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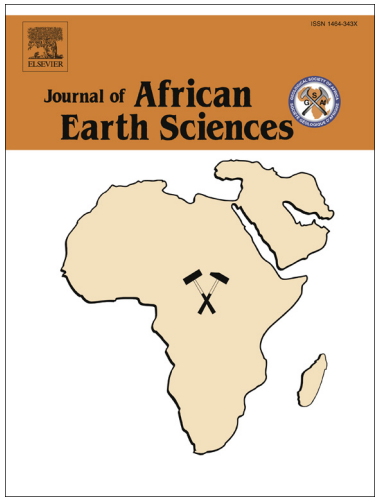

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Diagenetic contrast of sandstones in hydrocarbon prospective Mesozoic rift basins (Ethiopia, UK, USA)

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ABSTRACT

Diagenetic studied in hydrocarbon-prospective Mesozoic rift basins were carried out in the Blue Nile Basin, Ethiopia, Ulster Basin, United Kingdom and Hartford Basin, United States of America. Alluvial fan, single and amalgamated multistorey meandering and braided river, deep and shallow perennial lake, shallow ephemeral lake, aeolian and playa mud-flat are the prominent depositional environments.

The studied sandstones exhibit red bed diagenesis. Source area geology, depositional environments, pore-water chemistry and circulation, tectonic setting and burial history controlled the diagenetic evolution. The diagenetic minerals include: facies-related minerals (calcrete and dolocrete), grain-coating clay minerals and/or hematite, quartz and feldspar overgrowths, carbonate cements, hematite, kaolinite, illite-smectite, smectite, illite, chlorite, actinolite, laumontite, pyrite and apatite.

Diversity of diagenetic minerals and sequence of diagenetic alteration can be directly related to depositional environment and burial history of the basins.Variation in infiltrated clays, carbonate cements and clay minerals observed in the studied sandstones. The Adigrat Sandstone in the Blue Nile Basin is dominated by kaolinite, whereas the Sherwood Sandstone Group in the Ulster Basin is dominated by illite-smectite, smectite, illite and chlorite. The fluviatile sandstones in the New Haven Arkose in the Hartford Basin are dominated by illite, whereas the East Berlin and Shuttle Meadow Formations are dominated by illite in the fluviatile sequences and smectite-chlorite and illite-smectite in the lacustrine sandstones.

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