**Supplementary Material**

**Oceanographic and anthropogenic variables driving marine litter distribution in Mediterranean Protected Areas: extensive field data supported by forecasting modelling**

Matteo Galli1,a, Matteo Baini1,2,a, Cristina Panti1,2,\*, Dario Giani1, Ilaria Caliani1, Tommaso Campani1, Massimiliano Rosso2,3, Paola Tepsich2,3, Vanessa Levati3,4, Federica Laface5,6, Teresa Romeo2,6, Gianfranco Scotti7, Francois Galgani8, Maria Cristina Fossi1,2

1 Department of Physical, Earth and Environmental Sciences, University of Siena, Via Mattioli 4, 53100 Siena, Italy

2NBFC, National Biodiversity Future Center, Palermo, Italy

3 CIMA Research Foundation, 17100, Savona, Italy

4 [Department of Biology](https://www.unina.it/-/768551-dipartimento-di-biologia), University of Napoli Federico II, Corso Umberto I 40, 80138, Napoli, Italy

5Department of Chemical, Biological, Pharmaceutical and Environmental Sciences, University of Messina, Viale Ferdinando Stagno D'Alcontres 31, 98166 Messina, Italy

6Department of Integrative Marine Ecology (EMI), Stazione Zoologica Anton Dohrn - National Institute of Biology, Ecology and Marine Biotechnology, Sicily Marine Centre, Villa Pace - Contrada Porticatello 29, 98167 Messina, Italy

7ISPRA, Italian Institute for Environmental Protection and Research, 98057 Milazzo, Italy

8IFREMER, Unit RMPF, Vairao, Tahiti, French Polynesia

\*Corresponding author Dr. Cristina Panti e-mail: panti4@unisi.it

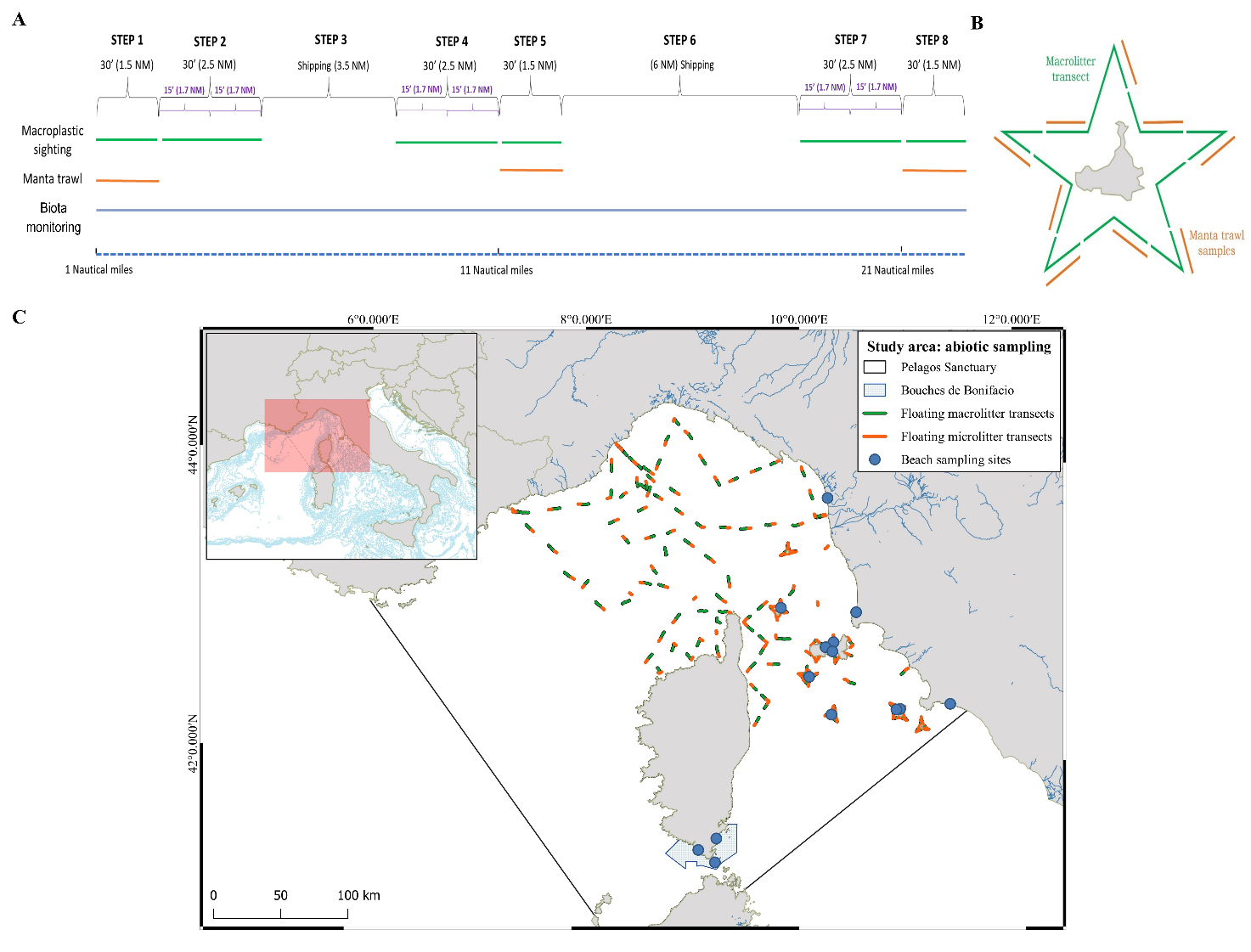
aThese authors equally contributed to the manuscript.

**Table S1.** Current status of peer-reviewed papers published on floating macrolitter abundance (items/km2) in the Mediterranean Sea Sub Regions proposed by MSFD. Detailed sampling information (sampling site and year, vessel speed, observer height and width and distance travelled) and the minimum detectable size of the object considered are also reported. UNEP/MAP threshold value for the Mediterranean Sea is reported in red. Studies entirely or partially performed in the MPAs are reported in bold. n.a. is used when no information is available.

