Evaporite Karst in the Southern Midcontinent

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Evaporites are the most soluble of sedimentary rocks; they are dissolved readily to form the same karst features that typically occur in limestones and dolomites. Evaporites, including gypsum (or anhydrite) and salt, are present in 32 of the 48 contiguous states, and they underlie 35–40% of the land area. They underlie western Kansas, western Oklahoma, the Texas Panhandle, and eastern New Mexico and Colorado, and locally can be a serious problem to petroleum exploration and development. In areas where gypsum crops out (or is less than 30 m deep), or where rock salt is less than 250 m deep, evaporites may be dissolved partly or wholly by unsaturated water. Evaporite outcrops typically contain sinkholes, caves, disappearing streams, and springs. Other evidence of evaporite karst includes surface-collapse features, saline springs, and saline plumes as a result of salt dissolution. Many evaporites in the deep subsurface also contain remains of paleokarst; such as dissolution breccias, breccia pipes, slumped beds, and collapse structures.

Human activities also have caused development of evaporite karst, primarily in salt deposits. Boreholes or underground mines may enable (either intentionally or inadvertently) unsaturated water to flow through or against salt deposits, thus allowing development of small to large dissolution cavities. If the dissolution cavity is large enough and shallow enough, successive roof failures can cause land subsidence or catastrophic collapse. At least 30 sites in the United States have reported land subsidence or collapse because of human-induced salt karst. Among these sites are Cargill and Panning sinks in Kansas, Wink sink in West Texas, and other sites in the southern Midcontinent. Evaporite karst, both natural and human-induced, is far more prevalent than generally believed.