White Paper Overview

Towards a Global Platform for Monitoring Marine Litter and Informing Action

GPML Webinar Series:

Towards a GPML Digital Platform

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About the White Paper

The purpose of white paper is to outline requirements for the development of a **global monitoring platform for marine litter** including vision, feasibility and potential structure and funding needed.

This paper will be used to further discussions with the view to develop a **long-term project in support of such a platform**.

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White Paper: A Global Platform for Monitoring Marine Litter and Informing Action

- Existing and developing **monitoring technologies**
- Existing **marine litter databases** and major published datasets
- **SDG indicators** and **other types of indicators**
- Existing and developing **platforms of relevance**
- **Proposed features of a global platform**
- Future developments

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Existing and developing monitoring technologies

- Human observers
- Microscopy
- Weighing
- Spectroscopy
- Spectronomy
- Visual Imagery and Video
- Synthetic Aperture Radar
- Hyperspectral Imaging
- GPS Tags and Transmitters
- Modeling


Photo Credit: NOAA

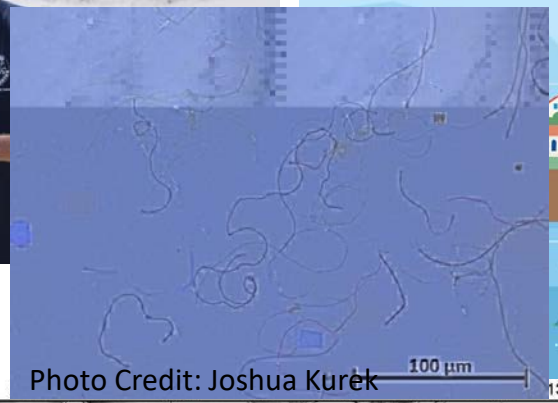


Photo Credit: Joshua Kurek

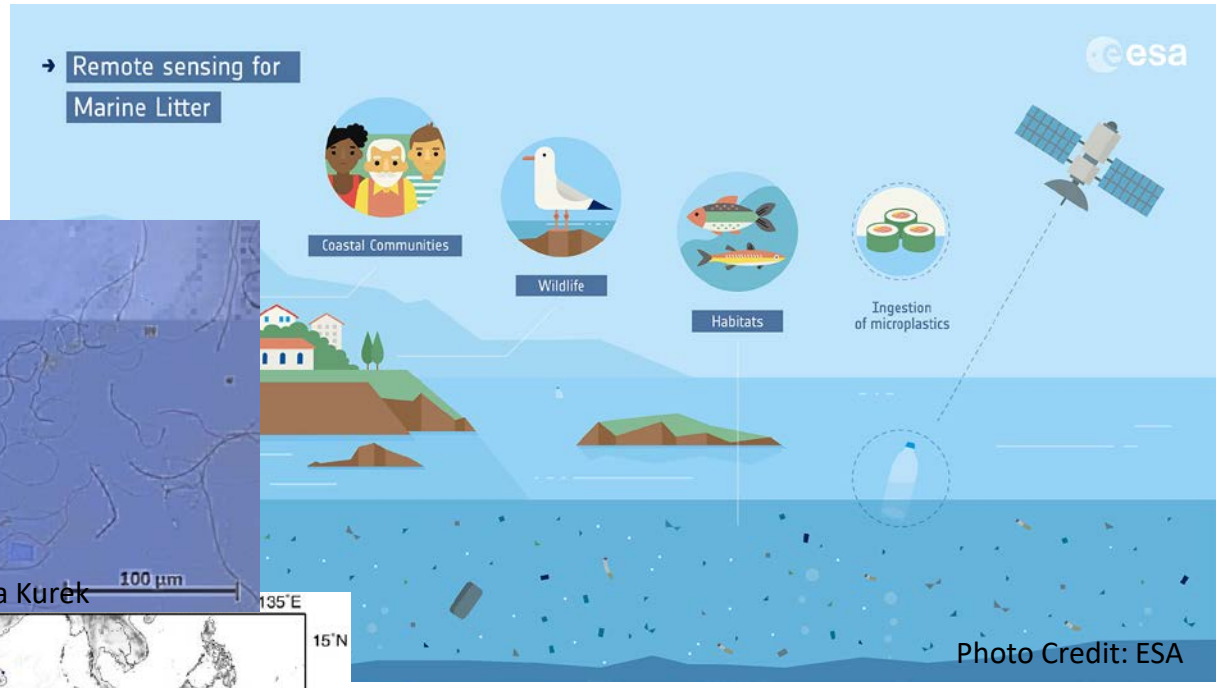


Photo Credit: ESA

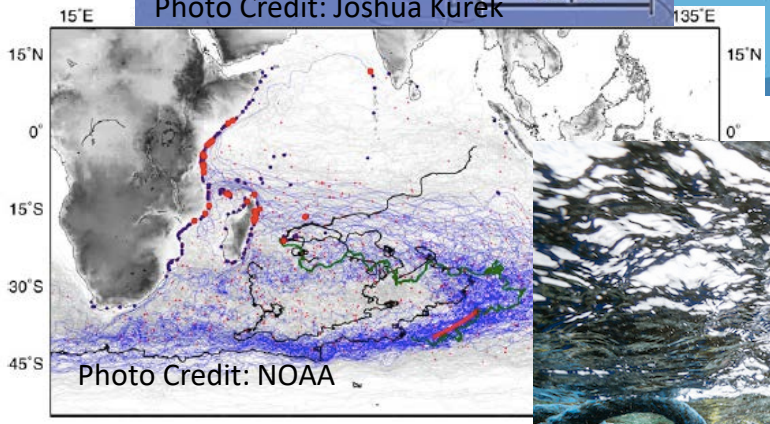
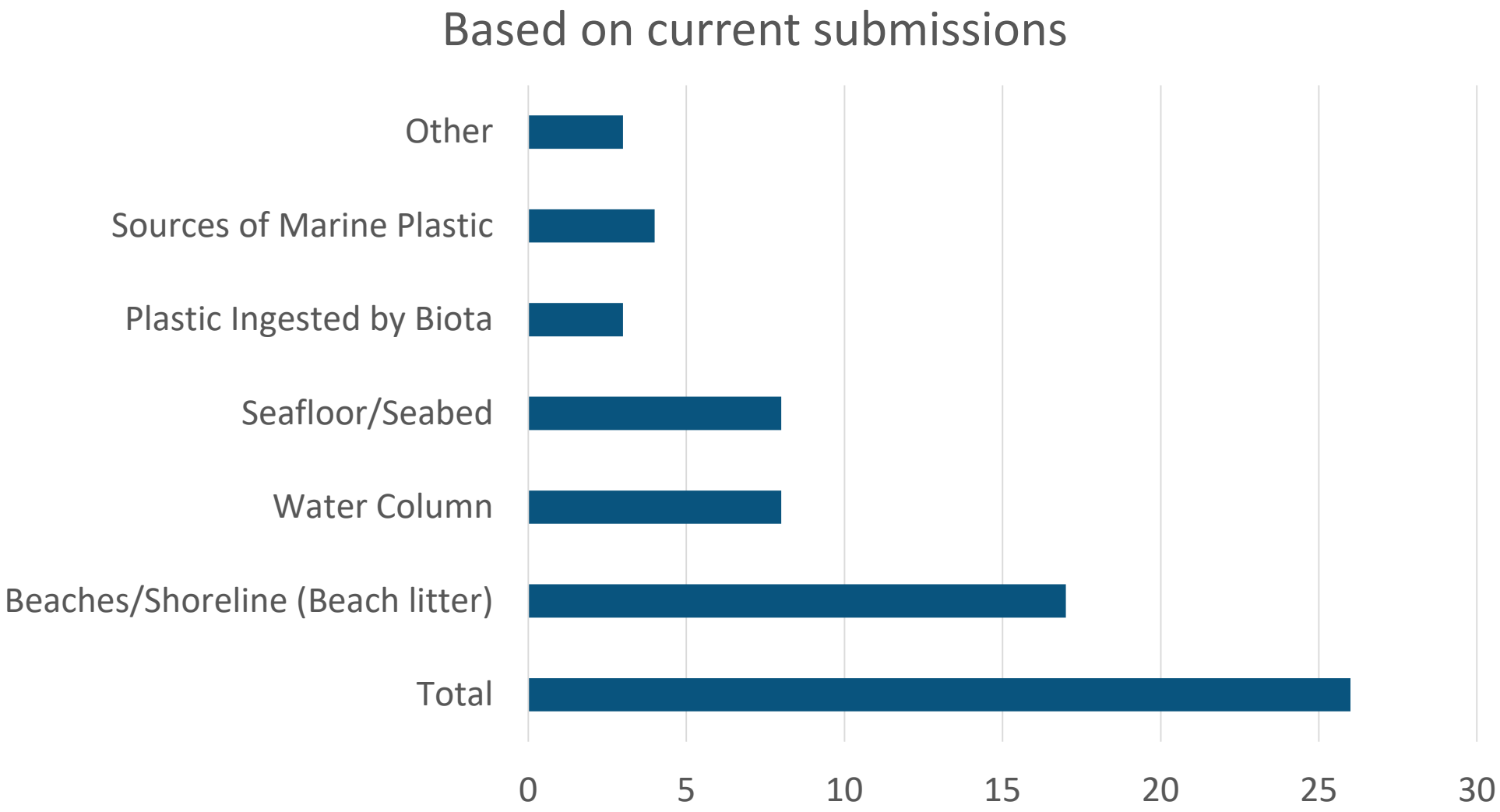


