Exploring The Use Of SAR Remote Sensing To Detect Microplastics Pollution In The Oceans

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Exploring use of SAR to detect microplastics pollution in the world’s oceans

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Introduction:
About 250 million tonnes of plastic is in the world’s oceans:
- North Pacific (Garbage Patch) - 1.16 trillion plastic items;
- North Atlantic (Garbage Patch) - 0.53 trillion plastic items.

The main objective and hypothesis of the research:
- Objective is to detect areas with microplastics pollution (surfactants and sea-slips) using SAR images.
- Microbes colonizing plastic will produce surfactants and sea-slips.

The risks associated with microplastics pollution:
- Ingestion by marine animals and fish, transfer via food chain;
- Leaching of chemical ingredients into surrounding seawater;
- Release of sorbed pollutants, depending on bioavailability.

The goals:
- To perform contextual analysis of SAR images;
- To analyse surfactants and sea-slips on SAR images;
- To analyse microbiology of surfactants and sea-slips (in lab).

CONCEPT: MICROPLASTICS DETECTION USING SAR

PRELIMINARY RESULTS-PRESUMED SURFACTANTS AND SEA-SLICKS

Dataset - c.300 images (5 examples) - North Atlantic - Sentinel-1A Level 1, Extra Wide Swath (EW) Ground Range Detected GRD; Full resolution 25x25m

Figure 1: Image - Sentinel-1A, EW GRD, acquired 14 June 2016, 09:25 am, with corresponding meteorological conditions: daily mean of wind speed and chlorophyll a

North Pacific - COSMO SkyMed, StriMap HIMAGE, Level 1B (DGM); Full resolution after resampling 4x20m

Figure 2: Image - COSMO SkyMed, Level 1B DGM, acquired 18 June 2011, 15:45pm with corresponding meteorological conditions: daily mean of wind speed and chlorophyll a

References:

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