

## Effects of age uncertainty on the Site 609 IRD record

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The last-glacial hematite-stained grain record (HSG) obtained from classic DSDP Site 609 was originally reported to exhibit 1476 $\pm$  584 year cyclicity and interpreted to indicate the presence of a "1500-year cycle". Here, this record is reinterpreted in the context of an updated chronology based on newly calibrated radiocarbon dates (Marine09) from 15 to 35 ka and correlation to the North GRIP ice core layer-counted chronology (GICC05) to 60 ka. This new age model results in periodicity at primarily ~1000- and ~2000-years, bands that are both consistent with the original reported results and periodicity of related Holocene proxy records.

A ~1500-year oscillation is also detected. However, it is non-stationary and mainly limited to the interval from 60 to 70 ka, the age of which is derived solely from an ice flow model (ss09sea), subject to the highest uncertainty of the entire record, and exhibits the greatest offset from the original chronology. The effects of age uncertainty on cycle length were modeled, and results indicate that the 1500-year oscillation is less robust than the 1000- and 2000-year oscillations. Though the presence of a 1500-year cycle cannot be entirely ruled out, similar analysis of synthetic series constructed from sine waves of corresponding frequencies indicate that it is a relatively minor component.

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