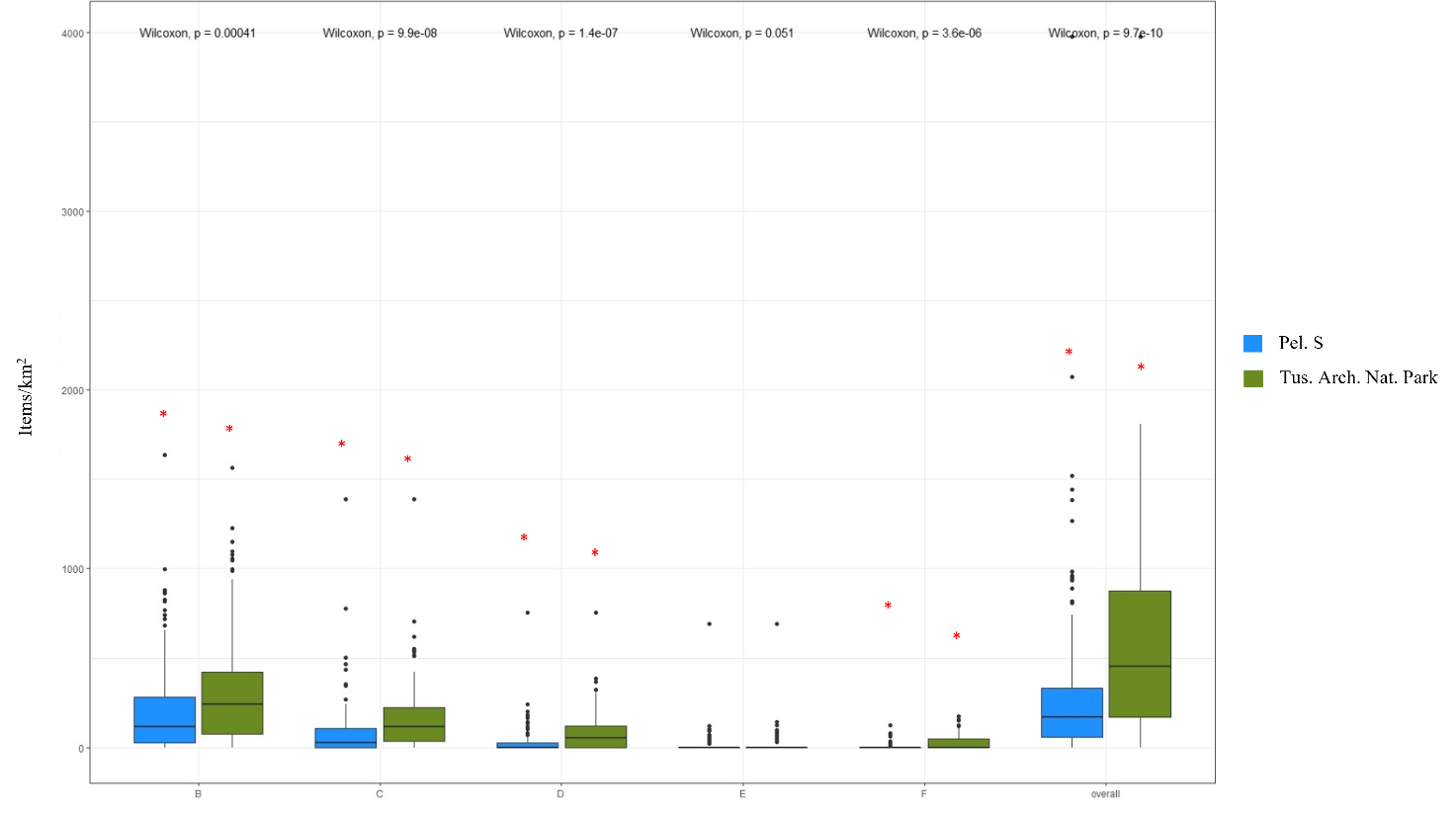
|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mediterranean Sea sub-region** | **Sampling\_area (MPAs)** | **Sampling year** | **Vessel speed (kt)** | **Observer height (m)** | **Observed width (m)** | **Distance travelled (km)** | **Density items/km2** | **Min. detected size (cm)** | **References** |
| **Mediterranean Sea** | **-** | **-** | **-** | **-** | **-** | **-** | **5** | **-** | **UNEP/MAP, 2020** |
| Western Mediterranean Sea | Catalan Sea | 2018-2019 | n.a. | 2.5 | 10 | 85 | 19.7 ± 25.8 | n.a. | Garcia-garin et al., 2020 |
| Western Mediterranean Sea | Balearic basin | 2005-2015 | 2 | 0.5 | Nets mouth:  0.8×0.6 m. | 613,112 | 116.6 ± 254.3 kg/km2 | 2.5 | Compa et al., 2019 |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2013-2016** | **19-25** | **17-25** | **n.a.** | **3724** | **1.8 ± 0.2** | **20** | **Arcangeli et al., 2018** |
| Western Mediterranean Sea | Sardinian-Balearic basin | 2013-2016 | 19-25 | 17-25 | n.a. | 5098 | 2.5 ± 0.3 | 20 | Arcangeli et al., 2018 |
| **Western Mediterranean Sea** | **Bonifacio Strait**  **(Bouches de Bonifacio)** | **2013-2016** | **19-25** | **17-25** | **n.a.** | **2303** | **2.4 ± 0.4** | **20** | **Arcangeli et al., 2018** |
| Western Mediterranean Sea | Central Tyrrhenian Sea | 2013-2016 | 19-25 | 17-25 | n.a. | 2488 | 2.1 ± 0.4 | 20 | Arcangeli et al., 2018 |
| Western Mediterranean Sea | Sicilian-Sardinian Channel | 2013-2016 | 19-25 | 17-25 | n.a. | 4500 | 2.8 ± 0.5 | 20 | Arcangeli et al., 2018 |
| Western Mediterranean Sea | Balearic Sea, Bonifacio Strait and Tyrrhenian Sea | 2013-2016 | 19–25 | 17–25 | 100 | 18,113 | 2.3 ± 0.4 | 20 | Campana et al., 2018 |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2006–2015** | **6** | **3** | **n.a.** | **5171.57** | **15 ± 23** | **1** | **Di-Méglio and Campana, 2017** |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2014** | **n.a.** | **n.a.** | **20** | **125.53** | **175.2** | **2.5** | **Fossi et al., 2017** |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **1996** | **3.2–11.5** | **top deck** | **50** | **176** | **15 –25**  (range) | **n.a.** | **Aliani et al., 2003** |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2000** | **6** | **top deck** | **n.a.** | **252** | **1.5 - 3.0**  (range) | **n.a.** | **Aliani et al., 2003** |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2013** | **10** | **5** | **30** | **1538** | **24.9 ± 2.5** | **2** | **Suaria and Aliani, 2014** |
| **Western Mediterranean Sea** | **Corsica Channel**  **(Pelagos Sanctuary)** | **2013** | **10** | **5** | **n.a.** | **73.1** | **24.7** | **2** | **Suaria and Aliani, 2014** |
| Western Mediterranean Sea | Strait of Sicily | 2013 | 10 | 5 | n.a. | 37.4 | 10.4 | 2 | Suaria and Aliani, 2014 |
| Western Mediterranean Sea | Central Tyrrhenian Sea | 2013 | 10 | 5 | n.a. | 70.1 | 4.9 | 2 | Suaria and Aliani, 2014 |
| Western Mediterranean Sea | South Tyrrhenian Sea | 2013 | 10 | 5 | n.a. | 110.8 | 24.1 | 2 | Suaria and Aliani, 2014 |
| Western Mediterranean Sea | Sea of Sardinia | 2013 | 10 | 5 | n.a. | 103.8 | 19.3 | 2 | Suaria and Aliani, 2014 |
| Western Mediterranean Sea | Balearic Sea | 2013 | 10 | 5 | n.a. | 141.8 | 30.7 | 2 | Suaria and Aliani, 2014 |
| Western Mediterranean Sea | Algerian Basin | 2013 | 10 | 5 | n.a. | 187.4 | 52.9 | 2 | Suaria and Aliani, 2014 |
| Western Mediterranean Sea | Sardinia Channel | 2013 | 10 | 5 | n.a. | 342.8 | 10.9 | 2 | Suaria and Aliani, 2014 |
| **Western Mediterranean Sea** | **Corsica Channel**  **(Pelagos Sanctuary)** | **2016** | **7** | **9** | **10** | **n.a.** | **165** | **2.5** | **Campanale et al., 2019** |
| Western Mediterranean Sea | Sardinian Sea | 2016 | 7 | 9 | 10 | n.a. | 47 | 2.5 | Campanale et al., 2019 |
| Western Mediterranean Sea | Central-southern Tyrrhenian Sea | 2016 | 7 | 9 | 10 | n.a. | 16 | 2.5 | Campanale et al., 2019 |
| Western Mediterranean Sea | Strait of Messina | 2016 | 7 | 9 | 10 | n.a. | 4.8 | 2.5 | Campanale et al., 2019 |
| Western Mediterranean Sea | n.a. | 2013 | n.a. | n.a. | n.a. | n.a. | 40.5 | n.a. | Galgani et al., 2013 |
