

On the harmonization of microplastic pollution levels in the Mediterranean Sea. A meta-analysis.

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BACKGROUND

The enclosed Mediterranean Sea is considered as one of the greatest accumulation area for plastic pollution^[1]. Still, the disparities in the different methodologies used by researchers for sampling, extracting and identifying microplastics (MPs) have limited the accuracy the intercomparison of this pollution in the basin. In previous literature reviews, authors have provided a general overview on the abundance of MPs in Mediterranean rivers^[2], surface waters^[3], sediments^[4] and their interaction with biota^[5].

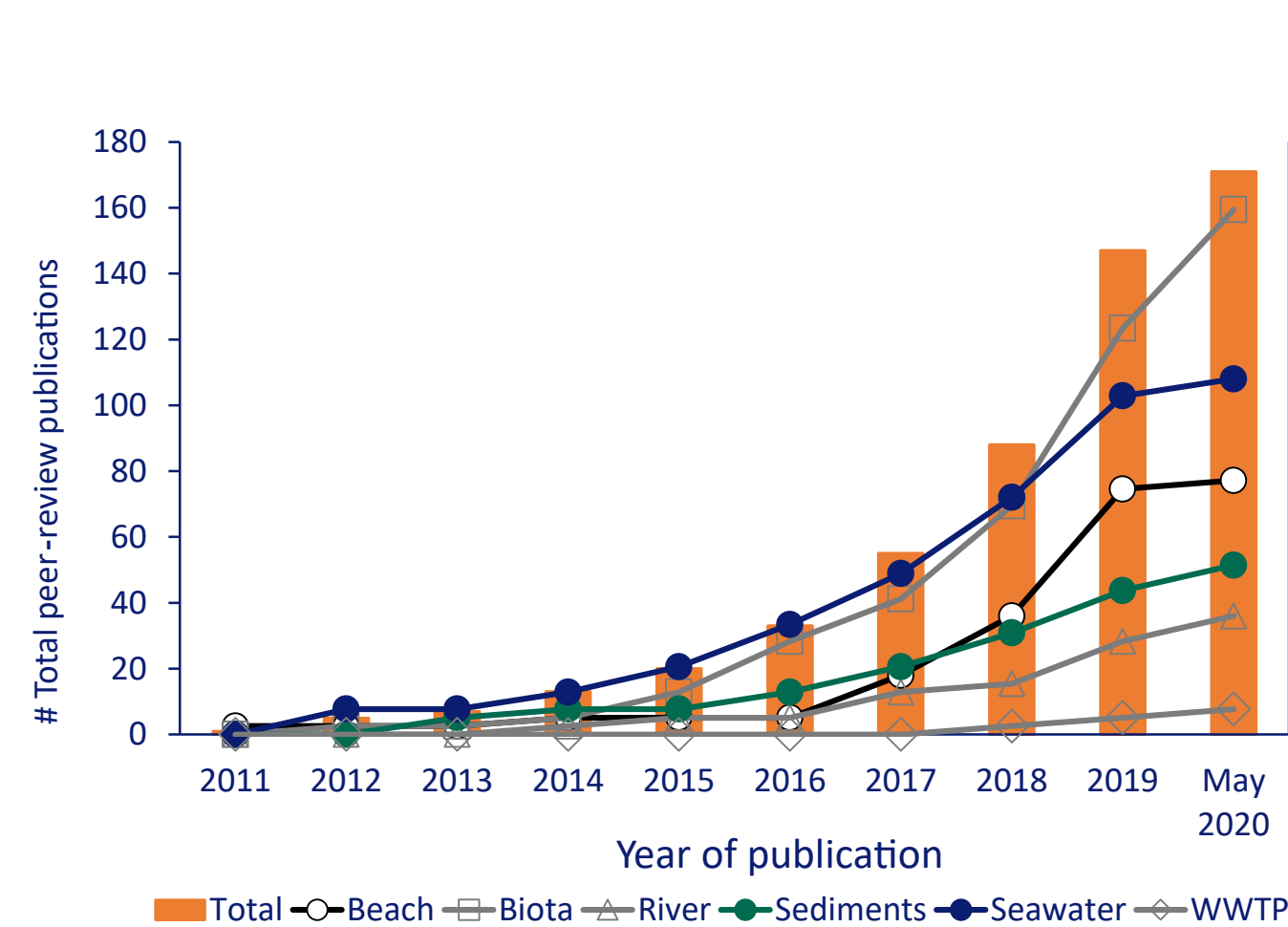
The present review aims to:

