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# 科学家称北半球天气模式使地球微小摆动

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Weather can have huge affects, from sinking a city to causing hillsides to slip away, but scientists say the weather might have an even larger impact — causing the whole planet to wobble.

As the Earth rotates, it wobbles on its axis like a spinning top. And like a top as it slows down, the planet develops a host of different wobbles, ranging in period from a few minutes to billions of years.

Some of the major wobbles are well studied, such as the 433-day Chandler wobble and the annual wobble, which together can tilt the Earth's axis up to 30 feet from its nominal center. One long-term change alters which point of light deserves to be called the North Star every few millennia.

Earth's axis of rotation is tilted about 23.5 degrees compared to the plane in which the planet orbits the Sun each year. The daily rotation of the planet creates a bulge at the equator, and the gravity of the Sun and Moon tends to pull this bulge back toward the orbital plane.

But Earth resists this pull. The result is that the axis moves in a cone-shaped pattern, called a precession, with the celestial North Pole describing a full circle every 26,000 years or so. Right now, the north celestial pole points towards Polaris, the North Star, but it used to point to Vega, and in 14,000 years it aim at Vega again.

Smaller variations, lasting a week or so, have proved difficult to study, partly because they're masked by the more prominent wobbles.

But from November 2005 to February 2006, the Chandler and annual wobbles essentially cancelled each other out. This allowed Sebastien Lambert of the Royal Observatory of Belgium and colleagues to study the minor variations and determine why they occur when they do.

Using newly-available GPS data that establishes the exact location of the poles, the team determined that weather patterns in the Northern Hemisphere play a significant role small wobbles.

The location of high- or low-pressure centers and the relation of these systems to each other played a measurable role in generating small, short-term wobbles, the scientists report. Moving weather systems caused the pole positions to swing in small loops ranging from the size of a cell phone to a sheet of paper.

The motion of the ocean also affects short-term wobbles; the study showed that oceanic pressure variations also coincided with the polar loops. This is the first study to demonstrate that day-to-day changes in atmospheric pressure produce a measurable effect on Earth's rotation.

The study is detailed in the July 1 issue of the journal Geophysical Research Letters.

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