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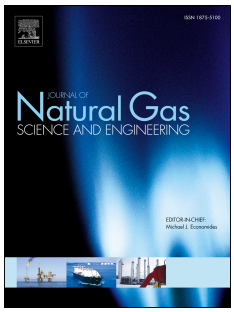

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Integrated Study of Gas Condensate Reservoir Characterization through Pressure Transient Analysis

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Abstract

This paper presents an alternative semi-analytical model which is able to integrate PVT properties of gas with dynamic pressure domain during production process. A modified three-region radial composite model is developed to evaluate the gas condensate reservoir, taking account of different gas flow behaviors and pressure dependent properties, such as the compressibility factor. The governing equation of the pressure diffusion process is highly nonlinear due to the complex dependence of coefficients on pressure. The linearization of the non-linear partial differential equation describing the complicated gas flowing in a reservoir is handled by application of reasonable definitions of pseudo-pressure and pseudo-time for each region, which is integrated into the reservoir system through physical continuity of changing phases with PVT properties. Modified forms of total compressibility factor are proposed by valid theoretical developments.

Results show that gas compositions of a gas condensate reservoir have significant effects on the fluid flow behaviors. Different proportions of C_5 , C_6 and C_{7+} are simulated with constant makeup of CO_2 , N_2 and $C_{1\square 4}$, showing that small changes in composition of heavier components make distinct differences in the flow behaviors, as reflected on the liquids dropout curves. In addition, total compressibility factor varies with fluid compositions instead of remaining constant in a gas condensate reservoir.