

Delineation of River Channel Sand Deposits in Warri, Niger Delta Basin Using Vertical Electrical Sounding

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River channel sand deposits within the Niger Delta Basin serve as important sources of construction aggregates, yet their subsurface distribution is not always clearly defined. To better understand these deposits, six Vertical Electrical Sounding (VES) surveys were carried out along selected river channels in Warri using the Schlumberger array with a maximum current electrode spacing of 120 m. Apparent resistivity data were interpreted through curve matching and forward modeling to estimate layer thickness, resistivity values, and lateral continuity.

The results reveal three- to four-layer geoelectric sequences. High-resistivity zones ranging from 280–750 Ωm at depths between 6 and 22 m are interpreted as coarse-grained sand suitable for extraction. Variations in the thickness of overlying clay layers influence the continuity of these sand bodies and provide additional insight into groundwater protection. Correlation across survey locations suggests laterally continuous sand units with economic potential. These findings highlight the effectiveness of near-surface geoelectrical methods as a practical and cost-efficient tool for mapping river channel sand deposits and supporting sustainable resource planning in sedimentary environments.