

11.2 **Rich and lean oil shale deposits, link to climate changes: Piceance Creek Basin, Eocene, Colorado, U.S.A.**

Kati Tanavsuu-Milkeviciene, J. Frederick Sarg

Colorado School of Mines, Golden, CO, United States

The Piceance Creek Basin (PCB) is one of the non-marine basins formed in the central Rocky Mountain region during the Laramide orogeny. The Green River Formation was deposited during the early to middle Eocene and is largely composed of kerogen-rich and kerogen-poor carbonates (rich and lean oil shale). Formation of rich and lean oil shale zones are correlative with lake stratigraphy and changes in the Eocene climate. At least three levels of cyclicity, bounded by sequence boundaries or their correlative conformities, can be separated based on facies, oil shale richness, and gamma ray logs. The cyclicity of deposits is suggested to be connected with variation of the runoff and vegetation due the climate changes, between more humid to arid. At the first level, six lake stages are separated: S1-Freshwater Lake, S2-High Siliciclastic Input, S3-Rapidly Fluctuating Lake, S4-Rising Lake, S5-High Lake, and S6-Closing Lake. These stages indicate overall lake evolution and correlate well with climate changes during the early to middle Eocene. At a smaller scale, cycles sequence boundaries mark in many places the boundary between rich and lean oil shale zones. The lean oil shale zone is suggested to be formed during periods of low runoff and low vegetation, whereas the rich oil shale zone formed during periods of high runoff and high vegetation.