

**AAPG Annual Meeting
March 10-13, 2002
Houston, Texas**

Stanley T. Paxton¹, R.A. Marston¹, S.J. Smith¹, A.R. Simms¹ (1) Oklahoma State University, Stillwater, OK

Downstream Fining of Sediment in a Modern Fluvial System: Lessons from the Canadian River Drainage, Oklahoma, USA, and Implications for Regional Reservoir Performance

Developments in regional reservoir-quality technology suggest that prediction of porosity/permeability in ancient clastic deposits requires better pre-drill estimates of sandstone composition and texture. Toward this end, we are evaluating a series of topographic analysis tools for describing the character of modern fluvial systems for input to reservoir models. Our intent is to demonstrate for the Canadian River drainage that texture and composition of sand varies predictably as functions of 1) distance of sediment transport, 2) bedrock lithology, and 3) changes in stream gradient.

Our results indicate that downstream fining occurs in the Canadian River (1,027km along-channel-length). However, the fining is best recognized in sediments obtained from positions high on the sand bars. These samples correspond to high discharge events when most particle size attrition occurs. Samples obtained at lower (intermediate) positions on the sand bars also show a downstream decrease in grain size, though this along-river change is less pronounced. Samples from the main channel (mean low-flow channel) do not show a change in grain size with distance.

Another finding of this work for exploration is that sediment size varies strongly with bedrock lithology. This relationship suggests that changes in bedrock character beneath an incisement can influence the permeability of the immediately overlying valley fill.