Photo Credit: NOAA


Photo Credit: europa.eu


Photo Credit: Ocean Voyages Institute

Preliminary Marine Litter Database Survey Results



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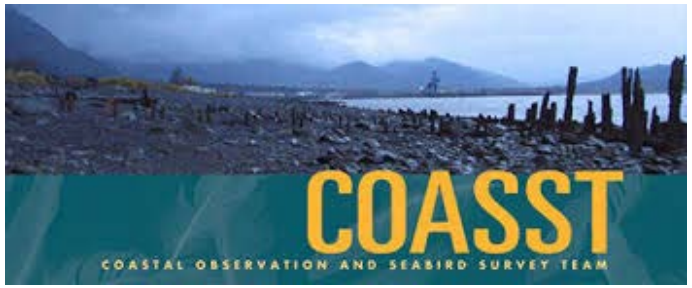
Existing Databases



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Indicators and Applications of Technologies

Some primary questions to be addressed by a global platform for monitoring marine litter and information action:

- What is the abundance, distribution and composition of marine litter, and are these attributes changing over time?
- What are the main sources of marine litter, and are they changing over time?
- What are the impacts of marine litter, and are they changing over time?

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Indicators and Applications of Technologies

Approved SDG 14 Indicators

- Level 1 (global)
- Level 2 (national)
- Level 3 (supplemental)

Indicators for abundance, distribution and composition

- Beach/shoreline
- Floating and water column
- Seafloor

Indicators for impacts of marine litter

- Biological/ecosystem
- Economic

Indicators for sources of marine litter

- Rivers and estuaries
- Ocean activities
- Coastal disasters
- Primary Microplastics
- Waste management
- Plastic Lifecycle

