

## **COMBINING STRATIGRAPHIC AND C-14 DATING INFORMATION TO CONSTRUCT MORE ACCURATE CHRONOLOGIES**

<sup>1</sup>Seitz, G.G., Southon, J.R., and <sup>2</sup>Weldon, R.J. <sup>1</sup>Lawrence Livermore National Laboratory, Livermore, California, USA, <sup>2</sup>University of Oregon, Eugene, Oregon, USA.

The stratigraphy and the quality of C-14 dating results fundamentally determine the accuracy of sedimentary chronologies. Mistakenly, it is common practice to limit the chronological resolution analysis to the analytical uncertainties of the C-14 determination, and largely ignore the inherent uncertainties related to the episodic nature of clastic sedimentation. Stratigraphic considerations largely influence the context uncertainty, i.e. the relationship of the event of interest to the age determination. We also found that the laboratory C-14 pretreatments have a significant effect, with age differences of up to several hundreds of years. In general we discovered that the “acid only” pretreated dates of peats show greater stratigraphic consistency. Insightful generalizations can be drawn from an analysis of the highest resolution chronologies. We focus on peat-bearing Southern San Andreas Fault paleoseismic sites, although we also consider other chronologies based on detrital charcoal. Typically these sections provide refined layer-age estimates with precisions of 20 to 60 years. The main reasons these peat-bearing sections provide such high resolution are the abundance of C-14 datable material with low context uncertainty, and high section completeness. Considering that the pretreatment related age effect may only be recognized at sites with multiple closely spaced dated samples, we make the following recommendations for peat-bearing sites: 1) compare dating results from various peat fractions to determine the extent or existence of contamination; 2) report C-14 pretreatments, and consider them when evaluating existing chronologies. We anticipate that the results of this study will ultimately improve the accuracy and precision of chronologies.