



THE HIGHLAND GEOLOGICAL SOCIETY OCTOBER 2024 NEWSLETTER

Scottish Charity No. SC004427

Welcome to our latest newsletter where we give details of the 2024/2025 autumn/winter lectures, some preliminary ideas of 2025 field trips and an illustrated look back at our 2024 field trips.

Talks Autumn/Winter 2024/2025

Thanks to Karen Deans for arranging the speakers and talks for the winter season.

Talks, as usual, will commence at 1930. (The first talk has already taken place, but is included here for completeness.)

Wednesday 2nd October: Dr Martin Smith, BGS. Glendoe Tunnel Collapse (In-person)

In 2009 just 2 months after the project was officially opened by Queen Elizabeth II the Glendoe hydroelectric tunnel that linked a containment dam in Glen Tarff to Loch Ness, experienced a catastrophic failure. The failure was located along a hitherto relatively unknown Conagleann Fault, a strike slip fault subparallel to the Great Glen Fault. The site subsequently became a focus of intense investigation generating a large volume of underground data allowing the 3D modelling of the fault structure and design of a by-pass tunnel. In this talk I described the geology and how it was unravelled to become an important component in one the largest civil engineering legal cases in Scotland. As a result of this work geologists now work closely with power company engineers in the design and construction of new hydro schemes in the Great Glen.

Wednesday 13th November: Dr John Heathcote, HGS. Radioactive Waste (In-person at Inverness Youth Hostel. We hope to record this talk.)

John has been involved the science of radioactive waste on and off for 30 years and his last job included being the technical lead on radioactive ground contamination management at Dounreay. The talk will spend some time on the nature of radioactive waste to start with, correcting some of the strange preconceptions out there.

Wednesday 11th December: Nicola Dakin, BGS. Deglaciation & Sedimentary Infill of Loch Lomond (Zoom only). Nicola is a BGS marine geochemist specialising in characterising the geology of the seabed and near subsurface geology offshore the UK continental shelf. Using multidisciplinary skills such as CPT analysis, geological and seismic interpretation, Nicola works on glacially-influenced landscapes with this talk concentrating on the subsurface of Loch Lomond.

2025

Wednesday 22nd January: Dr Rebecca Williams, Hull University. Catastrophic Volcanic Flows - Understanding Pyroclastic Density Currents (Zoom only)

Rebecca takes an interdisciplinary approach to volcano research which focuses on volcano-stratigraphy and hazardous volcanic flows (pyroclastic density currents and lahars), social-historical volcanology, and the communication of volcano science.

Wednesday 12th February: Andy Moffat, HGS. Chicxulub Seismic Drilling Data (In-person & Zoom)

The end Cretaceous and overlying Paleogene boundary (K-Pg) at 66.0 My is defined by a major, global extinction event best known for the demise of dinosaurs and ammonites. The contact zone, where present, is marked by a thin, clay-rich horizon with a distinctive chemical signature due to the presence of the extremely rare metal iridium. Iridium is a platinum group metal usually found in meteorites. The estimated global amount of iridium in this layer pointed towards a ~12 km diameter asteroid travelling at 17-25 km/s impacting with the force of 100 trillion tons of the high explosive TNT.

The goal then was to find the impact site. In 1978; seismic and gravity data work for oil and gas exploration in Mexico revealed a potential buried large seismic anomaly at Chicxulub in the Yucatan Peninsula. After several wells were drilled this was interpreted as a volcanic complex. As the iridium rich K-Pg marker event boundary is particularly well developed in the Gulf of Mexico the proximity suggested Chicxulub may be the 'smoking gun'.

Geophysics indicated a large buried crater 180 km in diameter and 30 km deep buried beneath 610 m of Tertiary sediments. The Earth's crust was melted down to 27 km. The seismic data shows a distinct crater shaped profile with outer and inner raised rings. This profile also correlates with many lunar craters. Earlier borehole drill-cuttings were re-examined and shocked quartz was discovered.

The only way to confirm from seismic and geochemical data that this was indeed a an impact site was through scientific drilling and coring. Several onshore scientific boreholes were drilled culminating in an offshore borehole in 2016 that confirmed, through drilling and particularly coring, that the Chicxulub seismic anomaly was indeed a major impact crater. Recovered drilled and cored rock samples showed major significant alteration.

