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Conditions Conducive to Coalescence of Isolated Platforms in the Miocene Wonocolo Formation, North Madura Area, East Java Basin, Indonesia

The middle to upper Miocene Wonocolo Formation in the North Madura area, East Java Basin contains numerous isolated platforms that are broadly distributed across the Indonesian back-arc region. A closely spaced grid of 2-D seismic data and information from several wells across the region were used to map all of the Wonocolo platforms found across an ~3000 sq km area. Up to five growth phases are recognizable in most of the Wonocolo platforms. In the western part of the North Madura study area, individual platforms are much larger in plan view than age-equivalent platforms to the east. The larger western platforms also tend to record initial development of several, relatively closely spaced, isolated platforms that coalesce at about the middle of their growth history into larger, composite platforms. Coalescence is asymmetrical, in the sense that the leeward (eastern) margins of the westernmost platforms typically show the greatest amounts of progradation and filling of interplatform troughs. In contrast, the smaller Wonocolo platforms from the eastern part of the study area tend to be steeper sided, are farther apart, and have largely aggradational stratal geometries. Faster subsidence rates in the eastern part of the study area may explain these regional growth patterns. These relationships also suggest that the intrinsic ability of Miocene isolated platforms to coalesce into larger composite buildups is controlled in a sensitive way by a number of factors that might be broadly classified as "autocyclical" in nature, including the distance between neighboring platforms, the area of individual platform tops where the sediment that fills interplatform troughs is created, and the incremental relief that develops along platform margins.