| Western Mediterranean Sea | n.a. | 2006-2008 | n.a. | n.a. | n.a. | n.a. | 3.1 | n.a. | UNEP/MAP, 2015 |
| **Adriatic Sea** | **Croatia**  **(Archipelago of Zadar)** | **2015** | **2–3** | **2.2** | **7** | **36.6** | **175 ± 181** | **2.5** | **Palatinus et al., 2019** |
| Adriatic Sea | Italy, Slovenia, Croatia, and Montenegro | 2014-2015 | 2–3 | 1–3 | 10 | 415 | 260 ± 596 | 2.5–5 | Zeri et al., 2018 |
| Adriatic Sea | Italy, Slovenia, Croatia, and Montenegro | 2014-2015 | 26 | 2\_3 | 100 | 9.062 | 4 ± 3 | 20 | Vlachogianni et al., 2017 |
| Adriatic Sea | Italy, Slovenia, Croatia, and Montenegro | 2014-2015 | 25 | 1\_3 | 8 | 415 | 332 ± 749 | 2.5 | Vlachogianni et al., 2017 |
| Adriatic Sea | Slovenia | 2008 | n.a. | n.a. | n.a. | n.a. | 5.7 | n.a. | UNEP/MAP, 2015 |
| Adriatic Sea | Slovenia | 2011 | n.a. | n.a. | n.a. | n.a. | 2 | n.a. | UNEP/MAP, 2015 |
| Adriatic Sea | Central sector | 2013 | 10 | 5 | n.a. | 28.4 | 54.6 | n.a. | Suaria and Aliani, 2014 |
| Adriatic Sea | Southwestern sector | 2013 | 10 | 5 | n.a. | 101.8 | 52.1 | n.a. | Suaria and Aliani, 2014 |
| Adriatic Sea | Southeaster sector | 2013 | 10 | 5 | n.a. | 47.2 | 25.8 | n.a. | Suaria and Aliani, 2014 |
| Adriatic Sea | Central southern  sector | 2013-2016 | 19-25 | 17-25 | n.a. | 6733 | 4.7 ± 0.5 | 20 | Arcangeli et al., 2018 |
| Adriatic Sea | Northern sector | 2016 | 7 | 9 | 10 | n.a. | 414 | 2.5 | Campanale et al., 2019 |
| Adriatic Sea | Central sector | 2016 | 7 | 9 | 10 | n.a. | 535 | 2.5 | Campanale et al., 2019 |
| Adriatic Sea | Southern sector | 2016 | 7 | 9 | 10 | n.a. | 1,313 | 2.5 | Campanale et al., 2019 |
| Adriatic Sea | Central sector. | 2013 | n.a. | n.a. | 31 | 922.2 | 31.5 | 2.5 | Carlson et al., 2017 |
| Adriatic Sea | Southern sector | 2015 | n.a. | n.a. | 23.6 | 922.2 | 114.7 | 2.5 | Carlson et al., 2017 |
| Adriatic Sea | Northern central sector | 2015 | n.a. | n.a. | 10 | 922.2 | 74.8 | 2.5 | Carlson et al., 2017 |
| Ionian Sea and the Central Mediterranean Sea | Ionian Sea | 2016 | 7 | 9 | 10 | n.a. | 100 | 2.5 | Campanale et al., 2019 |
| Ionian Sea and the Central Mediterranean Sea | Ionian Sea | 2013-2016 | 19-25 | 17-25 | n.a. | 4565 | 1.9 ± 0.2 | 20 | Arcangeli et al., 2018 |
| Ionian Sea and the Central Mediterranean Sea | Strait of Otranto | 2013 | 10 | 5 | n.a. | 100.2 | 12.9 | 2 | Suaria and Aliani, 2014 |
| Ionian Sea and the Central Mediterranean Sea | North-western Ionian Sea | 2013 | 10 | 5 | n.a. | 61.8 | 21.6 | 2 | Suaria and Aliani, 2014 |
| Ionian Sea and the Central Mediterranean Sea | Sicilian Sea | 2013 | 10 | 5 | n.a. | 26.2 | 6.3 | n.a. | Suaria and Aliani, 2014 |
| Ionian Sea and the Central Mediterranean Sea | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | 2.1 | n.a. | UNEP/MAP, 2015 |
| **Ionian Sea and the Central Mediterranean Sea** | **Malta and Gozo mpa** | **2018-2019** | **n.a.** | **2** | **6** | **n.a.** | **681 ± 1,004** | **2.5** | **Curmi and Axiak, 2021** |
| **Ionian Sea and the Central Mediterranean Sea** | **Malta and Gozo mpa** | **2018-2019** | **n.a.** | **2** | **6** | **n.a.** | **933 ± 1,594** | **2.5** | **Curmi and Axiak, 2021** |
| **Ionian Sea and the Central Mediterranean Sea** | **Malta and Gozo mpa** | **2018-2019** | **n.a.** | **2** | **6** | **n.a.** | **1,272 ± 4,403** | **2.5** | **Curmi and Axiak, 2021** |
| **Ionian Sea and the Central Mediterranean Sea** | **Malta and Gozo mpa** | **2018-2019** | **n.a.** | **2** | **6** | **n.a.** | **2,392 ± 7,477** | **2.5** | **Curmi and Axiak, 2021** |
| Aegean-Levantine Sea | Algeria | 2017-2018 | n.a. | n.a. | n.a. | n.a. | 136,514  max items | 2.5 | Tata et al., 2020 |
| Aegean-Levantine Sea | n.a. | 2017 | n.a. | 27 | 50 | 1784 | 232 ± 325 | 2.5 - 50 | Constantino et al., 2019 |
| Aegean-Levantine Sea | n.a. | 2008 | n.a. | n.a. | n.a. | n.a. | 2.1 | n.a. | UNEP, 2011 |
| Black Sea | n.a. | 2017 | n.a. | 10 | 50 | n.a. | 41.5 ± 30.1 | 2.5 | Berov and Klayn, 2021 |
| Mediterranean Sea | n.a. | 1979 | n.a. | 12 | 10 | n.a. | 19.7 ± 25.8 | 1.5 | Morris, 1980 |

