Mobilization and redistribution of elements in a spheroidally weathering profile of Amphibolite, Southern India

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Chemical weathering is the basic geochemical process responsible for redistribution of elements on the surface of earth. Fractionation of elements present in the weathered samples gives stimulating information about the distribution of elements in various phases formed during weathering. The selected spheroidally weathered sampling profile gives a strikingly distinct distribution of elements with the progressive weathering. Availability of elements and their partitioning into various geochemical phases, as a result of weathering, play an important role not only in determining the chemistry of water but also decide the fertility of the farmland. A well researched squential extraction procedure is adopted to study the speciation of elements during weathering. Ca, Na, K were largely associated with exchangeable sites, Mg, Mn, Ba, Co and Ca in the fresh rock samples were associated with carbonate fraction. The fraction representing Mn -oxide phase hosted Mn, Co and Ba specifically and in significant quantities. All the elements were present in organic fraction at some stage of weathering. This fraction represents the microbial population present in the weathering profiles and elements are either in the form of organometallic compounds, as ions bound to organic chelates or as dissolved organic complexes. This fraction is also responsible for mobilization of relatively less mobile elements like Fe and Al by the formation of soluble organic compounds. Trace elements such as V, Cr, Ba, Ni, Co, Cu and Zn were enriched in Fe/Mn oxides as the weathering progresses in the profile. The organic matter was realised to be important in the distribution of elements and determining the geochemistry of soil, sediments and water on the surface of the earth. The elements, especially nutrient elements, get carried in the rivers in organic colloidal forms which are the major source of plant nutrient elements for the floodplain agricultural fields.