

A multiscale coupled model for shale gas transport in porous geological media with contrast of properties.

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#### Abstract

In this work, we perform multiscale modeling of shale gas transport through the geological media having contrast of properties on different spatial scales. Homogenization technique together with an averaging with respect to the function of distribution of pores is used to obtain the macroscopic equation for evaluating the free gas amount in-place. It turns out that macroscale parameters characterizing gas transport depend on diffusivity, permeability, and porosity of the components of the system, the amount of inclusions and their spatial distribution. We determine the distribution of gas concentration through the production time and investigate its sensitivity to irregularities of pores distribution. We are also interested in how the depletion can be affected by the interchange of gas between kerogen inclusions and inorganic material.