Newsletter of The Farnham Geological Society

Volume 28, Number 3, August 2025



Hjalparfoss waterfall in Iceland by Sally Pritchard (2025)





A local group

within the GA

Volume 28, No. 3

Newsletter

August 2025

Issue No. 129

www.farnhamgeosoc.org.uk

Editorial

Welcome to the latest edition of the FGS Newsletter for 2025. I hope you are all fit and well and enjoying the sunshine and are not too inconvenienced by the, sometimes, very hot weather.

This month's Newsletter brings you some interesting articles, including reports from our monthly lectures. Don't forget to come along to **The Methodist Hall** or **Zoom-in** for our next talk on **Friday**, **12 September** when **Dr. lan Jarvis** from Kingston University will present "**Building the International Geological Timescale – Examples from the Cretaceous**" ... it promises to be a fascinating presentation.

This will be followed by **Dr. Alison Ure** of the Open University on the **10 October**, who will present "Discovery of Meteorite Impact Crater off the Coast of Turkey" at The Methodist Hall and on **Zoom.**

Our final two talks to end 2025 will both be via **Zoom only**:

- 14 November: Dr. Chris Damon, a consultant for the Down-To-Earth magazine, will present "The North Atlantic Igneous Province"
- 12 December: Dr. Robert Spicer of the Open University 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 the **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, if you would like to help.

Could you help with 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).

Front Cover

This month's Front Cover photograph was taken by **Sally Pritchard** (FGS Membership Secretary), showing the **Hjalparfoss waterfall in Iceland** where the River Fossa is eroding through lavas showing the structure of rootless cones. To the left of the fall is an infilled lava tube showing radial columns and cooling joints.

Contents

Editorial 2	Gigantic 'mud waves' 28
Front Cover 2	Image Of The Day 4: 2 nd warmest April 32
Contents 3	Solving the mystery of a dinosaur mass grave at the 'River of Death'
FGS Committee 4	Video: Hawaii's Kilauea 38
Diary 4	Africa is being torn apart by a 'superplume' of hot rock deep within Earth
Next Lecture: Geological Timescale 5	The closer a volcano is to erupting, the greener the trees around it look 40
Lecture Summary: Dinosaurs & Deserts 6	Mount Etna erupts 42
The FGS Needs You! 10	Earthquake News: N North Sea 44
Outreach: Churt Fete 11	TV Review: Volcano with Dara Ó Briain 44
Image Of The Day 1: Fuego Volcano 12	Geologists unveil UK 'super regions' with best potential for transition projects 45
Refuge from the worst mass extinction in Earth's history discovered fossilized in China	New species of dinosaur discovered that 'rewrites' T.rex family tree 47
Image Of The Day 2: Ouarkziz Crater 16	Image Of The Day 5: 2 nd warmest May 49
Image Of The Day 3: Mount Taranaki 17	Image Of The Day 6: Ubinas Volcano 50
Possible signs of alien life on nearby exoplanet	Small & speedy dinosaur recognised as a new species
Iran's folded rocks: The crumpled mountains at the intersection of Asia & Europe 20	Image Of The Day 7: Fogo, Cape Verde 52
'Breathing' magma cap inside Yellowstone supervolcano	Film Review: Jurassic World Rebirth 53
Ancient zircon crystals shed light on 1 Ga old meteorite strike in Scotland	TV Preview: Human 54
Giant pterosaurs could walk among dinosaurs too	Nuclear waste disposal: Geology must come first
Podcast Video: Massive quake causes ground to move laterally!	Further Reading 57
Scientists think a hidden source of energy could power Earth for 170,000 years - & they've figured out the 'recipe' to find it 27	Festival of Geology 68

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 Editorial Board or the FGS Committee.

Farnham Geological Society Committee 2025

Chair Mick Caulfield
Treasurer Mike Millar

Secretary Vacant (Judith Wilson)

Programme Secretary Janet Catchpole
Membership Secretary Sally Pritchard
Field Trip Secretary Tessa Seward

Newsletter Editor Mick Caulfield

Web Manager Bob Rusbridge
Advertising Peter Crow

IT/Sound Vacant (Mike Millar)

Without portfolio Peter Luckham

Ad Hoc Member Liz Aston

Meeting Programme 2025

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

Building the International Geological Timescale – Examples from the Cretaceous

Prof. lan Jarvis Friday, 12 September

Kingston University

Discovery of Meteorite Impact Crater off the Coast of Turkey

Dr. Alison UreOpen University
Friday, 10 October

North Atlantic Igneous Province

Dr. Chris Damon Friday, 14 November Consultant, Down to Earth

Field Trip Programme 2025

(book via the FGS website)

DAY TRIPS

Lambourn Valley
 Leader: Lesley Dunlop Sunday, 31 August

- Smokejack Clay Pit nr Ewhurst
- Oxford University Museum of Natural History Dr. Emma Nicholls tha

tba

RESIDENTIAL TRIPS

➤ Isle of Anglesey 16 – 19 October Leader: Robert Crossley

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

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

Hybrid Meeting

Tales from a geological curator

Dr. Emma Nicholls Friday, 10 October Oxford University Museum of Natural History

Zoom only

Mull Dyke Swarm Prof. Joe Cartwright

Friday, 5 December

Oxford

Reading Geological Society Lecture Programme 2025

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

Alpine peaks and salt intrusions - geological windows into deep Earth's mantle

Prof. Jonathan Turner Mon, 1 September University of Birmingham

Antarctica

Mark Easton Monday, 6 October

La Palma Volcanics

Prof. Dougal Jerram Monday, 3 November University of Birmingham

Places available on **Reading Geological Society's Field Meetings**

(book via the RGS website - https://readinggeology.org.uk/fieldtrips.php):

> Long Field Meeting to Cornwall

20 - 24 September

Leader: Dr. Jonathan Turner

Mole Valley Geological Society Lecture Programme 2025

http://mvgs.org.uk

An Introduction to the Geology of the Lizard, Cornwall

Dr. Mark Eller MVGS Thursday, 4 September

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/

Introduction to Geomorphology

Prof. Roger Moore Wed, 10 September

Jacobs

Bizarre dinosaurs from the Middle Jurassic of Morocco: implications for armoured dinosaur evolution

Dr. Susannah Maidment Wed, 8 October Natural History Museum

Exploration Geology

Helena Griffiths Wed, 12 November Exploration & New Ventures geologist

West Sussex Geological Society Lecture Programme 2025

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

Volcanic Rumblings

Tom Grant Friday, 19 September (*PhD student*)

Portsmouth University

The tale / tail of the Iguanodon: Gideon
Mantell's discovery of this ancient creature
Debby Mathews Friday, 17 October
Lewes

The relationship of English vineyards to Wealden strata

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



West Sussex Geological Society

Next Lecture

Friday, 12 September 2025

The Methodist Hall, Farnham

7.30 pm for 8.00 pm

Building the International Geological Timescale – Examples from the Cretaceous

Prof. Ian Jarvis, Kingston University

Prof. Jarvis is a member of the International Commission on Stratigraphy and Chair of the Cretaceous Subcommission, who are working to establish a multidisciplinary standard and global geological time scale that will allow high-resolution correlation between geological events on different continents. This is essential to constrain the forcing and feedback mechanisms responsible for past environmental change that inform our understanding of current and future climate.



Lecture Summary

Friday, 9 May 2025

On Friday, 9 May 2025 30+ FGS attendees in The Methodist Hall & via Zoom, together with other society members, welcomed **Cindy Howells** in presenting our external lecture.

Dinosaurs & Deserts in Wales

- Did you know that dinosaurs lived in Wales over 200 million years ago?
- 220 million years ago a desert covered the area that is now south Wales. However, sea levels were rising, and by 200 million years ago the deserts had been replaced by tropical seas.
- Dracoraptor is a small Welsh dinosaur from the Jurassic. It was found by fossil hunters in 2014 and is now on display in Amgueddfa Cymru Museum Wales.

Fossils represent the remains of animals and plants that lived millions of years ago and can inspire people of all ages. Recent discoveries of beautifully preserved, 200-million-year-old dinosaur fossils in south Wales have increased our understanding of these iconic reptiles and the environments in which they lived. The very oldest Welsh fossils date back to just over 560 million years ago – but that is another story.

When did dinosaurs first appear?

Dinosaurs first evolved around 240–235 million years ago. At that time life on earth was just recovering from the largest mass extinction of all time, known as The Great Dying, and many new groups were evolving to fill empty niches left by extinct animals. During this time, a period we call the Triassic, all of the continents that we know today were joined together as a massive supercontinent, Pangaea, which provided a hot, dry climate that Dinosaurs and other reptiles benefitted from. Dinosaurs and the flying pterosaurs belong to a group of reptiles called archosaurs, of which crocodiles and birds are the only living members today.

What did early dinosaurs look like?

The very earliest dinosaurs were all small, lightweight, bipedal animals which walked upon two legs, and it was only much later that they evolved into the extreme sizes, shapes and lifestyles that we are so familiar with today.

When were dinosaurs first discovered in Wales?

The first evidence of dinosaurs in Wales was found in 1879 when a Welsh artist and natural historian called T.H. Thomas was exploring villages near Porthcawl in the Vale of Glamorgan. He noticed an unusual slab of rock near the church at Newton. The flat, 2m-square rock contained a trackway of five indented footprints, each with three straight toes. Local legend said that these were the devil's footprints, but Thomas recognised them as matching with dinosaur footprints found in America. He arranged for the rock to be removed to the Cardiff Municipal Museum (forerunner of National Museum Cardiff as it is known today).

The same year, a second slab was found nearby with three different dinosaur footprints. One of these footprints was larger and broader, with four curved toes.

Can you still find dinosaur footprints in the rocks of south Wales?

Yes, there are a few Welsh sites where you can still find footprints today. It is important to remember that these are all protected by law, as they



Anchisauripus, the first dinosaur footprints to be found in Wales, in 1879.

are **Sites of Special Scientific Interest (SSSI)** and hammering or collecting footprints could lead to a huge fine.

Bendricks Bay, near Barry, is the best place to view some of the footprints. You need to visit when there is a low tide and look very carefully in the flat rock ledges. It is easiest to see footprints if the sun is low in the sky, or after rain when the little hollows are full of water.

What type of dinosaur footprints have been found in south Wales?

There are at least four different types of footprints that have been found in south Wales. There are two larger types and two smaller ones; however, they probably represent far more than just four varieties of dinosaur. There are also a few prints that might have been made by other types of reptiles.

What types of dinosaurs made these footprints?

It is almost impossible to say exactly what dinosaurs made any footprints, as many types have similar feet. Instead, palaeontologists use names that represent the size and shape of the



Footprint of a small dinosaur found in 2020.

footprint without trying to match it to any one animal. We compare the size and shape of the footprints with the fossilised foot bones of reptiles that lived at around the same time to work out the general group of dinosaurs that might have made them.

Three-toed footprints of about 20cm in length with a long middle toe are given the name *Anchisauripus* (An-chi-SAW-rip-uss). We think that *Anchisauripus* footprints were made by theropod or meat-eating, dinosaurs that were about 2m tall, and maybe up to 5m long. These would have been the top predators in the area.

The broader, four-toed (or sometimes three-toed) footprints are called *Eosauropus* (Eo-saw-RO-puss). *Eosauropus* footprints would have been made by plant-eating herbivorous dinosaurs, possibly about 2–3m tall.

There are also smaller three-toed prints called *Grallator* (GRAL-a-tor). These are about 8–12cm long and have a long middle toe. They were probably made by small theropod dinosaurs.

The fourth type is *Evazoum* (Eva-ZO-um). These are about 10–12cm long and have either 3 or 4 straight toes which are all pretty much the same length. They were probably made by small herbivorous, sauropodomorph (saw-ro-POE-doe-morph) dinosaurs. The little footprint found by Lily Wilder in 2021 was of this type and can now be seen in National Museum Cardiff.

How long ago did these dinosaurs live?

The dinosaurs that left the footprints in south Wales lived here 220 million years ago. This was in the upper part of the Triassic period (the Norian Stage). The reddish rock in which they were preserved is called the Mercia Mudstone.

What was Wales like in the Triassic period?

220 million years ago Wales was just one small part of the huge supercontinent called Pangaea. There was no Atlantic Ocean or North Sea as Wales was joined to America and Europe. This meant we had a very hot dry climate, and much of south Wales was covered in hot deserts.

Occasional storms caused floods of muddy water and rocks to tumble down from the surrounding hills and spill over the desert floor. This created shallow lakes and streams which evaporated rapidly leaving wet mud. Dinosaurs left footprints as they walked thorough this mud which then baked hard in the sun, preserving the prints before they were covered by the next flood.

Have any bones of these Triassic dinosaurs been found?

In 1897, a single jawbone was found at Stormy Down, near Bridgend. This was preserved in rocks that are just a few million years younger than the footprints. The jawbone was found in rock called the Quarella Sandstone, of late Triassic age, It shows very clear impressions of several curved, backwards pointing teeth, indicating that this was a meateater. The dinosaur was given the name of Zanclodon (ZAN-clo-don), meaning 'hollow-tooth'. It is thought to have been the same general type of dinosaur that left Anchisauripus footprints.



Zanclodon – the jaw of a theropod dinosaur found in 1897.

More recently, a finger bone and a toe bone of similarly sized dinosaurs have been found from the Triassic (Rhaetic bone bed) at Penarth, which is of a similar age. These remain in private ownership at the moment.

Have there been any other dinosaur discoveries in Wales?

Two small, fossilised dinosaurs were found in a quarry near Cowbridge, south Wales. They were excavated in the 1950s when quarries were worked by hand, rather than by explosives. These two dinosaurs were both juveniles, or young dinosaurs, and were both very small. They stood about tall. One of these 50cm is sauropodomorph dinosaur called Pantydraco (Pant-ur-DRAY-co) whilst the other is a little theropod called Pendraig (Pen-DRY-q). It is almost impossible to give exact dates for these dinosaurs as they were found in the remains of ancient caves, where they had been washed into small cracks and deep fissures. It is thought that they were probably from the very latest part of the Triassic period - about 200-205 million years ago. These fossils belong to the Natural History Museum, London.



Skull of Dracoraptor, the small theropod dinosaur found in 2014.

Are there any Jurassic dinosaurs in south Wales?

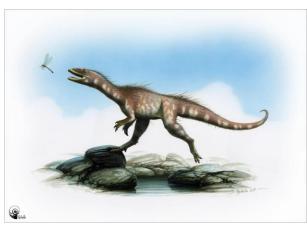
In 2014, the partial skeleton of a meat-eating dinosaur called *Dracoraptor* (Dray-co-RAP-tor) was found at Lavernock Point near Penarth. This was found in several blocks after a cliff fall. The bones are semi-articulated, with one block containing elements of the hip and upper leg, another had the left arm and hand bones, a third contained the skull, whilst another had bones of the left foot. This skeleton didn't fall apart before it was fossilised, but floated out to sea, where it then sank and was covered by mud.

What did *Dracoraptor* look like?

Dracoraptor was a small dinosaur. It would have been no more than 2.5m long and probably only about 50–70cm tall. It was a slim animal that could have moved swiftly to catch its prey. It had many sharply jagged teeth, which pointed backwards in its jaw. It walked and ran on its back legs, possibly using its arms to grab at its prey. It had a very long tail, and a long neck.

How long ago did *Dracoraptor* live?

Dracoraptor lived around 201 million years ago. We know this because we can see the exact layer of rock from which the fossil fell. The rocks at this point have been logged and measured in detail



An artist's impression of Dracoraptor.

so we know their age. This was the very start of the Jurassic Period.

What did Wales look like in the early Jurassic Period?

This was a time of climate change and sea-level rise in Wales. The super-continent of Pangaea started breaking apart in the late Triassic and the Atlantic Ocean began to form. The Triassic deserts were slowly flooded by the rising seas, and the climate turned much wetter too. By the start of the Jurassic, south Wales was mostly covered by warm, shallow seas, which were an ideal habitat for many marine animals. Some of the previous hills were now islands, sticking up out of the seas, and these islands were inhabited by early mammals, dinosaurs and other reptiles.

A fascinating and excellent talk from Cindy Howells.

Cindy Howells, National Museum Of Wales

Cindy graduated from University College, Cardiff with a degree in geology, & has spent the last 39 years working at the National Museum of Wales as a palaeontology curator & collections manager with over half a million fossils to look after.

Alongside the specimen work, she enjoys planning new displays, writing articles & giving talks & tours for specialist adult groups, such as the one to the FGS.





She is on the committees of the Geological Collections' Group (formerly Geological Curators' Group), South Wales Geologist Association and South East Wales RIGS group (Regionally Important Geological and geomorphological Sites).

She can also be seen in **Our Lives: The Dinohunters**, a BBC documentary series that celebrates remarkable stories from across the UK – the episode is a story about a momentous discovery in Wales, which she mentioned in her talk. The programme was first broadcast in September 2024; it is available on the BBC iplayer.

All photos from the Museum Wales.

References:

https://museum.wales/articles/2712/Welsh-Dinosaurs/

https://museum.wales/collections/on-your-doorstep/identifying-nature/spotters-guide/



Credit: LEONELLO CALVETTI / SCIENCE PHOTO LIBRARY / Getty Image

We need a new Secretary & a new IT/Sound committee member.

Can you help us?

No prior knowledge needed.

