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Impact of the cameras radiometric resolution on the accuracy of determining spectral reflectance coefficients

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Abstract. Nowadays remote sensing plays a very important role in many different study fields, i.e. environmental studies, hydrology, mineralogy, ecosystem studies, etc. One of the key areas of remote sensing applications is water quality monitoring. Understanding and monitoring of the water quality parameters and detecting different water contaminants is an important issue in water management and protection of whole environment and especially the water ecosystem. There are many remote sensing methods to monitor water quality and detect water pollutants. One of the most widely used method for substance detection with remote sensing techniques is based on usage of spectral reflectance coefficients. They are usually acquired using discrete methods such as spectrometric measurements. These however can be very time consuming, therefore image-based methods are used more and more often. In order to work out the proper methodology of obtaining spectral reflectance coefficients from hyperspectral and multispectral images, it is necessary to verify the impact of cameras radiometric resolution on the accuracy of determination of them. This paper presents laboratory experiments that were conducted using two monochromatic XEVA video sensors (400– 1700 nm spectral data registration) with two different radiometric resolutions (12 and 14 bits). In view of determining spectral characteristics from images, the research team used set of interferometric filters. All data collected with multispectral digital video cameras were compared with spectral reflectance coefficients obtained with spectroradiometer. The objective of this research is to find the impact of cameras radiometric resolution on reflectance values in chosen wavelength. The main topic of this study is the analysis of accuracy of spectral coefficients from sensors with different radiometric resolution. By comparing values collected from images acquired with XEVA sensors and with the curves obtained with spectroradiometer it's possible to determine accuracy of imagebased spectral reflectance coefficients and decide which sensor will be more accurate to determine them for protection of water aquatic environment purpose.

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