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News & Comments

A New Study Demonstrates Earth's Inner Core Oscillates

Gajendra Sharma

The day length is affected by six-year cycles of super-rotation and sub-rotation in seismic data.

Every six years, the Earth's inner core moves over a mile back and forth while the Earth is moving 3,000 miles beneath us according to a new study.

Earth's Inner Core (IC) has been observed to move and change over time. Conversely, there is still debate over the pattern, speed, and driving force of the transition.

Earth's inner core rotates consistently faster than the planet's surface, according to previously accepted models. There is new evidence of oscillations in Earth's inner core that contradicts previous models.

From 1969-1974, scientists at the University of Southern California analyzed seismic data to determine that the inner core changed direction. As part of their work, they also proposed an explanation for the fluctuating length of the day, which has been observed to oscillate persistently over the past several decades.

Super-rotation refers to the Earth's inner core rotating one degree faster than the rest of the planet on an annual basis. An initial study published in 1996 suggested that the Earth's inner core rotates at around 1 degree per year faster than the rest of the world. New findings confirm a slower super-rotation of the inner core.

In this latest study, the well-known oscillation of the past six years was directly observed through seismology.

Based on the study, both amplitude and phase of the inner core oscillate according to variations in the length of the day over six years, plus or minus 0.2 sec.

KEYWORDS

Earth Sciences, faculty, research, earth’s interior; university of southern California; seismology; oscillation; super-rotation; sub-rotation; day length