

Mapping Plastic Based on Multispectral UAV Images

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SUMMARY

Plastic pollution in water ecosystems has been a razing problem since the mid-1970s and it is becoming one of the biggest global environmental problems. Today, plastic litter is presented everywhere from river banks, coastal areas, seafloor to the most remote points in the ocean. However, there is still a lack of exact data on the amount and spatial distribution of plastic. Currently, most of the available data represents the results of empirical estimates or beach surveys which are time and money consuming and limited to small areas. Remote sensing data, artificial intelligence, and GIS tools have a great potential to overcome current limitations and provide the long-term, resource-effective, monitoring of floating plastics.

However, the knowledge gap in the fundamental understanding of the spectral signatures of floating plastic represents the major challenge in the application of remote sensing data in this area. Therefore, we created the set of three artificial floating plastic targets equipped with different types (Oriented Polystyrene, Nylon, and Polyethylene terephthalate) and sizes of plastics (squares from 1 to 10 cm) to analyze spectral signatures of floating and submerged plastic. The UAV equipped with a multispectral camera, covering the range from 450 nm to 840 nm, was used for capturing ultrahigh-resolution images. Moreover, the relationship between the spatial resolution of the image and detectable plastic size was presented. Our results indicated that multispectral data can be effectively used for the detection and quantification of floating plastics. The findings can be used to enhance the existing methodology for monitoring plastic pollution.

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