Please contact our Chair, Mick Caulfield, if you would like to help.

Newsletters.fgs@gmail.com

Outreach

Churt Fete 14 June 2025

On Saturday, 14 June at the Churt Fete on the Churt Recreation Ground, Peter Luckham, Janet Catchpole and Mick Caulfield of the FGS had a stand displaying some of the Societies fossils and minerals.

Situated between Farnham and Haslemere, Churt is on the edge of some stunning swathes of heath and common land from Hankley Common to The Devil's Jumps and The Flashes. Former Prime Minister, David Lloyd George, made Churt his home in 1921 and developed his estate in the village as he withdrew from the political scene.

A large crowd was in attendance at the VE Day themed Fete enjoying such events as the dog show, tug-of-war and sack race among a large number of stands from local societies and businesses.

The FGS had a steady stream of visitor's throughout the afternoon: mainly families with young to teenage children interested in geology. We handed out "Rockwatch" literature, some Cretaceous brachiopods and polished stones to the children and FGS flyers to the adults. Hopefully one or two of the adults might be interested in joining the Society.



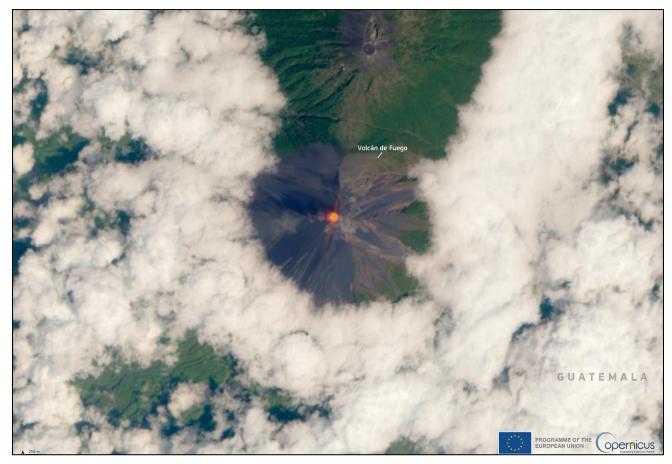
Janet Catchpole, Peter Luckham & Mick Caulfield at the FGS stand. (Credit: Churt Village Fete)

Image Of The Day 1

Eruption of the Fuego Volcano, Guatemala

Date: 12 March 2025 Location: Guatemala

Credit: European Union, Copernicus Sentinel-2 imagery



On 9 March 2025, the Fuego Volcano in Guatemala began erupting, prompting the evacuation of over 300 people in the vicinity. The National Coordinator for Disaster Reduction of Guatemala (CONRED) issued an orange alert, recommending that communities near the volcano prepare accordingly. Guatemalan authorities reported that the eruptive phase had ended on the following day.

Located in southern Guatemala, 53 km from the capital, Guatemala City, Fuego is one of the most active volcanoes in Central America. This image, acquired on 9 March 2025 by one of the Copernicus Sentinel-2 satellites, shows the thermal anomaly (infrared signature) detected at the summit of the Fuego Volcano.

The Copernicus Sentinel satellites provide important data on volcanic activity around the globe, providing authorities and researchers with insights into eruptions and their impacts on nearby communities and ecosystems.

Reference:

https://www.copernicus.eu/en/media/image-day-gallery/eruption-fuego-volcano-guatemala

News

Refuge from the worst mass extinction in Earth's history discovered fossilized in China

Stephanie Pappas, LiveScience

14 March 2025

The End-Permian mass extinction killed an estimated 80% of life on Earth, but new research suggests that plants might have done okay.



Fossils in China suggest the "Great Dying" mass extinction wasn't as catastrophic in some regions. (Image credit: YANG Dinghua)

The mass extinction that killed 80% of life on Earth 250 million years ago may not have been quite so disastrous for plants, new fossils hint. Scientists have identified a refuge in China where it seems that plants weathered the planet's worst die-off.

The **end-Permian mass extinction**, also known as "**The Great Dying**", took place 251.9 million years ago. At that time, the supercontinent Pangea was in the process of breaking up, but all land on Earth was still largely clustered together, with the newly formed continents separated by shallow seas. An enormous eruption from a volcanic system called the Siberian Traps seems to have pushed carbon dioxide levels to extremes: a 2021 study estimated that atmospheric CO2 got as high as 2,500 parts per million (ppm) in this period, compared with current levels of 425 ppm. This caused global warming and ocean acidification, leading to a massive collapse of the ocean ecosystem.

The situation on land is far hazier. Only a handful of places around the world have rock layers containing fossils from land ecosystems at the end of the Permian and beginning of the Triassic.

A new study of one of these spots — located in what is now northeastern China — revealed a refuge where the ecosystem remained relatively healthy despite the Great Dying. In this place, seed-producing gymnosperm forests continued to grow, complemented by spore-producing ferns.

"At least in this place, we don't see mass extinction of plants," study co-author Wan Yang, a professor of geology and geophysics at the Missouri University of Science and Technology, told *Live Science*.

The finding, published Wednesday (March 12) in the journal **Science Advances**, adds weight to the idea that the Great Dying was more complicated on land than in the seas, Yang said.



A fossilized conifer trunk from the end-Permian mass extinction uncovered in what is now northeastern China. (Image credit: NIGPAS)

The great changeover?

Yang and his colleagues looked at rock layers in Xinjiang that span the mass extinction event.

A major advantage of this now-desert site is that the rocks include layers of ash that hold tiny crystals called **zircons**. The zircons include radioactive elements — lead and uranium — that gradually decay, which enables researchers to determine how long it has been since the crystals formed. This means the researchers can more accurately date the rock layers here than they can at other sites.

Some of these layers also hold fossil spores and pollen. These fossils reveal that there wasn't a massive die-off and repopulation but a slow changeover of species, Yang said.

This is consistent with other evidence from Africa and Argentina, where plant populations seemed to have shifted gradually rather than dying off dramatically and then repopulating, said Josefina Bodnar, a palaeobotanist at the National University of La Plata in Argentina who was not involved in the research.

Land plants "have a lot of adaptations that allow them to survive this extinction," Bodnar told *Live Science*. "For example, [they have] subterranean structures, roots or stems, that can survive perhaps hundreds of years." "Seeds can also persist a long time", she added.

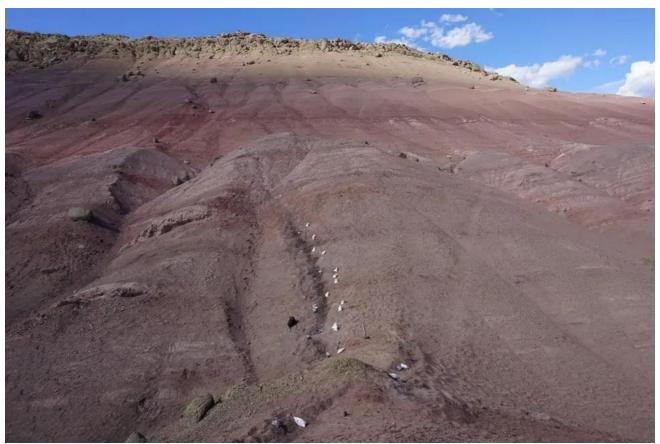
This survival may have been particularly possible at humid, high-latitude regions. The site in Xinjiang was once dotted with lakes and rivers, a few hundred miles from the coast. Other places where plant

refuges have been found, such as Argentina, were also high-latitude in the Permian, far from the equator where temperatures were the hottest.

Yang and his colleagues found that during the late Permian and early Triassic, the climate became a bit drier in what is now Xinjiang — but not enough to cause deforestation.

This may have been a consequence of location, said Devin Hoffman, a researcher in paleontology at University College London who was not involved in the new study. Marine animals had no escape from global ocean acidification. But climate change on land wasn't uniform. The impact would have been most pronounced in the centre of Pangea, which was a vast desert.

This means that in more temperate regions on land, survival could have been possible, Hoffman told *Live Science*. "You essentially have everything being pushed toward the poles and towards the coast, but on land you're able to escape some of the effects," he said.



Now an arid desert, the region the fossils were found would've been a humid forest 250 million years ago. (Image credit: NIGPAS)

The planet's memory

These findings have led to some debate over whether the greatest mass extinction ever deserves the moniker on land. "I will call it a crisis on land. I will not call it an extinction," said Robert Gastaldo, an emeritus professor of Geology at Colby College who was not involved in the new study, but who has collaborated with Yang in the past.

The end-Permian extinction is particularly interesting to scientists because it was driven by greenhouse gases, much like climate change today. The situation was far more extreme then: the polar ice caps melted completely — a situation that would cause sea levels to rise a staggering 230 feet (70 meters) today.

But humans may be nearly as deadly as giant volcanoes. A 2020 study, for example, found that a smaller extinction event at the end of the Triassic (201 million years ago) was driven by greenhouse gas pulses from volcanoes that were on a similar scale to what humans are expected to emit by the end of this century. Studying these ancient catastrophes can give us a sense of what to expect under atmospheric carbon dioxide levels people have never experienced, Gastaldo said.

"The planet has experienced it," he said. "The planet's memory is in the rock record. And we can learn from the rock record what happens to our planet under these extreme conditions."

Reference:

https://www.livescience.com/planet-earth/fossils/refuge-from-the-worst-mass-extinction-in-earths-history-discovered-fossilized-in-china?utm term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8 f&utm_campaign=368B3745-DDE0-4A69-A2E8-

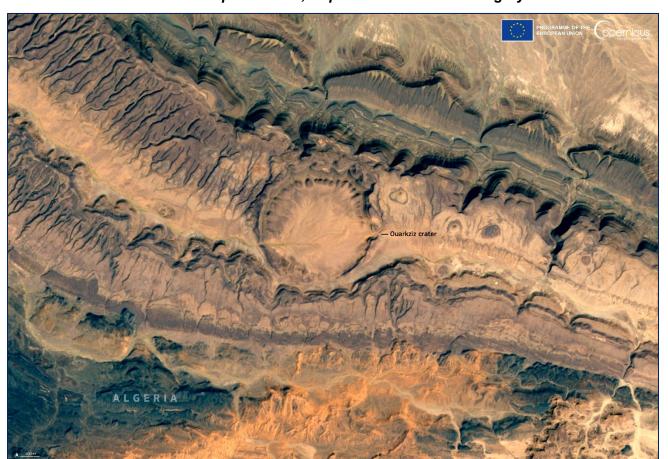
62503D85375D&utm medium=email&utm content=BDC5B349-CC28-4D72-818F-

0AC976CF0FA6&utm source=SmartBrief

Image Of The Day 2

The Ouarkziz crater, Algeria

Date: 03 April 2025 Location: Algeria



Credit: European Union, Copernicus Sentinel-2 imagery

The Ouarkziz crater in western Algeria is a well-preserved impact structure formed approx. 70 million years ago. Measuring around 3.5 kilometres in diameter, the crater was created when a meteorite

struck what is now the Sahara Desert, leaving a circular depression still visible today. The impact deformed the sedimentary rock layers, forming concentric rings which are a distinguishing geological feature. Erosion has since exposed the internal structure, providing valuable insights into impact processes and the Earth's geological history.

The Ouarkziz crater is visible in this Copernicus Sentinel-2 image acquired on 1 March 2025.

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.

Reference:

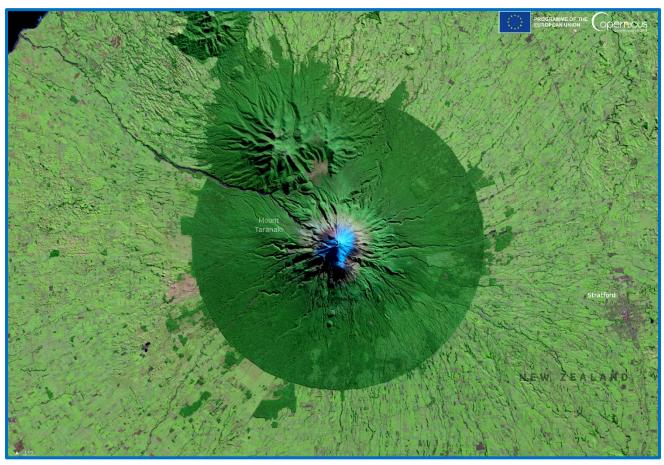
https://www.copernicus.eu/en/media/image-day-gallery/ouarkziz-crater-algeria

Image Of The Day 3

Mount Taranaki, New Zealand

Date: 14 April 2025 Location: New Zealand





This Copernicus Sentinel-2 image from 7 May 2024 shows Mount Taranaki, also known as Taranaki Maunga.

Located on the west coast of New Zealand's North Island, Mount Taranaki is a dormant stratovolcano standing at 2,518 metres. It is situated within Egmont National Park, New Zealand's second national park, established in 1900. The park's boundaries form a distinctive circular shape around the

mountain, which is clearly visible in this image. Though Mount Taranaki last erupted over 200 years ago, New Zealand authorities have estimated that there is a 30-50% chance of an eruption in the next 50 years.

The Copernicus Sentinel satellites deliver essential information on volcanoes around the world, providing researchers and authorities with insights to better understand these areas and their potential risks.

Reference:

https://www.copernicus.eu/en/media/image-day-gallery/mount-taranaki-new-zealand

News

Possible signs of alien life found on nearby exoplanet, study reports

Mike Wall, Space.com 17 April 2025

"Given everything we know about this planet, a Hycean world with an ocean that is teeming with life is the scenario that best fits the data we have."



Artist's illustration of the exoplanet K2-18b. (Image credit: NASA, ESA, CSA, Joseph Olmsted)

Scientists have found further evidence of possible biosignature gases on the nearby exoplanet K2-18b, strengthening the case that it could support alien life.

In 2023, researchers using **NASA's James Webb Space Telescope** (JWST) reported the potential presence of **dimethyl sulfide (DMS)** on K2-18b, which is nearly nine times more massive than Earth and circles in the "habitable zone" of a star about 120 light-years away from us.

Here on Earth, DMS is produced primarily by life — most prolifically by phytoplankton and other marine microbes — so the 2023 study was met with some enthusiasm. The excitement was tempered, however, by the preliminary nature of the find; JWST's observations were consistent with the presence of DMS but did not confirm it. So, the study team looked again, but in a slightly different way this time.

JWST can probe exoplanet atmospheres when these worlds "transit," or cross the face of their host stars from the observatory's perspective: the telescope detects certain molecules in the air based on the wavelengths of starlight that they absorb.

The team made the original, tentative DMS detection using JWST's NIRISS (Near-Infrared Imager and Slitless Spectrograph) and NIRSpec (Near-Infrared Spectrograph) instruments. For the new study, the researchers employed the \$10 billion telescope's Mid-Infrared Instrument (MIRI), which scrutinizes different wavelengths of light.

MIRI also detected the fingerprint of DMS (and/or dimethyl disulfide, or DMDS, a close chemical cousin and also a potential biosignature), the researchers report in the new study, which was published online today (April 17) in *The Astrophysical Journal Letters*.

"This is an independent line of evidence, using a different instrument than we did before and a different wavelength range of light, where there is no overlap with the previous observations," Nikku Madhusudhan, a professor at Cambridge University's Institute of Astronomy, who led both K2-18b studies, said in a statement today. "The signal came through strong and clear."

Based on its size and other characteristics, astronomers suspect that K2-18b may be a "Hycean" world — a class of exoplanet proposed in 2021 that has a huge liquid-water ocean and a hydrogenrich atmosphere. ("Hycean" is a portmanteau of "hydrogen" and "ocean.")

And K2-18b's air is also rich in DMS and/or DMDS, according to the new study. The researchers estimate concentrations of more than 10 parts per million by volume, compared to less than one part per billion for them here on Earth.

"Earlier theoretical work had predicted that high levels of sulfur-based gases like DMS and DMDS are possible on Hycean worlds," Madhusudhan said. "And now we've observed it, in line with what was predicted. Given everything we know about this planet, a Hycean world with an ocean that is teeming with life is the scenario that best fits the data we have."

Madhusudhan and his team *aren't claiming to have detected alien life*; they say that more research is needed to confirm and extend their findings. Other scientists feel the same way — and some are injecting heavier doses of scepticism into the debate around K2-18b and its life-hosting potential.

One of them is astronomer Chris Lintott, who took issue with Madhusudhan's "strong and clear" characterization of the DMS/DMDS signal. "Meanwhile, the peer-reviewed paper says 'While [the presence of molecules] DMDS and DMS best explains the current observations, their combined significance ... is at the lower end of robustness required for scientific evidence," Lintott, an astrophysics professor at the University of Oxford, wrote on the social media site *BlueSky* yesterday (April 16).

Detecting signs of alien life is a tricky business and confirming them is even tougher — especially on a world like K2-18b, which we won't be able to investigate up close for the foreseeable future, if ever. So, we should expect the debate, and the data collection, to continue.

