Fractured rock aquifer delineation and assessment using spatial analysis in Kano, Nigeria

ABSTRACT

Knowledge of fractures and their connectivity in geologic media is paramount to groundwater resource management. However, the theory of connectivity between the fractures and their measurement techniques, and its application in modelling are still under great debate. Various studies indicated that the aquifers of the basement complex rocks in Kano are regolith and the fractures are connected at various depths. However, no study has stated the extent (spread) of the underlain fractures, their position, the connectivity between the fractured zones and whether or not all the fractured rock aquifers are productive (water available within fractures). Therefore, this study was undertaken with a view to addressing these challenges. It is established using the GIS-based spatial analysis approach that 52.28 % of the underlain aquifers are productive. The minimum and maximum depths of the underlain fractured rocks are 19.8 and 50.6 m, respectively. Only 19 % of the total study area is unproductive while 42.35 % of the underlain basement complex is characterized by fractures. These fractures are completely saturated.

Keyword: Fractured rock; Delineation; GIS; Aquifer; Yield