

INTISARI

PENGARUH PANJANG WINDOW DATA LOW FREQUENCY PASSIVE SEISMIC (LFPS) TERHADAP ATRIBUT UNTUK ESTIMASI POTENSI HIDROKARBON PADA LAPANGAN “AZ”, CEKUNGAN SUMATRA TENGAH

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Salah satu metode geofisika yang digunakan untuk mendeteksi potensi keberadaan hidrokarbon yaitu *Low Frequency Passive Seismic* (LFPS) dengan memanfaatkan respon frekuensi rendah dari gelombang seismik alami di permukaan bumi. Metode ini diterapkan pada penelitian di Cekungan Sumatra Tengah yang merupakan cekungan produktif hidrokarbon di Indonesia dengan sistem petroleum yang kompleks. Penelitian ini bertujuan untuk menganalisis pengaruh variasi panjang *window* terhadap nilai atribut LFPS dan menentukan interval *window* yang paling optimal serta memetakan zona prospek hidrokarbon di Lapangan “AZ”, Cekungan Sumatra Tengah. Penelitian ini menggunakan data yang direkam pada 48 titik yang tersebar di area penelitian. Data diolah menggunakan variasi panjang *window* 10 s, 20 s, 60 s, dan 90 s. Setiap hasil perhitungan atribut spektrum kemudian dibandingkan antar variasi panjang *window* untuk melihat kestabilan tren nilai atribut dan konsistensi anomali secara spasial. Hasil menunjukkan bahwa nilai atribut amplitudo dan energi cenderung menurun seiring bertambahnya panjang *window*, tetapi pola persebaran anomali frekuensi rendah cukup konsisten di seluruh variasi. Zona *high prospectivity* muncul secara konsisten pada area utara sekitar sungai dan area selatan Lapangan “AZ”. Panjang *window* optimal ditentukan dari titik dimana atribut mulai mengalami perubahan yang cukup stabil antar *window*. Kestabilan nilai atribut mulai tercapai pada panjang *window* ≈ 30 s.

Kata Kunci: Seismik pasif frekuensi rendah, panjang *window*, amplitudo, energi, hidrokarbon, Cekungan Sumatra Tengah

ABSTRACT

THE INFLUENCE OF WINDOW LENGTH IN LOW FREQUENCY PASSIVE SEISMIC (LFPS) DATA ON ATTRIBUTES FOR HYDROCARBON POTENTIAL ESTIMATION IN THE “AZ” FIELD, CENTRAL SUMATRA BASIN

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One of the geophysical methods used to detect potential hydrocarbon occurrences is the Low Frequency Passive Seismic (LFPS) method, which utilizes the low-frequency response of naturally occurring seismic waves at the Earth's surface. This method was applied in a study conducted in the Central Sumatra Basin, one of Indonesia's most productive hydrocarbon basins with a complex petroleum system. This research aims to analyze the effect of varying window lengths on LFPS attribute values, determine the most optimal window interval, and map hydrocarbon prospect zones in the “AZ” Field, Central Sumatra Basin. The study utilized data recorded from 48 measurement points distributed across the study area. The data were processed using four different window lengths: 10 s, 20 s, 60 s, and 90 s. Each calculated attribute result was then compared across the different window lengths to evaluate the stability of attribute value trends and the spatial consistency of anomalies. The results show that amplitude and energy attribute values tend to decrease with increasing window length due to signal smoothing effects, while the spatial distribution patterns of low-frequency anomalies remain relatively consistent across all variations. Zones of high prospectivity consistently appear in the northern area near the river and the southern part of the “AZ” Field. The optimal window length was determined based on the point at which the attribute values begin to exhibit a relatively stable trend between window variations. Attribute stability was observed to begin at a window length of approximately 30 seconds.

Keywords: Low frequency passive seismic, window length, amplitude, energy, hydrocarbon, Central Sumatra Basin