

The Ice Caps are Growing

By David J. Ameling

There is very little precise data when it comes to climate change. Are the Ice Caps growing or are they diminishing? Accurate measurements are hard to obtain. The International Earth Rotation and Reference Systems Service (IERS) provides very precise data that can answer this question. The IERS calculates leap seconds.

Just like leap years add days to keep our calendar in sync with the actual amount of time it takes for the Earth to orbit the Sun, leap seconds are used to keep highly accurate atomic clocks in sync with clocks based on the Earth's rotation. The Earth's rotation has slowed down. To keep the clocks in sync leap seconds will have to be added at a constant rate. If the Earth's rotation continues to slow down leap seconds will need to be added at an increasing rate.

The IERS determines the rotation of the Earth. Data only exists from 1972 to the present. From 1972 thru 1998 (26 years) 21 leap seconds were added. From 1999 to the present (9 years) only 1 leap second has been added. This means since 1999 to the present the Earth's rate of rotation has increased. There are two possible (but not mutually exclusive) causes for this.

1. Some of the Earth's mass has moved closer to the Earth's axis of rotation similar to a spinning skater bringing his arms closer to his sides, and thus spinning faster.

For the Earth this would occur when some of its ocean water is moved to the polar ice caps to form snow and ice. Satellite data shows the Earth's atmosphere has been cooling since 1998. This would cause a build up of snow and ice at the polar ice caps and thus increase the Earth's rate of rotation. The time lines for the increase in the Earth's rotation and the atmosphere's cooling match. The Ice Caps are growing.

Mass could also have been moved closer to Earth's axis of rotation by geological methods, but these would require more time.

2. An electromagnetic force that would slow down the Earth's rotation is lessening.

When a conductor is passed through a magnetic field an Electromotive Force (EMF) is created. If this EMF results in a current; the magnetic field created by the current opposes the motion of the conductor through the magnetic field. This will slow the motion of the conductor unless additional force is applied.

The Earth rotates within the Sun's magnetic field. The Earth's oceans and atmosphere are conductors. The resulting eddy currents slow down the Earth's rotation.

The Sun's resultant magnetic field (a summation of polar and toroidal magnetic fields) has been decreasing since the 1990s. This results in a reduction in the created EMF. This results in a reduction of eddy currents, which reduces the electromagnetic force that would slow the Earth's rotation.

This reduction in the electromagnetic force that would slow the Earth's rotation rate is far too small to account for the increase in the Earth's rotation rate. It would only complement the effects described in cause 1. The Ice Caps are growing