

A relationship between paleomagnetic data and biodiversity during the Phanerozoic

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Crain, 1971 claimed a good relation between paleomagnetic reversal rate (McElhinny, 1971) and extinction rate (Simpson, 1966) during Phanerozoic. But the correlation factor was not so high (0.36) and those data he used was not sufficient. We used recent data sets, "A Concise Geologic Time Scale 2016", and Hounslow et al., 2018 for the reversal rate, and Alroy, 2010, Rohde and Muller, 2005 for genus diversity. We digitized the paleomagnetic reversals from "A Concise Geologic Time Scale 2016", and from Shaviv, 2003 for samples of cosmic radiation exposure ages of iron meteorites. First, the direct comparison showed positive relations between the magnetic and the biodiversity data at 250Ma and 375Ma when the biggest and the second biggest extinction occurred, whereas at the 170Ma reversal maximum, there was no relation between the two. We also found that there are coeval abrupt change between the biodiversity and the cosmic radiation at 250Ma and 375Ma. Second, we performed 100Myr running mean analysis for both biodiversity and magnetic reversals, and we found one local minimum and two local maximums are synchronized between the two data sets. This indicates that the earth's magnetic field and biodiversity related each other for the scale of 100Myr, and the cosmic radiation at 250Ma and 375Ma caused the mutations of life forms.