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Geophysical loom for deducing 3-D structure of palaeo-channels in middle Ganga plain (MGP), Bihar, India

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Palaeo-channel are potential sources of groundwater and help in augmenting groundwater resources by acting as recharge channel due to presence of buried pediments and alluvial fan. These features are natural recharge sites due to high permeability and water storage capacity. In such case, deducing of palaeo-channel and demarcation of its boundaries is essential for management of groundwater resources. An integrated geophysical loom of VES, ERT and the Heli-borne SkyTEM techniques was adopted to delineate palaeo-channels in middle Ganga plain (MGP), Bihar. The middle Ganga plain lies between the Munger - Saharsa ridge in the east and Faizabad ridge in the west. The study area is in western and south-western part of the Patna district and underlain by thick alluvial deposits of quaternary age. These deposits comprise of various grades of clay, silt and sandstone which constitute the groundwater reservoir. The entire alluvial thickness overlies on the Precambrian basement. Physiographically, the area is monotonously flat. The elevation of the area varies from 46 to 62 m amsl. The integrated geophysical results shows that the resistivity of the palaeo-channels varies from 60-200 Ω -m depending upon the water saturation in the sand horizons and thickness varies from 20 to 60 mbgl, which is well-correlated with the existing borehole lithologs. The 3-D view of the palaeo-channels was prepared which indicates the change in the course and meandering of the river in the past. It is constituted by alternating layer of fine to medium sand including kankar at certain place indicating flood and quiet period.

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