

**TINGKAT KEMATANGAN BATUAN INDUK  
EKUIVALEN FORMASI TUBAN BERDASARKAN  
PEMODELAN CEKUNGAN 1D DAN 2D DI LAPANGAN NSP,  
CEKUNGAN JAWA TIMUR UTARA BAGIAN *ONSHORE***

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**SARI**

Penelitian ini bertujuan untuk mengetahui karakteristik geokimia batuan induk, tingkat dan sebaran kematangannya di lapangan, dan migrasi hidrokarbon yang telah terbentuk. Penelitian dilakukan di Lapangan NSP, yang berada di regional Cekungan Jawa Timur Utara bagian *onshore* dengan menganalisis sikuen pengendapan sumur secara vertikal yang meliputi Formasi Kujung, Tuban, Ngrayong, Bulu, Wonocolo, Ledok, Mundu, dan Lidah berdasarkan prinsip sikuen stratigrafi. Data penelitian yang digunakan berupa data log sumur, data geokimia, dan data seismik 2D dengan panjang lintasan sekitar 57 km. Metode yang digunakan dalam penelitian ini yaitu *crossplot*, pemodelan cekungan 1D (*burial history*) dan pemodelan cekungan 2D. Metode *crossplot* data geokimia digunakan untuk mengetahui karakteristik geokimia batuan induk ekuivalen Formasi Tuban. Metode pemodelan cekungan 1D digunakan untuk mengetahui tingkat dan sejarah kematangan batuan induk, sedangkan metode pemodelan cekungan 2D untuk mengetahui sebaran kematangan batuan induk secara lateral dan arah migrasi potensialnya. Berdasarkan hasil penelitian, diperoleh kesimpulan bahwa batuan induk di daerah penelitian memiliki kuantitas material organik berkisar buruk hingga baik, dan kerogen Tipe II, II-III, dan III. Tingkat kematangan batuan induk berkisar belum matang, awal minyak (*early oil*), dan utama minyak (*main oil*), dengan sebaran kematangan yang semakin matang ke daerah deposenter cekungan (*Kening Trough*). Hidrokarbon telah memasuki tahap migrasi primer (ekspulsi batuan induk), namun belum pada tahap migrasi sekunder (minimum TR=50%) karena nilai rasio transformasi maksimum hanya mencapai sekitar 37%.

Kata kunci: tingkat kematangan, batuan induk, sejarah penguburan, migrasi hidrokarbon

**MATURITY LEVEL OF SOURCE ROCK  
EQUIVALENT TO TUBAN FORMATION BASED ON  
1D AND 2D BASIN MODELLING IN FIELD NSP,  
NORTHEAST JAVA BASIN, ONSHORE REGION**

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**ABSTRACT**

*This study aims to investigate the geochemical characteristics of source, the level and distribution of maturity on the field, and the migration of hydrocarbons that have been formed. Field of research was conducted in the NSP, which is in the region of North East Java Basin - onshore section by analyzing the depositional sequences of wells vertically which includes Kujung, Tuban, Ngrayong, Bulu, Wonocolo, Ledok, Mundu, and Lidah Formation based on principles of sequence stratigraphy. The research data used in the form of well log data, geochemical data and 2D seismic data with a path length of about 57 km. The method used in this research includes cross-plot, 1D basin modelling (burial history) and 2D basin modelling. Cross-plot method on geochemical data are used to determine the characteristics of the source rock geochemistry equivalent with Tuban Formation. 1D basin modelling method used to determine the maturity level and history of source rock, while the 2D basin modelling method used to determine the distribution of source rock maturity laterally and direction of migration potential. Based on the research results, it could be concluded that the source rock in the study area has a quantity of organic material ranges from poor to good, and kerogen type ranges II, II-III, and III. Maturity level ranges from immature, early oil and main oil, with the distribution of maturity that has matured into deposenter of basin area (Kening Trough). Hydrocarbons have entered the stage of primary migration (expulsion from source rock), but not yet at the stage of secondary migration (minimum TR = 50%) because the maximum value of the transformation ratio is only about 37%.*

*Keyword: maturity level, source rock, burial history, hydrocarbon migration*