Verification of the calibration technique of airborne hyperspectral raw data to reflectance based on sky light reference data

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Airborne hyperspectral sensor is increasingly being used for the precision agriculture and for the monitoring our environment. In general, data obtained by airborne hyperspectral sensor are affected by atmospheric conditions and solar illumination geometry. Therefore, airborne hyperspectral sensor data are commonly expressed as relative radiance value. For measuring and monitoring ground surface changes through time, it is important to calibrate hyperspectral sensor data to amount of reflectance. A number of calibration techniques have been developed ranging from empirical approaches to analytical radiative transfer approaches. These methods require a priori knowledge such as field reflectance observations or atmospheric conditions. Several airborne hyperspectral sensor systems which are used for commercial purpose include a fiber optic probe on the aircraft roof. A fiber optic probe is able to monitor sky light reference data to ratio to hyperspectral raw data. This is a simple and practical calibration technique. However, there is a problem that small inaccuracies in sky right reference data calibrations may lead to unacceptable errors in calculated apparent reflectance. In this paper, simple calibration technique based on sky light reference data was discussed. The resultant reflectance estimates are compared with field reflectance observations of flat and homogeneous ground target and illustrate that proposed calibration technique is possible to derive reasonable reflectance from airborne hyperspectral raw data.