

Sun really is brighter during winter, not summer

by the Geophysical Institute

for the Tundra Times

Most Alaskans would look at you as if you were a little strange if you told them the sun is actually brighter during the winter than the summer.

In reality, such a statement would make a good bar bet, because the fact is easy to establish. For instance, instrumental measurements made from atop Hawaii's Mauna Loa document that the sun is brightest not during June or July, but in mid-January.

The reason is that the earth's orbit around the sun is slightly elliptical — egg-shaped — and the sun is a little off-center. The earth is actually closer to the sun, and the sun is thus brighter, during January.

It appears dimmer at the northern latitudes because it lies lower in the sky, and its rays must pass through a greater thickness of atmosphere.

The earth's axis of rotation is currently tilted 23.5 degrees from the plane in which it revolves around the sun. That is why the Arctic and An-

The current situation has not always been the case, and these two factors may have combined to produce ice ages in the past.

tartic circles lie 23.5 degrees from their respective poles.

The orientation of this axis remains constant in space as the earth orbits, although the angle of tilt varies slowly from 21.5 to 24.5 degrees with a periodicity of 41,000 years.

On the winter solstice Dec. 21, the earth was at the point in its orbit where the North Pole achieves its greatest tilt away from the sun, and on the summer solstice on June 21, at the opposite side of the orbit, the North Pole will be leaning most directly toward the sun.

This accounts for the difference in hours of daylight and the accompanying wide range in seasonal temperatures.

One might think that the southern hemisphere would experience more extreme seasonal variations in temperature than we do in the North, because its "face" is tilted toward the sun during their summer — our winter — and the earth is closer to the sun.

That is, the southern hemisphere should have hotter summers and colder winters than we do in the North, where the two factors partially offset each other. However, the combined effect in the southern hemisphere is ameliorated because there is so much ocean.

The current situation has not always been the case, and these two factors may have combined to produce ice ages in the past.

The ellipse of the earth's orbit gradually rotates around the sun. Like a rubber band stretched between two twiddling fingers, it completes a total revolution in about 23,000 years.

About 11,000 years ago, the situation was almost reversed. In other words, the North Pole was then tilted in the direction of the sun during the time that the earth was closest to the sun. It would have been much warmer in the northern hemisphere, and its ice sheets would have begun to melt.

It would appear that we are now in an interglacial stage, with the tilt of the earth's axis and our seasonal distance from the sun balancing out. However, in another 11,000 to 12,000 years, the North Pole will be leaning away from the sun at the same time that the earth is furthest from it. You can almost hear the rumbling of the glaciers.

Now that the winter is beginning in earnest, the earth is actually getting closer to the sun at over 600 miles per hour. But in another couple of months, we'll start moving apart again.