Cyprus University of Technology

Faculty of Engineering and Technology
Department of Civil Engineering and Geomatics

Master's Thesis

Assessment of the Darkest Pixel atmospheric correction method for Sentinel-2 and Landsat-8- Remote Sensing Data

Stefanos Efthyvoulou

Limassol, May 2019

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Approval Form

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ABSTRACT

Atmospheric effects contribute significantly to the signal received by a satellite sensor. Over water areas, atmospheric effects account for the major proportion of the at-satellite received signal. The intervening atmosphere between the terrain of interest and the remote sensor can contribute significant noise and atmospheric attenuation. It is essential to review how such errors may be removed from the remotely sensed data by considering the available approaches. When selecting an Atmospheric Correction for a specific application, it is necessary to consider the nature of the problem, the type and the characteristics of the remote sensing system that is being used to collect the remote sensing data, the amount of in-situ historical atmospheric information available, and how accurate the biophysical information to be extracted must be. There are different available atmospheric correction algorithms in the literature applied for several satellite sensors, such as LANDSAT TM/ ETM, and for different applications. Indeed, the effectiveness of each method is evaluated through in-situ campaigns including sun-photometers, LIDAR and field spectroscopy as well as standard calibration targets in the fields. Darkest pixel and pseudo-invariant targets have been found to be suitable for LANDSAT TM/ETM data and worked better than different atmospheric models. Indeed, this study explores the importance of applying all the existing atmospheric corrections to SENTINEL-2 and the latest Landsat 8 image data. Finally, this dissertation presents the results of a field Spectro-radiometric campaign carried out in the Paphos district area in Cyprus, for assessing the effectiveness of atmospheric correction algorithms for LANDSAT 8 and SENTINEL-2.

Keywords: Optical satellites; Remote Sensing Data; Atmospheric correction; Emitted-Reflected Radiation; Sentinel 2; Landsat-8-;