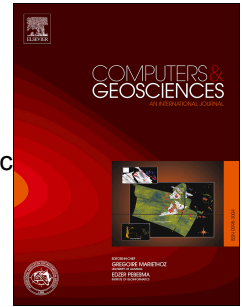


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A Method for Automatic Grain Segmentation of Multi-angle Cross-polarized Microscopic Images of Sandstone

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Abstract

Automatic grain segmentation of sandstone **is to partition mineral grains into separate regions in** the thin section, which is the first step for computer aided mineral identification and sandstone classification. The sandstone microscopic images contain a large number of mixed mineral grains where differences among adjacent grains, i.e., quartz, feldspar and lithic grains, are usually ambiguous, which make grain segmentation difficult. In this paper, we take advantage of multi-angle cross-polarized microscopic images and propose a method for grain segmentation with high accuracy. The method consists of two stages, in the first stage, we enhance the SLIC (Simple Linear Iterative Clustering) algorithm, named MSLIC, to make use of multi-angle images and segment the images as boundary **adherent** superpixels. In the second stage, we propose the region merging technique which combines the coarse merging and fine merging algorithms. The coarse merging merges the adjacent superpixels with less evident boundaries, and the fine merging merges the ambiguous superpixels using the spatial enhanced fuzzy clustering. Experiments are designed on 9 sets of multi-angle cross-polarized images taken from the three major types of sandstones.

*Fully documented templates are available in the elsarticle package on CTAN.

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