# SWIM and Horizon 2020 Support Mechanism

**Working for a Sustainable Mediterranean, Caring for our Future**

# MONITORING MARINE LITTER ON BEACHES – DATA ANALYSIS


Presented by:

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SWIM-H2020 SM / MIO-ECSDE Marine Litter Expert


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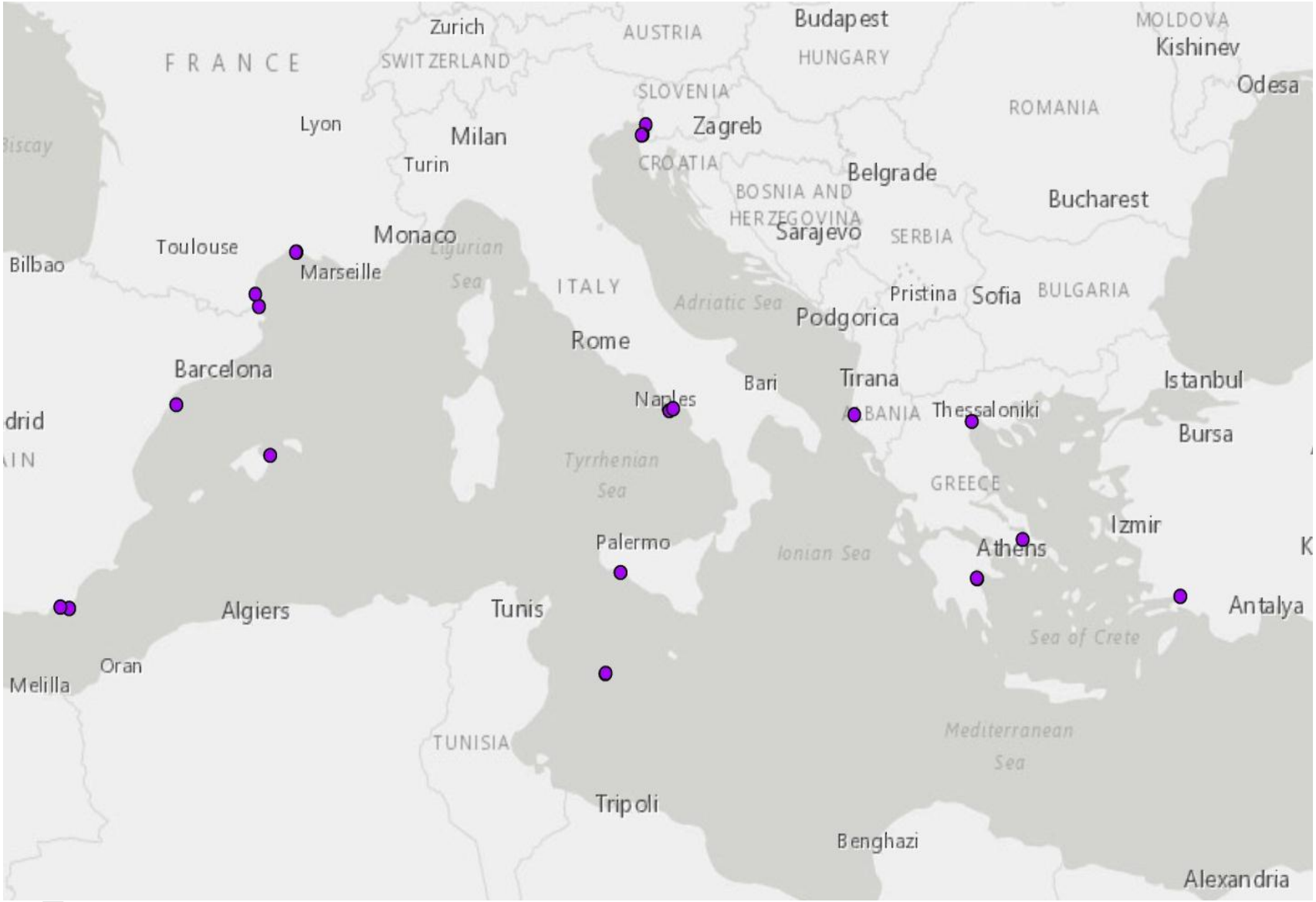
# THE ACT4LTTER MLWM CASE STUDY





# ML DENSITY



Macro-debris density is calculated as follows (Lippiatt et al., 2013):

$$C_M = n/(w \times l),$$

where $C_M$ is the density of litter items per $m^2$, w and l are the width and length of the sampling unit respectively.

# MARINE LITTER DENSITIES



| Beach code | Beach name | Average number of items per 100m stretch |
|---|---|---|
| GRE-ALI | Alyki Kitrous | 12896* |
| ITA-MIR | Miramare | 2050 |
| FRA-CRO | Crouste | 1182 |
| SPA-MES | Cala Mesquida | 1134 |
| ITA-TOR | Tordigliano | 752 |
| ITA-MAR | Marina del Cantone | 681 |
| ITA-PAL | Cala Palme | 535 |
| SPA-TGA | Torre Garcia | 467* |
| ALB-ZVE | Zvernec | 444 |
| ITA-PIS | Cala Pisana | 430 |
| ITA-CAP | Capo San Marco | 405 |
| TUR-ACK | Akcapinar | 399 |
| SLO-STR | Strunjan | 323 |
| SLO-BEL | Bele Skale | 315 |
| SPA-EMB | Embarcadero de los Escullos | 296 |
| GRE-SCH | Schinias | 174 |
| GRE-CHE | Cherronisi | 167 |
| FRA-ESP | Espiguette | 113 |
| FRA-FOU | Fourat | 106 |
| FRA-BOU | Boucanet | 78 |
| GRE-KAZ | Kazarba | 61 |
| SPA-SER | Serrallo | 46 |