Chicxulub was confirmed as the site of a major extinction impact event through the concentration and geographical distribution of palaeontological mass mortality fossils in the USA.

We will look at the geophysical, drilling and core data which supports the crater interpretation.

Wednesday 26th February: AGM (Zoom)

For your diary. Further details to follow.

Wednesday 26th March: Tom Sharpe, Geologist/Author. Mary Anning (In-person & Zoom)

Tom Sharpe is a geologist who has worked as a national museum curator, university lecturer, and expedition travel guide, mainly in the polar regions. He is a Fellow of the Geological Society and has been Chair of its History of Geology Group and Geological Curators' Group, as well as a trustee of Lyme Regis Museum

Mary Anning described as 'the greatest fossilist the world ever knew'. Drawing on recent research into her life and times, yet always aware of her character and personality, Tom Sharpe has taken a fresh and often surprising look at the achievements of a woman who is finally gaining the recognition she merits.

Field trips summer 2025

It's still early days of course but we have preliminary ideas for our 2025 field trip programme.

3 – 10 May: Self-led, a 'long' excursion in the Kintyre area.

Wednesday 21 May: David Jarman, Rock slope failures around Cluanie. Meet at Cluanie Inn.

Late August: Prof Alistair Robertson, Ballantrae Probably a long weekend in Ayrshire, at a time of very low tides.

September: Prof Peter Scott, Cromarty

A look back at HGS 2024 field trips

With our final 2024 HGS field trip now completed, thanks to Dave Longstaff for putting together short accounts of our endeavours this year, illustrated mainly with his excellent photographs. I think most would agree we've had a highly successful and enjoyable year.

Saturday 13 April to Saturday 20 April: Fife.



Left: Well appointed kitchen and dining area, Gordon's Hall Cottage, Carnbee, Fife

Right: Rock and spindle, St Andrews. Basalt volcanic neck and radiating basalt columns.



Left: Volcanic neck and basaltic columns above the Elie chain walk.

Right: Stromatolitic limestone: Randerston Limestone Formation, Kingsbarns.

A slightly reduced group of 7 had the pleasure of spending a week at the very well appointed Gordon's Hall Cottage near Pittenweem, Fife. The base allowed us to explore many locations along the Fife coastline including Crail, St Monans, Kinghorn, Kingsbarns and St Andrews. The one wet morning was spent in the McManus Art Gallery and Museum in Dundee and, even then,

we managed a half day on the rocks before returning to the cottage. Highlight for many was, with David Rae's help, that we found the famous Euripterid and giant millipede trackways about a mile south of St Andrews. This included quite a rough traverse along the shore and without prior knowledge we'd have never found the location. It was a nice lunch spot as well. Thanks David!

Saturday 18 May: Don Stewart: Glen Tilt.

The excursion was ably led by Don Stewart. Permission had been obtained from the Blair Atholl Estate to take cars up the track to Forest Lodge and after parking we headed straight for the famous locality visited by Hutton in 1785. We spent some time examining the complex patterns in the rock, looking for the best examples demonstrating that the (molten) granite had intruded into the surrounding rocks. We then made our way back along the glen, stopping at different locations. At the Clachghlas bridge we stopped to examine evidence of the Tay fault. By chance a tree had recently fallen at the side of the bridge exposing the rock beneath and revealing details of the fault in section.



Left: Courtesy Ed Acton, Glen Tilt mixing zone of granite and country rocks.

Right: Courtesy Anne Cockroft, fault gouge and brecciated rock by Clachghlas bridge.

Friday 21-Monday 24 June: Prof Rob Strachan: North of Scotland Geology.



Left: HGS members relaxing in Kyle of Tongue Hostel lounge.

Right: Boudinaged Lewisian gneiss, Ceannabeinne beach, Durness.



Left: HGS members at Ben Arnaboll thrust. Moine schists resting on deformed quartzite pipe rock.

Right: John Hawco's spectacular cut and polished hand specimen of mylonitised and folded Lewisian gneiss with large pink feldspars.

About 21 HGS members spent a thoroughly enjoyable and interesting 4 day excursion looking at localities along the Durness-Kyle of Tongue coastline under the leadership of Prof Rob Strachan assisted by Dr Martin Smith, the two editors of the 5th edition of *The Geology of Scotland*. Who better to talk geology with! As everyone was based in and nearby the Kyle of Tongue Hostel, which HGS had just about taken over, we were able to have very pleasant group meals and this also enabled day to day planning to occur much easier. We also enjoyed just about the best 4-5 days of weather that the area has had this 'summer'! There were many highlights but, for many, tramping over the heather to look at the famous Ben Arnaboll thrust sheet locality was a definite afternoon to remember.

