Geophysical Research Abstracts, Vol. 9, 07936, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07936

A new method of measuring petrologic textures and its application to granitic rocks

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Petrologic texture is very important in terms of rock weathering and the landslide-susceptibility of weathered rocks, whereas it has been studied only qualitatively and not quantitatively. We developed a new method to quantitatively analyze petrologic textures, which might influence the weathering styles and control the mechanism of landslide. We applied it to granite and granodiorite taken from Obara village, central Japan, where 1972 rainstorm induced many landslides. We made a smooth rock surface, obtained digital images of rock textures, and then processed the images by using PC programs we developed. We took the following procedure for the granitic rock samples: (1) cutting rock samples, (2) polishing the cut surfaces with carborundum powder #600, (3) etching the surfaces with hydrogen fluoride, (4) staining potassium feldspar with sodium cobaltinitrite, (5) obtaining digital images of the stained surfaces by a scanner, (6) distinguishing minerals by using different colors, and (7) analyzing the texture by using PC programs. Staining potassium feldspar makes it very easy to differentiate it from plagioclase. Once the image is digitized, it is very easy to measure the mineral modes and also to measure grain size by using a common program for image analysis. For the analysis of the connectivity of mineral grains, we developed a new program; we first divide an image to smaller view windows and count the number of windows with the full grain connection from the top to the bottom, and named the rate of full connection view numbers to the whole view numbers as *"Rct (rate of connection)"*. Minerals with high connectivity have large *Rct* in a large view. The *Rct* spectra as a function of view size are defined as connectivity curves, which are useful to compare the connectivity features for different rocks. In this case, connectivity curves of plagioclase in granodiorite were always above those in granite, suggesting the reason why very few landslides occurred in weathered granodiorite while so many

landslides occurred in weathered granite.