

Luminescence dating of alluvial and fluvial sediments from Bat, Oman: implications to the humidity changes and human activities in the SE Arabia

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The southeast Arabian Peninsula has been experienced extreme variations of arid/humid climatic conditions, due to the changes in the intensity of the Indian Ocean Monsoon. Past studies reconstructed the early Holocene moist period and the mid Holocene arid period, and suggested a link between the aridification and the start of oasis irrigation. To investigate the possible relationship between the human activity and the change in the environments in the SE Arabia, trench excavations at small alluvial fans were carried out along the Wadi Sharsah, east of the Bat archaeological sites. The results of the detailed sedimentological description and OSL dating indicate the followings: 1) alluvial fan formation in an arid-semiarid period at ca. 12ka, 2) a very moist period with the existence of perennial river channels between 10 and 8.5 ka, and 3) an aridification after 8.5 ka. A wadi terrace was formed during the mid Holocene (dated to 6-5.5ka by a previous study), shortly before the commencement of the Hafid period (5.2 ka). Our study also indicates that the combination of sedimentological investigation and OSL dating is a powerful tool for understanding the relation of human activity and climate in the Arabian Peninsula and elsewhere.

Keywords: OSL dating, moisture changes, alluvial fan, Bat archaeological sites