

## **MICROGRAVITY TO ASSESS KARST BENEATH TVA DAMS**

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The flow of the Tennessee River and its tributaries are controlled by a series of dams constructed by the Tennessee Valley Authority (TVA) for flood control, power generation, and navigation. Many of these dams are founded on karst geology and are susceptible to seepage and sinkhole development. Geophysical exploration programs play an important role in the characterization, monitoring, and remediation planning of these potential karst hazards beneath TVA dams. Microgravity has proven to be an essential part of the geophysical exploration programs at the reconnaissance and detailed-feature levels. We present case studies where microgravity successfully defines anomalies due to karst features and geologic structure. Examples include mapping dissolution zones beneath earthen embankments, identifying possible seepage pathways through karst conduits, characterizing geologic structure that controls karst development, and monitoring subsurface mass changes. We demonstrate how microgravity is beneficial in areas that present logistical constraints to other geophysical methods, while providing complementary data in areas where other geophysical methods are applicable. We validate the effectiveness of microgravity surveys through historical records of karst features encountered during dam construction and by information from geotechnical borings.