

Monitoring of Contaminants of Environmental Concerns along the coastlines of the Mediterranean Sea: the ONE-BLUE project



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State of the art

The Mediterranean Sea is a semi-enclosed basin that is exposed to intense anthropogenic pressure. The presence of emerging contaminants in this area is a growing concern for the integrity of the ecosystem and human health. In this context, the ONE-BLUE project aims to strengthen transnational knowledge and monitoring capacity by evaluating the occurrence and distribution of emerging contaminants across key sub-regions of the Mediterranean Sea.

Sampling and Analysis

Environmental samples were collected from five representative areas of the Mediterranean: the Spanish coast, the Tyrrhenian Sea, the Ionian Sea, the Adriatic Sea, and the Aegean Sea. Here we present the preliminary findings for pharmaceuticals, industrial chemicals, and other markers of human activity in the seas surrounding the Italian peninsula.

Italian peninsula: Pharmaceutical and Industrial Chemicals

Point-source inputs are rapidly diluted, resulting in a diffuse, ubiquitous presence inshore and offshore.

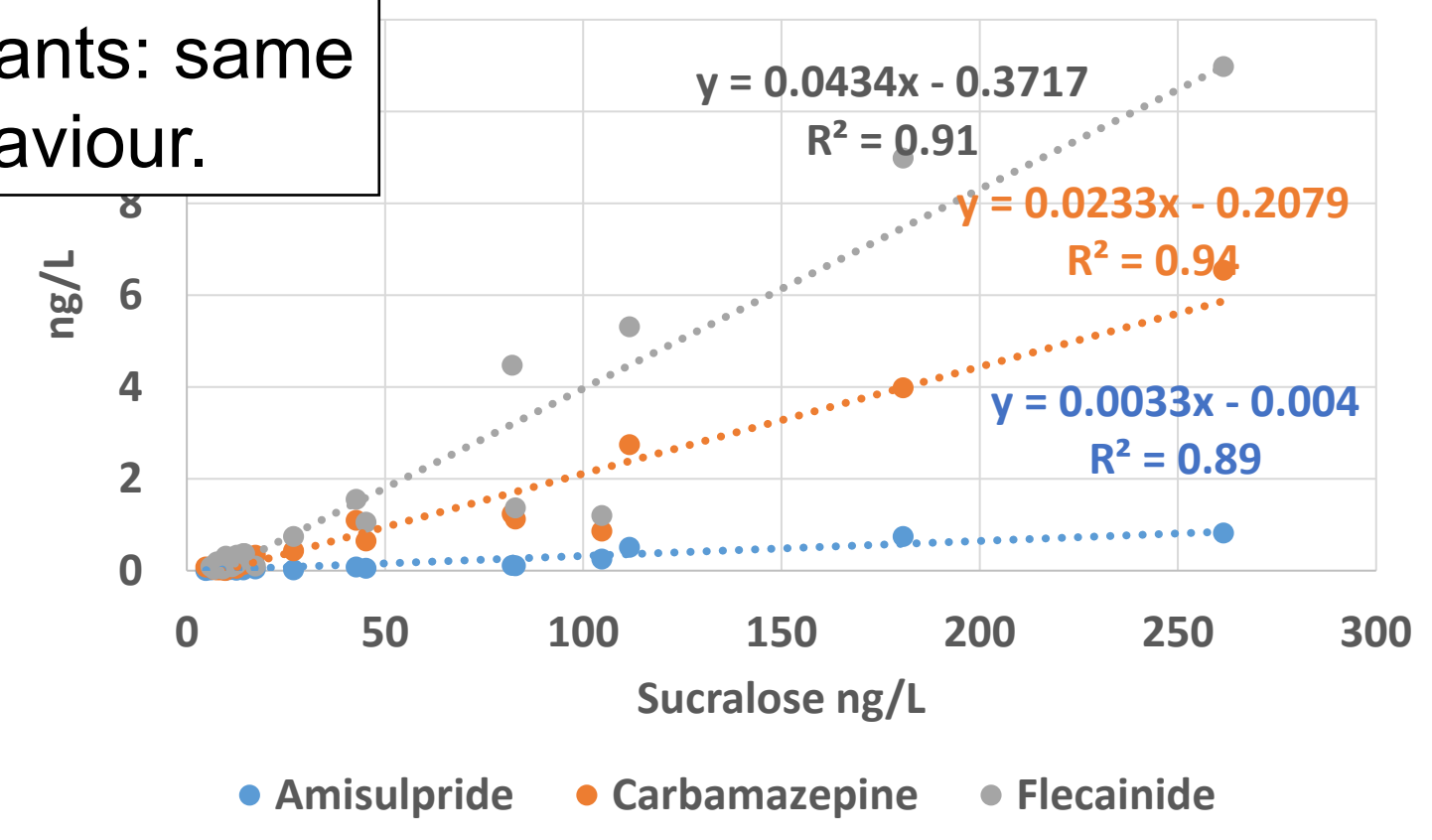
Input of Arno river dominates on coastal inputs

Adriatic Sea presents overall higher contamination

Adriatic 197 ng/L
Ionian and Tyrrhenian 31 ng/L
Median values

Sum CECs DF>75%
ng/L
• 16 - 30
• 30 - 75
• 75 - 125
• 125 - 215
• 215 - 300
• 300 - 615
Benzotriazole, Amisulpride, Atenolol, Carbamazepine, Flecainide, Caffeine and Sucralose

Other ubiquitous domestic contaminants: same sources and environmental behaviour.



Sucralose: domestic recalcitrant contaminant found in densely populated areas.

Industrial chemicals: higher levels in areas where industry is prevalent.

