Science - Geology; Data on Geology Described by Researchers at University of Texas Austin [The Role of Refluxing Deep Hypersaline Brines and Evaporite Precipitation Dynamics In the Castile Formation and Marginal Carbonate Strata (Delaware Basin, Usa)]

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2025 APR 11 (NewsRx) -- By a News Reporter-Staff News Editor at Science Letter -- Investigators publish new report on Science - Geology. According to news reporting from Austin, Texas, by NewsRx journalists, research stated, "The Upper Permian Castile Formation of the Delaware Basin is a 515.3 m (1690.6 ft) thick deep-water laminated evaporitic sequence dominated by anhydrite and halite. This formation seals hydrocarbon reservoirs and produced-water injection targets, and holds potential for salt cavern development due to its halite-bearing intervals."

Financial support for this research came from **Bureau of Economic Geology**, University of Texas at Austin.

The news correspondents obtained a quote from the research from the University of Texas Austin, "This study presents a sedimentological characterisation of two cores from the basin's centre and margin, complemented by a suite of petrographic and geochemical analyses, including X-ray diffraction, scanning electron microscopy, energy-dispersive spectroscopy, inductively coupled plasma mass spectrometry for halides and X-ray fluorescence for sulphates. These analyses facilitated evaporite characterisation and helped to establish a threefold hierarchical scheme (laminite, cycle, member) and advanced understanding of halite precipitation dynamics in deep brines. Additionally, intense dolomitisation and pore-filling sulphates were examined along the older carbonate margin, linking these processes to deep-water brine reflux events of varying ages and salinities. Pre-Castile dolomitisation enhanced permeability along the marginal strata, allowing the reflux of hypersaline deep brines outside the basin. This reflux promoted sulphate precipitation in porous dolostones along the margins (anhydritisation), leading to prolonged sulphate precipitation stages within the basin. Once marginal porosity was occluded, brine confinement led to further salinity increases, driving episodic halite deposition and producing five anhydrite-halite members. Based on this study, it is possible to conclude that dynamic deep hypersaline brines significantly influence sedimentary and diagenetic processes in the basin and its margins."

According to the news reporters, the research concluded: "Dynamic deep hypersaline brines are key in influencing sedimentary and diagenetic processes in the basin and its margins."

For more information on this research see: The Role of Refluxing Deep Hypersaline Brines and Evaporite Precipitation Dynamics In the Castile Formation and Marginal Carbonate Strata (Delaware Basin, Usa). The Depositional Record, 2025. The Depositional Record can be contacted at: Wiley, 111 River St, Hoboken 07030-5774, NJ, USA.

Our news journalists report that additional information may be obtained by contacting Ander Martinez-Donate, University of Texas Austin, Bur Econ Geol, 10611 Explorat Way, Austin, TX 78758, United States. Additional authors for this research include Lorena Moscardelli, Lucy Tingwei Ko, Leandro Melani, C. Nur Schuba, Priyanka Periwal and Shuvajit Bhattacharya.

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