**Table S2.** Current status of peer-reviewed papers published on floating microlitter abundance (items/km2 and corresponding value expressed as items/m3 “in parentheses”) in the Mediterranean Sea Sub Regions proposed by MSFD. Detailed sampling information (sampling site and year, number of samples, sampling nets and mesh) is reported. UNEP/MAP mean baseline value for the Mediterranean Sea is reported in red. Studies entirely or partially performed in the MPAs are reported in bold. n.a. is used when no information is available.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Mediterranean Sea sub-region** | **Sampling area**  **(MPAs)** | **Sampling year** | **N°. Samples** | **Sampling nets** | **Net mesh (µm)** | **Abundance items/km2**  **(items/m3)** | **References** |
| **Mediterranean Sea** | **-** | **-** | **-** | **-** | **-** | **340.000** | **UNEP/MAP, 2017** |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2018-2019** | **11** | **Manta trawl** | **300** | **59,388 ± 107,913** | **Tesán Onrubia et al., 2021** |
| Western Mediterranean Sea | Balearic sea, Mallorca | 2017 | 63 | Manta trawl | 335 | 858,029 ± 4,082,964 | Compa et al., 2020 |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2019** | 20 | **Manta trawl** | **330** | **255,865 ± 841,221** | **Caldwell et al., 2020** |
| **Western Mediterranean Sea** | **Balearic sea, (Menorca channel)** | **2014-2015** | **48** | **Manta trawl** | **333** | **224,294** | **Ruiz-Orejón et al., 2019** |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2018** | **34** | **Manta trawl** | **330** | **28,376 ± 28,917** | **Caldwell et al., 2019** |
| Western Mediterranean Sea | Alboran and Catalan-Balearic Sea | 2015 | 21 | Manta trawl | 330 | 108,000 ± 90,000 | de Haan et al., 2019 |
| Western Mediterranean Sea | Gulf of Lion | 2014-2016 | 43 | Manta trawl | 780 | 112,000 | Schmidt et al., 2018 |
| Western Mediterranean Sea | Balearic sea | 2014 | 20 | Manta trawl | 333 | 900,324 ± 1,171,738  (3.28 ± 4.05) | Ruiz-Orejón et al., 2018 |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2014** | **21** | **High-speed manta trawl** | **330** | **82,000 ± 79,000** | **Fossi et al., 2017** |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2013** | **33** | **Neuston net** | **200** | **125,930 ± 132,485** | **Pedrotti et al., 2016** |
| Western Mediterranean Sea | Gulf of Lion, Balearic Islands, Sardinia and Corsica | 2012 | 41 | Manta trawl | 330 | 129,682 | Faure et al., 2015 |
| **Western Mediterranean Sea** | **Ligurian Sea**  **(Pelagos Sanctuary)** | **2011-2012** | **38** | **WP2** | **200** | **115,000** | **Collignon et al., 2014** |
| **Western Mediterranean Sea** | **Gulf of Lion, Ligurian Sea**  **(Pelagos Sanctuary) and Tyrrhenian Sea** | **2010** | **40** | **Manta trawl** | **333** | **116,000** | **Collignon et al., 2012** |
| **Western Mediterranean Sea** | **Tyrrhenian Sea**  **(Pelagos Sanctuary)** | **2013-2014** | **24** | **Manta trawl** | **330** | **69,161 ± 83,244**  **(0.26 ± 0.33)** | **Baini et al., 2018** |
| Western Mediterranean Sea | Balearic island and Tyrrhenian Sea | 2011 | 26 | Manta trawl | 333 | 101,408 ± 148,114 | Ruiz-Orejón et al., 2016 |
| **Western Mediterranean Sea** | **Balearic sea**  **(Cabrera national park)** | **2019** | n.a. | **Manta trawl** | **330** | **n.a.**  **(3.52 ± 8.81)** | **Fagiano et al., 2022** |
| Western Mediterranean Sea | Algerian coast | 2018 | n.a. | n.a. | n.a. | n.a.  (0.86 ± 0.35) | Setiti et al., 2021 |
| **Western Mediterranean Sea** | **Bay of Marseille**  **(Calanque National Park)** | **2017-2018** | n.a. | **Manta trawl** | **150** | **n.a.**  **(0.05)** | **Schmidt et al., 2021** |
| Western Mediterranean Sea | Gulf of Lion | 2015 | 17 | WP2 plankton net | 200 | n.a.  (0.23 ± 0.20) | Lefebvre et al., 2019 |
| Western Mediterranean Sea |  | 2013 | 74 | Neuston net | 200 | n.a.  (1.00 ± 1.84) | Suaria et al., 2016 |
| **Western Mediterranean Sea** | **Ligurian sea**  **(Asinara National Park and Pelagos Sanctuary)** | **2012** | **70** | **WP2** | **200** | **n.a.**  **(0.31 ± 1.17)** | **Fossi et al., 2016** |
| **Western Mediterranean Sea** | **Ligurian sea**  **(Asinara National Park and Pelagos Sanctuary)** | **2012-2013** | **27** | **WP2** | **200** | **n.a.**  **(0.17 ± 0.32)** | **Panti et al., 2015** |
| Western Mediterranean Sea | Sardinian Sea | 2013 | 30 | Manta trawl | 500 | n.a.  (0.15 ± 0.11) | de Lucia et al., 2014 |
| **Western Mediterranean Sea** | **Ligurian Sea (Pelagos Sanctuary) and Sardinian Sea** | **2011** | **23** | **WP2** | **200** | **n.a.**  **(0.62 ± 2.00)** | **Fossi et al., 2012** |
| Western Mediterranean Sea | Têt river | 2016 | 13 | Manta trawl | 333 | n.a.  (0.18) | Constant et al., 2018 |
| Western Mediterranean Sea | Rhône river | 2016 | 18 | Manta trawl | 333 | n.a.  (0.19) | Constant et al., 2018 |
| Western Mediterranean Sea | Tyrrhenian Sea,  Eolie islands | 2015 |  | Manta trawl and WP2 | 333 | n.a.  (0.27 ± 0.08) | de Lucia et al., 2018 |
| **Western Mediterranean Sea** | **Tyrrhenian Sea,**  **(Ischia, Regno di Nettuno MPA)** | **2015** |  | **Manta trawl and WP2** | **333** | **n.a.**  **(0.49 ± 0.14)** | **de Lucia et al., 2018** |
| **Western Mediterranean Sea** | **Tyrrhenian Sea,**  **(Ventotene MPA)** | **2015** |  | **Manta trawl and WP2** | **333** | **n.a.**  **(0.20 ± 0.09)** | **de Lucia et al., 2018** |
| Western Mediterranean Sea | Tyrrhenian Sea | 2015 |  | Manta trawl and WP2 | 333 | n.a.  (0.23 ± 0.06) | de Lucia et al., 2018 |
| **Western Mediterranean Sea** | **Ligurian sea**  **(Asinara National Park)** | **2015** |  | **Manta trawl and WP2** | **333** | **n.a.**  **(0.12 ± 0.04)** | **de Lucia et al., 2018** |
| Western Mediterranean Sea | Tyrrhenian Sea | 2015 |  | Manta trawl and WP2 | 333 | n.a.  (0.57 ± 0.16) | de Lucia et al., 2018 |
| Ionian Sea and the Central Mediterranean Sea | Tunisian waters | 2017 | 8 | Manta trawl | 200 | 63,739 | Zayen et al., 2020 |
| Ionian Sea and the Central Mediterranean Sea | Italian and Greek waters | n.a. | 43 | n.a. | n.a. | 1,300 | Morris, 1980 |
| Ionian Sea and the Central Mediterranean Sea | Otranto Strait, North Ionian waters, and Kerkyraikos Gulf | 2014-2015 | 30 | Manta trawl | 200 | 410,000 | Digka et al., 2018 |
| Ionian Sea and the Central Mediterranean Sea | n.a. | 2011 | n.a. | Manta trawl | 333 | 181,918 ± 242,799 | Ruiz-Orejón et al., 2016 |
| Aegean-Levantine Sea | Iskenderun Bay | 2017 | 14 | Manta trawl | 333 | 1,067,120 | Gündoğdu et al., 2017 |
| Aegean-Levantine Sea | Iskenderun Bay and Mersin Bay | 2016-2017 | 8 | Manta trawl | 333 | 539,189 | Gündoğdu et al., 2018 |
| Aegean-Levantine Sea | Iskenderun Bay and Mersin Bay | 2016-2017 | 8 | Manta trawl | 333 | 7,699,716 | Gündoğdu et al., 2018 |
| Aegean-Levantine Sea | Turkish waters | 2015 | 17 | Manta trawl | 330 | 140,418 ± 120,671 | Güven et al., 2017 |
| Aegean-Levantine Sea | Iskenderun Bay and Mersin Bay | 2016 | 7 | Manta trawl | 333 | 376,000  (2.73) | Gündoğdu and Çevik, 2017 |
| Aegean-Levantine Sea | n.a. | 2013-2015 | 108 | Manta trawl | 333 | n.a.  (7.68 ± 2.38) | van der Hal et al., 2017 |
| Aegean-Levantine Sea | Lebanese waters | 2018 | n.a. | Manta trawl | 52 | n.a.  (4.3) | Kazour et al., 2019 |
| Aegean-Levantine Sea | Turkish waters | n.a. | 17 | Manta trawl | 333 | n.a.  (0.7) | Güven et al. 2017 |
| Aegean-Levantine Sea | Iskenderun Bay | n.a. | n.a. | Manta trawl | 333 | n.a.  (7.26) | Gündoğdu 2017 |
| Adriatic Sea | Northern sector | 2014 | 8 | Manta trawl | 330 | 1,200,861 ± 2,683,014 | Vianello et al., 2018 |
| Adriatic Sea | Northern sector | 2014 | 17 | Neuston net | 300 | 472,000 ± 201,000 | Gajšt et al., 2016 |
| Adriatic Sea | n.a. | 2014-2015 | 2 | Manta trawl | 308 | 228,046 ± 30,060 | UNEP/MAP, 2015 |
| Adriatic Sea | n.a. | 2014-2015 | 4 | Manta trawl | 308 | 287,924 ± 52,979.5 | UNEP/MAP, 2015 |
| Adriatic Sea | n.a. | 2014 | 11 | n.a. | n.a. | 63,175 | UNEP/MAP, 2015 |
| **Adriatic Sea** | **Northern central sector**  **(Archipelago of Zadar)** | **2015** | **26** | **n.a.** | **308** | **127,135 ± 294,847**  **(0.9 ± 1.9)** | **Palatinus et al., 2019** |
| Adriatic Sea | Northern central sector | 2014-2015 | 65 | Manta trawl | 330 | 315,009 ± 568,578 | Zeri et al., 2018 |
| Adriatic Sea | Northern sector | 2014-2015 | n.a. | n.a. | 308 | 259,310 ±57,096 | Kovač Viršek et al., 2017 |
| Adriatic Sea | Northern sector | 2014-2015 | n.a. | Manta trawl | 308 | 1,304,811 ± 609,426 | Kovač Viršek et al., 2017 |
| Adriatic Sea | Northern sector | 2011 | 11 | Manta trawl | 333 | 178,676 ± 292,753 | Ruiz-Orejón et al., 2016 |
| Adriatic Sea | Central sector | 2018 | 7 | Manta trawl | 300 | n.a.  (0.8) | Capriotti et al., 2021 |
| Adriatic Sea | Southern sector,  Tremiti islands | 2015 | n.a. | Manta trawl and WP2 | 333 | n.a.  (0.16 ± 0.04) | de Lucia et al., 2018 |
| Adriatic Sea | Northern sector,  Po' river | 2015 | n.a. | Manta trawl and WP2 | 333 | n.a.  (0.64 ± 0.23) | de Lucia et al., 2018 |
| Adriatic Sea | Northern sector,  Po' river | 2016 | n.a. | Manta trawl | 300 | n.a.  (1 – 84 range) | Atwood et al., 2019 |
| Black Sea | Marmara Sea | 2017 | 18 | n.a. | 333 | 12,626,775 | Tuncer et al., 2018 |
| Black Sea | South-western sector | 2017 | 10 | Manta trawl | 300 | 46,200 | Berov and Klayn, 2020 |
| Black Sea | Southern sector | 2015-2016 | n.a. | Manta trawl | 300 | 656,000 | Oztekin and Bat, 2017 |
| Black Sea | Marmara Sea | 2017 | 18 | Manta trawl | 333 | n.a.  (12.6) | Tuncer et al., 2018 |
| Black Sea | Romanian waters | 2018 | 12 | Neuston net | 200 | n.a.  (7) | Pojar et al., 2021 |
| Black Sea | n.a. | 2014-2015 | 12 | Neuston net | 200 | n.a.  (11,000) | Aytan et al., 2016 |
| Black Sea | North-western sector | n.a. | 12 | Neuston net | 200 | n.a.  (9) | Pojar and Stock 2019 |
| Black Sea | Southern sector | 2015-2016 | n.a. | Neuston net | 300 | n.a.  (2.67 ± 2.33) | Oztekin and Bat, 2017 |
| Whole Mediterranean | n.a. | 2013 | 39 | Neuston net | 200 | 243,853 | Cózar et al., 2015 |



