

氷床コアから復元される地磁気イベント時の 宇宙線変動

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Reconstruction of Cosmic Ray Variations during Geomagnetic Events from Polar Ice Core Studies

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Abstract

Cosmogenic Radio Nuclides (CRNs) are produced by nuclear reactions induced by cosmic rays in the Earth's atmosphere. The production rate of CRNs varies because changes in geomagnetic field intensity and solar activity strongly influence galactic cosmic rays, especially the lower part of energy. CRNs are produced in the upper atmosphere and are deposited on ice sheets in both Greenland and Antarctica, hence, ice cores in the polar regions provide excellent records of past histories of cosmic rays because of their continuous and relatively simple depositional processes. In recent studies, high-resolution records of ^{10}Be flux from ice cores have been reported, and these revealed the continuity of 205-year solar cycles over the last glacial period. In particular, the changes induced in the production rate of CRNs by solar modulations increased during periods of low geomagnetic field intensity, such as the Laschamp geomagnetic excursion. The results obtained in this study suggest that it may be possible to obtain a better understanding of long-term solar activity through a high-resolution ^{36}Cl analysis of the polar ice sheet.

Key words : cosmogenic nuclide, ice core, geomagnetic event, solar modulation, accelerator mass spectrometry

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