

IGNEOUS INTRUSIONS AND THERMAL EVOLUTION IN THE RATON BASIN, CO-NM: CONTACT METAMORPHISM AND COAL-BED METHANE GENERATION

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ABSTRACT

Tertiary mafic dikes and sills intrude coal-bearing formations of the Raton Basin. This study investigates the role of intrusions in generating methane from coal. Coal samples at four different outcrops were analyzed by vitrinite reflectance, carbon isotopes and petrography. Reflectance values at sill contacts are elevated over a wider zone than for dikes. Coal $\delta^{13}\text{C}$ values increase by 1‰ approaching the contacts of dikes and decrease by approximately 1.5‰ at sills due to the addition of ^{12}C -rich material such as pyrolytic carbon.

Xenoliths show little evidence of dissolution for xenoliths within sills with more dissolution for xenoliths within dikes. The lack of dissolution indicates a short residence time, due to rapid cooling once emplaced. The elevated reflectance pattern observed at sills cannot result from long emplacement durations and the very low thermal conductivity of coal is responsible. Intrusions may be very important for methane generation in sedimentary basins.