| Beach code | Beach name | Average number of items per square metre (items/m²) |
|---|---|---|
| GRE-ALI | Alyki Kitrous | 6,45 |
| ITA-PAL | Cala Palme | 1,07 |
| ITA-TOR | Tordigliano | 1,01 |
| ITA-PIS | Cala Pisana | 0,86 |
| ITA-MIR | Miramare | 0,86 |
| ITA-MAR | Marina del Cantone | 0,53 |
| SLO-STR | Strunjan | 0,32 |
| SLO-BEL | Bele Skale | 0,32 |
| SPA-EMB | Embarcadero de los Escullos | 0,30 |
| FRA-CRO | Crouste | 0,30 |
| ITA-CAP | Capo San Marco | 0,27 |
| SPA-MES | Cala Mesquida | 0,26 |
| SPA-TGA | Torre Garcia | 0,20 |
| TUR-ACK | Akcapinar | 0,16 |
| ALB-ZVE | Zvernec | 0,13 |
| GRE-SCH | Schinias | 0,11 |
| GRE-CHE | Cherronisi | 0,11 |
| FRA-BOU | Boucanet | 0,07 |
| FRA-FOU | Fourat | 0,05 |
| GRE-KAZ | Kazarba | 0,05 |
| FRA-ESP | Espiguette | 0,05 |
| SPA-SER | Serrallo | 0,03 |

# BEACH CLEANLINESS



Beach cleanliness can be assessed through the Clean Coast Index (Alkalay et al., 2007):

Clean Coast Index (CCI) = (Total litter on sampling unit/total area of sampling unit) x K,

where CCI is the number of litter items per $m^2$, the total area of the sampling unit is generated by multiplying the sampling unit's length with the width and K is a constant that equals to 20.

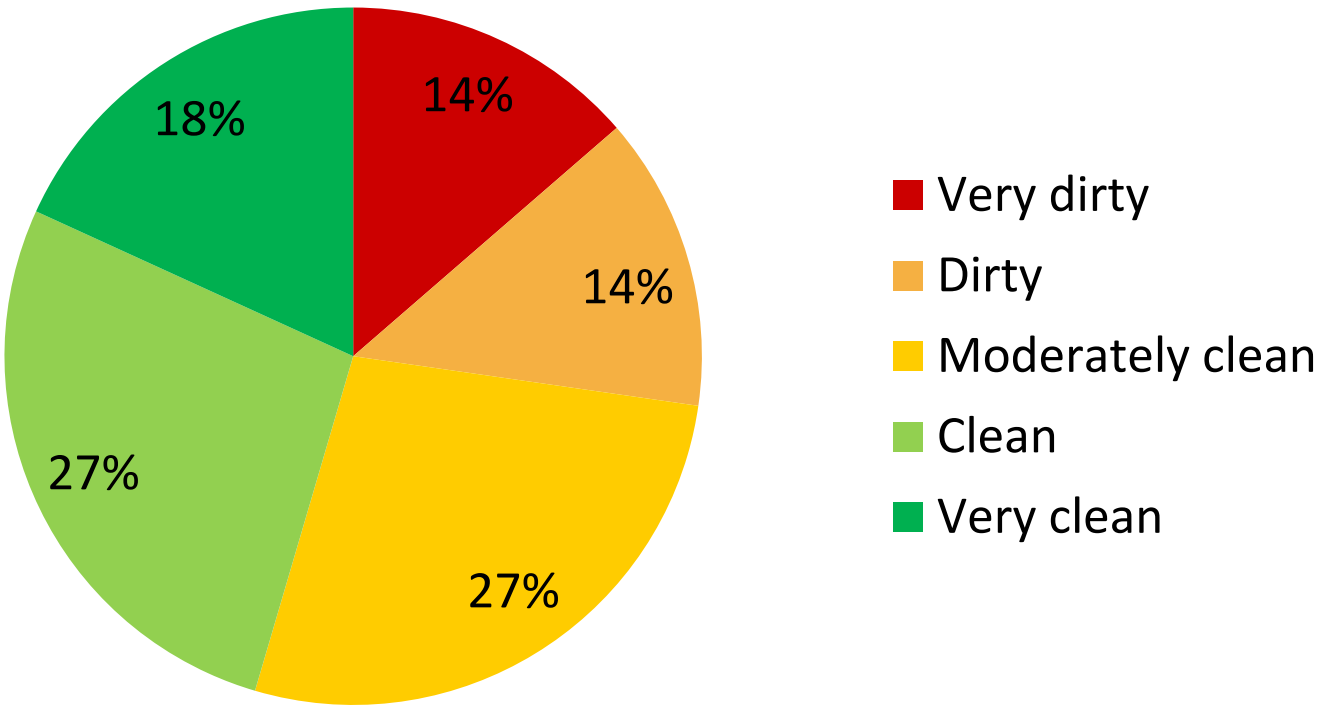
| Quality | Value | Definition |
|---|---|---|
| **Very clean** | 0-2 | No litter is seen |
| **Clean** | 2-5 | No litter is seen over a large area |
| **Moderate** | 5-10 | A few pieces of litter can be detected |
| **Dirty** | 10-20 | A lot of litter on shore |
| **Very dirty** | 20+ | Most of the beach is covered with litter |