- Integrate and harmonize MP pollution data from sediments and sea-water bodies of the Mediterranean Sea, considering the methods used in the 79 peer-reviewed articles selected for this study.
- Identify areas with higher and lower research efforts to highlight the pressing research needs to understand the fate of MP within this basin.

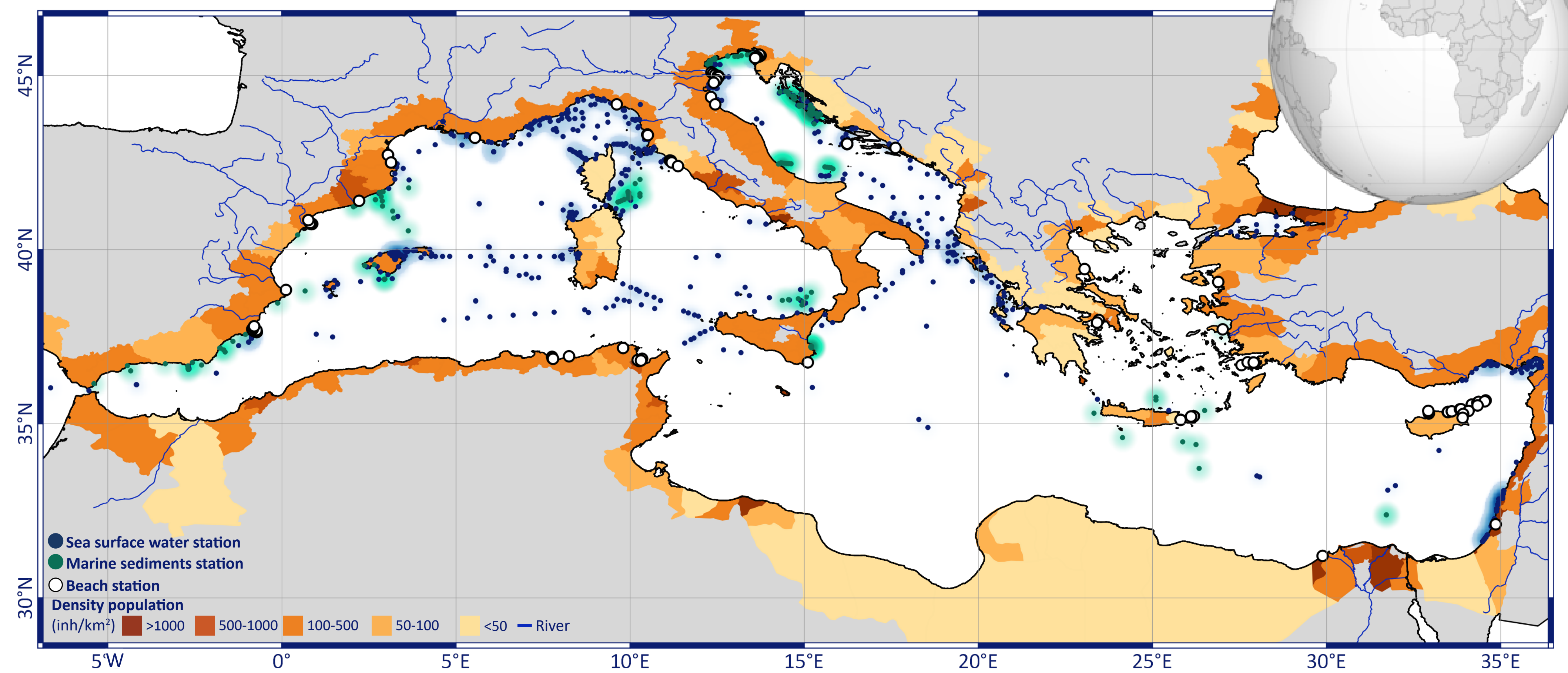
Systematic review was conducted under the PRISMA Statement^[6].

