



Enhancements in the processing of GPR at Maax Na, Belize, Central America

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Abstract

The University of Calgary has been involved in geophysical research at the Maax Na archaeological site in Belize for the last four years. A number of 2-D and 3-D ground-penetrating radar (GPR) surveys have been acquired using the 250 MHz Noggin Smart-Cart. Continued enhancements in the processing flow, and the application of creative algorithms have resulted in a dramatic improvement in the GPR image. The most successful processing flow to date consists of a static time shift and setting equidistant traces, the application of a “dewow” low-cut filter, gain function, a Q-filter and running average spatial filter, followed by a diffraction stack migration and a bandpass filter.

Interpolation issues relating to a lack of regularly sampled data continues to plague ground-penetrating radar. Although the results of using Kirchoff time migration as an interpolator looked promising on the Maax Na, it was recognized that a more finely sampled dataset would be advantageous in the development of a successful application. With this in mind, the University of Calgary recently shot a small survey on a property east of Fish Creek Park to counter questions regarding interpolation. In this particular survey, line separation was reduced to 20 cm (compared to 50 cm at Maax Na), with trace interval set at 5 cm. Questions pertaining to line separation distance and spatial resolution, suitable trace intervals, and the importance of acquisition direction were addressed. Interpolation using the full dataset and subsets of the dataset highlighted best practices in terms of parameter selection. This research will be used to improve our acquisition parameters and how we acquire the data when we return to Belize in 2006.