

SMACKOVER AND HAYNESVILLE FACIES RELATIONSHIPS IN NORTH-CENTRAL EAST TEXAS¹

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ABSTRACT

The Smackover Formation was deposited as a coarsening-upward carbonate unit that developed first with the deposition of transgressive laminated silty limes in deep anoxic waters. Mudstones and wackestones were deposited as the carbonate system established with a slow rise in sea level. Packstones and grainstones were deposited at the Smackover shelf margin in thick coarsening-upward sequences. Local lenses of anhydrite and dolomitic mud developed on the shoreward side of the shelf break. Pelleted sands also developed in the low-energy Smackover lagoon. Ultimately, a thin blanket of ooid sands covered the shelf.

During Haynesville time, a carbonate barrier at the shelf margin created an evaporative lagoon in which Buckner anhydrite and halite precipitated. As sea level rose, limestones and dolomites were deposited along the downdip margin of the Buckner lagoon. Terrigenous clastics began to prograde into the updip areas. Continued sea level rise flooded the shelf, and Gilmer limestones were deposited as far updip as the present-day Mexia-Talco fault zone. At the end of Haynesville time, limes and shales were deposited on either side of the Gilmer shelf margin as quartzose clastics continued to prograde into updip areas.

Evidence in East Texas suggests that the depositional model for the Smackover followed a shelf margin rather than the generally accepted ramp model. The shelf margin is clearly identified as a carbonate barrier during Haynesville time, outlining a Buckner lagoon as the depocenter that continued to experience subsidence at least through the end of the Haynesville.

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