

Ireland

The Geology of Ireland is uniquely varied, and the island is a world-renowned destination for mineral exploration. Geological Survey Ireland (GSI) and the Geological Survey of Northern Ireland (GSNI) collaborate closely on data acquisition, interpretation and the scientific understanding of the island's geology. All data is freely available from both organisations via their websites and associated data portals.

<https://www.gsi.ie>

<https://www2.bgs.ac.uk/gsni/index.html>

Geological Survey Ireland

Founded in 1845, Geological Survey Ireland is Ireland's public earth science knowledge centre and is a division of the Department of the Environment, Climate and Communications.

GSI is committed to providing free, open and accurate data and maps on Ireland's subsurface to landowners, the public, industry, and all other stakeholders, within Ireland and internationally.

In addition, GSI acts as a project partner in interpreting data and developing models and viewers to allow people to understand underground.

GSI deals with a diverse array of topics including bedrock, groundwater, seabed mapping, natural disasters, and public health risks. Programme areas of interest to the exploration and mining industry include the Tellus programme, Minerals, Geohazards and Mapping.

Geological Survey of Northern Ireland

The Geological Survey of Northern Ireland is an office of the Department for the Economy in Northern Ireland staffed by scientists of the British Geological Survey. It was established under the Minerals (Miscellaneous Provisions) Act (Northern Ireland) 1959.

GSNI provides professional, technical and scientific research, data services and archive management to support the legislative responsibilities and strategic priorities of Department for the Economy, other NI government departments and local Councils.

GSNI actively engages and works with all parts of society including central and local government, industry, academia, community organisations, NGOs, schools and the general public. GSNI staff collaborate on applied geoscience research with British Geological Survey, the Geological Survey Ireland and over 35 universities globally.

Tellus Programme

Tellus is a mapping programme, collecting geochemical and geophysical data across the island of Ireland, examining the chemical and physical properties of our soils, rocks and stream waters. The first phase of the Tellus story begins in Northern Ireland where the Geological Survey of Northern Ireland commenced the surveys in 2004, followed by a cross-border EU INTERREG-funded project mapping

the border region. Since then the GSI has managed a Government of Ireland funded programme to cover the rest of the country on a phased basis.

Tellus takes its name from the Roman Goddess for Mother Earth and includes two types of surveys (i) an airborne geophysical survey that takes measurements from the ground as the aircraft flies over and (ii) a ground geochemical survey that takes samples of soil plus sediments and waters from streams. These samples are then analysed to reveal their chemical composition. At the date of publication approximately 75% of the island of Ireland has been surveyed by the aircraft while about 50% has been covered by the ground survey.

Tellus data for all programme areas are digitally available on interactive map viewers where data can be viewed, interrogated or downloaded in Geosoft xyz, excel database or ESRI shapefile format.

Airborne Geophysical Survey

Since 2005 nearly 400,000 km have been flown across the island of Ireland by a low-flying aircraft collecting geophysical data. Millions of measurements are taken as the survey aircraft flies over the ground allowing us to produce detailed maps of the different physical properties of the rocks (Magnetics, Radiometric elements and Electrical Conductivity), assisting with improved geological mapping. The geophysical survey can measure rocks below the surface assisting geological mapping in areas where observing rocks directly is difficult such as areas covered by the soil, streams, water or over mountains. The geophysical instruments on board the plane comprise:

- A magnetometer to measure variations in the Earth's magnetic field, mounted on a rod on the back of the plane.
- A gamma ray detector to determine the natural radioactivity of shallow soil and rocks, housed inside the plane.
- A frequency-domain electromagnetic (EM) system to measure variations in electrical conductivity of the different soils and rock. This system is mounted in pods at the end of each wing.

Ground Geochemical Survey

The ground-based Tellus survey gathers geochemical data from soil and streams. It involves samplers collecting samples at specific sites. Across the island of Ireland, there are more than 50,000 sample sites to visit, with samples taken at a density of approximately one every 4km² in Ireland and one every 2km² in Northern Ireland. Soil samples are taken at each site with a hand-held core auger at 5-20 cm and 35-50 cm depths. Stream sampling involves sieving stream sediment, collecting stream water and also panning for minerals.

All samples are laboratory-analysed for up to 56 chemical elements and compounds. This allows the chemical signature of the soils and streams to be assessed and mapped showing the baseline conditions across the country. Geochemical surveys are also conducted within urban areas and can be used to identify the impacts of human activity on the environment.

Exploration in Ireland

The area of interest outlined below is prospective for numerous different metallic deposits. Across the older Dalradian rocks of the north west, gold is highly prospective, highlighted by the operating gold mine at Cavanacaw and the 6.6MOz deposit currently seeking planning permission at Curraghinalt. Further south, Ireland hosts a renowned zinc and lead orefield which is largely underexplored to the north west. This includes Boliden's Tara Mine at Navan, one of the largest zinc mines in Europe.

Links to Data Viewers

Tellus data for Northern Ireland: <https://www.opendatani.gov.uk/dataset?q=tellus>

Tellus data on Spatial NI: <https://www.spatialni.gov.uk>

