



**What AKTU, Prof. Bharat Raj Singh says about Earth Rotation....  
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## **Dire Consequences on Little Shifting of the Earth's Spinning Angle – An Investigation Whether Polar Ice Shrinkage may be the Cause?**

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The Earth's land covers by 148940000 km<sup>2</sup> (29.2%) and water by 361132000 km<sup>2</sup> (70.8 %) that means every mm rise in sea will have a shift of melting ice into water. The ice sheet covering Antarctica and Greenland contain about 99.5 percent of the earth's glacier ice that has the potential to raise the sea level by 63m (about 200 ft.), if melted completely.

The mass of the ice located in Greenland is 680,000 m<sup>3</sup>, and it stretches up to 3 miles (4.8 km) thick, covering three-quarters of the island. Some of the glaciers, particularly those in the southeast and northwest, have in the past 20 years dumped a increasing amount of ice into the ocean nearby, accounting for the rise of the water level by up to 15 % over the period.

A calculation shows that between April 2003 and April 2012, the region was losing ice at the rate of 10 billion tons a year. By year 2100, if a minimum of 3.6 feet (1.1 Meter) or maximum 10-13 feet (3.4-4 Meters) sea level rise occurs, then it will have a shift of ice melt into water by 397.245 trillion tonnes or maximum 1100-1450 trillion tonnes respectively.

Looking into the weight shift from polar (Northern / Southern coast) to sea, it might create change in the spinning angle of the Earth from 23.43 degree to further (+) or (-). The day may be a dark day on the beautiful planet when the entire living creatures may face dire consequences of their end up.

## Faculty of Science

### The days are getting longer

Scientists reveal that the rotation of Earth's core holds a clue to understanding global sea-level rise.  
Jennifer Pascoe - 11 December 2015



Scientists are studying past changes in sea level to make accurate future predictions of this consequence of climate change, and they're looking down to Earth's core to do so.

"In order to fully understand the sea-level change that has occurred in the past century, we need to understand the dynamics of the flow in Earth's core," says **Mathieu Dumberry**, a professor in the **Department of Physics** at the University of Alberta.

The connection is through the change in the speed of Earth's rotation. Meltwater from glaciers not only causes sea levels to rise, but also shifts mass from the pole to the equator, which slows down the rotation. (Picture the Earth as a spinning figure skater. The skater moves his or her arms in to spin more quickly or out to slow down.) The gravity pull from the Moon also contributes to the slowdown, acting a little like a lever brake. However, says Dumberry, the combination of these effects is not enough to explain the observations of the slowing down of Earth's rotation: a contribution from Earth's core must be added.

"To fully understand the sea-level change that has occurred in the past century, we need to understand the dynamics of the flow in Earth's core." -Mathieu Dumberry

One of only a few people in the world investigating changes in Earth's rotation, Dumberry contributed his expertise on Earth's core-mantle coupling to the study.

"Over the past 3,000 years, the core of the Earth has been speeding up a little, and the mantle-crust on which we stand is slowing down." As a consequence of Earth rotating more slowly, the length of our days is slowly increasing. In fact, a century from now, the length of a day will have increased by 1.7 milliseconds. This may not seem like much, but Dumberry notes that this is a cumulative effect that adds up over time.

Based on their work reconciling these discrepancies, the scientists involved in the study are confident in predicting sea levels to the end of the 21<sup>st</sup> century. "This can help to better prepare coastal towns, for example, to cope with climate change," says Dumberry. "We're talking billions of dollars of infrastructure here." Dumberry notes that this study serves as a stimulus for more work to continue investigating the deep interior of our planet.

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The findings, "Reconciling past changes in Earth's rotation with 20<sup>th</sup> century global sea-level rise: Resolving Munk's enigma," were published in the Dec. 11 issue of the journal *Science Advances*.