

Radiative Calibration of Airborne DMC III Camera Multi-Spectral Image

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To facilitate the applying Artificial Intelligence (AI) to the crop type classification based on aerial images (DMC III Camera Multi-Spectral Image), the radiative calibrations are especially essential which is the main aim of this study. With the reference of very high spatial resolution surface reflectance (~50 cm) from Pleiades satellite image, the radiative calibration of the orthographic DMC III images can be well processed. The main procedures are random sample consensus (RANSAC) technique for the sample data selection and the 6S model (Second Simulation of a Satellite Signal in the Solar Spectrum) for the relationship between DMC digital count and satellite surface reflectivity, including blue, green, red and near infrared bands. The results of radiative calibration on 183 aerial image sets showed that the root mean square percentage error (RMSPE) are 14.9 ± 2.9 in Blue band, 11.6 ± 3.4 in Green band, 12.8 ± 5.5 in Red band, 13.9 ± 5.2 in NIR band, indicating that the proposed approach is highly practical for the radiative calibration and further applications of aerial images.

Keywords: Radiative calibration, DMC III aerial image, Surface reflectance, Crop classification