

Ocean Sci. Discuss., referee comment RC3
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Comment on os-2020-127

Anonymous Referee #3

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-RC3>, 2021

The manuscript entitled "Plastics in the Indian Ocean – sources, fate, distribution and impacts" written by Charitha Pattiaratchi et al. is a review of plastic pollution in the Indian Ocean. In general, the manuscript has an excellent proposal to show for the scientific community an actual scenario of plastic pollution in the Indian Ocean, mainly when it has scarce information related to other oceans. The manuscript was organized in the following topics: sources (section 2), observations (section 3), transport (section 4), fate (section 5), impact (section 6), prevention and mitigation (section 6) of plastic debris in the Indian Ocean as well as highlight some of the emerging policies and initiatives, knowledge gaps and recommend future research strategies (section 7) (lines 92-95).

However, the manuscript does not have a section for methodology. Then, it does not possible to know how the authors found the papers for this study.
The authors should be clear in:

- what platform of science (Scopus, Scholar Google, Web of Science, Science Direct, and other) these papers were downloaded;
- what keywords were used to find the articles;
- in what period (time limit) they were downloaded (perhaps from 1980 to 2020 - lines 145-147/Table 01);
- What criteria were used for inclusion or exclusion of papers?

These questions must be answered because a review article should provide a comprehensive foundation on a topic, explain the current state of knowledge, identify gaps in existing studies for potential future research, and/or highlight the main methodologies research techniques. The authors tried to do it during the manuscript, but I do not have not access their methodology so I can not able to understand the database of the article to build this study.

I reinforce again that in a systematic review with a focused question, the research methods must be clearly described. Besides, a review article does not have an input of new data/results. Therefore, the illustration made by the authors should be excluded from

the manuscript (lines 298-315). Also, I think the name of the program is wrong. The correct would not be ichthyop instead of ICHYTOPOP? (line 300).

2.1 Land-based sources

This topic needs to have an increment of articles, reports, or data from NGOs local, regional about the situation of waste management or plastic pollution in the land.

On Scholar Google, I searched these references:

Vidanaarachchi, C. K., Yuen, S. T., & Pilapitiya, S. (2006). Municipal solid waste management in the Southern Province of Sri Lanka: Problems, issues, and challenges. *Waste Management*, 26(8), 920-930.

Talyan, V., Dahiya, R. P., & Sreekrishnan, T. R. (2008). State of municipal solid waste management in Delhi, the capital of India. *Waste Management*, 28(7), 1276-1287.

Patti, T. B., Fobert, E. K., Reeves, S. E., & da Silva, K. B. (2020). Spatial distribution of microplastics around an inhabited coral island in the Maldives, Indian Ocean. *Science of The Total Environment*, 748, 141263.

2.2 Ocean-based sources

Oceanic islands act as a source and/or a sink of plastic waste. Different studies in both the Atlantic and the Pacific Ocean have been discussing it and I think it should be discussed or at least presented on this topic. Oceanic Islands could be a temporary reservoir when plastics items fragmenting on beaches, for example, and physical forcing takes out them to water surrounding. On the other hand, plastic items could stay there for a long time on the supratidal zone fragmenting itself (final reservoir).

I looked for some articles in the Indian Ocean, but I can find nothing. Therefore, I suggest looking for some articles that could bring this discussion.

On Scholar Google, I find these references for example:

Pham, C. K., Pereira, J. M., Frias, J. P., Ríos, N., Carriço, R., Juliano, M., & Rodríguez, Y. (2020). Beaches of the Azores archipelago as transitory repositories for small plastic fragments floating in the North-East Atlantic. *Environmental Pollution*, 263, 114494.

Monteiro, R. C., do Sul, J. A. I., & Costa, M. F. (2018). Plastic pollution in islands of the Atlantic Ocean. *Environmental Pollution*, 238, 103-110.

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Oceanic islands act as a source and/or a sink of plastic waste. Different studies in both the Atlantic and the Pacific Ocean have been discussing it and I think it should be discussed or at least presented on this topic. Oceanic Islands could be a temporary reservoir when plastics items fragmenting on beaches, for example, and physical forcing takes out them to water surrounding. On the other hand, plastic items could stay there for a long time on the supratidal zone fragmenting itself (final reservoir) infinitely.

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On Scholar Google, I searched these references

Pham, C. K., Pereira, J. M., Frias, J. P., Ríos, N., Carriço, R., Juliano, M., & Rodríguez, Y. (2020). Beaches of the Azores archipelago as transitory repositories for small plastic fragments floating in the North-East Atlantic. *Environmental Pollution*, 263, 114494.

