LATE HOLOCENE PALEOFLOOD DEPOSITIONAL SEQUENCES: MIDDLE TENNESSEE RIVER VALLEY, USA

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Sediment stored in floodplains and low alluvial terraces along the middle Tennessee River reflects flood frequency and magnitude during the past ca. 1500 years. This study uses the stratigraphy, sedimentology and geochronology of three alluvial terraces to infer paleoflood deposits. Buried soils at the three locations are older than 630 CE and suggest a multi-century period of landscape stability. Multiple flood deposits are separated by weakly developed soils, indicating an increased flood frequency until ca. 1910 CE. Optically-stimulated luminescence dates of flood deposits yield ages of 580+/-110, 835+/-80, 1460 +/-30, 1465+/-35, 1660+/- 30, 1830+/-15, 1875+/-10 and 1910+/-10 CE. Age-depth modeling shows increased sediment accumulation rates following ca. 1800 CE. Particle-size analysis of historic floods demonstrates a relative increase in fine sand (RFS) content with increasing flood magnitude, which is consistent with previous work upstream. The highest RFS values are found within flood deposits dated to ca. 1830 CE, 1460+/-30 and 1875 +/-10 CE, the latter of which coincides with the 1867 CE historic flood along the Tennessee River. The high magnitude flood of 1830+/- 15 CE is consistent with USGS paleoflood analysis upstream that documents a paleoflood occurring ca. 1600-1800 CE that was higher in elevation than the historic flood of record. The earliest observed flood deposits appear to occur during transition into the Medieval Climate Anomaly between 800 and 1300 CE with increased flood magnitude through the Little Ice Age (1400-1800 CE), and with peak magnitude occurring 1830+/-15 CE.