

An Active Subsurface Geological Structure Pattern of Mud Volcano Phenomenon as an Environmental Impact of Petroleum Withdrawal in Sidoarjo, East Java, Indonesia

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Abstract : Lapindo mud (LUSI) phenomenon which occurred in Sidoarjo 2006 is a national scale of the geological phenomenon. This mudflow forms a mud volcano that spreads by time is in the need of serious treatment. Some further research has been conducted either by the application method of geodesy, geophysics, and subsurface geology, but still remains a mystery to this phenomenon. Sidoarjo Physiographic regions are included in the Kendeng zone flanked by Rembang zones in northern and Solo zones in southern. In this region revealed Kabuh formation, Jombang formation, and alluvium. In general, in the northern part of the area is composed of sedimentary rocks Sidoarjo klastika, epiklastic, pyroclastics, and older alluvium of the Early Pleistocene to Resen. The study was conducted with the literature study of the stratigraphy and regional geology as well as secondary data from observations coupled gravity method (Anomaly Bouger). The aim of the study is to reveal the subsurface geology structure pattern and the changes in mass flow. Gravity anomaly data were obtained from the calculation of the value of gravity and altitude, then processed into gravity anomaly contours which reflect changes in density of each group observed gravity. The gravity data could indicate a bottom surface which deformation occur the stronger or more intense to the south. Deformation in the form of gravity impairment was associated with a decrease in future density which is indicated by the presence of gas, water and gas bursts. Sectional analysis of changes in the measured value of gravity at different times indicates a change in the value of gravity caused by the presence of subsurface subsidence. While the gravity anomaly section describes the fault zone causes the zone to be unstable.

Keywords : mud volcano, Lumpur Sidoarjo, Bouger anomaly, Indonesia

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