Monteiro, R. C., do Sul, J. A. I., & Costa, M. F. (2018). Plastic pollution in islands of the Atlantic Ocean. *Environmental Pollution*, 238, 103-110.

3 Observations

Perhaps this topic is the most approximated to a methodological topic. Thus, this topic should be worked on to improve the mechanism to search articles in this manuscript. Here, it could be defined the kind of reservoirs (biota - seabirds, invertebrates, mammals, reptiles; sediment - sand mud, water; deep sea) among many other variables.

On the Scopus base, I used the following keywords "Indian Ocean" and plastic or microplastic and, I found 227 documents (1972-2021). After It was limited to review papers and, I found only seven articles and no one of them was about the purpose of this manuscript. Therefore, the authors have a great an fantastic study proposal. However, it needs to be improved, mainly in the methodology. After that, this article could be reference in plastic pollution in Indian Ocean.

About the whole physical section (section 4)

The proposition of information among these sections with the other is too much different. The topics need an equilibrium because a review is constructed by a global vision of the theme. As a researcher, I know we ended up talking more about what we understand, but we have to control it.

5. Fate

This topic is good writing in this manuscript because the authors bring a diversity of articles cited. But, because it is the Indian Ocean I think the manuscript should have more information about biological sinks since the literature has some articles about them.

Some suggestions of references

Cliff, G., Dudley, S. F., Ryan, P. G., & Singleton, N. (2002). Large sharks and plastic debris in KwaZulu-Natal, South Africa. *Marine and Freshwater Research*, 53(2), 575-581.

Carey, M. J. (2011). Intergenerational transfer of plastic debris by Short-tailed Shearwaters (*Ardenna tenuirostris*). *Emu-Austral Ornithology*, 111(3), 229-234.

Roman, L., Paterson, H., Townsend, K. A., Wilcox, C., Hardesty, B. D., & Hindell, M. A. (2019). Size of marine debris items ingested and retained by petrels. *Marine pollution bulletin*, 142, 569-575.

Ryan, P. G. (2008). Seabirds indicate decreases in plastic pellet litter in the Atlantic and south-western Indian Ocean. *Mar. Pollut. Bull*, 56, 1406-1409.

Sparks, C., & Immelman, S. (2020). Microplastics in offshore fish from the Agulhas Bank, South Africa. *Marine pollution bulletin*, 156, 111216.

Cartraud, A. E., Le Corre, M., Turquet, J., & Tourmetz, J. (2019). Plastic ingestion in seabirds of the western Indian Ocean. *Marine pollution bulletin*, 140, 308-314.

Crutchett, T., Paterson, H., Ford, B. M., & Speldewinde, P. (2020). Plastic Ingestion in Sardines (*Sardinops sagax*) From Frenchman Bay, Western Australia, Highlights a Problem in a Ubiquitous Fish. *Frontiers in Marine Science*, 7, 526.

McGregor, S., & Strydom, N. A. (2020). Feeding ecology and microplastic ingestion in

Chelon richardsonii (Mugilidae) associated with surf diatom *Anaulus australis* accumulations in a warm temperate South African surf zone. *Marine Pollution Bulletin*, 158, 111430.

Hoarau, L., Ainley, L., Jean, C., & Ciccione, S. (2014). Ingestion and defecation of marine debris by loggerhead sea turtles, *Caretta caretta*, from by-catches in the South-West Indian Ocean. *Marine Pollution Bulletin*, 84(1-2), 90-96.

Pfeiffer, M. B., Venter, J. A., & Downs, C. T. (2017). Observations of microtrash ingestion in Cape vultures in the Eastern Cape, South Africa. *African Zoology*, 52(1), 65-67.

Lavers, J. L., & Bond, A. L. (2016). Selectivity of flesh-footed shearwaters for plastic colour: evidence for differential provisioning in adults and fledglings. *Marine environmental research*, 113, 1-6.

Cherel, Y., Xavier, J. C., de Grissac, S., Trouvé, C., & Weimerskirch, H. (2017). Feeding ecology, isotopic niche, and ingestion of fishery-related items of the wandering albatross *Diomedea exulans* at Kerguelen and Crozet Islands. *Marine Ecology Progress Series*, 565, 197-215.

Please consider the information and suggestions given for improving the article. I think it has a lot of potentials, but we need to improve some points. The work done was a lot and I'm sure it can get even better.