# BEACH LITTER CLEANLINESS

| Beach code | Beach name | Clean Coast IndeX (CCI) | Cleanliness |
|---|---|---|---|
| GRE-ALI | Alyki Kitrous | 129,0 | Very dirty |
| ITA-PAL | Cala Palme | 21,4 | Very dirty |
| ITA-TOR | Tordigliano | 20,3 | Very dirty |
| ITA-PIS | Cala Pisana | 17,2 | Dirty |
| ITA-MIR | Miramare | 17,1 | Dirty |
| ITA-MAR | Marina del Cantone | 10,6 | Dirty |
| SLO-STR | Strunjan | 6,5 | Moderately clean |
| SLO-BEL | Bele Skale | 6,3 | Moderately clean |
| SPA-EMB | Embarcadero de los Escullos | 5,9 | Moderately clean |
| FRA-CRO | Crouste | 5,9 | Moderately clean |
| ITA-CAP | Capo San Marco | 5,4 | Moderately clean |
| SPA-MES | Cala Mesquida | 5,3 | Moderately clean |
| SPA-TGA | Torre Garcia | 4,1 | Clean |
| TUR-ACK | Akcapinar | 3,2 | Clean |
| ALB-ZVE | Zvernec | 2,5 | Clean |
| GRE-SCH | Schinias | 2,3 | Clean |
| GRE-CHE | Cherronisi | 2,2 | Clean |
| FRA-BOU | Boucanet | 1,5 | Clean |
| FRA-FOU | Fourat | 1,1 | Very clean |
| GRE-KAZ | Kazarba | 0,9 | Very clean |
| FRA-ESP | Espiguette | 0,9 | Very clean |
| SPA-SER | Serrallo | 0,6 | Very clean |

