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Malgorzata Peszynska* (mpesz@math.oregonstate.edu), Mathematics, Oregon State University, Corvallis, OR 97331. *Phase transitions in porous media: new applications and results.*

We discuss a model of methane evolution under deep ocean sediments in the hydrate zone and in the gas zone. The simplest model in the hydrate zone is a scalar nonlinear degenerate parabolic problem for which the nonlinearity is expressed as a parameter-dependent graph, and its well-posedness is obtained only in a very weak sense. We consider also new results in the gas zone and the transition between the hydrate and gas zones. The realistic models extend the scalar equations to a system modeling the transport not only of methane but also of salinity and energy. We will discuss numerical solutions which have been compared to experimental data obtained from geophysics collaborators. (Received September 15, 2016)