

Earth Observation (EO) for Marine

EO is currently being used in some services (e.g. [vessel detection with Ocean Mind](#) or [European Maritime Safety Agency](#)). Many emerging practical applications of EO for policy implementation are still in pilot or research phases. This document highlights three examples and indicates their ease of adoption.

Research Tool: [Coast X-Ray mapping intertidal extent](#)

Dynamic Coast

Uses time series Sentinel-2 data to calculate the proportion of time that land is covered by water, to identify the intertidal zone. Information is useful to detect changes in beach profiles potentially showing pressure on coastal defences. The tool is implemented on Google Earth Engine.



Method is well developed and in publication with a peer reviewed journal. Checks are required for misclassification of tidal areas.



Tool can be ran on Google Earth Engine for research purposes but effort would be required to bring the tool into operation. Storage and processing costs medium but high if Wales wide ARD has to be generated for this purpose only, and not generically provided.

Research method: Mapping sandbanks



Sentinel-2 Analysis Ready Data (ARD) was used to detect sandbank crests in Special Areas of Conservation in the North Sea. Results suggest that EO could be used to monitor movement of sandbanks in shallow water.



S2 ARD processed using ARCSI (optimised for land-based applications) compared favourably with S2 ARD processed using ACOLITE (optimised for marine applications) provided by [NERC Earth Observation Data Acquisition and Analysis Service \(NEODASS\)](#). Mean accuracy of current results is 1.2m RMSE for depths above 15m.



Dependent on suitability and availability of ARD data. Storage and processing costs medium but high if Wales wide ARD has to be generated for this purpose only, and not generically provided.

Case Study: [Detecting floating macro plastics](#)



Uses Sentinel-2 data to calculate indices such as Floating Debris Index to detect areas with suspected marine macro plastics. Method is reliant on the presence of sub mesoscale features. Sentinel-2 data needs to be processed to Analysis Ready Data (ARD) that's suitable for marine applications.



Method is a proof of concept but has limitations. Cannot detect small areas of plastics. More research is needed to identify different types of debris or other floating material in seas.



Effort is required to bring the method into operation. Floating Debris Index is likely to be delivered as a value added product by [NEODASS](#) in the future as an open dataset so storage and processing costs low, but high if Wales wide ARD needs to be processed for this purpose.

Policy Areas

Coastal Erosion / Fisheries tracking / Compliance / Monitoring and improved understanding / Planning, marine activities (dredging, wind farms)

Contact point:

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Complexity



Possible; needs research



Clear method but complex



Clear method and straightforward

Resource



High



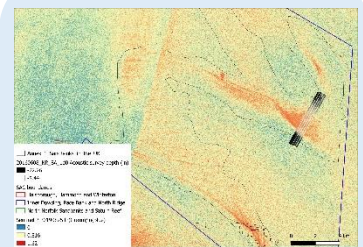
Medium



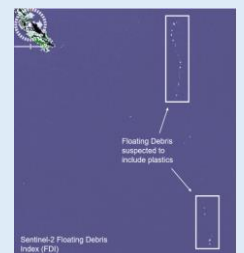
Low



Mapped tidal area of Morecombe Bay on the Coast X-Ray UK and Ireland map.



Shallow sandbank crests visible (in red) using Sentinel-2 data.



Suspected marine plastics identified using Sentinel-2.