

PLASTIC POLLUTION IN SINOP SARIKUM LAGOON COAST IN THE SOUTHERN BLACK SEA

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Abstract

Macro and micro plastic litter amount, density and composition were researched in the Western Black Sea in Sarikum Lagoon Coast in spring 2015. In this study was intended to determine the current situation the region under the Descriptor 10. Proposed methods by Guidance on Monitoring of Marine Litter in European Seas were adopted the region.

Keywords: Black Sea, Plastics, Pollution

Sarikum Lagoon which is one of the significant wetlands of the Black Sea has been announced as Nature Reserved Area in 1987 and then lagoon surroundings have been declared as Natural Protected Area in 1991. Lagoon and its surroundings is exposed to a significant accumulation of solid waste both with sea currents from neighboring countries and the influence of the prevailing winds in Sinop due to the geographical location. Marine litter causes a wide spectrum environmental, economic, safety, health and cultural impacts and mainly composed of plastics. Marine Strategy Framework Directive (2008/56/EC) published by European Union in 2008, includes necessary measures to provide or maintain "Good Environmental Status" (GES) of the Member States up to 2020. In Annex I to Directive is determined GES according to 11 qualitative 'descriptors' for marine regions and sub-regions and Descriptor 10 is related to marine litter.

Proposed methods by Guidance on Monitoring of Marine Litter in European Seas [1]'s published by European Marine Strategy Framework Directive Technical Subgroup on Marine Litter section of beach litter and section of microlitter adopted the region. Beach litter survey carried out in spring 2015, sampling stations were selected 4 sections of 50 m from the strandline to the back of the beach, because of heavily littered (figure 1). For macro plastics, within each sampling area, all debris items which were shown, collected, categorized, weighted and counted and the possible usage of items was recorded. For small fragment plastics (which are 0.5-2.5 cm size group) was selected sub-sampling area in sampling stations. Microplastic samples for 1-5 mm was collected 5 replicate samples from 5 cm of the sediment from strandline with used 50x50 cm quadrats for each sampling station and passed through a 1 mm metal sieve. Microplastic samples for <1 mm was collected 5 replicate samples by strand line and collecting approximately 250 ml of sediment. Collected sediment extracted in the laboratory by density separation and microplastic samples categorized according to size, type and color.

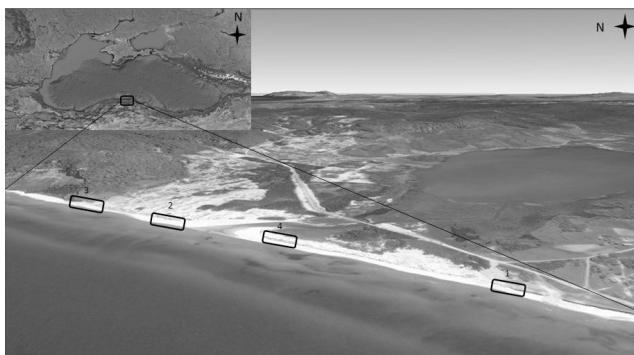


Fig. 1. Sinop Sarikum Lagoon and sampling stations

Macro plastic litter density varied from mean 1.0807-4.5054 pieces m⁻² and most of the macro plastic items encountered on the sampling stations composed of mainly rapid consumption items (39.56%) and unidentifiable plastic pieces (35.43%) originate from breakdown of large plastic products and beverage related items (26.40%) and medical and personal hygiene, construction and domestic and household related items etc. followed them. Small plastic litter

(0.5-2.5 cm) quantity varied from mean 0.5567- 1,5684 pieces m⁻² and mainly composed of unidentifiable plastic pieces and . Microplastic results show that microplastic density for 1-5 mm varied from 0.005-0.024 pieces g⁻¹. Microplastic results demonstrated that the most encountered microplastic items are polystyrene pieces (62.69%) and hard plastic pieces (26.80%) and followed by resin pellets (7.46%) and the others (3.05%). Microplastic density for <1 mm varied from 0.027-0.049 pieces g⁻¹. Our results are showed that most of the macro plastics consist of rapid consumption items and unidentifiable small plastics originate from breakdown of large plastic products by natural events like other studies in the Black Sea [2]. At the same time in the region was encountered with foreign-origin litter and nearly half of them originated from neighboring countries driven by currents and winds, the other part of this foreign-origin litter seem to come from international shipping activities in the Black Sea. Microplastic results are demonstrated that commonly consist of polystyrene pieces which are originated from polystyrene boxes especially used in fishing season (1 September-15 April) for transport the catch by fisherman. They are light and can be transported easily by currents and wind. And hard plastic pieces which are originate from breakdown of large plastic products by natural events as in macro plastic litter.

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