

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Fractionation of uranium isotopes in minerals screened by gamma spectrometry.¹ JEFFREY L. GEIGER, AUSTIN M. BALDWIN, CHARLES C. BLATCHLEY, Pittsburg State University — At least two groups have reported finding shifts in the ratio of U-235/U-238 for sandstone, black shale, and other sedimentary samples using precision ICP-MS. These shifts were tentatively attributed to a recently predicted isotope effect based on nuclear volume that causes fractionation for U^{IV} - U^{VI} transitions. However, fractionation of high Z elements may be less likely an explanation than U-235 depletion induced by galactic cosmic ray neutrons. Isotope depletion in marine sediments could therefore be an indicator of changes in cosmic ray flux due to nearby supernovae, gamma-ray bursts, or longer term changes during the 62 million year cycle of the Sun above and below the galactic plane. We report using a less precise approach than ICP-MS, but one which can quickly screen samples to look for anomalies in isotope ratios, namely HPGe gamma ray spectrometry. Various levels of depletion were measured for uranium rich minerals, including brannerite, carnotite, and pitchblende, as well as coal and limestone samples.

¹Partially funded by NASA EPSCoR 2006 and KTEC.

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Date submitted: 27 Nov 2007

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