CHAPTER 5

DISCUSSION AND CONCLUSIONS

This study presents success use of GPR methodology especially, the data processing and attribute analysis, for archaeological investigations. The suspected location of a brick Buddha hall built east of the old pagoda in Wat Pan Sao has been revealed by the GPR images which the top of the Buddha hall is clearly present at a depth of ~ 20 cm. This interpreted brick hall is consistent with the excavated brick base corresponding both in depth and position. Moreover, the application of the GPR methodology to the archaeological investigation in Wiang Kum Kam discovers the suspected location of the old brick wall corresponding to the location of the excavated wall although the GPR data acquired in this area are of very poor quality.

The GPR data from the two study areas were transformed from their originally recorded GPR format into SEG-Y seismic standard format enable them to be processed using the VISTA[®] Seismic Processing Software and subsequently to be attribute calculated in the OpendTect free software. Calculated GPR attributes were visualized by time slices and iso-surfaces. Time slices show anomalies of buried structures at various depths while iso-surface images are for overall views of buried structures. Time slices of all attributes were displayed using the same percentage range of the maximum value of individual attribute, and then it can be compared to other attributes. The percentage range was selected considering image display that simply distinguishes anomalies in all depth. From this study energy, instantaneous amplitude, and steepness event attributes together may be the best candidates for improving visualization of buried archaeological structures since they provide relative clear GPR images of high contrast anomalies of subsurface features. In contrast, similarity and coherency attributes may not be suitable for GPR data with poor quality due to these two attribute calculations require high resolution of GPR data with probably very dense profile spacing.

In conclusion visualization and the interpretation of the GPR data acquired in Wat Pan Sao and Wiang Kum Kam can be improved using the attribute analysis. The GPR data with the attribute analysis especially with energy, instantaneous amplitude, and steepness event attributes provide a clearer image of the edge of buried archaeological structures than the GPR data with common processing steps. The energy attribute provides subsurface images with high amplitude anomaly of target areas while the steepness event attribute highlights high contrast features. Among the attributes, the instantaneous amplitude gives the most continuity in events on the images. The location and extension of the buried archaeological structures in Wat Pan Sao and Wiang Kum Kam areas can be used as a guide for area management plans and further archaeological excavation The GPR attribute analysis used in this study should be applicable to other areas undergoing archaeological investigation

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