

The Evidence for flooding of Wadi Al Tarafiyah in Al Qassim Province, Central Saudi Arabia, since the late Quaternary

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Abstract

The current knowledge base pertaining to the late Quaternary history of environmental change in central Saudi Arabia is severely limited, due to inadequate research into the period. The information that has been made available, in the form of radiocarbon dating of deposits obtained from wadis and lakes in the 1980s, has generally been ignored, because it focused on system carbonates. However, since 2003 optically stimulated luminescence (OSL) dating has been employed in the central region of Saudi Arabia to examine and uncover the environmental shifts that have occurred over time. Such dating has been applied to investigate landforms and sediments.

Of particular interest when seeking information about the Quaternary period are the fluvial deposits in both Wadi Al Rimah and Wadi Al Tarafiyah, its tributary. OSL and X-ray analysis have assisted researchers, who have been active in monitoring changes in the sedimentary profiles of the wadis throughout history. The principle findings have revealed that Wadi Al Tarafiyah in Al Qassim Province, central Saudi Arabia was active during the Marine Isotope Stages 5c and 3 as a consequence of rainfall, most likely derived from cyclones that were responsible for intense Mediterranean rains; although potentially the water was derived from a combination of monsoon rains and contributions from lakes and lacustrine tufa located both in and around the wadi at this time. It has also been found that by the middle of the Holocene era, ca 5 ka, the Wadi Tarafiyah was covered by windblown sheets of orange sand, most likely under the influence of Shamal winds. At this time there was localised wadi flow caused by heavy rainfall during winter, with intervening long, hot and dusty seasons extending over consecutive years.