Geophysical Research Abstracts
Vol. 13, EGU2011-5485, 2011
EGU General Assembly 2011

2 Bit Inversion of 4D Gravity Data Using Genetic Algorithm to Characterize Injection and Production Zone in Permeable Layer

Eko Januari Wahyudi, Wawan Gunawan A Kadir, and Hendra Grandis

Geophysical Engineering Study Program, Institut Teknologi Bandung, Jl. Ganesha 10, Gdg BSC B lt 2, Bandung, Indonesia (ekojanuariwahyudi@yahoo.com)

Time-lapse microgravity is branches of potential field data that has been applied for detection of reservoir or aquifer fluid dynamics. The interpretation in the 3D subsurface can be derived with inversion model. Nowadays global optimization have been used as inversion techniques in potential field data, such as genetic algorithm (GA). Genetic Algorithm combines the biology genetic concept and optimization function that maximize the fitness with artificial evolution process. Artificial evolution use the principal of 'survival for the fittest'. GA does not need any derivatives or curvature information. Therefore once the forward problem is solved, inverse problem can be solved automatically.

Recently we try to develop the software using GA in order to applied in real data. In this paper, we demonstrate the latest improvement on inversion of surface 4D gravity (synthetic data) using genetic algorithm. For real data inversion, at least 3 possibility of density value must be considered in each cell of subsurface model. By using 2 bit and modified the coding value in every cell of subsurface, we get sufficient possibility to characterize injection,production, and normal zone.

Keywords: genetic algorithm, microgravity, time-lapse, inversion.