**Figure S1.** Experimental designs carried out during the Pelagos Sanctuary (A) and Tuscan Archipelago National Park (B) sampling campaigns. Macro (green) and microlitter transects (orange) were performed simultaneously starting one nautical mile from the coast and repeated every 3 and 10 nautical miles in the Pelagos Sanctuary and Tuscan Archipelago National Park, respectively.



**Figure S2.** Floating macrolitter different distribution among the two study areas considered (Pelagos Sanctuary: blue box plots; Tuscan Archipelago National Park: green boxplots) according to both size classes (B. 2.5-5 cm, C. 5-10 cm, D.10-20 cm, E. 20-30 cm, F. 30-50 cm, G. > 50 cm) and total avg. concentration. \* indicates difference statistically significative (p < 0.05).

**Table S3**. Mean concentration of floating litter according to different categories, for the two considered study areas. Grey cells evidenced statistically significant higher values (Wilcoxon test; p < 0.05).

|  |  |  |  |
| --- | --- | --- | --- |
| **G-code and corresponding category** | **Concentration [Items / km2] – mean (sd)** | | **Wilcoxon test**  **P (< 0.05)** |
| **Pelagos Sanctuary** | **Tuscan Archipelago National Park** |
| G2-Bags | 2.422 (13.771) | 5.018 (19.075) | W = 9153, p-value = 0.1517 |
| G6-Bottles | 0.474 (4.582) | 3.809 (13.923) | W = 8928.5, p-value = 0.006334 |
| G18-Crates and containers/baskets | 0.815 (6.476) | 4.782 (15.669) | W = 8814.5, p-value = 0.004033 |
| G38-Cover / packaging | 0.336 (4.410) | 0.345 (3.623) | W = 9484, p-value = 0.7541 |
| G45-Mussel nets / Oyester nets | 0.197 (2.585) | 2.5 (2.585) | W = 9135.5, p-value = 0.02362 |
| G48-Synthetic rope | 10.572 (28.626) | 20.036 (37.932) | W = 8516.5, p-value = 0.03621 |
| G51-Fishing net | 1.254 (9.728) | 1.264 (9.370) | W = 9506.5, p-value = 0.9583 |
| G58-Fish boxes - expanded polystyrene | 0.191 (2.509) |  | n.a. |
| G63-Buoys |  | 1.091 (11.442) | n.a. |
| G67-Sheets, indus. packaging, plastic sheeting | 125.110 (289.537) | 347.591 (435.738) | W = 5255.5, p-value = 1.628e-10 |
| G74-Foam packaging/insulation/polyurethane |  | 1.082 (11.346) | n.a. |
| G79-Plastic pieces 2.5cm ><50 cm | 100.393 (167.452) | 163.836 (193.097) | W = 7424.5, p-value = 0.001434 |
| G80-Plastic pieces >50 cm | 0.925 (6.465) | 3.336 (23.555) | W = 9470.5, p-value = 0.8075 |
| G82-Polystyrene pieces 2.5cm ><50 cm | 17.012 (44.943) | 19.400 (94.435) | W = 9920, p-value = 0.3895 |
| G83-Polystyrene pieces >50 cm | 1.127 (10.662) | 0.618 (6.484) | W = 9539.5, p-value = 0.8402 |
| G94-Table cloth | 0.283 (3.725) |  | n.a. |
| G124-Other plastic/polystyrene items (identifiable) | 16.156 (32.322) | 36.918 (50.646) | W = 7607, p-value = 0.0006935 |
| G125-Balloons and balloon sticks | 1.491 (9.104) | 1.645 (9.9) | W = 9529, p-value = 0.9441 |
| G135-Clothing (clothes, shoes) |  | 0.345 (3.623) | n.a. |
| G142-Rope, string and nets |  | 0.618 (6.484) | n.a. |
| G145-Other textiles (incl. rags) | 0.168 (2.205) |  | n.a. |
| G149-Paper packaging | 0.769 (7.139) |  | n.a. |
| G158-Other paper items | 0.150 (1.977) | 0.936 (7.117) | W = 9396, p-value = 0.3195 |
| G160-Pallets |  | 0.355 (3.719) | n.a. |
| G168-Wood boards | 0.214 (2.070) | 1.555 (9.382) | W = 9362.5, p-value = 0.3209 |
| G173-Other (specify)\* | 0.133 (0.1749) |  | n.a. |
| G197-Other (metal) | 0.208 (2.737) | 0.682 (5.088) | W = 9397, p-value = 0.3236 |

**Table S4**. Mean concentration of floating litter according to different size classes in the Tuscan Archipelago National Park. Grey cells evidenced statistically significant higher values (Kruskal-Wallis significance test for p < 0.05).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Dimension | Items / km2 mean (sd) | | | | | | |
| Gorgona | Capraia | Elba | Montecristo | Pianosa | Giglio | Giannutri |
| B 2.5-5cm | 463.25  (396.10) | 268.15  (288.69) | 193.71  (182.47) | 121.83  (124.12) | 356.07  (355.88) | 384.13  (417.84) | 579.25  (402.43) |
| C 5-10cm | 136.75  (160.33) | 177.77  (128.41) | 134.10  (168.48) | 95.83  (111.40) | 187.57  (176.74) | 153.75  (152.32) | 249.25  (213.60) |
| D 10-20cm | 79.00  (82.15) | 64.92  (104.70) | 81.67  (101.38) | 18.67  (36.69) | 122.29  (118.36) | 36.19  (48.35) | 110.83  (92.56) |
| E 20-50cm | 17.33  (31.94) |  | 11.67  (26.82) | 5.08  (17.61) | 30.93  (49.98) | 6.50  (18.06) | 39.00  (39.34) |
| F 50-100cm | 27.75  (43.16) | 14.38  (28.06) | 11.19  (23.96) | 17.33  (33.44) | 38.86  (68.51) | 30.31  (43.47) | 38.00  (47.97) |

