Accepted Manuscript

Velocity mapping of steady water flow through methane hydrate bearing samples

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PII: S1875-5100(18)30135-5

DOI: 10.1016/j.jngse.2018.03.020

Reference: JNGSE 2511

To appear in: Journal of Natural Gas Science and Engineering

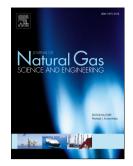
Received Date: 2 October 2017

Revised Date: 7 February 2018

Accepted Date: 20 March 2018

Please cite this article as: Wang, S., Wang, P., Chen, B., Yang, M., Li, Y., Velocity mapping of steady water flow through methane hydrate bearing samples, *Journal of Natural Gas Science & Engineering* (2018), doi: 10.1016/j.jngse.2018.03.020.

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ACCEPTED MANUSCRIPT

1	Velocity Mapping of Steady Water Flow Through Methane Hydrate Bearing
2	Samples
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11	Abstract The productivity of methane from natural gas hydrate reservoirs is
12	predominantly controlled by the fluid migration mechanisms in hydrate-bearing
13	sediments. Thus, the characterization of the effects of hydrate distribution on fluid
14	migration is significant in the exploitation of natural gas hydrates. In this work, a
15	phase contrast method was used to visualize water flow velocity fields at three
16	cross-sections under different injecting flow rates by using magnetic resonance
17	imaging (MRI). Four experimental cases were performed to directly measure the
18	cross-sectional velocity fields in a sand packed hydrate-bearing sample with hydrate
19	saturations varying from 22.5% to 32.7%. The effect of hydrate distribution on the
20	water velocity fields was discussed. It was found that hydrate formed nonuniformly in
21	the sand packed sample in all four cases, and the hydrate distribution predominantly
22	affected the water effective permeability and cross-sectional velocity fields when

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