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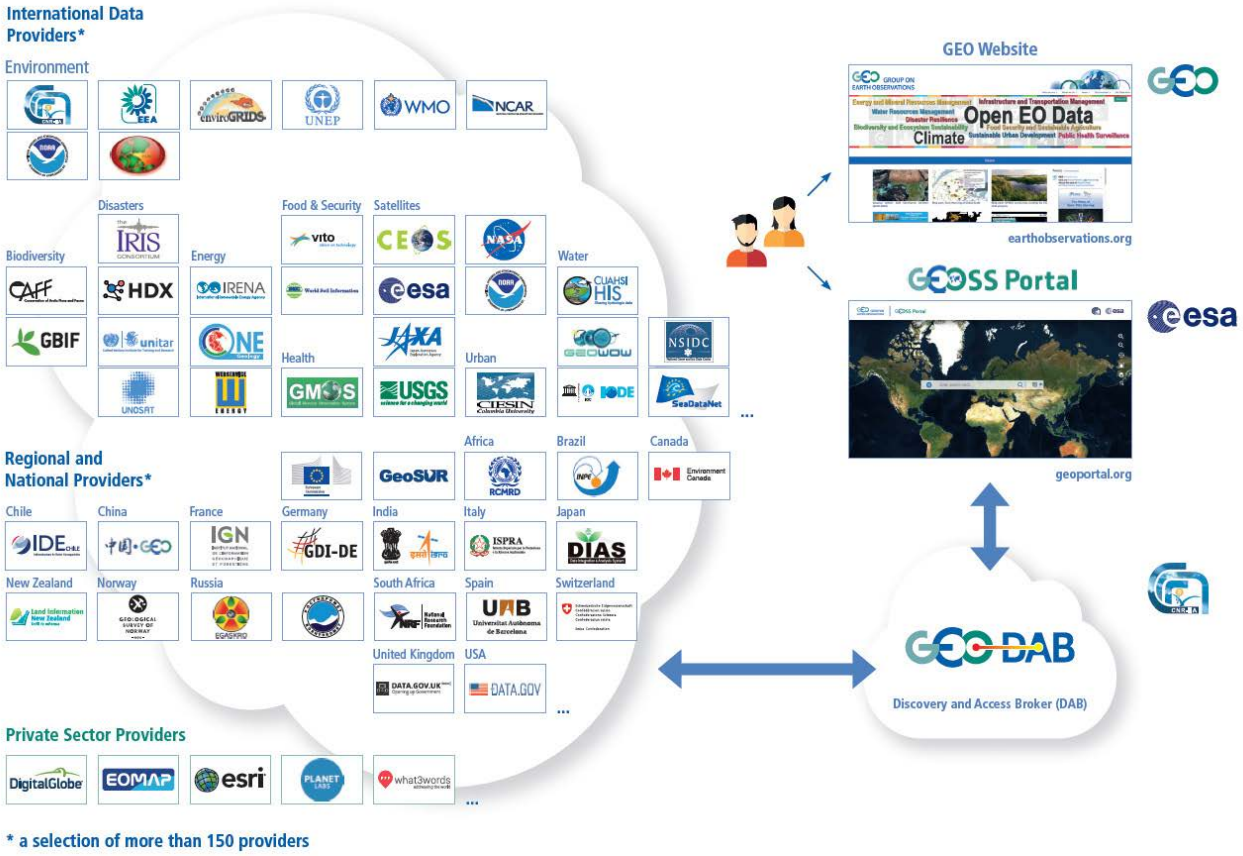
