

Sedimentology of Wonosari Carbonates Southern Yogyakarta: Outcrop Study and Petroleum Implications

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Middle Miocene to Pliocene-aged Wonosari reefal carbonates cropping out in Gunung Sewu area, southern Yogyakarta, Indonesia were studied to understand the geologic setting, depositional facies-environments, diagenetic overprints, and their implications for petroleum exploration.

Based on encountered facies association and depositional environments, the Wonosari reefal carbonates are interpreted to be developed in a rimmed shelf platform deepening to the north. From shallow area at the south to deep area in the north, the depositional environments and associated facies include : (1) back reef-shelf with patch reef and algal foraminiferal packstones, (2) reef zone with boundstones and packstones-grainstones cut in some places by surge channels with storm or tidal deposits (3) reef slope with packstones and rudstones, and (4) toe to slope with planktonic packstones and wackestones. A variety of diagenetic processes were observed in the carbonates, comprising : micritization, dolomitization, and dissolution developing in phreatic marine, mixed marine-fresh water, and fresh water vadose diagenetic environments, respectively.

Sedimentologic setting of the Wonosari carbonates is similar with the other carbonates in Indonesia proven to be rich in petroleum. Good porosities are encountered in a variety of facies of the Wonosari carbonates. However, porosity occlusion by diagenetic overprints is also observe in several facies. Presence of good source rocks and sealing rocks may seriously risk exploration venture in this area. Nevertheless, carbonaceous shales of Middle Miocene Sambipitu Formation may provide source rocks but their distribution in subsurface is not clear and volumetrically, limited. Mio-Pliocene Kepek limestones and marls may partly seal Wonosari reefs. The absence of oil seepage, however, may risk the opportunity of petroleum existence in this area.