D1.2-DB: Completion of the MP/ML database

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Objectives of WP1 - Marine MP sampling & processing

Our hypotheses are that highly-populated areas (via estuaries etc.) and Baltic Sea lanes are the most relevant sources for MP, and that beaches and coastal sediments are the major sinks of MP. On the other hand, besides beaches, vertical flux of MP towards the sediments is supposed to be one of the essential sinks in the Baltic Sea. To test this, the aim of this WP is to identify MP distribution:
- vertically, in the water column and associated sedimentation rates.
- spatially, in water, biota, sediment and beaches of relevant estuaries, shorelines and the open seas in the Baltic Sea.

Results

Summary

A Marine Plastic Database (MPDB) was developed. The MPDB is a database for all data collected within the project. It allows general import/export and data exchange with other international and national Marine Litter databases (e.g., German Baltic Marine Litter database) and provides tools for data quality insurance and assessment, spatial visualization, and statistical analysis. The database is developed using SQL as a widely spread and well-documented language with the necessary flexibility of storing data. Towards the next months and until the end of the MICROPOLL project the database will be further improved and expanded, if all users of the project use the database and give then comments and input.

Database description and aim

MICROPOLL Database (MPDB) is a database for all data collected within the project. It allows general import/export and data exchange with other international and national Marine Litter databases (e.g. German Baltic Marine Litter data base), and provides tools for data quality insurance and assessment, spatial visualization and statistical analysis. The database is developed using SQL as a widely spread and well-documented language with the necessary flexibility of storing data. Key points of the task:
- DB allows general export and data exchange (csv, ascii, xml);
- DB allows spatial visualization (with extra tools) and statistical analysis;
- An assigned person with sufficient IT skills (Natalja) will handle DB administrative management (thru the project implementation phase). Other users receive a user key (with limitation, to assure data quality and intactness).
- DB should be marinated following a technical maintenance plan which should include:
- Data quality assurance;
- Data backup plan;
- Risk assessment plan;

Database structure

The developed database structure is presented in Figure 1. The main tables are:
• Samples table;
• Analysis table;
• Particles table.

The supporting tables are:
• Colors;
• Shapes;
• Size fraction;
• Polymer category;
• Paint remark;
• Countries;
• Institution;
• Equipment;
• Method_category;
• Projects;
• Sampling_compartment;
• Affiliation.

The many-to-many relationship table is:
• Particles2analysis.

Supporting tables

Information in the supporting tables has to be filled up prior to the main tables. The information to be filled should follow the logic:
1. User fills out his/hers institution in the “Institution” table, if necessary (to be completed only once);
2. User fills out his/hers credentials in the “Contributor” table, if necessary (to be completed only once);
3. Fills out the “Projects” table, if necessary (to be completed only once);
4. User goes thru all the supporting tables and fills out the information needed (to be completed once or multiple times, depending on the situation);
   o Equipment (which equipment was used);
   o Method (which method was used);

The tables “Color”, “Shape”, “Polymer category”, “Paint remark”, “Size fraction” are already filled up with the agreed-upon categories.
Main tables
After completing the information input of the supporting tables, the user may proceed to the main tables. The data entry should follow the logic:

- A sample entry should be created in the “Samples” table, which provides the information on the collected sample/samples;
- An analysis method should be created in the “Analysis” table (if not created prior), by which these samples were analyzed;
- The Particles entries should be added to the “Particles” table. The user may specify how many on which category, shape, size, color, etc. particles were found in which sample analyzed by which method.

Relationship tables
Because the basis of the relation database is the one-to-many data integrity and structure, for many-to-many relationships a separate table should be included, which will define this relationship. The table is called “particles2analysis” and defines the IDs of those particles or those particles, who were found by multiple analysis method. In short, this table provides the linkage between multiple particles found by multiple analysis and contains the unique IDs of said entities.

Database access
The users may request the MPDB access via e-mail to: Natalja.cerkasova@gmail.com. Every user is issued with unique credentials for the DB usage.
The DB is currently hosted by the IOW server at 192.124.245.26 (micropol.io-warnemuende.de).
The instructional videos for MPDB usage are available at google drive storage (link): https://drive.google.com/drive/folders/1hdwP6AmJ1AAYQ-JbPyR0sf7XGZGH_I5Z?usp=sharing

Future work and fixes
Future work includes:

- The assessment of circular references within the database and possible separation of the tables;
- The assessment of fields and their constraints/requirements.
Figure 1. MPDB EER diagram