Geophysical Research Abstracts
Vol. 12, EGU2010-11736, 2010
EGU General Assembly 2010

Unravelling recent environmental change in a lowland river valley, eastern Ireland: geoarchaeological applications

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This paper reports the preliminary findings of an Irish Heritage Council INSTAR funded research project on the geoarchaeology and fluvial geomorphology of the lower River Boyne valley, eastern Ireland. The nature and evolution of the contemporary Boyne floodplain at Dunmoe, Co. Meath (53º 40' 22.8" N, 6º 37' 54.7" W) has been investigated using a multi-technique approach combining field and terrestrial LiDAR-based geomorphological mapping, radiocarbon dating of channel migration activity, electrical resistivity tomography surveys of sub-surface topography and high-resolution X-ray and XRF geochemical characterisation of fine-grained sediment fill sequences. All of these lines of evidence support a tripartite sub-division of the floodplain. Valley marginal floodplain Zone 1 is characterised by a colluvial sediment fill which has buried an irregular ditch-basin-platform surface containing recent archaeological material. Subtle variations in mapped elevation suggest that the buried surface may represent the site of an abandoned river-side complex, possibly a small docking area or port. Geomorphological field relationships suggest that the possible archaeological site was connected to a former bank line position of the main River Boyne (floodplain Zone 2) via a small canal. Radiocarbon dating of Zone 2 channel gravels suggests that the channel associated with this bank position was abandoned some time before 1490-1610 AD. Subsequent vertical and lateral channel migration, the onset of which has been radiocarbon dated to the 17th or 18th century AD, led to the development of the lowest and most recent floodplain surface (Zone 3). The sedimentology and geochemistry of the Zone 2 and 3 fluvial sediment sequences suggests that recent centuries have involved an increase in fluvial flood risk, evidenced by the burial of alluvial soils by bedded, shell-rich sands. A more complete understanding of the timing and environmental drivers of increasing flood risk is anticipated from ongoing radionuclide (Pb-210 and Cs-137) and pollen analysis of the fluvial sediment sequences. However, based on the established chronology and geomorphic field relationships, it is plausible that the archaeological complex represents a late medieval site linked to Dunmoe Castle (14th to 17th century AD), which overlooks the floodplain.