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Article Title: Storage constant values for the Edwards aquifer Balcones fault zone as determined from seismic efficiency

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scale. The interpreted intrusive boundaries and geometry can be used in regional hydrologic models to evaluate their influence on ground water flow. Deeper seated anomalies are interpreted as magmatic reservoirs, and these can be served as salt domes due to displaced salt from associated volcanism. A small scale very high resolution magnetic data set was acquired in 2003 as part of a helicopter electro- magnetic survey of the North Seco Creek study area, which is outside the main Usulata volcanic field. In 2004, it was continued to cover the volcanic pipe, this completed the traverse of the Woodard Cave fault, a major normal fault juxtaposing the rocks of the Trinity Group comprising the upper Trinity aquifer to the north, with the Devils River Formation, constituting the Edwards aquifer to the south. This project finding is important because adjacent faults also indicate the presence of a major magnetic low, led to a re-examination of the @xed-weld aeromagnetic data. Through careful micro- leveling, tilting, and image enhancement techniques, we see that major faults of the Barreton fault zone are associated with vestigial magnetic lineaments on a regional scale.

91-8 BTH 68 Waugh, John Russell USE OF MAGNETIC RESONANCE IMAGES TO EVALUATE AQUIFER CHARACTERISTICS ALONG THE FRESHWATER/SALINE-WATER INTERFACE OF THE EDWARDS AQUIFER WAUGH, John Russell II, FAIRHURST, David L., and WELLS, Gary, (1) San Antonio Water System, 100 N. St. Mary's, San Antonio, TX 78205; (2) Schlumberger, 200 NE Loop 410, Suite 634, San Antonio, TX 78209 The freshwaternsaline-water interface of the Edwards aquifer is defined by a mapped contour representing a total dissolved solids (TDS) concentration of 1000 mg/L. TDS values increase from 300-500 mg/L in the freshwater zone to values of several thousand on the saline side. Close proximity of the freshwater/saltwater interface to Comal and San Marcos springs, as well as many municipal well fields, has raised a continuing concern that potential future long-term severe droughts might cause serious water quality problems in these and other areas of the aquifer region, due to potential encroachment of salt water into the freshwater portion of the aquifer.

Development of a monitor well network was begun in the 1980s, and has recently been expanded by a program initiated by the San Antonio Water System. Additional wells will be constructed to monitor regional trends during the next decade. The data from these wells, recently activated as part of this network was logged using the Schlumberger Combinable Magnetic Resonance Plus (CMR-Plus) logging tool, as well as conventional logs. Results of analysis from these logs reveal valuable information concerning qualitative productivity data, identification of porosity regardless of matrix composition, and more accurate water quality estimation. An additional benefit from the use of the CMR-Plus tool is the ability to avoid the use of a displaceable water zone.

Results of the logging comparison show a better porosity evaluation and estimates of moveable pore space. Use of the CMR-Plus log to better evaluate permeability, productivity, and water quality in fractured carbonate aquifers such as the Edwards will be a valuable tool in future resource studies.

91-9 BTH 69 Lindgren, Richard J. CONCEPTUALIZATION AND SIMULATION OF THE EDWARDS AQUIFER, SAN ANTONIO REGION, TEXAS LINDGREN, Richard J., U.S. Geologic Survey, 5563 DeZavala, Suite 250, San Antonio, TX 78249, lindgren@usgs.gov, DUTTON, Alan R., Earth and Environmental Sciences, Univer of Texas San Antonio, 6900 N. Loop 1604 W, San Antonio, TX 78249-0653, DUNLOP, John W., Bureau of Economic Geology, The Univ of Texas at Austin, University Station, Box 1, Austin, TX 78713-8924, WORTHINGTON, Stephen R., Worthington Groundwater, 55 Mayfair Ave, Dumas, ON L4N 3K9, Canada, and PAINTER, Scott L., Southwest Research Institute, San Antonio, TX 78229-0310

Numerical ground-water flow models for the Edwards aquifer in the San Antonio region of Texas generally have been based on a diffuse-flow conceptualization, with the aquifer being considered a porous-media continuum at the regional scale. Whether flow through large fractures and conduits or diffuse-flow predominate in the Edwards aquifer at the regional scale is an open question, however. A new numerical ground-water flow model (Edwards aquifer model) that incorporates the variable complexity of the lithofacies provides nearly all of the water used for industrial, military, irrigation, and public supplies. The Edwards aquifer model is composed of several geologic formations consisting primarily of lime- stone, dolomite, and their transition rock, the Edinburg Dolomite. The model incorporates conduits simulated as generally continuously connected, one-cell-wide (1300 feet) zones with very large hydraulic-conductivity values (as much as 300,000 feet per day). The calculations maintain steady-state (1947-2000) conditions. Transient simulations were conducted using monthly recharge and pumpage (drawdown) data. The predominantly conduit-flow conceptualization incorporated in the Edwards aquifer model yielded a reasonably good match between measured and simulated hydraulic heads in the confined part of the aquifer and between measured and simulated springflows.

The simulated directions of flow in the Edwards aquifer model are most strongly influenced by the presence of ephemeral conduits and barrier faults. The simulated flow in the Edwards aquifer is appreciably influenced by the locations of the simulated conduits, which tend to facilitate flow. The simulated subregional flow directions generally are toward the nearest conduit and subsequently along the conduits from the recharge zone into the confined part of the aquifer and toward major springs. Structures simulated in the Edwards aquifer model influencing ground-water flow that tend to restrict flow are barrier faults. The influence of simulated barrier faults directions is most evident in northern Medina County.

91-10 BTH 70 Schindel, Geary TRACER TESTS IN THE EDWARDS AQUIFER RECHARGE ZONE SCHINDEL, Geary, Aquifer Science, Edwards Aquifer Authority, 1615 N. St. Mary St, San Antonio, TX 78205, geary@edwardsaquifer.org, JOHNSON, Steve, Edwards Aquifer Authority, 1615 N. St. Mary St, San Antonio, TX 78205, vursen@edwardsaquifer.org, GEARY, George, George Ven and Associates, 11304 Candle Park, San Antonio, TX 78249

The Edwards Aquifer Authority conducted a series of tracer tests in the Edwards Aquifer Recharge Zonal in northern Bexar County in the vicinity of Uvalde, Texas. The purpose of the tests was to measure the groundwater velocity, investigate groundwater flowpaths, and evaluate the hydraulic connectivity between the Edwards and the Trinity aquifers in the Recharge Zonal in northern Bexar County. The primary objective of the investigations was to comprehend the risk for ground-water contamination from point and non-point pollution sources. Previous ARC GIS analyses of readily available hydrostratigraphic and topographic datasets of the Edwards Aquifer showed that the Edwards Aquifer contributes less to the recharge of the Recharge Zonal compared with other regions. The five datasets used in these models included (1) hydraulic properties of Edwards Group hydrostratigraphic units, (2) faults/fractures, (3) caves/sinkholes, (4) slope topographies from 30-meter DEM surfaces, and (5) soil characteristics.