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Exploitation of multi-temporal Earth Observation imagery for monitoring land cover change in mining sites

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Surface mining has been shown to cause intensive environmental degradation in terms of landscape, vegetation and biological communities. Nowadays, the commercial availability of remote sensing imagery at high spatiotemporal scales, has improved dramatically our ability to monitor surface mining activity and evaluate its impact on the environment and society.

In this study we investigate the potential use of Landsat TM imagery combined with diverse classification techniques, namely artificial neural networks and support vector machines for delineating mining exploration and assessing its effect on vegetation in various surface mining sites in the Greek island of Milos. Assessment of the mining impact in the study area is validated through the analysis of available QuickBird imagery acquired nearly concurrently to the TM overpasses.

Results indicate the capability of the TM sensor combined with the image analysis applied herein as a potential economically viable solution to provide rapidly and at regular time intervals information on mining activity and its impact to the local environment.

KEYWORDS: mining environmental impact, remote sensing, image classification, change detection, land reclamation, support vector machines, neural networks