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APPLICATION NOTE

Effects of Sediment Color on OBS[®] Measurements



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WHEN MEASUREMENTS MATTER

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Effects of Sediment Color on OBS[®] Measurements

This application note includes discusses the effects of sediment color on OBS[®] measurements. After suspended-solid concentration (SSC) and size, sediment near infrared (NIR) reflectivity, indicated by color, has the third largest effect on OBS measurements.

Terry Sutherland and colleagues investigated the effects of sediment color on OBS sensitivity. OBS sensors are color blind; however, their study showed that hue, red, yellow, green, etc., perceived by the eye can indicate the relative darkness of the sediment. Moreover, darkness is related to the near infrared (NIR) reflectivity of the sediment and this strongly affects the efficiency with which it backscatters light.

The darkness level is determined directly by visually comparing the sediment with a set of Munsell cards and selecting the card number that appears as dark as the sediment. The Munsell darkness scale ranges from 0 (black) to 10 (white) and is analogous to the saturation of color. The effect of Munsell darkness is shown in Figure 1; mineral names are shown to place the results in geological context. Other sediment properties being equal, the sensitivity of an OBS sensor, expressed as the change in signal per unit of suspended solid concentration (SSC), will decrease in proportion to Munsell darkness. So an OBS sensor in a suspension of 10-micron magnetite grains will produce about one tenth the signal that it would produce in a suspension of calcite grains with the same size, shape, and SSC.

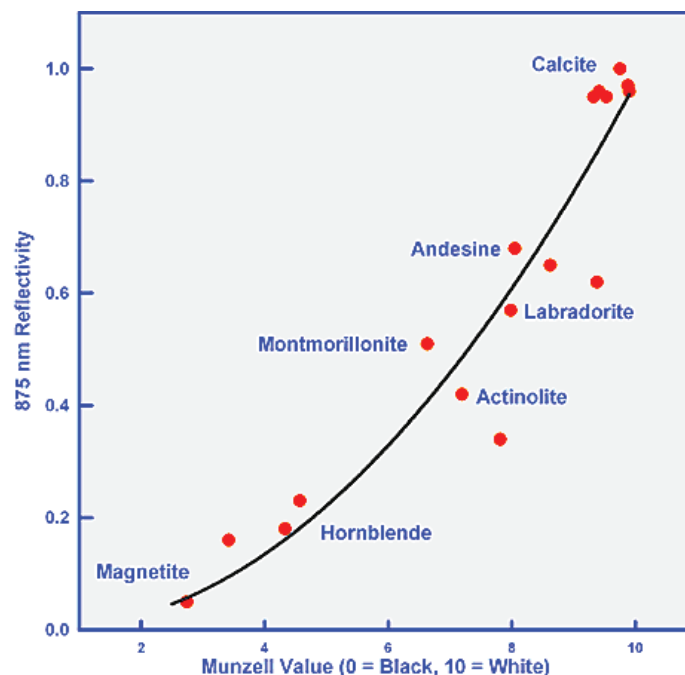


Figure 1. This chart uses data obtained by NASA to show the effect of Munsell darkness on reflectivity; mineral names are included for geological context.

Reference

Sutherland T.F., P.M. Lane, C.L. Amos, and John Downing. 2000. Calibration of Optical Backscatter Sensors for Suspended Sediment of Varying Darkness Levels. *Marine Geology* 162(2000), pp. 587-597.