

Microplastics... one league under the sea*!

Van Cauwenberghe Lisbeth¹, Ann Vanreusel², Jan Mees^{2,3} and Colin R. Janssen¹

¹ Laboratory of Environmental Toxicology and Aquatic Ecology, Ghent University, Jozef Plateaustraat 22, B-9000 Ghent, Belgium
E-mail: Lisbeth.VanCauwenberghe@UGent.be

² Marine Biology Research Group, Biology Department, Ghent University, Krijgslaan 281/S8, B-9000 Ghent, Belgium

³ Flanders Marine Institute (VLIZ), InnovOcean site, Wandelaarkaai 7, B-8400 Oostende, Belgium

Microplastics are small plastic particles (<1mm) originating from the degradation of larger plastic debris. These microplastics have been accumulating in the marine environment for decades and have been detected throughout the water column and in sublittoral and beach sediments worldwide. However, up to now, it has never been established whether microplastic presence in sediments is limited to accumulation hot spots such as the continental shelf, or whether they are also present in deep-sea sediments. Here we show, for the first time ever, that microplastics have indeed reached the most remote of marine environments: the deep sea.

Sediment originating from several locations in the Atlantic Ocean and Mediterranean Sea were investigated for the presence of microplastics. The sampling stations were located in the Atlantic sector of the Southern Sea, on the Porcupine Abyssal Plain (Northern Atlantic Ocean), in the distal lobe of the Congo Canyon (Gulf of Guinea, South Atlantic Ocean) and in the Nile Deep Sea Fan in the Eastern Mediterranean. These locations range in depth from 1100 to 5000 metres.

Microplastics sized in the micrometer range (75 - 161µm) were detected in the top centimetre of the sediment at three of the four locations. Based on the (limited) surface sampled it can be tentatively concluded that in/on the seafloor of the deep sea, microplastics can reach an average abundance of 0.5 microplastics per 25cm².

Our results demonstrate that microplastic pollution is present in the top sediment layer of the deep-sea floor. However, no conclusive statements can be made on how these microscopic particles were transported to the seafloor. Yet, their presence indicates that microplastics have spread throughout the world's seas and oceans, and into the remote and largely unknown deep sea.

* This title refers to Jules Verne's novel 'Twenty Thousand Leagues Under the Sea' (1870), with one League corresponding to approximately 5.5km.