Mineral neoformation in pore spaces during alteration and weathering of andesitic rocks in humid tropical Indonesia Dedicated to the late Dr. J. Delvigne

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Abstract

The morphology, chemistry, and mineralogy of minerals newly formed in voids—products of weathering of andesitic rocks—were studied using optical and submicroscopic techniques on thin sections, combined with scanning electron microscopy (SEM), energy dispersion X-ray analysis (EDXRA), and X-ray diffraction analysis on subsamples. Samples were taken from the core, the outer core, and the soft outer layers of weathered andesitic boulders in the Cigudeg area, West Java, about 75 km south of Jakarta, Indonesia, with udic moisture and isohyperthermic temperature regime. The neoformed minerals observed in planar voids and cavities comprise 1:1 phyllosilicates, goethite, and gibbsite, and juxtaposed coatings of halloysite, mixed layer phyllosilicates, goethite, and gibbsite. The mineral sequences observed confirm former studies on the groundmass of the boulder: in the first weathering layer, an absolute accumulation of gibbsite takes place; further away from the core, the gibbsite is redissolved, and replaced by illuvial phyllosilicate clay. The possibility of inheritance of the 2:1 layer silicates from a hydrothermal alteration is discussed. The sharp boundaries in the juxtaposed coatings point to a stepwise, sequential—rather than a gradual—evolution of the microenvironment.

Author Keywords: Weathering; Indonesia; Andesite; Gibbsite; Micromorphology; SEM

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