



## PROGRAMME 2018

Lecture Meetings at Bath Royal Literary and Scientific Institution,  
16 Queen Square, Bath at 7.30 pm 01225 312084

**Latest information and details: <http://www.bathgeolsoc.org.uk>**

### LECTURE MEETINGS

#### **February 8<sup>th</sup> Bird watching in the fourth dimension: how the fossil record reveals the origin of flight, feathers, and birds themselves**

*Dr. Daniel Field, University of Bath*

Birds are the most diverse and widely distributed groups of tetrapod animals exhibiting incredible disparity in their forms and lifestyles. Unravelling how, when, and why modern bird diversity has arisen demands an examination of the fossil record to study the early antecedents of modern birds: the non-avian dinosaurs. Dr Field will discuss how the ancestors of modern birds survived the end-Cretaceous mass extinction; how and when modern avian flight arose and how the geographic distributions of modern bird groups have changed over the last 66 million years.

#### **March 1st Finding new uses for old pollen : reconstructing past climate and vegetation change using pollen chemistry**

*Dr. Phillip Jardine, University of Münster*

Due to their widespread and abundant fossil record, pollen and spores have become a mainstay of research into past vegetation change and floral evolution, and are widely used to infer past climates and date sedimentary sequences. However, palynology as a discipline has remained largely unchanged in its approach for the last 100 years. In this talk, Dr. Jardine will describe how a new field of research is opening up, using the chemical signature of pollen and spores to extract previously inaccessible information on past climate and vegetation change. The talk will also offer some thoughts on the future direction of chemical palynology

#### **April 5th "Why Giraffes have such short necks"**

*Dr. Michael Taylor, University of Bristol*

The necks of sauropod dinosaurs exceeding 15m were by far the longest of any animals. By contrast, the neck of the giraffe - the longest of any extant animal - reaches only 2.4m. Four factors contributed to sauropod neck length: the size of the animals, their distinctive vertebral architecture, air-sacs, and heads that merely gathered food without processing it. However, other aspects of sauropod cervical anatomy remain puzzling and these apparent flaws suggest our understanding of sauropod neck mechanics remains incomplete.

#### **May 3rd 'Unlocking the Archive': Antarctic Peninsula glacial change**

*Dr Lucy Clarke, University of Gloucestershire*

The Antarctic Peninsula, a mountain glacier system comprising over 400 glaciers, is an important contributor to historical and future sea level rise. Assessment and monitoring of these glaciers is crucial for understanding sensitivity to climate change. Satellite data have been used to calculate changes over the last 3 decades, but methods to quantify change over longer timescales have eluded researchers. This talk will introduce some of the early expeditions that collected aerial photography and demonstrate how advances in image processing and capture of modern aerial photography have allowed an archive dating back to the 1940s, but largely ignored, to be 'unlocked'. The spatial and temporal changes that occurred on the glaciers over the period will then be explored.

#### **June 7th Subduction zone earthquakes and tsunami – exploring the Sumatra subduction zone using marine geology, geophysics and ocean drilling**

*Professor Lisa McNeill, University of Southampton*

The 2004 earthquake (magnitude 9.1) that originated on the subduction zone margin offshore North Sumatra and resulting tsunami killed more than 200,000 people and devastated large coastal regions around the Indian Ocean. Since the earthquake, many countries in collaboration with Indonesia have invested in geological and geophysical data collection to understand the structure of this subduction zone and its potential for large earthquakes and tsunamis. The data are also important for a general understanding of these processes in other subduction zones worldwide. The talk will show some results of the data collected in recent years, including marine geophysical data showing the structure of the subduction zone and properties of the faults that move and generate the earthquakes; sediment core sampling below the seafloor and ocean drilling of sediments from the Himalaya and Tibetan Plateau in the subduction zone.

#### **July 5<sup>th</sup> Dangerous Earth - or why we should be afraid!**

*Dr Simon Wakefield, Cardiff University*

Natural hazards: earthquakes, volcanic eruptions, floods, droughts, wildfires, landslides, storms and tsunamis have happened throughout geological time. As the world's population increases, some people are now living in hazardous areas, but have little choice. For others, the complexity of modern society means that a major event, e.g. Hurricane Harvey can inflict catastrophic economic and social consequences on the most sophisticated cities in the western world. The causes and consequences of a variety of hazards will be discussed and show that the impact of these events is likely to increase as climate, population and land use combine to amplify what are in reality entirely natural phenomena.

#### **September 6th The Geology of the Earth's Oceans Past and Present**

*Dave Green, Geostudies: A JOINTLY ORGANISED BRLSI-BGS TALK*

The talk will examine the current understanding of the geological processes operating in the oceans and their effects. Our knowledge and interpretation has changed radically since the 1950s and continues to develop, enabling better understanding of the geology of ophiolites e.g. Lizard and Ballantrae; the environmental relationships between plate tectonic processes, the oceans and the mantle, and an interpretation of the geology of our near neighbour planets. Changes that are thought to have taken place in the oceans through geological time will be discussed and the anthropogenic effects of the present.

