

Airborne hyperspectral remote sensing for vegetation mapping in New Caledonia

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Monitoring of the environment is of significant interest for New Caledonia as the island's economy is primarily supported by the nickel mining industry. Mining may be occurring on a biodiversity hotspot containing endemic species that have to be preserved. Therefore, mapping of the plant communities is necessary at all stages of mining for a range of requirements including to satisfy governmental environment regulations, to provide a baseline of vegetation status and inventory and establish the priorities in vegetation preservation and routine monitoring of impact. Recently, HyMap airborne hyperspectral images were acquired for the first time in the history of the island. These images were used for geological as well as environmental studies, specifically for vegetation mapping. The data processing included atmospheric correction using a MODTRAN-based radiative transfer modelling and Minimum Noise Transform (MNF). A supervised classification algorithm was applied to the first components of the MNF data, using classes defined from photo interpretation maps of plant communities. The algorithm was tested for three different vegetation cover types for an area transversing from the mountain to the sea. For the first vegetation cover type, 8 broad classes of vegetation (e.g. forest, shrub, savannah, mangrove. . .) were mapped with an accuracy of 80%. The second and the third cover types mapped respectively different kinds of shrubs, and different kinds of mangroves, with accuracies around 70%. These promising results indicate that hyperspectral remote sensing may be useful for the mapping and monitoring of the vegetation in New Caledonia.