The Potential for Subsidence in South Louisiana Resulting From the Subsurface Dissolution of Salt

Presented by:

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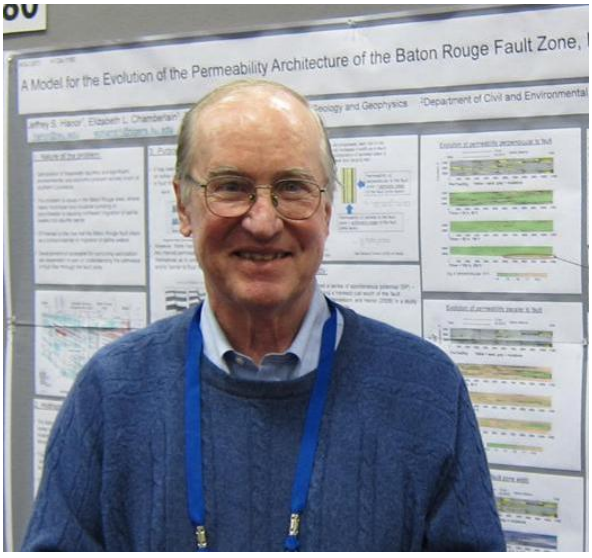
ABSTRACT

It has been estimated that a significant volume of the Jurassic salt originally deposited in southern and offshore Louisiana has been destroyed by subsurface dissolution. This dissolution is manifested in part by the presence of formation waters in freshwater, brackish, and marine sediments having salinities significantly in excess of that of seawater. Destruction of halite reduces total sediment volume, thus contributing to subsidence. Estimates of total minimum volume of NaCl dissolved at individual salt structures can be made from: 1) the volume of solid products of salt dissolution, such as the anhydrite-calcite cap rock at Bayou Choctaw and Weeks Island or the calcite-pyrite cements at West Hackberry, and 2) the mass of excess salinity in formation waters surrounding the structure, such as at the Welsh Dome. Such estimates have been typically in the range of cubic kilometers of NaCl per individual salt structure. Determining how these cubic kilometers of volume loss have been spatially distributed is more elusive, particularly if rising salt continuously fills the volume lost by dissolution. Broad areas of dissolution-induced subsidence around a rising salt stock could easily be obscured by other mechanisms of subsidence or by ongoing sediment deposition. However, at Bay Marchand, salt dissolution has produced localized normal faults immediately above the crest of salt having throws on the order of 100 m in Pliocene sediments. Interferometric Synthetic Aperture Radar (InSAR) has been used with success to study land surface response to salt tectonics in Iran and China, and it is possible that it could be used similarly in south Louisiana.

BIOGRAPHY



Jeff Hanor received his PhD in Geology from Harvard and then spent several years as a Post-Doc and Research Oceanographer at the Scripps Institution of Oceanography. He joined the faculty of the Department of Geology and Geophysics at LSU in 1970, where he has taught courses in sedimentary geochemistry and has served as a major professor to nearly 60 M.S., Ph.D., and B.S. Honors students. Jeff became an emeritus professor in 2011 and continues his research in sedimentary geochemistry and hydrogeology.