

# Structural Controls on Coalbed Methane in the San Juan and Western Canada Sedimentary Basins

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## ABSTRACT

The structural history of the San Juan basin is unique in its well documented diverse and recurring nature. Two cycles of Proterozoic crustal deformation are recorded in the Needle Mountains of southwestern Colorado, immediately bordering the northern margin of the San Juan basin. Fred Barker (1969) and Barbara Tewksbury (1989) have mapped and dated the Needle Mountains in detail. The Uncompahgre Uplift and Paradox basin regional tectonism, of Late Paleozoic age, preceded Cretaceous coal-bearing formations, followed by other distinctly different Late Cretaceous and Tertiary structural styles. The Animas Formation, straddling the Cretaceous-Tertiary boundary and the underlying McDermot Formation record a maximum 3,000 ft (915 m) of dominantly volcanic sediments, including a large amount of coarse andesite conglomerates. Major heat flow, hydrodynamic, and fracture regimes were fixed by these major tectonic events that control coal maturation and coalbed methane productivity.

The timing and duration of the Cretaceous/Tertiary and younger heat-flow pulses followed earlier crustal weakness patterns and created the thermal and related history necessary for favorable coalbed methane generation and economic producibility. Oligocene dating of the San Juan volcanic field does not fully explain Fruitland coal maturation levels.

An understanding of this complex episodic history will help evaluate the profitable development of coalbed methane and how the San Juan basin can serve as a model or scenario for other basins in the United States and western Canada.

Recent history of conventional oil and gas resource assessments indicates that the timely development of potential coalbed methane supplies could suffer if unrealistic industry or government appraisal methods are again employed. Environmental considerations and ownership issues affecting coalbed methane future production also will be discussed.

## REFERENCES

- Barker, Fred, 1969, Precambrian geology of the Needle Mountains, southwestern Colorado: USGS Professional Paper 644-A, 35 p.
- Tewksbury, B.J., 1989, Proterozoic geology of the Needle Mountains—A summary, *in* Grambling, J.A., ed., Proterozoic geology of the Southern Rocky Mountains: GSA Special Paper 235, p. 65-73.