

Potential utility of the spectral red-edge region of SumbandilaSat imagery for assessing indigenous forest structure and health

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ABSTRACT

Indigenous forest degradation is regarded as one of the most important environmental issues facing Sub-Saharan Africa and South Africa in particular. We tested the utility of the unique band settings of the recently launched South African satellite, SumbandilaSat in characterising forest fragmentation in a fragile rural landscape in Dukuduku, northern KwaZulu-Natal. The AISA Eagle hyperspectral image was resampled to the band settings of SumbandilaSat and SPOT 5 (green, red and near infrared bands only) for comparison purposes. Variogram analysis and the red edge shift were used to quantify forest heterogeneity and stress levels, respectively. Results showed that the range values from variograms can quantify differences in spatial heterogeneity across landscapes. The study has also shown that the unique band settings of SumbandilaSat provide additional information for quantifying stress in vegetation as compared to SPOT image data. This is critical in light of the fact that stress levels in vegetation have previously been quantified using hyperspectral sensors, which are more expensive and do not cover large areas as compared to SumbandilaSat satellite. The study moves remote sensing a step closer to operational monitoring of indigenous forests.