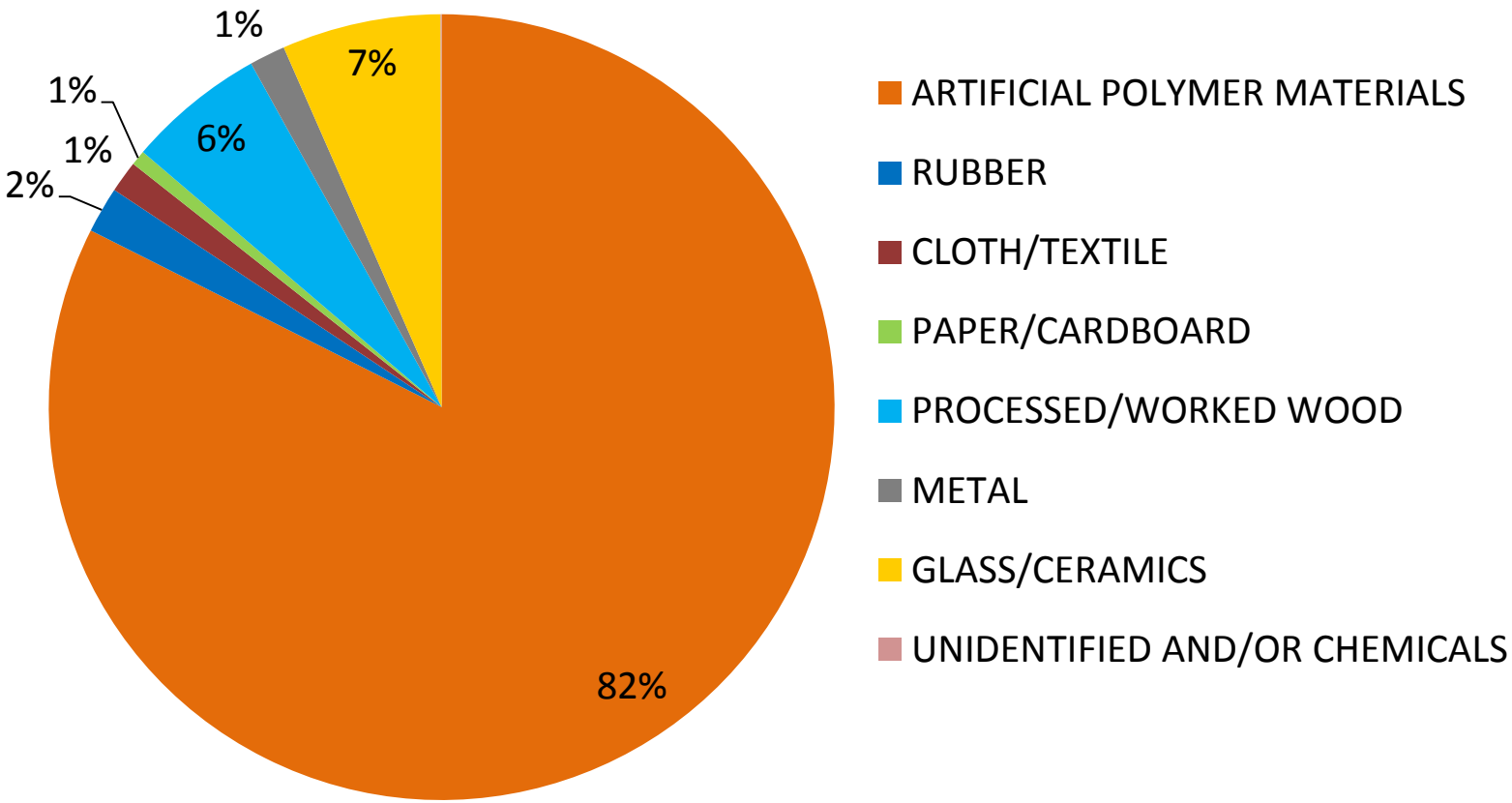
# BEACH CLEANLINESS





# COMPOSITION





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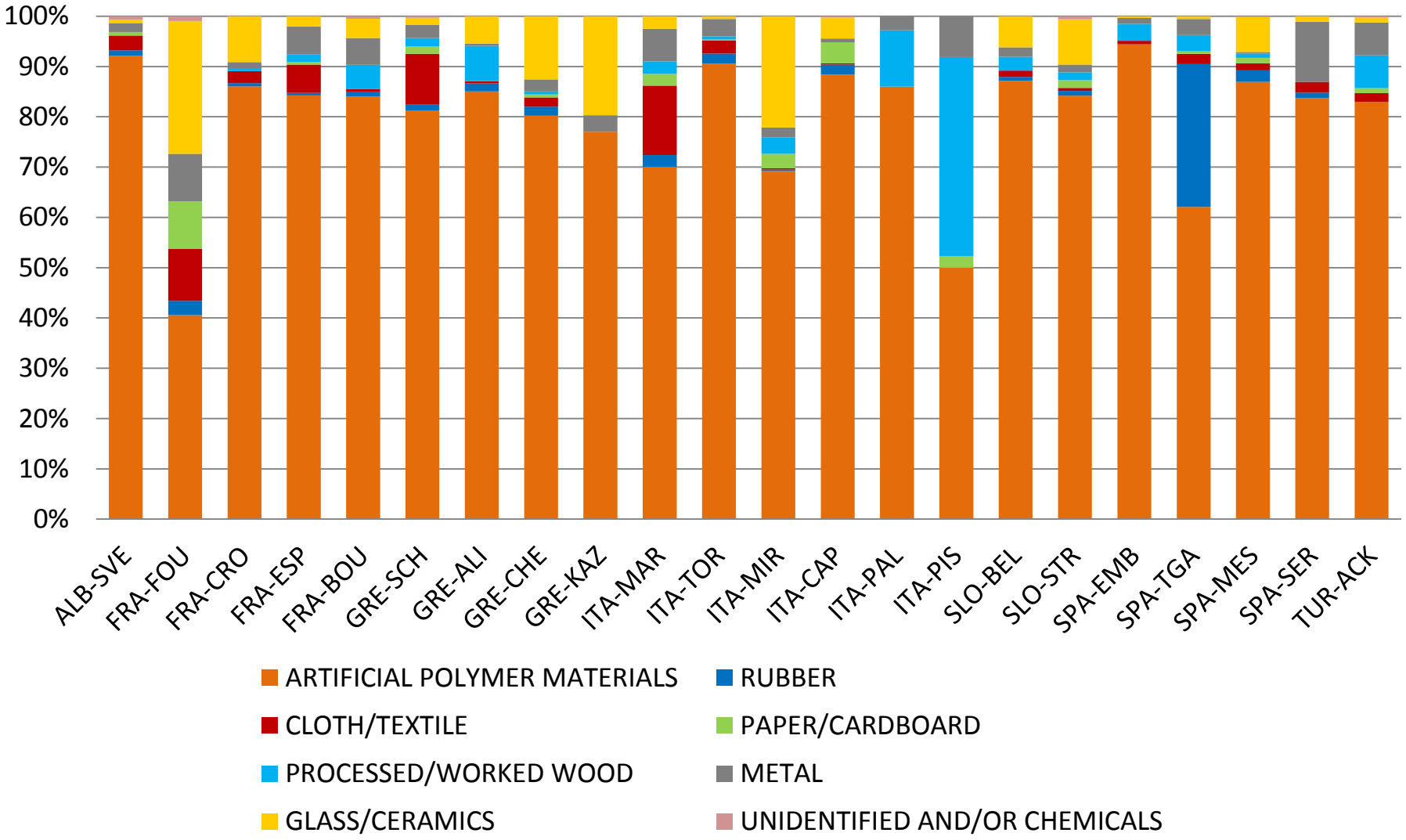


