# Geology of Ireland

1:1,000,000 scale
Geological Survey of Ireland

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Simplified from the Geological Survey of Ireland 1:100,000 scale Bedrock Map Series (1993 - 2003) and the Geological Survey of Northern Ireland 1:250,000 scale Geological Map of Northern Ireland (1997).

Geological Survey of Ireland 2003

Photograph credits: 1- GSNI; 2- B. Long; 3- B. McConnell; 4- M. Pulsford; 5- C. MacDermot; 6 & 7- M. Parkes

| ERA | AGE | PERIOD | MAP COLOUR | MAIN ROCK TYPES | ENVIRONMENTS | TECTONIC EVENTS |
|---|---|---|---|---|---|---|
| CENOZOIC | 1.8 | Quaternary* | | | **Ice Age:** Ireland covered and shaped by ice. | |
| | | Tertiary | | Clay | **Lake & swamp:** Mid-Tertiary clays and lignite deposited in large lake (the precursor to L. Neagh). | **North Atlantic rifting:** Greenland separates from Europe as Atlantic rift extends northwards. |
| | 65 | | | Basalt | **Volcanoes:** Vast amounts of basalt lava flood NE Ireland during Early Tertiary. | |
| MEZOZOIC | 144 | Cretaceous | | Chalk | **Shallow 'Chalk sea':** Ireland is land area for much of time. Pure limestone deposited in late Cretaceous shallow sea, probably over whole of Ireland. | |
| | 203 | Jurassic | | Shale & limestone | **Sea basins:** Mud and limestone deposited in early Jurassic shallow sea in NE, while rest of Ireland is land. Thick accumulations of sediment as today's offshore basins form. | **Early Atlantic rifting:** American & European Plates begin to separate, forming Atlantic ocean between. |
| | 250 | Triassic | | Sandstone 'New Red Sandstone' | **Desert:** Red sandstone formed in arid desert dunes and playa lakes. Evaporite (salt & gypsum) in hypersaline lakes. | **Extension:** Marine basins around Ireland formed by stretching of the continental crust. |
| PALAEOZOIC | 298 | Permian | | | **River deltas & swamps:** Sand and mud deposited in large river delta systems advancing into sea. Coal formed in hot swamps. | **Variscan Orogeny:** Minor effects in Ireland of mountain building in Central Europe. |
| | 354 | Carboniferous | | Sandstone & shale | **Tropical sea:** Limestones deposited in warm tropical sea. | |
| | | | | Limestone | | |
| | | | | Sandstone & shale | **Advancing sea:** Sand and mud deposited in shallow sea advancing from south to north over eroded Devonian mountains. | |
| | 410 | Devonian | | Sandstone 'Old Red Sandstone' | **Mountains & rivers:** Red sand and mud deposited among semi-arid mountains by large river systems. Subsiding basin in SW receives vast thickness of sediment. | **Acadian Orogeny:** Mountain building as Iapetus finally closes, joining NW and SE halves of Ireland. |
| | 440 | Silurian | | Sandstone & shale | **Ocean basin:** Sand and mud deposited in narrow ocean basin and continental margins as Iapetus closes. | |
| | | Ordovician | | Sandstone & shale | | |
| | 495 | | | Shale & sandstone, basalt & rhyolite | **Ocean depths & Ring of Fire:** Sand and mud deposited in deep ocean by turbidity currents. Ring of volcanoes around ocean formed above subduction zones | **Grampian Orogeny:** Mountain building and metamorphism in NW as volcanic arc collides with continental margin when Iapetus begins to close. |
| | | Cambrian | | Sandstone & slate | **Shelf sea:** Sedimentary rocks deposited on continental shelf in SE. | |
| | 545 | | | Quartzite in above | | **Iapetus ocean opens:** Ancient continents rift apart to form Iapetus ocean crust between. |
| PRECAMBRIAN* | | | | Schist & gneiss | **Ancient continents:** Ireland's oldest rocks formed 1800-1900 million years ago as igneous intrusions; metamorphosed to gneiss by Grenville mountain building. Sedimentary rocks (Dalradian), including deposits of global ice age, formed at rifting continental margin in NW. | **Cadomian Orogeny:** Metamorphism of oldest rocks in the SE. |
| | | | | Quartzite in above | | **Grenvillian Orogeny:** Mountain building and metamorphism of oldest rocks in the NW. |

* Precambrian and Quaternary not to scale

IGNEOUS ROCKS

- Volcanic rocks
  - Basalt, minor rhyolite - Tertiary
  - Volcanic rocks - Precambrian to Carboniferous
- Intrusions
  - Granite & gabbro - Tertiary
  - Granite - Ordovician to Devonian
  - Gabbro & related rocks - Ordovician

Gap in geological record (no rocks preserved)

Working mine or pit

② Photograph location

1. The Giants Causeway: Tertiary basalt lavas

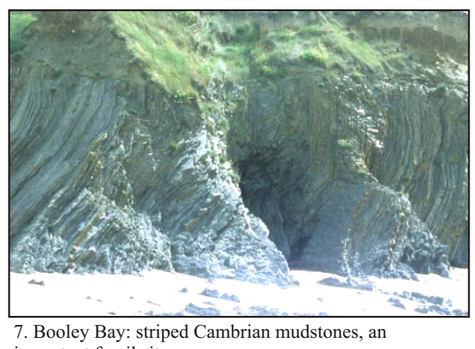
2. The Poisoned Glen: ice-sculpted Donegal granite

3. The Twelve Bens: Dalradian quartzite mountains

4. The Burren: karstic Carboniferous limestone

5. The Cliffs of Moher: bedded Carboniferous sandstone

6. Valentia tetrapod tracks: early amphibian footprints preserved in Devonian sandstone



7. Booley Bay: striped Cambrian mudstones, an important fossil site