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## Journal of The Remote Sensing Society of Japan

Vol. 29 (2009) , No. 3 p.471-484

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### New Topographic Correction Method of Satellite Image Low Solar Elevation

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(Received February 15, 2008)

(Accepted February 27, 2009)

#### Abstract

A new topographic correction method was developed, which can be used for satellite image in the season of low solar elevation. At first, Minnaert method was tested with the ASTER image of the mountainous area for the time of low solar elevation to clarify problems of these methods. As a result, Minnaert method was found to be insufficient in the part where the cosine of the solar incidence angle ( $\cos i$ ) was small because of structural problem of the correction formula. In CRI method,  $\cos i$  was insufficient in the part where  $\cos i$  was positive. Also, overcorrection was observed in the part where  $\cos i$  was negative. In this study, a new topographic correction method was developed, which can be used for satellite image in the season of low solar elevation. The new method is based on the Minnaert method and CRI method. The new method is based on the Minnaert method and CRI method. The new method is based on the Minnaert method and CRI method.

part where  $\cos i$  was negative because distribution characteristics of  $\cos i$  were different between positive part and negative part of  $\cos i$ . In an image used in this study, original DN value had elevation dependent leaves and fallen leaves.

In order to solve these problems, DPR (Dual Partitioning Regression) was developed. In this method, sample data were extracted from each leaf. The DPR method uses inclination of the linear regression line of  $\cos i$  versus  $D_o$  as the correction parameter. In this regard, regression was calculated for positive and negative part of  $\cos i$  separately. The correction formulas were derived so that corrected brightness  $D_c$  became equal to original brightness  $D_o$ . Topographic correction by DPR method was performed with the DPR method and C method were applied to. As a result, the coefficient of correlation in regressions between  $\cos i$  and  $D_c$  showed a very low value, less than 0.1.

Keywords: [Topographic correction](#), [EOS-Terra/ASTER](#), [DPR method](#), [C method](#)

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Kenji SAKAMOTO, Daichi NAKAYAMA and Hiroshi MATSU  
Correction Method of Satellite Image in the Season of Low Solar E  
Remote Sensing Society of Japan, **29**, **3**, pp.471-484, 2009 .