**Table S5*.*** Mean and SD weight density and concentration values for each considered Island in the Tuscan Archipelago National Park.

|  |  |  |
| --- | --- | --- |
| **Island** | **Concentration (items/km2)** | **Density (mg/m2)** |
| Gorgona | 563,962 ± 1,123,234 | 0.317 ± 0.662 |
| Capraia | 211,650 ± 159,736 | 0.088 ± 0.052 |
| Elba | 469,624 ± 468,907 | 0.231 ± 0.219 |
| Pianosa | 290,966 ± 321,938 | 0.105± 0.103 |
| Montecristo | 102,966 ± 83,089 | 0.023 ± 0.019 |
| Giglio | 241,007 ± 292,466 | 0.101 ± 0.109 |
| Giannutri | 211,074 ± 106,240 | 0.129 ± 0.099 |

**Table S6.** Floating macrolitter and MPs concentrations in the different habitats considered in the study areas.

|  |  |  |
| --- | --- | --- |
| **Habitat** | **Floating macrolitter (items/km2)** | **MPs (items/km2)** |
| Bathyal (> 2000 m) | 176 ± 158 | 88,508 ± 38,146 |
| Canyon (200 m - 2000 m) | 238 ± 337 | 378,137 ± 1,107,092 |
| Seamount (400 m - > 2000 m) | 205 ± 245 | 86,796 ± 59,482 |
| Slope (200 m – 2000 m) | 257 ± 340 | 161,176 ± 245,238 |
| Continental shelf (0 m -200 m) | 573 ± 572 | 310,489 ± 559,776 |

**Table S7.** Summary descriptive statistics of environmental and anthropogenic variables and their correlation with floating macrolitter concentration. The strength of Spearman’s rank correlation is reported using different shades of blue. Lighter blue corresponds to weak correlations (rho < 0.03), light blue to correlations (0.3< rho <0.5) and blue to strong correlations (rho > 0.5). The statistical significance is reported with different shades of grey. Light grey corresponds to p-values < 0.05, medium grey to p-values < 0.02, and dark grey to p-values < 0.01.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Floating macrolitter | | | | | | | | | | | | | | | | | | |
| Descr.  statistics | **SST**  **(°C)** | **SSH**  **(m)** | **MLD**  **(m)** | **Curr. velocity (m/s)** | **Bath.**  **(m)** | **Vess.**  **all** | **Vess.**  **fishing** | **Vess.**  **sailing** | **Vess.**  **pleasure** | **Vess.**  **passenger** | **Vess.**  **cargo** | **Vess.**  **tanker** | **Dist.**  **port (km)** | **Dist.**  **coast (km)** | **Dist.**  **outfalls (km)** | **Dist.**  **Big**  **outfalls (km)** | **Dist.**  **Little**  **outfalls (km)** | **Plastic density (items/km2)** |
| mean | 23.47 | -0.38 | 12.00 | 0.10 | -723.21 | 7.59 | 0.62 | 2.34 | 1.45 | 2.29 | 0.15 | 0.46 | 24.72 | 16.70 | 30.20 | 38.15 | 46.15 | 399.01 |
| sd | 3.17 | 0.11 | 0.68 | 0.08 | 843.70 | 76.93 | 2.20 | 28.37 | 15.97 | 31.22 | 0.35 | 6.34 | 20.12 | 18.59 | 17.37 | 21.14 | 32.00 | 485.84 |
| median | 24.48 | -0.41 | 11.89 | 0.07 | -216.60 | 1.13 | 0.00 | 0.26 | 0.27 | 0.04 | 0.00 | 0.00 | 19.87 | 5.98 | 28.83 | 37.31 | 37.86 | 219.37 |
| trimmed | 23.64 | -0.38 | 11.90 | 0.09 | -588.92 | 1.73 | 0.17 | 0.36 | 0.32 | 0.12 | 0.07 | 0.02 | 21.90 | 13.52 | 28.93 | 37.14 | 41.98 | 305.39 |
| mad | 3.57 | 0.13 | 0.07 | 0.05 | 287.52 | 1.36 | 0.00 | 0.31 | 0.30 | 0.06 | 0.00 | 0.00 | 19.36 | 6.91 | 16.12 | 22.43 | 30.00 | 248.66 |
| min | 17.03 | -0.59 | 11.58 | 0.00 | -2617.4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.38 | 0.26 | 2.69 | 3.94 | 2.69 | 0.00 |
| max | 28.12 | -0.17 | 18.10 | 0.37 | -3.98 | 1267.23 | 24.70 | 468.95 | 263.90 | 515.59 | 3.14 | 104.75 | 78.84 | 70.59 | 77.76 | 82.05 | 132.49 | 3,974.39 |
| range | 11.09 | 0.42 | 6.52 | 0.37 | 2613.47 | 1267.23 | 24.70 | 468.95 | 263.90 | 515.59 | 3.14 | 104.75 | 77.46 | 70.33 | 75.07 | 78.11 | 129.80 | 3,974.39 |
| skew | -0.41 | 0.08 | 6.64 | 1.31 | -1.08 | 16.09 | 7.56 | 16.29 | 16.22 | 16.28 | 4.40 | 16.31 | 1.00 | 1.24 | 0.63 | 0.35 | 0.99 | 2.61 |
| kurtois | -1.07 | -1.23 | 47.50 | 0.87 | -0.31 | 260.37 | 69.53 | 264.95 | 263.29 | 264.56 | 25.31 | 265.40 | 0.15 | 0.66 | 0.34 | -0.62 | 0.40 | 11.09 |
| se | 0.19 | 0.01 | 0.04 | 0.00 | 51.06 | 4.66 | 0.13 | 1.72 | 0.97 | 1.89 | 0.02 | 0.38 | 1.22 | 1.13 | 1.05 | 1.28 | 1.94 | 29.04 |
| Shapiro-Wilk normality test | | | | | | | | | | | | | | | | | | |
| p-value | 1.11 e-06 | 8.88 e-09 | <2.2e-16 | 1.39e-12 | <2.2e-16 | <2.2e-16 | < 2.2e-16 | <2.2e-16 | <2.2e-16 | < 2.2e-16 | <2.2e-16 | <2.2e-16 | 2.45e-10 | <2.2e-16 | 4.01e-05 | 5.62e-04 | 7.92e-12 | <2.2e-16 |
| Anderson-Darling test | | | | | | | | | | | | | | | | | | |
| p-value | 7.22e-12 | 4.28e-11 | <2.2e-16 | <2.2e-16 | <2.2e-16 | <2.2e-16 | < 2.2e-16 | <2.2e-16 | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | < 2.2e-16 | <2.2e-16 | 7.89e-05 | 1.46e-06 | 3.35e-16 | <2.2e-16 |
| \*Spearman’s rank correlation | | | | | | | | | | | | | | | | | | |
| rho | 0.24 | 0.22 | -0.17 | -0.27 | 0.33 | 0.076 | 0.25 | 0.17 | -0.022 | -0.055 | -0.24 | -0.19 | -0.34 | -0.36 | -0.085 | -0.18 | -0.12 |  |
| p-value | 0.0001 | 0.00028 | 0.0064 | 1.09e-05 | 2.22e-08 | 0.21 | 2.90e-05 | 0.004579 | 0.7224 | 0.3621 | 4.23e-05 | 0.001198 | 7.80E-09 | 8.023E-07 | 0.1605 | 0.002301 | 0.04737 |  |

