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Algorithm to Analyze Water Quality Conditions of Lake Hachiroko Using Textures of JERS-1 SAR Data

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Remote sensing has been used to understand water distribution and pollution situation in recent years. This paper proposed an algorithm for analyzing water quality conditions using the data acquired by active sensor Synthetic Aperture Radar (SAR) of Japanese Earth Resources Satellite-1 (JERS-1). The proposed method has four steps. First, the gradations of the SAR data were conformed. Second, textures were calculated from the co-occurrence matrix of the SAR data. Third, the fuzzy regression analysis of the texture features and measurements for local water quality was done. The relation between water quality data and textures was calculated by using MIN problem and MAX problem. Finally, the estimation maps of water quality were obtained by using fuzzy level-slice processing. By comparing the estimation maps of water quality and realities in the study area, it was clear that the proposed method was possible to understand the water quality conditions effectively from the SAR data with single brightness information.

Key Words : remote sensing, JERS-1, SAR data, fuzzy regression analysis, water quality