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### **Dolomitization of the Smackover Formation and Hydrocarbon Exploration in Mississippi**

In Mississippi, the Smackover Formation consists of limestone except on crests of high-rise salt structures where nearly the entire thickness of this unit was dolomitized forming excellent oil and gas reservoirs. Adjacent undolomitized strata on the same structures lack porosity and permeability. This unique system is studied to answer the timing, mechanism, fluid flow, and duration of the dolomitization of the Smackover Formation in Mississippi and its application to hydrocarbon exploration in this area.

The study concludes that dolomitization postdated deposition of the Smackover Formation, but it was contemporaneous with the precipitation of anhydrite of the Buckner Formation. Dolomitization took place by seepage of Mg-rich, Ca-deficient Buckner brine into Smackover grainstones through subaerial exposure surfaces that developed on crests of salt domes. This brine was derived by evaporation of Buckner seawater to anhydrite saturation in lagoonal environments between salt domes. Dolomitization was possible only when salt movement exposed porous and permeable grainstones close to sea-level. A rapid rise of salt domes would have displaced grainstones beyond the reach of the brines. A slow salt movement would have left them in subtidal environments where deposition of anhydrite or lime mudstone would have shut down brine seepage.

In high-rise salt structures of central Mississippi dolomitized Smackover can be found where the Buckner Formation is thin or absent. But, this situation means the lack of Buckner seals resulting in the leakage of potential hydrocarbons from these reservoirs. Therefore, other reservoir – seal geometries need to be considered.