# Leached Limestones: Burial Dissolution of Limestones in the Absence of Hot Dolomites!

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Hydrothermal dolomitization is not a requirement for burial dissolution of limestones. Numerous case studies of this phenomenon occur in lower Paleozoic to Tertiary-aged sequences around the world.

One case study is the Upper Jurassic Haynesville limestone sequence in east Texas, which produces gas from deeply-buried oolitic grainstones (11,000'-13,000'). Secondary micromoldic porosity in ooids, the major reservoir pore type, formed after oil emplacement, since reservoirs in the oil window lack this porosity and produce solely from primary interparticle porosity. Dolomitization is rare in this sequence and includes minor saddle dolomite emplacement. However, since these dolomites occur in all reservoirs (oil and gas), their emplacement played no role in the development of deep-burial secondary microporosity.

Several petrographic observations confirm the Haynesville's deep-burial secondary microporosity development: (1) ooids that are completely encased in bitumen lack secondary microporosity development; (2) ooids that are pervasively sutured by pressure solution lack precompaction cements, implying no early grain dissolution; (3) stable calcitic grains are leached; (4) high amounts of secondary porosity are preserved along pressure solution seams, implying leaching after at least initial stylolitization; and (5) microporosity formed after burial fractures were cemented.

Associated noncarbonate mineralization (fluorite and sulfide minerals) implied hot fluids promoted burial dissolution. Fluids were acidic based on precipitation of late-stage authigenic quartz and sulfide minerals, and were aggressive enough to dissolve even stable calcitic grains such as oysters. Thermochemical Sulfate Reduction (TSR) is a viable model to explain the observed deep-burial dissolution of these limestones.