Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

ACC029-14 Room:102 Time:May 26 16:45-17:00

Geomagnetic field intensity as a tool for chronostratigraphic correlation between marine sediments and ice cores

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Recent progress in paleomagnetic studies of marine sediments has revealed long-term (10 to 100 kyr) variations in geomagnetic field intensity (relative paleointensity). The accumulation of these relative paleointensity records has enabled the development of a composite geomagnetic field intensity stack for time intervals spanning the period from the last few tens of thousand of years to the last few million years and has helped establish an age model for marine sediments. This technique can be a powerful tool for synchronizing different geological archives, such as marine sediments and ice cores, by comparing the flux of cosmogenic nuclides. This synchronization is essential for understanding the initiation and propagation of changes in the Earth's climate system. However, there are some arguments concerning the limits of marine sediment age determination from relative paleointensity records. For example, uncertainty can be introduced into the synchronization by the lock-in of a paleomagnetic signal at some depth below the sediment-water interface in marine sediments through the acquisition of post-depositional remanent magnetization (PDRM). This article presents the current understanding of the PDRM process and offers examples of relative paleointensity-assisted correlation or dating in marine sediments. Possible sources of uncertainty and future prospects for this technique are also discussed.

Keywords: Relative paleointensity, marine sediments, Age model, Post-depositional remanent magnetization, Lock-in depth, Cosmogenic nuclides