

Newsletter of The Farnham Geological Society

Volume 28, Number 4, November 2025



*Carneddau, North Wales
by
Mick Caulfield, May 1982*



A local group
within the GA

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Newsletter

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Editorial

Welcome to the latest edition of the FGS Newsletter for 2025. I hope you all had a wonderful summer.

This month's Newsletter brings you some interesting stuff, including reports from our monthly lectures. Don't forget to join us on **Zoom** for our next talk on **Friday, 14 November** when **Dr. Chris Damon and Colin Schofield**, consultants for the Down-To-Earth magazine, will present "**New insights into the break-up of the North Atlantic Ocean**".

This will be followed by **Dr. Robert Spicer** of the Open University on **Friday, 12 December**. He will present "**Lost Landscapes of Tibet and How They Changed the World**".

The success of our Newsletter depends upon you, the Members, providing material. So, if you have been on a Field Trip, visited a site of geological interest, listened to an interesting Zoom talk, webinar or TV programme, or have any other news or views you would like to share or questions you would like to ask, then please feel free to get in touch with your **Newsletter Editor, Mick Caulfield** (Newsletters.fgs@gmail.com).

We are still looking for members to both join the FGS Committee, in particular as Secretary and as IT/Sound, as well as help with organising the Societies various activities. Please contact Mick Caulfield, as soon as possible if you are able to help.

Could you help man the **FGS display** at the **GA Festival of Geology** to be held in Burlington House, Piccadilly on **1 November 2025**? If you can help in any way please contact **Janet Catchpole** (janetcatchpole47@gmail.com).

RIP

It is with great sadness that we have to report the untimely death of **John Williams**, a member of FGS for many years and former Field Trip Secretary, who died on Friday, 18 October 2025 after a short illness. On behalf of the Society, I would like to extend our heartfelt sympathy and condolences to his family and friends. Rest In Peace John.

Front Cover

This month's **Front Cover photograph** was provided by **Mick Caulfield** (FGS Chair), showing the view from **Carneddau** in May 1982 whilst on a Birkbeck Field Trip, led by Prof. Jim Rose, to study active periglacial features. Carneddau are a group of mountains in the northern part of Snowdonia (also known as Eryri) in north Wales.

All of the information contained herein, both graphics and text, is for educational purposes only, as part of the Society's objective. There is no commercial gain for their use.

The views and opinions represented in the articles do not necessarily represent the views of the FGS Members, FGS Editorial Board or the FGS Committee.

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Farnham Geological Society

Committee 2025/26

Chair	Mick Caulfield
Treasurer	Mike Millar
Secretary	Vacant (<i>Judith Wilson</i>)
Programme Secretary	Janet Catchpole
Membership Secretary	Sally Pritchard
Field Trip Secretary	Tessa Seward
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Web Manager	Bob Rusbridge
Advertising	Peter Crow
IT/Sound	Vacant (<i>Mike Millar</i>)
Without portfolio	Peter Luckham
Without portfolio	Liz Aston

Meeting Programme 2025

Please note **The Methodist Hall** and **Zoom** meeting times:
7.30 pm for 8.00 pm start.

New insights into the break-up of the North Atlantic Ocean Friday, 14 November
Dr. Chris Damon & Colin Schofield
Consultants, Down to Earth

Lost Landscapes of Tibet and how they changed the World
Robert Spicer Friday, 12 December

Field Trip Programme 2026

(book via the FGS website)

DAY TRIPS

- Ice Age & Jurassic around Buckinghamshire (Coombs Quarry & Buckingham Sand Pit)
Tuesday, 12 May
Leader: Dr. Jill Eyres

PLANNED DAY TRIPS – Date tbc

- Silcretes in Cobham (Cobham area, Kent)
Leader: Geoff Downer.

- Building Stones walk near or around Chichester
Leader: David Bone.
- Brookwood Cemetery
Leader: Diana Smith.

PLANNED RESIDENTIAL TRIPS – Date tbc

- Lyme Regis
Leader: John Scott

Please let our **Field Trip Secretary**, Tessa Seward (wessa2006@hotmail.co.uk) know if you have other ideas for places of geological interest to visit.

Geologists' Association Lecture Programme 2025/26



<https://geologistsassociation.org.uk/lectures/>

Zoom only
Mull Dyke Swarm
Prof. Joe Cartwright Friday, 5 December
Oxford

Zoom only
Whoops! Fossil faux pas
Dr. Jon Noad Saturday, 10 January
Canada

Zoom only
Updating the geological map of the Yorkshire Wolds chalk aquifer
Saturday, 7 February
Laura Austin Sydes & Laura Burrell Garcia
BGS

Reading Geological Society Lecture Programme 2025/26

<https://readinggeology.org.uk/lectures.php>

La Palma Volcanics
Prof. Dougal Jerram Monday, 3 November
University of Birmingham

Cretaceous amber — frozen in time
Dr. Ricardo Perez-de la Fuente

Monday, 1 December
Oxford University Museum of Natural History

Snowballs in the desert
Dr. Ross Garden

Monday, 2 February
Reading Geological Society



Places may be available on **Reading Geological Society's Field Meetings**
(book via the RGS website)

<https://readinggeology.org.uk/fieldtrips.php>:

- **The Corallian at Dry Sandford Pit, Cothill, Oxfordshire**
Wednesday, 19 November
Leader: Dr. Ross Garden (RGS)

- **The Geology Section of Bristol Museum, Bristol**
Thursday, 4 December
Leader: Deborah Hutchinson (Bristol Museum)



Mole Valley Geological Society Lecture Programme 2025

<http://mvgs.org.uk>

The Anthropocene and its Implication For Our Future Climate

Dr. Colin Summerhayes

Thursday, 13th November
Emeritus Associate
Scott Polar Research Institute
Cambridge University

Horsham Geological Field Club Lecture Programme 2025

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

Exploration Geology

Helena Griffiths Wednesday, 12 November
Exploration & New Ventures geologist



West Sussex Geological Society

West Sussex Geological Society Lecture Programme 2025

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

The relationship of English vineyards to Wealden strata

Dr. Mark G. Eller Friday, 21 November
Mole Valley Geological Society (Chairman)

The Geology of Switzerland in 30 minutes

John Lonergan Friday, 12 December
WSGS

OUGS Wessex Branch Programme 2025

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

Day of Talks [London Branch]

All Saints Parish Church, Margaret Street,
London W1W 8JG

Saturday, 15 November

Please register via

<https://forms.gle/oXYMiGqgjFdiKPzt7>

No Itinerary has been made available online; please contact the Event Organiser for the itinerary.

Next Lecture

Friday, 14 November 2025

7.30 pm for 8.00 pm

Zoom only

New insights into the break-up of the North Atlantic Ocean

Chris Darmon & Colin Schofield

Over the last couple of years research has been accumulating evidence on exactly what has been going on in The North Atlantic over the past 60 million years or so. Some other ideas that are merging, challenge our long-held views about how plate tectonics has operated in this region. Beginning at the end of the Cretaceous period with what we now know as **the North Atlantic Igneous Province**, outpourings of basalt continue to the present day. We know that the mid-ocean ridge passes through Iceland, but what was the role of igneous activity in the Hebrides 60 million years ago? Is there a mantle plume beneath Iceland or is there another workable hypothesis?

Chris Darmon has had over 50 years in geological education beginning as a schoolteacher of O and A level geology; he went on to spend 25 years as an adult education tutor for the WEA and Sheffield University. Since 2010 he has run fieldwork for adults in a variety of different forms both in the UK and overseas. He now spends the 'closed season' teaching online courses and classes.

Colin Schofield is a geology/geography graduate who has worked with Chris to deliver the fieldwork and online educational content over the past 15 years.

Lecture Summary

Friday, 13 June 2025

On Friday, 13 June 2025 34+ FGS attendees in *The Methodist Hall* & via Zoom, together with other society members, welcomed **Dr. Michael Doel** in presenting our external lecture.

Fluorescent Minerals

The speaker began by thanking the Society for inviting him to speak and proceeded to demonstrate the dramatic effect that ultraviolet (UV) light can have on some minerals, making his point with specimens of hydrozincite (fluorescing white), halite (fluorescing red) and calcite (fluorescing blue) among others.

He noted that the purpose of the talk was to show how and why minerals fluoresce under ultra-violet lights and also to say a little about collecting fluorescent minerals and the equipment needed to do this. He explained that mineral fluorescence is one of a class of mechanisms which can cause physical bodies to emit visible light. In every case this is a result of an input of energy from some external source. Examples include bombardment with electron beams (as in old-style TVs), chemical reactions (glow worms and many denizens of the deep ocean), as a result of friction or rubbing or as a result of some form of electromagnetic radiation.

The effect has actually been known about for centuries – although at first no one actually knew what was happening. An Italian cobbler called *Casciarolo* apparently had a preparation of calcined baryte (barium sulphate) which glowed in the dark after exposure to sunlight and all sorts of strange and magical powers were attributed to it. Over the years various people have studied it – including the famous German poet *Goethe*, who was a noted amateur scientist. The term “**fluorescence**” was introduced by *Sir George Stokes* who was working at the time with specimens of fluorite from the North Pennines which fluoresce in sunlight. The problem with using the sun as a source of UV is that you get so much visible light at the same time and good “clean” sources of ultra-violet light were a problem for a long time – until the advent of the mercury discharge tube and suitable filters. After this

interest in the phenomenon began to grow. Nowadays UV-emitting LEDs are rapidly taking over as sources.

An explanation of why things fluoresce (or don't) requires a little delving into the underlying science, beginning with the **electromagnetic spectrum** (of which the visible light by which we see is but a small part). The speaker explained that the UV region lies outside the violet end of the visible band and has shorter wavelengths and higher energy than visible light. It is commonly divided into three sections, long-wave UV ("UVA"), mid-wave UV ("UVB") and short-wave UV ("UVC"). These have different properties in terms both of their effects on minerals and on people. One major difference noted was that UVA can pass easily through normal glass while UVC is completely blocked by glass. An explanation was given of the hazards of encountering UV radiation and necessary basic precautions outlined. This was accompanied by a demonstration of the effects of different types of UV on various minerals – such as fluorite (calcium fluoride), which fluoresces in UVA but not in UVC and scheelite (calcium tungstate) which fluoresces in UVC but not in UVA.

The speaker apologised for the fact that, to understand fluorescence you have to think for a moment about the fact that everyone and everything that we can see around us in the Universe, is composed of atoms. To a very rough first approximation, atoms consist of a heavy, positively charged nucleus surrounded by negatively charged electrons. It is these orbiting electrons, especially the outer ones, which are at the core of the fluorescent effect.

Because they are moving, these electrons carry varying degrees of energy. Quantum theory says that electrons cannot just have any level of energy but are confined to a series of defined energy levels. This is not really very restrictive as there are a large number of possible levels they can occupy. All electrons, whether in a rock or any other object, have a so-called "**ground state**" energy which is their normal stable state. However, under certain conditions they can absorb additional energy (for example from incoming UV radiation) and go to a higher energy level. They are then said to go into an "**excited state**". They tend not to be stable in this excited state and look for a way to get rid of the excess energy they have absorbed and go back to the ground state.

There are several ways for an electron do this, some of them internal and essentially radiationless, but one way is to simply re-emit a tiny pulse of energy in the form of radiation. Because of various energy losses within the material the re-emitted radiation always has lower energy - and therefore longer wavelength - than the radiation originally absorbed. Thus, the re-emitted radiation is often given off at a wavelength (i.e. colour) that puts it in the range that our eyes can see. The various possible routes for an electron back to the ground state level are part of the reason we see such a variety of colours in some minerals.

In the majority of cases the re-emission of energy as light is more or less instantaneous. The electrons transition up and down continuously and without "**hanging about**" for any easily measurable time. If you switch off the energising lamp the light emission stops almost at once. This was demonstrated using specimens of fluorite from County Durham and scheelite from Cumbria.

However, there are cases where the energised electrons get themselves "**caught up**" in a different set of higher energy levels that are not so easy to get out of. This means that, on balance, it takes them longer to re-emit their energy and return to their ground state. In these cases, the emission of light goes on after the light is switched off as the trapped electrons gradually filter back to their ground state. This effect was demonstrated with specimens of calcite (calcium carbonate) from Somerset and willemite (zinc silicate) from the USA. In some cases, this prolonged fluorescence can last for hours or even days.

However, although everything in the world is made of atoms and all electrons can jump between energy levels, not everything in the world commonly fluoresces. Experience will quickly show that not all minerals will fluoresce in response to UV light. Not even all examples of a single mineral will fluoresce. This was exemplified by a number of specimens of fluorite, some of which fluoresced while

others do not. The same assortment of specimens showed that a single mineral can fluoresce in several different colours.

The speaker explained that this is the result of a variety of agents within mineral structures which can act as “**activators**” of fluorescence. All of these have an effect on the atomic structure of minerals in a way which allows the mineral to interact with UV radiation in a way it would not do if the agent were absent.

This agent can sometimes be an intrinsic property of the mineral in question - something which is a necessary part of its structure - but very often it is some minor impurity or a defect in the crystal structure of the material that does this. Intrinsic activation was demonstrated by the strong UVC stimulated fluorescence of scheelite where the tungstate ion, $(\text{WO}_4)^{2-}$, is responsible for the fluorescence and the strong yellow-green fluorescence of many secondary uranium minerals where the uranyl ion, $(\text{UO}_2)^{2+}$, is responsible for the observed yellow-green fluorescence. Lead and boron can also be intrinsic activators.

However, in many cases the agent responsible for the fluorescence is not an integral part of the mineral but rather an impurity which is present only at a low level. These are the so-called “**impurity activators**” and they act by disturbing the internal structure of the mineral and altering the positions of its electron energy levels. Commonly observed impurity activators include rare earth elements such as europium or samarium in the case of fluorite or, manganese in the case of willemite from Franklin in the USA or calcite in many localities worldwide. Sometimes it can take more than one activator to produce an effect.

Many specimens of sodalite from around the world show a strong yellow - orange fluorescence under UVA. The cause of this fluorescence is the presence of sulphur, in the form of disulphide ions. The same activator is responsible for the strong red fluorescence of the tugtupite from Greenland and a number of related minerals. One unusual example of impurity activation is that of nitrogen in diamond. In many diamonds small amounts of nitrogen replace carbon in the diamond structure enabling them to exhibit blue glow under LW UV as demonstrated in a rather large diamond.



Dr. Michael Doel's display at the Sussex Lapidary & Mineral Society show in Haywards Heath in 2024 in plain and UV light.

There is a further way in which minerals can be activated to fluoresce under UV. That is by virtue of defects in the crystal structure. Few crystals are actually as perfect as the diagrams in textbooks would have you believe. They often contain a variety of types of irregularity in their structure. These defects can be either things that ought to be there and are not, things that ought to be there and are there but are in the wrong positions and “foreign” things that ought not to be there at all. An example of this was given by the sphalerite sometimes encountered at Franklin New Jersey and some other North American localities which is activated by this sort of effect. From all of these mechanisms it will

be clear why one mineral can show a number of different fluorescent responses - including none at all.

The focus of the talk then moved on to collecting fluorescent minerals and examples were shown from a number of areas within the UK. Foremost among these was the area of the North Pennines where the blue-fluorescing fluorite in particular is world class in terms of its brightness and is accompanied by a number of other fluorescent species including baryte, witherite and hydrozincite. With the appropriate permissions, specimens can still be collected - and you can still collect it there. Similarly, at locations like the old mine dumps of Leadhills and Strontian in Scotland much of the calcite and barite fluoresces brightly in shades of white and blue to cream and red. On the coast of the Isle of Sheppey, between Warden and Minster, the beaches yield nodules on the foreshore which contain white rosettes of barite perched on orange or tan calcite. This fluoresces a bright blue-white. There is also fluorescent gypsum (Selenite) in the outcropping London Clay. One of the best places to go in the UK just now if you are into fluorescent minerals are the active limestone quarries of the Mendip Hills in Somerset. In the calcite veins of these quarries, you can find material fluorescing almost every colour of the rainbow.

If you are prepared to go further afield to locations outside the UK, the scope for collecting becomes even greater. Notable localities currently yielding beautiful specimens include the mountains and river valleys of Afghanistan and NW Pakistan (*not recommended at this time*), Långban in southern Sweden, areas of southwest Greenland and the North-Eastern USA. Most of these areas are generally safe and are actually quite easily accessible.

The old iron and manganese mining area around Filipstad 100 miles or so to the west of Stockholm in Finland is well known for its intensely complex mineralogy. Among its 270 recorded species a significant number are fluorescent, and the old dumps are accessible for collecting - although the complexity of the area means you really need a local guide who knows what's what and where to find it.

The Ilimaussaq Intrusion in Southwest Greenland is an area 17km by 8km where a variety of unusually alkaline rocks, rich in beryllium and possessed of a particularly complex chemistry can be found among some exceedingly beautiful scenery. This area boasts a very wide range of mineral species, a number of unique minerals and a lot of UV fluorescent species - many of them as yet unidentified or very poorly described. This area is well worth visiting - as long as you don't mind a lot of hiking uphill and a bit of wilderness camping.

In north-western New Jersey, not a million miles from the airports of New York City and Newark, lies the town of Franklin - the self-styled “**Fluorescent Mineral Capital of the World**” and its sister town of Ogdensburg which contains the famous Sterling Hill Mine and Museum. This area has been mined for iron and zinc for hundreds of years and although all commercial mining there ceased some time ago it is still an active collecting area. For a fee you can collect more than you can carry of the brilliant red and green fluorescing willemite and calcite combinations for which the area is famous. It is not so easy now to find the rarer species like esperite, hardystonite and margsarosonite but they are still available from dealers and by trade with other enthusiasts in the region.

The area is home to the Franklin Mineral Museum, The Sterling Hill Mining Museum and the Thomas Warren Museum of Fluorescence. All are excellent and the last has a world-class fluorescent mineral display. The combination of several museums of fluorescent minerals with the various collecting localities and the opportunity at certain times of the year to collect at night on the old mine dumps make a visit to this area a memorable experience.

A few words followed on the equipment you need in order to collect fluorescent minerals. Apart from the usual paraphernalia of hammers and chisels and protective clothing the most obvious thing you need is a suitable UV lamp. Most useful in general is a UVC lamp - because more minerals react to it - although UVA lamps are generally cheaper and easier to obtain. There are several good suppliers

of lamps - although, unfortunately most of them are in the USA. These are not cheap - in fact they are very expensive when you include taxes and shipping costs - but they open up a new world in mineral collecting. Many of these lamps are still based on the mercury discharge tube and appropriate filters as the source of specific UV wavelengths. It is certain that the next generation of UV lamps will be based entirely on LED technology. The capability of this technology is rapidly expanding and this, with the slowly reducing cost of components is making them the preferred choice for many collectors. Mention was made of one good European source of UV lamps, namely **Colorgems** in Holland. Their lamps are still expensive, but shipping costs are very much lower than from the USA.