## **October 4th Creating the critical zone: dissolving, fracturing and eating rocks**

*Dr Heather Buss, University of Bristol*

The critical zone, the region of terrestrial Earth that extends from the treetops to where rock begins to weather, provides many essentials that we need to survive on this planet. Its creation from solid rock is a complex but fascinating set of interlinked processes of chemical reactions, physical transport, fracturing and metabolism. The feedbacks amongst these very different processes determine many of the characteristics of the critical zone. Because the zone is so critical, it is essential that we preserve (or restore) its functions in the face of global and local environmental change. We need to understand exactly how these feedbacks work to make accurate predictions of the consequences of environmental change and of our interventions. How these different processes are interlinked will be discussed, with a case study of spheroidal weathering in a tropical granitic rock with extension to other lithologies and climate zones globally.

## **November 1 New fossil discoveries that shed light on the origin of starfish and brittle stars in the Great Ordovician Biodiversification Event**

*Dr Aaron Hunter, University of Cambridge*

The asterozoans, including starfish and their close relatives the brittle stars, are a dominant and successful group and amongst the most instantly recognisable marine animals. The early evolution of asterozoans and their echinoderm cousins has remained a mystery; but new discoveries from France and Morocco, through exceptionally preserved fossils and an understanding of the developmental biology, have allowed a reconstruction of the sequence of evolution of the asterozoans (with a comprehensive phylogenetic framework). The talk will explore the earliest common ancestors (somasteroids) and their Cambrian echinoderm relatives, including the earliest starfish-like animal so far recorded in the fossil record. We then follow these fossils through the Ordovician and show how they rapidly diversified during the biotic revolution - the Great Ordovician Biodiversification Event, and demonstrate that these animals survived until the Permian with some of their descendants still found in the oceans today.

## **December 6<sup>th</sup> Diamond eruptions**

*Dr. Thomas Gernon, Associate Professor University of Southampton*

Kimberlite volcanism typically involves the formation of diverging pipes or diatremes which are the locus of high-intensity explosive eruptions. The talk will provide an overview of diatreme formation and diatreme fills, known as 'pelletal lapilli' - well-rounded clasts with an inner 'seed' particle and a complex rim thought to represent quenched juvenile melt. New observations show they coincide with a transition from magmatic to pyroclastic behaviour, offering fundamental insights into eruption dynamics and constraints on vent conditions. The origin of pelletal lapilli is important for understanding how magmatic pyroclasts are transported to the surface during explosive eruptions, where they can be associated with high diamond grades. A similar origin may apply to pelletal lapilli in a range of alkaline volcanic rocks.

## **February 7<sup>th</sup> 2019 Annual General Meeting**

## **FIELD MEETINGS**

*Field Meetings' Disclaimer – for details, please refer to the BGS website*

### **Saturday 10<sup>th</sup> March Brown's Folly Nature Reserve**

*Leader: Professor Maurice Tucker*

*University of Bristol and Bath Geological Society*

The annual, morning clear-up of the Great oolite exposures on the SSSI reserve near Bathford. Bring your secateurs and hedge trimmers, to cut back the vegetation and clean up the outcrops, or just take the opportunity to visit the sites and talk about geology. *Meet at 10.30 a.m. at Brown's Folly Car Park (G.R. ST 798663). Strong boots, waterproofs and hard hats are required.*

### **Saturday, April 14th Watchet**

*Leader: Maurice Tucker*

The north Somerset coast has brilliant exposures of the upper Triassic and lower Jurassic strata and these will be examined in the region of Watchet. Fossils are particularly abundant in the mudstones and thin limestones of the Lower Lias. We should find ammonites, bivalves, brachiopods, crinoids and belemnites, along with reptiles if we are lucky. *Meet at 10.30 am. Location to be determined. Transport by private car; lifts to be arranged. Details will be posted on the Bath Geol Soc website.*

### **Saturday, June 23<sup>rd</sup> Lambourne and Avebury**

*Leader: Isabel Geddes*

This trip will examine the sarsen stones and landscape in the region of Fyfield Down. *Meet at 10.30 am, location to be determined. Details will be posted on the Bath Geol Soc website.*

### **Saturday, September 1<sup>st</sup> Mere**

A continuation of the clean-up of the exposure of Greensand-Chalk, so come along with gardening tools. Strong boots, waterproofs and hard hats are required.

*Meet at 10.30 am at the Dead Maid Quarry Industrial Estate, Mere (ST 803 324). Details will be posted on the Bath Geol Soc website.*

## **November**

**Festival of Geology**

**Geologists' Association**

For details, see [www.geologists.org.uk](http://www.geologists.org.uk)