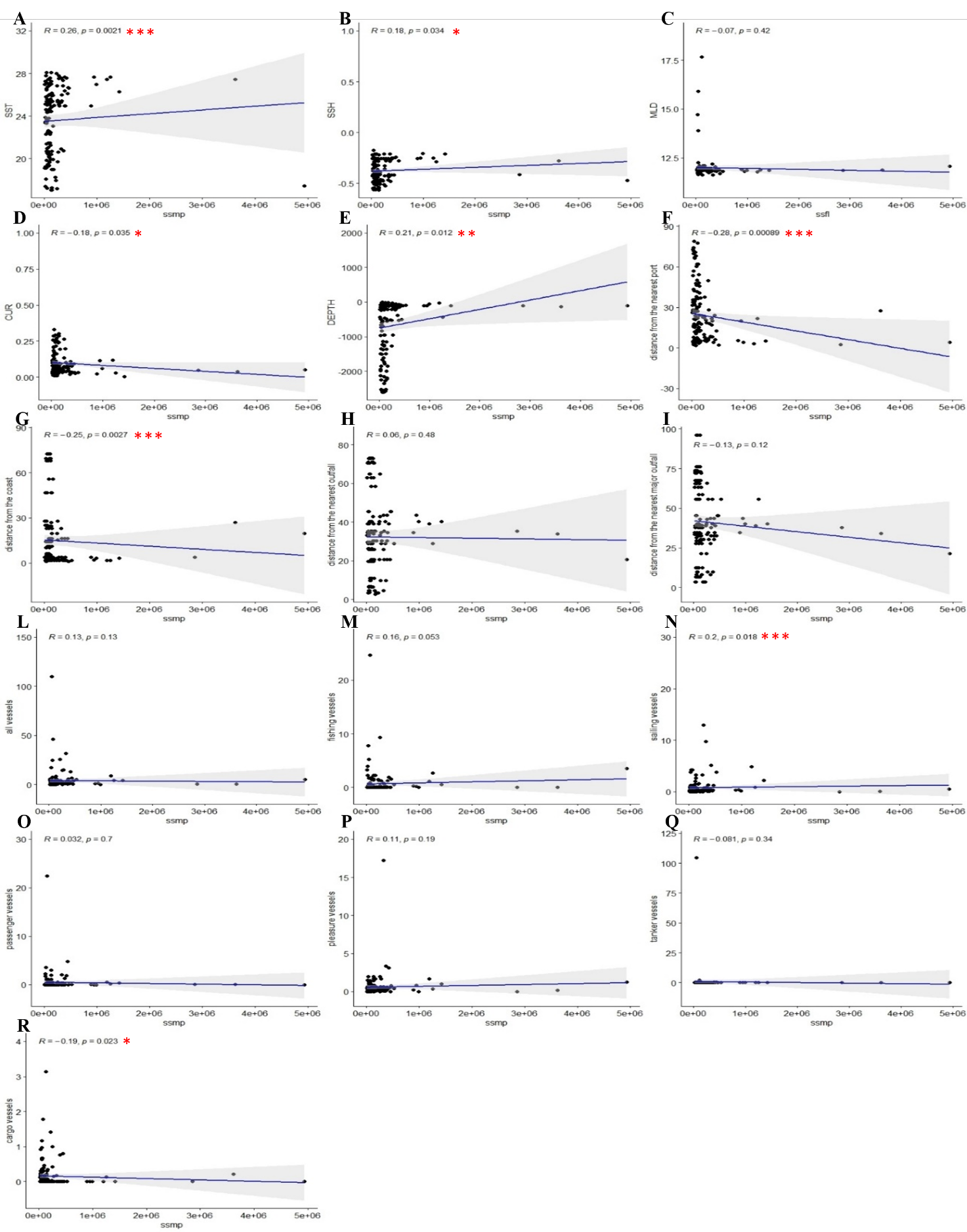
**Figure S3.** Correlation scatterplots among floating macrolitter concentration and environmental (SST (A), SSH (B), MLD (C), Current velocity (D), and Depth (E)) and anthropogenic (distance from ports (F), distance from the coast (G), distance from rivers outfalls (H and I) and marine traffic (L - R)) factors. The crescent number of \* symbol indicates the statistical significance strength (\* p-values < 0.05, \*\* p-values < 0.02, \*\*\* p-values < 0.01).



**Table S8.** Summary descriptive statistics of environmental and anthropogenic variables and their correlation with MPs concentration. The strength of Spearman’s rank correlation is reported using different shades of blue. Lighter blue corresponds to weak correlations (rho < 0.03), light blue to correlations (0.3 < rho < 0.5) and blue to strong correlations (rho > 0.5). The statistical significance is reported with different shades of grey. Light grey corresponds to p-values < 0.05, medium grey to p-values < 0.02, and dark grey to p-values < 0.01.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MPs | | | | | | | | | | | | | | | | | | |
| Descr.  statistics | **SST**  **(°C)** | **SSH**  **(m)** | **MLD**  **(m)** | **Curr. velocity (m/s)** | **Bath.**  **(m)** | **Vess.**  **all** | **Vess.**  **fishing** | **Vess.**  **sailing** | **Vess.**  **pleasure** | **Vess.**  **passenger** | **Vess.**  **cargo** | **Vess.**  **tanker** | **Dist.**  **port (km)** | **Dist.**  **coast (km)** | **Dist.**  **outfalls (km)** | **Dist.**  **Big**  **outfalls (km)** | **Dist.**  **Little**  **outfalls (km)** | **Plastic density (items/km2)** |
| mean | 23.59 | -0.38 | 12.00 | 0.10 | -681.73 | 3.90 | 0.68 | 0.77 | 0.59 | 0.45 | 0.15 | 0.81 | 23.94 | 14.73 | 32.20 | 41.21 | 45.59 | 259,490 |
| sd | 3.21 | 0.11 | 0.67 | 0.08 | 835.86 | 10.74 | 2.41 | 1.62 | 1.52 | 1.99 | 0.38 | 8.82 | 19.94 | 19.21 | 19.61 | 21.80 | 31.84 | 586,477 |
| median | 24.57 | -0.41 | 11.89 | 0.07 | -173.60 | 1.33 | 0.00 | 0.30 | 0.32 | 0.04 | 0.00 | 0.00 | 19.00 | 3.84 | 30.38 | 39.16 | 37.86 | 105,195 |
| trimmed | 23.78 | -0.38 | 11.90 | 0.08 | -539.13 | 1.88 | 0.21 | 0.39 | 0.36 | 0.12 | 0.06 | 0.02 | 21.01 | 10.20 | 30.77 | 40.88 | 41.43 | 139,875 |
| mad | 3.55 | 0.14 | 0.06 | 0.05 | 208.67 | 1.40 | 0.00 | 0.40 | 0.38 | 0.06 | 0.00 | 0.00 | 19.26 | 3.38 | 14.71 | 16.90 | 29.28 | 85,294 |
| min | 17.05 | -0.57 | 11.62 | 0.00 | -2,607.5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.92 | 1.19 | 2.69 | 3.44 | 2.69 | 15,757 |
| max | 28.09 | -0.17 | 17.67 | 0.33 | -3.98 | 109.75 | 24.70 | 12.95 | 17.23 | 22.47 | 3.14 | 104.75 | 78.84 | 72.57 | 73.08 | 96.13 | 132.35 | 4,933,909 |
| range | 11.04 | 0.39 | 6.04 | 0.33 | 2,603.6 | 109.75 | 24.70 | 12.95 | 17.23 | 22.47 | 3.14 | 104.75 | 76.92 | 71.38 | 70.39 | 92.69 | 129.66 | 4,918,152 |
| skew | -0.43 | 0.04 | 6.49 | 1.32 | -1.16 | 7.47 | 7.60 | 4.77 | 9.37 | 9.77 | 4.68 | 11.61 | 1.04 | 1.85 | 0.55 | 0.25 | 0.99 | 5.67 |
| kurtois | -1.09 | -1.27 | 44.98 | 0.72 | -0.13 | 66.14 | 68.61 | 27.86 | 98.60 | 104.03 | 28.19 | 133.85 | 0.24 | 2.48 | -0.33 | -0.49 | 0.47 | 36.23 |
| se | 0.28 | 0.01 | 0.06 | 0.01 | 70.39 | 0.90 | 0.20 | 0.14 | 0.13 | 0.17 | 0.03 | 0.74 | 1.68 | 1.62 | 1.65 | 1.84 | 2.68 | 49,390 |
| Shapiro-Wilk normality test | | | | | | | | | | | | | | | | | | |
| p-value | 1.627e-03 | 1.209e-02 | <2.2e-16 | 2.81e-08 | 3.99e-11 | <2.2e-16 | <2.2e-16 | <2.2e-16 | < 2.2e-16 | < 2.2e-16 | <2.2e-16 | < 2.2e-16 | 2.44e-09 | 7.78E-13 | 9.622E-04 | 0.00014 | 1.21e-07 | <2.2e-16 |
| Anderson-Darling test | | | | | | | | | | | | | | | | | | |
| p-value | 2.43e-05 | 1.57e-04 | <2.2e-16 | <2.2e-16 | <2.2e-16 | <2.2e-16 | < 2.2e-16 | <2.2e-16 | < 2.2e-16 | < 2.2e-16 | <2.2e-16 | <2.2e-16 | 1.40e-09 | <2.2e-16 | 1.19e-07 | 6.40e-03 | 3.80e-08 | < 2.2e-16 |
| \*Spearman’s rank correlation | | | | | | | | | | | | | | | | | | |
| rho | 0.26 | 0.18 | -0.070 | -0.18 | 0.21 | 0.13 | 0.16 | 0.20 | 0.11 | 0.032 | -0.19 | -0.081 | -0.28 | -0.25 | 0.060 | -0.13 | -0.013 |  |
| p-value | 0.0021 | 0.034 | 0.42 | 0.035 | 0.012 | 0.13 | 0.052 | 0.017 | 0.19 | 0.70 | 0.023 | 0.34 | 0.00085 | 0.0027 | 0.48 | 0.12 | 0.88 |  |

