

Newsletter March 2019

UPCOMING EVENTS

First NEGS Field Trip of 2019

14th April 2019: Ouseburn and Victoria Tunnel

Leader: Gordon Liddle

Meet 13.00: at OS explorer 316. 262 647 at top of the road leading into Ouseburn. (Biscuit Factory is it 258 646, leader will be there from 12.00)

There is a reduced fee of £6 for the Tunnel trip. There will be 14 places available, please reserve a place at negsec@gmail.com

NOUGS Field Trip

24th March: Lewisburn, Kielder.

Leader: Karl Egeland-Eriksen

Meet: 10.00 at Matthew's Linn Car Park, Kielder. £5.00 all day. (Grid ref: NY646902). To investigate the Lower Carboniferous Scremerston Coal Group rocks along the Lewisburn valley.

13th April – Seahouses.

Leader: Karl Egeland-Eriksen

To investigate the Carboniferous Succession north and south of the Annstead Fault.

Meet: 10.00am. Parking area roadside past Seahouses Golf Course. NU222315

All NOUGS: Further Details:

<https://ougs.org/northumbria/>

or Karl Egeland-Eriksen

egeland-eriksen@hotmail.com

LECTURE REPORTS

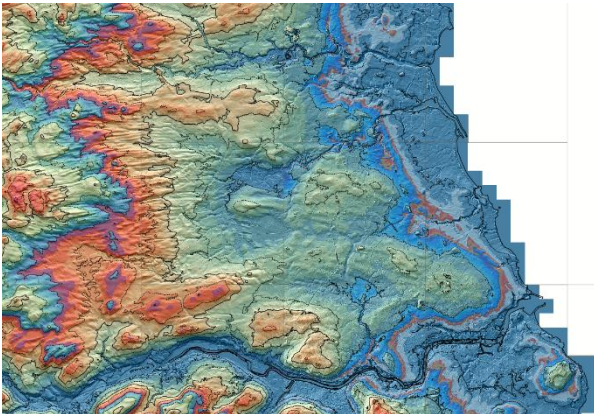
18th January 2019

Derek Teasdale: **Reconstructing the Glacial History of Mid Northumberland.**

Derek's talk began with a review of previous research into the presence and effects of glaciation in the North East with a focus on the direction of ice movement, its expansion and retreat. For over one hundred years research papers have consistently presented a generalised model of ice movement. This model proposed that ice moved from W to E along the Tyne Valley, and out into the North Sea basin. At a later point during the last (or Devensian) ice age, the ice was deflected by an ice mass (the North Sea Lobe – NSL) first to the SE in south Northumberland, and then towards the south near the current North Sea coast.

A recent development in glacial studies has been to examine detailed height measurement data collected using airborne LiDAR scanning. Much of which is freely available via the Environment Agency website. The captured data is converted to a grid of values which can be manipulated and interrogated using open source software (e.g. QGIS). The approach favoured by Derek is to create artificially coloured and shaded 3D maps of the height data, known as Digital Elevation Models (DEM). The DEM maps can help identify landscape features, such as small moraines and drumlins, which can be very difficult to spot in the field.

See picture over



Derek's research revealed that indeed the ice moved west to east over the Pennines, the source being the Lake District, but were deflected as they approached the east coast, gradually turning NW-SE and then South, joining the North-South flow from Scotland. The meeting point was in the form of a suture or junction. In Northumberland can be seen along Crowder Hill Ridge which runs N-S and is today utilised by the Berwick-Newcastle railway line. Behind this (to the West) was a sequence of lakes which, as the ice melted, caused a N-S flow of meltwater via glacial overflow channels. Following the peak of ice-flow the subsequent retreat occurred during the Late Devensian period, though there are still only a couple of good dates to cover a huge area. Evidence does remain of terminal or end moraines, which lie at right-angles to the original ice-flow direction and represent temporary stillstands as the ice margin retreated.

Derek finished by hoping that future research can enable us to work out the sequence of events and get closer to a robust chronology. Although, the free LiDAR data allows great insights, such data then needs to be checked on the ground, so members will be pleased to have confirmed that there will always be a place for fieldwork.

15th February 2019

Dr. Antonio Capponi: BUBBLES IN BASALTIC VOLCANIC SYSTEMS: insights from analogue experiments.

Dr. Capponi of Durham University Department of Geology introduced us to his research into volcanic conduits using Stromboli as a type locality and the focus of his investigations.

Stromboli is a volcanic island to the west of the toe of Italy and is part of the Calabrian Volcanic Arc which includes Mount Etna. He drew parallels with the Hawaiian volcanoes since they also have a low viscosity magma and low levels of gas in the magma, making observation and measurement more straightforward, since activity is consistent over many years; indeed, Stromboli has been erupting for over two thousand years!

Typical activity was shown in short video clips and the sequence of activity involved rising bubbles of gas in the flowing magma of the vent expanding and bursting at the surface. Such "open" vents were contrasted with partly covered and blocked vents (caused by rollback of previously ejected lava). When a block occurs, it is referred to as a plug and activity is more violent as the magma is forced out by the pressure of the gas (the "slug").

The gas emissions (in this case sulphur dioxide) were monitored using UV imaging which can provide image snapshots of plume gas column amounts.