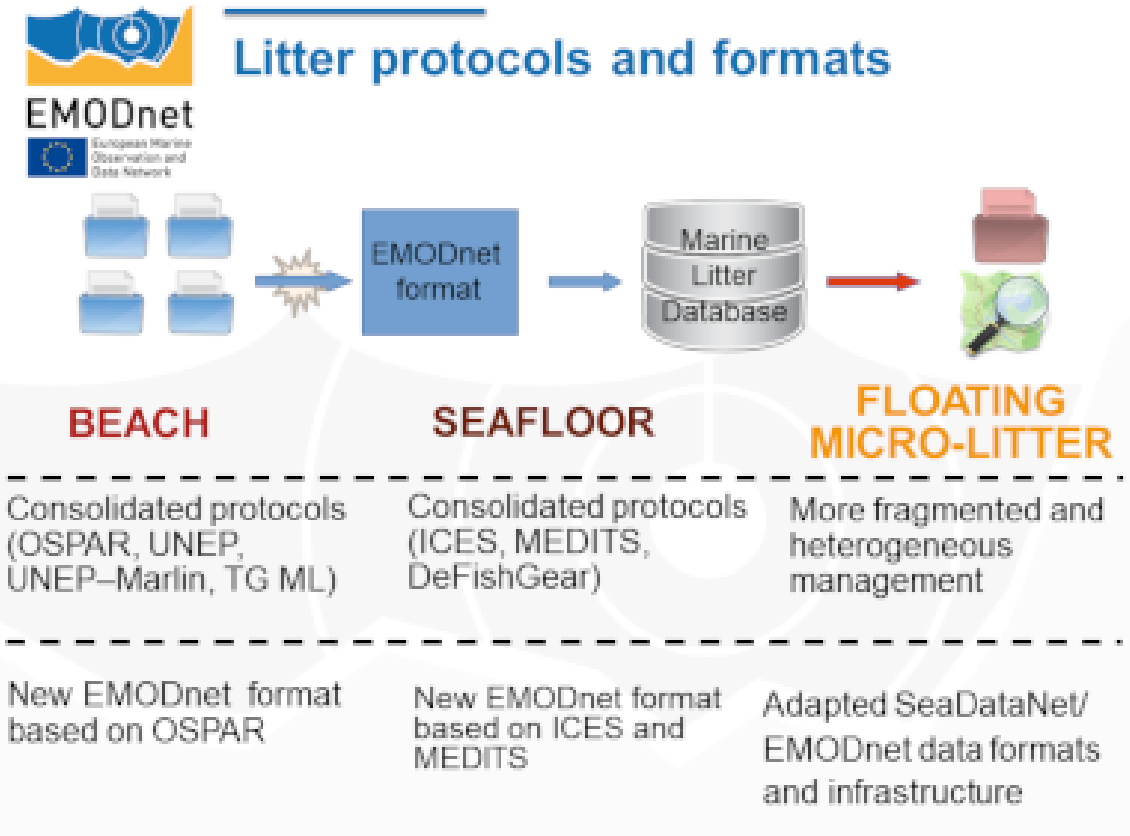
Existing Data Platforms of Relevance





