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Picturing internal fractures of historical statues using ground penetrating radar method

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Abstract. The aim of the study is to formulate an approach to the monitoring of internal micro discontinuities in a hybrid 2-D/3-D image of ground penetrating radar (GPR) data gathered on historical monument groups, and to indicate methodologically rearranging amplitude-color scale and its opacity functions to activate micro fractures in monument groups including three colossal women, three men, and 24 lion statues in Mustafa Kemal ATATÜRK's mausoleum (ANITKABIR) in Ankara, Turkey. Additionally, this paper illustrates the use of petrographic research to describe the monument and its groups. To achieve the aim, data measurements were carried out on the monument groups with spaced 10 cm profiles and 1.6 GHz antenna.

The 3-D image was transparent 3-D volumes of the GPR data set that highlighted internal micro fractures and cavities in the statues. Rearranging appropriate amplitude-color scale and formulating the opacity of the data sets were the keys to the transparent 3-D data visualizations. As a result, the internal fractures and cavities were successfully visualized in the three women, three men and twenty-four lion statues. Micro fractures were observed particularly at the rim of the vesicular of the rocks under a polarizing microscope.

Full Article in PDF (PDF, 10154 KB)

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