References:

https://www.space.com/the-universe/exoplanets/possible-signs-of-alien-life-found-on-nearby-exoplanet-study-reports?utm term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8 f&utm_campaign=58E4DE65-C57F-4CD3-9A5A-

609994E2C5A9&utm medium=email&utm content=0FE8A421-A6C5-4AC6-9F1E-

94C438E0A137&utm source=SmartBrief

https://www.livescience.com/space/extraterrestrial-life/did-the-james-webb-telescope-really-find-evidence-of-alien-life-heres-the-truth-about-exoplanet-k2-18b?utm_term=8DEBC9E5-6C7F-4337-

AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8 f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=7E6FA2F1-AFC1-41D9-9AA7-

B56C97DD8049&utm source=SmartBrief

https://www.space.com/space-exploration/search-for-life/scientists-question-possible-signs-of-life-on-exoplanet-k2-18b-in-new-study-we-never-saw-more-than-insignificant-

hints?utm term=8DEBC9E5-6C7F-4337-AFFF-

<u>D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8</u> f&utm_campaign=58E4DE65-C57F-4CD3-9A5A-

609994E2C5A9&utm medium=email&utm content=E65183B0-6E87-4744-8C59-

83D42F7A8645&utm_source=SmartBrief

Iran's folded rocks: The crumpled mountains at the intersection of Asia and Europe

Sascha Pare, LiveScience

18 April 2025

Iran's folded rocks are a colourful formation that is part of the Greater Caucasus mountains, which formed when the Eurasian tectonic plate collided with the Arabian plate millions of years ago.



Iran's folded rocks are millions of years old, having formed when the Eurasian and Arabian tectonic plates collided. Satellite image from 2023. (Image credit: NASA Earth Observatory)

Iran's folded rocks are rugged mountain ridges and valleys to the southwest of the Caspian Sea. They are an extension of the Greater Caucasus mountain belt, which also stretches along Russia's border with Georgia and Azerbaijan.

The folded rocks sit at the intersection of Asia and Europe, where major tectonic forces converge. The rocks are formed of countless sedimentary layers, which were upturned and creased into the

landscape we see today during the initial collision between the Arabian and Eurasian tectonic plates. The timing of this collision is hotly debated, with estimates ranging from 10 million to 50 million years ago.

"A tectonic collision between Eurasia and Arabia over millions of years compressed these colourful rock layers, bending them into large folds," NASA officials wrote on the social platform X in January 2024.

The Arabian and Eurasian plates are still converging, and recent research indicates a chunk of oceanic crust that separated the two plates before they collided is now being torn apart under Iraq and Iran. The Neotethys oceanic plate appears to be pulling the region down from below, resulting in an unusual accumulation of sediment at the surface.

OUICK FACTS

Name: "Folded rocks" of the Aladaghlar

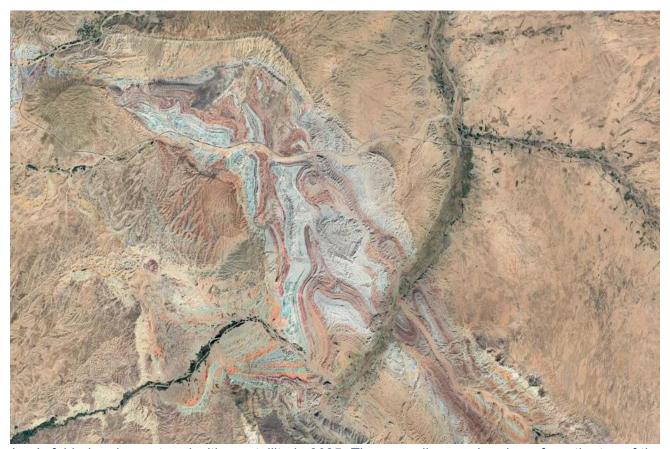
Mountains

Location: Northwest Iran

Coordinates: 37.126276036681965,

47.61930020667193

Why it's incredible: The landscape looks crumpled and folded from above.



Iran's folded rocks captured with a satellite in 2025. The green line curving down from the top of the image is the Qezel Ozan River. Towards the top of the image, a line cutting through the folded rocks shows the Zanjan-Tabriz freeway (Freeway 2). (Image credit: Imagery ©2025 Airbus, CNES / Google maps)

Iran's folded rocks are colourful, with vibrant terracotta, greenish and blueish bands that are the result of different sedimentary layers deposited over time. These layers were eroded over millions of years after the initial tectonic collision, exposing the underlying rocks' alternating colours and textures.

Satellite images of the folded rocks reveal the extent to which the landscape was bunched together over the eons. Scientists at NASA's Jet Propulsion Laboratory coloured one such image with infrared to show the various rock layers, as well as vegetation and the human-built Zanjan-Tabriz freeway, which cuts through the folded rocks and connects the cities of Tehran and Tabriz.

Another satellite image from NASA's Earth Observatory highlights the intricacy of Earth's surface in this region and shows the Qezel Ozan River, which hugs the southeast corner of the folded rocks and supplies water for agriculture in the area.

Reference:

https://www.livescience.com/planet-earth/geology/irans-folded-rocks-the-crumpled-mountains-at-the-intersection-of-asia-and-europe?utm term=8DEBC9E5-6C7F-4337-AFFF-

<u>D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8</u> f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=7309E2D1-2BC9-41BE-A919-

507A54B9D73B&utm source=SmartBrief

Scientists find 'breathing' magma cap inside Yellowstone supervolcano

Patrick Pester, LiveScience

25 April 2025

Yellowstone's supervolcano appears to have a magma cap that vents pressure and reduces the chances of a massive eruption happening anytime soon.



The newly discovered magma cap is 2.6 miles (3.8 kilometres) below the surface of Yellowstone. (Image credit: Xiyu Zhang via Getty Images)

A "breathing" cap of magma has been discovered inside the Yellowstone supervolcano, and it might help determine when the volcano will next erupt, a new study has found.

Yellowstone hasn't had a major eruption for hundreds of thousands of years, but it's still very much an active system. This newly discovered cap, which is 2.6 miles (3.8 kilometres) below the surface, acts like a lid, according to a recent statement. Not only does this lid trap a significant amount of heat and pressure inside, but it also appears to be porous enough to steadily release some of that pressure, so the whole system doesn't blow.

Discovering the cap gives researchers a better understanding of where Yellowstone's magma begins, along with fresh insights into the nature of this ancient volcanic system. The researchers published their findings April 16 in the journal *Nature*.

"For decades, we've known there's magma beneath Yellowstone, but the exact depth and structure of its upper boundary has been a big question," study co-author Brandon Schmandt, a professor of earth, environmental and planetary sciences at Rice University, said in the statement. "What we've found is that this reservoir hasn't shut down — it's been sitting there for a couple million years, but it's still dynamic."

Yellowstone is one of the world's largest volcanic systems. The volcano has blown big on three occasions in the last 2.1 million years — the most recent was 640,000 years ago and covered 2,900 square miles (7,500 square kilometres). Researchers aren't expecting Yellowstone to erupt again for many thousands of years, and there's no guarantee it'll ever have another catastrophic eruption like those in the past. However, volcanic eruptions are difficult to predict, and scientists still have a lot to learn about the Yellowstone system.

Schmandt and his colleagues focused their new research on the northeastern part of the caldera, where previous studies have suggested the next eruption could come. To identify the depth of the top of the magma system, the team used a 53,000-pound (24,000 kilograms) vibroseis truck. These trucks generate tiny earthquakes that send seismic waves into the ground, which then reflect off different layers in the Earth. Researchers then recorded when the reflected waves returned to the surface, according to the statement.

Once they had the depth, the team used computer models to determine that the cap layer was most likely made up of molten minerals and supercritical water bubbles within a porous rock. Bubbles accumulating in a volcanic system can increase pressure and may help trigger eruptions. However, in Yellowstone, the researchers found that the bubbles are rising and then escaping through the porous cap, thus releasing the pressure and lowering the risk of an eruption. Schmandt compared this system to "steady breathing."

"Although we detected a volatile-rich layer, its bubble and melt contents are below the levels typically associated with imminent eruption," Schmandt said. "Instead, it looks like the system is efficiently venting gas through cracks and channels between mineral crystals, which makes sense to me given Yellowstone's abundant hydrothermal features emitting magmatic gases."

Reference:

https://www.livescience.com/planet-earth/scientists-find-breathing-magma-cap-inside-yellowstone-supervolcano?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8 f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm_medium=email&utm_content=7E6FA2F1-AFC1-41D9-9AA7-

B56C97DD8049&utm source=SmartBrief

Ancient zircon crystals shed light on 1 billion-year-old meteorite strike in Scotland

Patrick Pester, LiveScience

1 May 2025

Geologists have found that an ancient meteorite hit Scotland 200 million years later than previously thought, which has massive implications for the geological history of the region and some of the U.K.'s earliest land life.

An ancient meteorite strike hit what is now Scotland significantly later than previously thought, scientists say. The finding will rewrite the region's geological history and change what researchers thought they knew about some of the U.K.'s earliest land life.

Researchers initially believed the unnamed meteorite hit Earth 1.17 billion years ago, creating the **Stac Fada Member rock layer in northwestern Scotland.** However, a new study has determined that the meteorite actually hit **990 million years ago** — around 200 million years later than previously thought.

The date difference is significant because it changes the geological timeline of the region, which during the days of the strike hosted some of what is now the U.K.'s



The meteorite struck northwestern Scotland around 1 billion years ago, creating the Stac Fada Member rock formation. (Image credit: Ignatiev via Getty Images)

earliest nonmarine life — microscopic freshwater organisms that became the ancestors to plants, animals and fungi, according to a statement released by the University of St Andrews in Scotland.

The Stac Fada Member — part of the supercontinent Rodinia 1 billion years ago — preserves what Earth's surface environments were like before and after the impact, study co-author Tony Prave, an emeritus professor of geoscience at the University of St Andrews, told *Live Science*.

"Those environments (rivers, lakes, estuaries) contained well-established microbial ecosystems," Prave said in an email. "Thus, the region provides a natural laboratory to examine what microbial ecosystems, and their habitats were like before the impact and, importantly, how they recovered following that dramatic event." The researchers published their findings Monday (April 28) in the journal *Geology*.

Meteorites are meteoroids — pieces of asteroids or comets — that make it through a planet's atmosphere without burning up and strike the surface. In this case, the strike occurred on Earth during the Precambrian period (4.6 billion to 541 million years ago), when life first evolved and diversified.

To better understand the impact date, researchers analysed the crystals of zircon minerals in the Stac Fada Member. Zircon is highly resistant and can last for billions of years. Additional rings of zircon grow around the mineral's crystal core over time, like the rings in a tree trunk, and in doing so, they can preserve a record of geological events, according to the American Museum of Natural History.

Zircon also has tiny amounts of the radioactive element uranium in its crystal structure, which decays over a long period of time and changes into lead, Prave noted. Researchers can measure this decay and use it to date ancient geological events.

"The decay of uranium to lead is like a time clock hence, when the meteorite impacted the rocks, it 'reset' the time clock in the zircon crystals," Prave said. "My colleagues then extracted those zircons from the rock and analysed the ratio of lead to uranium within the crystals..."

The results showed that the impact occurred **200 million years later than researchers thought**. The new estimate helps researchers better understand Scotland's ancient geology and early freshwater life, but there's still a lot they don't know about the impact, including the size of the meteorite. To estimate that, researchers would need access to the impact crater, but its location is unknown.

Prave noted that the environment of Stac Fada returned to normal after the impact, and sediment then slowly buried the impact rocks and associated ancient land surface over the next tens of millions of years. These sediments are now the Torridonian mountains. The crater could be beneath them or under the nearby sea, Prave said. Either way, it likely won't be found anytime soon.

"Basically, we'll have to wait another few tens of millions of years for the Torridonian mountains to be eroded away to see if we can find the impact beneath those or, more likely, the impact occurred in what became (about 950 million years later) the north Atlantic Ocean and hence its location will forever remain unknown" Prave said.

Reference:

https://www.livescience.com/space/meteoroids/ancient-zircon-crystals-shed-light-on-1-billion-year-old-meteorite-strike-in-scotland?utm term=8DEBC9E5-6C7F-4337-AFFF-

<u>D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8</u> f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=B12D744D-AF26-4E2D-8473-CA1D9DF15CE9&utm source=SmartBrief

Giant pterosaurs weren't only good at flying, they could walk among dinosaurs too

Patrick Pester. LiveScience

6 May 2025

Researchers studying pterosaur tracks have found that ancient flying reptiles became better adapted to life on land during the middle of the Jurassic period and even shared environments with dinosaurs.



Tracks left by pterosaurs such as the comb-jawed pterosaurs (Balaeonognathus) suggest that these animals were comfortable living on the ground. (Image credit: Rudolf Hima)

Ancient tracks reveal that many pterosaurs were just as comfortable walking on the ground as they were flying through the skies during the age of dinosaurs, a new study finds.

Pterosaurs, informally called "pterodactyls," were flying reptiles that ruled the skies when dinosaurs dominated the land. However, new research has discovered that pterosaurs diversified during the

middle of the Jurassic period (201 million to 145 million years ago) and evolved to walk more effectively on four limbs, using their hands and feet.

The findings were published May 1 in the journal *Current Biology*, and support decades-old evidence from the fossil record. Researchers also matched previously unidentified tracks to specific pterosaur groups, offering a new window into their lives.

"Footprints offer a unique opportunity to study pterosaurs in their natural environment," study lead author Robert Smyth, a doctoral researcher at the University of Leicester in the U.K., said in a statement. "They reveal not only where these creatures lived and how they moved but also offer clues about their behaviour and daily activities in ecosystems that have long since vanished."

Many pterosaur studies have focused on their flight and feeding. However, researchers have uncovered many fossilized pterosaur tracks in recent decades, which represent a unique and untapped resource, according to the study.

The problem with pterosaur tracks — or any other extinct animal tracks — is that it's difficult for researchers to know which species or group left them behind. Fossilization is rare, and researchers typically don't find bones and tracks alongside each other, which fossilize under different conditions.

For the new study, researchers created 3D models of pterosaur tracks and compared them with different pterosaur skeletons. They identified three distinct pterosaur track types and linked them to three known groups: ctenochasmatoids, dsungaripterids and neoazhdarchians. The neoazhdarchian group included *Quetzalcoatlus northropi*, one of the largest pterosaurs — and largest flying animals — to ever live.

They used this analysis to show that neoazhdarchian footprints were present in coastal and inland regions, suggesting that the animal was often on the ground, living in the same environments as dinosaurs, according to the statement.

Reference:

https://www.livescience.com/animals/dinosaurs/pterosaur-tracks-reveal-flying-reptiles-were-comfortable-on-land-too-some-even-shared-environments-with-dinosaurs?utm_term=8DEBC9E5-6C7F-4337-AFFF-

 $\underline{D9A51CC6C2C0\&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8}\\ \underline{f\&utm_campaign=368B3745-DDE0-4A69-A2E8-}$

62503D85375D&utm medium=email&utm content=83303A6A-B062-4168-AED9-

969C76D730B6&utm source=SmartBrief

Podcast Video

Massive Quake Causes Ground To Move Laterally!

MUST SEE Video and Geologist Analysis

Shawn Willsey: Geology Explained

12 May 2025

As suggested by FGS Member, Angela Snowling

Geology professor Shawn Willsey briefly reviews the M7.7 quake in Burma/Myanmar from March 28, 2025, and shares an INCREDIBLE video at 6:24 mark that shows surface rupture from this large and destructive earthquake. Also included is a summary of this quake from the USGS.

Reference:

https://www.youtube.com/watch?v=CfKFK4-HNmk

https://www.youtube.com/watch?v=77ubC4bcgRM

News

Scientists think a hidden source of clean energy could power Earth for 170,000 years — and they've figured out the 'recipe' to find it

Sascha Pare, LiveScience

14 May 2025

Researchers have compiled a list of "ingredients" that could help resource exploration companies locate huge reservoirs of clean hydrogen, a critical element in the transition away from fossil fuels.

Recent breakthroughs suggest that hydrogen reservoirs are buried in countless regions of the world, including at least 30 U.S. states.

Finding such reservoirs could help accelerate a global energy transition, but until now, geologists only had a piecemeal understanding of how large hydrogen accumulations form — and where to find them.

"The game of the moment is to find where it has been released, accumulated and preserved," Chris Ballentine, a professor and chair of geochemistry at the University of Oxford and lead author of a new review article on hydrogen production in Earth's crust, told *Live Science* in an email.

Ballentine's new paper starts to answer those questions. According to the authors, Earth's crust has produced enough hydrogen over the past 1 billion years to meet our current energy needs for 170,000 years. What's still unclear is how much of that hydrogen could be accessed and profitably extracted.

In the new review, published Tuesday (May 13) in the journal **Nature Reviews Earth and Environment**, the researchers draw up an "ingredient" list of geological conditions that stimulate the creation and build-up of natural hydrogen gas below ground, which should make it easier to hunt for reservoirs.

"The specific conditions for hydrogen gas accumulation and production are what a number of exploration companies (e.g. Koloma, funded by a consortium led by Bill Gates Breakthrough Energy fund, Hy-Terra funded by Fortescue, and Snowfox, funded by BP [British Petroleum] and RioTinto) are looking at carefully and this will vary for different geological environments," Ballentine said.

Natural hydrogen reservoirs require three key elements to form: a source of hydrogen, reservoir rocks and natural seals that trap the gas underground. There are a dozen natural processes that can create hydrogen, the simplest being a chemical reaction that splits water into hydrogen and oxygen — and any type of rock that hosts at least one of these processes is a potential hydrogen source, Ballentine said.

"One place that is attracting a lot of interest is in Kansas where a feature called the mid continental rift, formed about 1 billion years ago, created a huge accumulation of rocks (mainly basalts) that can react with water to form hydrogen," he said. "The search is on here for geological structures that may have trapped and accumulated the hydrogen generated."