**Figure S4.** Correlation scatterplots among floating microlitter concentration and environmental (SST (A), SSH (B), MLD (C), Current velocity (D), and Depth (E)) and anthropogenic (distance from ports (F), distance from the coast (G), distance from rivers outfalls (H and I) and marine traffic (L - R)) factors. The crescent number of the \* symbol indicates the statistical significance strength (\* p-values < 0.05, \*\* p-values < 0.02, \*\*\* p-values < 0.01).



**Table S9.** Generalized additive models (GAMs) results for each environmental and anthropogenic factor potentially influencing the floating macrolitter distribution. The corresponding p-value of each variable and the deviance of data explained (%) were shown. Variables significantly influencing the floating macrolitter concentrations were highlighted in blue. The crescent number of the \* symbol indicates the statistical significance strength (\* p-values < 0.05, \*\* p-values < 0.02, \*\*\* p-values < 0.01).

|  |  |  |
| --- | --- | --- |
| **GAM for environmental variables** | **p-value** | **Deviance explained** |
| Floating macrolitter conc. ~ s(sst) | 6.45e-05 \*\*\* | 10.2% |
| Floating macrolitter conc. ~ s(ssh) | 6.14e-06 \*\*\* | 7.55% |
| Floating macrolitter conc. ~ s(mld) | 0.0597 | 1.34% |
| Floating macrolitter conc. ~ s(mld without outliers) | 0.221 | 0.578% |
| Floating macrolitter conc. ~ s(cur) | 6.64e-05 \*\*\* | 5.9% |
| Floating macrolitter conc. ~ s(bath) | 0.0597 | 1.34% |
| **GAM for anthropic variables sources** | **p-value** | **Deviance explained** |
| Floating macrolitter conc. ~ s(v\_all conc.) | 0.071 | 1.2% |
| Floating macrolitter conc. ~ s(v\_all conc. without outliers) | 0.682 | 0.0652% |
| Floating macrolitter conc. ~ s(v\_fishing conc.) | 0.415 | 0.246% |
| Floating macrolitter conc. ~ s(v\_fishing conc. without outliers) | 0.419 | 0.506% |
| Floating macrolitter conc. ~ s(v\_sailing conc.) | 0.0567 | 1.36% |
| Floating macrolitter conc. ~ s(v\_sailing conc. without outliers) | 0.256 | 0.482% |
| Floating macrolitter conc. ~ s(v\_pleasure conc.) | 0.0601 | 1.3% |
| Floating macrolitter conc. ~ s(v\_pleasure conc. without outliers) | 0.273 | 0.45% |
| Floating macrolitter conc. ~ s(v\_passenger conc.) | 0.0642 | 1.26% |
| Floating macrolitter conc. ~ s(v\_passenger conc. without outliers) | 0.383 | 0.292% |
| Floating macrolitter conc. ~ s(v\_tanker conc.) | 0.241 | 1.44% |
| Floating macrolitter conc. ~ s(v\_tanker conc. without outliers) | 0.108 | 2.06% |
| Floating macrolitter conc. ~ s(v\_cargo conc.) | 0.128 | 2.19% |
| Floating macrolitter conc. ~ s(v\_cargo conc. without outliers) | 0.0412 \* | 3.29% |
| Floating macrolitter conc. ~ s(d\_coast) | 1.19e-06 \*\*\* | 11.8% |
| Floating macrolitter conc. ~s(d\_port) | 1.47e-06 \*\*\* | 8.44% |
| Floating macrolitter conc. ~ s(d\_outfall) | 2.42e-05 \*\*\* | 13.9% |
| Floating macrolitter conc. ~ s(d\_big\_outfall) | 0.000132 \*\*\* | 9.02% |
| Floating macrolitter conc. ~ s(d\_little\_outfall) | 3.96e-05 \*\*\* | 11% |

**Table S10.** Generalized additive models (GAMs) results for each environmental and anthropogenic factor potentially influencing the MPs distribution. The corresponding p-value of each variable and the deviance of data explained (%) were shown. Variables significantly influencing the MPs concentrations were highlighted in blue. The crescent number of \* symbol indicates the statistical significance strength (\* p-values < 0.05, \*\* p-values < 0.02, \*\*\* p-values < 0.01).

|  |  |  |
| --- | --- | --- |
| **GAM for environmental variables** | **p-value** | **Deviance explained** |
| MPs concentration ~ s(sst) | 0.0278 \* | 7.97% |
| MPs concentration ~ s(ssh) | 0.217 | 1.14% |
| MPs concentration ~ s(mld) | 0.609 | 0.197% |
| MPs concentration ~ s(mld without outliers) | 0.439 | 0.464% |
| MPs concentration ~ s(cur) | 0.0647 | 2.53% |
| Floating litter density ~ s(bath) | 0.0242 \* | 3.61% |
| **GAM for pollution sources** | **p-value** | **Deviance explained** |
| MPs concentration ~ s(v\_all density) | 0.844 | 0.0297% |
| MPs concentration ~ s(v\_all density without outliers) | 0.112 | 1.93% |
| MPs concentration ~ s(v\_fishing density) | 0.298 | 2.9% |
| MPs concentration ~ s(v\_fishing density without outliers) | 0.283 | 0.872% |
| MPs concentration ~ s(v\_sailing density) | 0.644 | 0.155% |
| MPs concentration ~ s(v\_sailing density without outliers) | 0.521 | 0.303% |
| MPs concentration ~ s(v\_pleasure density) | 0.593 | 0.209% |
| MPs concentration ~ s(v\_pleasure density without outliers) | 0.227 | 1.08% |
| MPs concentration ~ s(v\_passenger density) | 0.645 | 0.154% |
| MPs concentration ~ s(v\_passenger density without outliers) | 0.572 | 0.237% |
| MPs concentration ~ s(v\_tanker density) | 0.715 | 0.0981% |
| MPs concentration ~ s(v\_tanker density without outliers) | 0.509 | 0.322% |
| MPs concentration ~ s(v\_cargo density) | 0.478 | 0.364% |
| MPs concentration ~ s(v\_cargo density without outliers) | 0.469 | 0.388% |
| MPs concentration ~ s(d\_coast) | 0.455 | 0.402% |
| MPs concentration ~s(d\_port) | 0.0237 \* | 3.64% |
| MPs concentration ~ s(d\_outfall) | 0.236 | 3.06% |
| MPs concentration ~ s(d\_big\_outfall) | 0.250 | 2.9% |
| MPs concentration ~ s(d\_little\_outfall) | 0.402 | 0.507% |