

# Pemodelan naturally fractured pada basement reservoir menggunakan metode continuous fracture modeling (CFM), lapangan "WS", cekungan Jambi, cekungan Sumatera Selatan = Naturally fractured modeling in basement reservoir using continuous fracture modeling (CFM) method, "WS" field, Jambi sub-basin, South Sumatra basin.

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## Abstrak

Reservoir batuan dasar terekah merupakan reservoir batuan beku dan batuan metamorf yang terekahkan secara alami, sehingga memiliki porositas dan permeabilitas sekunder yang dapat menjadi tempat terkonsentrasinya hidrokarbon. Indonesia merupakan salah satu negara yang memiliki potensi reservoir batuan dasar terekah, salah satunya berada pada Cekungan Sumatera Selatan. Pencarian rekahan pada reservoir batuan dasar terekah dinilai cukup rumit. Untuk itu, dibutuhkan metode yang tepat dalam memprediksi sebaran rekahan pada batuan dasar. Salah satu metode yang efektif dalam memetakan dan memodelkan sebaran rekahan pada batuan dasar terekah yaitu metode *Continuous Fracture Modeling* (CFM). Metode ini memanfaatkan integrasi antara data seismik dengan data sumur melalui pendekatan *neural network*, sehingga dinilai mampu mengakomodir kelemahan data seismik yang memiliki resolusi terbatas. Data *dip angle* dan *dip azimuth* dari data *log FMI* digunakan untuk analisis rekahan disekitar sumur yang selanjutnya disebarkan secara lateral dalam model *grid* 3D untuk memprediksi keberadaan rekahan pada daerah yang tidak memiliki data sumur. *Fracture driver* terpilih (*maximum curvature*, *ant-track*, *variance*, *chaos*, *dip illumination*, dan *3D edge enhancement*) digunakan dalam proses *training* dengan *fracture indicator* untuk menghasilkan model intensitas rekahan. Pemilihan *fracture driver* didasarkan oleh nilai korelasi, dimana korelasi terbesar terdapat pada atribut *passive ant-track* sebesar 0.316 dengan *fracture indicator*. Selanjutnya, model di validasi dengan data *Drill Stem Test* (DST). Berdasarkan hasil data DST dan model intensitas rekahan menunjukkan bahwa, daerah dengan intensitas rekahan tinggi memiliki korelasi dengan keberadaan fluida berupa gas pada data DST.

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Fractured basement reservoir is a reservoir of igneous rocks and metamorphic rocks that are naturally fractured, which has good secondary porosity and permeability which can act as a reservoir for hydrocarbon concentration. Indonesia is one country with a potential of fractured basement reservoir, one of which located in the South Sumatra Basin. Exploring fractured in the basement reservoir is quite tricky, for this reason, a proper method is required to predict the distribution of fractures in the fractured basement. One of the effective methods in mapping and modeling the distribution of fractures in the fractured basement exploration is the *Continuous Fracture Modeling* (CFM) method. This method utilizes the integration of seismic data and well log data through a neural network approach, which is capable to resolve the weaknesses of the seismic data which has limited resolution. Dip angle and dip azimuth data from log FMI, are used for fracture analysis around wells which later distributed in a 3D grid model to predict the existence of fractures in the area that does not have well log data. The selected fracture drivers (*maximum curvature*,

ant-track, variance, chaos, dip illumination, and 3D edge enhancement) are used for training process with fracture indicator to build the fracture intensity model. The fracture drivers were selected by its correlation value to the fracture indicator, where passive ant-track has the highest value at 0.316. Furthermore, the results of the model are validated with Drill Stem Test (DST) data. Based on the results of DST data and fracture intensity models show that areas with high fracture intensities have a correlation with the existence of gas fluid in the DST data.