A biogeochemical proxy for solar irradiance; Proxy development and application to Lake Bosumtwi, Ghana.

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Proxy development

The development of a new biogeochemical proxy for solar irradiance [1-3] has provided the opportunity to explore past solar input to the Earth's system, independent of reliance upon physical models. This proxy is based on a biochemical response of plants to changes in specific wavebands of incoming solar radiation (UV-B, 280-315 nm) [3], which in turn is preserved in the chemical composition of the walls of pollen and spores (sporomorphs) [4]. By exploring changes in sporomorph wall chemistry across a range of spatial and temporal scales, over which solar radiation is found to vary, we have built up a robust proxy [1-3].

Proxy application

Here, we present an overview of the basis of our sporomorph-based solar irradiance proxy, and highlight the most recent application of this proxy to a high resolution sedimentary record recovered from Lake Bosumtwi, Ghana, revealing 250,000 years of solar irradiance change, focusing on the last 50,000 years.

[1] Watson *et al*. (2007) *Photochem. Photobiol. Sci*. **6**, 689-694. [2] Lomax *et al*. (2008) *Nat. Geosci*. **1**, 592-596. [3] Fraser *et al*. (2011) *Pol. Res*. **30**, 8312. [4] Fraser et al. (2012) *New Phyt*. **195**, 397-401.