USING TIME-LAPSE ELECTRICAL RESISTIVITY TOMOGRAPHY TO VISUALIZE CONDUIT-MATRIX EXCHANGE A SINK-RISE SYSTEM OF A SEMI-CONFINED KARST AQUIFER

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The Santa Fe River Basin is a complex watershed containing hydrologic regions of confined, semi-confined and unconfined karst aquifer. Each region has unique characteristics that lead to difficulty in describing how groundwater and surface water interact. In the semi-confined region, the Santa Fe River is entirely captured by a sinkhole then flows through various karst windows and emerges as a spring 6 kilometers to the south. Recent work has developed a working hypothesis to describe how groundwater and surface water interact in the karst aquifer during high and low flow. In this study, we are interested in the semi-confined region and visualizing how groundwater and surface interactions control overall flow. Using electrical resistivity tomography, a time lapse study was conducted at two locations to study changes in conductivity during groundwater and rain flow driven events over a six-week time period. Our results reflect the locations of known karst conduits. Changes in resistivity during rainfall infiltration and in karst and matrix flow over time provide insight into exchange dynamics. These observations provide details about the surface water-groundwater exchange in a complicated, semi-confined, sink-rise system.