RADIOCARBON AND STABLE ISOTOPE STUDIES OF C4 GRASSES

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We report on studies to evaluate the possibility of using C4 grasses as probes of the isotopic composition of atmospheric CO_2. Marino and McElroy (1991) have reported recently on the use of *Zea mays* to track secular variations of $\delta^{13}C$ over the last 40 years. Our experiments focus on both historically and ^{14}C-dated samples of C4 grasses found in the southwestern United States. Isotopic studies on variations of $\delta^{13}C$ within single plants, and as a function of time, will be discussed.

REFERENCE

Marino, BD and McElroy, MB 1991 Isotopic composition of atmospheric CO_2 inferred from carbon in C4 plant cellulose. *Nature* 349: 127–131.

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NEW PERSPECTIVES FOR RADIOCARBON DATING ORGANIC DEPOSITS BY ACCELERATOR MASS SPECTROMETRY

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Radiocarbon dating of short-lived, *in-situ* specimens found in organic deposits, is, in principle, preferable to dating bulk samples, because the latter may contain a number of sources of error. We instituted a program of comparative AMS ^{14}C dating of bulk samples and macrofossils occurring in the same stratigraphic level in minerotrophic peats and gyttjas. Our results show that coexisting macrofossils yield consistent ages. Although bulk and macrofossil ages often do not show significant differences, disturbing effects (notably a hard-water effect in gyttjas and ageing of clayey peats or gyttjas due to fluvial input of reworked, older organic debris) are present in a number of bulk samples. Further, contamination by recent roots may be a serious problem in surficial bulk samples. In these cases, dating results can be improved by ^{14}C dating well-selected macrofossils by AMS.

UTILITY OF AMS ^{14}C MEASUREMENTS IN SEDIMENT BIOGEOCHEMISTRY

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Variation of the radiocarbon content of sedimentary organic matter with chemical or physical pretreatment of the sample is well documented. The ability to separate sedimentary organic carbon into components with different turnover times (as evidenced by the radiocarbon content) can provide valuable information addressing fundamental questions about the origins, transport and ultimate fate of sedimentary organic materials. The small-sample capabilities of AMS are particularly well suited to this task.