

Marine litter tracking system: a case study with open-source technology and a citizen science-based approach.

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Abstract

It is well established that rivers are amongst the most important carriers of the plastic pollution found in the oceans. However, the main processes contributing to plastic and debris fate through riparian systems is still poorly known and understood. The Marine Litter Drifter project from the Arno River aims at using modern consumer software and hardware technologies to track the trajectories and evolution at sea of real Anthropogenic Marine Debris (AMD) from rivers, with a specific focus on the Arno River, in Italy. Innovative and low cost "Marine Litter Trackers" (MLT) were designed, assembled and used in this framework as they are reliable, robust, self-powered and they present almost no maintenance costs. Furthermore, they can be built not only by those trained in the field but also by those with no specific expertise, including high school students, simply by following the instructions.

Several dispersion experiments were successfully conducted using different types of trackers in different seasons and weather conditions. The maximum distance tracked was 2845 km for a period of 94 days. The activity at sea was integrated by lagrangian numerical models supporting the planning of the deployments and the recovery of the drifters. The models, in turn could benefit from the observed tracking data for calibration and validation and serve as tools to study and interpret the processes driving macro plastic displacement at sea. In this presentation we describe this activity and we discuss the dynamics of marine litter (ML) dispersion in the Tyrrhenian Sea on the basis of these integrated monitoring tools, as well as the potential of open-source approaches including the "citizen-science" perspective for both improving Big Data collection and educating/awareness-raising on AMD issues.