3D Visualization of Rock Textures

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Abstract

Computer tomography technique by serial-grinding has been developed for understanding 3D rock textures. Rock samples that were cut into several cm cubes were sequentially ground and were taken in color pictures at every 0.5mm thickness by hand-operation. Based on a set of 2D section images derived from serial section pictures, 3D rock textures were synthesized by a visualization software "AVS" in two ways; cross-section method and volume-rendering method. This technique has been applied to two kinds of rock sample; metamorphosed composite intrusive rock showing complicated fluidal texture of mafic and felsic parts from the Hida metamorphic belt, Japan, and garnet porphyroblast-rich eclogite from Franciscan terrane, California. For the former sample, the resultant 3D textures show commingling relation between mafic and felsic parts and strongly suggest the mingling of two magmas before metamorphism. For the latter sample, the 3D images clearly show the size, amount and distribution of garnet porphyroblasts, and such data may contribute to discuss the nucleation of garnet porphyroblast in eclogite. The serial-grinding CT with the 3D visualization software is available for understanding real rock textures ranging from several mm to cm scale by use of sample block of several cm size cube.