Comparison of Some Desert Varnish Characteristics on Stable, Unstable and Moderately Stable Surfaces of Mantled Pediment in Giroft Area

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Abstract

Physical, chemical, and microscopic properties together with mineralogy are among useful techniques for dating and paleoclimatological interpretation and identification of varnishes. The present research was performed to evaluate the application of stone varnish in dating and landform development investigations in southern dry lands of Giroft area, Kerman Province. The mantled pediment was identified and divided into stable, unstable and moderately stable surfaces due to the type of geological sediments and stone varnish properties. Varnished stones were collected and their physico-chemical properties, petrography and scanning electron microscope characteristics, and clay mineralogy on geomorphic surfaces were studied. Silicon, Al, Fe, and Ca were the dominant elements found in stone varnishes of the area and varnish thickness varied from 100 to 600µm on different stones studied. The results of cation ratio (Ca + K)/Ti showed that the samples from stable surface were older than those on moderately stable and unstable surfaces. Clay coating and infilling were also observed on stones of stable surfaces. Chlorite, illite, palygorskite, smectite, kaolinite and sepiolite clay minerals were found in varnishes studied. Besides, scanning electron microscope images clearly showed layer morphology of rock varnish. The results of the research proved the potential of stone varnish application in relative dating investigations of different geomorphic surfaces in Giroft area.

Keywords: Rock coating, Relative dating, Stone varnish, Cation ratio.

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