Ediacaran of Saudi Arabia: Myth, Facts, and Potential

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Abstract

The Ediacaran stratigraphic record of Saudi Arabia is among the best exposed (up to 00 m thick of continuous exposure) and least studied sequences in the world, in particular the carbonate sequence. These sequences are identified in several small sedimentary basins, associated with the Najd Fault System of the Arabian plate and interpreted to be developed before, during and after the major biogeochemical event in the geologic records, known as Shuram Anomaly event, that took place globally from 570 to 560 Ma. Out of the few researches performed in the region, none was able to answer the questions about the origin, extant of deposition and their co-relation with the globally spread Ediacaran deposits. Previous works employed different geochemical proxies which were found to be inconclusive. High-resolution inorganic and organic geochemical characterizations were performed on the samples acquired from different basins in order to enhance our knowledge about these sequences. Our high-resolution $\delta^{13}C$ results from the Dhaiqa basin, for the first time, show a promising trend that capture the recovery period following the Shuram-Wonoka anomaly while the results from the Antaq basin show pre-Shuram values. The Shuram anomaly has been well-studied in exposures from neighboring Oman and other regions of the world. The possibility of this event to be the triggering cause of the origin of complex life on earth is well established so finding traces of this event in Saudi Arabia will be promising. Moreover, similar sequences are proven reservoirs in Oman and our results obtained so far show a good correlation with the data previously acquired in studied basins and also show resemblance with the results acquired from other related basins of Saudi Arabia and neighboring Oman. Correlation of our results along with petroleum play studies of these Ediacaran sediments with Oman can be promising considering the worldwide connectivity of the Ediacaran seas.