Estimation of fractional vegetation cover of alpine grassland ecosystems of Shule River Basin on the Qinghai-Xizang Plateau

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Fractional vegetation cover (FVC) is an important indicator of ecosystem status, and is often estimated at quadrat scale; FVC is also an important factor affecting interactions between land surface and atmosphere and hydrological processes, and is usually estimated at basin to regional scale using remote sensing data. However, the traditional methods of estimating FVC at quadrat scale are either arbitrary and/or time-consuming; and the empirical relationships between FVC and vegetation indexes used for large scale application were usually developed at quadrat scale. In this study, we proposed to use a multi-spectral camera to study FVC of alpine grassland ecosystem at quadrat scale; and developed relationships between FVC and vegetation indexes (VIs) at both quadrat and plot scale. After validation of remote sensing data at plot scale, we studied the spatial pattern of FVC in relation to permafrost zones in Shule River Basin on the Qinghai-Xizang Plateau. Results showed that: (1) calculating of FVC based on multi-spectral pictures was accurate and efficient; (2) there were no obvious differences of relationships between relationships at quadrat scale and at plot scale; (3) for the alpine grasslands in the studied area, the phenomena of NDVI saturation did not exist; and (4) FVCs of stable permafrost zone were significantly higher than those of extremely stable permafrost zone and seasonal frost zone.