for these variables is as great as 0.9, but, individually, the correlation between uranium and the variables was no greater than 0.3. These elements individually have little significance but, taken as a suite, they are related to the uranium mineralization. Major and minor elements which are also related are MgO, CaO, CO_2, Fe, and S. The deposit is interpreted as having been deposited from uraniferous ground waters between 100 and 200°C, migrating toward paleotopographic lows on the east. The uranium is believed to have been derived from the leaching of tuffs.

HALPIN, DAVID, Geotronics Corp., Austin, TX

Magnetotelluric Exploration—Update

Exploration for oil, gas, and geothermal resources through the use of magnetotellurics has reached an all-time high. Geophysical exploration in poor or nonseismic areas, coupled with increased interpretational capabilities, has made magnetotelluric exploration a practical tool. The explorationist now has an increased capability to explore in areas where geophysical data were previously impossible to obtain. Interpretation of magnetotelluric data is greatly enhanced through the use of new modeling techniques. Case studies demonstrate magnetotelluric exploration applications.

HANDFORD, C. ROBERTSON, Bur. Econ. Geology, Univ. Texas, Austin, TX

Facies Patterns and Depositional Models of Permian Sabkha Complex—Red Cave Formation, Texas Panhandle

The Red Cave Formation (Permian, Leonard Series) in the Texas Panhandle consists of cyclic, red-bed clastic and carbonate-evaporite members that were deposited in an extensive coastal sabkha, desert wadi plain, and a carbonate inner shelf which bordered the northern Midland basin. Evaporite members were deposited in carbonate-evaporite crustal sabkhas and clastic members were deposited in mud-rich coastal to continental sabkhas.

North to south, red-bed wadi-plain facies pass into coastal sabkha facies and inner-shelf dolomite facies. In a Randall County core, vertical sequences commonly include slightly fossiliferous, faintly laminated to burrowed dolomitic mudstone and pellet wackestone overlain by cross-laminated oolitic or pellet packstone to grainstone, followed by algal-laminated dolomitic mudstone and nodular anhydrite in dolomite matrix. A progradational carbonate shoreline is inferred, with supratidal or sabkha evaporite to intertidal algal-mat and sand-flat environments passing seaward into a shallow, muddy subtidal inner shelf. Mud-rich sabkha sequences culminate with red to green mudstone and anhydrite above shoreline carbonates. Carbonate and evaporite facies pinch out generally toward the northwest and northeast into wadi-plain red beds. These facies include ripple-drift cross-laminated siltstone and sandstone deposited in braided fluvial channels, adhesion-rippled siltstone, and red to green mudstone deposited in mudflat and interchannel environments. Desiccation features, intraclasts, root zones, and paleosol horizons attest to subaerial exposure and probable nonmarine conditions.

Large-scale cyclicity of red-bed clastic and carbonate-evaporite members probably was controlled by the relative supply or fluctuating input of clastics to sabkhas by way of fluvial systems rather than by absolute sea-level changes.

Partial modern analogs to Red Cave sabkha depositional models are the coastal mud flats and alluvial fans in the northwestern Gulf of California, tidal flats and an ephemeral stream delta (Wooramel delta) in Gladstone Embayment, Shark Bay, Australia, and the Trucial Coast sabkhas in the Persian Gulf. Each setting has certain facets that are remarkably similar to intepreted paleoenvironments and lithofacies of the Red Cave Formation.

HATTON, KAY S., New Mexico Energy & Minerals Dept., Santa Fe, NM

Geothermal Research and Exploration in New Mexico

A Department of Energy (DOE)-sponsored evaluation of the hydrologic characteristics of New Mexico's low-temperature geothermal sites is being conducted. Over 40 areas have been designated for possible low-temperature geothermal application. There are nine areas with estimated temperatures of between 100 and 105°C, and three areas with estimated temperatures $\geq$ 150°C. Eight prospective high-temperature geothermal resource areas, where public knowledge of successful drilling is lacking, were designated for DOE by New Mexico researchers.

Drilling on state and private lands is concentrated in the Lightning Dock and Radium Springs KGRA vicinities, west of Socorro, east of Las Cruces, east of the Jemez River, and in the Baca Loc. 1 KGRA. Drilling on federal land is concentrated in the Baca Loc. 1, Kilbourne Hole, Radium Springs, and Socorro Peak KGRAs.

Geothermal research at Sandia Laboratories includes: (1) successful testing of a high-temperature borehole temperature-logging instrument, (2) development of an efficient continuous chain bit, and (3) continuation of the Magma Energy Research Project, which was recently involved in drilling into the Kilauea Iki lava lake.

NMIMT has mapped a large, deep magma body and several shallow magma bodies in the crust of the Rio Grande rift near Socorro.

The LASL Hot Dry Rock Geothermal Energy Project has yielded promising technical results; researchers are studying two out-of-state areas for possible hot dry rock demonstration sites: Stumpy Point-Wallops Island in Maryland, and the western Snake River Plain in Idaho.

HENRY, CHRISTOPHER D., and TIMOTHY W. DUEX, Bur. Econ. Geology, Univ. Texas, Austin, TX

Uranium in Diagenesis of Pruett, Duff, and Tascotal Formations, Trans-Pecos, Texas

The Pruett, Duff, and Tascotal Formations (Eocene-Oligocene) form a 1-km thick sequence of tuffaceous sediment composed, prior to diagenesis, of rock and mineral fragments and volcanic glass. Ground-water diagenesis dissolved glass and some mineral fragments to produce the following mineral assemblages from top to bottom: (1) hydrated glass, (2) clinoptilolite-opal, (3) clinoptilolite-quartz, and (4) analcime-quartz. Calcite and montmorillonite formed early and are present throughout the section. The presence of minor uranium mineralization in underlying Cretaceous rocks and in channel sandstones and lacustrine deposits in tuffaceous sediments and the presence of uranium concentrations up to 100 ppb in present ground water in tuffaceous sediments confirm that some uranium mobilization has occurred.

Average uranium concentration increases down section reflecting either (1) greater primary abundance in older sediment due either to greater abundance of glass or more U-rich