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Role of equatorial fracture zones on fluid migration across the South Atlantic margins

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The continental margin basins of Brazil and West Africa share very similar tectono-stratigraphic megasequences that are recognizable in petroliferous basins, as a result of the Late Jurassic-Early Cretaceous rifting of the South Atlantic basins. A number of oil families present along the South Atlantic conjugated margins are composed of genetically related oils of mixed provenance. Motion of tectonic plates and their configurations which depend so much on the nature of the boundaries and their orientations strongly influence fault tectonics (within both continents and oceans). The tectonic evolution of the plates leads to the formation of fracture zones parallel to the direction of plate motion. The Equatorial Fracture Zone sourced from the Gulf of Guinea, and propagating deep into the African and South American continental blocks. They are here regarded as "flow lines" tracing the movement of separating plates and acting as effective long distance hydrocarbon migration pathway across the South Atlantic margins.

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Groundwater modeling for assessment and evaluation of vulnerability to pollution in the lake Tana basin, Ethiopia: Improving the DRASTIC model approach in a GIS environment

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GIS - based groundwater vulnerability assessment to delineate areas that are more vulnerable to contamination from anthropogenic sources has become an important element for sensible resource management and land use planning. Surface water quality can be determined by hydrological responses that vary geographically. The sub-surface hydrologic environment, however, has a primary influence on groundwater movement and hence pollutant migration to the sub-surface water. Spatial maps of aquifer vulnerability to pollution are becoming more in demand because on the one hand groundwater represents the main source of drinking water, and on the other hand high concentrations of human/economic activities, such as industrial, agricultural, and household represent real or potential sources of groundwater contamination. There is a need to conduct studies on groundwater pollution. The objective of this study is to find out the groundwater vulnerable zones in shallow and deep aquifers in the Lake Tana Basin (Ethiopia), using the improved DRASTIC model in a Geographical Information System (GIS) environment. This model is based on geospatial data acquisition and advanced spatial analysis of the different hydrological and hydrogeological parameters/ data layers that provide the input to the modeling. It corresponds to the initials of seven RDASTIC layers. Moreover, a new parameter (Preferential flow paths-P) is included to improve the DRASTIC Model approach. ArcGIS software is used to spatially analyze, evaluate and finally find out the pollution vulnerable zones in aquifers. After rigorous assessment, analysis and evaluation of groundwater vulnerability, the study area is mapped and delineated as: Highly vulnerable zone; Moderately Vulnerable Zone; Low Vulnerable Zone, etc depending on the final findings. The GIS technique is expected to provide an efficient tool for assessing and analyzing the vulnerability to groundwater pollution. The model in general is expected to be an effective tool for local authorities who are responsible for managing groundwater resources.

Biography

Berhanu T. Workie is a PhD fellow in the department of Geoinformatics and Geographic information Systems (GIS), University of Tuebingen. He earned his M.Sc. degree in Applied Environmental Geosciences from faculty of Geosciences in the same university in 2009. His employment background has been in various research and practical applications in the areas of Geosciences, Environmental Science, GIS and Remote Sensing.

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