ABSTRACT

GEOLOGICAL STRUCTURE MODELLING BY GRAVITY METHOD IN THE WEST REGION OF NORTH EAST JAVA BASIN

By:
Kurnia Diki Prasetya
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Gravity method surveys have been carried out in Kudus, Pati, Demak and Grobogan Regencies where included in Rembang Zone that are known prospects for hydrocarbons in the North East Java Basin. The study area is at 6° 41' 30" - 7° 8' 10" LS, 110° 48' 22" – 111° 7' 25" BT. This research used secondary gravity data with a total of 144 measurement points, the distance between measurement points ranges from 1 to 2 km with large area is (35 × 48) km^2. The purposes of this research is decribe subsurface model and fault structure based on the contrast value of the gravitational acceleration anomaly.

Gravity data processing and analysis are carried out sequentially using Oasis Montaj software. Correction of curvature is applied on research to reducing the effect of curvature from the earth. Reduction to the flat plane is carried out on gravity data because the value of gravitational acceleration on the Complete Bouguer Anomaly map is still in the different topography of the elevation. The depth estimation is obtained from spectrum analysis, which is used for the modeling depth of 2.5 D. As frequency filterstep, Bandpass filter is applied to obtain regional anomaly maps. The Total Horizontal Derivative filter was applied to analyze faults in the research area. The 2.5 D model was made using Oasis Montaj software to determine the location of faults and subsurface images which were then correlated to determine the continuity of faults.

Based on the results of the Complete Bouguer Anomaly map analysis, there is a contrast value of gravitational acceleration that indicate as a fault. The indication of the fault is clarified with the results of the Total Horizontal Derivative map which produce a high gradient value with west-southwest (WSW) to east-northeast (ENE) direction which is interpreted as Lasem's normal fault. From 2,5D modelling shows that the fault is not continuous to the surface and cut the Ngimbang Formation (2.44 gr/cm^3), Kujung Formation (2.2 gr/cm^3), Tawun Formation (2.3 gr/cm^3) and Ngrayong Formation (2.47 gr/cm^3). Presumably that Lasem's normal fault controls the formation of Rembang depression.

Keywords: *Lasem fault, Gravity method, Total Horizontal Derivative*