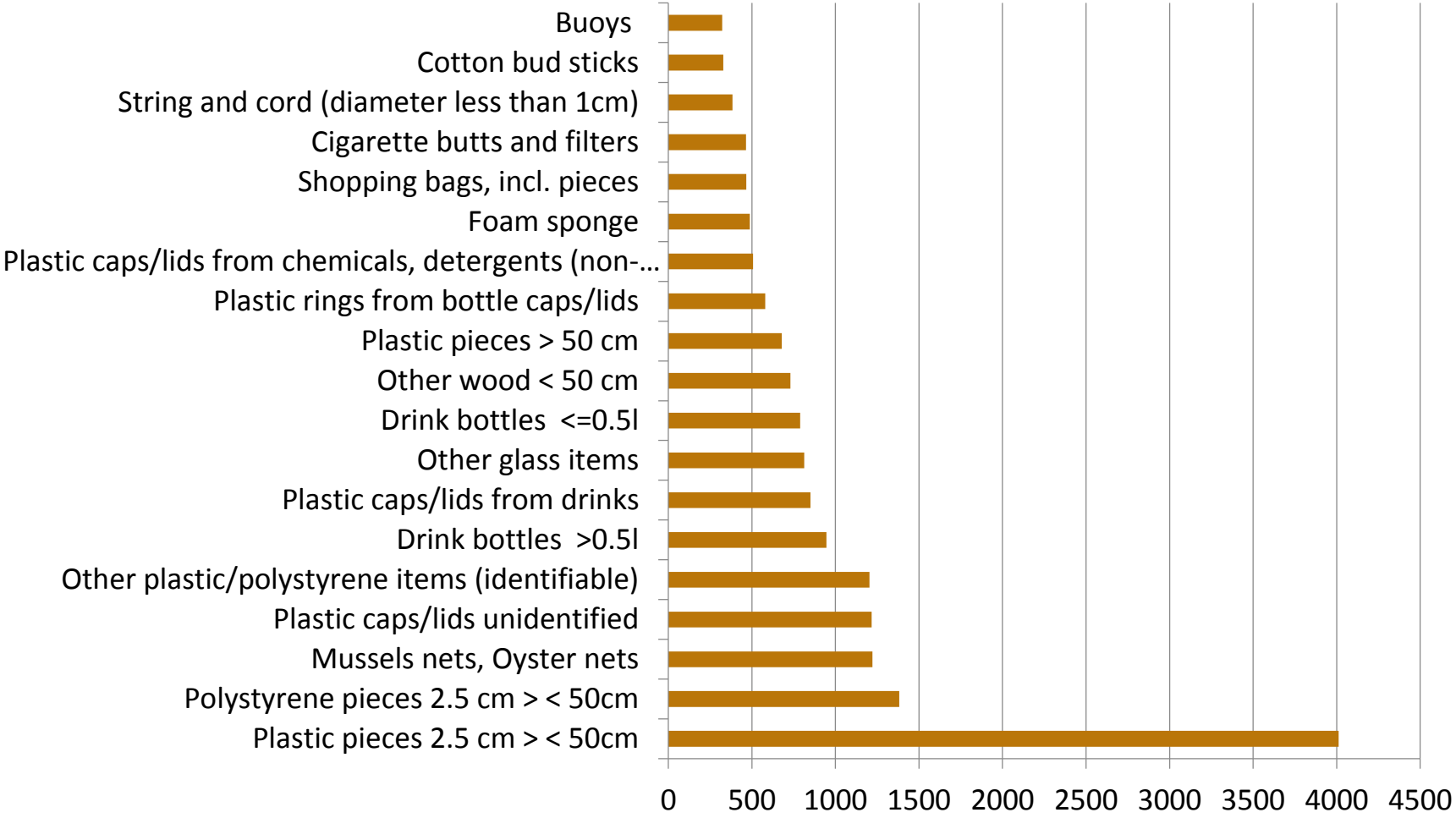
# TOP 20 ITEMS



| | Item code | Item name | Items count | % |
|---|---|---|---|---|
| 1 | G79 | Plastic pieces 2.5 cm > < 50cm | 4012 | 16,3 |
| 2 | G82 | Polystyrene pieces 2.5 cm > < 50cm | 1382 | 5,6 |
| 3 | G45 | Mussels nets, Oyster nets | 1221 | 5,0 |
| 4 | G23 | Plastic caps/lids unidentified | 1217 | 5,0 |
| 5 | G124 | Other plastic/polystyrene items (identifiable) | 1203 | 4,9 |
| 6 | G8 | Drink bottles >0.5l | 946 | 3,8 |
| 7 | G21 | Plastic caps/lids from drinks | 850 | 3,5 |
| 8 | G210 | Other glass items | 814 | 3,3 |
| 9 | G7 | Drink bottles <=0.5l | 789 | 3,2 |
| 10 | G171 | Other wood < 50 cm | 731 | 3,0 |
| 11 | G80 | Plastic pieces > 50 cm | 679 | 2,8 |
| 12 | G24 | Plastic rings from bottle caps/lids | 579 | 2,4 |
| 13 | G22 | Plastic caps/lids from chemicals, detergents (non-food) | 507 | 2,1 |
| 14 | G73 | Foam sponge | 487 | 2,0 |
| 15 | G3 | Shopping bags, incl. pieces | 466 | 1,9 |
| 16 | G27 | Cigarette butts and filters | 464 | 1,9 |
| 17 | G50 | String and cord (diameter less than 1cm) | 383 | 1,6 |
| 18 | G95 | Cotton bud sticks | 329 | 1,3 |
| 19 | G63 | Buoys | 322 | 1,3 |
| 20 | G200 | Bottles, including pieces | 309 | 1,3 |

# TOP 20 ITEMS




Buoys
Cotton bud sticks
String and cord (diameter less than 1cm)
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Shopping bags, incl. pieces
Foam sponge
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Plastic rings from bottle caps/lids
Plastic pieces > 50 cm
Other wood < 50 cm
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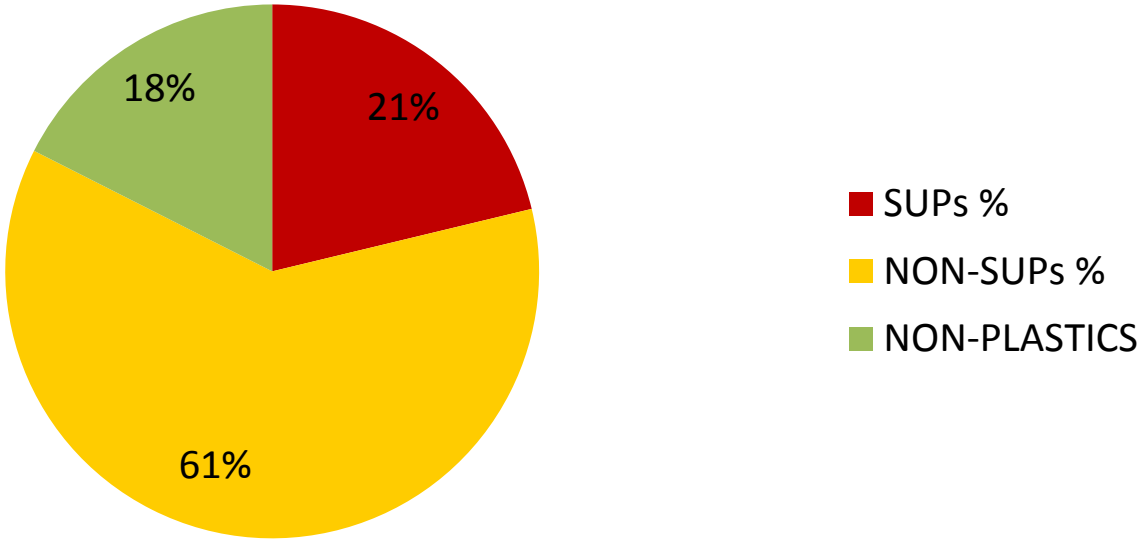
Other glass items
Plastic caps/lids from drinks
Drink bottles >0.5l
Other plastic/polystyrene items (identifiable)
Plastic caps/lids unidentified
Mussels nets, Oyster nets
Polystyrene pieces 2.5 cm > < 50cm
Plastic pieces 2.5 cm > < 50cm
0
500
1000
1500
2000
2500
3000
3500
4000
4500

