Improved cloud detection method over land surface using multi-temporal NDVI with blue reflectance

Hwa-Seon Lee[*] and Kyu-Sung Lee

Dept. of Geoinfomatic Eng., Inha university,
4-312,253, YoungHyundong, Namgu, Incheon, Republic of Korea, leehwaseon@inha.edu

Abstract: Cloud detection method using multi-temporal NDVI is completely based on daily NDVI value without any fixed threshold value and also considers to seasonal variation of cover types. In this method, a pixel was determined as cloud if the NDVI value is lower than the average of 10-days NDVI (before and after five days from the present day). We applied this method on GOCI images, and compared the cloud detection results with MODIS cloud mask product. Multi-temporal NDVI method is effective to detect cloud pixels over vegetative area. However, it shows certain limitation over non-vegetation areas such as soil and desert because NDVI value between soil/desert and cloud are similar. In particular, thin clouds such as cirrus are not well detected over non-vegetation areas. Therefore, cloud coverage obtained from GOCI is underestimated compared to cloud coverage in MODIS cloud mask product. To improve this problem, we added blue reflectance threshold processing step to detect thick clouds more accurately before the multi-temporal NDVI method. In further, we conducted BRDF correction to improve the unstable NDVI value. It derived to more accurate cloud detection results over non-vegetative area. As a result, agreement of cloud coverage between GOCI and MODIS cloud mask product was much higher than when using multi-temporal NDVI method.

KEY WORDS: cloud detection, GOCI, NDVI, land