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Proposed Features of a Global Platform

To build a useful Global Platform for Marine Litter we must address:

1. **Usability** — who is it for?

2. **Accessibility** — who can access it?

3. **Capacity** — are users equipped?

4. **Political buy-in** — is there wider support?

5. **Governance** — frameworks, policies in place?

6. **Sustainability** — long-term thinking & funding

For the Global Platform to be a useful tool, stakeholders must come together to identify the priorities in terms of the necessary policy drivers and the corresponding information and knowledge products to be made available.

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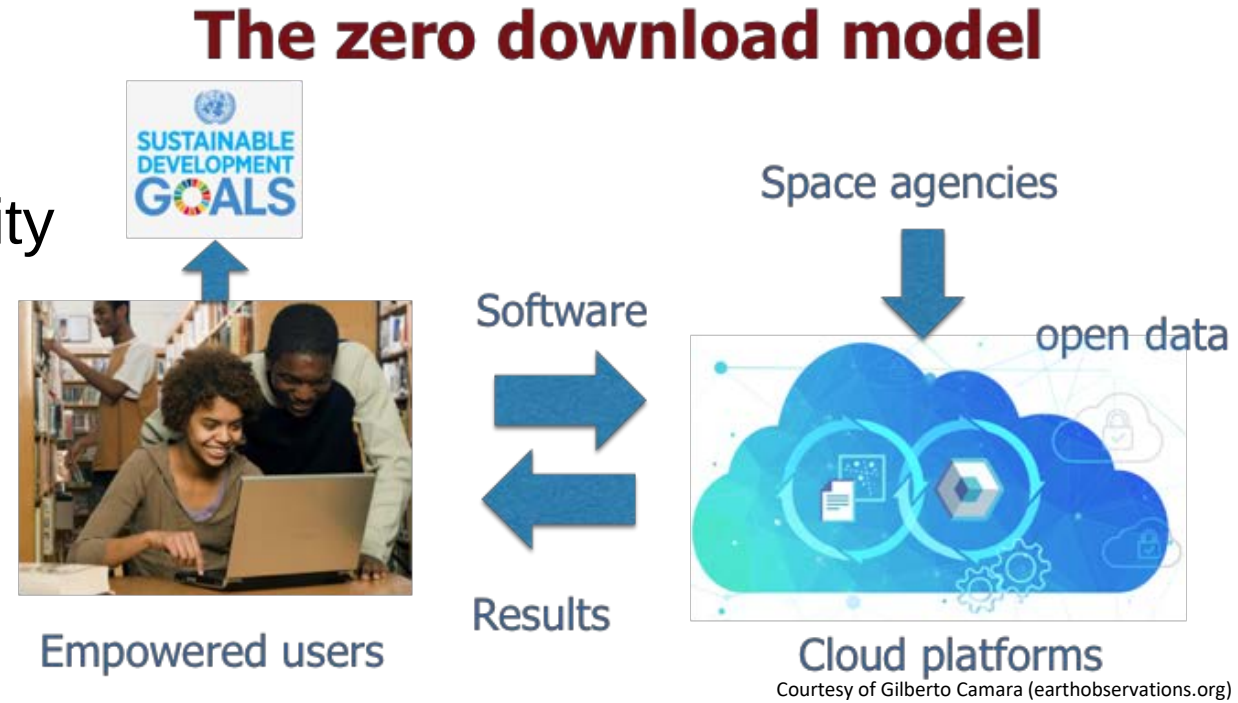
Proposed Features of a Global Platform

- Data Ingestion Portal
- Standardization and Interoperability
- Knowledge Resource repository
- Data processing and Analysis
- Data visualization



Courtesy of Gilberto Camara (earthobservations.org)

- Open Platform: open data, open science and open knowledge

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Future Developments – Artificial Intelligence

Environmental Science and Pollution Research
June 2019, Volume 26, Issue 17, pp 17091–17099 | Cite as

Identifying floating plastic marine debris using a deep learning approach

Authors | Authors and affiliations

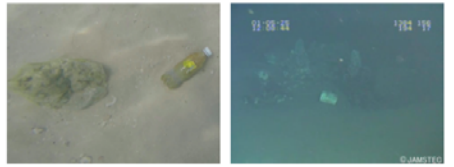
Kyriaki Kylili, Ioannis Kyriakides, Alessandro Artusi, Constantinos Hadjistassou

Robotic Detection of Marine Litter Using Deep Visual Detection Models

Michael Fulton[1], Jungseok Hong[2], Md Jahidul Islam[3], Junaed Sattar[4]

***Abstract*— Trash deposits in aquatic environments have a destructive effect on marine ecosystems and pose a long-term economic and environmental threat. Autonomous underwater vehicles (AUVs) could very well contribute to the solution of this problem by finding and eventually removing trash. A step towards this goal is the successful detection of trash in underwater environments. This paper evaluates a number of deep-learning algorithms to the task of visually detecting trash in realistic underwater environments, with the eventual goal of exploration, mapping, and extraction of such debris by using AUVs. A large and publicly-available dataset of actual debris in open-water locations is annotated for training a number of convolutional neural network architectures for object detection. The trained networks are then evaluated on a set of images from other portions of that dataset, providing insight into approaches for developing the detection capabilities of an AUV for underwater trash removal. In addition, the evaluation is performed on three different platforms of varying processing power, which serves to assess these algorithms' fitness for real-time applications.**

in real-time, and how do we achieve best results in that area?



