

MIS024-10

会場:301B

時間:5月25日 16:45-17:00

地質時代に見られる地磁気と気候のリンク

Link between geomagnetic field and climate during geologic time

北場 育子^{2*}, 兵頭 政幸², 加藤 茂弘³, 佐藤 裕司⁴, 松下 まり子⁵

Ikuko Kitaba^{2*}, Masayuki Hyodo², Shigehiro Katoh³, Hiroshi Sato⁴, Mariko Matsushita⁵

¹ 神戸大・理・地球惑星, ² 神戸大・内海域, ³ 人と自然博, ⁴ 兵庫県立大・自然研, ⁵ 奈文研

¹Earth Planet. Sci., Kobe Univ., ²Kobe Univ. R. C. Inland Seas, ³Hyogo Museum, ⁴Inst. Nat. Environ. Sci., Univ. Hyogo, ⁵Nara Res. Inst. for Cultural Properties

The main goals of climatology are to reveal the climate change and ascertain the cause of it. The climatic records during the geomagnetic field reversal would be the most suitable to examine the geomagnetic impact on climate, a long-term disputed subject. We report that the climate changes from marine oxygen isotope stage (MIS) 31 to 17 based on the palynological data from the Osaka Bay core. During this period, two geomagnetic polarity reversals occurred during interglacial periods; the Lower Jaramillo (LJ) and the Matuyama-Brunhes (MB) polarity reversals in MISs 31 and 19, respectively. The climate changes well accord with marine oxygen isotope variations which are dominated by the Earth's orbital elements. However, the climates of MISs 31 and 19 have an anomalous cooling event, which cannot be explained by the Milankovitch theory. Both cooling events are almost correlated with the time of low-geomagnetic field intensity (below 20-30% of a normal intensity) just before the main polarity boundaries, and the warming occurred in conjunction with the geomagnetic field intensity recovery. More than 60% of increase in CR flux is estimated for such low field intensity. Such an increase in CR flux would cause cooling by 2-3 deg. C, estimated by the cloud radiative forcing. The same degree of cooling can be estimated by applying the modern analogue technique to palynological data. These lines of evidence demonstrate a link between the Earth's magnetic field and climate.

キーワード: スpensマルク効果, 寒冷化, 地磁気逆転, 宇宙線, 古気候

Keywords: Svensmark effect, Cooling, Geomagnetic polarity reversal, Cosmic ray, Paleoclimate