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IMPACT OF EARTH-SUN ORBITAL VARIATIONS ON CLIMATE CHANGE AND MAGNETIC POLARITY OF EARTH

Abstract

Earth's axial precession, also called precession of the equinoxes, moves westward along the observed ecliptic relative to fixed stars, opposite to the yearly motion of the Sun, and completes one cycle in about 25,771 years. Spectral analyses of climate proxy records provide substantial evidence that a fraction of the climatic variance is driven by insolation changes in the frequency ranges of axial precession variations of Earth's orbit. Eccentricity of the observed relative Earth-Sun motion ellipse also changes with varying cycles, and observation shows that the insolation variance components centered near the eccentricity-driven period of 100,000 years dominate most Upper Pleistocene climatic records, with a peak eccentricity every 405,000 years, and there are also strong periods around 95,000 years and 123,000-years related to eccentricity, in addition to a 22,000-year period and its quarter cycles related to precession. During the past century Earth's North Magnetic Pole has moved with a speed of 0–15km/year, whereas in the last 20 years it has accelerated up to 50–60km/year, when it suddenly decelerated to 40 km/year after 2020. Time intervals between Earth's Magnetic Pole reversals have averaged about 300,000 years, with last one taking place about 780,000 years ago, but between 42,200 and 41,500 years ago the magnetic field weakened significantly and Earth's magnetic poles reversed, only to flip back again in about 500 years. In the past 200 years Earth's magnetic field has weakened about 9% on a global average, which hints it might be a sign of a pole reversal in progress. As part of our previous research, we had mathematically proven that bodies moving on two different circular orbits vector-wise behave as if moving on an elliptical path with respect to each other on their relative ecliptic plane, and we had made the assertion that the Sun, the Earth, and the Moon must each be revolving in their individual circular orbits of revolution in space but seeing their relative orbits as elliptic. We had also approximately calculated orbital parameters of Earth, Sun, and Moon based on this individual circular orbit model. In this paper, we fit observed precession and eccentricity cycles into our circular orbit model, enabling a topology analysis to potentially predict Earth's major climate changes and magnetic polarity reversals over tens and hundreds of thousand years due to major changes in Sun-Earth distance and relative tilt, which impact electromagnetic field and heat energy from the Sun imposed on Earth.