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Seismic Architecture of Turbidites in Lake Mead

Density flows have been observed in Lake Mead since completion of the Hoover Dam in 1935, and recently acquired seismic data allow mapping the seismic stratigraphy of these deposits. This reservoir provides an opportunity to study dispersal of turbidites from a point source, and determine how their distribution is affected by basin topography. The investigation is based on a grid of chirp seismic profiles spaced approximately 500 m apart. The reservoir is composed of four major basins each separated by narrow canyons. The stratigraphy in the easternmost basin, where the Colorado River enters the lake, could not be imaged seismically because of gas within the sediment. In the western three basins, post-impoundment sediment is clearly imaged, and is as much as 35 m thick. Numerous flat-lying reflectors have been traced throughout the gas-free part of the lake.

In general, reflector strength decreases to the west away from the source, however this progression is not uniform. Lake floor morphology has a strong influence on reflector strength. Amplitude has been mapped on several horizons that were traced throughout the lake. In straight sections of the narrow canyons, reflector strength is highest in the center, while in sinuous sections reflector strength increases to the outside of meanders. Where the narrow canyons debouch into a broader basin, reflector strength decreases in a radial pattern away from the canyon mouth. Cores suggest the turbidites are fine grained, thus Lake Mead may serve as an analog to fine-grained turbidite systems in complex topographic settings.