

WATER-ROCK INTERACTION STAGES AND EVOLUTION OF METASOMATIC ZONING IN THE WEATHERING CRUST

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With help of methods of physico-chemical modelling the sequence of formation of mineral zones in weathering crust can be interpreted in new way. Two main stages of rock alteration in zones of hypergenesis are distinguished: relic bearing and transformation. On the first stage mineral composition of zones of weathering crust is defined by the interaction of water and parent rock, while on second stage phase the composition of the weathering products depends on new-formed paragenesis of minerals. If at the first stage the rain waters react directly with the parent rocks then after the mineral zoning is formed and relics of parent rocks simultaneously disappear this process will follow another way. Rain waters will percolate through early formed weathering products and react with it, so the composition of mineral zones will be changed. At the first stages in open system theoretical overall weathering profile when granodiorite reacts with rain waters must consist of following mineral zones (up down): goethitic, goethite-gibbsitic, goethite-kaolinitic, montmorillonite-kaolinitic, montmorillonitic and montmorillonitic with silica. During gradual transformation of primary rock relics the weathering profile is growing in the result of moving of borders between mineral zones downwards and every overlaying zone will replace underlaying one. Because of decrease of primary material into the weathering zones the infiltration water composition at the replacement front will be constantly changing and it will violate the balance of partial equilibrium states between mineral associations of neighbouring zones. After overall disappearing of rock relics this process will not finish as new portion of rain water will not react upper goethitic and goethite-gibbsitic zones. The model of mineral transformation under conditions of permanent drainage explain the common tendency of developing of the mineral zoning in the weathering crusts.