
Why do plastic debris forms matter for the Anthropocene?

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Abstract

Anthropocene is still not formally included in the Geological Time Scale, and the scientific community is discussing what it represents stratigraphically. However, the Anthropocene is considered by many in the scientific community as currently happening and highlights humans as active global-scale geological agents. In this sense, geoscientists have the opportunity to understand how we influenced the past and are influencing the present, which is key to the future from an archaeological perspective. In this scenario, plastic pollution stands out as plastic debris forms, i.e., materials containing plastic with a rock-like appearance. We have described the first outcrop composed of plastic forms on a remote oceanic island (Tartarugas beach, Trindade Island, SE Atlantic Ocean). We have identified plastiglomerates composed of melted plastic cement, a framework of volcanic lithoclasts, and a matrix ranging from fine to coarse sand (approximately 0.125 mm to 1 mm) of lithic fragments, heavy minerals, plastic, and bioclasts. In addition, we introduced the term plastistones, characterized by the homogeneous composition of melted plastic. We verified that occurrences were compatible with that of pure polyethylene (PE) and polypropylene (PP) via Fourier Transform Infrared Spectroscopy (FTIR). We have found microplastics in the beach sediment. Therefore, the outcrop eroded has become a sediment supply for the beach. In this sense, due to Trindade Island's location in a region with intense carbonate precipitation and beach rock formation, these plastic fragments have the potential to be preserved among the natural material during these rocks formation. This scenario suggests that these human-influenced rock-like materials show a high fossilization susceptibility (e.g., ichnofossils, anthropoquinas). In this sense, plastic debris forms are relevant in the Anthropocene background. The Earth Sciences should increasingly deal with these novel sedimentary scenarios, where plastic and other types of marine pollution are the main components in deposits.

Keywords: Anthropocene deposits, Atlantic Ocean, Trindade Island, Marine pollution

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