Based on knowledge of how other gases are released from rocks underground, the review's authors suggest that tectonic stress and high heat flow may release hydrogen deep inside Earth's crust. "This helps to bring the hydrogen to the near surface where it might accumulate and form a commercial resource," Ballentine said.

Within the crust, a wide range of common geological contexts could prove promising for exploration companies, the review found, ranging from ophiolite complexes to large igneous provinces and Archaean greenstone belts.

Ophiolites are chunks of Earth's crust and upper mantle that once sat beneath the ocean but were later thrust onto land. In 2024, researchers discovered a massive hydrogen reservoir within an ophiolite complex in Albania. Igneous rocks are those solidified from magma or lava, and Archaean greenstone belts are up to 4 billion-year-old formations that are characterized by green minerals, such as chlorite and actinolite.

The conditions discussed in the review are the "first principles" for hydrogen exploration, study coauthor Jon Gluyas, a professor of geoenergy, carbon capture and storage at Durham University in the U.K., said in a statement. The research outlines the key ingredients that companies should consider when developing their exploration strategies, including processes through which hydrogen might migrate or be destroyed underground.

"We know for example that underground microbes readily feast on hydrogen," co-author Barbara Sherwood Lollar, a professor of Earth sciences at the University of Toronto, said in the statement. So, environments where bacteria could come in contact with hydrogen-producing rocks may not be great places to look for reservoirs, Sherwood Lollar said.

Hydrogen is used to make key industrial chemicals such as methanol and ammonia, which is a component in most fertilizers. The gas could also aid the transition away from fossil fuels, as hydrogen can power both cars and power plants.

But hydrogen today is produced from hydrocarbons, meaning manufacture of the gas comes with huge carbon emissions. "Clean" hydrogen from underground reservoirs has a much smaller carbon footprint, because it occurs naturally.

Earth's crust produces "plenty of hydrogen," Ballentine said, and it is now a question of following the ingredient list to find it.

Reference:

https://www.livescience.com/planet-earth/geology/scientists-think-a-hidden-source-of-clean-energy-could-power-earth-for-170-000-years-and-theyve-figured-out-the-recipe-to-find-

it?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8 f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=F6539B91-15F4-4880-B364-

7CD6F6BFC890&utm source=SmartBrief

Gigantic 'mud waves' buried deep beneath the ocean floor reveal dramatic formation of Atlantic when Africa and South America finally split

Stephanie Pappas, LiveScience

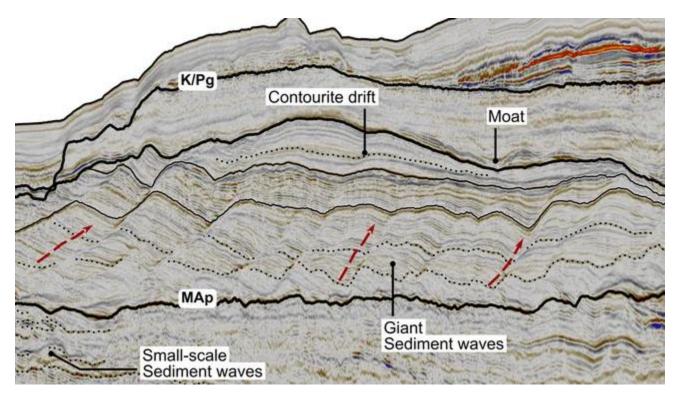
14 May 2025

Enormous "mud waves" buried under the Atlantic seabed formed 117 million years ago as the Atlantic Ocean opened up.

The discovery of buried "mud waves" off the coast of western Africa reveals that the Atlantic Ocean was born at least 4 million years earlier than scientists previously thought.

These waves, each hundreds of feet high and over half a mile (1 kilometre) long, were caused by the mixing of extremely salty water from the southern hemisphere with less-salty water from the northern hemisphere as South America and Africa tore apart 117 million years ago, forming the Atlantic, according to new research published in the June issue of the journal *Global and Planetary Change*.

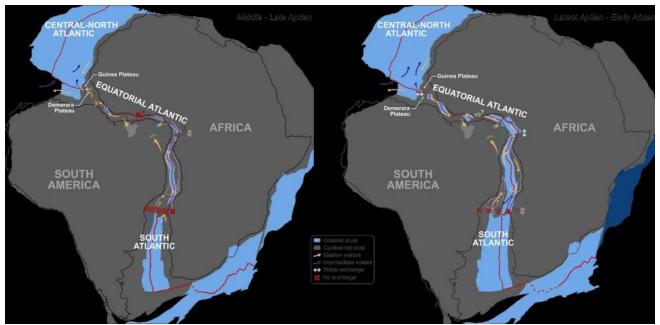
Previously, the Atlantic was thought to have finished opening between 113 million and perhaps 72 million years ago.



The "mud waves" discovered off the coast of Africa, under the Atlantic Ocean, are hundreds of feet high and almost a mile long. (Image credit: courtesy of D Duarte et al/Heriot-Watt University).

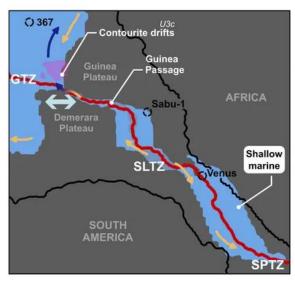
The giant waves were found in sediment cores drilled from 0.6 mile (1 km) below the seabed about 250 miles (400 km) west of Guinea-Bissau in 1975, as part of the Deep Sea Drilling Project. The ocean-drilling project confirmed that Earth's surface is broken into rafts of ever-moving tectonic plates.

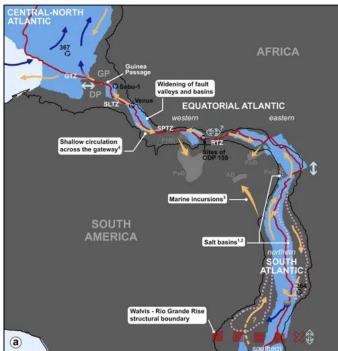
In further studying these cores, Heriot-Watt University geologists Débora Duarte and Uisdean Nicholson found evidence of huge mud waves in this region, which would have been the last spot to pull apart when Africa and South America split.



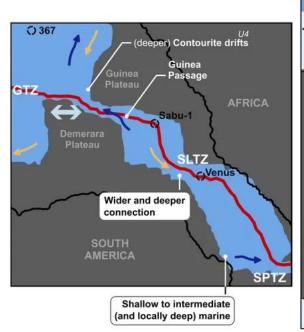
The mud waves formed when water from the north and south, with very different salinities, were mixed together following the final split of South America and Africa. (Image credit: courtesy of D Duarte et al/Heriot-Watt University)

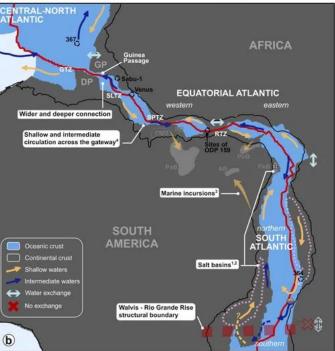
Stage 2 Latest Aptian - Early Albian





Late Albian





Reconstruction of the final stages of the separation of Africa and South America, with a series of basins between the North and South Atlantic. (Image credit: courtesy of D Duarte et al/Heriot-Watt University).

"Imagine one-kilometre-long waves, a few hundred metres high: a whole field formed in one particular location to the west of the Guinea Plateau, just at the final 'pinch-point' of the separating continents of South America and Africa," Nicholson said in a statement. "They formed because of dense, salty water cascading out of the newly formed gateway."

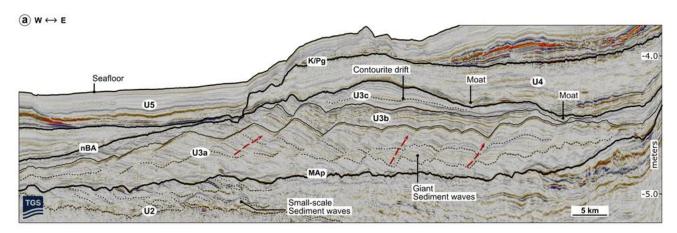
Before the Atlantic split South America and Africa for good, the final connection between the two continents would have been a series of deep basins, which were probably lakes, Duarte said in the statement.

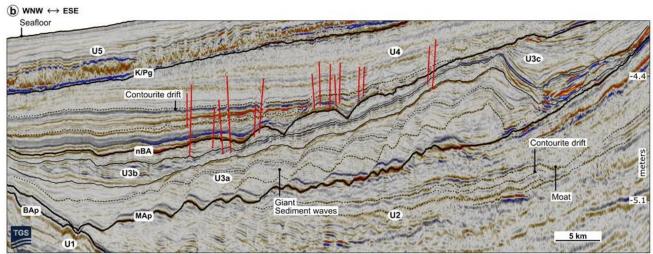
At that time, the South Atlantic was rich in salt deposits that made its water very saline, while the North Atlantic was less salty. This difference in salinity caused huge currents when the northern and southern Atlantic waters mixed. The currents, in turn, created the enormous mud waves along the seabed.

Over the eons, more sediment has buried the waves, locking them below the surface.

The existence of these waves 117 million years ago also suggests that the opening of the Atlantic caused Earth's climate to warm, Duarte said.

The basins that flooded in the final rifting of South America and Africa were rich in carbon, and the birth of the ocean would have made the sequestering of carbon less efficient. This reduced efficiency led to a period of warming between 117 million and 110 million years ago, the researchers said. After that, the ocean currents that circulate throughout the Atlantic stabilized, leading to a period of cooling.





The mud waves were buried beneath sediment over 117 million years, the researchers found. (Image credit: courtesy of D Duarte et al/Heriot-Watt University)

"This shows that the gateway played a really important role in global climate change," Duarte said in the statement.

Reference:

https://www.livescience.com/planet-earth/geology/gigantic-mud-waves-buried-deep-beneath-the-ocean-floor-reveal-dramatic-formation-of-atlantic-when-africa-and-south-america-finally-split?utm term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8

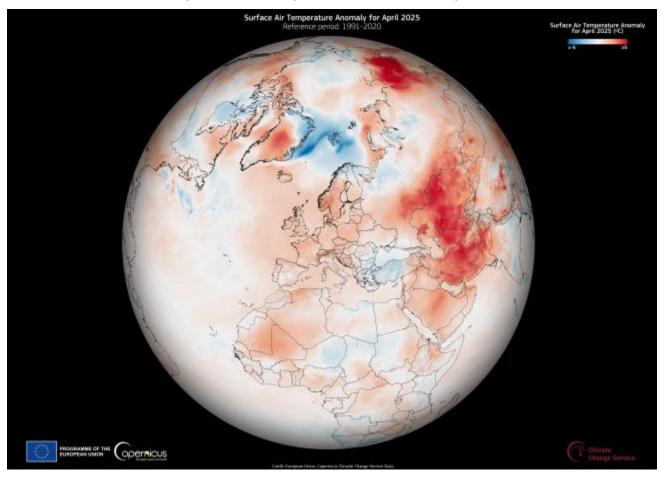
ka (kilo-annum)	=	thousand years (10 ³)	One thousand seconds	=	16.67 minutes
Ma (mega-annum)	=	million years (10 ⁶)	One million seconds	=	11.57 days
Ga (giga-annum)	=	billion years (109)	One billion seconds	=	31.71 years
Ta (tera-annum)	=	trillion years (10 ¹²)	One trillion seconds	=	31,709.79 years

Image Of The Day 4

April 2025 was the second warmest April on record globally

Date: 14 May 2025 Location: Europe





The Copernicus Climate Change Service (C3S) has published its latest monthly Climate Bulletin, focused on key climate trends in April 2025.

The bulletin reports that April 2025 was the second warmest April on record globally, with an average surface air temperature of 14.96°C, 0.60°C above the 1991-2020 average for the month. Furthermore, April 2025 measured 1.51°C above the pre-industrial average. In Europe, the average temperature for April was 9.38°C, 1.01°C above the 1991-2020 average

This data visualisation, produced using C3S data, illustrates the surface air temperature anomalies for April 2025 across the Northern Hemisphere. Shades of red indicate areas with above-average temperatures, while blue tones show below-average values. The intense warm anomalies over parts of western Asia and Scandinavia are particularly notable, as are the cooler conditions observed over Greenland and parts of the northern Atlantic Ocean.

Reference:

https://www.copernicus.eu/en/media/image-day-gallery/april-2025-was-second-warmest-april-record-globally

News

Solving the mystery of a dinosaur mass grave at the 'River of Death'

Rebecca Morelle, BBC Science editor & Alison Francis, BBC Senior science journalist
19 May 2025



A hip bone of a Pachyrhinosaur is one of thousands of discoveries in the creek (Image source: Kevin Church/BBC News).

Hidden beneath the slopes of a lush forest in Alberta, Canada, is a mass grave on a monumental scale. Thousands of dinosaurs were buried here, killed in an instant on a day of utter devastation.

Now, a group of palaeontologists have come to **Pipestone Creek** - appropriately nicknamed the "River of Death" - to help solve a 72-million-year-old enigma: how did they die?



Pipestone Creek still holds many secrets (Image source: Kevin Church/BBC News).

Trying to work out exactly what happened here starts with the hefty strike of a sledgehammer. Brute force is needed to crack open the thick layer of rock that covers what Professor Emily Bamforth, who's leading the dig, describes as "palaeo gold".

As her team begins the more delicate job of removing the layers of dirt and dust, a jumble of fossilised bones slowly begins to emerge.

"That big blob of bone right there is, we think, part of a hip," Prof Bamforth says, watched on by her dog Aster - whose job today is to bark if she spots any nearby bears. "Then here, we have all of these long, skinny bones. These are all ribs. And this is a neat one - it's part of a toe bone. This one here, we have no idea what it is - it's a great example of a Pipestone Creek mystery."

BBC News has come to Pipestone Creek to witness the sheer scale of this prehistoric graveyard and see how researchers are piecing together the clues. Thousands of fossils have been collected from the site and are constantly generating new discoveries.

The bones all belong to a dinosaur called *Pachyrhinosaurus*. The species, and Prof Bamforth's excavation, feature in a new landmark BBC series - **Walking With Dinosaurs** - which uses visual effects and science to bring this prehistoric world to life.

These animals, which lived during the Late Cretaceous period, were a relative of the Triceratops. Measuring about five metres long and weighing two tonnes, the four-legged beasts had large heads, adorned with a distinctive bony frill and three horns. Their defining feature was a big bump on the nose called a boss.

The dig season has just started and lasts each year until autumn. The fossils in the small patch of ground that the team are working on are incredibly tightly packed; Prof Bamforth estimates there are up to 300 bones in every square metre.



Pachyrhinosaurus had distinctive unicorn-style horns, as shown in this computer-generated image (Image source: Walking with Dinosaurs/BBC Studios).

So far, her team has excavated an area the size of a tennis court, but the bed of bones extends for a kilometre into the hillside. "It's jaw dropping in terms of its density," she tells us. "It is, we believe, one of the largest bone beds in North America. More than half of the known dinosaur species in the world are described from a single specimen. We have thousands of *Pachyrhinosaurus* here."

Palaeontologists believe the dinosaurs were migrating together in a colossal herd for hundreds of miles from the south - where they had spent the winter - to the north for the summer.

The area, which had a much warmer climate than it does today, would have been covered in rich vegetation, providing abundant food for this enormous group of plant-eating animals.

"It is a single community of a single species of animal from a snapshot in time, and it's a huge sample size. That almost never happens in the fossil record," says Prof Bamforth.

Bigger beasts offering clues

And this patch of north-western Alberta wasn't just home to *Pachyrhinosaurus*. Even bigger dinosaurs roamed this land and studying them is essential to try and understand this ancient ecosystem.

Two hours' drive away, we reach the Deadfall Hills. Getting there involves a hike through dense forest, wading - or doggy-paddling in the case of Aster - across a fast-running river and clambering over slippery rocks.

No digging is required here; super-sized bones lie next to the shoreline, washed out from the rock and cleaned by the flowing water, just waiting to be picked up. A huge vertebra is quickly spotted, as are bits of ribs and teeth scattered across the mud.

Palaeontologist Jackson Sweder is particularly interested in what looks like a chunk of dinosaur skull. "Most of what we find here is a duck-billed dinosaur called *Edmontosaurus*. If this is a skull bone, this is a dinosaur that's large - probably 30ft (10m) long," he says.

The *Edmontosaurus*, another herbivore, roamed the forests like the *Pachyrhinosaurus* - and is helping palaeontologists build up a picture of this ancient land.



Jackson Sweder works on 'Big Sam' for clues about this ancient world (Image source: Kevin Church/BBC News).

Sweder is the collection manager at the **Philip J Currie Dinosaur Museum** in nearby Grande Prairie, where the bones from both of these giants are taken to be cleaned up and analysed. He is currently working on a huge *Pachyrhinosaurus* skull that's about 1.5m long and has been nicknamed "Big Sam".

He points to where the three horns should be at the top of the frill, but the one in the middle is missing. "All the skulls that are decently complete have a spike in that spot," he says. "But its nice little unicorn spike doesn't seem to be there."

Throughout years working at the extraordinary site, the museum team has collected 8,000 dinosaur bones, and the surfaces of the lab are covered in fossils; there are bones from *Pachyrhinosaurus* of every size, from young to old.

