We are presently limiting our analyses to quartz separates collected from Bonneville-level, wave-cut quartzite benches to eliminate uncertainties arising from compositional and mineralogic variability. Our new procedure involves step-heating a pair of samples—one exposed at the surface, the other shielded at depth. Comparing the ^{14}C thermal release patterns from each sample should allow us to identify the *in-situ* ^{14}C component unambiguously. We will use these improved methods to refine our integrated late Quaternary production rate estimate for *in-situ* ^{14}C. This production rate estimate should provide a strong basis for geomorphic applications of *in-situ* ^{14}C, as well as providing cross-checks for production rates of other cosmogenic nuclides.

NEUTRAL INJECTION FOR AMS

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Neutral injection was used successfully for nuclear physics experiments with helium and neon ion beams >30 yr ago and has not yet been used for AMS as negative ion beams have bean found to be more convenient. However, there are many elements which form negative ions with difficulty. The positive ions of such elements can usually be generated quite easily by sputtering with negative ions. Isobar suppression can be undertaken by a variety of methods at low energies (Kilius and Litherland 1995). Neutral injection, if done by resonant electron transfer below 100 keV, gives a high quality neutral beam which can then be changed to a positive or negative ion beam in the terminal of a suitable tandem accelerator for further acceleration. The completion of the molecular destruction at high energies, and isobar separation, if necessary, has a number of advantages. Examples such as the detection of ^{39}Ar and ^{135}Cs will be discussed.

[1]Deceased January 1996

Reference

Kilius, L. R. and Litherland, A. E. 1995 Patent number 5386116, USA

OIL FORMATION AND FLUID CONVECTION IN RAILROAD VALLEY, NV: A STUDY USING COSMOGENIC ISOTOPES AND NUMERICAL SIMULATIONS TO DETERMINE THE ONSET OF HYDROCARBON MIGRATION

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The onset of hydrocarbon migration is a critical question for the understanding of the formation process of many oil reservoirs. We present here first results for the use of cosmogenic isotopes and numerical simulations to address this question. The characteristics of ^{129}I (half-life $T_{½}$ =15.7 Ma; strong biophilic nature of iodine) make this isotopic system a particularly well suited candidate in this context. Although ^{129}I is produced in the atmosphere by the interaction of cosmic rays with xenon isotopes, the important production mechanism for this application is that by spontaneous fission of ^{238}U in the subsurface. In a non-migrating situation, ^{129}I levels in hydrocarbons will reflect the secular equilibrium attained in the source rock as a function of uranium concentrations. Once migration starts, this signal will be carried along by the fluids into the reservoir rock which has in general a lower uranium concentration than the source rock. A comparison between the observed ^{129}I levels in oil field brines to those supported by the uranium concentration in the reservoir rock