Advances in Handheld Energy-Dispersive X-ray Fluorescence Calibrations for Carbonate-Rich Sedimentary Rocks

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While the use of handheld energy-dispersive x-ray fluorescence (HH-ED-XRF) instrumentation in stratigraphic studies has increased during the past few years, very little has been published regarding efforts to properly calibrate the instrumentation for several rock types. The purpose of the presentation is to illustrate a template for developing calibrations that will be useful for specific ranges in lithologies, in this case, carbonates with low and high iron content. Our working low-Fe carbonate calibration uses 29 in-house reference materials developed from our drill core-based studies of Paleozoic and Mesozoic sequences. Our working siderite-bearing calibration uses 8 in-house reference materials that were developed from the Carboniferous-age Smithwick Formation of north-central Texas. These two calibrations represent starting points for assessing stratigraphic changes in carbonate-rich strata. The limitations and future development of the calibrations will be discussed. Case studies to be presented are from Texas, and include the Smithwick Formation, Kimmeridgian-age Haynesville Formation, Aptian/Albian-age Pearsall Formation, and Cenomanian/Turonian-age Eagle Ford Formation.