Drone image processing for water quality in the cloud

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The use of drones to monitor water quality is relatively new. Although drones and lightweight cameras are readily available, deriving water quality parameters is not so straightforward. It requires knowledge of the water optical properties, the atmospheric contribution and special approaches for georeferencing of the drone images. We present a cloud-based environment, MAPEO-water, to deal with the complexity of water surfaces and retrieve quantitative information on the water turbidity, the chlorophyll content and the presence of marine litter/marine plastics.

MAPEO-water supports already a number of camera types and allows the drone operator to upload the images in the cloud. MAPEO-water also offers a protocol to perform the drone flights and allow efficient processing of the images. Processing of the drone images includes direct georeferencing, radiometric calibration and removal of the atmospheric contribution. Final water quality parameters can be downloaded through the same cloud platform. Water turbidity and chlorophyll retrieval are based on spectral approaches utilizing information in the visible and Near Infrared wavelength ranges. Marine litter detection combines spectral approaches and Artificial Intelligence. Visible, Near Infrared and Short Wave Infrared wavelengths are used to detect marine litter but also discriminate marine litter from turbid water plumes and surface features such as glint and white caps. First tests have also been performed to apply a Convolutional Neural Network (CNN) for the automatic recognition of the marine plastic litter.