# ABSTRAK

## ANALISIS PENGARUH FREKUENSI DAN *PHASE WAVELET* TERHADAP EFEKTIVITAS *STRATAL SLICING* DALAM KARAKTERISASI *THIN SAND BODIES* PADA SISTEM *INTERBEDDED SAND–SHALE*

Oleh
**Hafizah**

Karakterisasi *thin sand bodies* pada sistem *interbedded sand–shale* merupakan tantangan dalam interpretasi seismik akibat keterbatasan resolusi vertikal, interferensi refleksi, dan efek *tuning* yang dapat mengaburkan respon masing-masing lapisan. Metode *stratal slicing* dikembangkan untuk mempertahankan kesetaraan waktu geologi secara lebih representatif dibandingkan atribut konvensional seperti *time slice* dan *horizon slice*. Penelitian ini bertujuan untuk mengevaluasi pengaruh frekuensi dan fase *wavelet* terhadap efektivitas *stratal slicing*, serta mengkaji sensitivitas hasil interpretasi terhadap kondisi *thin bed* dan kesalahan *picking* (*mis-pick*). Metode yang digunakan berupa *stratal slicing* berbasis atribut amplitudo pada model seismik sintetik 3D dengan reflektor horizontal dalam kondisi ideal tanpa struktur dan *noise*, sehingga respon seismik yang diamati hanya dipengaruhi oleh karakter *wavelet* dan interferensi antar lapisan. Variasi fase *wavelet* dianalisis melalui perbandingan *wavelet zero-phase* dan *wavelet* 90°-*phase* pada beberapa rentang frekuensi. Hasil penelitian menunjukkan bahwa *wavelet* 90°-*phase* dengan frekuensi 45 Hz memberikan respon paling optimal, ditandai dengan berkurangnya interferensi refleksi, meningkatnya resolusi lapisan tipis, serta geometri *sand body* yang lebih jelas dan konsisten pada hasil *stratal slicing*. Selain itu, sensitivitas terhadap *mis-pick* dipengaruhi oleh ketebalan lapisan, di mana lapisan tebal relatif stabil, sedangkan lapisan tipis lebih rentan mengalami distorsi amplitudo akibat interferensi refleksi yang berpotensi menimbulkan kesalahan interpretasi. Hasil penelitian ini menunjukkan bahwa optimasi parameter *wavelet* dan ketelitian *picking* merupakan faktor penting dalam meningkatkan resolusi stratigrafi dan keandalan interpretasi *stratal slicing* pada reservoir *thin bed.*

Kata Kunci: *Stratal slicing, wavelet, Phase,* frekuensi

## ABSTRACT

***ANALYSIS OF THE EFFECT OF WAVELET FREQUENCY AND PHASE ON THE EFFECTIVENESS OF STRATAL SLICING IN THE CHARACTERIZATION OF THIN SAND BODIES IN INTERBEDDED SAND–SHALE SYSTEM***

*By*
**Hafizah**

*Characterizing thin sand bodies in interbedded sand–shale systems remains a challenge in seismic interpretation due to limited vertical resolution, reflection interference, and tuning effects that may obscure the response of individual layers. Stratal slicing was developed to preserve geological time equivalence more representatively than conventional seismic attributes such as time slices and horizon slices. This study aims to evaluate the influence of wavelet frequency and phase on the effectiveness of stratal slicing, as well as to investigate the sensitivity of interpretation results to thin-bed conditions and picking errors (mis-picks). The method employed consists of amplitude-based stratal slicing applied to a 3D synthetic seismic model with horizontal reflectors under ideal conditions without structural complexity and noise, allowing the observed seismic response to be controlled solely by wavelet characteristics and interlayer interference. Wavelet phase variations were analyzed by comparing zero-phase and 90°-phase wavelets across several frequency ranges. The results indicate that a 90°-phase wavelet with a frequency of 45 Hz provides the most optimal response, characterized by reduced reflection interference, improved thin-bed resolution, and clearer as well as more consistent sand body geometry in the stratal slicing results. Furthermore, sensitivity to mis-picks is influenced by layer thickness, where thicker layers remain relatively stable, while thinner layers are more susceptible to amplitude distortion caused by reflection interference, potentially leading to interpretation errors. These findings demonstrate that wavelet parameter optimization and accurate picking are critical factors in improving stratigraphic resolution and the reliability of stratal slicing interpretation in thin-bed reservoirs.*



*Keyword*: *Stratal slicing, wavelet, Phase, frequency*