



Remote Sensing Monitoring of Volcanic Ash Clouds Based on PCA Method

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A b s t r a c t

Volcanic ash clouds threaten the aviation safety and cause global environmental effects. It is possible to effectively monitor the volcanic ash cloud with the aid of thermal infrared remote sensing technology. Principal component analysis (PCA) is able to remove the inter-band correlation and eliminate the data redundancy of remote sensing data. Taking the Eyjafjallajökull volcanic ash clouds formed on 15 and 19 April 2010 as an example, in this paper, the PCA method is used to monitor the volcanic ash cloud based on MODIS bands selection; the USGS standard spectral database and the volcanic absorbing aerosol index (AAI) are applied as contrasts to the monitoring result. The results indicate that: the PCA method is much simpler; its spectral matching rates reach 74.65 and 76.35%, respectively; and the PCA method has higher consistency with volcanic AAI distribution.

Key words: remote sensing, principal component analysis (PCA), volcanic ash cloud, monitoring, aviation safety.