RELATIONSHIP BETWEEN THE MATUYAMA-BRUNHES REVERSAL AND INDOCHINITES

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Introduction: Indochinites are a sort of tektite which forms as a result of cosmic impacts. Several studies [1, 2, 3, 4, 5] showed that Australasian tektite fall could change magneto-hydrodynamic motions of the Earth’s core. In this study, the relationship between Matuyama-Brunhes magnetic reversal and indochinites is discussed.

Methods and results: A study [4] suggested that the effect of a large cosmic impact on Earth can create a geomagnetic reversal. According to that, the dust from impact crater may trigger an ice age. Rotational speed of the crust and mantle is changed by redistribution of the water near the equator to ice. When the sea level change is larger than 10 meters and within a few hundred years, the speed change in the liquid outer core may disturb the convective cells making the dynamo effect. This new convective cells then reduce the dipole component while increasing the energy in the multipole components. Finally, a dipole is rebuilt by reestablished dynamo action and a geomagnetic reversal occurs. The estimated mass of indochinites in Australasian strewnfield is 100 million tons [1] and the area includes 10% of the earth's surface [3].

It was situated that the deposition date of Australasian indochinites is close to the beginning of the Matuyama-Brunhes magnetic reversal [6]. In fact the inclination of the magnetic field starts rapidly fluctuate at about the same time as the deposition of the indochinites. The glacial age following the tektite deposition [4] and disappearance or formation of some marine radiolarian and foraminiferal micro-organisms support this idea [3, 7]. Furthermore, a 30-50 cm thick ocean sediment layer including Australasian microtektites was thought to be related to Matuyama-Brunhes magnetic reversal [2].

On the other hand, it is known that all large impact events associated with magnetic reversals did not produce tektites [3]. Ivory Coast tektites deposited just after the Jaramilo magnetic reversal [5, 8, 9]. In Cretaceous-Tertiary boundary, a tektite fall occured much time (0.2 my) before the Chron C29R reversal [5, 10, 11]. Furthermore, 105 magnetic reversals occured in the last 35 million years [3, 12], but the number of craters, which are larger than 10 km and thought to be related to a magnetic reversal, is 10 [3, 13]. It’s much less than the number of reversals. However, some craters may not be visible because they are in water or covered by sedimentation and other events [3].

Discussion and conclusions: In the light of this informations, we try to combine the relationship between indochinites and Matuyama-Brunhes magnetic reversal from a cave sediment data. Australasian tektite strewnfield, and Moravian cave sediments occur simultaneously. We provide a new model to explain how the impact event responsible for tectites could lead to magnetic reversal recorded in Moravian cave sediments..

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