MICROPLASTIC RESEARCH IN THE MEDITERRANEAN SEA

- **Seawater:**
37 studies
- **Sediments:**
Marine: 18 studies
Beach: 24 studies

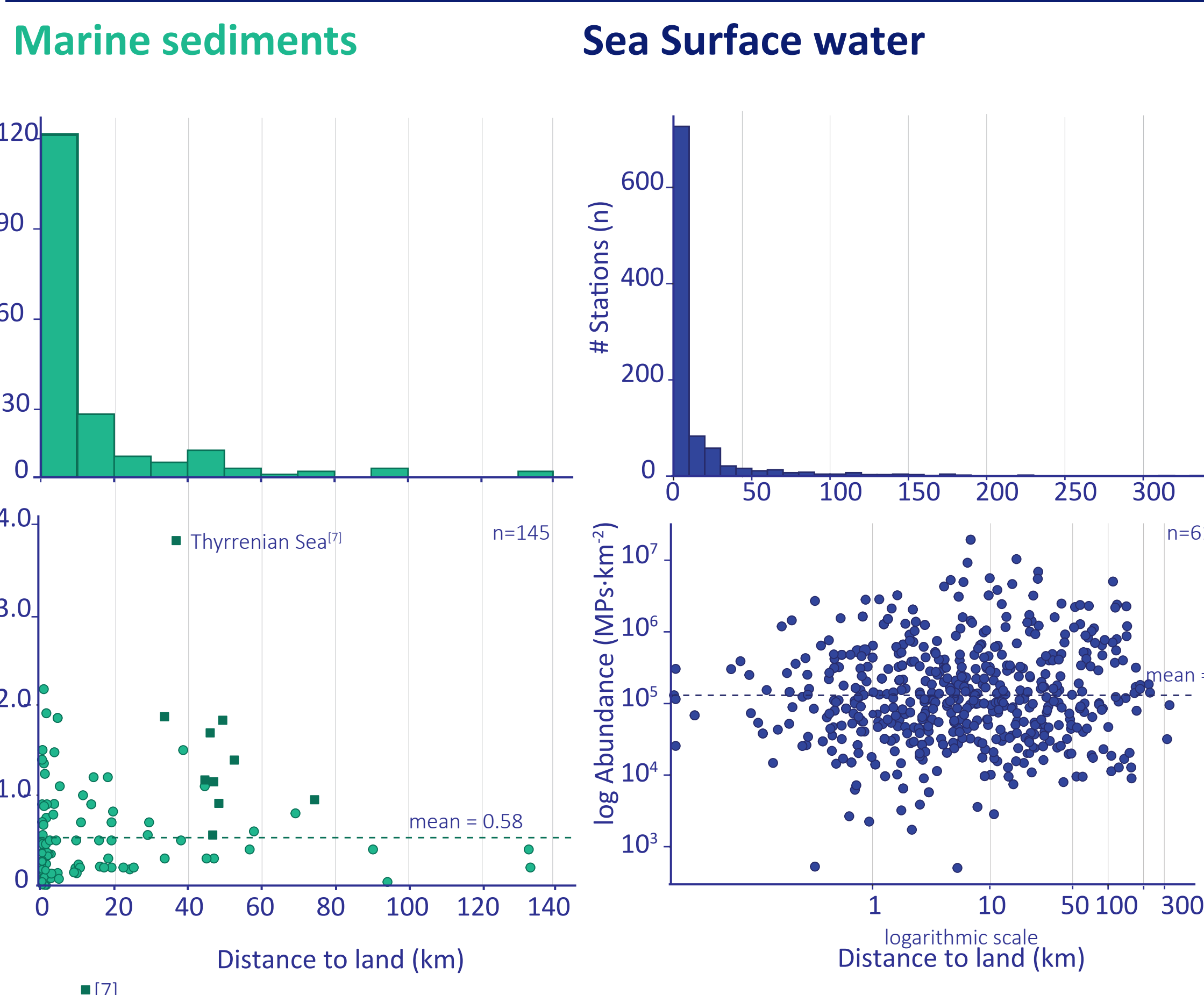


Exponential growth in the number of peer-reviewed publications.

