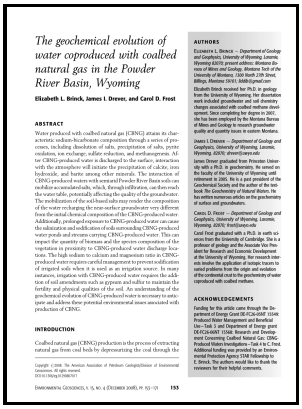
Geochemistry of water in the Fort Union formation of the Northern Powder River Basin, southeastern Montana

s.n - Stable isotope geochemistry of coal bed and shale gas and related production waters: A review



The geochemical evolution of water coproduced with coalbed natural gas in the Powder River Basin, Wyoming

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ABSTRACT

Water produced with coalbed natural gas (CBNG) attains its characteristic sodium-bicarbonate composition through a series of processes, including dissolution of salts, precipitation of salts, pyrite oxidation, ion exchange, sulfate reduction, and methanogenesis. After CBNG-produced water is discharged to the surface, interaction with the atmosphere will initiate the precipitation of calcite, iron hydroxide, and barite among other minerals. The interaction of CBNG-produced waters with semiarid Powder River Basin soils can mobilize accumulated salts, which, through infiltration, can then reach the water table, potentially affecting the quality of the groundwater. The mobilization of the soil-based salts may render the composition of the water recharging the near-surface groundwater very different from the initial chemical composition of the CBNG-produced water. Additionally, prolonged exposure to CBNG-produced water can cause the salinization and sodification of soils surrounding CBNG-produced water ponds and streams carrying CBNG-produced water. This can impact the quantity of biomass and the species composition of the vegetation in proximity to CBNG-produced water discharge locations. The high sodium to calcium and magnesium ratio in CBNG-produced water requires careful management to prevent sodification of irrigated soils where it is used as an irrigation source. In many cases, sodification of CBNG-affected soils can require the application of soil amendments such as gypsum and sulfur to maintain the fertility and physical qualities of the soil. An understanding of the geochemical evolution of CBNG-produced water is necessary to anticipate and address these potential environmental issues associated with production of CBNG.

INTRODUCTION

Coalbed natural gas (CBNG) production is the process of extracting natural gas from coal beds by depressurizing the coal through the

AUTHORS

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Selenium mobilization in a surface coal mine, Powder River Basin, Wyoming, U.S.A.

Geological Survey Digital Data Series DDS-69D, chap.

Factors affecting the geochemistry of a thick, subbituminous coal bed in the Powder River Basin: volcanic, detrital, and peat

Others include sandstone pinch-outs in the reservoirs of the Frontier Formation, Mesaverde Group, and Muddy Sandstone, as well as vertical and lateral cementation variations in Tensleep Sandstone reservoirs. Trace fossils are common within the upper part of the Main Body Member. Data from scanning electron and optical microscope analyses indicate that several factors influenced the geochemistry of the Anderson-Dietz 1 coal bed.

Geology and water

Mineral mining and processing remains a small use for electricity in Montana, while the industrial load centers have shifted or closed operations. The basin contains the first oil well drilled in Wyoming Mike Murphy 1 and the first logged well in Wyoming Atlantic Richfield Company Muskrat 2C, September 1936.

Selenium mobilization in a surface coal mine, Powder River Basin, Wyoming, U.S.A.

The Medicine Bow Mountains and Rawlins Uplift occurred during the late Paleocene. These members consist of infrequent lenses of fluvial-channel sandstones interbedded within thick units of variegated red, orange, purple and gray overbank and paleosol mudstones. Shallow water in the coal-bearing Paleocene Fort Union Formation of southeastern Montana was investigated to provide a better understanding of its geochemistry.

Chemical and stable isotopic evidence for water/rock interaction and biogenic origin of coalbed methane, Fort Union Formation,

Powder River Basin, Wyoming and Montana U.S.A.

Because coal is a solid, it cannot be produced from many scattered wells as oil and gas can be. The Bonneville Power Administration was formed during this era and remains a major influence, mostly west of the Continental Divide.

Stable isotope geochemistry of coal bed and shale gas and related production waters: A review

In Montana, the formation overlies the Fort Union Formation and is overlain by the. The analysis concluded that the Wasatch sandstone is a first cycle sediment, the Archean core of the Bighorn uplift was exposed and shedding sediment into the Powder River Basin during time of deposition of the Wasatch Formation and the Powder River Basin Wasatch detrital zircon age spectra are distinct from the coeval in the west of the Bighorn Mountains. The Clarkforkian Land-Mammal Age and Mammalian Faunal Composition Across the Paleocene-Eocene Boundary.

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