



Quantifying particle migration during gas production from gas hydrate deposits

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Hydrate reservoir is mostly unconsolidated unlike conventional gas reservoirs. Consequently, the sand control is one of the major issues for managing safe and efficient gas production from unconsolidated hydrate-bearing deposits. Most of field test production from gas hydrate deposits experienced severe or moderate sand production during the operations. Sand production causes down-hole cavities and malfunction of downhole equipment.

An experimental system was designed to study sanding during gas production from gas hydrate deposits. The system can monitor the particle migration with X-ray CT imaging while maintaining high pressure and low temperature to form hydrates in sediments. Particle migration during gas production from gas hydrate-bearing sands with about 10% of fine contents was monitored in this study. The detection of fine migration from X-ray images is based on the differences in densities of different phases. While gas production from hydrate-bearing deposits, not only particles but also water and gas move together. Consequently, detecting particle migration in multiphase flow system is a very complex problem. A technique to detect particle movements in multiphase system has been developed from the experimental results. A model to quantify the fine contents also has been developed and successfully modelled the experimental results.