(a) (b)

Fig. 1: Examples of plastic and other refuse material in various marine environments. (a) A plastic bottle lying on the sea floor off the coast of Barbados; image collected by the authors, January 2018. (b) A beverage can on the sea bed off the coast of Japan, taken from the J-EDI dataset [3].

Deep Neural Networks For Marine Debris Detection In Sonar Images

Matias Alejandro
Valdenegro Toro, M.Sc., B.Sc.

April 2019.

ELSEVIER

Marine Pollution Bulletin
Volume 132, July 2018, Pages 52-59

Mapping coastal marine debris using aerial imagery and spatial analysis ☆

Kirsten Moy [a], Brian Neilson [b], Anne Chung [a], Amber Meadows [a], Miguel Castrence [c], Stephen Ambagis [c], Kristine Davidson [a]

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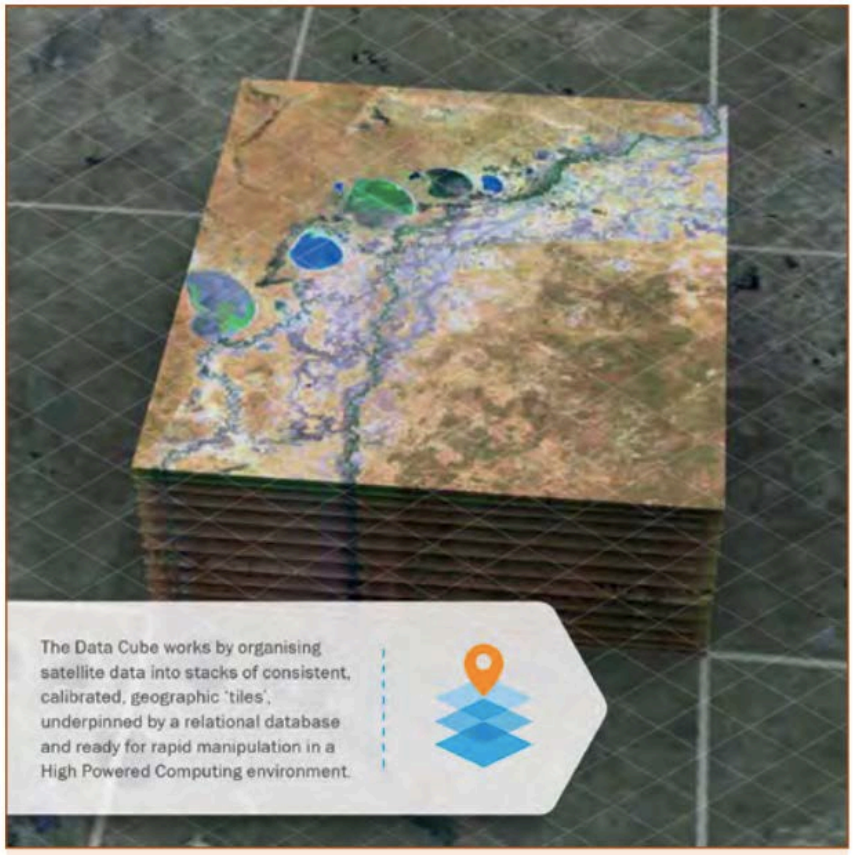
Challenges

Need to reduce EO data size & complexity to allow widespread & application. Data continuity is crucial for confidence in national investment in human resources & information system to handle EO.

- Data democracy: Open & Free data & access to infrastructure.
- EO data complexity and access: Bring data to users (ARD, ODC, DIAS).
- Data continuity: Need confidence that there will be continuity over years & decades for any new data streams before making investments in new systems.



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Thank you

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