In order to measure and better understand this activity Dr Capponi's approach is to undertake simulation experiments in the laboratory. For this, it is necessary to design appropriate tools to achieve this, and to break down/identify the variables that can be controlled, in order to find relationships between the various elements such as

viscosity, gas-flow and ejected material etc., to produce data in graph form. The laboratory investigation involved simulations by which a single slug in a less-viscous liquid ascended through a more-viscous plug i.e. Silicon oil capped with castor oil in a vertical tube (representing the conduit), the variables to be recorded being gas volume, thickness of plug and ambient pressure.

It is then necessary to return to the field where the situation is of course more complex.

So far, the work has concentrated on single pipes but elsewhere, in Iceland for example, there are multiple vents along extensive fissures, involving complex hydro-dynamics and producing magma flows on the surface. The lecture concluded with a short video of rivers of lava in Iceland extruded from fissures extending more than a kilometre. The audience was impressed!!

15th March 2019

Dr Claire Horwell, Durham University: Health Interventions in Volcanic Eruptions.

Volcanism again, but very different. For this lecture Dr Horwell began by looking at recent volcanic eruptions in Java, the first in 2010, the second in 2014, both affecting Jakarta, in her quest to determine the health risks and hazards for communities who live in the shadow of volcanoes and beyond. Her focus was on the respiratory hazards due to exposure to airborne particles entering the lungs and finding their way into to the alveoli. Silica cristobalite is a big irritant and health hazard and is often present in volcanic emissions. The body's natural defences can filter out some of the particles for example, the hairy walls of the nose, but the finest particles which evade it, may enter deep into the lungs resulting not only in asthma and bronchitis but also, with prolonged exposure,

to silicosis and lung cancer, tuberculosis etc. There is already historic evidence of the effect of dust particles in the lungs of workers at industrial sites such as mines when little protection was available for workers.

Understandably, people living close to active volcanoes want to know what precautions to take against atmospheric pollution, so Dr Horwell has developed a two-phase approach; firstly, to gather data from erupting volcanoes by monitoring volcanic smog and using the laboratory for chemical analysis and secondly, to provide information to the public on how best to protect themselves. In the monitoring process it became clear that not only do different volcanoes emit different chemical pollutants, but this may also happen at the same volcano in successive eruptions.

Regarding the second aspect of her work, Dr Horwell looked at ways of protecting the public. This led to an investigation into the different types of mask and their relative effectiveness. Although surgical masks are widely used little or no comparative testing had been done. Dr Horwell's filtration tests on all types of mask showed that the Industrial Certified mask N95 widely used in the USA was the most effective, whilst the cheaper, surgical type masks were much less so. However, the latter are more widely used, and their effectiveness can be increased to some extent by increasing the number of layers of material. It may be the only type poorer countries can afford, but the research is ongoing.

Dr Horwell's research findings are in much demand in many countries which have active volcanoes.

All reports: **Les Barnes**, with thanks.

FIELD TRIP PROGRAMME

Details: Meeting Point and Time

Sunday May 19th Upper Teasdale geology.
Leader: Lesley Collins

Aim: To investigate the **Closehouse-Lunedale Fault system** and the unique mineralisation of the **Whin Dykes at Closehouse**.

Meet: at 10.15 at Wemmergill Estate track gate on B6276 road, Grid Ref NY873212, c. 6 miles S of Middleton-in-Teesdale on the right-hand side, c. 7 miles north of Brough – under-Stainmore on the left-hand side.

Sunday June 9th. Cocklawburn coast.
Leader: Ian Killie

Meet **10.30** at southern end of Cocklawburn beach: GR NU OZT486

Sunday July 7th Trow Point and Marsden

Leader: Karl Egeland-Eriksen

Meet at **10.00 am** at Public car park (pay and display), South Shields (Trow Quarry). GR NZ 382667.

The rocks along the coastline from South Shields to Sunderland are Magnesian Limestones from part of the Permian Period. Raisby Formation beds were deposited as carbonate mud-rock on the basin-margin slope beneath >100m of water. Near the end of the time of the Raisby Formation a major submarine slide took place redepositing Raisby sediments. Above this we have the Trow Point Bed containing stromatolites. A thin bed of the residue of the Hartlepool Anhydrite overlies this with brecciated Concretionary Limestone above.

Field Visits are listed at

<https://www.negs.org.uk/>

with further information of meeting points and times available via **links** to a further page.

Information may also be available on our Facebook Page

<https://www.facebook.com/northeasterngeolsoc/>

NOUGS Field Visits are listed, with links to details at

<https://ougs.org/northumbria/>

And finally

The **27th AGM** of the **North Eastern Geological Society** was held on Friday 15th March 2019.

No nominations had been received for any of the vacant posts, thus the Chair, Secretary and Social Secretary positions remain vacant. Remaining in position are:

Gordon Liddle: Field Programme Secretary
Professor Gillian Foulger: Lecture Programme
Judy Harrison: Treasurer

Elsie Denham: Membership Secretary
Alan Denham continues to maintain and upgrade the website.

Wherever possible proceedings, events, field trips, lectures will be communicated on the website at <https://www.negs.org.uk/> and on the Facebook page at <https://www.facebook.com/northeasterngeolsoc/>