

Stratigraphy and Mudrock Lithologies of the Devonian Woodford Shale, Anadarko basin, West-Central Oklahoma.

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Since early 2008 over three-hundred horizontal Woodford Shale wells have been completed in the Anadarko basin, west-central Oklahoma, along a northwest-southeast trend approximately 100 miles (161 km) in length and 20 miles (32 km) wide. Shallowest production to date occurs at 10,500 ft (3,200 m), and deepest production occurs at 16,100 ft (4,900 m).

Seven mudrock lithofacies, defined mainly on the basis of percent TOC and variations in mineral content (primarily quartz, clay, and dolomite), make-up the fifteen stratigraphic units that comprise the Lower, Middle, and Upper Woodford in the geographic center of the play where the Woodford is 175 to 330 ft (53 to 100 m) thick. The basal-most units of the Woodford in this area are TOC-poor clayey mudrock (<2% TOC), recording the first transgression of the Woodford seas. The overlying Lower Woodford and the Middle Woodford are composed of 10 to 30 ft (3 to 9 m) intervals dominated by one of three lithologies: clayey mudrock (CM) (38% clay and 41% quartz), clayey siliceous mudrock (CSM) (27% clay and 55% quartz), and less common dolomitic clayey mudrock (DCM) (33% clay, 32% quartz, and 15% dolomite). These mudrock lithologies are organic-rich with TOC values averaging 5 to 6.5%. Clay is predominantly illite, and dolomite is commonly ferroan. Quartz is biogenic and detrital. The Upper Woodford in this area is predominately CSM and siliceous mudrock (SM) (14.5% clay and 75% quartz). CSM and SM units are characterized by density-neutron cross-over and are readily distinguishable on wireline logs. The more silica-rich mudrocks (CSM and SM) are likely dominated by biogenic silica, recording distal deposition in areas less affected by detrital influx.