

**Evaluation of Responses from  
Handheld Gamma-Ray  
Spectrometers:  
How Reliable is Outcrop Data  
for Interpretation?**

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Outcrop gamma-ray (GR) surveys from handheld units are often used to obtain information for correlation to the subsurface. Spectral outcrop GR data can be useful in determining a variety of geologic parameters but factors such as collector type, environmental conditions, calibration, stabilization methods, processing techniques, etc. may affect data quality and therefore skew interpretations. Several outcrop GR surveys were acquired from a 20-meter section in order to evaluate the quality of data obtained from different types of handheld units and to examine variation in same unit responses over time. Two different models of handheld GR spectrometers were used to collect spectral assays simultaneously in the same beds at one-foot intervals. One of these units was previously used on the same section nearly a decade ago. Total GR data from a third non-spectral unit used in 2001 was also compared.

Correlation coefficients of Total GR API for all surveys range from 0.23 to 0.91. Logs produced from the simultaneous surveys were extremely consistent overall, with similar max counts, but one unit recorded a greater range of values. Responses from the same unit across a decade were also remarkably consistent; variations in these specific surveys were primarily attributed to readings taken at slightly different points within the outcrop. The Total GR data from the non-spectral unit had consistently lower API values. After baseline adjustments its general log character matched fairly well but with suppressed max



values. Experience from previous and recent surveys show environmental conditions (temperature) appear to be a major issue with these units. This may be a calibration/stabilization related issue. Evaluation of differences in unit responses can provide an insight for adjustments that may be needed during interpretation and application of outcrop GR data.

