

A Vegetation Classification of the Opunohu Valley (Moorea Island, French Polynesia) based on a Relative Canopy-Height Class Set Using AirSAR and MASTER Data

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This paper addresses the vegetation mapping and land use of Opunohu Valley (Moorea Island - French Polynesia) using JPL-AirSAR and MASTER (MODIS/ASTER simulator) images acquired during the PACRIM2 mission (Aug. 2000). These sensors are different but can be considered as complementary since MASTER is a 20 meters ground resolution multispectral imaging scanner with 50 channels distributed in the visible-shortwave infrared, mid infrared and thermal infrared, and AirSAR is a C-band (TOPSAR) and L-band (POLSAR), 5meters ground resolution radar sensor. Our main application field deals with the complex and fragile vegetation cover of south pacific volcanic islands. We presently focus on Opunohu Valley because of its highly representative diversity of vegetation and land cover (found in other polynesian volcanic islands), including different types of forests, coconut fields, grass fields, fern lands, urban zones, agricultural areas, etc ...

We first defined an original set of classes based on the relative canopy-height of the vegetation, we then composed a well-suited RGB SAR-composite image in order to visually discriminate our vegetation classes. An interesting “pineapple fields” class (an important economic resource in Moorea island) proved to particularly discriminate from height-related “grass fields” class because of its structural properties, which lead to a particular signature on SAR images. Using a supervised maximum likelihood algorithm, two classification maps have been defined on both the AirSAR and the MASTER images, using aerial photographs as a ground truth training set. The vegetal species included in each class as well as the classification results are further discussed and the MASTER and AirSAR based classification maps are compared.