

Moonless Earth could potentially still support life, study finds

Scientists have long believed that, without our moon, the tilt of the Earth would shift greatly over time, from zero degrees, where the Sun remains over the equator, to 85 degrees, where the Sun shines almost directly above one of the poles.

A planet's stability has an effect on the development of life. A planet see-sawing back and forth on its axis as it orbits the sun would experience wide fluctuations in climate, which then could potentially affect the evolution of complex life.

However, new simulations show that, even without a moon, the tilt of Earth's axis — known as its obliquity — would vary only about 10 degrees. The influence of other planets in the solar system could have kept a moonless Earth stable.

The stabilizing effect that our large moon has on Earth's rotation therefore may not be as crucial for life as previously believed, according to a paper by Jason Barnes of the University of Idaho and colleagues which was presented at a recent meeting of the American Astronomical Society.

The new research also suggests that moons are not needed for other planets in the universe to be potentially habitable.

Due to the gravitational pull of its star, the axis of a planet rotates like a child's top over tens of thousands of years. Although the center of gravity remains constant, the direction of the tilt moves over time, or precesses (as astronomers call it).

Similarly, a planet's orbital plane also precesses. When the two are in synch, the combination can cause the total obliquity of the planet to swing chaotically. But the gravity of Earth's moon has been shown to provide a stabilizing effect. By speeding up Earth's rotational precession and keeping it out of synch with the precession of Earth's orbit, it minimizes fluctuations, creating a more stable system.

As terrestrial moons go, Earth's moon is on the large size — only about a hundred times smaller than its parent planet. In comparison, Mars is over 60 million times more massive than its largest moon, Phobos.

■ The difference is substantial

The difference is substantial, and with good cause — while the Martian moons appear to be captured asteroids, scientists think that Earth's moon formed



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when a Mars-sized body crashed into the young planet, blowing out pieces that later consolidated as the lunar satellite — a satellite which affects the planet's tilt.

Scientists estimate that only one percent of any terrestrial planets will have a substantial moon. This means that most such planets are expected to experience massive changes in their obliquity.

While Earth's moon does provide some stability, the new data reveals that the pull of other planets orbiting the sun — especially Jupiter — would keep Earth from swinging too wildly, despite its chaotic evolution.

Without a moon, Barnes and his collaborators have determined that Earth's obliquity would only vary 10 to 20 degrees over a half a billion years.

That doesn't sound like much, but the changes of 1 to 2 degrees the planet presently exhibits are thought to be partly responsible for the Ice Ages.

According to Barnes, the present shift

is a "small effect, but in combination with Earth's present climate, it causes big changes."

Still, a 10-degree change is not a huge problem when it comes to life. "(It) would have effects, but not preclude the development of large scale, intelligent life."

Furthermore, if Jupiter were closer, Barnes explains, the Earth's orbit would precess faster, and the moon would actually make the planet fluctuate more wildly, rather than less.

A "moon can be stabilizing or destabilizing, depending on what's going on in the rest of the system," he said.

The team also determined that planets with a retrograde, or backward, motion should have smaller variations than those that spin in the same direction as their parent star, a large moon notwithstanding.

"We think the initial rotation direction should be random," Barnes said. "If it is, half the planets out there would not have

problems with obliquity variations."

What determines which way a planet spins? He suspects that "whatever smacks the planet last establishes its rotation rate."

A 50/50 shot at retrograde precession, combined with the likelihood of other planets in the system keeping the planet from tipping on its side, means more terrestrial planets could be potentially habitable. Barnes ventured an estimate that at least 75 percent of the rocky planets in the habitable zone may be stable enough for life to evolve, though he notes that additional studies are needed to confirm or disprove that.

In comparison, the previous idea that a large moon was necessary for a constant tilt meant that only about 1 percent of terrestrial planets would have a steady climate.

A "large moon can stabilize (a planet)," Barnes said, "but in most cases, it's not needed."

(Source: Space.com)

U.S. scientists predict eruption of undersea volcano



U.S. scientists said Tuesday they have for the first time successfully predicted the eruption of one of the world's most active undersea volcanoes off the coast of the western state of Oregon.