5-methyl-benzotriazole
ng/L
• 0.4 - 0.8
• 0.8 - 1.5
• 1.5 - 3
• 3 - 5.9
• 5.9 - 10
• 10 - 13.5

Caffeine: tracer of undepurated domestic waste.

Caffeine
ng/L
• 8 - 29
• 29 - 76
• 76 - 161
• 161 - 265
• 265 - 320

See also

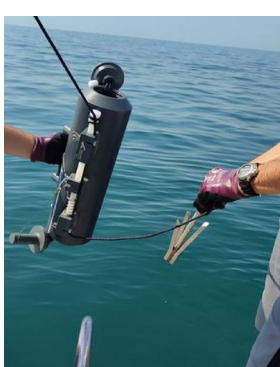
3.21.P-Tu350 State of Pharmaceutical Pollution in Italian Waters and Estimation of the Load Discharged from Rivers into Coastal Waters

Mediterranean Case study sampling strategy

5 study areas: Spanish coast, Tyrrhenian Sea, Ionian Sea, Northern and Mid Adriatic Sea, Aegean Sea

8 Partners: CNR-IRSA, IDAEA-CSIC, ICM-CSIC, HCMR, UNIPD, UNIDU, UMIL, ARPAT

Sea water sampling



Sampled at different depths:

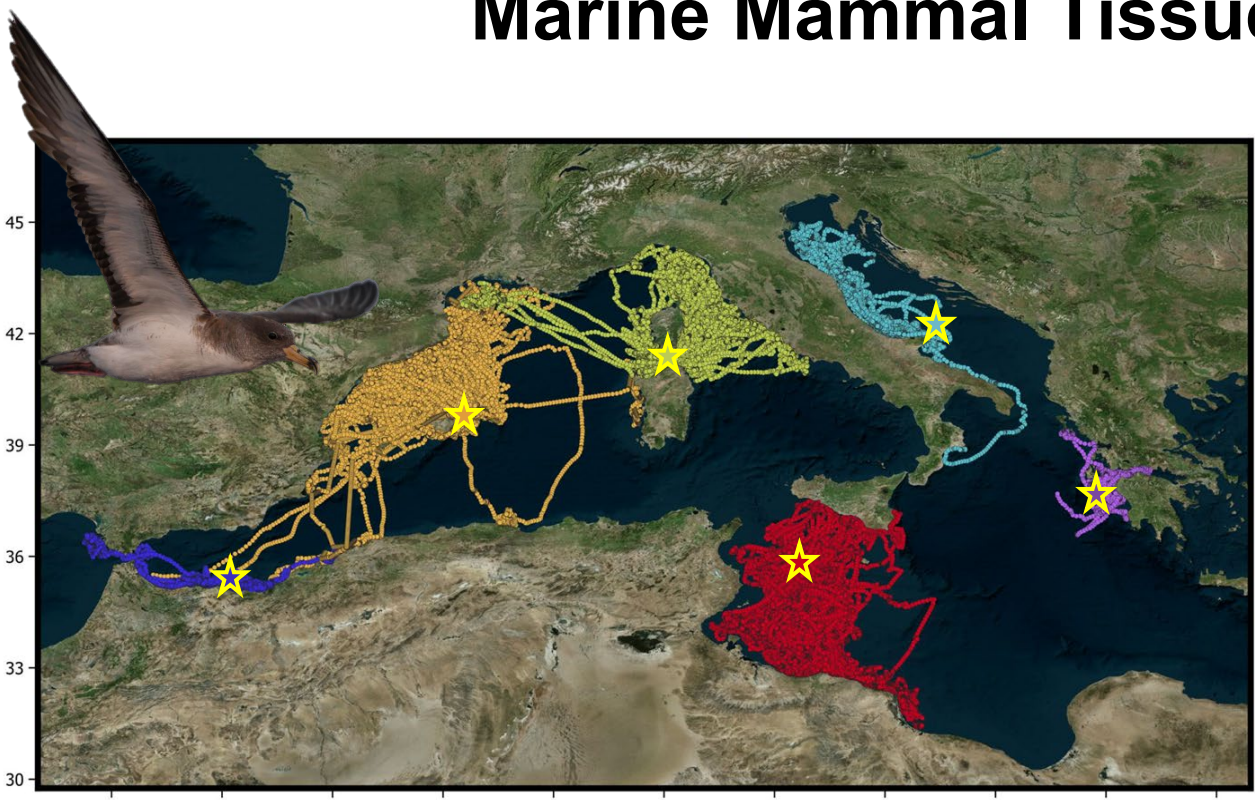
- Coastal stations: surface and bottom
- Offshore stations: surface, medium and bottom

Sediment sampling:

- Ekman dredge
- Box corer



Marine Mammal Tissue Bank



Wild bird blood sampling (Scopoli's shearwater nestlings)

Biota from local fishermen or local angling club at 3 trophic levels

Chemical Analysis

➤ **Target Analysis**
pharmaceuticals, personal care products, food additive, pesticides, PFAS

➤ **Suspect Screening**
by tailored mass lists

First multiresidual analysis

- 1 industrial chemical
- 1 food additive
- 1 antithrombotic agent
- 2 antiarrhythmic
- 2 diuretic
- 2 hormonal contraceptive
- 2 preservative
- 2 antimycotic
- 3 pharma metabolite
- 3 drugs for acid related disorders
- 4 antiviral
- 4 betablocking agent
- 4 antiepileptic
- 4 analgesic
- 5 anti-inflammatory and antirheumatic
- 7 psychoanaleptic
- 7 lipid modifying agent
- 26 anti-infective
- 10 other uses