The speaker concluded with a brief summary of books and other sources of information for existing or intending collectors. There are several good books, including the one by Tom Warren and others and Manny Robbins' book entitled simply "**Fluorescence**". Although now out of print, these are available from second-hand booksellers on the internet. More recent publications include two by Stuart Schneider which, despite a few inaccuracies in the mineral descriptions, are full of excellent photographs of fluorescent minerals.

It is no surprise that there are a great number of internet sites offering information on fluorescent minerals. A good place to start would be the site of the US-based Fluorescent Mineral Society. eBay, Etsy and other internet marketplaces always offer fluorescent specimens, as do several specialist fluorescent mineral dealers. People should be careful, however, about taking at face value much of what appears on "social media". There is more mis-information there than is good for you.

The speaker concluded by thanking his audience for their attention (i.e. not falling asleep) and invited questions from the floor - of which there were several - before the audience had a chance to see the specimens close-up and operate the UV lamps for themselves.

Dr. Michael Doel was born in Trowbridge, Wiltshire and educated at the City of Bath Technical School, Bath, Somerset and the University of Birmingham (Chemistry, BSc 1967, PhD 1970).

He worked as a Research Fellow of the Medical Research Council of Canada at the University of British Columbia, Vancouver, BC, Canada (1970 – 1973). From 1973 to 1980 he was employed as a Senior Research Investigator in the Research Laboratories of G.D. Searle (Pharmaceuticals) at High Wycombe.

In 1980 he was instrumental in the setting up, in Slough, Berkshire, "Celltech", the first biotechnology company in the UK, where he served as Head of Molecular Biology and later as Director of Development.

He was employed by MAFF (which later became DEFRA [Department for Environment, Food & Rural Affairs]) as a Scientific Liaison Officer from 1990 to 2008. Responsible for defining new collaborative research programmes involving industry and academia in areas of food science and technology – and also for the monitoring and evaluation of the outputs from those programmes.

Michael retired in 2008 and is enjoying the experience immensely! His main interests presently include reading, gardening and walking, along with mineralogy and the collecting of minerals. In recent years a major interest has been the phenomenon of UV induced fluorescence in minerals and the mechanisms of this effect.

Memorable mineral collecting trips this century have included Franklin, New Jersey, USA (for fluorescent minerals) in 2001 and 2003; the Illimaussaq Intrusion in S.W. Greenland in 2005 and 2008, the Eifel Mountains of N.W. Germany for micro-mount material in 2011 and 2012, Långban, Sweden in 2014 and Namibia in 2016.

He is currently a member of the Russell Society, The British Micromount Society, The Cheltenham Mineral & Geological Society, the Sussex Mineral & Lapidary Society, The Fluorescent Mineral Society (USA) and the Franklin & Ogdensburg Mineral Society (USA).

Paul Olver Geological Collection

By Sally Pritchard, FGS Membership Secretary



On 7 July 2025 I joined the U3A members of Geology Group 2 on a tour of **The University of Portsmouth's Geology** labs. Our guide Dr. Roy Smith remarked that all donations of rocks minerals and fossils were gratefully received for use as a teaching collection and that a small selection of one from Herefordshire was currently on display. I began to wonder and sure enough, there was a display of some of Paul Olver's vast collection kindly donated by his widow, Sue.

In the early days of FGS Paul played a significant part in helping to develop the society. This was all before I joined and some of our longer serving members would have known Paul, joining him on field trips at home and abroad, including a trip to Europe in 1999 to see the solar eclipse in Hungary as well as visit important geological localities. I later joined Paul on his volcano tours with the GA, so it was interesting to see some of his volcanic specimens on display including "Pele's hair" which was a first for me. There were also fine examples of fossils and minerals for students to study.

It is good to know that "Geology" in some form, be it degree courses in Earth Science, Palaeontology or Engineering Geology, is thriving at Portsmouth University and that I won't have to travel far to one day dispose of my own geological collection.

Reference:

<https://www.port.ac.uk/study/courses/undergraduate/bsc-hons-earth-science>

News

Complex animals living millions of years before the Cambrian Explosion revealed by seabed tracks

James Ashworth, NHM

9 July 2025

The **Cambrian Explosion** is a landmark moment in the history of life on Earth when many of the major groups of animals first appear in the fossil record. New research, however, suggests that many of their key characteristics were already in place millions of years earlier during the Late Ediacaran Period.

The Cambrian Explosion may have been less of a burst of evolution, and more of a final flourish.

This event, which lasted from around 539 to 519 million years ago, is when the major animal groups alive today first appeared.

Examples of these different categories, known by scientists as a phylum, include molluscs, arthropods and tardigrades.

While animals existed before the Cambrian Explosion, in a period known as the Ediacaran, they've been hard to study as they rarely fossilise. Generally, the only reminders of these animals are trace fossils, such as the tracks and burrows they left behind.

Our scientist Dr. Zekun Wang has led new research to see what these traces can reveal about the animals which made them. The shape of an animal can be linked to the tracks that it leaves behind, while its route through an environment can be used to infer what senses it might have had.

"Life in the Ediacaran was no longer microscopic, but typically, it wasn't able to move along the seafloor," Zekun says. "By the Cambrian, however, animal life could explore the seabed. Something clearly changed, but the trace fossils that survive from this transition lack many anatomical details."

"By studying their mathematical properties instead, we can infer what the animals that made the traces might have been like. We see a clear progression towards more advanced senses and ways of moving, as well as slender body profiles, at the end of the Ediacaran. This sets the stage for the Cambrian Substrate Revolution and the Cambrian Explosion."

Zekun's findings have been published across two papers in the journals **Proceedings of the Royal Society B** and **Geology**.



By analysing trace fossils like Psammichnites, researchers have been able to infer how animals lived and moved over half a billion years ago. (© Mr Ziwei Zhao and Dr Xiaoya Ma)



The impressions of animals like Kimberella are some of the few body fossils which survive from the Ediacaran. (© Alizada Studios/ Shutterstock)

Life in the Ediacaran Period

The **Ediacaran Period** lasted for almost 100 million years from around **635 to 539 million years ago**. It's a time in Earth's history when life evolved from more simple collections of cells to more complicated structures made up of different tissues.

While a few hardy organisms had already moved onto land, plants and animals lived exclusively in the sea. The sediment on the ocean floor occasionally trapped some of these soft-bodied animals, preserving species like *Kimberella* and *Dickinsonia* as body fossils.

The majority of the mobile animals from the Ediacaran Biota, however, are known from traces. Earlier in the period these are often simple horizontal trails and burrows but change towards the end as the tracks start to become more complex.

Zekun's research focuses on how smoothly and tightly the tracks turn to reveal new details about the animal which made them.

"Think of a snake, for example," explains Zekun. "While these animals didn't exist during the Cambrian, a snake will always make a long, curving path behind it because of its slender shape."

"As a result, there are certain turns that can never be made by this body shape because they can only bend a certain amount. If there are abrupt changes in the angle of a track, then it must have been made by a shorter, even round, body shape."

"We can also link the smoothness of a track to an animal's perception, as animals with long range senses can plan a direct journey towards food. If they have limited sensory abilities, then the animal will only find food when it stumbles into it. In this case, the trajectory will be unsmooth and to some extent random as an animal wanders around its environment."

Zekun, along with his co-authors Professor Gabriela Mangano, Professor Luis Buatois and Dr. Nianzhi Hang, investigated over 170 different trace fossils from the Ediacaran–Cambrian transition. They compared the fossils to the tracks of modern arthropods, gastropods and worms to see what could be learned about wildlife more than 540 million years ago.

How did Ediacaran fauna develop?

After analysing the Ediacaran fossils, the team divided them into three different groups. The first, from around 550 million years ago, are relatively simple tracks with many abrupt turns. These are thought to have been made by simple animals with short, round bodies and limited senses that could turn on the spot.

The researchers suggest that these animals might have moved like amoeba, extending parts of their body to move forward, or had hair-like structures called cilia to help them move.

Around 545 million years ago, smoother tracks with fewer abrupt turns appear. The tracks resemble those left by living horseshoe crabs, slugs and snails, and suggest that short animals were gaining greater control of their movement to make more co-ordinated journeys.

At about the same time, entirely smooth trails similar to the tracks left behind by modern worms appear in the fossil record. While these animals can no longer turn abruptly, their long and streamlined bodies have reduced drag and a larger surface area for sensory organs to cover.

"By using the data from tracks made by known animals through deep time, my colleague Dr. Olmo Miguez-Salas and myself were able to ultimately estimate the minimum body length of the trace maker" Zekun says.

"Our results show that the length of the animals making these tracks gradually increases over the Ediacaran to Cambrian transition, moving from an ovoid shape towards more worm-like bodies."

Together, the papers help to build the case that many of the key characteristics animals needed to thrive on Earth were developing millions of years before the Cambrian. These traits might have allowed them to survive the end of the Ediacaran, when many other unique species disappear after a presumed major extinction.

This provided a clean slate for the predecessors of modern animals to diversify during the Cambrian Explosion which followed, establishing much of life on Earth as we know it today.

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400-mile-long chain of fossilized volcanoes discovered beneath China

Aubrey Zerkle, *LiveScience*

29 July 2025

Researchers recently discovered a huge chain of extinct volcanoes buried deep below South China that formed when two tectonic plates collided during the breakup of Rodinia, around 800 million years ago.

Researchers have discovered a 400-mile-long chain of extinct, fossilized volcanoes buried deep below South China. The volcanoes formed when two tectonic plates collided during the breakup of the supercontinent Rodinia hundreds of millions of years ago, the scientists reported in a new study. The ancient volcanoes extend the region of past volcanism in this area by several hundred miles and may have affected Earth's climate.

About 800 million years ago, during the early Neoproterozoic era, South China sat at the northwestern margin of Rodinia. Shifting plate tectonics caused this area to break off into what is now the **Yangtze Block** plate, pushing it toward the **China Ocean** plate. As the two plates collided, the denser oceanic crust sank beneath the more buoyant continental crust and slid deep into Earth — a process known as **subduction**.

As oceanic crust subducts, it heats up and releases water, which generates magma. The magma rises to the surface, creating a long, narrow chain of volcanoes that follow a curved line above the subduction zone. This is known as a **volcanic arc**.

Volcanism and mountain building in arc systems create new crust and modify the existing crust. Therefore, researchers study ancient volcanic arcs to understand how crust formed on early Earth.

Geologists previously discovered remnants of an extinct volcanic arc along the edge of the Yangtze Block dating back to the early Neoproterozoic. In the new study, published June 30 in the ***Journal of Geophysical Research: Solid Earth***, Zhidong Gu, a senior engineer at PetroChina, Junyong Li, a researcher at Nanjing University, and colleagues tested whether these arc volcanoes extended further inland.

Fossil mountains can be difficult to find because they're gradually worn down by wind and water and buried beneath layers of sediment. Today, several kilometres of sedimentary rocks blanket the interior of the Yangtze Block, forming the Sichuan Basin.

Gu and Li's team used an airborne magnetic sensor to "see" the crust beneath these sedimentary rocks. Different rock types contain different magnetic minerals, so geophysicists use magnetic signals to map underground rock formations.

They found a strip of iron-rich rock with a stronger-than-average magnetic field located about 4 miles (6 km) beneath the surface. It formed an approximately 430-mile-long (700 km), 30-mile-wide (50 km) belt stretching from the northeast to the southwest of the Yangtze Block and reaching as far as 550 miles (900 km) inland. Iron-rich rocks like these are generated above subducting oceanic crust.

The team also analysed rocks from seven deep boreholes drilled into the uppermost crust below the Sichuan Basin. They verified that these rocks came from magma and were chemically similar to new crust formed by arc volcanoes. They dated the magmatic rocks to between 770 million and 820 million years ago, confirming that the rocks had formed during the early Neoproterozoic.

The researchers concluded that plate subduction during the breakup of Rodinia formed a ring of volcanoes extending hundreds of miles into the Yangtze Block's interior.

This finding is surprising, the team said, because most volcanic arcs form narrower belts along the continental margin. For example, the Cascades form a single mountain chain above the Juan de Fuca Plate as it subducts beneath the coast of North America.

Gu and Li attributed the wide Yangtze arc to a different style of tectonics, called **flat-slab subduction**. In flat-slab subduction, the oceanic plate moves horizontally beneath the continental plate at a shallow angle for hundreds of miles before sinking into the Earth. This process produces two distinct volcanic ridges — one near the boundary where the oceanic plate first slips under the continent, and one farther inland, where it finally sinks. Similar shallow subduction of the Nazca Plate beneath the west coast of South America forms the parallel mountain ranges of the Andes today.

Peter Cawood, an Earth scientist at Monash University in Australia who was not involved in the study, agreed this was one way the inland volcanoes could have formed. However, he proposed an alternative explanation. "It could be that the two belts are not part of one broad arc system and flat slab but represent two independent but time-equivalent systems that were sutured together" he told *Live Science*.

Regardless, Cawood said the work presents an "exciting new set of data in a region that has been difficult to study." He added that it "shows that the volume of magmatic activity along this boundary may be considerably greater than previously realized" and its impact on Earth's past climate should be evaluated.

Scientists think the global carbon cycle underwent a major shift during this time interval, based on geochemical records from 720 million to 1 billion-year-old sedimentary rocks. Volcanoes release carbon dioxide into the atmosphere, but chemical weathering of mountains consumes it. Both processes work to regulate Earth's carbon cycle and climate over millions of years. It remains unclear how the rings of fire in South China could have contributed to this perturbation and any resulting climate instability.

Reference:

https://www.livescience.com/planet-earth/volcanos/400-mile-long-chain-of-fossilized-volcanoes-discovered-beneath-china?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

Powerful Earthquake Off Russia's Kamchatka Peninsula Triggers Tsunami Across The Pacific

David Bressan, Senior Contributor, Forbes.

30 July 2025

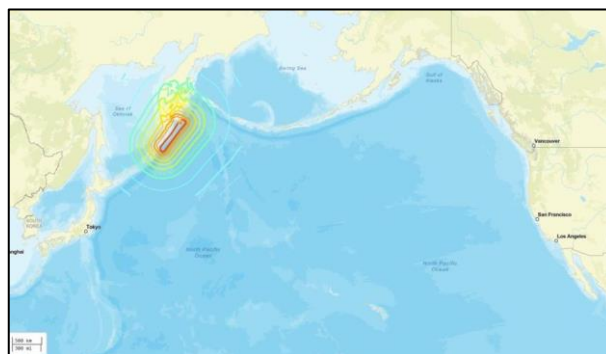
At 11:24 am local time on July 30, 2025, a powerful earthquake struck offshore of the Kamchatka Peninsula, as reported by the **U.S. Geological Survey** on its social media platform. Videos shared on social media show shaking lasting several minutes.

With a preliminary magnitude of **7.8 to 8.8** it is the strongest earthquake since the magnitude 9.1 Tōhoku earthquake of March 11, 2011.

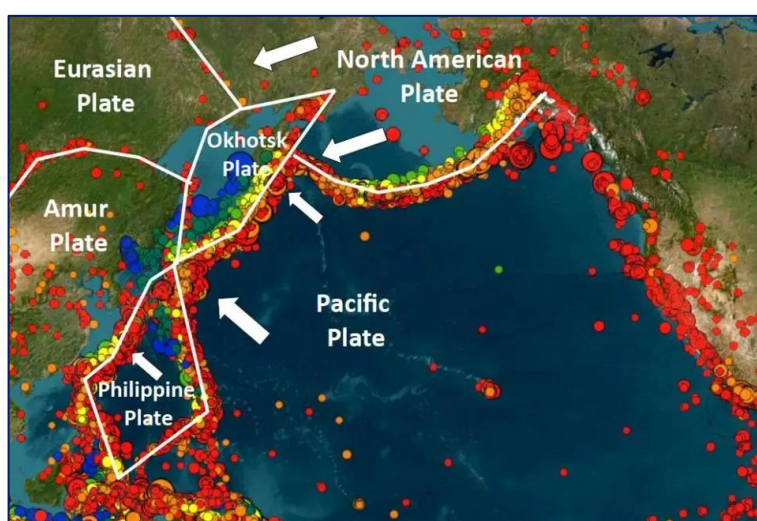
Tsunami alerts were issued by the U.S. Tsunami Warning System around the Pacific Basin for the Aleutian Islands (Alaska), the islands of Hawaii, California, Oregon and Washington on the U.S. west coast, the Japanese archipelago and other Pacific nations, with 1 to 3 meter waves possible. Japanese authorities evacuated low-lying areas along the shores and partially shut off the rail system in eastern Japan. Russian authorities have reported minimal damage and few injured people so far and issued evacuation orders for Sakhalin Island. They also warned of possible aftershocks.

The rupture likely spanned an area roughly 390 kilometres long and 140 kilometres wide, following the Kuril-Kamchatka Arc. Earthquakes of this magnitude are not points, but large areas of slip along faults.

The Kuril-Kamchatka Arc extends approximately 2,100 kilometres from Hokkaido, Japan along the Kuril Islands and the Pacific coast of the Kamchatka Peninsula, until terminating at its intersection with the Aleutian arc south of the Commander Islands, Russia. It marks the region where the Pacific plate subducts into the mantle beneath the Okhotsk microplate, a proposed regional microplate between the larger North America plate and the Eurasian plate in the east. The Pacific plate is moving northwest at a rate that increases from 79 millimetres/year near the northern end of the arc to 83 millimetres/year near adjacent to Hokkaido. This is one of the highest rates of relative movement at a plate boundary.



A magnitude 8.8 struck the Kamchatka Peninsula, Russia on July 30, 2025. (Credit: USGS)



Map showing earthquakes since 1980 (according to <https://seismic-explorer.concord.org/>) and plate boundaries in the north-east Pacific basin. (Credit: D.Bressan/Seismic Explorer)

Deformation of the Okhotsk microplate generates shallow crustal earthquakes within 20 kilometres, while slip at the subduction zone interface between the Pacific and North America plates generates megathrust earthquakes that extend to depths of 40 to 60 kilometres. Today's event is likely an example of an earthquake along a subduction zone beneath 20 kilometres. As the seafloor rebounds, it displaces water, which can trigger tsunamis that travel vast distances across the ocean.

The Kuril-Kamchatka region frequently experiences large (with a magnitude over 7.0) and great (with a magnitude over 8.0) earthquakes. Since 1900, 133 large and 12 great earthquakes have occurred along the arc, including a magnitude 9.0 earthquake in 1952.

Reference:

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Why did Russian mega earthquake not cause more tsunami damage?

Esme Stallard and Mark Poynting, BBC News Climate and Science

30 July 2025

It has been one of the strongest earthquakes ever recorded – but so far has not brought the catastrophic tsunami that many feared.