# SINGLE-USE ITEMS

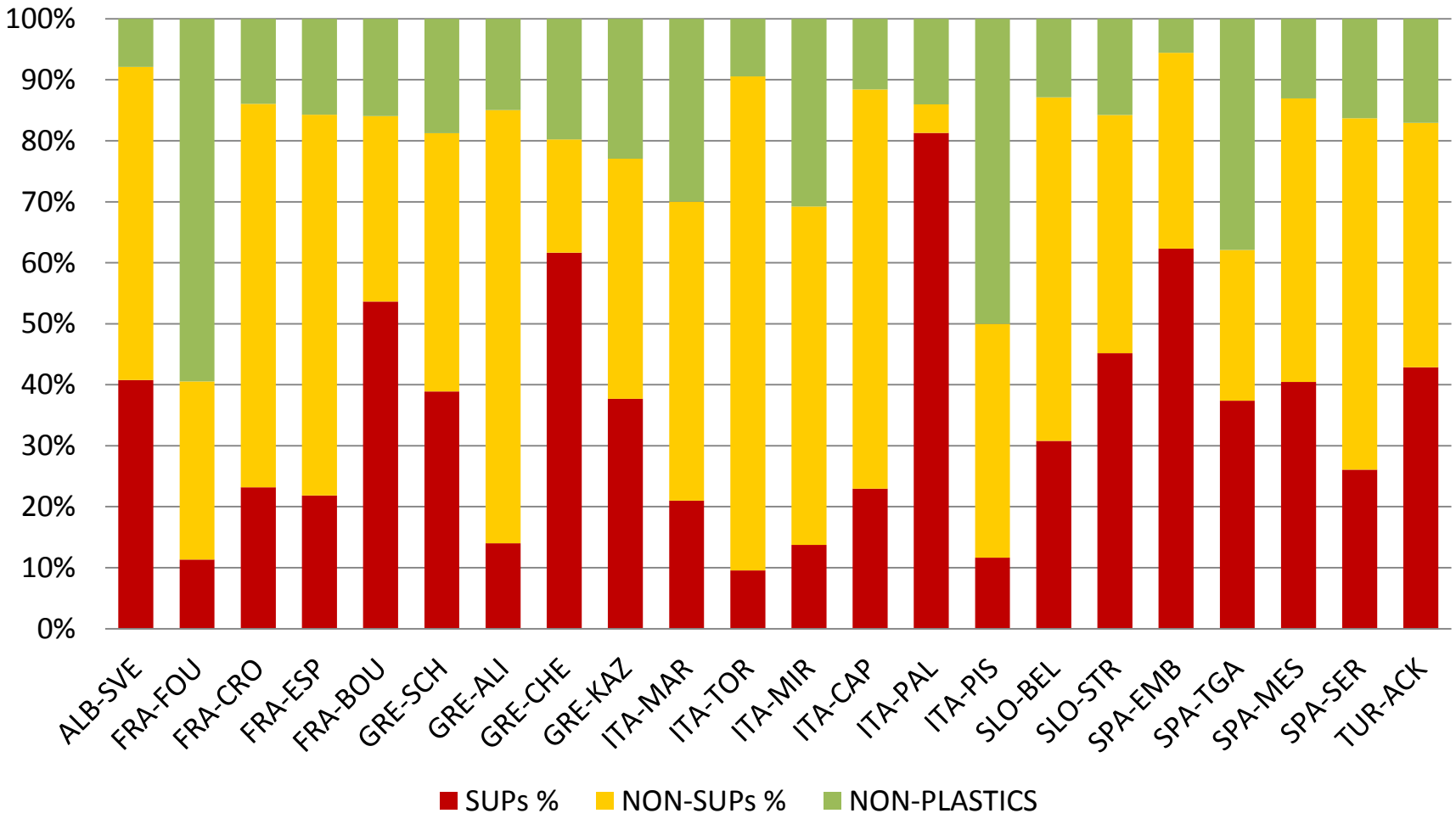





As single-use plastics the following items were considered: shopping bags, including pieces (G3), drink bottles <=0.5l (G7), drink bottles >0.5l (G8), food containers including fast food containers (G10), plastic caps/lids from drinks (G21), cigarette butts and filters (G27), crisps packets/sweets wrappers (G30), lolly sticks (G31), cups and cup lids (G33), cutlery and trays (G34), straws and stirrers (G35), cotton bud sticks (G95) and sanitary towels/panty liners/backing strips (G96), toilet fresheners (G97).

