Study: Earth’s Inner Core May Be Changing Speed

研究：地球内核可能正在改变速度

A recent study suggests that the rate at which the Earth's center is turning is slowing down compared to the outer parts of the planet.

最近的一项研究表明，与地球外部相比，地球中心的转动速度正在放缓。

Earth scientists, or geologists, say that the center or core of the Earth can rotate, or turn, at a different rate than the outer areas.

地球科学家或地质学家说，地球的中心或核心可以以与外部区域不同的速度旋转或转动。

The latest research appeared in the scientific publication Nature Geoscience.

最新研究发表在科学出版物《自然地球科学》上。

The writers of the research are Xiaodong Song and Yi Yang of China's Peking University in Beijing. They used information about seismic waves from earthquakes to study the core.

该研究的作者是位于北京的中国北京大学的宋晓东和杨怡。他们使用有关地震波的信息来研究岩心。

Earth's inner core is a ball of hot iron that is a little smaller than the Moon. Because it floats in the liquid metal of the outer core, it can spin at a different speed than the rest of the planet.

地球的内核是一个比月球稍小的热铁球。因为它漂浮在外核的液态金属中，所以它可以以不同于地球其他部分的速度旋转。

In the 1930s, scientists discovered the Earth's core by studying changes in the speed of seismic waves as they travelled through the planet. The changes in speed showed that the core was a solid center made mostly of iron.

在 1930 年代，科学家通过研究地震波穿过地球时速度的变化，发现了地核。速度的变化表明核心是一个主要由铁制成的实心中心。

The new research by Song and Yang studied what they called "repeated seismic waves from the early 1990s." They looked for changes in the amount of time seismic waves take to travel over the same paths inside the Earth.

宋和杨的新研究研究了他们所谓的“1990 年代初期的重复地震波”。他们寻找地震波在地球内部相同路径上传播所需时间的变化。

The scientists suggest changes in the spin of Earth's core can explain the changes in travel times.

科学家们认为地核自旋的变化可以解释旅行时间的变化。

"We believe the inner core rotates, relative to the Earth's surface, back and forth, like a swing," they told The French news agency AFP. They added that its relative rotation changes about once every 35 years.

“我们相信内核相对于地球表面来回旋转，就像秋千一样，”他们告诉法国新闻社法新社。他们补充说，它的相对旋转大约每 35 年改变一次。

They also said these changes correspond with very small changes in "length of day"—the exact amount of time it takes for Earth to rotate on its axis.

他们还表示，这些变化对应于“一天的长度” 的非常小的变化——即地球绕其轴旋转所需的确切时间。

Different research results

不同的研究结果

In June 2022, John Vidale and Wei Wang, Earth scientists at the University of Southern California (USC), published a study in Science Advances.

2022 年 6 月，南加州大学 (USC) 的地球科学家 John Vidale 和 Wei Wang在Science Advances上发表了一项研究。

They reported that between 1969 and 1971 the core rotated more slowly than the outer layers. They also said that after 1971, the core rotated faster than the outer layers. In their study, Wang and Vidale used data on seismic waves from nuclear test explosions.

他们报告说，在 1969 年到 1971 年间，地核的旋转速度比外层慢。他们还说，1971 年以后，地核的旋转速度比外层快。在他们的研究中，Wang 和 Vidale 使用了核试验爆炸产生的地震波数据。

Earth scientists say the Earth's core is difficult to understand and study. They disagree about how much, and how often, the spin might change. Some scientists argue that the speed of the spin does not change at all. They say the changes in seismic waves are caused by changes on the surface of the inner core instead of differences in how fast the core is spinning.

地球科学家说地核很难理解和研究。他们对旋转可能改变的程度和频率持不同意见。一些科学家争辩说自旋的速度根本没有改变。他们说地震波的变化是由内核表面的变化引起的，而不是由内核旋转速度的差异引起的。

Hrvoje Tkalcic is a geophysicist at the Australian National University. He thinks scientists will disagree about the latest research.

Hrvoje Tkalcic 是澳大利亚国立大学的地球物理学家。他认为科学家们不会同意最新的研究。

He compared seismologists, who study earthquakes and seismic waves, to doctors "who study the internal organs of patients' bodies using imperfect or limited equipment." He added: "Our image of the inner Earth is still blurry."

他将研究地震和地震波的地震学家比作“使用不完善或有限的设备研究患者体内器官”的医生。他补充说：“我们对地球内部的印象仍然很模糊。”

Song and Yang said scientists need years of seismic data to answer questions about Earth's core.

宋和杨说，科学家需要多年的地震数据来回答有关地核的问题。

Vidale of USC said, "Something's happening and I think we're going to figure it out. But it may take a decade."

南加州大学的 Vidale 说，“有些事情正在发生，我认为我们会弄清楚。但这可能需要十年时间。”