When the **8.8-magnitude quake** struck eastern Russia at 11:25 local time on Wednesday (00:25 BST), it raised concerns for coastal populations across the Pacific. Millions of people were evacuated, as minds cast back to the devastating tsunami of Boxing Day 2004 in the Indian Ocean and Japan 2011, both triggered by similarly large earthquakes. But today's tsunami has been much less severe, even though it's brought some damage.

So, what caused the earthquake and tsunami – and why wasn't it as bad as initially feared?

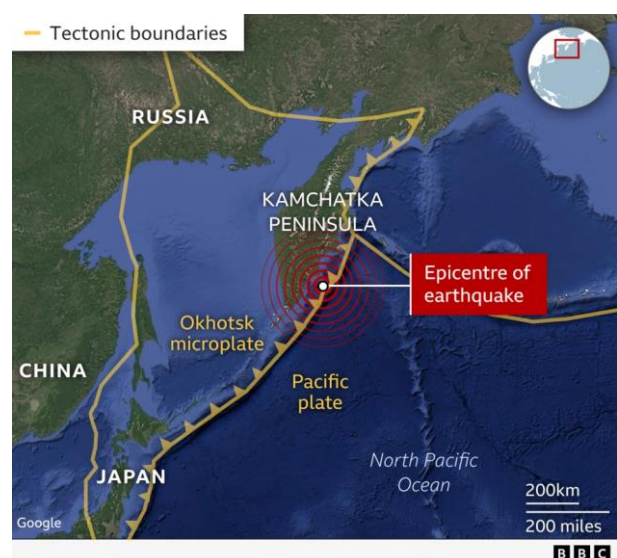
What causes a mega earthquake?

The Kamchatka Peninsula is remote but lies in the **"Pacific Ring of Fire"** - so called because of the high number of earthquakes and volcanoes that occur here.

The upper layers of the Earth are split into sections – tectonic plates – which are all moving relative to one another.

The "Pacific Ring of Fire" is an arc of these plates that extends around the Pacific. Eighty percent of the world's earthquakes occur along the ring, according to the British Geological Survey.

Just off the coast of the Peninsula, the Pacific plate is moving north-west at about 8cm (3in) per year - only about twice the rate that your fingernails grow, but fast by tectonic standards. There it comes into contact with another, smaller plate - called the Okhotsk microplate.



Map showing the epicentre of the earthquake on the Kamchatka Peninsula, where the Pacific plate meets the Okhotsk microplate off the east coast of Russia. (Credit: BBC)

The Pacific plate is oceanic, which means it has dense rocks and wants to sink beneath the less dense microplate. As the Pacific plate sinks towards the centre of the Earth, it heats up and begins to melt, effectively disappearing. But this process is not always smooth. Often the plates can get stuck as they move past each other and the overriding plate is dragged downwards.

This friction can build up over thousands of years but can then be suddenly released in just a couple of minutes. This is known as a **megathrust earthquake**.

"When we typically think about earthquakes, we imagine an epicentre as a small point on a map.

However, for such large earthquakes, the fault will have ruptured over many hundreds of kilometres," explained Dr. Stephen Hicks, lecturer in environmental seismology at University College London. "It is this vast amount of slip and area of the fault that generates such a high earthquake magnitude."

The largest earthquakes recorded in history, including the three strongest in Chile, Alaska and Sumatra, were all megathrust earthquakes.

And the Kamchatka Peninsula is prone to strong quakes.

In fact, another high magnitude 9.0 earthquake struck less than 30km (19mi) from today's earthquake in 1952, the US Geological Survey says.

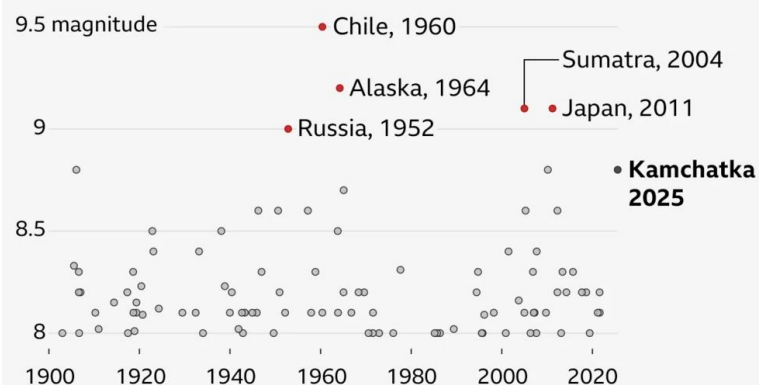
Why wasn't this as bad as previous tsunamis?

This sudden movement can displace water above the plates, which can then travel to the coastline as tsunami.

In the deep ocean, tsunami can travel at more than 500mph (800km/h), about as fast as a passenger aeroplane.

Here, the distance between waves is very long and the waves aren't very high – rarely more than a metre. But as a tsunami enters shallow water near land, it slows down, often to about 20-30mph. The distance

Only five earthquakes were stronger than Kamchatka since 1900

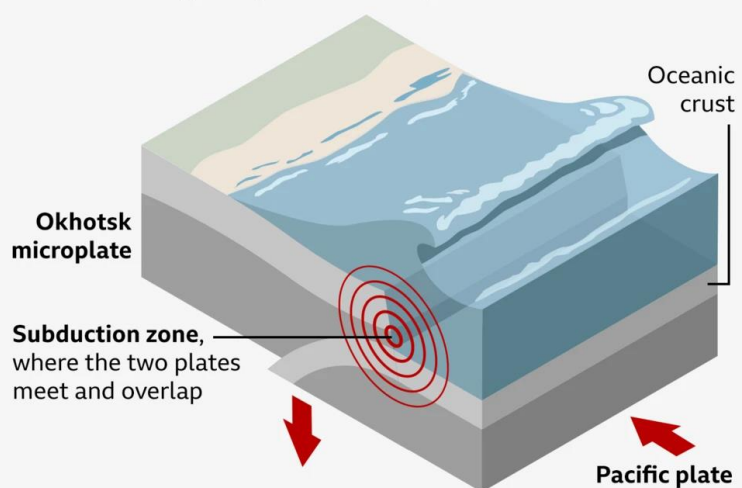


Source: USGS

BBC

Chart showing earthquakes of magnitude 8 or greater since 1900, by year. Labelled on the chart are Chile, 1960 (9.5), Alaska, 1964 (9.2), Sumatra, 2004 (9.1), Japan (9.1) and Kamchatka, 2025 (8.8).

Friction between plates can suddenly be released causing a **megathrust earthquake**



Source: BBC research

BBC

3D visual diagram showing how the Pacific plate is moving towards the Okhotsk plate and identifying the point of subduction. The model shows layers of the earth and the ocean on top.

between waves shortens, and waves grow in height, which can effectively create a wall of water near the coast.

But it's by no means guaranteed that a very strong earthquake will lead to a particularly tall tsunami reaching far inland.

Today's quake brought tsunami waves of 4m (13ft) in parts of eastern Russia, according to authorities there.

But they don't come close to the waves tens-of-metres high of Boxing Day 2004 in the Indian Ocean and Japan 2011.

"The height of the tsunami wave is also affected by local shapes of the seafloor near the coast and the [shape] of the land where it arrives," said Prof. Lisa McNeill, professor of tectonics at the University of Southampton. "These factors, along with how populated the coast is, affect how serious the impact is" she added.

Initial reports from the US Geological Survey said that the earthquake was centred at quite a narrow depth, about 20.7km (12.9 miles) below the Earth's surface. That can lead to greater displacement of the seafloor, and therefore a bigger tsunami wave, but it's hard to tell for sure so soon after the event.

"One possibility is that the tsunami models have maybe taken a conservative estimate on the earthquake depth" Dr. Hicks told BBC News. "Potentially you could shift that earthquake another 20 kilometres deeper, and that would actually reduce the amplitude of the tsunami waves quite considerably."

Better early warning systems

Another important element is the development of early warning systems. Due to the high occurrence of earthquakes in the Pacific region, many countries have tsunami centres. They send out warnings via public announcements for populations to evacuate. No such system was in place when the 2004 Boxing Day tsunami occurred - leaving many people without time to evacuate. More than 230,000 people died across 14 countries in the Indian Ocean.

Early warning systems are important because of the limited ability of scientists to predict when an earthquake will occur.

The US Geological Survey, external recorded an earthquake measuring 7.4 in the same region ten days before. This may have been a foreshock - an early release of energy - but it is not a predictor of exact timing of a future earthquake, explained Prof. McNeill.

"Although we can use how fast the plates are moving, GPS to measure current movements and when previous earthquakes occurred, we can only use this information to make forecasts of probability of an earthquake" she said.

The Geophysical Survey of the Russian Academy of Sciences (GS RAS) will continue to monitor the region as it anticipates aftershocks could continue for the next month.

Reference:

<https://www.bbc.co.uk/news/articles/c0l6pj7kkg7o>

Russian volcano explodes in 'powerful' eruption, likely intensified by 8.8 magnitude earthquake

Perri Thaler, LiveScience

30 July 2025

Klyuchevskoy volcano in Russia erupted shortly after a powerful 8.8 magnitude earthquake in the same region.

Klyuchevskoy volcano in eastern Russia began erupting shortly after a powerful 8.8 magnitude earthquake and several aftershocks shook the same area.

"A descent of hot lava is observed on the western slope" the Geophysical Centre of the Russian Academy of Sciences said in a translated post on the messaging app *Telegram* Wednesday (July 30).

The Kamchatka branch of the academy captured the eruption on cameras observing the volcano. In the Telegram post, they reported seeing "explosions" as a "powerful glow above the volcano."

The ash plume from the eruption extended at least 1.5 miles (2.5 kilometres) above and 36 miles (58 km) east of the volcano, the **Kamchatkan Volcanic Eruption Response Team** said on Telegram. The group warned that explosions of ash up to 5 miles (8 km) high could occur at any time.

Details about the full extent of the eruption and damages are unknown at this time.

In the weeks leading up to the earthquake, "the volcano was showing signs of unrest" a U.S. Geological Survey (USGS) representative told ***Live Science*** in an email. On July 21, a team of Russian scientists found a lava lake at the summit of the volcano, signalling that the volcano was primed for eruption.

"While yesterday's large earthquake did not cause the eruption to begin, it did likely increase in the vigour of the eruption including some ash emission" the USGS representative said.

Klyuchevskoy, which rises 15,597 feet (4,754 meters) above sea level, is the tallest active volcano in Asia and Europe, according to NASA's Earth Observatory. The volcano sits on Russia's Kamchatka Peninsula, a hotspot for geologic activity due to its position on the Pacific Ring of Fire.

The eruption came hours after an 8.8 magnitude earthquake — tied for the sixth-most-powerful earthquake ever recorded — struck on the same peninsula Wednesday at 11:24 a.m. local time. The earthquake could generate tsunami waves higher than 10 feet (3 m) above the tide on the coasts of



The Klyuchevskoy volcano in eastern Russia erupted hours after an 8.8 magnitude earthquake. (Image credit: Alexander Piragis)



Klyuchevskoy is about 280 miles (450 kilometres) north of Petropavlovsk-Kamchatsky, the regional capital city. (Image credit: Anadolu via Getty Images)

Hawaii, Ecuador and Russia, the U.S. National Tsunami Warning Centre warned after the earthquake struck.

The volcano is about 280 miles (450 km) north of Petropavlovsk-Kamchatsky, the regional capital city. It last erupted in late 2023, when it spewed a 1,000-mile-long (1,600 km) river of dust and ash that reached up to 7.5 miles (12 km) above Earth's surface.

This eruption is "typical activity at this very active volcano" the USGS representative said. "The volcano is in a remote area, and this eruption is consistent with other recent past eruptions."

Reference:

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Dormant volcano erupts in Russia for first time in around 500 years, days after magnitude 8.8 megaquake

Patrick Pester, LiveScience

4 August 2025

Krasheninnikov volcano has erupted on Russia's Kamchatka Peninsula. This is the second volcano to erupt in the region following the magnitude 8.8 megaquake on July 30.



A massive plume of ash erupted from Krasheninnikov volcano on Sunday. (Image credit: Sheldovitsky Artem Igorevich / IViS / Handout/Anadolu via Getty Images)

A long-dormant volcano has erupted on Russia's Kamchatka Peninsula just days after a magnitude 8.8 megaquake rocked the region on July 30. It is the second volcano to blow its top in the region in the last five days, following the eruption of Klyuchevskoy within hours of last week's quake.

The roughly 6,000-foot-tall (1,800 meters) **Krasheninnikov volcano** erupted overnight into Sunday (Aug. 3), for the first time in about 500 years. The eruption blew a plume of ash 3.7 miles (6 kilometres) into the sky but posed no threat to populated

areas, Russia's Ministry for Emergency Situations for the Kamchatka Territory wrote in Telegram posts.

A magnitude 7.0 earthquake also hit the region on Sunday. The National Oceanic and Atmospheric Administration (NOAA) Tsunami Warning System registered the latest earthquake at 6:37 a.m. local time in the Kuril Islands, a volcanic archipelago that stretches from the southern end of the Kamchatka Peninsula to the northeastern tip of Japan. Following the earthquake, Russia issued a tsunami warning for the peninsula, but officials later cancelled this alert, Reuters reported.

This latest eruption and earthquake could be linked to the megaquake that hit the peninsula on July 30, which is also thought to have intensified the eruption of Klyuchevskoy volcano.

Last week, Russian scientists warned that strong aftershocks could occur in the peninsula region for several weeks, Reuters reported.

It's unclear precisely what time the Krasheninnikov volcano began erupting. Nikolai Solovyov, head of the security service of Russia's Federal State Budgetary Institution "Kronotsky State Nature Reserve," reported receiving a message about the beginning of the eruption at 6 a.m. local time on Sunday, according to a translated statement released by the Kronotsky State Nature Reserve, where the volcano is located.

Krasheninnikov volcano has been dormant for hundreds of years. Olga Girina, head of the Kamchatka Volcanic Eruption Response Team, told Russia's RIA state news agency that this was the first historically confirmed eruption in 600 years, Reuters reported. On the Institute of Volcanology and Seismology Telegram channel, Girina also said that the last lava effusion, or outpouring of lava, occurred within 40 years of 1463, Reuters reported. However, the Smithsonian Institution's Global Volcanism Program states that the last known eruption was later, in 1550.

Researchers still have a lot to learn about last week's megaquake and the more recent activity on the Kamchatka Peninsula. Large earthquakes (magnitude 6.0 or higher) can be linked to subsequent eruptions or volcanic unrest. However, the volcanoes must already be poised to erupt for this to be the case, with enough "eruptible" magma and significant pressure where the magma is stored, according to the U.S. Geological Survey (USGS) website

"If those conditions exist, it's possible that large tectonic earthquakes might cause dissolved gases to come out of the magma (like a shaken soda bottle), increasing the pressure and possibly leading to an eruption" USGS representatives wrote on the website.

Reference:

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Book Review

Under the volcano

Robert Harris's skilful and provocative evocation of Pompeii has chilling echoes of modern times

Mark Lawson, The Guardian

6 Sep 2003

As recommended by Janet Burton.

The ability to disguise the outcome is held to be a vital part of the thriller writer's art. Robert Harris, though, has built a major career in the form through open defiance of this rule.

Readers of **Enigma** (1995) knew that his hero would have to be successful in breaking the German codes or we would be living in the triumphant Nazi empire that he hypothesised in **Fatherland** (1992). Now, switching his fictional co-ordinates from 1939-45 to AD79, he attempts, in **Pompeii**, a suspense

novel in which every reader knows the close before they open it. Rather than a whodunit, Pompeii is a "when will it" in which the killer looms in full view over the city, hissing magma.

Frederick Forsyth's *The Day of the Jackal* (1971) is generally held to be the model here, because history made it impossible that his assassin could succeed in killing De Gaulle. Forsyth triumphed by creating an alternative tension around the question of what was going to go wrong, and Harris is equally successful in making us flinch and fear for characters who are going to a doom which we know before them.

Harris always had an impressive weathervane as a journalist - buying into and then out of Blairism at precisely the right time - and he has cleverly sensed that Pompeii, though an ancient story, has a sudden new currency. A culture in which we routinely see CCTV footage of murder victims in their final minutes and read transcripts of the last things terrorism victims ever said is particularly open to the subject of people living their lives half an hour from disaster.

In the post-eruption sequences - chillingly, viscerally described - the novelist makes explicit this implied connection with September 11: "The further he went the more clogged the road became, and the more pitiful the state of the fleeing population.

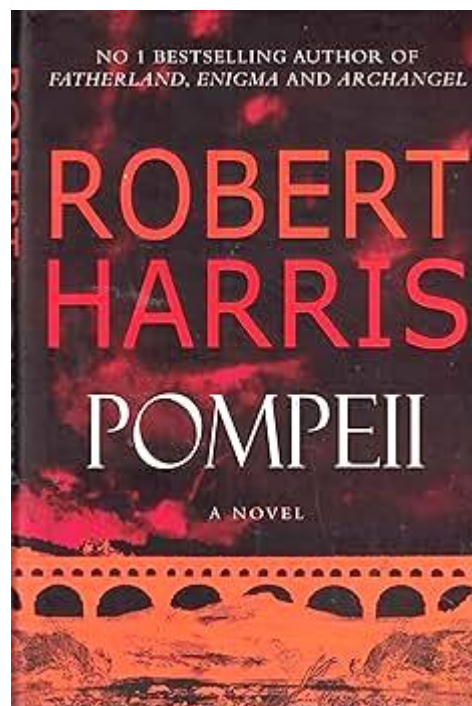
Most were coated in a thick grey dust, their hair frosted." Readers will be reminded here not of their school history books but of newspaper front pages just two years old.

More provocatively, given the importance of the US market to thriller sales, Harris also, through the use of a triumphalist epigraph from Tom Wolfe about American superiority, invites a comparison between the Roman empire's journey from smugness to destruction and imperial Washington DC. Gore Vidal has often made the same point, but he is not writing populist thrillers.

For British readers, there's another - and rather charming - code buried in the prose. Some aspects of the characterisation of Pliny the Elder seemed curiously familiar: a tubby, sweaty man given to elaborate courtesies which may contain a feline twist, someone who wipes his face with a napkin and then inspects the cloth "as if it might contain some vital clue". The model here was surely Harris's friend Roy Jenkins, a more recent example of a man who combined a brilliant literary output with high political office.

As the Roman novels of the crime writers Lindsey Davis and Steven Saylor have shown, the principal difficulties in writing modern novels about the ancient world are nomenclature and dialogue. Once characters start having to address each other as "Glutinus Maximus" and so on, the ghostly sniggers of Frankie Howerd and Monty Python start echoing round the spa baths. Harris allows his Romans the occasional "By Jupiter!", but otherwise uses contemporary terms: "millionaire", "luxury cruiser", "apartment". This is both less distracting than attempted latinisms and encourages the intended parallels with modern America.

