



Marine plastic litter pathways connecting the subtropical convergence zones: from ocean dynamics to realistic scenario cases

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Introduction

Marine litter and plastic debris are ubiquitous nowadays in the global ocean and represent a potential health issue for humans. However, open questions on the amount of plastic floating at the sea surface remain, and more generally, basic information and knowledge about the origins, where it is accumulating, and its transport pathways are still uncertain. Recourse to ocean modeling is required, and from a certain point of view, the litter problem forces numerical modelers to identify the near-surface ocean dynamics required to tackle problems such as the distribution and transport pathways at the global ocean scales. In a recent study on the five regions of surface convergence at the scale of each oceanic basin, using a Lagrangian analysis, a convergent pathway connecting the South Indian subtropical region with the convergence zone of the South Pacific through the Great Australian Bight, the Tasman Sea and the southwest Pacific Ocean has been identified. This “super-convergent” dynamical pathway at the ocean surface is robust and permanent over a distance longer than 8000 km, and quite unique in the Southern Hemisphere. How this particular circulation affects the marine plastic litter under different scenarios, including realistic source functions and reflecting inputs into the open ocean will be the focus of the present study. The objective is to underline the importance of ocean dynamics in order to assess implications and consequences on the complex problem of marine litter.

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