COSMOGENIC ^{10}Be EXPOSURE-AGE DATING OF THE POST-WISCONSIN DEGLACIATION OF INDIANA

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Cosmogenic ^{10}Be has been measured in samples from large, well-exposed glacial erratics in Indiana, north of the Wisconsin Stage boundary. These erratics are situated on both till and outwash surfaces. The ^{10}Be concentrations of five erratics from a less than one-quarter square mile area on a terrace of the Wabash River will provide information on the reproducibility of the technique, and should provide a minimum age for the terrace. In west central and northern Indiana the exposure ages of additional erratics on till surfaces should yield critical information on the deglaciation history, because they provide the only chronologic control where ^{14}C data from intertill and postglacial organics are sparse or absent.

As comparisons with conventional techniques establish the accuracy and reliability of cosmogenic techniques for dating Wisconsin age tills and more recent deposits, the method will increasingly be used in efforts to refine glacial chronology by dating other erratics within the Laurentide ice sheet boundary and by correlating till units based on direct dates rather than on bracketing or absent ^{14}C data. Thus, the technique has the potential to significantly improve our understanding of the chronology of the last deglaciation, by providing data in areas where other techniques are not appropriate.

AMS TECHNIQUES APPLIED TO NEGATIVE-ION STUDIES

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The techniques and equipment developed for AMS studies are well suited for identifying exotic negative ions. When double-negative ions consisting of clusters of seven or more carbon atoms were suggested as the explanation for peaks of half-integral mass (molecules were assumed to be of the form $^{12}C_{n-1}{}^{13}C^{2-}$) obtained using conventional mass spectrometry (Schauer, Williams and Compton 1990), we decided to use the AMS system at the University of Pennsylvania to incontrovertibly confirm the existence of these molecular dianions. We used our multianode ΔE–E detector to identify the positive atomic ions produced by stripping negative-ion clusters at the terminal of the tandem. Transmission from ion source to detector was high (>10%) so that it was possible to detect many (in some cases all) of the ions produced from the breakup of a single cluster. The presence of 2n positive ions of C arriving at the detector nearly simultaneously while injecting masses of n*12, provided definite proof of the existence of carbon clusters with double-negative charges. To examine the physical structure of the dianions, we replaced several stripper foils at the terminal of the tandem with track detectors consisting of very thin (~2 μg/cm^2) carbon foils positioned ~1 mm from Lexan sheets. The Coulomb explosion in the carbon foil resulted in separations of several tens of micrometers between the tracks produced by the ionized atoms from the breakup of a single molecule. Count rates were keep low enough so that the clusters of tracks from individual molecules were distinct. Similar searches for polyatomic dianions of Li, B, O, and Si were unsuccessful.