

Heavy Minerals Stratigraphy (HMS) of the Sand-rich Member of the Burqan Formation, Midyan Basin, NW Saudi Arabia

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Abstract

The Early Miocene sand-rich member of Burqan Formation exposed in Midyan Basin, NW Saudi Arabia consists mainly of sub-arkose to sub-litharenite, pebbly coarse to medium, sub-angular to sub-rounded, poorly to moderately sorted turbiditic sandstone interbedded with mudstone. This paper studies the stable heavy mineral distribution and stratigraphy in the Burqan sandstone. The heavy minerals are separated and then studied using optical microscopy in detail in terms of mineralogy and petrography. The heavy minerals including zircon, tourmaline, and rutile are the most dominant. Zircon is the main constituent of the heavy minerals with an average percentage of 70 % followed by tourmaline 20 %, and rutile 10 %. Anhedronal grains of zircon are the most dominant in addition to subhedronal grains. Tourmaline grains are dominated by angular brown grain in the proximal part and rounded spherical brown and green grains in the distal part of the sandstone. Zircon composition is high at the proximal part of the sandstone and decreases toward the distal part, unlike tourmaline, which increases toward the distal part. Rutile shows no significant changes. The sand-rich member of Burqan Formation is divided into three heavy mineral zones based on the concentration, shape, and color of the heavy minerals. This study shows that Heavy Mineral Stratigraphy (HMS) can be used as a useful stratigraphic tool for the correlation within sandstone units.