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Development on Quality Assessment Technique in COMS Broadband Albedo

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In the National Weather Satellite Center (NMSC), albedo is generated by using COMS data In this study, we established quality assurance system to ensure. To do this, we tracked the algorithm of the broadband albedo calculation by step. And the uncertainty in each step of calculation was presented. Moreover, broadband albedo produced by other satellites and ground observation data were used for verification.

COMS L1B' data, which is calibrated L1B through GSICS, was used, and pixel identification, atmospheric correction, BRDF modelling, and narrow-to-broadband conversion were performed to produce broadband albedo.

Each step to generate broadband albedo occur errors which are errors of input data and correction models. These errors affect an accuracy of broadband albedo. Thus, we were drawn up a traceability chain of two types. Main-traceability chain covers entire process of broadband albedo's computation, and sub-traceability chain is included in each process.

In the pixel identification, it is the separation process on land/maritime, day/night, and cloud/snow area in each pixel. We suggested false alarm ratio as uncertainty. In the atmospheric correction by using 6S, albedo is calculated by using geolocation, AOD, TCO, and TPW. We suggested errors by model, LUT specification, and input data. We compared 6S RTM with the other models. As the results, difference between RTMs was from 0.0009 to 0.01, as albedo. Error due to LUT specification was below 0.01, for all View Zenith Angle (VZA) and Solar Zenith Angle (SZA). And, uncertainty according to the input file's error in 6S RTM was calculated by albedo depending on TPW, TCO, and AOD with increasing SZA and VZA. In the BRDF modelling, semi empirical model was used. Because the model statistically yields BRDF, an accuracy is affected by the number of observations. In this study, RMSE was calculated according to the number of observations about one year. RMSE of 0.1 or less was observed when the number of observations exceeded 30 times, but it was 0.4 or more when the number of observations was 4 to 10 times. In the narrow-to-broadband conversion, broadband albedo was generated by linear regression equation, which was produced between COMS spectral albedo and MODIS broadband albedo. Coefficients in linear regression equation were constructed on general and snow areas. Correlation coefficients of the general area were 0.705 and 0.671 in black and white sky, respectively, and 0.767 and 0.762 in snow area.

In order to provide objective COMS broadband albedo quality, we compared and verified using other satellite data and ground observation data. GLASS, MODIS, PROBA, GlobAlbedo were used as other satellite data, and data from flux tower in the Jeju island was used as ground observation data. Broadband albedo errors of PROBA, MODIS, GlobAlbedo, GLASS and COMS were -0.017, -0.004, 0.002, and 0.004 respectively in Black sky and -0.021, -0.004, -0.003 and 0.003 in white sky. Monthly comparisons showed an RMSE of less than 0.05 from May to September, but more than 0.07 from November when snowfall began. Compared with flux tower, RMSE was 0.02.