

ABSTRACT

Microplastic pollution has become a global concern due to its influence towards the environment. The frequent occurrence of microplastic in the marine ecosystem poses the risk to the marine species, which can lead to threat human health through the process of bioaccumulation. Microplastic pollution has challenges to control its occurrence in the environment, due to the size which is smaller than 5 mm and the temporal atmospheric factor such as wind force. Recently, natural litter band –the component consisted the accumulation of natural material from washed ashore alga and driftwood– has identified as microplastic accumulation hot spot in the beach and the potential microplastic substitute to overcome the detection difficulty. This study aims to quantify the microplastic occurrence with natural litter band as its proxy and to correlate seasonal variability, represented by wind condition, influence to the transport of microplastic in Northern Suo-Oshima Beach, Yamaguchi Prefecture, Japan. Sample was collected from three litter bands along the direction of onshore – offshore during autumn 2023 to summer 2024, four times in each representative season month. This study conducted monitoring of the beach using camera trap data to be processed through deep learning image analysis with HRNet network architecture. The evaluation of the atmospheric condition impact on microplastic occurrence in the beach was analyzed with wind data (speed and direction) as the seasonal variable. This study has successfully quantified FPS microplastic weight (g) with the result revealed the spring season has the largest deposition and revealed the strong correlation of the wind influence to the microplastic occurrence in the summer ($r = 0.39$, $p = 0.00027$). The usage of camera monitoring and image analysis method in this study provides continuous data to estimate the dynamic of microplastic on the beach and the ability to handle large dataset with the application of deep learning.

Keywords: sequential microplastic monitoring, image segmentation, deep learning