

High Resolution Sandstone Connectivity Modelling: Implications for Outcrop Geological and Its Analog Studies

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Abstract : Advances in data capturing from outcrop studies have made possible the acquisition of high-resolution digital data, offering improved and economical reservoir modelling methods. Terrestrial laser scanning utilizing LiDAR (Light detection and ranging) provides a new method to build outcrop based reservoir models, which provide a crucial piece of information to understand heterogeneities in sandstone facies with high-resolution images and data set. This study presents the detailed application of outcrop based sandstone facies connectivity model by acquiring information gathered from traditional fieldwork and processing detailed digital point-cloud data from LiDAR to develop an intermediate small-scale reservoir sandstone facies model of the Miocene Sandakan Formation, Sabah, East Malaysia. The software RiScan pro (v1.8.0) was used in digital data collection and post-processing with an accuracy of 0.01 m and point acquisition rate of up to 10,000 points per second. We provide an accurate and descriptive workflow to triangulate point-clouds of different sets of sandstone facies with well-marked top and bottom boundaries in conjunction with field sedimentology. This will provide highly accurate qualitative sandstone facies connectivity model which is a challenge to obtain from subsurface datasets (i.e., seismic and well data). Finally, by applying this workflow, we can build an outcrop based static connectivity model, which can be an analogue to subsurface reservoir studies.

Keywords : LiDAR, outcrop, high resolution, sandstone facies, connectivity model

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