formerly had wide use in the past was the [manufacture of clay pipes](#) from the [clay deposits](#) noted above. Changes in the use of tobacco have diminished the need for [traditional Irish clay pipes](#).

## Climate



Köppen Climate Classification – Ireland

■ Cfc (Subpolar oceanic climate)    ■ Cfb (Temperate oceanic climate)

The climate of Ireland is fairly uniform: wet and cool. Almost all the island falls under subpolar oceanic climate ([Cfc](#)) although some coastal places enjoy a slightly more moderate temperate oceanic climate ([Cfb](#)).

If you want to visit Ireland, I can tell you from personal experience that it is well worthwhile. As usual, check the travel advisories ([here](#) and [here](#) for The Republic; [here](#), [here](#), and [here](#) for The North) before you go. You might also want to check out Climates to Travel ([here](#) and [here](#)) and [Lonely Planet](#).

Figure 13 – Köppen Climate Classification – Ireland

Credit (modified): [Adam Peterson, Creative Commons Attribution-Share Alike 4.0 International](#) license

## History and Geopolitics

### *The Long Shadow of History*



Figure 14 – Battle of the Boyne, July 11th, 1690

Credit: [Jan van Huchtenburg \(1647 – 1733\), Rijksmuseum collection, public domain](#)

The history of Ireland is fairly complicated, and if you like detail, check out these sites [here](#) and [here](#). For this posting I'll look at some of the general events of the Irish story.

The earliest human inhabitants of Ireland, [Paleolithic and Mesolithic](#) hunter/gatherers, were essentially [genocided](#) by the [arrival of Neolithic farmers](#) around 4,000 B.C. These farmers built impressive [megalithic monuments](#) and established a fairly prosperous agricultural society. The Neolithic farmers in Ireland were, in turn, [conquered by the arrival of Celtic warriors](#) who introduced the ancestor of Irish Gaelic. The Neolithic farmers, and their hunter/gatherer predecessors are remembered in Irish mythology as the "[little people](#)".

The various Gaelic tribes pretty well had Ireland to themselves, and they engaged in their favourite pastimes of [blood feuds](#) and piracy. Among the captives taken by Irish pirates was one Briton, [Patrick](#), who escaped captivity only to return to Ireland to [introduce Christianity](#). One famous warrior from ancient Ireland was [Niall Noígíallach](#), i.e. Niall of The Nine Hostages who is claimed ([with some justification](#)) as the progenitor of the Ui'Neill (O'Neil) Clan.

The next set of invaders were the [Norse Vikings](#). They were also great lovers of armed conflict, blood feuds, and piracy; the [population of Iceland](#) can trace some of their ancestry to Irish lasses kidnapped by Norse adventurers. The Irish natives, under [Brian Boru](#), decisively defeated the Vikings at the [Battle of Clontarf](#) in 1014 AD.

The Irish weren't finished with invaders. In 1129, [Anglo-Norman adventurers](#) began to conquer fiefs for themselves in Ireland, thus beginning a long, violent, association with the English. Over the next 800 years, or so, the [English repeatedly fought the Irish](#) to subjugate them. Among the great events in this long, sad history, is the [Plantation of Ulster](#) by Scottish and English Protestants beginning in 1609; the [campaign of Oliver Cromwell](#) (1641-1653), and the war against King James II that culminated in the James' defeat at the [Battle of the Boyne](#).

Throughout this time and into the 20<sup>th</sup> Century, some Irish began took steps to express their national identity. The [callous treatment of the Irish by their English](#) rulers during the [Potato Famine](#) (1845-1851) was one of the spurs to development of [modern Irish nationalism](#), a movement that led to the [Home Rule controversy](#). After the end of [World War 1](#), the British realized that hanging on to Ireland was a lost cause, but only after fighting a bitter [guerrilla war](#) with Irish nationalists. In 1921 the Irish gained independence for what became The Republic, excepting out [the Ulster Counties](#); these were communities that were predominately Protestant and whose population had no desire to be part of a majority Catholic state.

Independence didn't bring peace. The Irish [fought a civil war](#) among themselves to decide who would rule in the new state. In the end, the party led by [Eamon de Valera](#) won out.

In The North, although there was a predominant Protestant majority, the Catholics lobbied for union with The Republic and peaceful demonstrations progressed to a [violent guerrilla war](#) between the [Provisional IRA](#) and the British authorities that lasted from 1968 to 1999 when a [peace accord](#) was agreed upon.

The [exit of the United Kingdom from the EU](#) has led to fears that [The Troubles may start again](#), although a [work-around](#) has been established. However, a new set of invaders have shown up: people [claiming asylum from political troubles](#) elsewhere. Not everyone in Ireland is [happy with the newcomers](#), to the

point that sworn enemies – [Protestant militias](#) and the Provisional IRA – have [joined forces](#) in demonstrations against the asylum seekers.

### *Geopolitics – An Island in the Atlantic*



**Figure 15 – Irish Houses of Parliament**

**Credit:** CraftyCaedus, [Creative Commons Attribution-Share Alike 4.0 International](#) license

Ireland has an interesting position. A member of the [European Union](#) (EU), their economic well being is dependent on how they manage their relations with the rest of the EU. I suspect that part of the reason The Republic Government is [settling asylum seekers](#) in small Irish villages are [directives from Brussels](#). It's not a choice if Ireland wants to remain in the EU.

Next door in The North, and across the Irish Sea, is the United Kingdom (UK). When the UK was part of the EU, the border between The Republic and The North was largely imaginary. Now it matters and it will continue to cause friction. Not least among the fractious Protestants and Catholics of The North. Meanwhile, The Republic is also economically tied with the UK and cordial relations are good for business. Also, things could get difficult for the Protestants in The North with the changing demographics in that the Catholics are now in the majority. This situation is worth keeping an eye on.

Further afield, The Republic has good [relations with the United States](#), a relationship that is under threat given the growing [trade dispute\(s\) between the USA and the EU](#). The Republic is caught in the middle. Also, the [Americans of Irish descent](#) have some [political influence](#), so watch for them to get involved in

ensuring good relations between the USA and The Republic. This whole situation is developing and worth keeping an eye on.

Even further afield are the ongoing [war in the Ukraine](#), among other world trouble spots. Although The Republic is a member of the EU, it is not a member of the [North Atlantic Treaty Organization](#). However, both the [EU and NATO are providing material support to Ukraine](#) in the conflict. For The Republic, this conflicts with their stated intention to [remain neutral](#). Meanwhile, the [European Union warns Irish households to prepare three-day survival kits](#); I guess that they are expecting trouble. The North is in a contrary position, no longer a part of the EU, but a part of NATO through their membership in the UK. Yeah, its complicated, so here is another situation worth keeping an eye on.

Finally, although conflicts in Ukraine, Africa and the Middle East are far away, Ireland, both The North and the Republic, are affected by the arrival of refugees in Ireland. This has not been without [controversy](#), and the government in The Republic are [seeking to bring the situation](#) under control. The Irish spent centuries seeking control of their own destiny, and many are none too happy with having all these foreigners showing up. Keep an eye on this one, too.

I am going to wrap up this quick look at Ireland here. The future is in flux and Ireland will continue to display a combination of personal good manners with the potential for horrible violence that marks their history. History suggests that Ireland is very much the child of both St. Patrick and Niall off The Nine Hostages.

## **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.