Readers who have followed Harris on the wide page as well as the narrow one may regret that some of the irony and humour of his columns is missing from the novels, but this is presumably because the latter are written for a broader, international audience. In *Pompeii*, however, as in the earlier books, Harris shows a great talent for the organisation of a story. The novel has a subtle underlying structure moving from water to fire - it is the discovery of sulphur in the aqueducts that first hints at the conflagration to come - and the story proceeds in short sections named after Roman days and hours, each starting with a teasing epigraph from a volume on volcanology.



Since *The Usual Suspects*, novels and movies have become obsessed with the trick ending: no carpet can avoid having something swept under it, all rugs must be pulled. Insolently resisting this trend, Harris has brought off a known-ending story. He should probably now write a detective novel called *The Doctor Did It*.

Reference:

<https://www.theguardian.com/books/2003/sep/06/featuresreviews.guardianreview24>

Image Of The Day 1

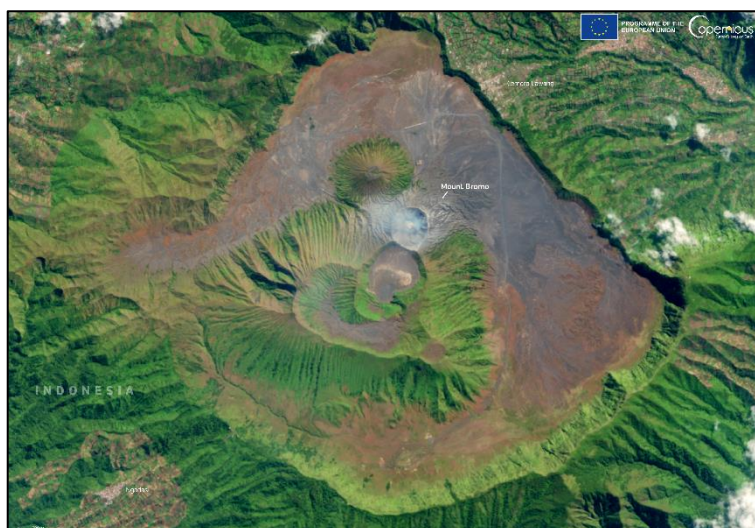
Mount Bromo, Indonesia

Date: 03/08/2025

Credit: European Union, Copernicus Sentinel-2 imagery

Mount Bromo, located in the Area Gunung Bromo, Podokoyo, Pasuruan in East Java, Indonesia, is a prominent active volcano and a popular tourist destination within the Bromo Tengger Semeru National Park. Rising to 2,329 metres, it is famous for its captivating sunrise views and its vast surrounding sea of volcanic sand. The volcano is part of the Tengger caldera, one of the most visited volcanic regions in Indonesia.

Mount Bromo is visible in this Copernicus Sentinel-2 image from 18 July 2025.



The Copernicus Sentinel satellites deliver essential data on volcanoes around the world, providing information on eruptions and their impacts to help keep nearby communities

Reference:

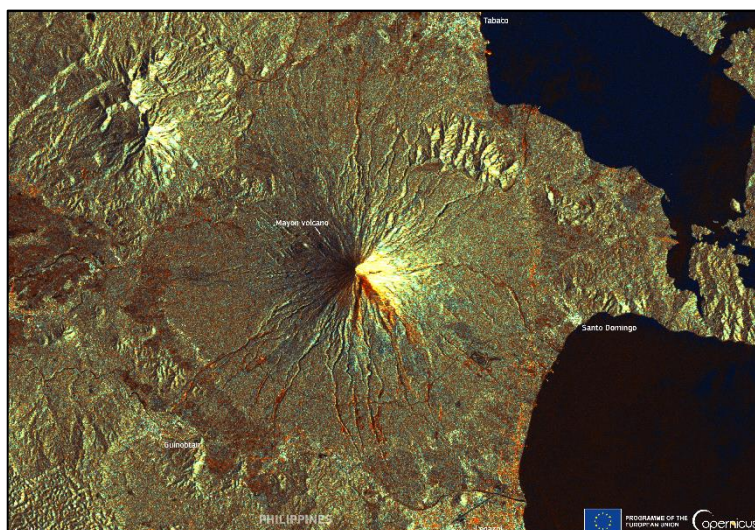
<https://www.copernicus.eu/en/media/image-day-gallery/mount-bromo-indonesia>

Image Of The Day 2

Mayon Volcano, the Philippines

Date: 12/08/2025 **Credit:** European Union, Copernicus Sentinel-1 imagery

The Mayon Volcano, located in Albay province on Luzon Island in the Philippines, is one of the most active stratovolcanoes in the world. Rising 2,462 metres above sea level, it is part of the Pacific Ring of Fire and a



designated protected landscape under the Philippine National Integrated Protected Areas System. Its fertile slopes support diverse ecosystems, although its frequent eruptions pose a persistent threat to nearby communities.

One of the Copernicus Sentinel-1 satellites acquired this radar image on 2 March 2025, revealing the volcano's radial drainage patterns and lava channels in sharp detail.

Copernicus Sentinel satellites provide key open data for monitoring volcanoes worldwide, delivering information on eruptions and supporting early warning systems to help protect vulnerable populations.

Reference:

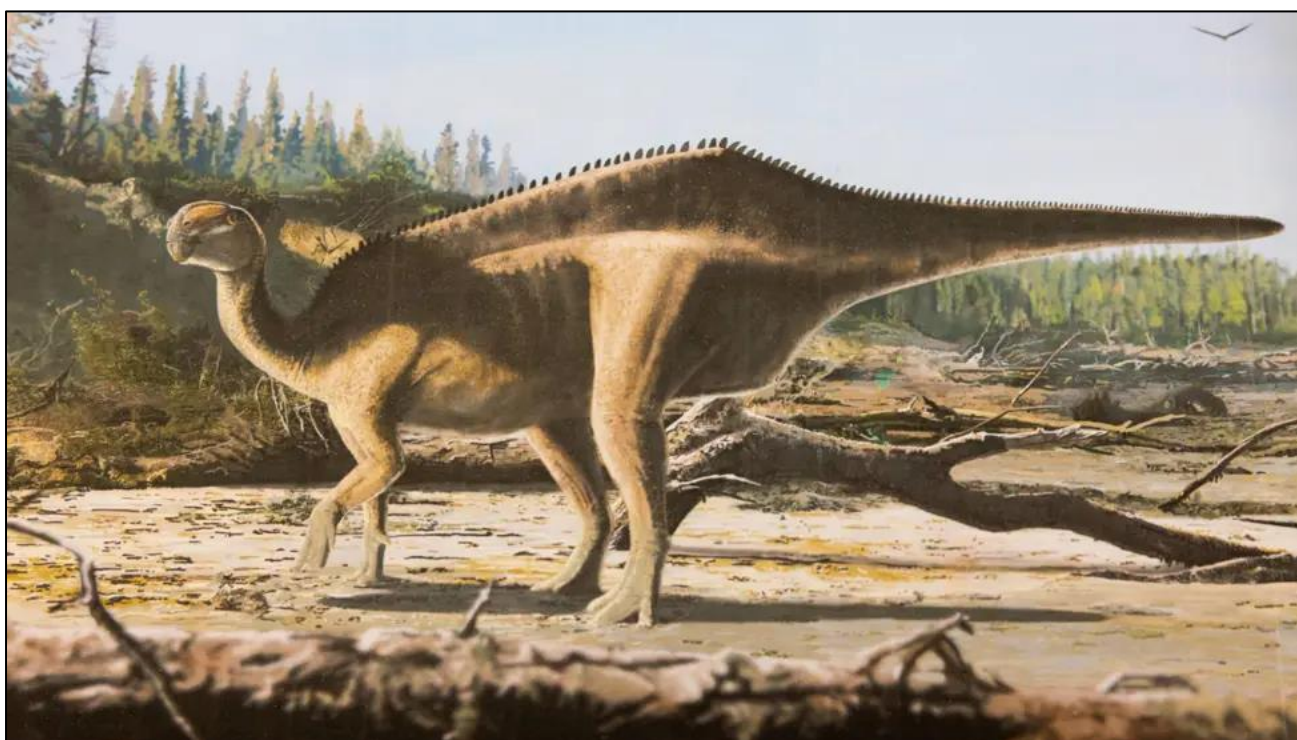
<https://www.copernicus.eu/en/media/image-day-gallery/mayon-volcano-philippines>

News

New dinosaur named after record-breaking sailor

BBC News

22 August 2025



An artist's impression issued by the University of Portsmouth of an Istiorachis macarthurae. (Credit: PA/James Brown)

A new species of dinosaur that had an "eye-catching sail" along its back has been named after sailor Dame Ellen MacArthur. The dinosaur, unearthed on the Isle of Wight, has been given the name ***Istiorachis macarthurae*** with the first word meaning "sail spine" and the second referring to Dame Ellen's surname.

The record-breaking round-the-world yachtswoman said it was a "huge honour", adding: "The fact that the *Istiorachis* 'sail' could be likened to the sails I have spent so much of my life below was very touching."

After being analysed it has now been officially named and described by island-based scientist Jeremy Lockwood and is now on display at **Dinosaur Isle Museum** in **Sandown**.

The medium-sized herbivore once roamed the floodplains of what is now the island's south-west coast. Its remains, which date back 125 million years, were originally discovered by fossil hunter Nick Chase, who died of cancer in 2019.

Before Dr. Lockwood's analysis the fossils were assumed to have belonged to one of the two known iguanodontian dinosaur species from the Isle of Wight. He said: "While the skeleton wasn't as complete as some of the others that have been found, no-one had really taken a close look at these bones before. It was thought to be just another specimen of one of the existing species, but this one had particularly long neural spines, which was very unusual. It may have been used for display, much like a peacock's feathers, possibly to attract mates or intimidate rivals."

For the study, researchers compared the fossilised bones with a database of similar dinosaur back bones which allowed them to see how these sail-like formations had evolved.

Dame Ellen, founder and patron of the East Cowes based charity the Ellen MacArthur Cancer Trust, said: "It is certainly not an everyday occurrence to be asked if a newly discovered dinosaur could reference your name in its title. I was somewhat taken aback when this conversation began but felt hugely privileged to be asked.

"The fact that the *Istiorachis* 'sail' could be a-likened to the sails I have spent so much of my life below was very touching. It is both extraordinary and a huge honour that a creature living 125 million years ago could possibly be linked to my family name."

She became the fastest person to sail solo non-stop around the world in 2005.

Reference:

<https://www.bbc.co.uk/news/articles/c87ew7qq4ww0>



Dame Ellen MacArthur, who is from Derbyshire, said it was "both extraordinary and a huge honour" to have the dinosaur named after her. (Image source, EMCTrust)

Image Of The Day 3

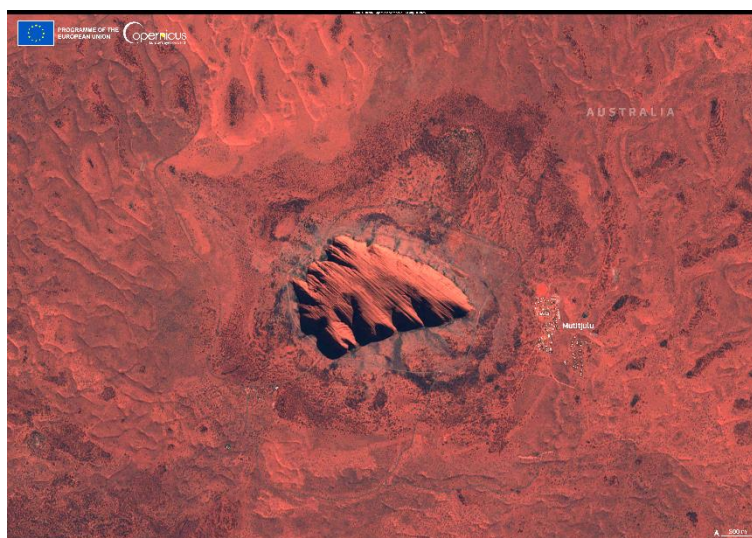
Uluru, Australia

Date: 28/08/2025

Credit: European Union, Copernicus Sentinel-2 imagery

Uluru, also known as **Ayers Rock**, is a massive sedimentary rock formation located in the heart of Australia's Northern Territory. Rising 348 metres above the surrounding plain, Uluru is not only a striking natural landmark but also holds deep spiritual significance for the Anangu people.

Estimated to be over 500 million years old, this UNESCO World Heritage site hosts diverse vertebrate fauna and threatened species.



This Copernicus Sentinel-2 image, acquired on 14 August 2025, shows Uluru from above. Buildings of the Mutitjulu Aboriginal community are visible to the east of Uluru.

The Copernicus Sentinel satellites play an important role in monitoring culturally and ecologically significant sites around the world. They deliver valuable data for monitoring environmental changes and provide key insights for better protecting these areas.

Reference:

<https://www.copernicus.eu/en/media/image-day-gallery/uluru-australia>

Image Of The Day 4

The Étang de Montady, southern France

Date: 3/09/2025

Credit: European Union, Copernicus Sentinel-2 imagery

The Étang de Montady, located in southern France near the town of Montady, is a remarkable example of **medieval land reclamation**. Originally a wetland, it was drained in the 13th century using a radial system of ditches converging at a central collection point. This ingenious hydraulic design transformed the area into fertile farmland and created a sunburst pattern which remains clearly visible today.



This false-colour image, acquired by one of the Copernicus Sentinel-2 satellites on 11 May 2024, shows the radial layout of the agricultural landscape surrounding the former wetland, intersected by canals and roads.

Open data from the Copernicus Sentinel satellites is key for monitoring land use change and agricultural productivity. This data helps track seasonal vegetation dynamics and support sustainable land and water management around the world.

Reference:

<https://www.copernicus.eu/en/media/image-day-gallery/etang-de-montady-southern-france>

News

A parade of volcanoes is erupting in Russia following an 8.8 earthquake

Perri Thaler, LiveScience

5 August 2025

Six Russian volcanoes erupted shortly after an 8.8 magnitude earthquake struck nearby, with a seventh possibly to follow.

Six volcanoes in far eastern Russia are now erupting following the 8.8 magnitude earthquake and aftershocks that shook the region last week.

Klyuchevskaya erupted first, on **July 30**. It had already shown signs of unrest before the earthquake, and experts deduced that the quake likely intensified the eruption but didn't trigger it. However, it's difficult to know the exact effect of the earthquake on the volcano. Eruptions of nearby volcanoes **Shiveluch**, **Bezymianny**, **Karymsky**, **Avachinsky** and **Krasheninnikov** soon followed and continue through today.

All of the volcanoes sit on the **Ring of Fire**, a geological feature notorious for volcanic and seismic activity.

The area around this parade of erupting volcanoes, called the **Kamchatka Peninsula**, is sparsely populated, so there doesn't seem to be an active threat to local communities. However, the eruptions could pose a risk to planes if they were to fly through ash plumes, Harold Tobin, a seismologist at the University of Washington, told **Live Science** in an email.

Despite the recent spate of eruptions, experts say this kind of volcanic activity is not out of the ordinary. "About 40 to 50 volcanoes are actively erupting around the world at any given time. Right now is no different" Tobin said. "Kamchatka is a very volcanically active region."

Were the eruptions caused by the earthquake?

There is no clear or singular way an earthquake can cause volcanic eruptions, but these two events can co-occur at subduction zones, areas where one tectonic plate dives beneath another.

"It is not unprecedented for a large subduction zone earthquake to trigger volcanic eruptions," Paul Segall, a geophysicist at Stanford University, told **Live Science** in an email.

The largest earthquake ever recorded — a magnitude 9.5 quake that struck Valdivia, Chile, in 1960 — was followed by several volcanic eruptions. "The earthquake changed the stress in [Earth's] crust, which may have made it easier for magma to rise to the surface," Segall said. The shaking of the ground by the earthquake also may have contributed to the eruptions by changing the movement of magma beneath Earth's surface.

Both these mechanisms could have played a role in the Chilean eruptions, but it's still too soon to characterize the recent Russian events, Segall said.

Klyuchevskoy was already showing signs of activity prior to the earthquake, but "it did likely increase in the vigour of the eruption, including some ash emission," a U.S. Geological Survey representative told **Live Science** on July 30.

The most notable aspect of this chain of events was the eruption of Krasheninnikov for the first time in about 500 years. "The timing is either a very strong coincidence, or its magma system was perturbed by strong seismic waves and triggered the eruption," Tobin explained. "It's very hard to determine which is true for a single given eruption."

Additionally, the Ministry of Emergency Situations of Russia for the Kamchatka Territory reported increased thermal activity of a seventh nearby volcano, Mutnovsky. Satellite images revealed a thermal anomaly at the volcano, which has yet to erupt, but scientists say they can't predict if or when it might blow.

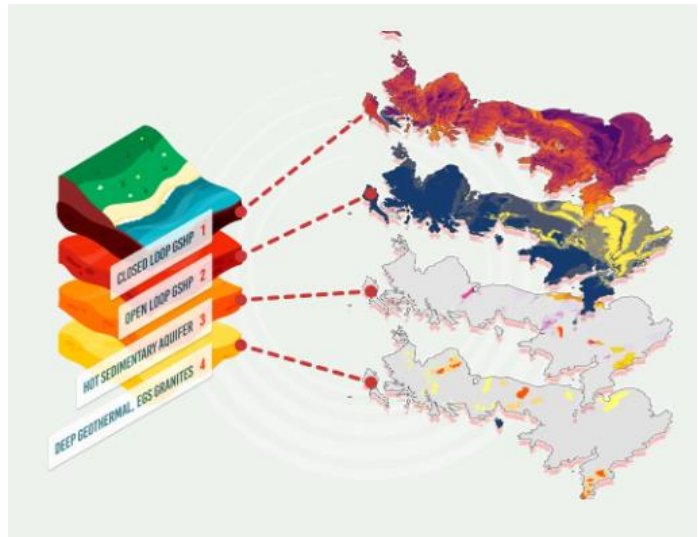
Reference:

https://www.livescience.com/planet-earth/volcanos/a-parade-of-volcanoes-is-erupting-in-russia-following-an-8-8-earthquake?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=A42C9C54-F7E7-4370-AD5E-FEC40AF31CD4&utm_source=SmartBrief

UK Geothermal platform

The Department for Energy Security & Net Zero (DESNZ)'s UK Geothermal Platform (UKGTP) is a freely available geothermal energy information hub. Summary layers provide a map overview of geothermal energy potential for four technologies, whilst a map explorer and a data access page enable you to view more detailed geoscientific datasets from several organisations. A user guide and examples are also provided.

