

## عنوان مقاله:

Sensitivity analysis of time lapse gravity for monitoring fluid saturation changes in a giant multi-phase gas reservoir located in south of Iran

## محل انتشار:

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## نویسندگان:

Abdolmalek Khosravi - *M.Sc. Graduated, Department of Earth Physics, Institute of Geophysics, University of Tehran, Iran*

Seyed Hani Motavalli-Anbaran - *Assistant Professor, Department of Earth Physics, Institute of Geophysics, University of Tehran, Iran*

Sajad Sarallah- Zabihi - *Expert, National Iranian Oil Company, Exploration Directorate, Tehran, Iran*

Mohammad Emami Niri - *Assistant Professor, Institute Of Petroleum Engineering, College of Engineering, University of Tehran, Iran*

## خلاصه مقاله:

The time lapse gravity method is a widely used technique to monitor the subsurface density changes in time and space. In hydrocarbon reservoirs, the density variations are due to different factors, such as: substitution of fluids with high density contrast, water influx, gas injection, and the variation in reservoir geomechanical behavior. Considering the monitoring of saturation changes in the reservoir that cannot be inferred directly by seismic survey, a forward modelling followed by a sensitivity study is performed to examine that in what conditions the saturation changes are detectable by means of 4D gravity method in the understudy reservoir. Then static and dynamic models of a giant multi-phase gas reservoir are constructed. Then, synthetic gravity data are generated after variation of production time intervals and the number of production and injection wells. In addition to detecting the gravity signal for shallower reservoirs with similar characteristics to our reservoir, a sensitivity analysis was conducted for variation in depth of the reservoir. As either the depth of the reservoir decreases or the number of the production wells and production time periods increases, the produced gravity signal is more prone to be detectable by means of modern offshore gravimeters. The gravity signal could be detected with the maximum magnitude range of 9 - in different scenarios as a consequence of gas-water substitution, which is consistent with water drive support from surrounding aquifers. Therefore, this method is applicable for providing complementary and even independent source of information about the saturation front changes in the under-study reservoir.

## کلمات کلیدی:

4D gravity, Water influx, Aquifer, Fluid saturation

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