

## Facies analysis of turbidite succession using borehole log data

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Gamma-ray logging is regarded as the most sensitive method to lithofacies changes in boreholes. For this reason, identifications of lithofacies in turbidite successions along a well-log succession are made mainly based on gamma-ray logs. Gamma-ray logs are also analyzed using software, e.g. CycloLog<sup>TM</sup> for spectral analysis of gamma-ray logs, to detect sedimentary facies and stratigraphic variations, because the resolutions of the log data are limited for certain data intervals and the identifications are necessary for objective interpretations. Such tools can be used to easily and objectively detect sandy or muddy horizons, estimate scales of stratigraphic variations, and discover correlations in the log data. In this study, in particular, sedimentary facies was analyzed using the lamina identifying method proposed by Sasaki et al.(in press) and the Hurst analysis procedure using gamma-ray log data from turbidite successions.

The method of Sasaki et al. can provide reproducible and objective lamina boundary identifications by use of a combination of change rates with median values from the gray-value profiles of digital lamina images. Because the method can identify bicolored laminae, it was used for identifying intervals of sandstone-dominated and mudstone-dominated horizons in the logs. The Hurst analysis can reveal the fractal nature of log data, and these data can be used to further characterize each unit of the horizons identified by the method of Sasaki et al.

In the results, high and low-density sandy intervals and high and low-density muddy intervals were identified using the above methods on the density logs (e.g., RHOB) from the gamma-ray log data. The Hurst analysis evaluated persistence, and the results suggest that fluctuations in "real" alternations affected the log-patterns of the intervals. It is suggested that corroboration of the results from these methods can provide a new kind of robust sedimentary-facies analysis for turbidite succession.

Keywords: sedimentary facies analysis, turbidite succession, Hurst analysis, gamma-ray log