A dislocation pathway for (micro)plastics to the deep sea: preliminary results on their presence in Neptune balls in the SE Sardinian coast

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Abstract

The presence of plastics in seagrass meadows and within seagrass beached remains, including Neptune balls or aegagropilae (AG, natural aggregations of the seagrasses remains) (Huang et al., 2020; Sanchez-Vidal et al., 2021) has been reported. As a result, the potential of seagrasses in providing an ecosystem service by trapping marine plastics in coastal areas has been highlighted. However, there also exists evidence of the transport to the deep sea of seagrass remains.

In the present study, the presence of plastics in AGs collected at great depths (1000-1200 m) on the SE Sardinian coast was characterized to evaluate the potential role of AGs in dislocating plastics. We confirmed the presence of plastics in 75% of the AGs collected, with fibres of diverse lengths (from 0.6 to 87 mm) and bundles of fibres (ranging from 0.8 to 18 mm of mean cross-section) being the most abundant items found (mean values of 47 fibres and 3 bundles per AG). In both cases, polyester was the predominant polymer, followed by polyamide and polypropylene. Overall, a positive relationship between AG size and the abundance of plastics was found, with no depth differences observed when this relationship was accounted for.

Considering that the items found might have been entrapped in AGs during their formation process in shallow waters, our findings suggest that seagrasses may promote the dislocation of plastics to the deep sea. The potential impact of these entrapped plastics as well as their potential contribution to plastic exposure for deep-sea organisms remains unknown though, as little is known about the utilization of AGs and their degradation rates in this environment.

Keywords: aegagropilae, dislocation, deep, sea

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