Scientists from Oregon and New York have been monitoring Axial Seamount, 250 miles (400 kilometers) out to sea, since it last erupted in 1998, and predicted it would erupt again before 2014.

On an expedition to the area on July 29, researchers using a remotely operated robot discovered a lava flow that was not there the year before, and began noticing that the entire area looked unfamiliar.

"When we first arrived on the seafloor, we thought we were in the wrong place, because it looked so completely different," said Bill Chadwick, an Oregon State University geologist who co-authored a 2006 study that forecast another eruption by 2014.

"We couldn't find our markers or monitoring instruments or other distinctive features on the bottom." The team was using bottom pressure sensors, the same tools used to monitor the sea floor for potential tsunamis after an earthquake.

A couple of their recording

instruments soon turned up, and scientists determined that the eruption happened on April 6.

The team was excited at the discovery, but cautioned that most volcanoes remain highly volatile.

"Forecasting the eruption of most land volcanoes is normally very difficult at best, and the behavior of most is complex and variable," said Scott Nooner, a geophysicist at Columbia University's Lamont-Doherty Earth Observatory.

"We now have evidence that Axial Seamount behaves in a more predictable way than many other volcanoes."

Researchers were watching the level of the volcanic crater, or caldera, rise after its last eruption at a rate of about 15 centimeters (six inches) per year as it inflated with accumulating magma, and predicted it would erupt again when it reached its 1998 level.

The "acid test in science — whether or not you understand a process in nature — is to try to predict what will happen based on your observations," Chadwick said.

"Now we can build on that knowledge and look to apply it to other undersea volcanoes — and perhaps even volcanoes on land."

(Source: AFP)

Did dinosaurs hibernate? Melting history's mysteries at South Pole



Dinosaurs living in the intense cold and months-long darkness of the South Pole were once thought to hibernate during the winter months just to survive.

That old theory has been put on ice.

Montana State University graduate student Holly Woodward found that the physiology of dinosaurs living in Australia over 160 million years ago was practically the same as dinosaurs living everywhere else on Earth.

During this period, Australia was located in the Antarctic Circle, meaning the dinosaurs that populated the region lived in complete darkness and extreme cold for up to six months at a time.

Now Woodward has opened the door to find out how these dinosaurs made it through the extreme cold.

"This is basically just the first study, there's so much more to say," Woodward told FoxNews.com. There have been few studies done on polar dinosaurs, she explained: "People have a hard time getting to Australia to do these studies. The next step for me is to look at the bones more in depth."

The journey started for Woodward after hearing a lecture from Dr. Thomas Rich, the author

of a study regarding polar dinosaurs done in 1998. Rich's paper discussed the possible ways in which dinosaurs living in Australia survived; he came up with the idea that dinosaurs near the southern pole hibernated during the dark winter months.

The concept peaked Woodward's curiosity.

"I wanted to see if that hypothesis held true," Woodward told FoxNews.com. "Because there wasn't as much dinosaur material back then, I wanted to see if it held up. I spoke with [Dr. Rich] after his presentation, and he told me if I could find a way to get to Australia, I could look at more specimens."

After applying to the East Asia and Pacific Summer Institute through the National Science Foundation, Woodward received the money she needed to travel to the land down under. While in Australia, she sampled bones from 18 different dinosaurs that lived in the Antarctic circle during the Early Cretaceous Period.

The original study had only two bones as samples.

The two studies all hinged on the bones' "Lines of Arrested Growth" (LAGs) or rings formed inside the bone tissue.

(Source: FoxNews.com)

NEWS

Japan tsunami calved Antarctic ice shelf, Manhattan-sized iceberg broke off

An Antarctic ice shelf that had remained unshuffled for 46 years was broken by the Japanese tsunami in March, scientists have discovered. The Sulzberger Ice Shelf in the Antarctic registered the impact of the Japanese tsunami in 18 hours, when a huge iceberg began disintegrating and floating off to the Ross Sea.

