

Imaging Graves and Stone Rings at Depth: Recent Magnetic and Radar Results from Montana and Idaho

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Total magnetic intensity (TMI) and ground penetrating radar (GPR) provide guidance for placing test units and help delimit the extent of sites. Measuring the vertical gradient of the magnetic field is more common in archaeology, particularly in Europe. However, TMI acquisition is more economical, yields richer data, and is amenable to sophisticated filtering techniques developed for minerals and energy exploration. These tools enhance our ability to produce 3D models of subsurface sources. GPR acquisition and processing takes longer than TMI and requires a smooth ground surface. However, GPR combined with TMI allows separation of some geological and archaeological sources. TMI followed by spatially limited GPR investigation often provides the most productive combination. As examples, recalculation of TMI over a visible stone ring indicates it would be detectable at depths exceeding one meter. Recent TMI, GPR, and excavation in Idaho reveal such buried rings. TMI followed by GPR in Yellowstone Park allowed separation of fluvial sources from other geological and archaeological sources. Subsequent excavation revealed cultural artifacts and fire hearths dating to 3,090 years at 0.8 meters. GPR alone, acquired on a paved surface in Yellowstone, shows an older roadway, and points to the most likely spot for a historic grave.