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Characterization of the weathering degree of granitic rocks by the cation packing index

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In literature, there are various mineralogic and petrographic weathering indices for determination of weathering states of rocks since the weathering state and weatherability of rocks are highly important for engineering geology projects and the use of rocks as building stones. For the determination of the weathering state of a rock, considerable amount of chemical analyses is required. Weatherability of rocks depends on not only their mineral composition but also the number of cation replaceable with hydrogen in a mineral. For this reason, the purpose of the present study is to investigate the use of the cation packing index (k-value) for characterizing the degree of weathering of granitic rocks. For the purpose of the study, the Kurtun granitic rocks are used as the material of the study. the weathering characteristics of the Kurtun granitic rocks are described by various methods such as field observations, chemical analyses, petrographic analyses, pyhsical and mechanical tests. During the field studies, total three profiles showing all weathering classes gradually are selected. At the final stage of the study, a series of regression analyses between the cation packing index and other properties of the samples are performed. The results show that the k-value can be used as a weathering indicator. Although some chemical weathering indices were proposed, there is not a chemical weathering index describing the weathering process. For this reason, in the study, the k-value is considered as a weathering indicator. When compared with the other chemical weathering indices, the k-value can be used as a weathering index without chemical analyses, because it can be determined by mineralogical analyses. As a result of the regression analyses, the k-value exhibits good correlations with both

mechanical properties and the other weathering indices. Determination of the k-value is easier than that of other weathering indices.