North Eastern Geological Society

Newsletter March, 2017

UPCOMING EVENTS

Sunday April 30th 2017

NORTHUMBRIA OUGS FIELD EVENT

Beadnell and Bamburgh (NEGS members welcome).

Meet: 10.00 a.m., by picnic area at junction for Beadnell off B1340 Seahouses road. NU231295
Toilets: Beadnell Car Park - NU235288 & Links Car Park, Bamburgh - NU192345

LECTURE REPORTS

Meeting February 17th 2017

Helium it's a gas, gas, gas

Prof, Jon Gluyas, Durham University

Following the very large audience at our recent North Atlantic symposium the core membership welcomed Jon to speak on the developments in locating sources of Helium. Jon is a member of an illustrious team investigating helium, as the global resources had appeared to be declining.

Helium is extremely light, when released at the surface of the Earth it rapidly leaves the planet so it is necessary to find geological source environments and extremely effective traps for accumulation mechanisms. The value of helium today is about 300 times the value of the natural gas it is commonly found with. A concentration of helium at 0.3% in natural gas can be economically viable. North Dome, the world's largest gas field in Qatar is able to extract helium at <0.1% concentration and make a profit because the hydrocarbon gases have to be liquefied for export (as LNG).

Today the uses of helium have accelerated in variety and quantity; the medical MRI scanner uses it to cool the magnets, it is also used in fibre optics, diving, welding, aviation, leisure and a variety of manufacturing processes.

Most helium forms during natural radioactive decay of thorium or uranium that frees alpha particles, basically helium nuclei. The helium has a low solubility in connate water but nevertheless appears to move with nitrogen acting as a carrier, with both elements dissolved in the connate water. Optimum geological conditions for helium generation are ancient cratons that have been recently undergone a heating event. Many natural hydrocarbon gas accumulations do contain traces of helium mixed with the other gases. This is because when a helium bearing water contacts a body of free gas phase fluid the helium immediately and completely partitions into the gas phase.

The USA provides much of the world's production of helium from wells originally drilled to find oil and gas. (The first Helium well was found at Dexter in Kansas at a Helium concentration of 11%, astonishingly high).

In December 2015 a remarkable find occurred. In Tanzania a natural gas seepage was tested and revealed around 10% concentration of Helium This has been

analysed and indicates a very large reservoir, associated with the rifted African craton and trapped by very impermeable formations. This find is likely to be a major addition to the known global helium resource. It also demonstrated that the association with hydrocarbon deposits was not an exclusive condition. Whilst the extraction process will require very large scale funding and associated management support; the value of the gas will ensure a healthy return and adequate resource for the many uses of Helium we rely on today.

Jon willingly accepted, and dealt with, questions from the audience with his sure style which had made such a positive response from the negs members. His ability to communicate complex situations and lighten the process with his humour were very much appreciated as were the images he used in his talk.

Gordon Liddle

March 17th 2017 Post AGM

The changing Earth: Monitoring changes in Earth structure using tomography.

Dr. Najwa Mhana (Durham)

Tomography, earth structure and geothermal environments

Najwa introduced her theme of clean energy from geothermal resources. The sites that are exploited around the world use the steam produced to generate electricity and reinject the water back into the earth.

Her research, using seismic tomography, seeks to identify the steam generation locations and record how they change with time. Her studies produce 3D images of the reservoirs beneath the surface using local earthquakes as sources of seismic rays. She developed a technique that employs the velocity of the primary and secondary waves and the ratio of these two waves to identify the locations of heat and steam.

This work supports evaluation of sites for ongoing electricity generation which, of course, is deemed clean energy. Two locations have been closely studied, the Geysers in Northern California (this site generates 10% of the electricity for Northern California) and Coso in Southern California. The latter is in a military area which limits some aspects of the research. The research was repeated at two-year and one-year intervals for multiple depths, to allow the changes in the reservoirs that occur because of production to be assessed.

The Coso site is currently the seventh largest geothermal electricity generating site in the world and produces 300 MW. The seismic activity is considerable. In 2004 there were 1264***surely more? earthquakes recorded. Seismic velocity varies because of a variety of factors, and identifying the most important is a problems that must be solved. The Vp:Vs ratio appears to identify key locations in the field. These change with time and depth.

Theoretical models have been developed to interpret the results. The new method appears to offer the most reliable results. Analysis of the data is a challenge and best fit values are produced for a variety of factors. These include pore pressure, water saturation and drying of minerals. The shallower depths give more reliable results.