Renewable geothermal and related underground thermal-energy storage technologies have the potential to decarbonise heating, cooling and energy storage across the UK as it moves towards net zero emissions. The potential varies, depending on the subsurface geology and type of technology. Some areas of the UK currently have potential for geothermal power and heat, and innovations being demonstrated globally are likely to broaden those areas.



Reference:

<https://ukgeothermalplatform.org/>

TV Review

Disaster at Sea: The Piper Alpha Story review – this oil rig horror is up there with Chernobyl

Shocking and superb, this documentary is packed with terrifying details of the notorious 1988 catastrophe, from the fire that could be seen from 120 miles away to the squashed tomatoes

Jack Seale, The Guardian

25 August 2025

On the evening of 6 July 1988, the Piper Alpha oil production platform in the North Sea suffered a catastrophic gas explosion, followed by a conflagration that destroyed the structure; **167 people were killed**, and almost all the physical evidence of what had occurred became charred debris, lost to the waves. After the disaster, a public inquiry struggled to form a complete picture of the event, for reasons that also make it a hard subject for documentary-makers.

Disaster at Sea: The Piper Alpha Story copes with the challenge superbly, leaning heavily on survivor testimony – 61 men escaped from the rig – and combining it with a simple 2D diagram of the platform's layout to give us the fullest picture possible. It doesn't have the special-effects budget that would be required to simulate the ferocity of the fire or the intensity of the thick, black smoke – possibly no amount of pyrotechnics or CGI would be able to do that anyway – so reconstructions of the disaster itself are kept to a minimum. Instead, the focus is on the verbal responses given by survivors to the

inquiry, which have been dramatised. It's excellent work by a cast of little-known actors, made all the more powerful by them using nothing but a chair, a table and the transcript.

Context is provided by archive newsreel, and by the wives and children of the men who were aboard Piper Alpha, who talk of families reluctantly adjusting to a life where the father/husband would be absent and hard to contact for a fortnight at a time. These were ordinary working people, carried out to sea by economic forces beyond their control: the daughter of one survivor explains how her dad ended up as an employee of the billion-dollar US oil company



Horror unfolds ... the Piper Alpha oil platform off the coast of Aberdeen, Scotland, where 167 men died in 1988. (Photograph: Dave Caulkin/AP)

Occidental after the Linwood car factory near Glasgow, a major Scottish employer, shut down in 1981.

As *Letter from America* by The Proclaimers plays in the background (with its lyrics of "Linwood no more ..."), we see Margaret Thatcher cosying up to flamboyant Occidental boss Armand Hammer, promising his lavish investment in Piper Alpha and other North Sea oil-production platforms and rigs would surely trickle down to benefit all. Another clip is a bewildering nugget from the pop culture of oil-rush Britain, taken from Shirley Bassey's eponymous 1976 BBC TV show: Bassey stands on a North Sea rig in hard hat and overalls, surrounded by men grappling with greasy drilling equipment, belting out Everything's Coming Up Roses.

Occidental's safety and maintenance procedures would later be gravely criticised by the inquiry, but the aftermath of the Piper Alpha calamity and the families' fight for justice is to come in two further episodes of Disaster at Sea. For now, we are in the "iron village" of the rig itself, as horror unfolds with extraordinary power and speed. For children of the 1980s, Piper Alpha is one of a handful of notorious disasters that punctuated the decade, alongside Chernobyl, Lockerbie and the Challenger space shuttle – in its mechanics, it's nearest to Chernobyl, as it begins with red lights blinking on a control panel, warning men who know their workplace is potentially lethal that something is slightly wrong. Before anyone has time to remedy the situation, something is terribly wrong.

Those statements from the inquiry tell a bleak story of men left helplessly confused by the enveloping smoke and by the lack of guidance. They relied on Piper Alpha's default safety protocol, which was to gather in the dining area at the top of the platform in the event of a fire: it was just beneath the helipad, from which airlifts to safety would be organised. But men towards the bottom of the structure immediately realised they couldn't climb upwards, and those who did make it to the dining room merely found themselves trapped in a dark room that rapidly became unbearably hot and smoky, and which didn't give them a view of the rest of the platform.

The programme highlights telling, horrifying and strange details, from the men in the dining room using squashed tomatoes to cool themselves since there was no water at hand, to the film-maker riding with RAF Search and Rescue who heard a pilot's transmission stating the fire was visible from 120 miles away. One Piper Alpha worker casually took a book with him as he evacuated, to read on

the rescue vessel he assumed would save him soon; minutes later, he was in a group that disagreed about which staircase to sprint down. The men who chose the wrong staircase died.

The shocking story is skilfully told by those unfussy dramatisations of the survivors' words, as the actors leave us in no doubt about how deeply traumatised the men were by their experience. A grim and difficult task is performed with care.

*The first part of the three-part series **Disaster at Sea: The Piper Alpha Story** aired on BBC Two and the whole series is available on iPlayer*

References:

<https://www.theguardian.com/tv-and-radio/2025/aug/25/disaster-at-sea-the-piper-alpha-story-review-this-oil-rig-horror-is-up-there-with-chornobyl#:~:text=The%20shocking%20story%20is%20skilfully,task%20is%20performed%20with%20care.>

<https://www.bbc.co.uk/news/articles/cjw69e0vv2zo>

News

Peeps into the Past: When mammoths roamed the Farnham countryside

Marcus McQuilton, Farnham Herald

6 September 2025

It was a quiet spring morning in 1980 when an ordinary day at a **Sand Quarry near Farnham** turned into history.

On Friday, May 18, **The Herald** reported what would become a remarkable archaeological discovery: Colin Jones' "mammoth" find.

Mr. Jones was operating his bulldozer at the Hall Aggregates site, digging through layers of gravel and topsoil, when his blade hit a strange layer of black clay.

He had no idea what lay beneath. That is, until he saw his manager, Raymond White from Talbot Road, Farnham, practically bouncing with excitement, waving frantically for him to stop.

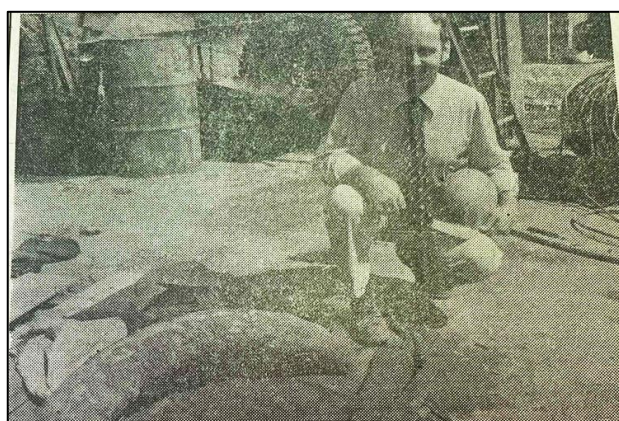
With a mix of awe and care, the two men took spades and began uncovering the tusk. It was enormous.

Once fully revealed, it took four men to carry it. They wrapped it in wet cloths and tarpaulins, shielding it from decay while awaiting the experts.

"We were uncovering sand, and this was about 15-feet down in black clay. It is pitch black, and it just seems to preserve everything in it," said



In 1980, a woolly mammoth tusk was found at a quarry near Farnham. (Wikipedia: Mammut)



The news report of Raymond White and his mammoth tusk find. (Herald archives)

Mr. White, reflecting on the moment decades later.

Experts confirmed what locals could scarcely imagine: woolly mammoths had roamed the fields of the Farnham and Alton area around 20,000 years ago.

"The bulldozer cleared the earth off the top, and a part was sticking up. We must have taken a bit off it, so it could have been even longer," Mr. White recalled. "We're always finding fossils here, and we've found about three of these, but they were broken up when the machines went over them, and we had no chance of saving them. We've found lots of fossils, cockles, and shell here, so there's ample evidence of the sea covering the land."

The tusk, damp and earthy, was carefully transported to Thorpe Park Leisure Centre, Egham, owned by Hall Aggregates, where it was preserved and displayed.

Reference:

<https://www.farnhamherald.com/news/nostalgia/peeps-into-the-past-when-mammoths-roamed-the-farnham-countryside-827238>

Life on Mars? 'Leopard-spot' rocks could be biggest clue yet

Rebecca Morelle, BBC Science editor

10 September 2025

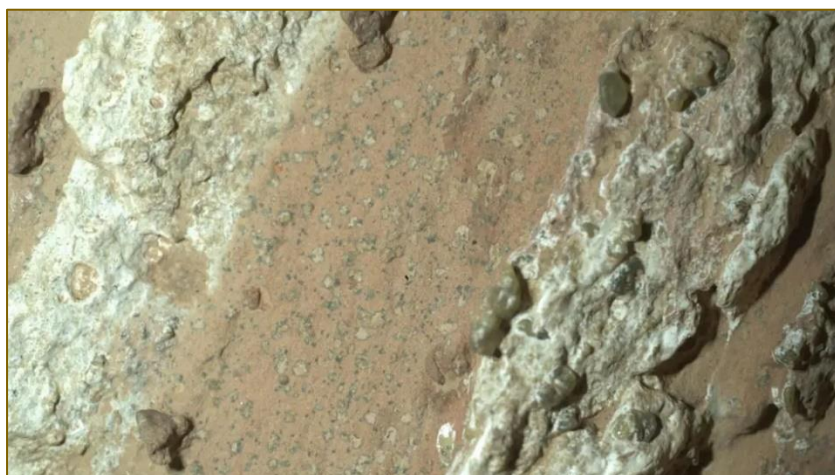


Image taken on the surface of Mars. It shows a large red grainy rock with unusual pale dots ringed with a black outline that look like leopard spots as well as small black dots that scientists have nick named poppy seeds. There are also pale white rocky outcrops. (Image source: NASA/JPL)

Unusual rocks discovered on Mars contain the most tantalising evidence yet of potential past life on the Red Planet.

The mudstones, found in a dusty riverbed by **Nasa's Perseverance Rover**, are dotted with intriguing markings nicknamed **leopard spots** and **poppy seeds**.

Scientists believe these features contain minerals produced by chemical reactions that could be associated with ancient Martian microbes.

It's possible the minerals were produced by natural geological processes, but at a press conference **Nasa said the features could be the clearest signs of life ever found**.

The findings are significant enough to meet Nasa's criteria for what it calls "potential biosignatures". This means that they warrant further investigation to determine whether they are biological in origin.

"We've not had something like this before, so I think that's the big deal," said Prof Sanjeev Gupta, a planetary scientist from Imperial College London and one of the authors of a study, external which has been published in the journal **Nature**.

"We have found features in the rocks that if you saw them on Earth could be explained by biology - by microbial process. So, we're not saying that we found life, but we're saying that it really gives us something to chase."

"It's like seeing a leftover fossil. Maybe it was a leftover meal, maybe that meal's been excreted and that's what we're seeing here," Dr. Nicola Fox, Nasa's Associate Administrator for the Science Mission Directorate, said in at the press conference.

Inside Mars' Jezero crater



Source: Aster Cowart/NASA/ESA

BBC

The only way to fully confirm if the minerals were made by microbes would be to bring the rocks back to Earth for analysis .

A Mars sample return mission has been proposed by Nasa and Esa, but its future looks highly uncertain. The US Space Agency's science budget is facing huge cuts that have been put forward in President Trump's 2026 budget, and a sample return mission is one of those facing cancellation.

Today, Mars is a cold and arid desert. But billions of years ago there is

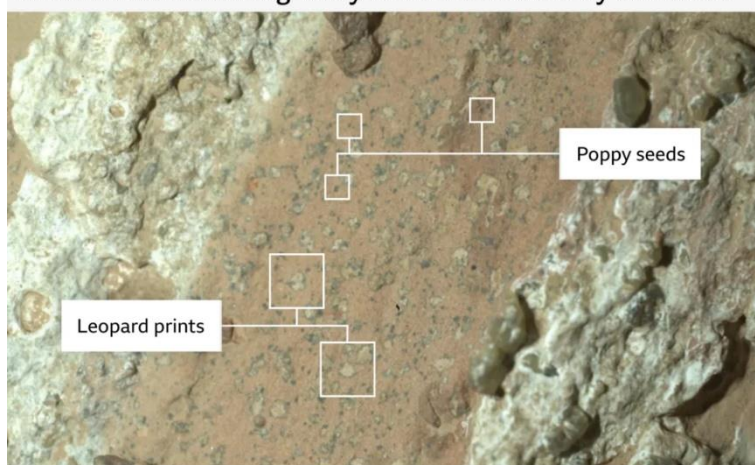
evidence that it had a thick atmosphere and water, making it a promising place to look for past life.

The Perseverance Rover, which touched down on the Martian surface in 2021, was sent to search for signs of biology. It has spent the last four years exploring a region called the Jezero Crater, which was once an ancient lake with a river flowing into it.

The rover found the leopard print rocks last year at the bottom of a canyon carved out by the river in an area called the Bright Angel Formation. They are about 3.5bn years old and are a type of rock called mudstone, which is fine-grained rock formed from clays.

"We kind of immediately knew there was some interesting chemistry that had happened in these rocks, so we were pretty excited right away," said Joel Hurowitz from Stony Brook University in New York, who is also a Perseverance mission scientist and lead author of the paper.

Mineral rock markings may have been made by microbes



Source: Nasa

BBC

The rover used several instruments in its onboard lab to analyse the minerals in the rocks. This data was then beamed back to Earth for scientists to study.

"We think what we've found is evidence for a set of chemical reactions that took place in the mud that was deposited at the bottom of a lake - and those chemical reactions seem to have taken place between the mud itself and organic matter - and those two ingredients reacted to form new minerals," explained Dr. Hurowitz.

In similar conditions on Earth, chemical reactions creating minerals are typically driven by microbes.

"That is one of the possible explanations for how these features came to be in these rocks," said Dr. Hurowitz. "This feels like the most compelling potential biosignature detection that we've had to date."

The scientists have also examined how the minerals could have formed without microbes - and concluded that natural geological processes could also be behind the chemical reactions.

However, they would require high temperatures, and the rocks don't look like they've been heated.

"We found some difficulties for the non-biological pathways - but we can't rule them out completely," Dr. Hurowitz said.

Perseverance has been collecting samples while it's been exploring Mars - including the rocks found at the Bright Angel Formation. They have been stored in canisters and will be deposited on the surface of Mars awaiting a mission that could return them.

Nasa's plans for such an endeavour hang in the balance because of the threatened budget cuts, but China is also pursuing a sample return mission that could launch in 2028.

While the decision is debated, scientists are desperate to get their gloved hands on the rocks.

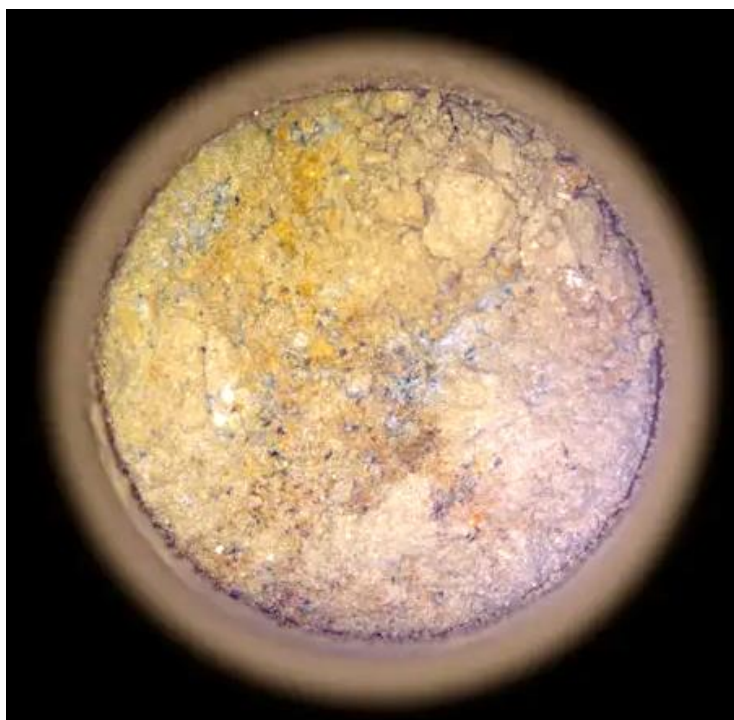
"We need to see these samples back on Earth," said Prof. Gupta. "I think for true confidence, most scientists would want to see and examine these rocks on Earth - this is one of our high priority samples to return."

Reference:

<https://www.bbc.co.uk/news/articles/cd725pj0g9ro>

https://www.livescience.com/space/mars/incredibly-exciting-nasa-claims-its-found-the-clearest-sign-yet-of-past-life-on-mars?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=4D7C622D-9686-4E29-AD01-DF8489AC6207&utm_source=SmartBrief

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Perseverance has collected samples of the intriguing rocks. (Image source: NASA/JPL)

New climate assessment for Jackdaw gas field

Kevin Keane, Environment, energy and rural affairs correspondent, BBC Scotland

3 September 2025

The oil company **Shell** has submitted a fresh environmental impact assessment for the controversial **Jackdaw gas field** in the North Sea. The company was forced to produce a new assessment after a successful legal challenge by the environmental group Greenpeace.

The courts ruled that emissions from burning the oil and gas must be considered by ministers when deciding whether to give projects the go-ahead. It means the consent previously granted was ruled unlawful.

The Jackdaw field – 150 miles east of Aberdeen – could account for **6% of the UK's projected gas production**. Construction is well underway for the production platform for the gas field. However, Shell has been told it cannot begin production until a fresh decision has been made by the UK government.

A Shell spokesman said: "We have submitted our response to the regulator's request for further information on Jackdaw, which includes the assessment of scope three emissions associated with the project. We remain committed to delivering Jackdaw, which is a nationally important project that is almost complete and would provide enough fuel to heat 1.4 million homes. North Sea projects like Jackdaw deliver energy to UK homes and industry with significantly less emissions than importing more gas from overseas."

'Climate damage'

Details of the new environmental impact assessment have not been released but are expected to be published by the UK government.



A map of the North Sea showing the Jackdaw and Rosebank fields relative to the mainland and other island groups.

The Department for Energy Security and Net Zero said it could not comment on individual projects.

Greenpeace says the public has a right to see the information being submitted to the regulator and that the government has a duty to take it into account.

The charity's senior climate campaigner Philip Evans added: "It's not surprising to see Shell doggedly pursue a new gas project that will boost their multi-billion-pound profits while fuelling more extreme weather and bringing no relief to bill payers. But we have won a decisive court ruling that forced Shell and other oil giants to come clean over the full scale of climate damage caused by new drilling projects in the North Sea."

The decision over whether to give the go ahead to the Jackdaw field, alongside Equinor's Rosebank oil development, will be the first to be taken since the court ruling.

