



## **Geostatistical analysis of acoustic profiling data in the Soyang Lake, Korea**

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To determine sediment distribution patterns and deposition rates in the reservoir of the earth-filled Soyang dam in Korea, 227 km of acoustic profiling was conducted using a 10-20 kHz sonar system. The acoustic data were recorded at roughly 50-m intervals between longitudinal lines and 500-m intervals between transverse lines. A programmed-gain-control proportional to  $t^{1.5}$  and f-k time migration were applied to these data. The thickness of sediments along profiles was interpolated using the kriging method after analyzing variograms in 26 regions. Anisotropic models in this geostatistical method yield an average of 0.7 m thickness of sediments deposited after construction of the dam and a maximum thickness of 9.0 m. The estimated total volume of the sediments is approximately  $3.1 \times 10^7 \text{ m}^3$  in the investigation area, which comprises 1.2 percent of the reservoir encompassed by the area. This volume is 1.5 times greater than that which was estimated by kriging with an isotropic model. The lake deposits interpreted on the acoustic sections were verified with 26 core samples. The average deposition rate is computed to be approximately  $2.6 \times 10^{-2} \text{ m/year}$  in the studied area. Near the dam, the net deposition rates of the lake sediments are much lower than they are farther upstream. The net deposition rate near the dam is decreased by periodic flushing of sediments that contributes to the safety of the dam and increases the capacity of the reservoir.