

## **3D Modelling of Longshore Bar Deposit in Modern Fluvial Dominated Delta, Case Study Wulan Delta, Demak, Central Java Province**

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### **Abstract**

Wulan Delta is a part of Java Island northern coast, which has the shape of the coastline juts into the sea with an approximately 25 km<sup>2</sup> area. Administratively, it is located in Wedung District, Demak City, Central Java Province. This is a quarter delta which formed in Java as a part of back-arc basin and included in the Sundaland. The delta system is still active, which formed in humid tropical climate under high wave energy, large fluvial influx, and quite high tidal influences.

In 2000s, the section around mouth bar began to form sand deposit which grow laterally until 2015 and continue to widen forming longshore bar in northeast-southwest direction. The ocean wave control the distribution pattern of sedimentary material in the delta front. The depositional of longshore bar in fluvial dominated delta are very rare, most of longshore bar deposit were founded in wave dominated delta system.

The main purpose of 3D modelling study of longshore bar deposit in modern delta is to understand subsurface condition and geometry of sand deposit, vertical stratigraphic pattern, facies changes, and the northeast-southwest orientation direction.

The subsurface condition was derived from core samples. The stratigraphic correlation shows facies changes around longshore bar which has integration with vertical and lateral grain size distribution granulometry sample. Facies changes caused by the fluctuation of rapid sedimentation and wave process can be shown by remote sensing analysis using LANDSAT aerial photograph from 1975 until 2015 in Wulan Delta.

The interpretation result provide new information to understand vertical and lateral continuity around longshore bar deposit, vertical and lateral grain size distribution using granulometry sample, wave movements and direction influence, prograding delta formation, sand distribution boundary in the longshore bar, and gross sand map distribution. All results have been combined into 3D modelling of the longshore bar. Thus, the 3D model can be used to determine sand distribution geometry in the longshore bar. This study will give contribution to hydrocarbon exploration to find out the sand geometry in the deltaic system which has longshore bar facies reservoir.