Reference:

<https://www.bbc.co.uk/news/articles/c99g0vyrzml0>

New evidence proves North Sea asteroid impact

BBC

20 September 2025

Scientists have found proof that an asteroid hit the North Sea more than 43 million years ago causing a huge tsunami and leaving a 1.9 mile (3km) wide crater under the seabed.

The **Silverpit Crater** is around 80 miles (128 km) off the East Yorkshire coast and was discovered in 2002.

Since then, geologists have disagreed over how it was formed with some claiming it was caused by the movement of salt rock or the collapse of the seabed because of volcanic activity. Now a new study using seismic imaging and analysing rock samples indicates it was caused by a 535ft (160m) wide asteroid crashing into the Earth.

Dr. Uisdean Nicholson, associate professor at Edinburgh's Heriot-Watt University, said new technology had helped to solve the mystery of the crater's origins. He said the research team, funded by the Natural Environment Research Council, had recovered rare "shocked" quartz samples which settled the argument.

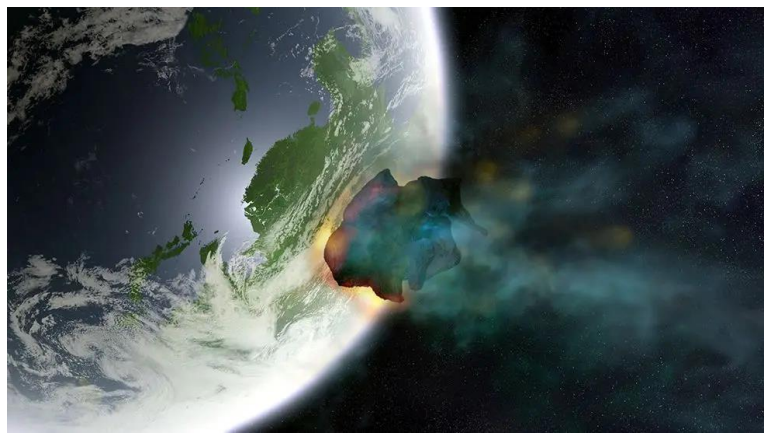
"We were exceptionally lucky to find these, a real needle-in-a-haystack effort," he said. "These prove the impact crater hypothesis beyond doubt, because they have a fabric that can only be created by extreme shock pressures."

Dr. Nicholson said the impact would have caused a 328ft (100m) high tsunami of water.

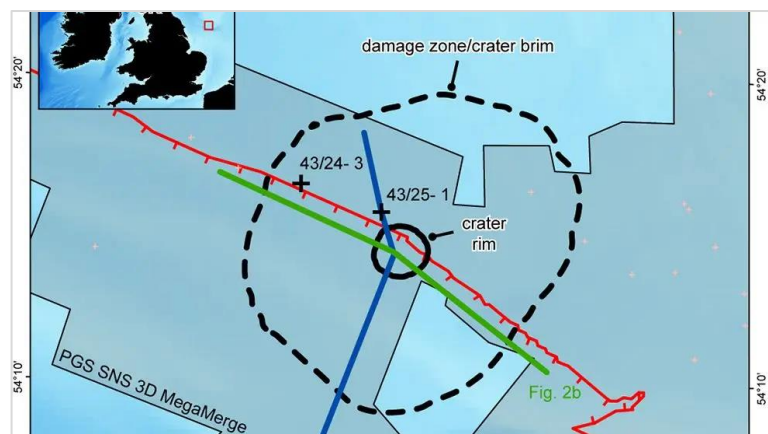
The crater lies under the current seabed and is not visible, so scanning equipment, which Dr. Nicholson described as "like ultrasound for the earth", was used to map it.

The professor said such craters were very rare with "around 200 confirmed impact craters exist on land and only about 33 have been identified beneath the ocean".

Other sites include the Chicxulub Crater in Mexico caused by an asteroid impact 66 million years ago that is believed to have led to the extinction of the dinosaurs.



The impact of the North Sea asteroid caused a 328ft (100m) high tsunami of water, geologists said. (Image: BBC)



The Silverpit Crater is located around 80 miles (128 km) off the East Yorkshire coast. (Image source: Heriot-Watt University)

"We can use these findings to understand how asteroid impacts shaped our planet throughout history," Dr. Nicholson said. "As well as predict what could happen should we have an asteroid collision in future."

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<https://www.bbc.co.uk/news/articles/c5yv3e7ql72o>

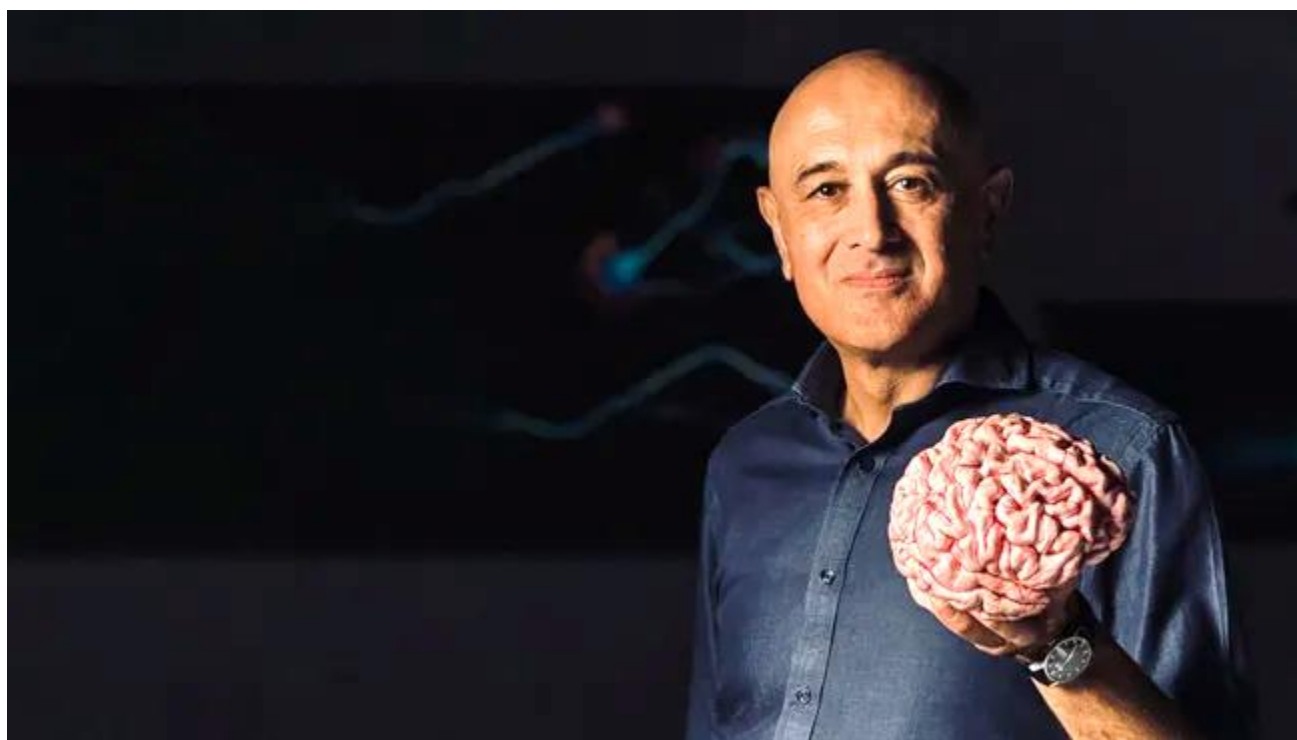
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TV

Jim Al-Khalili uncovers brain's secrets for BBC

29 September 2025



Jim Al-Khalili, professor of theoretical physics and chair in the public engagement in science at the University of Surrey, hosts a new show called "Secrets of the Brain," which traces the evolution of the brain from its earliest beginnings to the heads of modern humans. (Image credit: BBC/Furnace/Andy Jackson)

BBC Factual has announced a range of Science programming for BBC Two and iPlayer with Chris Packham confirmed to front new blue-chip series **Evolution** and **Horizon: Secrets of the Brain**.

Tom Coveney, Head of Commissioning, Science, says: "In a world where we're bombarded with non-stop news and social media awash with misinformation, good science programmes aren't just

important, they're a joyful inspiration. I'm continually amazed and delighted by the work of British scientists and their international colleagues in these programmes: whether studying the inner workings of our minds or exploring the origins and endless variety of life on Earth, there's something for everyone. It's thrilling to bring our viewers such a range of stories and specialisms, especially with this stellar line up of British presenters; some of the best science communicators on the planet."

Horizon: Secrets of the Brain

As we stand on the brink of the age of AI where technology might one day outstrip human intelligence, Professor Jim Al-Khalili unravels the mysteries of arguably the most complex object in the cosmos: the human brain. **Secrets of the Brain** is a groundbreaking 2×60' Horizon special that takes a deep dive into cutting edge neuroscience, as Jim explores the inner physics of the brain and how it has been shaped by the laws of nature.

From ancient marine animals to modern humans, **Secrets of the Brain** investigates **the evolution of the brain over hundreds of millions of years**. Our brains contain a remarkable story, forged in a cauldron of planetary catastrophes, epic conflicts, death, sex, kinship, and love. How did the physical conditions on planet Earth drive the evolution of this most remarkable of organs? That is the central question this series will try to answer.

Among many new discoveries, Jim will find out: how vicious prehistoric predators gave us "left and right brains"; how warm-bloodedness evolved and shaped the brain's ability to remember: crucial for finding food; how when worms huddle together, they use the same chemicals as we do when we fall in love; and how competition, friendship, nurturing, playfulness, song, and laughter helped evolve our brains.

Jim solves puzzles with chimpanzees, snorkels with sea anemones, undergoes state-of-the-art brain scans, and interviews leading experts—all to tell the story of how the brain evolved as never before.

Horizon: Secrets of the Brain, a 2×60' for **BBC Two** (Monday, 29 September and Monday, 6 October) and **iPlayer**, is made by Furnace TV, co-produced by The Open University.

Evolution

In 2023, Chris Packham told us the story of the planet we call home in **Earth** – one of the highest rating series on BBC Two that year. Now he's tackling an even more ambitious subject in a major new blue-chip science series: **Evolution**.

All the incredible diversity of animal life sprang from a single organism. Every animal, no matter how weird, is related to every other. And behind each species is an incredible story of the millions of generations that gave rise to it – every animal we know and love today sprang from creatures that looked nothing like it. In this landmark series Chris Packham is going to unravel five of these remarkable stories, to reveal how animal life became so diverse and beautiful and to discover the secrets of Evolution.

Each episode opens with an iconic animal, finely tuned through millions of generations of evolution. For example, the bat whose ultrasonic hearing makes it one of the deadliest hunters on the planet. Or the peacock, with its magnificent, feathered display, the spectacular pinnacle of sexual selection. Or the kangaroo, impressively leaping across the outback thanks to adaptations, not to its legs, but to its teeth.

To reveal the incredible forces that created these evolutionary phenomena, Chris will take viewers back in time into our planet's past, along the myriad branches of the tree of life. On the way, we'll also meet some of the bizarre creatures that died out: the crocodiles with hooves like horses, millipedes the size of cars, or bizarre sea creatures that were a cross between crabs and sharks. And we'll follow

the fingerprints that evolution has left on all life today, from the viruses that helped brains evolve, to the hiccups that are remnants of the first air breathing fish.

Thanks to the latest research, and advances in genetic analysis, each episode can now take us back further than ever before and tell these extraordinary stories in astonishing new detail. Cutting edge CGI will bring millions of years of evolution alive and reveal how it took a single spark of life and turned it into the interconnected web of ecosystems that cover our globe. We'll discover the moments when life hung in the balance and the extraordinary twists and turns along the way, when threats from climate change to invading species and global extinctions have put life on the line.

Evolution, a 5x60', is a BBC Studios Science Unit production, with NOVA and GBH for PBS and the BBC and co-produced by The Open University, **due for release in 2026**.

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Human

In this new series, paleoanthropologist **Ella Al-Shamahi** reveals humanity's incredible story across 300,000 years of human evolution and how – thanks to new discoveries – we're learning that the story is stranger and more surprising than we ever imagined. When Homo sapiens emerged in Africa we were not alone: there were at least six other human species alive at the time. Human examines how we went from being just one of many types of human to the dominant form of life on the planet.

Reference:

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News

Gigantic dinosaur with 'claws like hedge trimmers' found with croc leg still in its jaws in Argentina

Chris Simms, LiveScience

23 September 2025

As suggested by Peter Crow.

Speedy megaraptor
Joaquinraptor casali had big arms and claws like hedge trimmers that would have made T. rex's forelimbs look puny.

There is a new dinosaur king of South America. This newly discovered top predator, named **Joaquinraptor casali**, was some 23 feet (7 metres) long and was a fast-moving hunter with powerful "claws like hedge trimmers." And the massive beast's remains were found with the leg bone of an ancient crocodile relative locked in its jaws.



Artist impression of *Joaquinraptor casali*, a newly-discovered megaraptor from Argentina. (Image credit: Andrew McAfee, Carnegie Museum of Natural History.)

Lead author Lucio Ibáñez, a palaeontologist at CONICET's Patagonian Institute of Geology and Paleontology in Chubut, Argentina, and his colleagues unearthed the well-preserved fossil — including much of the skull, ribs, vertebrae and fore and hind-limbs — from the Lago Colhué Huapi Formation of south-central Chubut Province in central Patagonia, Argentina.

J. casali was a type of theropod dinosaur known as a megaraptor or "large thief," that lived in the final stages of the Cretaceous period between about 70 million and 66 million years ago, before the Chicxulub asteroid slammed into the Yucatán Peninsula causing the Cretaceous–Paleogene extinction event that spelled the end for dinosaurs (except for some birds).

The megaraptors, which lived across South America, Asia and Australia, were carnivores with elongated skulls, powerful arms and big claws.

"*Joaquinraptor* provides a clearer understanding of how this enigmatic group of predatory dinosaurs lived and evolved," Darla Zelenitsky, a palaeontologist at the University of Calgary in Canada who wasn't involved in the work, told **Live Science**. "Deemed the latest surviving megaraptoran, this fossil provides insight into the final phase of their evolutionary history in South America prior to the mass extinction."

The discovery reveals that megaraptorans (any dinosaur belonging to the Megaraptora clade, which includes megaraptors) stayed relatively large until the end of the Cretaceous, likely filling the apex predator niche in the region of southern Patagonia at that time, she said.

The lands where *Joaquinraptor* roamed were very different from the cool, dry Patagonian climate of today, though. Sediment from the same layer as the fossil find reveals that it was probably a warm, humid floodplain near the sea.

Ibáñez told **Live Science** that the first hints of the fossil were uncovered in 2019, but it took three field seasons to fully unearth it. When they finally excavated the fossil, the researchers discovered the leg bone of a crocodile relative in *Joaquinraptor*'s jaws, hinting at its diet and that it was likely the top predator in the area.

The researchers then analysed the histology, or microstructure, of a tibia and rib bone to work out how old the specimen was when it died.

"We know based on histology that this was a sexually mature individual, but it might have been able to grow a little bit more. We know that when it died, it was at least 19 years old," Ibáñez said.

Bone measurements also led the researchers to estimate that *Joaquinraptor* would have been about 23 feet long and weighed more than 2,200 pounds (1,000 kilograms). The find is described in a paper published Tuesday (Sept. 23) in the journal **Nature Communications**.

"This is a fantastic discovery and one of the most intriguing new dinosaur discoveries in recent memory," Steve Brusatte, a palaeontologist at the University of Edinburgh, Scotland who wasn't



The thumb claw of Joaquinraptor. Researchers describe the dinosaur's claws as being like "hedge trimmers." (Image credit: Matt Lamanna)

involved in the study, told **Live Science**. "It was dinosaurs like these that topped the southern food chain at the same time that Tyrannosaurus rex was reigning supreme in North America."

Brusatte said the two predators were drastically different, though. "*Joaquinraptor* was slender and svelte and fast, and it had ridiculously oversized arms and claws, like hedge trimmers. Its arms and hands make *T. rex* look puny by comparison, Arnold Schwarzenegger vs Danny DeVito, at least in the arms category" he said.

These differences would have meant the two apex predators would have hunted very distinctly, Zelenitsky said. "At more than four times the weight of *Joaquinraptor*, *T. rex* was a brute force predator — massive, with a bone-crushing bite. But *Joaquinraptor* was swift, slender and attacked with surgical precision. It would have delivered slashing bites and had long arms with big claws for grabbing, slashing and manipulating prey," she said.

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New study adds to the possibility of favourable conditions for life at Saturn's moon Enceladus

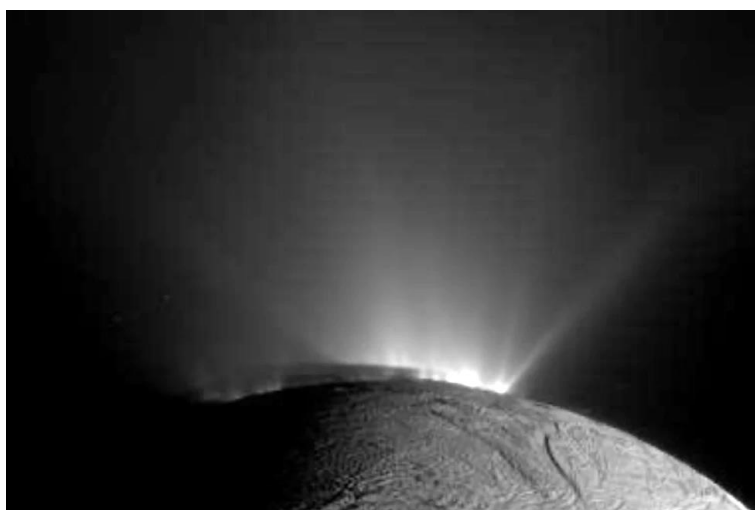
Marcia Dunn, AP News

1 October 2025

As suggested by Peter Crow.

CAPE CANAVERAL, Fla. (AP) — Scientists have uncovered new types of organics in icy geysers spouting from Saturn's moon Enceladus, bolstering the likelihood that the ocean world may harbour conditions suitable for life.

Their findings, reported Wednesday, are based on observations made by NASA's Cassini spacecraft in 2008 during a close and fast flyby of Enceladus. The small moon, one of 274 orbiting Saturn, has long been considered a prime candidate in the search for life beyond Earth because of its hidden ocean and plumes of water erupting from cracks near its south pole.



In this image provided by NASA, NASA's Cassini spacecraft captured this image of Enceladus on Nov. 30, 2010, with the shadow of the body of Enceladus on the lower portions of the jets is clearly visible. (NASA/JPL-Caltech/Space Science Institute via AP)

While Enceladus may be habitable, no one is suggesting that life exists.

