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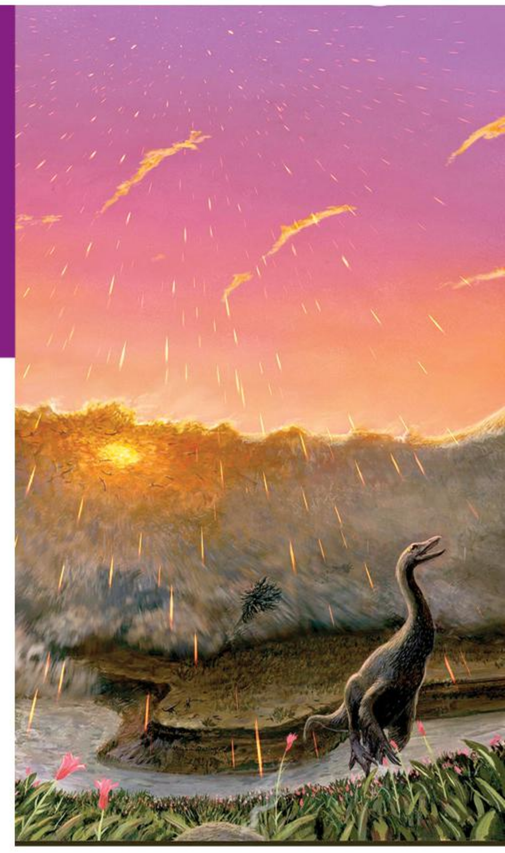
Asteroid that wiped out dinosaurs hit Earth during spring



Artistic reconstruction of the historic event, known as Chicxulub with lethal impact spherules raining down from the sky

BY JONATHAN CHADWICK

It's well known that the dinosaurs were obliterated 66 million years ago by a massive asteroid that slammed into Earth.

Now, researchers have confirmed in a new study that the cataclysmic event, called the Chicxulub impcat event, occurred in the Northern hemisphere's spring.

They examined the bones of six fish that died less than 60 minutes after the asteroid impacted, recovered from the Tanis fossil site in North Dakota.

The new study corroborates findings published last year by a University of Manchester team, who also found the event happened on a spring day.

As of yet, no study has put the event at any other time of year than Northern hemisphere's spring (and the Southern hemisphere's autumn).

Around 66 million years ago non-avian dinosaurs were wiped out along with more than half the world's species.

This mass extinction paved the way for the rise of mammals.

The Chicxulub asteroid is often cited as a potential cause of the Cretaceous-Paleogene extinction event.

The asteroid slammed into a shallow sea in what is now the Gulf of Mexico.

The collision released a huge dust and soot cloud that triggered global climate change, wiping out 75 percent of all animal and plant species.

Researchers used computer models of asteroid evolution, along with observations of known asteroids and examined rock samples from the Chicxulub impact on Mexico's Yucatan peninsula

Global catastrophe

Researchers claim that the soot necessary for such a global catastrophe could only have come from a direct impact on rocks in shallow water around Mexico, which are especially rich in hydrocarbons.

Within 10 hours of the impact, a massive tsunami waved ripped through the Gulf coast.

In the new study, the researchers studied the bones of six fish to estimate when the dinosaur-killing asteroid struck.

'Cold-blooded fishes had bones that grew very much like trees, adding a new layer every year,' study author Dr Melanie During from Uppsala University told MailOnline.

'We analysed these layers in thin sections and quantified the bone cell fluctuation with the means of synchrotron scanning at ESRF and saw that all these fishes recorded seasonality and died exactly at the same time – spring.'

Dr During explained that the subtle differences in bone can reveal the time of year growth abruptly ended due to death.

'In spring the fish is eating a little; in summer it is eating a lot; in autumn it is almost not eating anymore and then in winter, it does not eat,' she told MailOnline.

'When we look at how they grew we can see that every year they started growing in spring, grew fastest in summer, slowed down in autumn, and stopped growing in winter.'

It's already well known that the dinosaurs were wiped out by the Chicxulub impact event – a plummeting asteroid or comet that slammed into a shallow sea in what is today the Yucatán peninsula in Mexico around 66 million years ago.

For those not killed directly by the impact, the collision released a huge dust and soot cloud that triggered global climate change, wiping out 75 percent of all animal and plant species.

All non-avian dinosaurs, pterosaurs, ammonites and most marine reptiles disappeared, whilst mammals, birds, crocodiles, and turtles survived.

When the asteroid impacted Earth, it rocked the continental plate and caused huge waves in water bodies, such as rivers and lakes.

These moved enormous volumes of sediment that engulfed fish and buried them alive, while impact spherules (glass beads of Earth rock) rained down from the sky, less than an hour after impact.

'Molten Earth rock that got ejected into space by the violent impact, was already starting to rain down like a hail of glass and rock,' Dr During told MailOnline.

'The hail of impact spherules hit the water and started clogging up the gills of the unfortunate freshwater paddlefishes and anadromous (migrating between fresh- and seawater) sturgeons, who at that moment were violently brought together and almost instantly buried alive.'

Today, Tanis contains fossilised paddlefishes and sturgeons that were direct casualties of Chicxulub.

The European Synchrotron Radiation Facility (ESRF) is the most intense source of synchrotron-generated light, producing X-rays 100 billion times brighter than X-rays used in hospitals.

These X-rays are produced by the high energy electrons that race around a circular tunnel measuring half a mile in circumference.

ESRF functions like a 'super-microscope' that 'films' the position and motion of atoms in condensed and living matter.

This reveals the structure of matter and new insights for scientists in the fields of chemistry, material physics, archaeology, nanotechnologies and more.

'It was obvious to us that we needed to analyse these bones to get valuable information about the moment of the impact', Dr During said.

Next, they headed to the European Synchrotron Radiation Facility (ESRF) with a partial fish specimen and sections of the bones and carried out high-resolution synchrotron X-ray tomography.

These X-rays are produced by the high energy electrons that race around a circular tunnel measuring half a mile in circumference.

'super-microscope'

Thanks to the quality of its X-rays, ESRF functions like a 'super-microscope' that 'films' the position and motion of atoms in condensed and living matter to reveal more about its structure, at a level of detail invisible to the human eye.

ESRF revealed fine details such as bone cell density and volumes that can be traced over multiple years and indicate whether it was spring, summer, autumn, or winter at time of death.

'Thanks to the ESRF's data, we found that the bones registered seasonal growth, very much like trees do, growing a new layer every year on the outside of the bone', said Sophie Sanchez, also at Uppsala University.

The team also carried out carbon isotope analysis to reveal the annual feeding pattern of a fish.

The availability of zooplankton - its prey of choice - oscillated seasonally and peaked in summer.

This temporary increase of ingested zooplankton enriched the skeleton of the fish with the heavier carbon 13 isotope relative to the lighter carbon 12 isotope.

'The carbon isotope signal across the growth record of this unfortunate paddlefish confirms that the feeding season had not yet climaxed – death came in spring,' said Dr During.

The study comes shortly after a team led by palaeontologist Robert DePalma of the University of Manchester published their findings into the time of the impact event.

Similarly, they performed multiple different analyses of the annual growth lines in fossil fish bones preserved at Tanis before concluding it was during spring.

According to Dr During, her new study was originally submitted well before the December study was submitted to another journal.

'Ours is the prior work and does not in any respect rest on the data or conclusions of DePalma et al,' she told. *-Daily Mail*