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Atmospheric correction for satellite remotely sensed data intended for hydrological applications using in-situ spectroradiometric and sun-photometer measurements

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Bearing in mind that the atmospheric effects are mainly caused by scattering and absorption of atmospheric gases, aerosol and clouds, the most important point in order to perform an atmospheric correction is to be aware of the optical characteristics of the atmosphere. These optical characteristics can be found from different sources such as the general climatology of the area under investigation or ground measurements. Molecular scattering and absorption are not considered to vary in time and space. Nevertheless, aerosol scattering and absorption do vary and these are the main variables in the atmospheric effect on satellite remote sensing. One way to describe the information which refers to the atmospheric optical characteristics is by using the sun-photometer to measure directly the aerosol optical thickness and the water vapor concentrations. Based on the fact that for the hydrological applications, time-series

image data acquired over time are required, the fundamental objective of applying the atmospheric correction is to retrieve the true spectral signatures of the land-cover prior to their use in any hydrological models. The atmospheric correction is performed by using the normalization method using standard calibration targets. For assessing the performance of such atmospheric correction, during the satellite overpass reflectance measurements of different targets areas such as soil, vegetation, asphalt area, sea-water have been acquired using the GER1500 and SCVHR-1024 field spectroradiometers. Microtops II sun photometer has been used to measure the aerosol, water vapor and ozone thickness during the Landsat TM/ETM and MODIS satellite overpasses. The area under investigation was Paphos District area in Cyprus. An agricultural area irrigated by the Asprokremmos Dam has been selected. It has been found that is important to take account of atmospheric effects for both single date and time-series satellite imagery in hydrological studies in which several spectral targets are appeared.