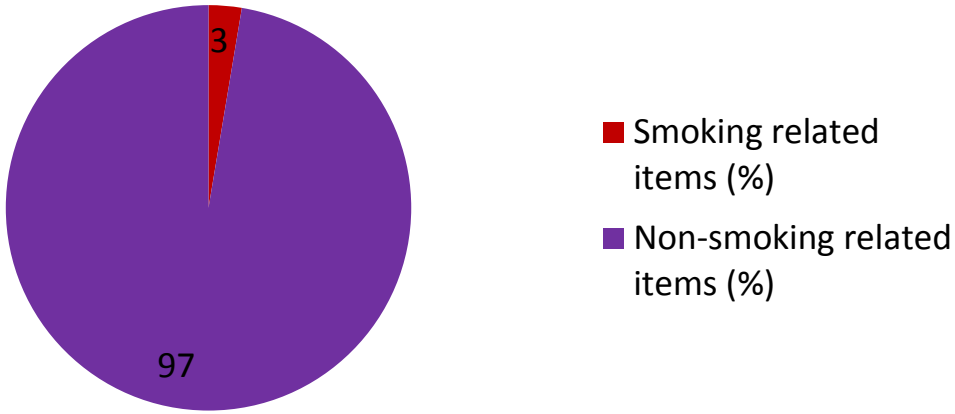
# SINGLE-USE ITEMS

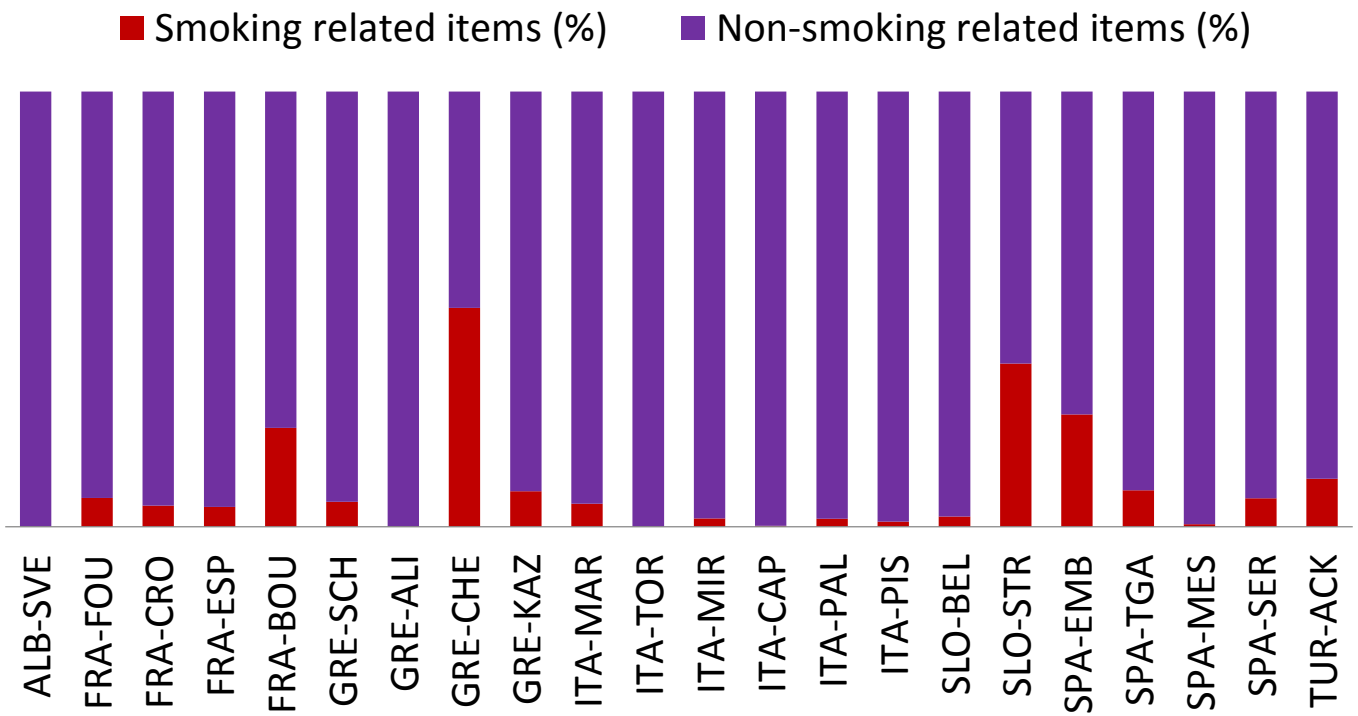




# SMOKING RELATED ITEMS

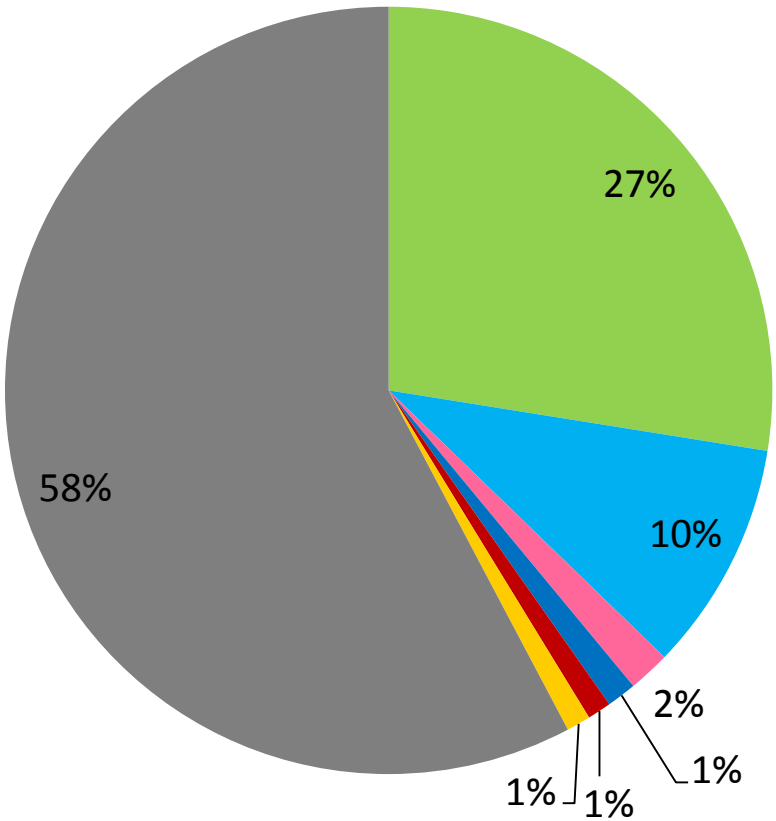




# SOURCES OF ML

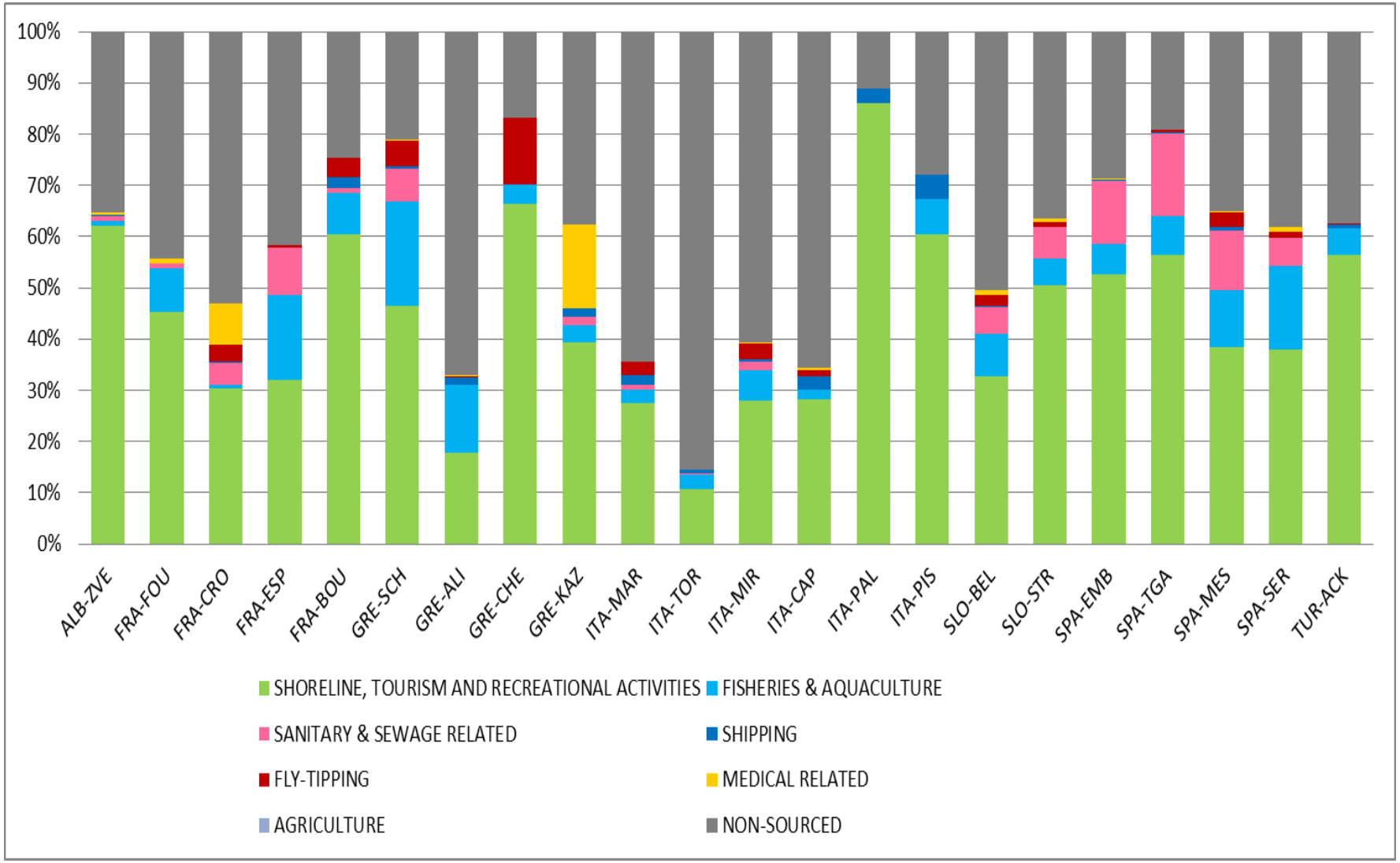





- SHORELINE, TOURISM AND RECREATIONAL ACTIVITIES
- FISHERIES & AQUACULTURE
- SANITARY & SEWAGE RELATED
- SHIPPING
- FLY-TIPPING
- MEDICAL RELATED
- AGRICULTURE
- NON-SOURCED

# SOURCES OF ML





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## Thank you for your attention!

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