The application of shallow geophysics towards complete settlement patterns of Viking Age Iceland

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Introduction
Accurate settlement surveys are key for assessing, understanding, and explaining socioeconomic changes that are played out on a landscape over time. Over the last 9 years the Skagafjörður Archaeological Settlement Survey (SASS) has developed a series of protocols involving coring, electromagnetic conductivity survey, resistivity, GPR, and test excavations to make an accurate assessment of the first few hundred years of Viking Age settlement in Northern Iceland. Because of the substantial and early land erosion and corresponding sediment deposition in Iceland, many of the first sites are completely buried. The lack of plowing and the scarcity of artifacts make these early sites almost impossible to identify using traditional survey methods. By employing shallow geophysics and coring, we have identified important sites that are not visible on the surface or in air photos.

Coring
Coring is used to identify areas where post settlement deposits are deep enough to cover and obscure turf structures. Using the volcanic tephra deposits, soil deposition rates across the landscape can be calculated. We have now cored over 2700 separate locations along 12 km of Langholt (approximately 0.6 km wide). Coring identified 11 locations, away from visible farm mounds, where preservation was good enough to warrant further investigation with shallow geophysics. Coring was also used to select locations for 1x1 test pits into the visible farm mounds.

Test Pits & Intensive Midden Excavations
At all 14 farmmounds, 1x1 test pits were excavated to determine their earliest occupation dates. These test pits were placed in the deepest and oldest area of the midden as determined by coring. Paleoethnobotanical samples were taken from each distinct layer. Most of these farmmounds were dated using tephrachronology. At 7 of these farmmounds larger sections were excavated where substantial archaological samples were recovered.

Ground Penetrating Radar
We found that GPR energy was substantially dissipated and the readings more difficult to interpret when taken over the grass surfaces so common in Iceland. Therefore, we used a backhoe to de-sod large areas (eg 40x40m) in order to get better GPR readings. GPR profiles were sliced using GPR-Slice software. Sliced GPR images also guided excavations of the complex sites and the excavations.

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Excavation
Over the course of the project, we accomplished extensive excavations at five sites. Because of the detailed information gained from coring and geophysics, these excavations were done primarily to confirm and interpret the geophysics. Therefore the excavations were extremely shallow, designed to expose and confirm the tops of deposits. Floors and other deposits were only sampled, not excavated. Using GPR-Slice images, we were able to rapidly probe and interpret large, convoluted sites, fleshing out, with specific examples, the farmsteads that make up the settlement pattern.

Conclusion
Without this program of sub-surface investigation, the settlement pattern from Langholt in Skagafjörður would be profoundly flawed. The earliest components of two of the largest, and most powerful sites would not have been identified. The addition of these sites, as well as several smaller ones, to the Viking Age settlement pattern pushes back in time the development of inequality. The location of these buried sites suggests how property and land ownership played an important role in promoting social stratification.

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Notes
\(^1\) http://www.fiskecenter.umb.edu/SASS.

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