The Laboratory of Tree-Ring Research

presents a talk by

William E. Wright, Christopher Baisan, Martin Streck, W. Walton Wright, Paul Szejner

(LTRR)

Dendrochronology and middle Miocene petrified oak: Modern counterparts and interpretation

Wednesday, February 10, 2016 - 12:00pm to 1:00pm

Room: Bannister 110

This study reports the first successful statistical ‘crossdating’ among ring width time series from many specimens of petrified wood, based samples of the genus Quercus from the Stinking Water (SW) site in Oregon, a Miocene-aged exposure associated with the Columbia River Basalts. Ring width time series from 26 radii, 17 different trees, show significant intercorrelation. 40AR/39AR dating on pillow basalt from the locality yielded a weighted Plateau Age of 13.79 ±0.09 Ma placing the death of the trees at the end of the Langhian Stage of the Middle Miocene (15.97±0.05 to 13.65±0.05 Ma), during the middle Miocene Climate Transition (MMCT).A Modified Coexistence Approach was applied to determine the likely climate range when the SW trees were growing. The modified approach included regression of site-mean ring width time series statistic values on estimated soil moisture for the site locations, using site-mean data from 126 modern Quercus sites from across the United States. Identification of highly significant linearities indicated strong relationships between ring width intercorrelation and soil moisture and ring width variability and soil moisture. Comparison of individual modern site-mean statistical values with values calculated for the SW locality suggests a mesic growing environment for the SW Quercus, with moderate temperatures. Geographic placement of modern Quercus sites with site-mean statistics similar to the SW values indicates a modern analogue in the eastern United States. Modern distributions of mesic species in the genera present at the SW locality suggest similarities with the central and southern Appalachian Mountains and the Ozark/Ouachita Mountains, indicating a mean annual temperature range of □10 °C to □15 °C and a mean annual precipitation range of □750 mm to □1200 mm when the SW Quercus were growing.

The University of Arizona