

# The Effectiveness of Various Dark Targets for Dark Subtract Atmospheric Correction Method: Case Study on Vegetation Index for Mangrove Carbon Stock Mapping

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**Abstract:** Atmospheric correction is an important procedure for removing path radiance during remote sensing for biophysical mapping and Dark subtract method is one of the most effective methods. This method is simple and the atmospheric offset can be generated insitu, hence applicable anywhere. Other atmospheric correction methods require robust climatological and meteorological inputs, which is not always available. However, the success of Dark Subtract method highly relies on the availability and the quality of the dark target. Theoretically, due to the response to the downwelling irradiances, the most effective dark target would be optically deep water. Unfortunately, optically deep water pixels are not always available due to several conditions such as there is no water body in the scene or the water body in the scene is turbid. Therefore, it is important to find the alternative dark targets in case the ideal dark target is unavailable in the scene. This research aimed at comparing the effectiveness of various dark targets to be used in Dark Subtract atmospheric correction method during mangroves carbon stock mapping. ALOS AVNIR-2 image was used as the test image and pristine mangroves forest in Karimunjawa and Kemujan Island were selected as the study area. The comparison analysis covers the quality of the resulting spectral curve of the three main earth objects, land (dry soil), optically deep water, and healthy vegetation (mangrove), and the performance during mangroves carbon stock mapping using vegetation indices, measured from the correlation coefficient ( $r$ ), coefficient of determination ( $R^2$ ), and standard error of estimate (SE). The results of this research provide understanding about the effectiveness of using different dark targets for atmospheric correction during mangroves carbon stock mapping, and in broader context would be vegetation mapping in general.

**Keywords:** dark subtract, atmospheric correction, ALOS, mangroves carbon stock, vegetation index