

Generation of Cloud-free Imagery Using Landsat-8

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Abstract: Cloud cover and cloud shadow areas on satellite imagery are the significant problems in the optical remote sensing processing, and this issue restricts the practical use of the remote sensing data. Thus, cloud screening and filling are critical to the geospatial users. More recently, successfully launched Landsat-8 provides the coastal/aerosol and cirrus bands, which have cloud information allowing cloud and cloud shadow removal, to tackle this problem. In this case, the cloud can be accurately detected with Landsat-8 data, and filling the masked cloud areas could be performed with image processing methods. This paper presents a novel method of cloud and cloud-shadow detection and filling methods using the Landsat-8 sensor. Firstly, cloud and cloud-shadow areas were detected using Otsu's N thresholding method with ultra-blue, short wavelength infrared, cirrus, and thermal infrared bands. The detected cloud and cloud-shadow areas were then replaced with the pixel value from the same location of clear image taken from different time, which was applied the histogram matching and linear normalization. Experimental results using the Landsat-8 dataset indicated that the proposed method generated a superior quality of cloud free imagery.

Key word: Cloud detection, Cloud removal, Landsat-8, Otsu's N thresholding