

Neotectonics as a Tool to Explore for Groundwater in Semi-Arid Environments, Case of the Fractured Karoo Aquifers in the Eastern Cape Province, South Africa

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Finding productive boreholes in the fractured Karoo aquifers is not easy and requires implication of other techniques to ascertain the potentiality of groundwater. The Eastern Cape, second largest of South Africa's nine provinces, hosts rocks of the Karoo Supergroup over a large area and few rocks of the Cape Supergroup. Literature review, remote sensing, examination of seismic data, field observations, and location of springs and hot springs, magnetic and electromagnetic survey, and vertical electric sounding (VES) were used to identify and characterize neotectonic belts that can be targeted for groundwater exploration. Results indicate that the Eastern Cape Province can be subdivided in four zones with regard to neotectonics. The southern, the eastern, northern neotectonic belts, and the central inactive belt. The southern neotectonic belt has some faults that were reactivated during the Quaternary, the eastern neotectonic belt has been affected by a surface uplift that might have generated some fractures (e.g. Fort Beaufort Fracture) in the Karoo during the last five million years, the northern neotectonic belt stretches over a big seismic belts has seven hot springs, and the central inactive belt with no neotectonic markers. Magnetic and electromagnetic survey point to the occurrence of a fault hosted in the northern neotectonic belt. Vertical electrical sounding identified some fractures in the southern neotectonic belt. The three neotectonic belts (southern, eastern and northern) can be considered as potential targets to explore for groundwater.

Biography:

Kakaba Madi is a qualified geologist (BSc Hons University of Lubumbashi DRC, PhD University of Fort Hare South Africa. Madi has been involved in the exploration in the Copperbelt (DRC) and is specializing in neotectonics with its application for the exploration of groundwater. Madi is currently lecturing structural geology and geochemistry at the University of Fort Hare in South Africa. He is member of the Geological Society of South Africa (GSSA), and is registered with the South African Council for Natural Scientific Professions (SACNASP).