

Ocean Sci. Discuss., referee comment RC1
<https://doi.org/10.5194/os-2020-127-RC1>, 2021
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Comment on os-2020-127

Anonymous Referee #1

Referee comment on "Plastics in the Indian Ocean – sources, fate, distribution and impacts" by Charitha Pattiaratchi et al., Ocean Sci. Discuss.,
<https://doi.org/10.5194/os-2020-127-RC1>, 2021

Abstract

L33: "Some of the highest plastic-polluted rivers end up in the IO with all this..." – this sentence reads a little awkward to me. Suggest changing to something along the lines of "Some of the most plastic-polluted rivers empty into the IO suggesting the IO..."

L48: slight issue with the phrasing, for example discuss vs discussed and identify vs identified. Pick one and be consistent throughout.

Introduction

L33-46: The first paragraph is fascinating; however, it feels inappropriate for this paper (and journal - sorry) given these statements are focused on a historical account of the evolution of plastics in the late 1850s. Even if this were condensed significantly (which I would argue it needs to be, at 14 lines of text it feels too long and detailed – for example, "billiard balls" are mentioned five times), I'm still not convinced it's the best fit. Instead, could you provide historical context for plastic usage in the SE Asia/IO region? I've not seen this information compiled/synthesised in other papers, so that would be a useful contribution.

L49 (and some of the sentences in the paragraph above; also line 57 "35% of all plastic materials"): references are somewhat minimal and/or missing in a few places. For example, this sentence "Since a large percentage of all plastics are single use, "throwaway" packaging items, plastic waste has increased at a similar rate.

Section 2 Sources

L97-100 – no reference(s) provided

L102 – "the total amount of plastic waste produced in 2010 by the USA and China" Here and elsewhere, how do these values such as these compare to more recent (2015) estimates? <http://advances.sciencemag.org/content/advances/3/7/e1700782.full.pdf>

L110-114 – suggest providing more information on how and when this error was identified, and more importantly, how it has been rectified (this could potentially be

included as Supp Info). The level of detail provided here is a little lacking. For example, what exactly is the error originating from the World Bank Data?

L123-124 "The estimates of the amount of plastic waste entering the oceans through rivers by Lebreton et al. (2017) and Schmidt et al. (2017) agree relatively well with each other. In contrast, the estimates by Jambeck et al. (2015) of the amount of plastic waste entering the oceans through coasts are an order of magnitude higher" – it's useful to synthesise these 3 studies like this, but I'm left wondering what the take home message is beyond what you've stated here. Could the authors make some sort of recommendation on how the plastics community should move forward, in light of this? Do we need another of these modelling papers to try and figure out who is "most right" or is the more useful path forward to fill an obvious data gap that would help refine one of the existing models? As the authors are aiming to synthesise information and "recommend future research strategies" it would be useful to answer the "now what" question.

L135 – I find the wording of this sentence to be in an odd order, sorry "Although the International Convention prohibited the dumping of waste from vessels in 1988 for the Prevention of Pollution from Ships (MARPOL)"

L136 – what about ghost nets in Carpentaria, do you have any information on whether some could make their way across to the IO?
<https://www.sciencedirect.com/science/article/pii/S0016718516302603>

L149 – "Commonly used type categories are plastic fibres, fragments, films, and pellets" this is a brief and somewhat uninformative statement as it lacks references and other information. For example, why are these the commonly used categories (why does this matter to the reader)? Consider this paper, or others like it: Serra-Gonçalves, C., Lavers, J.L., Bond, A.L., 2019. Global review of beach debris monitoring and future recommendations. *Environ. Sci. Technol.* 53, 12158-12167.

L151 – "Size categories as defined by..." this is actually a very complex and actively debated issue that is often over-simplified. GESAMP may have been (one of) the original groups to define these categories, but there's been much development and learning in the 12 years since the report was published. For example, see Gigault et al. 2018. Current opinion: What is a nanoplastic? *Environ. Pollut.* 235, 1030-1034.

L207 – definition of Convergent flows isn't provided until line 210, after it's first mention. This is a little confusing for readers not familiar with this concept

Sections 4.1 to 4.3 – these are well-written and referenced sections. The level of detail is high, explanations are clear, and I found this useful and enjoyable to read. However, it stands out against other sections which, in comparison, are brief and sometimes feel incomplete (or a little unnecessary). I'm not suggesting you write more elsewhere as your article is already 18 pages – instead, is it possible to focus the paper more on these sections where the author's clearly have a wealth of knowledge and experience? (and less on the tangential topics, many of which have already been covered in other papers).

Section 5 (fate)

This 1st paragraph is redundant with earlier sections which also talk about buoyant plastics (e.g., line 181-186) and sinks (e.g., line 59, 80-84, and 174).

L391-395 – an example of one of the brief sections that seems "thrown in" at the last minute (sorry). While this is interesting and does indeed occur, you either need to provide more information on the mechanism of how this actually occurs, or disregard this entirely and focus on other fates. Two refs that you may want to consider:

Cartraud et al. 2019. Plastic ingestion in seabirds of the western Indian Ocean. Mar. Pollut. Bull. 140, 308-314.

Fujieda et al. 2008. Ingestion case of plastics by black marlin and lancetfish caught in the east Indian Ocean. Memoirs of Faculty of Fisheries 57, 47-48.

Section 5.1 – well-written, however I'm not entirely convinced this section adds anything new as it essentially summarises the findings of one paper written by the authors (van der Mheen et al. 2019).

L490 - Abandoned, lost, and discarded fishing gear (ALDFG) already defined on line 136

section 6.1 (ghost nests) is 2 paragraphs, but only one sentence (line 489) contain information or direction refers to the Indian Ocean – can you replace some of this with information more specific to the region?

Acknowledgements - Australia nPostgraduate Award

Figure 7 – the brown arrows and red boundaries are a little difficult to distinguish (perhaps even more so when the image is reduced in size during printing). Can you select another colour, being mindful of folks with colour blindness <https://www.ascb.org/science-news/how-to-make-scientific-figures-accessible-to-readers-with-color-blindness/>

Table 1 – some entries seem incomplete, plastic size and type data is available at least for Cocos, yes?