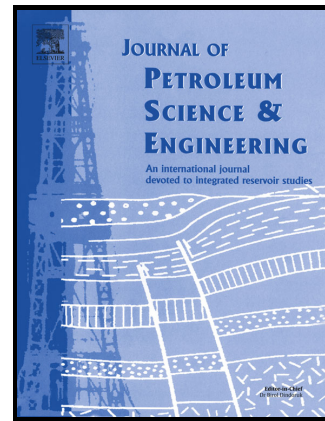


## Author's Accepted Manuscript

Analytical model to determine optimal fluid injection time Ranges for increasing fluid storage and oil recovery: A reservoir compaction approach

Ilyas Khurshid, Yoshiaki Fujii, Jonggeun Choe



[www.elsevier.com/locate/petrol](http://www.elsevier.com/locate/petrol)

PII: S0920-4105(15)30102-9  
DOI: <http://dx.doi.org/10.1016/j.petrol.2015.09.007>  
Reference: PETROL3169

To appear in: *Journal of Petroleum Science and Engineering*

Received date: 20 November 2014

Revised date: 20 June 2015

Accepted date: 7 September 2015

Cite this article as: Ilyas Khurshid, Yoshiaki Fujii and Jonggeun Choe, Analytical model to determine optimal fluid injection time Ranges for increasing fluid storage and oil recovery: A reservoir compaction approach, *Journal of Petroleum Science and Engineering*, <http://dx.doi.org/10.1016/j.petrol.2015.09.007>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Analytical Model to Determine Optimal Fluid Injection Time Ranges for Increasing Fluid Storage and Oil Recovery: A Reservoir Compaction Approach

\*Ilyas Khurshid, Yoshiaki Fujii , Jonggeun Choe

Ilyas Khurshid, PhD, University of Modern Sciences.

Yoshiaki Fujii, Professor, Hokkaido University.

Jonggeun Choe, Professor, Seoul National University.

\*Corresponding Author: Ilyas Khurshid

Email: [ilyas9822@snu.ac.kr](mailto:ilyas9822@snu.ac.kr)

Phone: +971-566198515

### Abstract

Reservoir compaction and pore collapse are induced with fluids (oil, gas, and water) productions. They are responsible for both recovery and environmental problems. Our objective is to develop a generic integrated framework for reservoir compaction to determine optimal time ranges of fluids (CO<sub>2</sub> or water) injection in a reservoir for increasing oil recovery and their storage. The framework consists of a model with a methodology. We derive the model using the concept of body-centered pores in a cubic lattice at microscopic level. The model describes the relationship between porosity and stresses, and estimates reservoir compaction as a function of fluid withdrawal, time, and stresses.

On the basis of the model developed, we propose a methodology named a failure-line method to determine the critical point of irreversible brittle pore collapse. Thus, the best fluid injection time range is before touching this critical point. We use inversion analysis to determine, compare and validate our results with experimental and field data available, and found a good match. As a result, the developed model and methodology can be an efficient and cost effective tool to investigate the effect of production on reservoir compaction, variation in porosity, and to determine an optimal time range for fluid injection. The model assumes that there are no consistent capillary and gravity forces.

Download English Version:

<https://daneshyari.com/en/article/8126364>

Download Persian Version:

<https://daneshyari.com/article/8126364>

[Daneshyari.com](https://daneshyari.com)