Syria has 28 seismic recording sites that Najwa hopes to return to (after the current conflict is over) and identify potential geothermal sites for development. Known geothermal sites occur all around the world. Potentially they could become an even more important global energy resource.

The lecture was supported by a large range of images that demonstrated (via, especially, Vp:Vs ratios) the quality of the steam generating areas over time and depth. Understanding how and why steam is produced together with the 3D location of those areas is potentially the most valuable outcome of the research.

Najwa responded to questions from the audience. The presentation was well received by NEGS members.

This presentation marked the end of the lecture programme for 2016/2017.

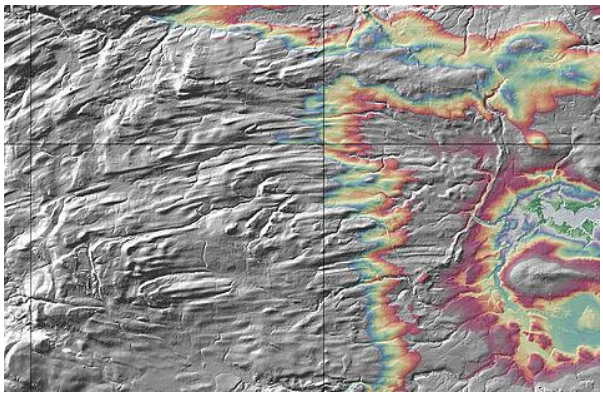
Gordon Liddle

FIELD TRIP PROGRAMME

Sunday May 7th 2017

Mega-Scale Glacial Lineations in Mid-Northumberland

A joint field meeting with NHSN led by Derek Teasdale



Meet: 10.00 am at Kirkley Hall, Ponteland, Northumberland, NE20 0AQ. The car park is free, and there are a cafe and toilets.

Saturday MAY 20th 2017

Jurassic ironstone and jet plus a Palaeogene dyke, Roseberry Topping and Cliff Rigg Quarry.

Joint Field Trip with NOUGS led by Karl Egeland-Erikson

Meet: 10.00 a.m.at Newton-under-Roseberry Car Park, A173 (£4.50 all day). NZ570128

Saturday June 17th2017

Whiteadder Water, Lower Carboniferous sediments, Berwickshire, Scottish Borders

Louis Golightley

Saturday July 15th 2017

Whin exposures on north east coast

Ian Kille

Sunday July 23rd 2017

The Cross Fell Inlier, Dufton

A joint field meeting with NOUGS led by Karl Egeland-Erikson

NEWS AND LOCAL EVENTS

GOVERNMENT MINE WATER TREATMENT SCHEMES

You can keep up to date with the proposals for the Nent and West Allen rivers by going to the Gov Uk website at https://www.gov.uk/government/collections/metal-mine-water-treatment

Nenthead Mines will publish a selection of documents on their website, including

copies of paper documents distributed at Consultation Events. These paper documents are usually available from the Gov UK website.
http://www.nentheadmines.com/author/pete

You may wish to read the documents and complete the feedback forms.

REBUILDING THE MINE WATER SAMPLING WEIRS

The Coal Authority contractors are renewing the water measuring devices in Caplecleugh Low, Rampgill and Nentsberry Haggs Levels. Work starts on 27th March and should be completed by 31st March.

There is a need to form a **Working Group** for the Heritage Open Days events planned for early September (7-10th are the official dates). Please contact negsec@gmail.com to volunteer to help plan, run, back-mark on these events.

NEGS requires a representative to the GEOLOGISTS ASSOCIATION, this person needs to be a member of the Geologists Association who will report back from meetings. GA pays some expenses.

ADMINISTRATION

AGM Report March 17th 2017.

The Chairman presented apologies from five members. He then gave an overview of the years superb lectures and field trips, and thanks to Professor Gillian Foulger, to Dr Eric Johnson and to Derek Teasdale for maintenance of the Website.

Our new student representative Cassandra Bailly (Durham) was introduced – more later.

This report, the Treasurers report and the Secretary's report were all accepted by the members present. Elsie Denham was voted in as Membership Secretary, the other vacant roles were not filled.

2017 FEES WERE DUE AT THE AGM.

Address for cheques: Judy Harrison, 28 St Ann's Quay, 4 St Ann's Street, Newcastle upon Tyne, NE1 2DJ.

For internet banking:

Sort code 09-01-51
Account number 75189803

Full Member .....£**20.00**

Unwaged Member, or largely dependent on State Retirement Pension .....£**10.00**

Family member - for persons residing at the same address as a Full Member to which only one copy of mailed items will be sent
..... £**10.00**

Postal Member (persons not normally attending meetings)..... £**7.00**