



Investigating the sedimentary architecture and morphology of the Brampton kame belt using ground-penetrating radar (GPR) and high-resolution LiDAR data

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Kames constitute a diverse range of glaciofluvial and glaciolacustrine landform-sediment assemblages that provide information on the style and pattern of deglaciation. The Brampton kame belt is one of the largest (>40 km²) glacio-depositional complexes in the UK and is located at the centre of the former British-Irish Ice Sheet. A large-scale survey of the kame belt subsurface sedimentary architecture was conducted using ground-penetrating radar (GPR). Using a 100 MHz Mala Geosciences 'Rough Terrain Antenna' system allowed us to test the application of GPR in investigating complex glaciofluvial landform-sediment assemblages and to provide insight into the formation of the kame belt. The full range of geomorphic features were targeted, including ridges, flat-topped hills, channels and depressions. Where possible, GPR survey lines were collected both along and across features in order to provide an insight into their 3D architecture. At two locations survey lines were collected above man-made sediment exposures, which were logged in order to tie the radar data to the sedimentary facies. Initial analysis of the data demonstrates it is possible to identify large-scale sedimentary architecture, including bedding, changes in sediment type, and deformation structures (e.g. faulting and folding). It is also possible to tie radar facies to sediment facies exposed in section. Our analysis builds on existing models of kame formation by providing a better understanding of individual landform-sediment assemblages, transitions between them and spatial variations in the pattern, style and volume of kame sediments in the region.