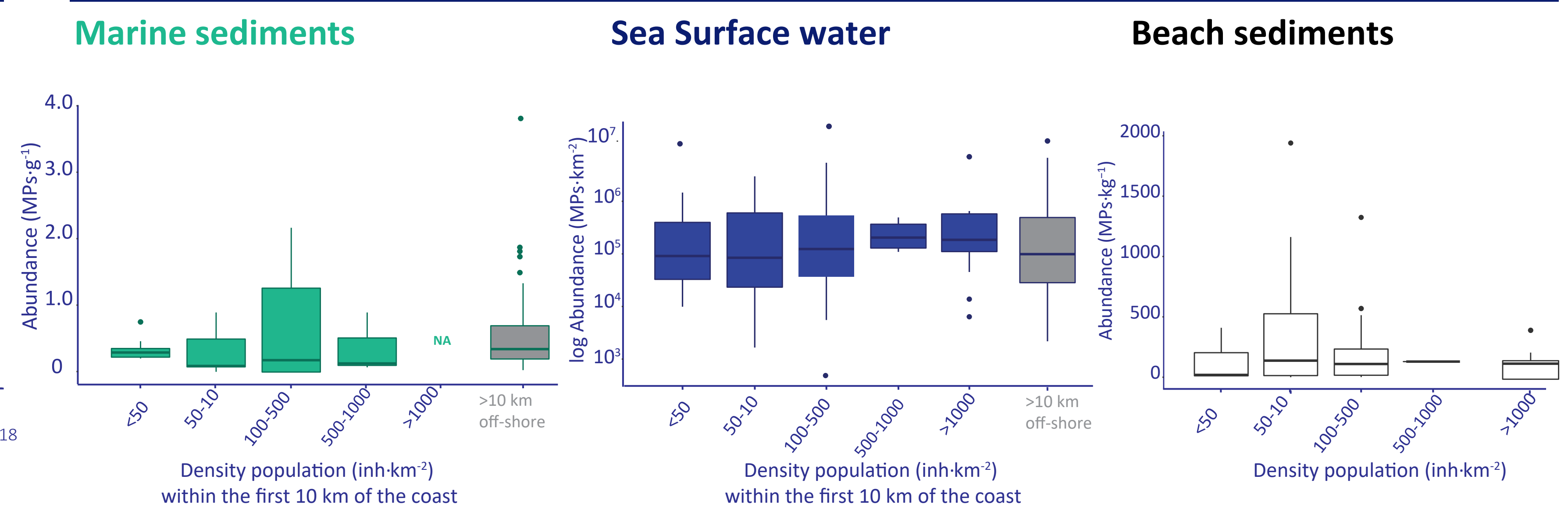


The location of the 1336 sampling stations considered in this study show clear spatial disparities.

MPs concentration vs distance to seashore



MPs concentration vs density population



- General lack of data in the eastern basin: Ionian Sea, Aegean Sea and Levantine Basin.
- Predominance of sampling stations in the coastal areas (<10 km; 74.0%).
- The concentration of MPs in sea surface waters present homogeneous dispersion in relation to the distance to the coast.
- No significant relation is found on the concentration of MPs and the density population of the coastal regions.

CONCLUSIONS

The available data on the occurrence of MPs in the Mediterranean Sea indicate that these pollutants are effectively dispersed in the surface waters, while coastal sediments and specific offshore hotspots (i.e. Tyrrhenian Sea^[7]) present higher MPs abundances. However, the predominance of sampling stations in the coastal areas might be jeopardizing our general understanding of the MP fate within the Mediterranean basin. In the future, international collaboration between Mediterranean countries is needed to provide a full picture of the microplastic pollution status in this basin, especially in the open sea and the North African coasts.

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