A cryosphere specialist at NASA's Goddard Space Flight Center and team have found that an iceberg the size of Manhattan island, 8,000 miles away from where the tsunami took its origin, was broken off in the impact, establishing for the first time the direct impact of devastating tsunamis on ice shelves.



According to the findings published in the Journal of Glaciology, the phenomenon marked the "first direct observation of such a connection between tsunamis and icebergs."

Using the European Space Agency Envisat data, the scientists observed for the first time that a Northern Hemisphere tsunami could trigger the calving of an Antarctic ice-shelf. While it was predicted that massive tsunamis can trigger calving of ice shelves, it was the first time that the phenomenon was proved. This will shed light into some unexplained phenomena in the past, scientists say.

"In September 1868, Chilean naval officers reported an unseasonal presence of large icebergs in the southernmost Pacific Ocean, and it was later speculated that they may have calved during the great Arica earthquake and tsunami a month earlier ... we know now that this is a most probable scenario," NASA quoted a scientist as saying.

The Tohoku earthquake and tsunami that occurred on March 11, 2011 rumbled across the Pacific and Southern Oceans and reached Antarctica in less than eighteen hours. On reaching the region, it impinged on the Sulzberger Ice Shelf causing the calving of an iceberg almost the size of Manhattan.

"In the past we've had calving events where we've looked for the source. It's a reverse scenario - we see a calving and we go looking for a source," Kelly Brunt, a cryosphere specialist at Goddard Space Flight Center, said. "We knew right away this was one of the biggest events in recent history - we knew there would be enough swell. And this time we had a source."

The scientists say when the Japan tsunami interacted with the bathymetry of the Pacific Ocean basin, it reflected and refracted, adding to the complexity of wave arrivals along the coast of Antarctica that persisted for days.

(Source: International Business Times)

Nokia confirms N9 MeeGo phone not coming to U.S.

Nokia unveiled the N9, its first MeeGo-based smartphone, at an event in June. Although the device is impressive, Nokia is setting it up for failure. Nokia's commitment to a new platform strategy that revolves around Windows Phone 7 raises questions about the extent to which its first—and probably last—MeeGo device will be supported.

Prospects for the N9 look increasingly poor in light of business decisions that Nokia is making ahead of the phone's debut. The company has confirmed that the N9 smartphone isn't going to be sold in the U.S. at launch. Retailers have also indicated that it won't be released in the UK, either. The N9 launch countdown timer was reportedly removed yesterday from the Nokia N9 Sweden website, which currently appears to be down entirely.

The MeeGo platform was a joint effort launched by Nokia and Intel last year. Nokia intended to offer MeeGo on its high-end smartphones and continue using Symbian on mid-range devices.

The company was strangely quiet about its MeeGo plans at NokiaWorld earlier this year, but CTO Rich Green — who has since left the company — said that the platform was "critically important" for Nokia's future products, offering a modern desktop-like platform that could compete with Android and iOS. Stephen Elop, a former Microsoft executive who became Nokia's CEO earlier this year, had other plans.

After evaluating Nokia's platform options, Elop announced in February that the company would transition to Windows Phone 7, eventually discontinue Symbian, and relegate MeeGo to a research project. Elop has also said that Nokia will not follow up the N9 with additional MeeGo phones, even if the product is successful.

Despite the seemingly clear mandate, the role that various platforms will play in the company's future product lineup remains somewhat ambiguous.

In an interview with the Wall Street Journal's All Things Digital blog this week, Nokia U.S. President Chris Weber — another former Microsoft executive — discussed Nokia's new focus on Windows Phone 7 and the emphasis that the company now places on North America.

"When we launch Windows Phones we will essentially be out of the Symbian business, the S40 business, etc.," he said. "We'll develop for North America and make the phones globally available and applicable."

The situation is somewhat different outside of the United States. Although Nokia has gutted its Symbian developer division and has indicated that 2014 is likely the end of the line for Symbian support, a number of corporate executives have said that the platform will continue to be sold on devices in certain regions, particularly BRIC markets and Southeast Asia.

(Source: Ars Technica)