General Statement of ^{14}C Procedures
at the National Ocean Sciences AMS Facility

All laboratory preparations for AMS radiocarbon analyses of submitted samples occur in the NOSAMS Sample Preparation Lab unless otherwise noted on the attached report of Final Results. Procedures appropriate to the raw material being analyzed include: acid hydrolysis (HY), oxidation (OC or DOC), or stripping of CO_2 gas from water (WS) samples. Carbon dioxide, whether submitted directly (GS) or generated at the NOSAMS Facility, is reacted with Fe catalyst to form graphite. Graphite is pressed into targets, which are analyzed by accelerator mass spectrometry along with primary and secondary standards and process blanks. The primary standard NBS Oxalic Acid I (NIST-SRM-4990) is used for all ^{14}C measurements. Every group of samples processed includes an appropriate blank, which is analyzed concurrently with the group. Process blank materials include IAEA C-1 Carrara marble and TIRI F Icelandic Doublespar for inorganic carbon and gas samples; FIRI A and B wood as well as FISONS acetanilide for organic carbon samples; a ^{14}C- free groundwater for DIC (dissolved inorganic carbon) samples; and Alfa Aeasar graphite powder for AMS machine background.

Fraction Modern (Fm) is a measurement of the deviation of the $^{14}C/C$ ratio of a sample from "modern." Modern is defined as 95% of the radiocarbon concentration (in AD 1950) of NBS Oxalic Acid I normalized to $\delta^{13}C_{VPDB}$ = -19 per mil (Olsson, 1970). AMS results are calculated using the internationally accepted modern value of 1.176 ±0.010 x 10^{-12}(Karlen, *et. al.*,1964) and a final ^{13}C-correction is made to normalize the sample Fm to a $\delta^{13}C_{VPDB}$ value of -25 per mil. NOSAMS has two accelerators for radiocarbon measurement, either a 3 Megavolt Tandetron system or a 500 kilovolt compact AMS system.

Stable isotope measurements of sample $\delta^{13}C$ are used to correct Fm values measured on the Tandetron system. These are typically made at the NOSAMS Facility with either a VG PRISM or VG OPTIMA mass spectrometer by analyzing a split of the CO_2 gas generated prior to graphite production. Some carbonate samples are reacted and measured directly with the VG PRISM ISOCARB. These $\delta^{13}C$ values and source used to calculate the Fm of a sample are specified in the report of Final Results.

AMS analyses made on the 500 kilovolt AMS system are corrected using measured $^{12}C/.^{13}C$ ratios. Measured $^{12}C/.^{13}C$ ratios are not reported.

Reporting of ages and/or activities follows the convention outlined by Stuiver and Polach (1977) and Stuiver (1980). Radiocarbon ages are calculated using 5568 (yrs) as the half-life of radiocarbon and are reported without reservoir corrections or calibration to calendar years. A $\Delta^{14}C$ activity normalized to 1950 is also reported according to these conventions. The activity, or $\Delta^{14}C$, of the sample is further corrected to account for the decay between collection (or death) and the time of measurement if a collection date is specified on the submittal form, otherwise $\Delta^{14}C$ is reported assuming that collection and measurement date are the same.

Atoms of ^{14}C contained in a sample are directly counted using the AMS method of radiocarbon analysis, therefore, internal statistical errors are calculated using the number of counts measured from each target in combination with the errors of the standard. An external error is calculated from the reproducibility of individual analyses for a given target. The error reported is the larger of the internal or external errors.

When reporting AMS results of samples run at the NOSAMS facility, accession numbers (e.g. OS-####'s) are required to be listed together with the results. To avoid confusion, we suggest tabulating OS-numbers and associated radiocarbon ages as they appear on the attached Final Report in addition to any subsequent corrections that may need to be made to the ages. We ask that published results acknowledge support from NSF by including the NSF Cooperative Agreement number, OCE-0753487. The NOSAMS facility would appreciate receiving reprints or preprints of papers referencing AMS analyses made at the NOSAMS facility.

Any sample material not consumed during sample preparation or AMS radiocarbon analysis is archived for two years at the NOSAMS Facility unless other arrangements are made by the submitter.

REFERENCES

Karlen, I., Olsson, I.U.,Kallburg, P. and Kilici, S., 1964. Absolute determination of the activity of two ^{14}C dating standards.ArkivGeofysik, 4:465-471.

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Stuiver, M., 1980.Workshop on ^{14}C data reporting. Radiocarbon, 22:964-966.