Having material from so many animals allows researchers to learn about dinosaur biology, answering questions about how the species grows and the make-up of the community. They can also look at individual variations, to see how one Pachyrhinosaurus could stand out from the herd – as may be the case with Big Sam and his missing spike.

A sudden devastating event

All of this detailed research, in the museum and at the two sites, is helping the team to answer the vital question: how did so many animals in Pipestone Creek die at the same time?

"We believe that this was a herd on a seasonal migration that got tangled up in some catastrophic event that effectively wiped out, if not the entire herd, then a good proportion of it," Prof Bamforth says.



A wave can be seen in a rock found from the creek (Image source: Kevin Church/BBC News).



Before disaster struck, the Pachyrhinosaurus are thought to have been migrating, as shown in this computerised image (Image source: Walking With Dinosaurs/BBC Studios).

All the evidence suggests that this catastrophic event was a flash flood - perhaps a storm over the mountains that sent an unstoppable torrent of water towards the herd, ripping trees from their roots and shifting boulders.

Prof Bamforth says the *Pachyrhinosaurus* wouldn't have stood a chance. "These animals are not able to move very fast because of their sheer numbers, and they're very top heavy - and really not very good at swimming at all."

Rocks found at the site show the swirls of sediment from the fast-flowing water churning everything up. It's as if the destruction is frozen in time as a wave in the stone.

But this nightmare day for the dinosaurs is now a dream for palaeontologists.

"We know, every time we come here, it's 100% guaranteed we'll find bones. And every year we discover something new about the species," says Prof Bamforth. "That's why we keep coming back, because we're still finding new things."

As the team packs up their tools ready to return another day, they know there's a lot of work ahead. They've only just scratched the surface of what's here - and there are many more prehistoric secrets just waiting to be revealed.

The new series of **Walking With Dinosaurs** starts on **Sunday 25 May** at **18:25 BST** on **BBC One**, with all episodes available on **BBC iPlayer**.

References:

https://www.bbc.co.uk/news/articles/c0k3x8lmje1o

https://www.theguardian.com/tv-and-radio/2025/may/19/walking-with-dinosaurs-is-back-to-challenge-everything-you-know-bbc

https://www.theguardian.com/science/2025/may/25/arctic-feathered-or-just-weird-what-have-welearned-since-walking-with-dinosaurs-aired-25-years-ago

Interesting Video

Watch: Hawaii's Kilauea volcano spews lava as high as the Eiffel Tower

One of the world's most active volcanoes has erupted again in Hawaii. According to the Hawaiian Volcano Observatory, in some areas the fountains of lava erupting from the vents has reached up to 1000ft (300m) in height, which is almost the height of the Eiffel Tower. Since an eruption on 23 December, activity around the volcano has been stop-start, lasting as little as 13 hours to as long as eight days.



References:

https://www.bbc.co.uk/news/videos/c071vx4vrpzo

https://www.livescience.com/planet-earth/volcanos/watch-mesmerizing-1-000-foot-tall-lava-fountains-kilauea-volcano-erupting-in-ways-not-seen-for-40-years?utm_term=8DEBC9E5-6C7F-4337-AFFF-

<u>D9A51CC6C2C0&Irh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8</u> f&utm_campaign=368B3745-DDE0-4A69-A2E8-

<u>62503D85375D&utm_medium=email&utm_content=90A59B11-2BDF-40B3-90AE-</u> 3FB3B81FC659&utm_source=SmartBrief

News

Africa is being torn apart by a 'superplume' of hot rock from deep within Earth, study suggests

Patrick Pester, LiveScience

27 May 2025

Researchers have found fresh evidence that Africa is breaking apart because of a deep mantle superplume of hot rock beneath the East African Rift System.

Researchers have found new evidence that a gigantic superplume of hot rock is rising beneath Africa, causing intense volcanic activity and splitting the continent in two.

Geologists have long known that Africa is slowly breaking apart in a region called the East African Rift System (EARS), but the driving force behind this massive geological process was up for debate. Now, a new study has presented geochemical evidence that a previously theorized superplume is pressing up against — and fracturing — the African crust.



The East African Rift System drives volcanic activity in places like the Erta Ale volcano in Ethiopia (pictured here). (Image credit: Mike Korostelev via Getty Images)

Scientists found that gases at the Meengai geothermal field in central Kenya have a chemical signature that comes from deep inside Earth's mantle, likely from between the bottom of the mantle and the core. The signature matches those of gases found in volcanic rocks to the north, in the Red Sea, and to the south, in Malawi, indicating all of these places are sitting on the same deep mantle rock, according to a statement from the University of Glasgow in Scotland.

"The deep mantle signatures observed in different segments of EARS are remarkably similar, suggesting that they all originate from a common deep source," study first-author Biying Chen, a postdoctoral research associate in the School of Geosciences at the University of Edinburgh in Scotland, told *Live Science* in an email.

The researchers published their findings May 12 in the journal *Geophysical Research Letters*.

EARS is the largest active continental rift system on Earth, ripping through around 2,175 miles (3,500 kilometres) of Africa. The lithosphere, Earth's rocky outer shell of crust and upper mantle, has been gradually breaking apart across the rift for around 35 million years. This has left a network of valleys that carve through the top of the continent from the Red Sea off northeastern Africa to Mozambique in southern Africa.

Previous studies identified signs of a deep mantle plume beneath EARS in noble gas signatures. Noble gases, such as helium and neon, are rare and inert, which means they usually don't chemically react with other substances. As a result, they stick around for a long time, so researchers can use them to trace long-term geological processes. However, Chen noted that these geochemical tracers have been sparse and often controversial beneath EARS.

To help clarify what's going on beneath EARS, the team used high-precision instruments to look for neon (Ne) isotopes in Kenyan gases — and they detected a deep mantle signature. The signature in the gases is very similar to those of the most primordial (ancient) surface signatures in Hawaii, which is also thought to be sitting on a deep mantle plume.

"We were very excited to see the preliminary Ne isotope data showing the primordial deep mantle signature," Chen said. "But the deep mantle signature is small, and we had to work hard to disentangle it — truthfully there was no Eureka moment, we frequently questioned the result and spent many hours checking and re-checking the data."

Once the team had rigorously assessed the data, they became confident that the signature was genuine and matched signatures found in other parts of the rift. Chen noted that the EARS plume likely originates from the core-mantle boundary, about 1,800 miles (2,900 km) deep inside the Earth.

While the EARS signatures are similar to those found in volcanic rocks on Hawaii, Chen noted that the Hawaii plume is proposed to be a discrete rising stream of hot mantle, a bit like a lava lamp, while the EARS plume is probably a different shape.

"More likely a large mass of upwelling of hot buoyant material from deep within the Earth has replaced the mantle that was originally beneath the EARS," Chen said. "As it has risen and meets the solid colder lithosphere it spreads out generating enough force to fracture the thin lithosphere, leading to intense volcanic activity in the region."

Reference:

https://www.livescience.com/planet-earth/geology/africa-is-being-torn-apart-by-a-superplume-of-hot-rock-from-deep-within-earth-study-suggests?utm_term=8DEBC9E5-6C7F-4337-AFFF-

<u>D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8</u> f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=EB3AA47C-CFAA-4C68-A74D-

490D18C1E1B9&utm source=SmartBrief

The closer a volcano is to erupting, the greener the trees around it look from space

Sascha Pare, LiveScience

30 May 2025

Scientists have found a way to monitor volcanic carbon dioxide levels — one of the first signs a volcano might be about to blow — that doesn't involve trekking up a mountain.

Scientists can tell whether a volcano is about to erupt from the greenness of the trees around it, with more vibrant leaves indicating a potentially imminent blast.

Until now, these subtle colour changes could be observed only from the ground — but researchers have recently found a way to monitor them from space.



Satellites can now detect one of the first signs that a volcano is about to erupt. (Image credit: Gani Pradana Ongko Prastowo/Getty Images)

A new collaboration between NASA and the Smithsonian Institution could "change the game" when it comes to detecting the first signs of a volcanic eruption, volcanologists said in a statement published by **NASA** earlier this month. These signs can help to protect communities against the worst effects of volcanic blasts, including lava flows, ejected rocks, ashfalls, mudslides and toxic gas clouds.

"Volcano early warning systems exist," Florian Schwandner, a volcanologist and chief of the Earth Science Division at NASA's Ames Research Center in California, said in the statement. "The aim here is to make them better and make them earlier."

Current indicators of an imminent volcanic eruption include seismic activity, changes in ground height and sulfur dioxide emissions, which are visible from space. Scientists also look out for carbon dioxide (CO2) emissions linked to magma near Earth's surface, but these are harder to pinpoint with satellites than sulfur dioxide due to the ubiquity of CO2 in the atmosphere.

"A volcano emitting the modest amounts of carbon dioxide that might presage an eruption isn't going to show up in satellite imagery," Robert Bogue, a doctoral student in volcanology at McGill University, Canada, said in the statement.

But researchers are particularly interested in detecting these emissions because CO2 is one of the very first signs of a coming eruption — preceding even sulfur dioxide, according to the statement.

To that end, scientists have been developing methods to monitor carbon dioxide based on the colour of trees around volcanoes. Clouds of CO2 wafting from volcanoes that are about to blow boost the health of surrounding trees and plants, making their leaves greener and more lush.

"The whole idea is to find something that we could measure instead of carbon dioxide directly," Bogue said in the statement.

Until recently, scientists had to trek to volcanoes if they wanted to measure their CO2 levels. By using the colour of tree leaves as an indicator of volcanic gas concentrations, researchers can save themselves the trouble of accessing remote and potentially dangerous locations — instead relying on satellites to do the hard work.

A 2024 study published in the journal *Remote Sensing of Environment* revealed a strong correlation between the carbon dioxide and trees around Mount Etna in Italy. Using pictures taken by Landsat 8 and other Earth-observing satellites between 2011 and 2018, the study's authors showed 16 clear spikes in both the amount of CO2 and vegetation's greenness, which coincided with upward migrations of magma from the volcano.

"There are plenty of satellites we can use to do this kind of analysis," study lead author Nicole Guinn, a doctoral student in volcanology at the University of Houston in Texas, said in the statement.

Measuring the greenness of trees from space won't be useful in all volcanic settings, however. Many volcanoes don't host trees – or at least not enough trees to measure with satellites, according to the statement. Some trees and forests may respond unexpectedly to changing carbon dioxide levels — for example, if they have been affected by fires, diseases or abnormal weather conditions.

"Tracking the effects of volcanic carbon dioxide on trees will not be a silver bullet," Schwandner said. "But it is something that could change the game."

To expand on the potential of the new method, researchers from NASA, the Smithsonian Institution and other organizations recently launched the Airborne Validation Unified Experiment: Land to Ocean (AVUELO), which will compare satellite images of trees around volcanoes with ground observations. The aim is to ensure the data match, so that scientists can calibrate space-borne instruments and take the research forward.

References:

https://www.livescience.com/planet-earth/volcanos/the-closer-a-volcano-is-to-erupting-the-greener-the-trees-around-it-look-from-space?utm_term=8DEBC9E5-6C7F-4337-AFFF-

<u>D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8</u> f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=B8519777-9519-45BF-8C40-

C76D2FC12A4E&utm source=SmartBrief

Mount Etna erupts as large plumes rise from volcano

Esme Stallard, Climate and science correspondent & Alex Boyd, BBC News 2 June 2025

Italy's Mount Etna has erupted, with large plumes of ash seen rising from the volcano. Images and

video from the island of Sicily showed volcanic material spilling out of the volcano on Monday morning.

A number of explosions of "increasing intensity" were recorded in the early hours on Monday morning, Italy's National Institute of Geophysics and Volcanology (INGV) Etna Observatory said.

The full scale of the eruption is currently unclear, and disruption appears to be minimal, with flights departing and arriving as usual at the island's airports.



The eruption as seen from the nearby town of Milo. (Image Credit: Reuters)

Mount Etna is one of the world's most active volcanoes, so eruptions are not uncommon, and its outbursts rarely cause significant damage or injury.

Ground movements indicated the latest eruption happened on the southeastern edge of the volcano, according to INGV. This appears to be where a known 200m-wide vent is.

Footage shared throughout Monday shows a rapidly moving mix of ash, gas and rock - known as a pyroclastic flow - emerging from the site and moving down the side of the volcano.

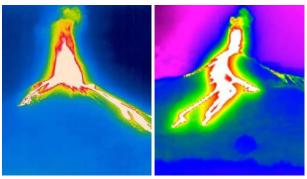
Geologists monitoring the eruption said it was likely that part of volcano's crater collapsed and that this was the material being carried down its slopes.

Pyroclastic flow can be very dangerous to the surrounding area, but there has been no indication of an imminent threat.

In its most recent update, INGV noted that the volcanic material had not yet gone past the Valley of the Lion, the point on the approach to the summit where tourist trips stop.

INGV said it first recorded changes in the volcano's activity at 00:39 local time (22:39 GMT), before clarifying that there was an ongoing "Strombolian" eruption. The size of Strombolian eruptions can vary but often characterised intermittent explosions, which occur due to the presence of gas in the magma chamber within the volcano. When the gas bubbles reach the surface, they can burst suddenly, throwing material skywards. The process is not dissimilar to letting gas out of a fizzy drink.

These types of eruptions can be particularly dangerous for nearby aircraft. A red alert was reportedly issued earlier on Monday, possibly suspending flights operating nearby, but this was later downgraded.



Thermal imaging cameras show the Mount Etna eruption earlier on Monday. (Image source: INGV)



2 June 2025

https://www.facebook.com/groups/257770391025303/?hois ted section header type=recently seen&multi permalinks =3522730531195923 Mount Etna's last notable eruption came in February and caused the island's Catania airport to divert dozens of flights because of ash clouds. Tourists were also warned to stay away from the volcano's lava flows.

References:

https://www.bbc.co.uk/news/articles/cy5e7vx2pk9o

https://www.esa.int/ESA Multimedia/Images/2025/06/Mount Etna erupts

https://www.skyatnightmagazine.com/earth-from-space/mount-etna

https://www.livescience.com/planet-earth/volcanos/watch-mount-etna-erupt-europes-largest-

volcano-blows-as-tourists-scramble-to-safety?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8

f&utm campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=36E50810-6A49-4E9A-8717-

591CD8F60286&utm source=SmartBrief

Earthquake News

BGS SEISMIC ALERT: NORTHERN NORTH SEA

7 JUNE 2025 09:25 UTC

The following preliminary information is available:

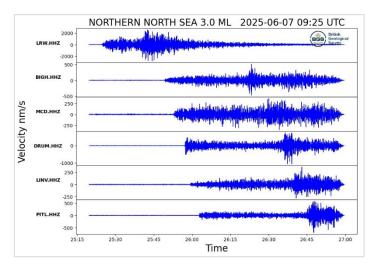
LAT/LON: 59.856° North / 1.196° East GRID REF: 579.0 kmE / 1112.1 kmN

DEPTH: 14 km

MAGNITUDE: 3.0 ML

Epicentre is approx. 135 km ESE of Lerwick,

Shetland Islands.



TV Review

Volcano with Dara Ó Briain

Channel 5 Available Until: 09 February 2030

Dara O Briain explores the immense power of Italy's most active volcanoes.

David Hollingsworth, whattowatch

28 March 2025

'Volcanoes are very alluring, so you're drawn like a moth to a flame,' says Dara

Volcano with Dara Ó Briain is a new two-part documentary series on Channel 5 where the star investigates the awesome power of volcanoes. The comedian heads to Italy, where he visits **Stromboli**, whose constant eruptions have earned it the nickname "Lighthouse of the Mediterranean".

Dara tells us: "Stromboli is a very interesting volcano, because it's like an open valve straight into hell and every 30 seconds it's spitting stuff out. When dusk appears so do the colours of the eruptions and they're amazing. We were all filming them on our phones — we wanted to capture the sight."

He also goes to **Campi Flegrei** and **Mount Etna**, where volcanic soils produce some of the best wines in the world. And he also goes to **Vesuvius**, where a devastating eruption thousands of years ago, buried a city.

Dara tells us: "Volcanoes are very alluring, so you're drawn like a moth to a flame. But we didn't get too close, and the team were very cautious. I once almost died in a river while filming for Comic Relief, so I don't do danger for the cameras anymore!

Where does Dara go?

In episode 1, he begins with a mission to uncover the inner workings of volcanoes, starting out in Sicily, home to the mighty Mount Etna — Europe's largest and most active volcano.

In episode 2, Dara travels to mainland Italy and, with the help of volcanologist Dr. Dougal Jerram, he learns about a deadly phenomenon known as a pyroclastic flow. In Naples, he explores the story of Mount Vesuvius and its 79 AD eruption.

Dara learns in the series how scientists can predict eruptions. "When you're on a volcano, you think, 'This could go at any moment.' But actually, scientists would see an uptick in activity, such as the changing nature of the gases. Even before Vesuvius erupted in AD 79, Pompeiians had noticed changes. Nowadays, the city would be cleared after those changes had been spotted. The authorities would have enough of a warning, so it's not as if it just goes 'boom'!"

Reference:

https://www.whattowatch.com/watching-guides/volcano-with-dara-o-briain-release-date-and-everything-we-know

https://www.channel5.com/show/volcano-with-dara-o-briain

News

Geologists unveil UK 'super regions' with best potential for transition projects

BGS scientists say eight regions of the UK can play a key role in geothermal energy and carbon capture and storage.