"Being habitable and being inhabited are two very different things. We believe that Enceladus is habitable, but we do not know if life is indeed present," said the University of Washington's Fabian Klenner, who took part in the study.

An international team decided to launch a fresh analysis of tiny grains of ice encountered as Cassini flew through the moon's geysers. The grains were young compared with the much older geyser particles that ended up in one of Saturn's outermost rings.

These new grains collided with Cassini's cosmic dust analyser at 40,000 mph (64,800 kph), faster than the old ones. The increased speed provided a clearer view of the chemical compounds present, the scientists noted.

Organic molecules already had been spotted in the old geyser grains, but their age raised questions as to whether they had been altered over the years by space radiation.

Scientists found some of the same molecules in the fresh grains, confirming they came from the moon's underground sea, as well as new chemical compounds. The findings were published in ***Nature Astronomy***.

An ice-encapsulated water world barely 310 miles (500 kilometres) across with a rocky core, Enceladus is suspected of having hydrothermal vents on its ocean floor, quite possibly like those in the Arctic. The moon's jets of water vapor and frozen particles can stretch thousands of miles (kilometres) into space.

"We are confident that these molecules originate from the subsurface ocean of Enceladus, enhancing its habitability potential," the Free University of Berlin's Nozair Khawaja, the lead author, said in an email.

The scientists favour new missions to further explore Enceladus. Launched in 1997, Cassini is long gone; the spacecraft was deliberately plunged into Saturn in 2017 following its joint mission by NASA, the European Space Agency and the Italian Space Agency.

"Having a variety of organic compounds on an extraterrestrial water world is simply phenomenal," Klenner said in an email.

The European Space Agency is in the early planning stages of a mission to land on Enceladus decades from now. China also has proposed a landing mission.

NASA has a spacecraft en route to another enticing target to hunt for the ingredients of life: Jupiter's moon Europa. The **Europa Clipper** is expected to begin orbiting Jupiter in 2030 with dozens of Europa flybys. ESA also has a spacecraft, **Juice**, that's headed to Jupiter to explore Europa and two other icy moons that could hold buried oceans.

Underground oceans on moons "are perhaps the best candidates for the emergence of extraterrestrial life in our solar system. This work only confirms the need for further studies," said University of Kent physics professor Nigel Mason, who was not involved in the latest findings.

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Image Of The Day 5

The Richat Structure, Mauritania

Date: 4/10/2025

Credit: European Union, Copernicus Sentinel-2 imagery

The Richat Structure, a striking circular geological formation in the Sahara Desert of central Mauritania, is among the most distinctive landforms visible from space. Measuring around 40

kilometres in diameter, this feature, also known as the “Eye of the Sahara”, consists of concentric rings of exposed sedimentary rock. Once believed to be an impact crater, it is now recognised as a deeply eroded geological dome shaped by uplift and prolonged erosion over millions of years.

The Copernicus Sentinel satellites play a key role in monitoring remote regions worldwide by delivering essential

data about their conditions. This information is essential for tracking changes in these areas and studying geological processes.

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<https://www.copernicus.eu/en/media/image-day-gallery/richat-structure-mauritania>



The Richat Structure is visible in this Copernicus Sentinel-2 image acquired on 27 September 2025.

News

Bethan's Rock: Beloved exhibit returns to museum

By **Indy Almroth-Wright, BBC South of England & Steve Harris, BBC Radio Solent**

8 October 2025

When Poole Museum reopens visitors will once again be able to see Bethan's Rock - a treasured stone donated by a five-year-old girl - alongside its other artefacts. The rock became a popular exhibit after the museum placed it in a glass case, complete with its own "**Bethan's Rock – 2019,**" label. Bethan, now 11, said it was given to her by her late grandmother, "who was the one who found that rock... it's really special to me because of her".

The museum's curator Gary Edwards said: "Treasures don't have to be rare, they don't have to be significant to everybody it's about the deeper meaning connected to those objects."

Visiting the museum to see her rock in its new spot, Bethan described the day six years ago when she visited the museum with her mum. "I had brought my rock with me, so I thought I'd donate it as I thought it was special," she said. "So, I went up to the desk on the way out and gave it to them." She said her mum told the museum staff: "'You don't have to do anything with it... just smile and wave' but then a few weeks later we saw it on display."

The rock and its story captured the imaginations of visitors and people on social media sites after photos were shared of the humble little rock on display.

The museum said Bethan's selfless gesture "had made a lasting impact on our museum".

Its curator Gary Edwards said: "Bethan's Rock is one of those items that really highlights that museums are about people. People's stories and treasures don't have to be rare, they don't have to be significant to everybody it's about the deeper meaning connected to those objects. Bethan's act of kindness has touched the hearts of people all over the world and it emphasises that essence of curiosity that makes museums what they are."



The unassuming rock has become one of the museum's highlights. (BBC)

Poole Museum, in the Lower High Street in the Old Town area of Poole, is currently reopening in phases and is due to open fully after its £10m revamp in the coming weeks.

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New species of Jurassic 'sword dragon' could help solve an evolutionary mystery

Skyler Ware, LiveScience

10 October 2025

The newly discovered ichthyosaur dubbed *Xiphodracon goldencapsis* was about 10 feet long and had a sword-shaped snout.

As mentioned by Alison Ure.

A nearly complete fossil skeleton found on the U.K.'s Jurassic Coast represents a newly identified species of ancient marine reptile that lived alongside dinosaurs.

The ichthyosaur, dubbed *Xiphodracon goldencapsis*, was likely around 10 feet (3 meters) long when it lived, according to a study published Friday (Oct. 10) in the journal ***Papers in Palaeontology***. It had large eye sockets and a long, narrow snout shaped like a sword.

The specimen dates to a period in the Early Jurassic known as the Pliensbachian, which lasted from about 193 million to 184 million years ago. By studying an ichthyosaur fossil from this period, scientists could learn more about a critical point in these aquatic animals' evolution, according to the study.

Fossil collector Chris Moore found the remains in 2001 along the Jurassic Coast, a 96-mile (154 kilometres) stretch of seaboard in Dorset known for being a treasure trove of fossils. Moore sold the fossil to the Royal Ontario Museum in Canada shortly thereafter. Although it was identified as an ichthyosaur, it wasn't studied in detail until recently.

"I remember seeing the skeleton for the first time in 2016," study co-author Dean Lomax, a palaeontologist at the University of Manchester and the University of Bristol, said in a statement.

"Back then, I knew it was unusual, but I did not expect it to play such a pivotal role in helping to fill a gap in our understanding of a complex faunal turnover during the Pliensbachian."

The new genus name, *Xiphodracon*, comes from the Greek words "xiphos," meaning sword, and "dracon," meaning dragon — a reference to ichthyosaurs' "sea dragons" nickname. Its species name, "goldencapsis," comes from Golden Cap, the site on the Jurassic Coast where the ichthyosaur was found.

The fossil also hints at how the individual ichthyosaur lived and died.

"The limb bones and teeth are malformed in such a way that points to serious injury or disease while the animal was still alive, and the skull appears to have been bitten by a large predator — likely another much larger species of ichthyosaur — giving us a cause of



The ichthyosaur fossil was discovered in 2001 but has only recently been studied. (Image credit: Dean Lomax, Judy Massare, and Erin Maxwell)



The ichthyosaur appears to have suffered a bite wound to the head by a larger predator and had malformed bones and teeth indicating serious injury or disease. (Image credit: Dean Lomax, Judy Massare, and Erin Maxwell)

death for this individual," study co-author Erin Maxwell, curator of fossil aquatic vertebrates at the State Museum of Natural History Stuttgart in Germany, said in the statement. "Life in the Mesozoic oceans was a dangerous prospect."

X. goldencapsis could also help to clarify a major shift in ichthyosaur speciation in the early Jurassic. Although scientists have found many ichthyosaur fossils from before and after the Pliensbachian, the two groups have very few species in common, suggesting a major turnover sometime during the Pliensbachian. In fact, ichthyosaur fossils from the Pliensbachian period are rare.

The newly discovered ichthyosaur "is more closely related to species in the later Early Jurassic ... and its discovery helps pinpoint when the faunal turnover occurred, being much earlier than expected," Lomax said. In other words, the shift likely occurred in the early Pliensbachian. However, scientists don't yet know what caused this upheaval.

For now, the *X. goldencapsis* fossil will be displayed at the Royal Ontario Museum.

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Papers in Palaeontology, Volume 11, Issue 5.

First published: 09 October 2025

A new long and narrow-snouted ichthyosaur illuminates a complex faunal turnover during an undersampled Early Jurassic (Pliensbachian) interval

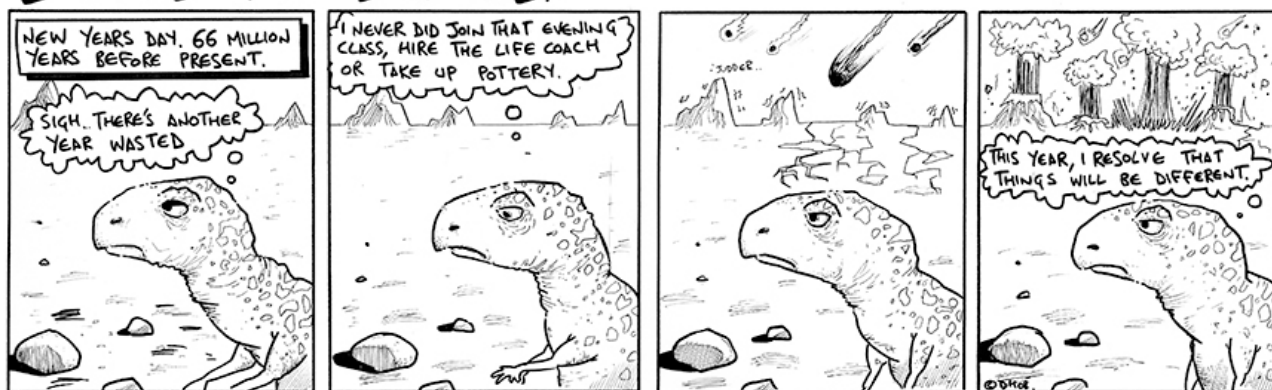
Dean R. Lomax, Judy A. Massare, Erin E. Maxwell

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And Finally

As suggested by Janet Catchpole.

STICKS AND STONES



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Further Reading



These rocks are probably the last remains of Earth's early crust

James Dinneen, New Scientist

26 June 2025



Geologists have long debated whether a stony formation in Canada contains the world's oldest rocks – new measurements make a compelling case that it does.

<https://www.newscientist.com/article/2485959-these-rocks-are-probably-the-last-remains-of-earths-early-crust/>

Fossilised tree in park stumps experts

BBC

21 July 2025

"It is just possible that it was nibbled off by a dinosaur"

<https://www.bbc.co.uk/news/articles/c0epjn88n1po>

Bite marks reveal giant terror birds were potentially prey for another apex predator — humongous caiman

Patrick Pester, LiveScience

23 July 2025

Researchers have found evidence of a titanic tussle between a terror bird and a large caiman in Colombia's ancient La Venta wetlands.

https://www.livescience.com/animals/extinct-species/bite-marks-reveal-giant-terror-birds-were-potentially-prey-for-another-apex-predator-humongous-caiman?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=A3F48E1E-D605-4E26-A051-E4ED3871755B&utm_source=SmartBrief

Mars rock found in Niger sells for millions in New York - now the country wants answers



The Martian meteorite found in Niger went on display in New York before it was auctioned. (Image source, EPA)

Damian Zane, BBC News 10 August 2025

<https://www.bbc.co.uk/news/articles/cly3q635n4no>

'Devil Comet' contains 'strongest evidence yet' that comets delivered water to Earth

Stefanie Waldek, Space.com

19 August 2025



Water found on Comet 12P/Pons-Brooks is "virtually indistinguishable" from water found on Earth.

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After Mount Vesuvius erupted, Romans returned to Pompeii and stayed for 400 years — but it was likely anarchy

Sascha Pare, LiveScience 9 August 2025

New excavations in Pompeii's Insula Meridionalis quarter have confirmed long-held suspicions that people returned to the ancient Roman city after the volcanic eruption in A.D. 79.



Evidence from Insula Meridionalis (pictured) suggests people returned to Pompeii after Mount Vesuvius' eruption. (Image credit: Archaeological Park of Pompeii)

https://www.livescience.com/archaeology/romans/after-mount-vesuvius-erupted-romans-returned-to-pompeii-and-stayed-for-400-years-but-it-was-likely-anarchy?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=7D82C9E1-401A-4F1A-A3BE-DB775F9C702E&utm_source=SmartBrief

**Is your region susceptible?
Britain's geohazard hotspots
revealed**

From sinkholes to radon: new maps highlight the most geologically at-risk regions

BGS Press

14 August 2025

Scientists at the British Geological Survey (BGS) have published **UK regional hazard maps** revealing the most susceptible local authority regions around the country. The maps provide regional decision makers with an overview of the relevant hazards in their local area and provide an important indication of where more detailed hazard data may be required.

The analysis considers the occurrence of eight key geohazards relating to natural subsidence, the presence of the ground-gas radon, and the possibility of legacy mining in an area (excluding coal).

https://www.bgs.ac.uk/news/is-your-region-susceptible-britains-geohazard-hotspots-revealed/?fbclid=IwY2xjawMuUQ9leHRuA2FlbQlxMABicmlkETBFTThhEcFZYRmlyZjdIOWpLAR7sMzJR1Skr27pf0TQlwCVZoy1KOOXocgJHfZtBOh7YY9FROumYJMTCKw9pFg_aem_8pMkcbj5eO3IMXmcPIWvnA



17 August 2025

Cees Van Staal on the Origin of the Appalachians

In his podcast episode, Rob Strachan described how a single extended orogeny, the Caledonian orogeny, formed rocks now in the northern British Isles, eastern Greenland, and western Norway. In this episode, Cees Van Staal explains how the Appalachian Mountains are also part of this same story, even though they now lie across the Atlantic ocean. These mountains stretch for over 2,000 miles, all the way from Newfoundland in Canada to central Alabama in the United States.

Van Staal has been studying the Appalachians for over 35 years, focusing especially on the large-scale tectonics of their formation. He is Emeritus scientist at the Geological Survey of Canada and an Adjunct/Research Professor in the Department of Earth and Environmental Sciences at the University of Waterloo in Ontario.

<https://www.geologybites.com/cees-van-staal>

17 September 2025

Claudio Faccenna on the Dynamics of Subduction Zones

Subduction zones can be very long-lived, persisting for tens or even hundreds of millions of years. During that time, they rarely stay still, but instead retreat, advance, move laterally, or reverse direction. In the podcast, Claudio Faccenna discusses the processes that govern these movements. It turns out that they depend not only on the properties of the subducting slab, but also on the environment, including the proximity of other subduction zones.

Faccenna has been studying how convergent margins evolve for over 30 years, concentrating particularly on the Mediterranean region. He is Head of the lithospheric dynamics section at the Helmholtz Centre for Geosciences at GFZ in Potsdam in Germany and also a Professor at the Department of Science at Roma Tre University.

<https://www.geologybites.com/claudio-faccenna>

6 October 2025

Jiří Žák on the Orogenies that Shaped Central Europe

Jiří Žák describes the two main orogenies whose remnants figure prominently in central European geology. First, the Cadomian orogeny that lasted from the late Neoproterozoic to the early Cambrian and took place on the northern margins of Gondwana, only later to rift and travel north to form what was to become Europe. And second, the Variscan orogeny that occurred in the late Palaeozoic and accompanied the collision of Gondwana with Laurussia in the final stages of the assembly of the supercontinent Pangea.

Žák has been studying the geology of central Europe for over 25 years using methods ranging from structural studies in the field to detrital zircon geochronology. He is a Professor in the Institute of Geology and Paleontology at Charles University in Prague.

<https://www.geologybites.com/jiri-zak>

“Bizarre” armoured dinosaur, *Spicomellus afer*, had spikes sticking out from its neck, fossils show

University of Birmingham 27 August 2025

Newly discovered fossils reveal that *Spicomellus afer*'s skeleton was covered in spikes, some fused to the animal's

skeleton, measuring as much as a metre long.



<https://www.birmingham.ac.uk/news/2025/biz-arre-armoured-dinosaur-spicomellus-afer-had-spikes-sticking-out-from-its-neck-fossils-show>

Seismic evidence for oceanic plate delamination offshore Southwest Iberia

Nature Geoscience (2025) 27 August 2025

Subduction of oceanic lithosphere and delamination of continental lithosphere constitute the two predominant mechanisms by which the Earth's surface is recycled into the mantle. Continental plate delamination typically occurs in collisional orogens by the separation of the lithospheric mantle from the overlying lighter crust, aided by weak layers within continental lithosphere. By contrast, oceanic lithosphere is generally considered to be sufficiently rigid to inhibit delamination. Here it is shown from seismic imaging and numerical simulations that delamination of oceanic lithosphere is occurring offshore Southwest Iberia. Specifically, seismic tomography reveals a high-velocity anomaly that is interpreted as a delaminating block of old oceanic lithosphere, a process that is reproduced with numerical simulations. It is proposed that this process was triggered by plate convergence and assisted by a thick serpentinized layer that allows the lithospheric mantle to decouple from the overlying crust. It is suggested that such oceanic delamination may facilitate subduction initiation, a long-

unsolved problem in the theory of plate tectonics and may be responsible for some of the highest-magnitude earthquakes in Europe, including the M8.5–8.7 Great Lisbon Earthquake of 1755 and the M7.9 San Vicente Earthquake of 1969.

<https://www.nature.com/articles/s41561-025-01781-6>

70-million-year-old hypercarnivore that ate dinosaurs named after Egyptian god

Patrick Pester, LiveScience

28 August 2025



Researchers have unveiled Kostensuchus atrox, a giant crocodile relative that ate dinosaurs in Argentina 70 million years ago during the Cretaceous period.

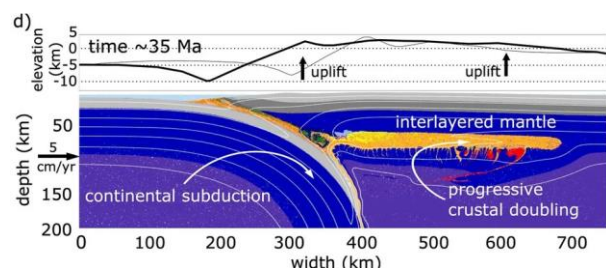
https://www.livescience.com/animals/70-million-year-old-hypercarnivore-that-ate-dinosaurs-named-after-egyptian-god?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=ED25DD65-7EAF-46DC-861D-CE9E2A6FA4AF&utm_source=SmartBrief

The geology that holds up the Himalayas is not what we thought, scientists discover

Sascha Pare, LiveScience 30 August 2025

A 100-year-old theory explaining how Asia can carry the huge weight of the Himalayas

and Tibetan Plateau needs to be rewritten, a new study suggests.



