Structural model of coal-bearing Raniganj Formation derived from petrophysical data in the Raniganj (E) block, India

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Abstract:

Raniganj Basin is the eastern most coal producing basin of the Damodar Valley located in West Bengal, India. The basin has a large reserve of high-volatile coal deposits in the Raniganj and Barakar formations. The aim of this study is to map the Raniganj Formation in the eastern Raniganj basin as very limited information is available in the area. We used the geophysical well log datasets from 38 drilled wells provided by Essar Oil and Gas Exploration and Production Limited to delineate the Raniganj Formation. The resistivity, density and gamma-ray logs are used to identify the coal seams encountered in the drilled well. Further, considering the occurrence of topmost and bottommost coal seam, we provide the preliminary information about the depth and thickness of the Raniganj Formation. The result suggests that the Raniganj Formation occurs at the depth range of 137 to 1219 m in the study area. The shallowest occurrence is at the north-eastern end whereas deepest occurrence is in the central western part of the study area. The thickness of the Raniganj Formation varies from 101 to 548 m, where thin column of the formation is present at the eastern boundary while thick section is present at the center. The results on depth and thickness further suggest that there may be a depocenter located at central-western part of the study area. The Raniganj Formation strike generally swings along the basin margin in the eastern part of the basin. The formation has a general dipping trend from north to south, however it also shows a sharp random depth variation at several locations, which might indicate presence of sub-surface faults in the region. The preliminary information on the Raniganj Formation need detailed geophysical study to refine its depth and thickness and further can be used for the carbon sequestration purpose.

Keywords: Raniganj Basin, Coal seams, Raniganj Formation, Faults, Depocenter, Carbon-sequestration