

Control of Climate on Amphibolite Weathering in the Mysore Plateau of Southern India: A Geochemical Appraisal

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Amphibolite rocks occurring within the Archean Peninsular gneisses in the Kaveri catchment area of southern India have been studied to understand their weathering geochemistry under different climatic conditions. Samples of rocks, saprock and saprolites were collected from semi-arid (annual rainfall: 70-80 cms) and humid (annual rainfall: 300-400 cms) regions in the study area. It has been observed that although all samples exhibit different degrees of physical weathering, not much chemical weathering has taken place in the semi-arid climatic setup. Smectite and chlorite are the major secondary minerals in the weathered products of amphibolites in the semi-arid climatic setup; under the humid conditions, secondary minerals are kaolinite, goethite and gibbsite. The Chemical Index of Alteration (CIA) (Nesbitt and Young, 1984) increases progressively from fresh rock to the most weathered samples (CIA from ~ 32 to a maximum of 87) under semi-arid conditions. In the humid climatic setup, however, the CIA reaches the value of 100 indicating a total loss of mobile major elements. Behaviour of many trace elements does not show too much dependency to the prevailing climate during weathering. Only the REE and yttrium show dependency on the climate. Under the humid condition, REE are mobilized and fractionated resulting in the removal of HREE and enrichment of Ce; residual saprolites have REE patterns that are similar to those of suspended sediments from many large rivers of the world (Sholkovitz, 1988) and those are complimentary to that of sea-water. The usefulness of REE geochemistry in understanding sedimentary processes needs to be studied in detail. References Nesbitt H. W. and Young G. M. (1984), *Geochim. Cosmochim. Acta* 54, 1523-1534. Sholkovitz E. R., (1988), *Am. J. Sci.* 288, 236-281