Energy Voice

10 June 2025

Geologists have unveiled "super regions" throughout the UK with the best geological potential to host energy transition technologies, including geothermal energy, and carbon capture and storage (CCS).

The findings, published by the **British Geological Survey (BGS)**, show the UK has an incredibly diverse subsurface, which can play a key role in supporting efforts to reach the country's legally binding climate goals.



Geothermal energy infrastructure in Cornwall. © Supplied by Eden Geothermal

Many areas have geology that is well suited to certain net zero technologies, including shallow geothermal installations or critical minerals occurrences. But BGS scientists say eight super regions contain subsurface formations and conditions that are favourable to multiple different technologies within a relatively small area.

These are Northern Ireland, the Scottish Central Belt, north-east England, north-west England, the South Yorkshire and Humber region, the East Midlands and East Anglia, South Wales and south-west England.

Here, the subsurface can provide a sustainable heat source for geothermal energy, geological formations for secure storage of energy and carbon dioxide (CO2), rocks containing important resources for mineral extraction, and suitable geological foundation conditions for onshore and offshore wind infrastructure projects, the scientists said.

For example, south-west England has significant deep geothermal resources offering opportunities for sustainable heat and power generation while its sedimentary basins provide potential sites for CCS and energy storage, they added.

Meanwhile, the Scottish Central Belt boasts a complex geology, including sedimentary reservoir rocks and significant igneous intrusions, abundant geothermal resources, abandoned coal mines and a legacy of subsurface data, they said.

Geology and the UK energy transition

The BGS said its findings offer crucial insights and a road map for decision makers, ministers and land managers looking to maximise return on investment in the energy transition.

The geologists assessed that strategic spatial planning for such technologies in these areas can help unlock an estimated £40 billion of annual investment and support the Government's target of creating 650,000 jobs through renewable energy by 2030. But they added that further investigation will be required to fully establish each of the super region's true potential, ensure safe deployment of each technology, and understand environmental impact.

Michelle Bentham, BGS chief scientist for decarbonisation and resource management, said: "The UK is incredibly diverse in its geology. Because it's out of sight, geology gets a little bit forgotten about. And I don't think people realise how blessed we are in the UK, if you like, in terms of the geology that could really help us have a sustainable future. But you can really see the difference that geology could make to reaching Government goals in terms of net zero, energy provision, clean energy."

Ms Bentham said funding and the policy landscape may have been barriers to rolling out technologies such as CCS and geothermal energy across the UK. "In Europe, geothermal energy is used much more widely. In the UK, we don't use it as widely and it's always been a bit of a Cinderella of clean energy technologies," she said. "And in the North Sea, we could potentially become a hub for carbon storage in Europe for countries that don't have the right geology who are trying to decarbonise," she added.

The BGS contributed to the consultation on the Government's upcoming land use framework, which looks at how England's finite land can meet the escalating demands of food security, clean energy, nature restoration and new homes. But the framework is focusing more on surface demands, with some scope for shallow subsurface areas such as geothermal infrastructure.

Ms Bentham said strategic spatial planning for the subsurface could also help optimise the UK's resources for the energy transition. For example, it could stop decision makers from locking into one technology – such as wind farms or CCS – in one area where another could have yielded more benefits, or where multiple technologies could have been deployed.

"Like the map, it's not one technology that's going to be the answer," she said. "That's why we need this combination to give us flexibility."

The BGS highlighted that the data underpinning its research has been shaped by geologists' current understanding of the subsurface, adding that a few parts of the country have been less extensively surveyed than others, and more research is required to fully assess their potential.

Reference:

https://www.energyvoice.com/renewables-energy-transition/geothermal/574020/geologists-unveil-uk-super-regions-with-best-potential-for-transition-

projects/?utm_source=Sailthru&utm_medium=email&utm_campaign=Energy%20Voice%20-%20Lite%20Newsletter%20%5BB%5D%202025-06-10&utm_term=Energy%20Voice%20-%20Lite%20Newsletter%20%5BB%5D

New species of dinosaur discovered that 'rewrites' T.rex family tree

Victoria Gill, Science correspondent, BBC News 12 June 2025

Scientists have discovered a new species of dinosaur - in the collection of a Mongolian museum - that they say "rewrites" the evolutionary history of tyrannosaurs.

Researchers concluded that two 86 million-year-old skeletons they studied belonged to a species that is now the closest known ancestor of all tyrannosaurs - the group of predators that includes the iconic *T.rex*.

The researchers named the species *Khankhuuluu* (pronounced khan-KOO-loo) *mongoliensis,* meaning Dragon Prince of Mongolia.

An artist's impression of Khankhuuluu mongoliensis, the newly discovered tyrannosaur ancestor. (Image source: Masato Hattori)

The discovery, published in Nature, is a window into

how tyrannosaurs evolved to become powerful predators that terrorised North America and Asia until the end of the reign of the dinosaurs.

"Prince' refers to this being an early, smaller tyrannosauroid," explained Prof Darla Zelenitsky, a palaeontologist from the University of Calgary in Canada. Tyrannosauroids are the superfamily of carnivorous dinosaurs that walked on two legs.

The first tyrannosauroids though were tiny. PhD student Jared Voris, who led the research with Prof Zelenitsky, explained: "They were these really small, fleet-footed predators that lived in the shadows of other apex predatory dinosaurs."

Khankhuuluu represents an evolutionary shift - from those small hunters that scampered around during the Jurassic period - to the formidable giants, including T.rex.

It would have weighed about 750kg, while an adult T.rex could have weighed as much as eight times that, so "this is a transitional [fossil]," explained Prof Zelenitsky, "between earlier ancestors and the mighty tyrannosaurs".

"It has helped us revise the tyrannosaur family tree and rewrite what we know about the evolution of tyrannosaurs," she added.

The new species also shows early evolutionary stages of features that were key to the tyrannosaurs' tyranny, including skull anatomy that gave it a strong jaw. Jared Voris explained: "We see features in its nasal bone that eventually gave tyrannosaurs those very powerful bite forces."

The evolution of such powerful jaws allowed T.rex to pounce on larger prey, and even bite through bone.

The two partial skeletons that the team examined in this study were first discovered in Mongolia back in the early 1970s. They were initially assigned to an existing species, known as *Alectrosaurus*, but when Mr. Voris examined them, he identified the Tyrannosaur-like features that set it apart.

"I remember getting a text from him - that he thought this was a new species," recalled Prof. Zelenitsky.

The fact that this group of dinosaurs were able to move between North America and Asia - via land bridges that connected Siberia and Alaska at the time - also helped them to find and occupy different niches.

Mr. Voris explained: "That movement back and forth between the continents basically pushed the evolution of different tyrannosaur groups" over millions of years.

Prof. Zelinitsky added: "This discovery shows us that, before tyrannosaurs became the kings, they were they were princes."

References:

https://www.bbc.co.uk/news/articles/cy8dzv3vp5jo

https://www.theguardian.com/science/2025/jun/11/tyrannosaurs-new-species-fossils-mongolia



While there are beautiful, complete fossils that give us a clear picture of T.rex (like the one pictured) its earlier ancestors are more mysterious. (Image source: Darla Zelenitsky)



An artist's impression of the newlydiscovered dinosaur. (Image source: Julius Csotonyi)



PhD student Jared Voris and Prof Darla Zelenitsky examine a tyrannosaur fossil. (Image source: Riley Brandt/University of Calgary)

https://www.livescience.com/animals/dinosaurs/meet-dragon-prince-the-newly-discovered-t-rex-relative-that-roamed-mongolia-86-million-years-ago?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

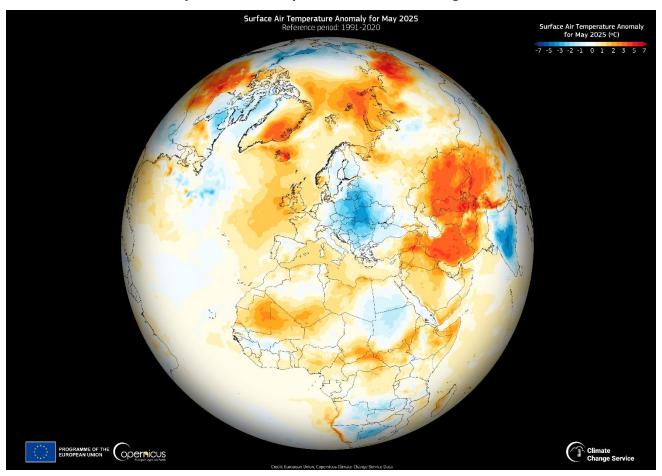
62503D85375D&utm medium=email&utm content=9BD419AD-CC5A-46F5-AE93-24F1B8F64C38&utm source=SmartBrief

Image Of The Day 5

May 2025 was the second warmest May on record globally

Date: 17 June 2025 Location: Europe

Credit: European Union, Copernicus Climate Change Service Data



The Copernicus Climate Change Service (C3S) has published its latest monthly Climate Bulletin, focused on key climate trends in May 2025.

The bulletin reports that May 2025 was the second warmest May on record globally, with an average surface air temperature of 15.79°C, 0.53°C above the 1991-2020 average for the month. In Europe, the average temperature for May was 12.98°C, 0.29°C below the 1991-2020 average.

This data visualisation, produced using C3S data, illustrates the surface air temperature anomalies for May 2025 across part of the Northern Hemisphere. Shades of red indicate areas with above-average temperatures, while blue tones show below-average values. There was a notable contrast in surface air temperatures across Europe: temperatures in Eastern Europe were predominantly below average, with pockets of cold anomalies also observed in Spain and France. On the other hand, Western Europe was mostly affected by warmer-than-average temperatures.

Reference:

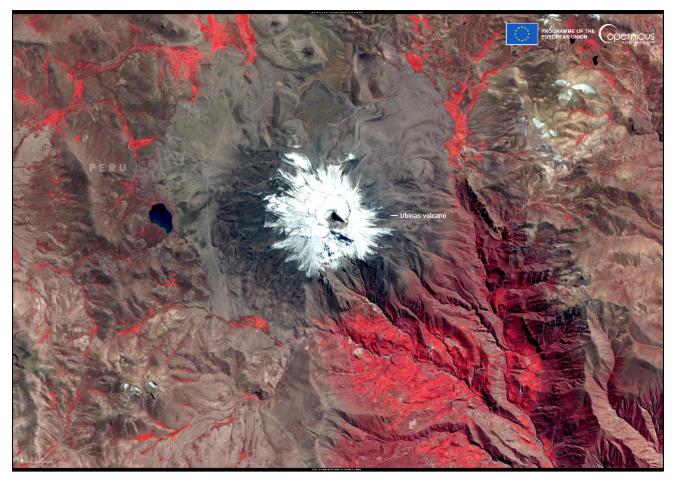
https://www.copernicus.eu/en/media/image-day-gallery/may-was-second-warmest-may-record-globally

Image Of The Day 6

The Ubinas Volcano, Peru

Date: 23 June 2025 Location: Peru

Credit: European Union, Copernicus Sentinel-2 imagery



The Ubinas Volcano, located in southern Peru within the Moquegua Region, is the most active volcano in the country. Rising to an elevation of about 5,672 metres, it forms part of the Central Volcanic Zone of the Andes. Ubinas has a long history of eruptions, with activity recorded as far back as the 16th century, and it remains closely monitored due to its frequent explosive eruptions. The volcano features a steep-walled summit crater, which regularly emits ash plumes and volcanic gases. Its activity has prompted periodic evacuations and disaster preparedness measures in surrounding areas.

This image, acquired by one of the Copernicus Sentinel-2 satellites on 23 April 2025, shows the Ubinas Volcano from above.

The Copernicus Sentinel satellites deliver essential data on global volcanic activity, providing information on eruptions and their impacts to help keep affected communities safer.

Reference:

https://www.copernicus.eu/en/media/image-day-gallery/ubinas-volcano-peru

News

Small and speedy dinosaur recognised as a new species

Enigmacursor darted around North America in the Late Jurassic 145-150 million years ago and its skeleton now be on display in London's Natural History Museum

Chris Simms, New Scientist

25 June 2025

A newly discovered species of dinosaur is going on display in London's Natural History Museum.

Enigmacursor mollyborthwickae was a speedy, two-legged herbivore, 64 centimetres tall and 180 cm long that lived about 145 million to 150 million years ago, during the Late Jurassic Period.

Its reconstructed skeleton will be on display in the museum's Earth Hall from 26 June, alongside its contemporary, Sophie the Stegosaurus.

Susannah Maidment and Paul Barrett, both palaeontologists at the Natural History Museum, have



Illustration of Enigmacursor mollyborthwickae, a newly recognised dinosaur species. (Credit: Bob Nicholls Art)

analysed the *Enigmacursor* specimen, which was uncovered from the Morrison Formation in the western US in 2021-22.

Back then, it was thought to be a *Nanosaurus* – a poorly known species of small herbivorous dinosaur. The *Enigmacursor* fossil isn't complete but using the few teeth – which reveal it ate plants – and portions of the neck, backbone, tail, pelvis, limbs and feet, Maidment and Barrett have defined this fossil as a new species, placed it in an evolutionary tree and reconstructed it for display.

They have based the structure of missing elements, like the skull, on similar small dinosaurs like *Yandusaurus* and *Hexinlusaurus*. Generally, we know little about smaller dinosaurs, both because they are less likely to fossilise than bigger animals and because fossil hunters tend to seek larger, more valuable examples.

"This is a two-legged dinosaur, and it's got very small forearms that it probably would have used to grasp food to bring it to its mouth," says Maidment. "And it's got incredibly large feet and very long limbs. So, it was probably quite fast by dinosaur standards."

That is where the "cursor" part of its name comes from: it means "runner". Maidment says it was probably charging around in the shadows of behemoths like *Diplodocus* and *Stegosaurus*.

The specimen's vertebrae weren't fused, which implies it wasn't fully mature when it died. "I think this animal was probably a teenager, but it may well have been sexually mature, so it might not have got that much bigger," says Maidment.

"Enigmacursor represents one of the rarities from further down the food chain of the dinosaur era," says David Norman at the University of Cambridge. "This newly described animal was clearly a small, wallaby-sized herbivore that scampered around the Late Jurassic countryside."

The discovery sheds light on the early evolutionary stages of the herbivorous dinosaurs that would go on to dominate Cretaceous ecosystems in North America, says Maidment, and helps us build a more realistic ecological picture of the life and times of dinosaurs.

References:

https://www.newscientist.com/article/2485569-small-and-speedy-dinosaur-recognised-as-a-new-species/?fbclid=lwY2xjawLJ0YVleHRuA2FlbQIxMABicmlkETB5VVZQNzZBM1I4RW5menVMAR4aBGWfy A7t5rHMKih1knQ3wRN9GA44T2BeFgPQAPu-YAjZJf1jQLnmNstQA aem Y2ULfKLK6H1qiiHo4 GShA

https://www.bbc.co.uk/news/articles/cglzy4zndp0o

https://www.nhm.ac.uk/discover/news/2025/june/new-species-mystery-dinosaur-unveiled-natural-history-museum.html?utm content=pod1-cta2&utm campaign=visit-new-dinosaur&utm_medium=email&utm_source=2636635_ma_SC_visit_newdino_solus_20250626&utm_term= &id1=840a98cbe34ba22d824f6df096d90a0be8fe4763876a779b0361304855882d8f&id2=751d6140d4ffdfec1b74cf63d89446d251e2cd229f75dc4b3fc24c872d3890e4&dm_i=2XEG,1KIFV,6L3SCQ,6C2W6,1

Journal reference:

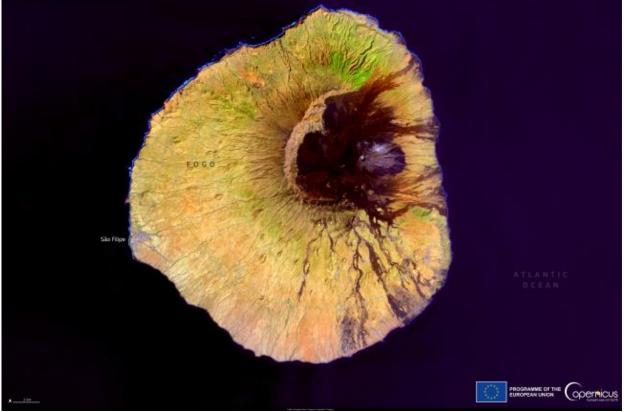
Royal Society Open Science https://royalsocietypublishing.org/doi/10.1098/rsos.242195

Image Of The Day 7

Fogo, Cape Verde

Date: 30 June 2025 Location: Cape Verdi





The landscape of Fogo, one of the Cape Verde islands, is dominated by **Pico do Fogo**, the archipelago's highest peak at nearly 2,830 metres. This active volcano last erupted in 2014. Its collapsed crater, **Chã das Caldeiras**, spans 8 kilometres and hosts a small village. To the southwest, the capital São Filipe sits on a 100-metre-high cliff overlooking a black lava beach.

This Copernicus Sentinel-2 image, acquired on **24 February 2025**, reveals Fogo's striking topography and dark lava flows surrounding the central crater.

Copernicus Sentinel satellite open data supports the monitoring of islands around the world. They deliver insights on marine and coastal environments, providing communities with reliable information for evidence-based decision-making.

