**Very High Resolution Mapping of Spekboom Canopy Cover**

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Very high resolution canopy cover maps of Spekboom are required to assist with restoration work on private land in the Little Karoo. High resolution remote sensing of vegetation over large spatial extents has not received much attention, especially in arid areas. Variations in habitat and level of degradation, in addition to radiometric variations in the imagery, make this a challenging problem. Here we present a per-pixel classification approach for canopy cover mapping of Spekboom. A novel cross calibration technique for radiometric correction of aerial imagery was developed and applied to imagery from National Geospatial Information. The essence of this method is the use of a well-calibrated reference image to which the aerial images are adjusted using a spatially varying linear model. A concurrent and collocated MODIS NBAR image was used as a surface reflectance reference. The mean absolute reflectance error of calibration was found to be 3.92% using an atmospherically corrected SPOT reference. This compares favourably to other methods for calibration of aerial image mosaics. Ground truth was produced by selecting and hand labelling polygons in the imagery. A decision tree classifier was trained on a reduced set of spectral, textural and vegetation index type features. The classifier was validated against ground truth acquired at 20 field sites. There was a mean absolute canopy cover error of 5.85% with a standard deviation of 4.65%. Visual inspection of the canopy cover map showed good overall accuracy with some sensitivity to habitat and degradation variation.