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AUTOMATIC MAPPING OF GLACIER BASED ON SAR IMAGERY BY BENEFITS OF FREELY OPTICAL AND THERMAL DATA

L. Fang, L. Hoegner, and U. Stilla

Photogrammetry & Remote Sensing, Technische Universitaet Muenchen (TUM), Munich, Germany

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Abstract. For many research applications like water resources evaluation, determination of glacier specific changes, and for calculation of the past and future contribution of glaciers to sea-level change, parameters about the size and spatial distribution of glaciers is crucial. In this paper, an automatic method for determination of glacier surface area using single track high resolution TerraSAR-X imagery by benefits of low resolution optical and thermal data is presented. Based on the normalized difference snow index (NDSI) and land surface temperature (LST) map generated from optical and thermal data combined with a surface slope data, a low resolution binary mask was derived used for the supervised classification of glacier using SAR imagery. Then, a set of suitable features is derived from the SAR intensity image, such as the texture information generated based on the gray level co-occurrence matrix (GLCM), and the intensity values. With these features, the glacier surface is discriminated from the background by Random Forests (RF) method.

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