Saturday 24 August: Dr Martin Smith: Strathnairn and Daltulich, River Findhorn.



Left: Lochan Uaine, remains of a prominent meltwater channel and jökulhlaup basin'.

Right: Ruthven Formation: migmatised semipelitic rocks.

A group of about 15 members met in Farr to share cars before travelling to the track leading to Dunmaglass Windfarm where we were to start a short uphill trek towards Lochan Uiane, the remains of a meltwater channel, a jökulhlaup basin. We examined exposures Gairbeinn Pebbly Psammite looking for cross-bedding in the psammities which, after discussion, we *may* have found. Rounding the southern boundary of the basin and heading uphill we were now in the Ruthven Sempelite Formation displaying spectacular migmatitic textures. Studying the two formations enabled the group to examine the difference between gneissose (migmatitic) rocks and non-gneissose rocks (psammitic with cross-bedding). After a drive across country we spent the

afternoon by the Daltulich Bridge on the River Findhorn where we saw small exposures of the Badenoch Group basement rocks and the 'cover' rocks the Daltulich Psammite Formation which, at one location, showed almost vertically bedded turbiditic sedimentary layers.

Saturday 14 September: Rosemarkie Pebble Day and Strathpeffer Science Fair.



Similar to last year Karen Deans organised another Rosemarkie Pebble Day in association with the Scottish Geology Festival with Rosemarkie Café providing space, shelter and, if required, coffee and tea!

The weather was much kinder than last year and enthusiastic visitors to Rosemarkie Café were treated to a display of specimens, posters and models connected with the natural sciences. HGS volunteers were on hand to show rock samples and to answer any questions posed and, once again, the event has received positive comment. Thank you to our HGS members who gave up time to help out for the event.



On the same day Andy Moffat manned a geology stall at the Strathpeffer Science Fair taking the opportunity to advertise HGS to interested guests and well as being available to answer questions. Andy says, 'We could have done with some fossils.' Maybe we can sort that out for next year!

Monday 16 September: Launch of the 5th edition of The Geology of Scotland

Our chair, Ann Reynolds, represented HGS at the launch of the new edition of The Geology of Scotland. The event was sponsored by the Edinburgh Geological Society.

Items of interest, geological websites

Sir Archibald Geikie Centennial Celebrations

HGS is one of the sponsors of this event, the Ullapool part of which is being led by Northwest Highlands Geopark. In Ullapool it comprises a programme of events on 3rd, 8th and 9th November, plus the exhibition at Ullapool museum 4-7 November.

Details of this event: <https://nwhgeopark.com/sir-archibald-geikie-centennial-celebration/>

Friends of Hugh Miller

A link to the Friends of High Miller website <https://www.thefriendsofhughmiller.org.uk/>

And their latest, September, newsletter:

https://mcusercontent.com/4de7edd2ea04c5552a2470892/files/097929bd-dd01-4df2-51c2-87e69b17dfe3/HN57_Sept_2024.pdf

SGT Geosite: Scottish Geoconservation project

The SGT GCR database keeps growing and is slowly turning into a very valuable resource and HGS members are heavily involved with this. <https://geosites.scottishgeologytrust.org/>

You can choose particular categories of SSSI from the main page or tick on 'Show photographs' to see how this work has progressed.

Palaeocast podcasts:-

<https://www.palaeocast.com/category/mesozoic/>

The Scottish Geology Trust

<http://www.scottishgeologytrust.org/>

Other Scottish geological societies:

Aberdeen Geological Society

<http://www.aberdeengeolsoc.org.uk/>

Edinburgh Geological Society

<https://www.edinburghgeolsoc.org/>

Glasgow Geological Society

<https://geologyglasgow.org.uk/>

Open University Geology Society

<https://ougs.org/>

CONTACT INFORMATION:

Chair: Ann Reynolds 07485 668234 highlandgeologicalsociety@gmail.com

Secretary: Anne Cockroft 01463 238992 hgssec@gmail.com

Treasurer: Kathryn Logan treas4hgs@gmail.com