Introduction.

Danau Matano (or Lake Matano) is Indonesia’s deepest lake, located on the island of Sulawesi, south of the Celebes Sea. Understanding the structure of the lake floor can help geoscientists assess current hydrology and the best places for future, more in depth study. This project uses seismic reflection data acquired by boat in August 2007 to determine sediment type and develop a reliable map of Lake Matano’s bathymetry.

Methods.

Data was collected using an EdgeTech, sub-profiling system. Processing was performed by 3200 XS top unit with Discover software. Time-to-depth conversion assumed sound velocity to be 1450m/s. • Seismic data, only available in graphic form were digitized, manually using EdgeTech Direct and Microsoft Excel.
• Each digitized point included latitude, longitude, depth, and an estimation of sediment type:

![Figure 1. Scheme used for approximating sediment type. Roughly associated with coarseness (sediments fining to 6).](image)

• All 5,400+ points were imported into ArcMap and projected into the WGS 1984 UTM Zone 51S coordinate system.
• Transect data was combined with shoreline data (depth value=0) and interpolated over the entire lake floor via the natural neighbor method.
• Sediment interpolation calculated just through transect data.
• Raster interpolation area was constrained by using a polygon of the lake as a mask.

Results.

Lowest depth recorded was 587m, on the north-western end of the steep southern slope.
• Identified a small patch of higher bathymetry in the center of the lake, bounded by deeper areas, both to the north and to the south.
• The finest material on the lake floor was interpolated to be at the south-eastern end of the lake. The center area of the lake also showed some finer-grained sediments, but to a lesser degree. Distribution is also patchier in the center of the lake.

Discussion.

Basic Conclusions:

The two major maps developed agree with previous expectations about the lake structure.
• The steep slope on the southern shore is typical of graben lakes that are bounded by normal fault.
• Slope asymmetry (i.e. difference between north and south shores) is consistent with other graben lakes, e.g. Lake Tahoe.

![Figure 4. Approximate slopes of the lake floor. Interpolated data found in the bathymetric map were used to calculate these slope values.](image)

• Greatest amount of fine sediment is coincidental with the shallowest slopes in central and eastern parts of the lake.

Problems:

• Human error during seismic data input.
• Subjectivity in sediment type designation and classification
• Numerical designation of coarseness (interpolation is quantitative, rather than qualitative).
• Subjectivity in sediment type designation and classification.
• Distribution of transects leave significant gaps in data:

![Figure 5. Location of sample points used to for all interpolation in this study. Linear nature is due to the straight boat transects during collection.](image)

Future Considerations:

• Places with finest sediment likely best place to take cores.
• How is are sediment and depth related to stream inlets?

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