

ABSTRAK

Studi Rekonstruksi *Palinspastic* dan Paleogeografi, Implikasinya Terhadap *Petroleum System* *Southeast Offshore* Seram dan *South Offshore* Onin

Oleh:

Sisdeo Hutagaol

111210087

Program Studi Sarjana Teknik Geologi

Wilayah *Southeast Offshore* Seram dan *South Offshore* Onin merupakan bagian dari Cekungan Onin–Kumawa yang terletak dalam sistem tektonik kompleks di Indonesia Timur, yang dikontrol oleh interaksi antara Lempeng Australia, Lempeng Pasifik, dan Lempeng Eurasia. Meskipun secara tektonik berada dalam jalur prospektif hidrokarbon seperti Cekungan Bintuni dan Seram, potensi di wilayah ini masi belum tercermin. Studi ini dilakukan untuk memahami evolusi tektonik, karakteristik struktur geologi, rekonstruksi paleogeografi, serta implikasinya terhadap sistem petroleum dengan menggunakan pendekatan integratif berbasis data seismik 2D, log sumur, korelasi stratigrafi, dan restorasi palinspastik. Metode yang digunakan meliputi interpretasi horizon dan sesar pada penampang seismik 2D, analisis peta struktur kedalaman bawah permukaan, analisis *isochrone* dan paleogeografi, serta restorasi penampang secara bertahap untuk memperoleh gambaran evolusi deformasi. Validasi model dilakukan dengan prinsip keseimbangan geometri struktur, perhitungan strain, serta integrasi data stratigrafi dan struktur. Studi ini juga menyusun sintesis *petroleum system* berdasarkan sekuen pengendapan dan dinamika tektonik yang berkembang. Hasil penelitian menunjukkan bahwa cekungan ini mengalami evolusi tektonik dari fase ekstensional Pra-Tersier hingga fase kontraksional Tersier, dengan struktur aktif yang berperan sebagai perangkap hidrokarbon dan pengontrol jalur migrasi. Paleogeografi wilayah berkembang dari margin pasif menjadi sistem *foredeep* akibat inversi Neogen. *Petroleum system* tersusun atas batuan induk serpih Trias, *reservoir* batupasir Jura dan sedimen karbonat Tersier, serta *seal* berupa serpih Miosen – Pliosen.

Kata Kunci : Onin-Kumawa, *Palinspastic*, Paleogeografi, *Petroleum System*, Struktur Geologi.

ABSTRACT

Study of Palinspastic Reconstructions and Paleogeography, Its Implication for Petroleum System of Southeast Offshore Seram and South Offshore Onin

By:

Sisdeo Hutagaol

111210087

Geological Engineering Undergraduate Program

The Southeast Offshore Seram and South Offshore Onin areas are located within the Onin–Kumawa Basin, which is part of a complex tectonic system in Eastern Indonesia. This system is driven by the interactions among the Australian Plate, the Pacific Plate, and the Eurasian Plate. While these areas are situated within a promising hydrocarbon pathway, similar to the Bintuni and Seram Basins, their potential has not yet been fully tapped. This study aims to examine the tectonic evolution, geological structural characteristics, paleogeographic reconstruction, and the implications for the petroleum system. We employed an integrative approach utilizing 2D seismic data, well logs, stratigraphic correlation, and palinspastic restoration. The methods employed in this study include interpreting horizons and faults on 2D seismic sections, analyzing subsurface depth structure maps, conducting isochrone and paleogeographic analyses, and performing gradual section restoration to understand deformation evolution. Model validation was carried out using the principles of structural geometric balance, strain calculations, and the integration of stratigraphic and structural data. Additionally, this study compiled a synthesis of the petroleum system based on the sequence of deposition and the evolving tectonic dynamics. The study's results indicate that this basin experienced tectonic evolution from a pre-Tertiary extensional phase to a Tertiary contractional phase. During this process, active geological structures served as both hydrocarbon traps and migration pathways. The region's paleogeography transitioned from a passive margin to a foredeep system as a result of Neogene inversion. The petroleum system of the basin consists of Triassic shale source rocks, Jurassic sandstone reservoirs, and Tertiary carbonate sediments, with Miocene to Pliocene shale acting as seals.

Keywords : Onin-Kumawa, Palinspastic, Paleogeography, Petroleum System, Structural Geology