A diagram from the study shows how blobs of the Indian crust rose & attached to the bottom of the lithosphere after the Asian & Indian continents collided. In dark blue we see the upper mantle, & in orange, the partially molten Indian crust. (Image credit: Sternai et al. 2025, *Tectonics*. Redistributed under Creative Commons licence CC BY 4.0.)

https://www.livescience.com/planet-earth/geology/the-geology-that-holds-up-the-himalayas-is-not-what-we-thought-scientists-discover?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=2126AC1F-6905-4051-B528-73DF6DBF3CA7&utm_source=SmartBrief

Afghanistan earthquake: Taliban appeal for aid as death toll rises to 900

Hannah Ellis-Petersen & Haroon Janjua,
The Guardian 2 September 2025

Rescuers search into the night for people trapped under debris of mud and stone homes in steep valleys

<https://www.theguardian.com/world/2025/sep/02/afghanistan-earthquake-taliban-appeals-for-international-aid-as-rescue-teams-search-for-survivors>

<https://www.bbc.co.uk/news/articles/cpqvqeg3nz5o>

<https://www.bbc.com/pidgin/articles/c1l84v4vr1do>

Oil and gas imports are a problem. Labour should rethink its North Sea stance

Nils Pratley, *The Guardian*

2 September 2025

Rachel Reeves could make geopolitical, economic and environmental case for limited boost in production

<https://www.theguardian.com/business/nils-pratley-on-finance/2025/sep/02/oil-and-gas-imports-are-a-problem-labour-should-rethink-its-north-sea-stance>

A massive eruption 74,000 years ago affected the whole planet – archaeologists use volcanic glass to figure out how people survived

Jayde N. Hirniak, *Space.com*

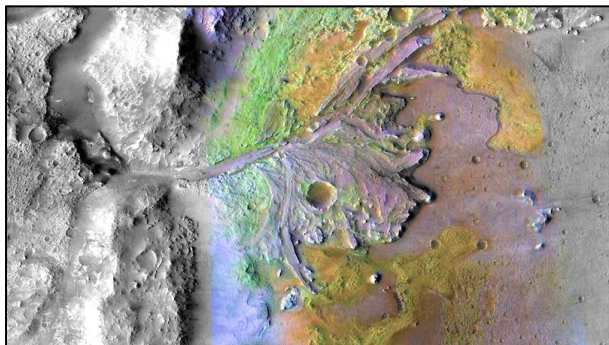
20 September 2025

If you were lucky 74,000 years ago, you would have survived the Toba supereruption, one of the largest catastrophic events that Earth has seen in the past 2.5 million years.

https://www.space.com/astronomy/earth/a-massive-eruption-74-000-years-ago-affected-the-whole-planet-archaeologists-use-volcanic-glass-to-figure-out-how-people-survived?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=58E4DE65-C57F-4CD3-9A5A-609994E2C5A9&utm_medium=email&utm_content=C607FE39-A3A3-457D-8F3C-3522855449C1&utm_source=SmartBrief

New research shows Mars' Jezero crater was repeatedly habitable

Paul Scott Anderson, *EarthSky.org*
26 September 2025



- **Jezero crater was once a lake billions of years ago.** And it's where the Perseverance rover landed in 2021. Was this area habitable?
- **The crater experienced multiple periods of habitability over time,** new research shows.
- **Water in the crater shifted** from acidic and hot early on, to cool and easily habitable later on.

<https://earthsky.org/space/jezero-crater-mars-perseverance-rover-astrobiology/>

Mysterious crown-like features on Venus may finally have an explanation

Victoria Corless, *Space.com*
29 September 2025

Scientists have proposed a new explanation for Venus' giant, crown-shaped geological features, known as coronae.

The mystery behind Venus' giant, crown-shaped geological features, known as coronae, may finally have an explanation: A "glass ceiling" in Venus' mantle is trapping heat and driving slow, shifting currents that might lead to the formation of the crown-like surface features, scientists propose in a new study.

<https://www.space.com/astronomy/venus/mysterious-crown-like-features-on-venus-may->

[finally-have-an-explanation?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=58E4DE65-C57F-4CD3-9A5A-609994E2C5A9&utm_medium=email&utm_content=63A439C4-23C9-466D-929C-7E2F45BBFF6A&utm_source=SmartBrief](https://www.iris.vanilla.tools/template/html/3431)

Shell starts up Victory gas field, delivering North Sea gas to the UK

Shell 30 September 2025

Shell U.K. Limited (Shell UK) has started production from the **Victory gas field** in the UK North Sea, approximately 47 km north-west of the Shetland Islands (Shell 100% owner and operator). The field will help to maintain domestically produced gas for Britain's homes, businesses and power generation.

<https://www.shell.co.uk/about-us/news-and-publications/media-releases/2025-media-releases/victory-gas-starts-up.html>

<https://ogv.energy/news-item/shell-starts-production-from-victory-gas-field-in-north-sea/>

<https://www.worldoil.com/news/2025/10/1/shell-brings-first-gas-from-victory-field-in-uk-north-sea-partnering-with-nsmg-on-delivery/>

As suggested by Peter Crow.

The Moon is rusting

The Week: Morning Report
30 September 2025

Like pipes, statues and nails, the Moon can rust. Such rusting has occurred despite a seeming lack of necessary components – but all signs of blame point to the Earth. A new study published in the journal **Geophysical Research Letters** posits that the relevant rust-forming particles are coming from the Earth's atmosphere during a short period in the lunar cycle.

<https://iris.vanilla.tools/template/html/3431>

Iran among 'world's most extreme subsidence hotspots' with some areas sinking up to 1 foot per year, study finds

Chris Simms, LiveScience

30 September 2025

The extraction of water from aquifers in Iran is causing an area the size of Maryland to sink, exposing an estimated 650,000 people to the risks of subsidence and freshwater depletion.

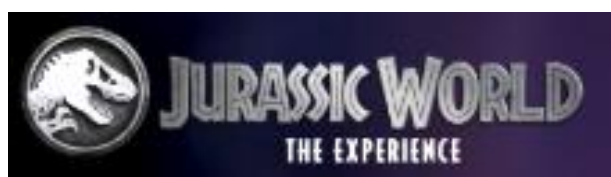
https://www.livescience.com/planet-earth/iran-among-worlds-most-extreme-subsidence-hotspots-with-some-areas-sinking-up-to-1-foot-per-year-study-finds?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=9E99E558-7E47-45A3-A7DD-C499F45F025F&utm_source=SmartBrief

Scientists Discover a 70-Million-Year-Old Dinosaur Fossilized Egg With a Perfectly Preserved Embryo Inside

A mysterious fossilized egg sat unnoticed for years in a Chinese museum—until a crack revealed something astonishing inside.

Arezki Amiri, Daily Galaxy October 7, 2025

<https://dailygalaxy.com/2025/10/scientists-discover-a-70-million-year-old-dinosaur-fossilized-egg-with-a-perfectly-preserved-embryo-inside/>



THE CLOSEST YOU'LL EVER COME TO LIVING DINOSAURS

EXTENDED DUE TO POPULAR DEMAND. SEASON MUST CLOSE SUNDAY 4 JAN 2026

NEON at Battersea Power Station



AN EXCITING ADVENTURE AWAITS!

Step through the iconic Jurassic World gates and begin an unforgettable journey across 10 immersive zones that brings to life one of the biggest blockbuster franchises in cinema history.

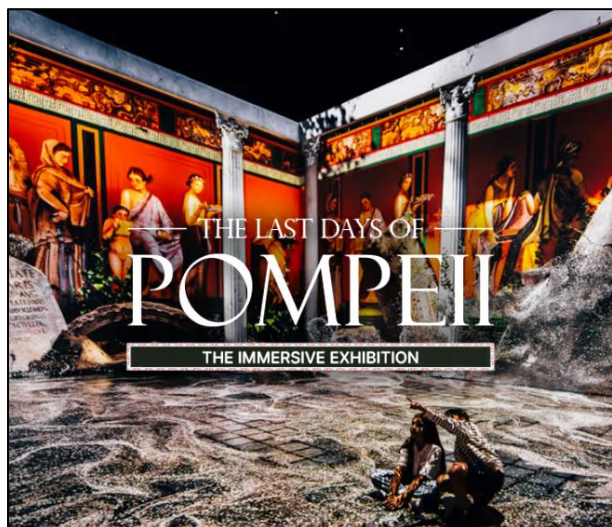
- **WALK ACROSS THE ICONIC JURASSIC GATES**
- **EXPLORE THE LAND OF GENTLE GIANTS**
- **MEET OUR ADORABLE BABY DINOSAURS**
- **COME FACE TO FACE WITH LIFE-SIZE PREDATORS**

<https://jurassicworldexperience.com/uk/>

<https://batterseapowerstation.co.uk/events/jurassic-world-the-experience-lands-at-battersea-power-station/>

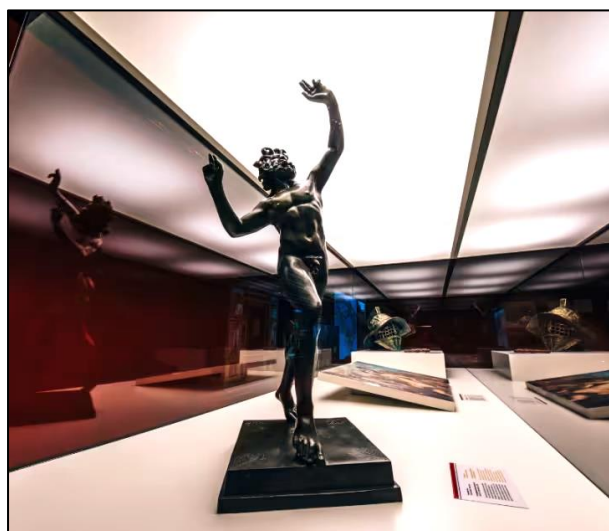


The Last Days of Pompeii: The Immersive Exhibition



Experience history like never before with **The Last Days of Pompeii!**

Experience London's first ever immersive Pompeii exhibition which brings ancient Rome to life like never before. Travel back 2,000 years with VR and cutting-edge immersive tech, see rare artefacts and replicas and witness the eruption of Vesuvius that froze Pompeii in time. Explore Roman life, culture, and power in this unforgettable journey, coming to London for 16 weeks only.



https://feverup.com/m/462609?utm_source=facebook&utm_medium=post&utm_campaign=462609_lon&utm_content=FeverupUK&utm_term=Pompeii_SL_London&ad_id={{ad.id}}&fbclid=IwY2xjawNPKzZleHRuA2FibQlxMABicmlkETBTENXTEtPbkxc0NBRFRWAR6snQU8Y_3pa96j937n1SOGR_6NEOThd3Ke2FOhwpz0MrQibYqEOYI5ZThMBA_aem_hPSmr5rMu6RDsrmIJ22OA

[id=IwY2xjawNPKzZleHRuA2FibQlxMABicmlkETBTENXTEtPbkxc0NBRFRWAR6snQU8Y_3pa96j937n1SOGR_6NEOThd3Ke2FOhwpz0MrQibYqEOYI5ZThMBA_aem_hPSmr5rMu6RDsrmIJ22OA](https://lightroom.uk/whats-on/prehistoric-planet/)

Step Into A Dinosaur's World, Like Never Before

Join Damian Lewis on an unforgettable journey as you explore the extraordinary story of dinosaurs — from their dominance 66 million years ago to their lasting legacy today.

Blending iconic moments from Apple TV+'s Emmy-nominated **Prehistoric Planet** with brand-new content — including bespoke illustrations and extended CGI sequences — this 360° immersive experience transports you straight into the heart of the prehistoric world. From dangerous deserts to soaring skies and mysterious ocean depths, witness life-size dinosaurs at the most dramatic moments of their lives.



Both breathtaking and educational, this epic adventure is set to an original score by multi-Academy Award winner Hans Zimmer, Anže Rozman, and Kara Talve for Bleeding Fingers Music. Discover a world lost to time — and feel it come roaring back to life.

Prehistoric Planet: Discovering Dinosaurs is directed and designed by 59 Studio in close collaboration with the makers of Prehistoric Planet, Apple TV+, and Executive Producer and BBC Studios Natural History Unit Creative Director Mike Gunton.

<https://lightroom.uk/whats-on/prehistoric-planet/>

Satellites detected strange gravity signal coming from deep within Earth almost 20 years ago, study reveals

Patrick Pester, LiveScience

11 October 2025

Researchers have discovered there was an anomaly in Earth's gravitational field between 2006 and 2008, potentially caused by a mineral shift deep within Earth's mantle. GRACE satellites detected a strange gravity signal at the time.

https://www.livescience.com/planet-earth/geology/satellites-detected-strange-gravity-signal-coming-from-deep-within-earth-almost-20-years-ago-study-reveals?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=EBFE1FD3-74E8-42D6-8057-66FA58AC3DE8&utm_source=SmartBrief



In the footsteps of giants One of the world's longest dinosaur trackways uncovered in Oxfordshire quarry

Rebecca Morelle, Alison Francis, Kevin Church and the BBC Visual Journalism team

14 October 2025

They were the colossal animals that roamed the Earth 166 million years ago. Now a window

into their prehistoric past is being revealed in an Oxfordshire quarry.

Hidden under tonnes of rock, a dinosaur superhighway is emerging - where palaeontologists are walking in the footsteps of these giant beasts.

This summer's excavation at this extraordinary site has uncovered one of the longest trackways found anywhere in the world.

Scientists from across the UK descended on Dewars Farm Quarry and the BBC captured them working to unearth the footprints, amongst the trucks, diggers, and tippers.



A *Megalosaurus* print which was also found at the quarry. (Credit: Oxford University Museum of Natural History)

<https://www.bbc.co.uk/news/resources/idx-5f8c77b0-92bc-40f2-bf21-6793abbe5ffe>

Page 59:

https://www.farnhamgeosoc.org.uk/newsletters/2023_2028/v28n1feb2025.pdf

https://www.livescience.com/animals/dinosaurs/weird-bumps-in-uk-quarry-turn-out-to-be-166-million-year-old-dinosaur-highway-for-some-of-jurassics-biggest-dinosaurs?utm_medium=referral&utm_source=pushly&utm_campaign=Animals&fbclid=IwZ_Xh0bgNhZW0CMTEAAR27E1vgdSm758eGmBRuJa4UEzAqdC4O-7kh_y3l48wwdxJCFbv0Fby6K6Q_aem_Z70QTzomtrBAA-n7mGzjlq

https://earthsky.org/earth/dinosaur-highway-unearthed-footprints/?fbclid=IwY2xjawH27wVleHRuA2FIbQIxMAABHQI-epON4UxuUJu7EXodC-0YMomGcezcCUID8mscrjgs7pObu_UhvWnmPg_aem_NKSXHjzqwizyCqqJyzWSlw

FESTIVAL OF GEOLOGY

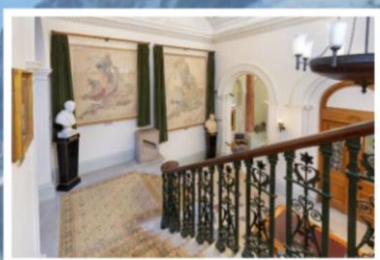


Saturday 1 November 2025
10:30am to 4:30pm

The Geological Society
Burlington House,
Piccadilly
London
W1J 0BG



Save the date!



- Exhibits by societies, universities and museums with minerals and fossils for sale
- Talks
- Books
- Activities for children

ROCKWATCH
The UK's Nationwide Geology Club for Children

Also: Field trips on
Sunday 2 November

www.geologistsassociation.org.uk



https://geologistsassociation.org.uk/festival/?fbclid=IwY2xjawNdyZtleHRuA2FlbQlXMAbIcmIkETBTENXTETpBkkxc0NBRFRWAR46FslgQPWdMYTOynwJbWf8ENDCf6O9T3B1uQZKqbSpuuJhXQnFoBHPILUuEg_aem_nyg2f7nlQKwvXzgXnBARhA

SUSSEX MINERAL & FOSSIL SHOW



Amazing Crystals, Minerals,
Fossils and Gems



Saturday 15th November 2025

Haywards Heath College, Harlands Road, RH16 1LT, 10am

Over Forty Exhibitors, Displays, Talks,
Interactive Activities for Adults & Children,
Refreshments, Prize Draw, Free Parking

Entrance: Adults £3 Children £1



www.smls.online



Sussex Mineral

Anthony Brook (Conference Organiser): A personal invitation for you to attend the 6th biennial

Wealden Geological Assembly

on Saturday, **29 November 2025** in Kings Church Hall, Lewes, BN7 2BY

9.00	Doors open	
9.45	Welcome, etc	
Session A	Chairman: John Lonergan	Tectonics and Orogenesis
9.50-10.25	Prof. Craig Storey	Onset of Modern Plate Tectonics
10.25-11.00	Roger Smith	The Formation of the Alps
	David Cuthbertson	Case Study of the Italian Alps
11.00-11.30	<i>Coffee and Biscuits</i>	
Session B	Chairman: David Shilston	Dinosaurs and Extinctions
11.30-12.05	Prof. Mike Benton	Extinctions: Major Interruptions to Ecosystems
12.05-12.40	Prof. Susie Maidment	The Stegosaurian Dinosaurs
12.40-1.20	<i>Lunch</i>	
Session C	Chairman: Martin Munt	Isle of Wight
1.20-1.55	Jeremy Lockwood	The Iguanodontian Fauna of the Isle of Wight, including 3 new species
1.55-2.30	Eva Horsfall	Late/Postglacial Landscape Development
2.30-3.05	Phil James	Coloured Sand Jars and the Mysterious Mr. Carpenter
3.05-3.35	<i>Tea and Biscuits</i>	
Session D	Chairman: Geoffrey Mead	Environmental Changes
3.35-4.10	Prof. John Boardman	Sunken Lanes of Southeast England
4.10-4.45	Lorna Linch	Melting Icesheets & Rising Sea Level: The Cryosphere – and why it matters
4.50	Concluding Comments	

To Register for WGA25, please forward your Name, Address, Tel. No. and email to the Conference Organiser (anthony.brook27@btinternet.com); and also remit the Conference Fee of **£35 per person**, by Direct Bank Transfer, including your name as the reference, to Anthony Brook Sort Code 40-47-25 Account No. 41791532.

If it is easier for you, please forward a cheque for the Conference Fee to 15, Cambourne Court, Shelley Road. Worthing, West Sussex, BN11 4BQ. Or even, pay Cash at Reception on the day! Discounts are available for full-time University students.

The Conference Fee includes the Conference publication, coffee/tea, and packed lunch. Please indicate any dietary requirements.

Thank you for registering for WGA25
Anthony Brook (Conference Organiser)