

## **Lidar Intensity as a Remote Sensor of Rock Properties: An Investigation of the Sege Sandstone, Book Cliffs, Utah**

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Terrestrial lidar (light detection and ranging) has become a popular tool for outcrop investigation and modeling. Lidar units can collect a spatially accurate 'cloud' of points approximating the shape of the outcrops surface. In addition to providing detailed spatial data, lidar scanners record the intensity: the power of the backscattered signal relative to the power of the emitted signal. Intensity has been used as a remote sensing and surface classification tool in archeology, forestry, glaciology, volcanology, urban development, and other fields of study. However, lidar-based outcrop studies have largely ignored intensity data, focusing primarily on x, y, and z information. Experiments were conducted to test the relationship between lidar intensity and clastic lithology by scanning core of the Sege Sandstone, from the Book Cliffs of Utah. Intensity shows a good log-linear correlation to shale ( $r = -.84$ ) and sand ( $r = .88$ ) weight percent. This relationship can be used on outcrop to estimate v-shale, net-to-gross, and even simulate gamma-ray logs in relatively unweathered outcrops.