

Assessment of Aquifer Protective Capacity and Soil Corrosivity Using Geoelectrical Method in Obun-Ewi, Ondo East Local Government, Southwestern Nigeria

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The electrical resistivity technique was used to evaluate the topsoil corrosivity and the aquifer protective capacity of Obun Ewi County, southwestern Nigeria. A total of 23 vertical electrical soundings (VES) were obtained in the area using the Schlumberger electrode configuration with half-current electrode separation (AB/2) ranging from 1 to 100 m. The results obtained from the geoelectric sections showed that there are three subsurface geologic layers, namely: the topsoil, weathered layer (comprises of clay/sandy clay and laterite), and fractured basement/fresh bedrock. The topsoil resistivity ranged from 56 to 1222 Ωm with a mean value of 366.8 Ωm . The weathered layer has resistivity range of 16 to 1168 Ωm with a mean value of 246.1 Ωm and thickness that varies from 0.7 to 6.2 m. The delineated weathered and fractured basement columns constituted the aquifer units. The longitudinal conductance and aquifer transverse resistance vary from 0.0029 to 0.152 mhos and 91.0 to 3256.1 , respectively. Analysis of these results revealed that 82.61% of the hydrogeological units in the area are poorly protected, 17.39% has weak protection, while 73.91% of the topsoil at the sounding stations is practically non-corrosive (PNC), 21.74% is slightly corrosive (SC) and 4.35% is moderately corrosive (MC). The entire study area was identified as having a poor aquifer protective capacity, indicating its susceptibility to contamination.