

Structural Controls on Fluid Migration in Cretaceous Strata, Central Texas

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ABSTRACT

The Edwards Aquifer is a large, complex groundwater system located throughout Central Texas in association with the Balcones Fault Zone. The San Antonio and Barton Spring segments of the Edwards Aquifer have been extensively studied in the past because they provide groundwater resources to the largely urbanized areas of Austin and San Antonio and smaller communities along the Interstate 35 corridor. Previous research has been conducted on these southern and central portions of the Edwards Aquifer system, which have characterized the structural, hydrogeologic and geochemical variations within the highly karsted region. However, the Northern Segment of the Edwards Aquifer primarily consists of undeveloped land and agriculture, and is therefore lacking the sufficient studies to fully understand the relationship between the structural and hydrogeologic systems. The Balcones Fault Zone, an en echelon normal fault system, stretches from Del Rio to north of Dallas, Texas. Faulting from the Balcones Fault Zone provide planar surfaces that either increases or decreases preferential flow for groundwater migration and compartmentalization. Therefore, increased understanding of the structural controls on fluid migration in the Northern Segment is essential for the development of models for aquifer dynamics in this poorly studied region. Lidar and remote sensing have enabled identification and delineation of spatial distribution of the fractures visible on the surface, and provides valuable information regarding the understanding of potential groundwater flow paths associated brittle deformation. Results from this study provide essential data that will be used in the refinement of groundwater characterization for the northern most extension of the Edwards Aquifer System.