Reference:

https://www.copernicus.eu/en/media/image-day-gallery/fogo-cape-verde

Film Review

Jurassic World Rebirth review – Scarlett Johansson runs show as nearextinct franchise roars back to life

The latest instalment marks a return to form after some recent duds, with all the expected Spielberg-style set pieces and excellent romantic chemistry between the leads

Peter Bradshaw, The Guardian

What a comeback. The Jurassic World film series had looked to be pretty much extinct after some increasingly dire dollops of franchise content: *Fallen Kingdom* in 2018 and *Dominion* in 2022. But now, against all odds, these dinosaurs have had a brand refresh: a brighter, breezier, funnier, incomparably better acted and better written film, with unashamed nods to the summer smashes of yesteryear, that makes sense of the dino-spectacle moments that earn their place.

Screenwriter David Koepp and director Gareth Edwards have been drafted in to take us back to basics with a new story, all but retconning the drama with a "17 years previously" flashback at the start that entirely (and thankfully) ignores the tiresome convoluted dullness of what has recently

★★★☆

30 Jun 2025



Romcom chemistry ... Jonathan Bailey and Scarlett Johansson in Jurassic World Rebirth. (Photograph: Jasin Boland/Universal Pictures and Amblin Entertainment)

happened. Then we're in the present day, when the existence of dinosaurs in the wild is accepted but they've all pretty much died out – except in and around the lush fictional Île Saint Hubert in the Caribbean.

A creepy corporation (is there any other kind?) has discovered that dinosaur blood has the makings of a profitable medicine, so odious big pharma smoothie Martin Krebs, played by Rupert Friend, assembles a crack special forces team to take a blood sample from each of three types of dinosaur – land, sea and air. Zora Bennett, played by Scarlett Johansson, is the ex-military type running the

show; bespectacled palaeontologist Dr. Henry Loomis (Jonathan Bailey) provides the scientific expertise; and Mahershala Ali brings megawatt charm to the role of Duncan Kincaid, the easy-going boat captain. They and the rest of the crew chance across a family at sea. The dad, Reuben Delgado, is played by Manuel Garcia-Rulfo, and this group have a kind of separate, parallel adventure, providing the conventional family-bond narrative beats.



We get all the traditional moments, including some classic Jurassic slow turns: a cast member will be doing something, hear a dinosaur behind (which we can see) and then, aghast, will execute a slow swivel, after which we cut to a hilarious closeup on their suitably gobsmacked expression. We also get a classic Jurassic security guy (played by Ed Skrein), like a Star Trek redshirt, whose job is arrogantly shooting at dinosaurs and who meets an obvious comeuppance.

There is some terrific romcom chemistry between Johansson and Bailey. Johansson's Zora seems to have a tendresse for this shy intellectual – a bit like

the crush her character Natasha Romanoff had on Mark Ruffalo's cerebral Dr. Bruce Banner in Avengers: Age of Ultron. It's a very different performance from the one Bailey gave in Wicked, but just as in that film, he comes close to pinching this one with his adorable high-mindedness. His Dr. Loomis wants to die in a shallow sea and get covered by silt, apparently, because it's better for creating fossils. And he has an interesting line about how intelligence as a factor in survival is overrated; the dumb dinosaurs were around for 165m years and smart humans so far only 300,000.

This new Jurassic adventure isn't doing anything so very different from the earlier successful models, perhaps, and I could have done without its outrageous brand synergy product placement for certain brands of chocolate bar. But it feels relaxed and sure-footed in its Spielberg pastiche, its big dinojeopardy moments and its deployment of thrills and laughs. Maybe the series can't and shouldn't go on for ever: we need new and original ideas. This one would be great to go out on.

Reference:

https://www.theguardian.com/film/2025/jun/30/jurassic-world-rebirth-review-scarlett-johansson-runs-show-as-near-extinct-franchise-roars-back-to-life

TV Preview

Human - everything you need to know about the most extraordinary story of all - our own

The major new science series on BBC Two and iPlayer

8 July 2025

In this new series, **Human**, paleoanthropologist Ella Al-Shamahi reveals our incredible story across 300,000 years of human evolution and how – with the help of the latest 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. Across five episodes, Human examines how we went from being just one of many types of humans to the dominant form of life on the planet. It's an extraordinary story, spanning many millennia, but for 99% of it we have no written record of what happened.

Now, following breakthroughs in DNA technology and remarkable fossil evidence, Ella Al-Shamahi is able to tell us this story in startling detail: from the discoveries in Africa revolutionising our understanding of how our species began, to the caves of the Americas where we hunted ferocious ten-foot-tall prehistoric bears, and the stories of the other human species - like Neanderthals - and the role we played in their demise. And she'll draw on the latest scientific evidence to learn how the lives of our ancestors shaped who we are today.

References:

https://www.bbc.co.uk/mediacentre/mediapacks/humans

https://www.theguardian.com/tv-and-radio/2025/jul/14/human-review-bbc-two-iplayer-history-at-its-most-irresistibly-infectious

News

Nuclear waste disposal: Geology must come first

For the UK to make meaningful progress on a geological disposal facility for nuclear waste, argues Jonathan Turner, the government must adopt a bold new strategy – one that prioritises geology

GEOSCIENTIST, The magazine of the Geological Society of London

8 July 2025

Jonathan Turner CGeol FGS, Former Chief Geologist, Nuclear Waste Services

It is time for the UK government to abandon the policy in which voluntary community consent is the primary driver determining the selection of a site for geological disposal of its nuclear waste.

A geological disposal facility (GDF) is a critical item of national infrastructure for dealing permanently with the enduring hazard of the higher activity nuclear waste stockpile that has accumulated over the last 70 or so years, mainly as a byproduct of nuclear power generation. With the decline of fossil fuels, a GDF is also essential to facilitate the transition to cleaner forms of energy including large (e.g., Hinkley Point C in Somerset, Sizewell C in Suffolk) and small-modular nuclear reactors.

Progress stalled

The programme for identifying a suitable site for the waste has been ongoing for some 40 years with no site yet moving forward into borehole



Earlier this year, Theddlethorpe in east Lincolnshire withdrew from the siting process for a geological disposal facility despite it having what looked to be the most promising geology of all the areas under consideration. (Image credit: Saltfleet-Theddlethorpe Dunes, National Nature reserve by Chris, CC BY-SA 2.0, via Wikimedia Commons.)

drilling and comprehensive site characterization (*Turner et al., 2023*). Nuclear Waste Services (NWS), the government body tasked with leading the search for a GDF site, has worked tirelessly to engage with any and all communities interested in finding out more about what a GDF is and the benefits it would bring in terms of long-term investment in jobs and infrastructure.

Earlier this year one of the three communities working with NWS – Theddlethorpe in east Lincolnshire – withdrew itself from the siting programme. This removes the possibility of siting a GDF in what looked to be by far the most promising geology under consideration: the Middle Jurassic Ancholme

Group, which includes the Oxford Clay Formation (OCF). Note that French and Swiss GDFs will also be constructed in Lower-Middle Jurassic mudstones with similar characteristics to the OCF.

This leaves Mid and South Copeland in Southwest Cumbria as the two communities remaining in the siting programme. The highly fractured Palaeozoic rocks along the Cumbrian coastal fringe (that is, outwith the off-limits Lake District National Park) are not an option after a drilling campaign in the 1990s demonstrated the near impossibility of adequately characterizing them (*Knipe, 1996*). The focus is therefore on investigating the Mercia Mudstone Group (MMG), at least 10 km offshore beneath the Irish Sea. Whilst the MMG could contain sufficiently thick and persistent mudstone (or possibly salt) intervals it is notoriously heterolithic (variable) both vertically and laterally on scales of centimetres to kilometres, thus very challenging to characterise to the required fidelity. An offshore GDF would also be significantly more expensive to construct. It is perhaps noteworthy that some three years after NWS acquired bespoke 3D seismic data offshore from the two Copeland communities there has been no word from NWS on what was found there in terms of geological suitability for a GDF.

Alternative approach

So, what should we do differently? After several decades trying, NWS and its predecessors have demonstrated that a policy of voluntary community consent may never deliver a GDF. An alternative siting policy for the UK is provided by examples from the other national waste management organizations currently progressing their GDF siting programmes (such as, Finland, https://www.posiva.fi/en/; Sweden, https://skb.com/; Switzerland, https://nagra.ch/; France, https://international.andra.fr/; Canada, https://www.nwmo.ca/). None of theirs were based on an initial voluntary process. Rather, they started their siting programmes by identifying search areas where the geology looked to be suitable (in terms of operational and long-term post-closure safety, and engineering feasibility) and only then began the process of engaging with the various communities. A similar approach has been adopted in Germany (https://www.bge.de/en/).

To move forward this knotty problem of identifying candidate GDF locations in the UK, a bold new strategy is needed that promotes the critical role of geology as a primary driver of the siting process. Furthermore, there is a growing imperative to get a GDF delivered sooner rather than later: a fundamental tenet of higher activity nuclear waste disposal programmes is that the generations that benefitted from nuclear technologies (i.e. ours and perhaps the next couple) should be the ones that get the ball rolling on disposing of the waste and indeed funding its disposal.

https://www.jonathanturner.co.uk/nuclear-waste

Further reading

- UK Government (2025) Lincolnshire County Council withdraws from the GDF siting process.
 Nuclear Waste Services, 3 June; https://www.gov.uk/government/news/lincolnshire-county-council-withdraws-from-the-gdf-siting-process
- Knipe, C. (1996) Appendix 1 to Inspector's Report. C.S. McDonald (Ed.), Report on the Public Enquiry Appeal by United Kingdom Nirex Limited, Ref APP/ H0900/A/94/247019
- Turner, J.P. et al. (2023) Role of the geosphere in deep nuclear waste disposal An England and Wales perspective. *Earth-Science Reviews 242,104445*; https://doi.org/10.1016/j.earscirev.2023.104445

Reference:

https://geoscientist.online/sections/viewpoint/geology-first/

Further Reading



Rainbow Mountains: China's psychedelic landscape created when 2 tectonic plates collided

Sascha Pare, LiveScience 4 April 2025



The colourful swirls and stripes that characterize China's Rainbow Mountains would have remained hidden without the epic tectonic collision that created the Himalayas.

https://www.livescience.com/planetearth/geology/rainbow-mountains-chinaspsychedelic-landscape-created-when-2tectonic-plates-

collided?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm co ntent=149FA0A2-937B-4E33-8AA5-0B44682E9D11&utm source=SmartBrief

Wilkes Land crater: The giant hole in East Antarctica's gravitational field likely caused by a meteorite

Sascha Pare, LiveScience 11 April 2025

Researchers have proposed many origins for a gravity anomaly in Wilkes Land, East

Antarctica, but the latest evidence suggests the subglacial hole is an impact crater measuring 315 miles across.

https://www.livescience.com/planetearth/antarctica/wilkes-land-crater-the-gianthole-in-east-antarcticas-gravitational-fieldlikely-caused-by-a-

meteorite?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=2FA8DCD2-B6BC-43B1-A9AB-5AA8D3319C5D&utm source=SmartBrief

'Dispiriting and exasperating': The world's super rich are buying up T. rex fossils and it's hampering research

Patrick Pester, LiveScience 15 April 2025



A Tyrannosaurus rex researcher has found that there are now more scientifically valuable T. rex specimens in private or commercial ownership than in public museums, hampering research.

https://www.livescience.com/animals/dinosaurs/dispiriting-and-exasperating-the-worlds-super-rich-are-buying-up-t-rex-fossils-and-its-hampering-research?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E862503D85375D&utm medium=email&utm content=5B18BC5D-DE66-436F-9763-12AF7F7AC6A0&utm source=SmartBrief

An ocean of magma formed early in Earth's history, and it may still influence our planet today, study finds

Stephanie Pappas, LiveScience

16 April 2025

Remnants of a liquid layer of magma near Earth's core, formed in the first few hundred million years of the planet's history, may still persist today as odd anomalies in the mantle.

https://www.livescience.com/planetearth/an-ocean-of-magma-formed-earlyin-earths-history-and-it-may-still-influenceour-planet-today-studyfinds?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&Irh=840a98cbe34ba22 d824f6df096d90a0be8fe4763876a779b03 61304855882d8f&utm_campaign=368B37 45-DDE0-4A69-A2E8-

62503D85375D&utm_medium=email&utm content=E916208C-9800-40CB-97AC-873B0306473A&utm_source=SmartBrief

NASA's Curiosity rover finds major clue that Mars was once habitable

Victoria Corless, Space.com 21 April 2025

NASA's Curiosity rover has found iron-rich carbonates on Mars, offering new clues about the planet's ancient climate and potential habitability.

https://www.space.com/spaceexploration/mars-rovers/nasas-curiosity-roverfinds-major-clue-that-mars-was-oncehabitable?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824

f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm campaign=58E4DE65-C57F-4CD3-9A5A-

609994E2C5A9&utm medium=email&utm content=A9373723-BADF-40F8-AAB6-315B4CA78FFC&utm source=SmartBrief

£2bn HyNet carbon storage project will provide massive jobs and net zero boost

NSTA

24 April 2025

- NSTA issues permits for carbon storage sites after robust assessments
- More than 100m tonnes of CO2 to be captured and stored over 25 years
- Project is second of its kind approved by regulator in under five months

https://www.nstauthority.co.uk/newspublications/gbp2bn-hynet-carbon-storageproject-will-provide-massive-jobs-and-netzero-boost/

Dinosaurs might still roam Earth if it weren't for the asteroid, study suggests

Patrick Pester, LiveScience 1 May 2025

The dinosaurs were not in decline before the asteroid hit, a new study finds. Instead, poor fossilization conditions and unexposed late Cretaceous rock layers mean they're either not preserved or hard to find.

https://www.livescience.com/animals/dinosaurs/dinosaurs-might-still-roam-earth-if-it-werent-for-the-asteroid-study-

suggests?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm_medium=email&utm_content=B12D744D-AF26-4E2D-8473-CA1D9DF15CE9&utm_source=SmartBrief

T. rex may have evolved in North America after all, scientists say

Jess Thomson, LiveScience 7 May 2025



T. rex was previously suspected to have evolved in Asia and migrated to North America, but new research shows that the direct ancestors of this iconic dinosaur may have been the one to make the journey instead.

https://www.livescience.com/animals/dinosaurs/t-rex-may-have-evolved-in-north-america-after-all-scientists-say?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&Irh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm co ntent=15C9EE73-953C-45FF-A0BD-246D75546B5A&utm source=SmartBrief

Podcast



Mike Hudec on Salt Tectonics 11 May 2025

Most of Earth's salt is dissolved in the oceans. But there is also a significant amount of solid salt among continental rocks. And because of their mechanical properties, salt formations can have a dramatic effect on the structure and evolution of the rocks that surround them. This

gives rise to what we call salt tectonics – at first sight, a rather surprising juxtaposition of a soft, powdery substance with a word that connotes the larger scale structure of the crust.

In the podcast, Mike Hudec explains the origin of salt in the Earth's crust and describes the structures it forms when subjected to stresses. He also discusses how salt can play in important role in the formation of oil and gas reservoirs.

https://www.geologybites.com/mike-hudec

Folarin Kolawole on Continental Rifting

2 June 2025

What happens when continents start to rift apart? In the podcast, Folarin Kolawole describes the various phases of rifting, from initial widespread normal faulting to the localization of stretching along a rift axis, followed by rapid extension and eventual breakup and formation of oceanic lithosphere.

https://www.geologybites.com/folarin-kolawole

Renée Tamblyn on the Origin of Continents

3 July 2025

When the Earth formed, it was covered by a hot magma ocean. So, when and how did thick, silica-rich continental lithosphere form? Were the first, ancient continents similar to the present-day continents? And did the continents form in a burst of activity at a certain point, or was it a gradual build-up over Earth history?

In the podcast, Renée Tamblyn addresses these questions, as well as how early geological processes created molecular hydrogen that may have powered the first forms of life. In her own research, she has focused on the critical role played by water released from hydrous minerals that formed within oceanic lithosphere on the sea floor.

https://www.geologybites.com/renee-tamblyn

Andreas Fichtner on the Frontiers of Seismic Imaging

21 July 2025

In the podcast, Andreas Fichtner describes the state of the art in seismic imaging. Despite enormous improvements in our capabilities over the past decades, there are still many structures and data types that remain elusive. Fichtner explains the various types of challenges faced by researchers seeking to sharpen our images of the Earth's interior from seismic data. While some challenges appear insurmountable, others are gradually yielding to improved methods and computational power, and we can expect to see continual improvements over the next decade.

