

Exploring the links between climate and the stable isotopic compositions and radiocarbon ages of terrestrial biomarkers in marine sediments

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Molecular stable isotopic signatures retrieved from sedimentary archives are increasingly being used to derive records of past climate variability. Many of these studies focus on construction of high temporal resolution records as analytical methods continue to be streamlined, and as more attention is focused on abrupt changes in the earth's climate system. With this emphasis on short-term variability, the timescales of over which these signals are transferred from their biological source to the sediments may be an important consideration. Radiocarbon measurements on specific vascular plant biomarkers isolated from marine sediments frequently return ages greater than the depositional age, suggesting that transport times may be significant. Moreover, the magnitude of these temporal lags appears to vary geographically, and also shows some correspondence with stable isotopic compositions. Together, these observations suggest that there may be a link between climate and the timescales of signal transmission from source to sedimentary sink. In this presentation, we explore these relationships and examine their implications for interpretation of molecular isotopic records of past climate change.