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Optimized Multiresolution Segmentation for Mapping Glaciers

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Abstract: In the object-oriented classification approach, image segmentation is a prerequisite that directly affects the accuracy of classification. For glacier mapping, multi-resolution segmentation is a widely used segmentation technique that depends on three user-defined parameters i.e., scale, shape, and compactness. Previous studies involve rigorous exercise in selecting the optimal combination of these parameters. Therefore, this study introduces an optimum parameterization approach for multi-resolution segmentation that utilizes the contrast in spectral reflectance of ice/snow in Green and SWIR bands and compactness feature for defining color and compactness criterion, respectively. The scale parameter is estimated by local variance. This optimized segmentation approach is tested on Landsat images to map the glacier ice/snow area. This approach has sped up the segmentation process as it generated optimum segments in a single iteration, unlike the trial and error technique.

Keywords: Segmentation, Object-based classification, Parameter optimization