Fichtner is a Professor in the Department of Earth and Planetary Sciences at the Federal Institute of Technology in Zurich.

https://www.geologybites.com/andreas-fichtner

News

'River of fire' unleashes toxic gases as eruption destroys town in La Palma — Earth from space

Harry Baker, LiveScience 13 May 2025



A 2021 satellite image shows destructive lava flows burning through a residential area in the Canary Islands as molten rock spilled into the sea and unleashed surprising levels of volcanic gas.

https://www.livescience.com/planetearth/volcanos/river-of-fire-unleashes-toxicgases-as-eruption-destroys-town-in-la-palmaearth-from-space

Restoration of (Crystal Palace) dinosaurs to begin in a matter of days

It is part of the multi-million-pound regeneration of Crystal Palace Park

Cameron Blackshaw, Southwark News 21 May 2025



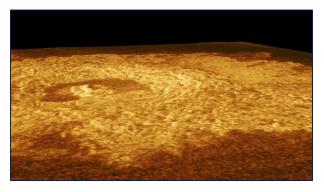
https://southwarknews.co.uk/area/crystalpalace/restoration-of-dinosaurs-to-begin-in-amatter-of-days/

Venus may be geologically 'alive' after all, reanalysis of 30-year-old NASA data reveals

Sharmila Kuthunur, LiveScience

20 May 2025

New research strengthens the case that Venus, long considered a geologically stagnant world, may be more Earth-like in its internal dynamics than once believed.

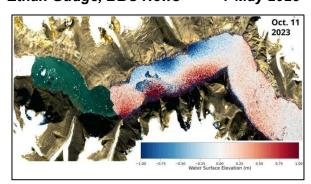


A view of Venus taken by NASA's Magellan spacecraft in 1996. A new look at Magellan data has revealed a shocking hint that Venus may be more 'alive' than previously thought. (Image credit: NASA/JPL)

https://www.livescience.com/space/venus/venus-may-be-geologically-alive-after-all-reanalysis-of-30-year-old-nasa-data-reveals

'Extraordinary' tremors caused by tsunamis - study

Ethan Gudge, BBC News 7 May 2025



A series of "extraordinary" tremors observed across the globe were caused by two tsunamis stranded within a fjord in Greenland, a new study has confirmed.

https://www.bbc.co.uk/news/articles/ce80p1rpe97o

https://www.livescience.com/planetearth/tsunami/mysterious-mega-tsunamisthat-shook-the-entire-world-for-9-daysrevealed-by-satellite?utm_term=8DEBC9E5-6C7F-4337-AFFF-

<u>D9A51CC6C2C0&lrh=840a98cbe34ba22d824</u> <u>f6df096d90a0be8fe4763876a779b036130485</u> <u>5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-</u>

62503D85375D&utm medium=email&utm co ntent=F88F0C76-2773-4DDC-9D5A-8723C180E3E8&utm source=SmartBrief

Energy Transition

Thousands plead with Starmer to save North Sea jobs

An open letter to Prime Minister Sir Keir Starmer has been signed by thousands warning that Aberdeen's energy skills base is at risk of being lost forever.

Erikka Askeland, EnergyVoice

21 May 2025

https://www.energyvoice.com/renewablesenergy-transition/573030/thousands-pleadwith-starmer-to-save-north-sea-jobs/

Giant 85 million-year-old mystery sea monster fossil finally identified

Jess Thomson, LiveScience 28 May 2025

A brand-new species of elasmosaur named Traskasaura sandrae has been identified from three specimens found on Vancouver Island.



https://www.livescience.com/animals/extinctspecies/giant-85-million-year-old-mystery-seamonster-fossil-finally-

<u>identified?utm_term=8DEBC9E5-6C7F-4337-AFFF-</u>

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=B49F6F36-A480-4B5B-B58C-42FB645F6C2D&utm source=SmartBrief

Campi Flegrei Had a Massive Eruption 40,000 Years Ago – Could a Supermassive Volcano Happen Soon?

Monica Cull, Discover

29 May 2025

Learn more about the current activity around Italy's Campi Flegrei region and if that means a supermassive volcano is opening up.

https://www.discovermagazine.com/planetearth/campi-flegrei-had-a-massive-eruption-40-000-years-ago-could-a-supermassive

https://www.dailymail.co.uk/sciencetech/article -14758831/world-supervolcanoes-awakeningeruption-planet-chaos.html

https://www.nature.com/articles/s41467-025-59821-z

https://scitechdaily.com/scientists-may-havefound-a-way-to-stop-italys-awakeningsupervolcano/

https://metro.co.uk/2025/05/29/experts-revealhappen-supervolcano-1-000-miles-londonerupted-23276149/

Glacial collapse buries Blatten, Switzerland

Location: Switzerland 31 May 2025 Credit: European Union, Copernicus

Sentinel-2 imagery



https://www.copernicus.eu/en/media/image-day-gallery/glacial-collapse-buries-blatten-switzerland

Birds were nesting in the Arctic during age of dinosaurs.

Minuscule fossils from 73m years ago are oldest evidence yet for birds nesting in polar regions

Nicola Davis, Science correspondent 29 May 2025

https://www.theguardian.com/science/2025/may/29/birds-were-nesting-in-the-arctic-during-age-of-dinosaurs-scientists-discover

Drop in UK oil & gas players' profits prompts calls for tax changes to amplify investments

Melisa Cavcic, Offshore Energy

2 June 2025

Given the need to reshape the North Sea's future through low-carbon technologies, while enabling a leg-up for investment in delivering the energy security the UK needs, Britain's trade body for the offshore energy industry, Offshore Energies UK (OEUK), has urged the government to take action on the energy profits levy (EPL), known as the windfall tax on oil and gas profits, by next year to put all ingredients in place to secure jobs, energy security enhancement, and the build-out of the energy infrastructure for the future.

https://www.offshore-energy.biz/drop-in-uk-oil-gas-players-profits-prompts-calls-for-tax-changes-to-amplify-investments/?utm_placeholder_value=&cdmw

t=QAAABAlcmDECgSUZhSKUs1x4ugZBHxl mpMskig

New discovery at the Grand Canyon has rewritten geology textbooks

Eric Ralls, Earth.com

6 June 2025



The Colorado River has been carving its way through northern Arizona for millions of years, but what really stops people in their tracks are the rocks of the Tonto Group in the Grand Canyon walls themselves.

https://www.earth.com/news/new-discovery-at-the-grand-canyon-is-rewriting-geology-textbooks-tonto-group/

https://www.geosociety.org/GSA/Publications/GSA Today/GSA/GSAToday/science/G604A/article.aspx

Hidden layer beneath Italy's Campi Flegrei caldera may explain why it's so restless

Stephanie Pappas, LiveScience

6 June 2025

According to new research, the active volcano that sits west of Naples has a "tuff" layer about two miles beneath the surface that traps volcanic gases deep below the caldera's floor.

https://www.livescience.com/planetearth/volcanos/hidden-layer-beneath-italyscampi-flegrei-caldera-may-explain-why-its-sorestless?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm content=D956EF69-55BD-4A54-95CC-E4DB6BB6F6FA&utm source=SmartBrief

Industrial waste is turning into a new type of rock at 'unprecedented' speed, new study finds

Sascha Pare, LiveScience 17 June 2025

Samples from slag cliffs in England reveal industrial waste products can turn into rock in less than four decades, challenging assumptions about how rocks form.

https://www.livescience.com/planetearth/geology/industrial-waste-is-turning-intoa-new-type-of-rock-at-unprecedented-speednew-study-finds?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm co ntent=971D78E2-3569-4E7E-8653-69A7493158E7&utm source=SmartBrief

Indonesia's Lewotobi Laki-laki volcano erupts twice in 2 days, unleashing 6-mile-high ash cloud

Sascha Pare, LiveScience 18 June 2025

Mount Lewotobi Laki-laki erupted on Tuesday and Wednesday (June 17 and 18), unleashing gigantic ash plumes and showering villages with volcanic debris.



https://www.livescience.com/planetearth/volcanos/indonesias-lewotobi-laki-lakivolcano-erupts-twice-in-2-days-unleashing-6mile-high-ash-cloud?utm_term=8DEBC9E5-

6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm co ntent=A5C38270-EB9D-4471-9738-7899E342C62D&utm source=SmartBrief

Km-scale mounds and sinkites formed by buoyancy driven stratigraphic inversion

Jan Erik Rudjord & Mads Huuse 21 June 2025

Rudjord, J.E., Huuse, M. Km-scale mounds and sinkites formed by buoyancy driven stratigraphic inversion. Commun Earth Environ 6, 490 (2025).

https://doi.org/10.1038/s43247-025-02398-8

https://www.nature.com/articles/s43247-025-02398-8

https://www.livescience.com/planetearth/scientists-discover-that-mysterious-giantstructures-beneath-the-north-sea-seemingly-defywhat-we-know-about-

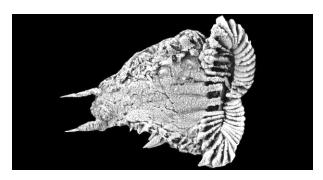
geology?utm_term=8DEBC9E5-6C7F-4337-AFFF-D9A51CC6C2C0&lrh=840a98cbe34ba22d824f6df0
96d90a0be8fe4763876a779b0361304855882d8f
&utm_campaign=368B3745-DDE0-4A69-A2E8-62503D85375D&utm_medium=email&utm_content=1BD468EC-B884-414D-92B1-6D2B38754BDD&utm_source=SmartBrief

500-million-year-old fossils reveal how the starfish got its arms

Josh Davis, NHM

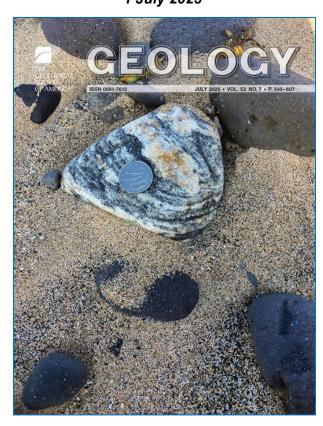
26 June 2025

Starfish are some of the most recognisable animals in the world. But their simple appearance belies an evolutionary mystery - how did these animals evolve such an unusual shape? A new fossil discovery may have cracked the case.



https://www.nhm.ac.uk/discover/news/2025/june/500-million-year-old-fossils-reveal-how-the-starfish-qot-its-arms.html

GEOLOGY Volume 53, Number 7 1 July 2025



ISSN: 0091-7613 EISSN: 1943-2682

https://pubs.geoscienceworld.org/geology/issue/53/7?fbclid=lwY2xjawLTtM9leHRuA2FlbQlxMABicmlkETB5VVZQNzZBM1I4RW5menVMAR5igS1FJDysDqrfjmzaakdGA3VQWExtj0CxKyJqqFEXEx0jtBlfxTn9FxTA_aem_o8r3wvDcVvEwbrawuBct7g

Ash-winged dawn goddess' is oldest pterosaur ever discovered in North America — and it was small enough to sit 'on your shoulder'

Patrick Pester, LiveScience 7 July 2025

A cache of Triassic fossils in Arizona has revealed Eotephradactylus mcintireae, or "ash-winged dawn goddess," the oldest pterosaur ever discovered in North America.

https://www.livescience.com/animals/dinosaurs/ash-winged-dawn-goddess-is-oldest-pterosaur-ever-discovered-in-north-america-and-it-was-small-enough-to-sit-on-your-shoulder?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm co ntent=05F1B828-2AD1-4E52-A279-339F6CFB0278&utm source=SmartBrief

Melting glaciers could trigger volcanic eruptions around the globe, study finds

Ben Turner, LiveScience 8 July 2025

Glacial melt could increase volcanic activity in North America, New Zealand and Russia, spewing greenhouse gases into the atmosphere.



https://www.livescience.com/planetearth/volcanos/melting-glaciers-could-triggervolcanic-eruptions-around-the-globe-studyfinds?utm_term=8DEBC9E5-6C7F-4337-AFFF-

D9A51CC6C2C0&lrh=840a98cbe34ba22d824 f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm co ntent=05F1B828-2AD1-4E52-A279-339F6CFB0278&utm source=SmartBrief



What is the Virtual Microscope?

The Virtual Microscope (VM) for Earth Sciences is primarily an Open Educational Resource (OER). The VM project aims to make a step change in the teaching of Earth Sciences by broadening access to rock collections that are currently held in museums, universities and other institutions around the world. The Virtual Microscope allows users to examine and explore minerals and microscopic features of rocks, helping them to develop classification and identification skills without the need for high-cost microscopes and thin section preparation facilities.

https://www.virtualmicroscope.org/



Welcome to "the Shear Zone" - a hub for educational videos on geology, developed by Rob Butler of the University of Aberdeen. The materials focus on the interpretation of the geometry and relationships found in and between rocks - topics embraced by the term "structural geology". This involves the study of

rock deformation describina understanding how rocks are broken, folded and distorted. And this links through the scales, from grains to plates. But it also includes broader ideas on how rock formations are organised which is fundamental stratigraphic understanding, deducing earth history and the processes that have shaped it. You can find videos on the interpretation of geological maps, 2D seismic profiles of the subsurface alongside developing ideas on how deformation structures, sedimentary basins, mountain belts and tectonic plates work. Supporting materials (maps, images, course notes) will go up on the companion website.

https://www.youtube.com/channel/UCIUYjr1y PCZQWYI9cJCO1mA

https://theshearzone.wordpress.com/



Saturday 20th September 2025
Oasis Academy, Southampton, SO16 8FA
10am to 4pm

MINERALS ~ FOSSILS ~ GEMS ~ METEORITES ~ DINOSAURS ACCESSORIES ~ JEWELLERY ~ BOOKS ~ EQUIPMENT 50+ tables of SALES, EXHIBITS and ACTIVITIES



Admission £1 (accompanied children under 14 free) Hot and cold refreshments available on site

Show organised by Southampton Mineral & Fossil Society
For further information, visit our website www.sotonminfoss.org.uk or email
contact@sotonminfoss.org.uk

Volcano erupts in Iceland spewing lava from the ground



A volcano has erupted in Iceland spewing out streams of bright yellow and orange lava - the latest in a string of volcanic events in the region in recent years.

Iceland has seen about 12 eruptions since volcanic systems on the Reykjanes peninsula - close to the capital Reykjavik - became active again in 2021.

According to Iceland's meteorological office, magma breaking through the Earth's crust created a large fissure estimated to be between 0.7 and 1km (0.4 to 0.6 miles) long.

Scientists have warned that eruptions in this region could continue for decades or even centuries.

https://www.bbc.co.uk/news/videos/c2ezy1exj 9wo

Scientists discover long-lost giant rivers that flowed across Antarctica up to 80 million years ago

Skyler Ware, LiveScience 16 July 2025

Large flat surfaces carved by ancient rivers deep beneath East Antarctica are influencing how ice flows across the continent today, according to a new study.

https://www.livescience.com/planetearth/antarctica/scientists-discover-long-lostgiant-rivers-that-flowed-across-antarctica-upto-80-million-years-

ago?utm_term=8DEBC9E5-6C7F-4337-AFFF-

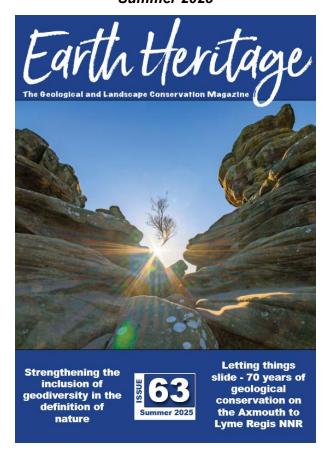
D9A51CC6C2C0&lrh=840a98cbe34ba22d824

f6df096d90a0be8fe4763876a779b036130485 5882d8f&utm_campaign=368B3745-DDE0-4A69-A2E8-

62503D85375D&utm medium=email&utm co ntent=09A7CDB5-1C60-439F-B4E2-4A1D257CABBD&utm source=SmartBrief

EARTH HERITAGE Issue 63

Summer 2025



https://www.earthheritage.org.uk/wp/wp-content/uploads/EH-63_final_web.pdf

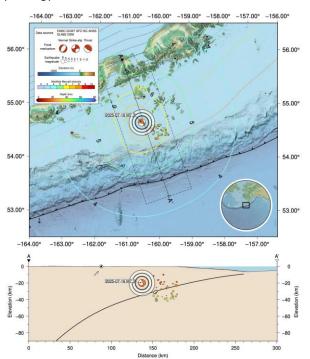
Magnitude 7.3 earthquake in the Shumagin Gap, Alaska

Another exciting strike-slip earthquake in a classic subduction setting

Judith A Hubbard & Kyle Bradley 18 July 2025

At 12:37 PM local time on July 16, 2025, a magnitude 7.3 earthquake occurred off the

southern coast of Alaska. A seismometer on Chernabura Island, 67 kilometres to the northeast, recorded intensity VI shaking (strong).



https://earthquakeinsights.substack.com/p/magnitude-73-earthquake-in-the-shumagin

M7.4 earthquake strikes the Kamchatka Peninsula

Judith A Hubbard & Kyle Bradley 20 July 2025

At 18:49 local time (06:49 UTC) on July 20, 2025, a M7.4 earthquake struck off the eastern coast of Russia's Kamchatka Peninsula. The USGS estimates that about a quarter of a million people living on the peninsula felt at least moderate shaking (intensity V); damage is expected to be limited. This relatively modest shaking can be credited to the distance of the earthquake from nearby population centres (~130+ kilometres).

https://earthquakeinsights.substack.com/p/m7 4-earthquake-strikes-thekamchatka?utm_source=post-emailtitle&publication_id=1580102&post_id=16876 9689&utm_campaign=email-posttitle&isFreemail=true&r=enbqv&triedRedirect= true&utm_medium=email

FESTIVAL OF GEOLOGY



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

The Geological Society Burlington House, Piccadilly London



Save the date!

W1J 0BG





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

R@CKWATC

Also: Field trips on **Sunday 2 November**

www.geologistsassociation.org.uk





