

ID: W2759784647

TITLE: Microplastic sampling with the AVANI trawl compared to two neuston trawls in the Bay of Bengal and South Pacific

AUTHOR: ['Marcus Eriksen', 'Max Liboiron', 'Tim Kiessling', 'Louis Charron', 'A. Alling', 'Laurent Lebreton', 'Heather Richards', 'Barent Roth', 'Nicolas C. Ory', 'Valeria Hidalgo-Ruz', 'Erika Meerhoff', 'Carolynn Box', 'Anna Cummins', 'Martín Thiel']

ABSTRACT:

Many typical neuston trawls can only be used during relatively calm sea states and slow tow speeds. During two expeditions to the Bay of Bengal and the eastern South Pacific we investigated whether the new, high-speed AVANI trawl (All-purpose Velocity Accelerated Net Instrument) collects similar amounts and types of microplastics as two established scientific trawl designs, the manta trawl and the DiSalvo neuston net. Using a 335 m net, the AVANI trawl can collect microplastics from the sea surface at speeds up to 8 knots as it "skis" across the surface, whereas the manta and DiSalvo neuston trawls must be towed slowly in a less turbulent sea state and often represent shorter tow lengths. Generally, the AVANI trawl collected a greater numerical abundance and weight of plastic particles in most size classes and debris types than the manta trawl and DiSalvo neuston net, likely because these trawls only skim the surface layer while the AVANI trawl, moving vertically in a random fashion, collects a "deeper" sample, capturing the few plastics that float slightly lower in the water column. However, the samples did not differ enough that results were significantly affected, suggesting that studies done with these different trawls are comparable. The advantage of the AVANI trawl over traditional research trawls is that it allows for collection on vessels underway at high speeds and during long transits, allowing for a nearly continuous sampling effort over long distances. As local surface currents make sea surface abundance widely heterogeneous, widely spaced short-tow trawls, such as the manta and DiSalvo trawls, can catch or miss hotspots or meso-scale variability of microplastic accumulations, whereas the AVANI trawl, if utilized for back-to-back tows of intermediate distances (5-10 km), can bridge variable wind conditions and debris concentrations potentially reducing variance and provide a greater resolution of spatial distribution.

SOURCE: Environmental pollution

PDF URL: None

CITED BY COUNT: 104

PUBLICATION YEAR: 2018

TYPE: article

CONCEPTS: ['Microplastics', 'Environmental science', 'Oceanography', 'Bay', 'Plastic pollution', 'Water column', 'Fishery', 'BENGAL', 'Marine debris', 'Debris', 'Geology', 'Biology']