

Green Red Water Indices – vegetation indices for environmental Geomonitoring

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One of the challenges of today's world is the long-term geo-monitoring of phenomena and processes that affect our environment after mining activities have ceased (1-3). Water resources are one of the elements affected by post-mining processes (1, 2). Moreover, land subsidence can be observed both during and after mining activities. This phenomenon affects the entire water management of the region.

This research presents a methodology for using drones to detect water surfaces using a vegetation index. During their research, the authors modified the GRNDVI index (4) to include the Red Edge band in the calculations (Formula 1).

$$GRWI = \frac{NIR - (Green - RedEdge)}{NIR + (Green + RedEdge + Red)} \quad (Formula\ 1)$$

The Red Edge band also influences the presentation of a given pixel in the image (Fig.1). It can be seen that the spectral profiles of the water, soil and street classes have similar spectral profiles.

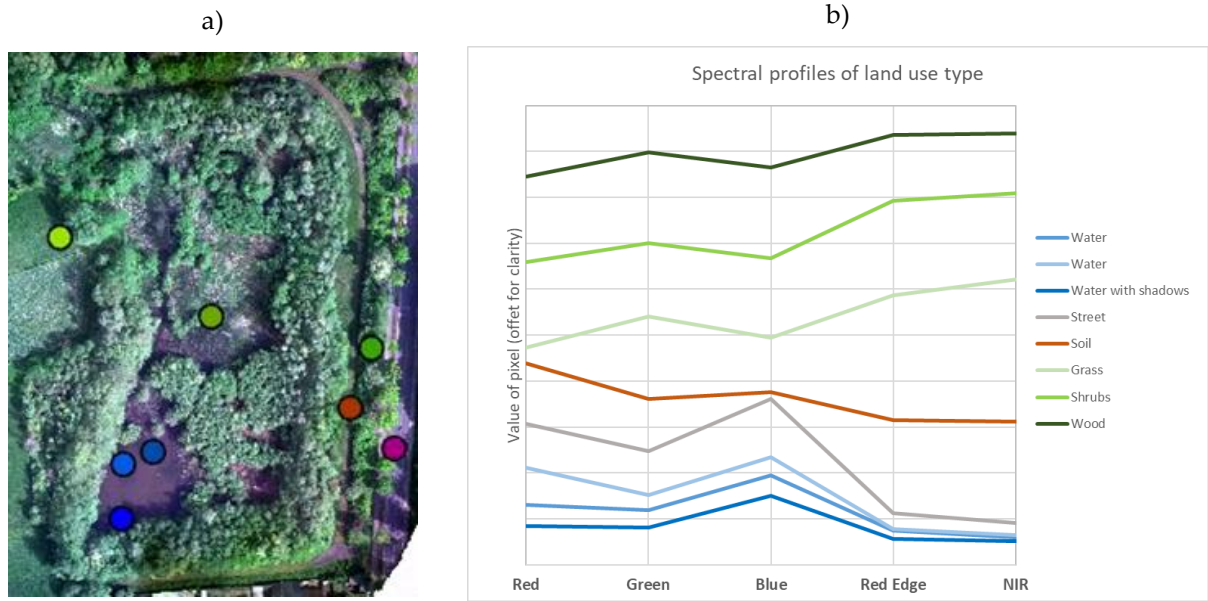


Figure 1. Spectral profiles of various types of land use (a) location; (b) spectral profiles.

The newly developed Green Red Water Index, GRWI, allows the identification of water surfaces (Fig.2). The authors suggest that the water values for GRWI should be determined between -1 to 0.2.

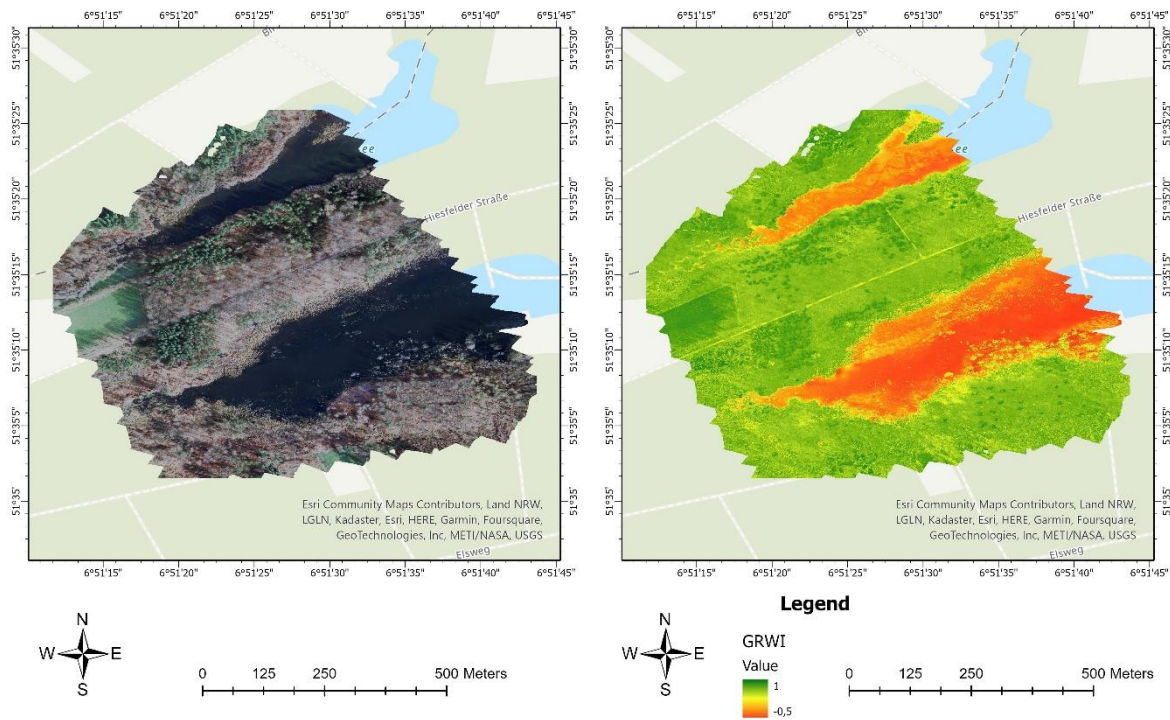


Figure 2. GRWI from 28.03.2023 in the test area Weihnachtsee. Source of Basemap: ESRI.

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