3D Computed Tomography for Microplastics Analysis

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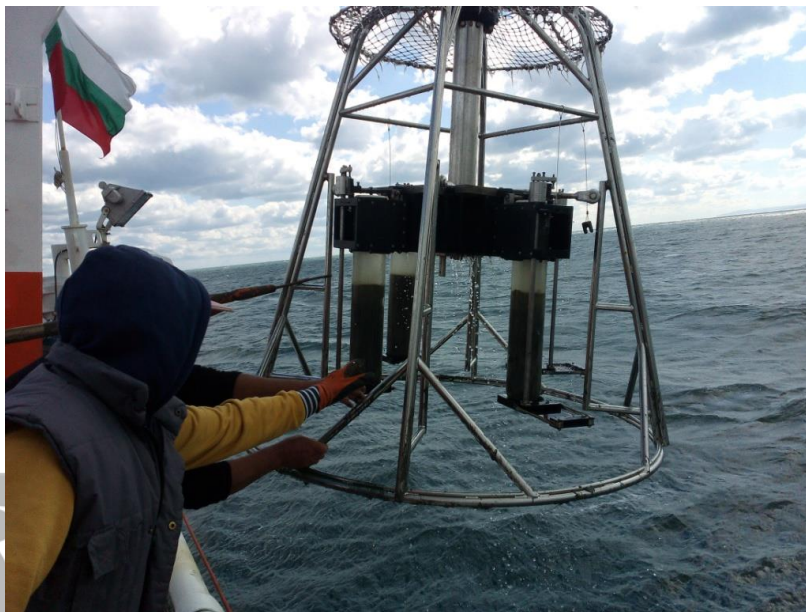[3]IAEA Environment Laboratories, 4, Quai Antoine 1er, Principality of Monaco

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Sampling of core sediments

• All plastics from the sea are considered to end up in sediments.

• 3DCT analysis can be applied to the core sub-samples.

• Samples on the photography have the volume of 1 mL (1 cm^3)

• Results can be put in the time perspective (e.g. by lead-210 dating) in the case of the intact sediment cores.

• This can help in identifying potential sources and pathways of microplastics pollution.
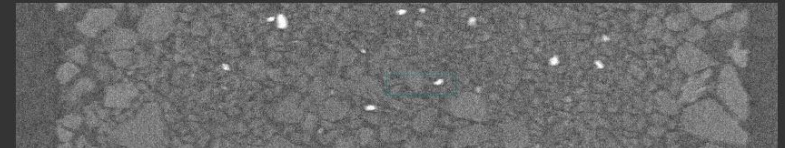
3D x-ray computed tomography

- A view from above, sediment sample is 8 mm in diameter
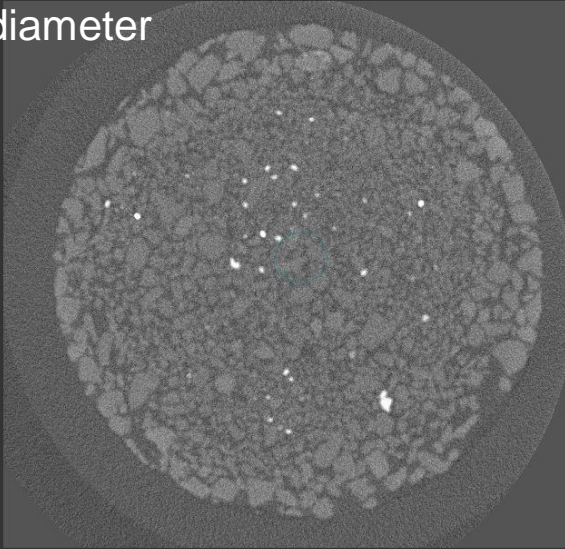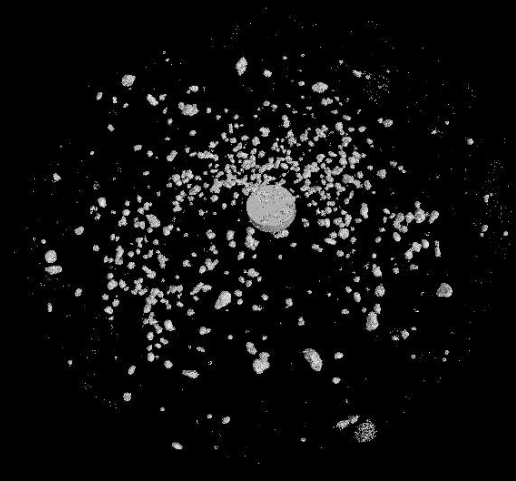

- A layer from the vertical profile.

- The highlighted dots are shell remains which are the densest particles found in the sediment

- Another layer from the vertical profile.

- Scanning was performed by NIKON XTH 225, 185 kV and 190 μA, exposition 500 ms, 720 projections, total measurement time: 60 min.

- A view from above of the shell remains only

A table produced by software as a result of the image analysis showing each particle's characteristics

Properties of Porosity/inclusion analysis (VGDefX/Only Threshold): Analysis 1 of Extracted ROI

Settings | Colors | Defects | Statistics | Feature plot | Annotations | Images | Rules | Report

Click to add a filter or search criteria

|	Probability	Radius [mm]	Diameter [mm]	Center x [mm]	Center y [mm]	Center z [mm]	Volume [mm³]	Voxel	Surface [mm²]	Classification	Gap [mm]	Compactness	Sphericity
1055	10.49	0.00396	0.00792	-0.06629	0.21343	-0.05336	0.00	8	0.00	n/a	0.01148	1.00	0.81
772	13.14	0.00396	0.00792	0.00808	0.21020	-0.01779	0.00	8	0.00	n/a	0.00244	1.00	0.81
853	12.29	0.00536	0.01073	0.51579	0.02749	-0.16007	0.00	9	0.00	n/a	0.00160	0.47	0.75
1248	9.00	0.00536	0.01073	0.25062	0.01294	-0.07438	0.00	9	0.00	n/a	0.03421	0.47	0.75
407	17.93	0.00536	0.01072	0.06629	0.13258	-0.09701	0.00	9	0.00	n/a	-0.00495	0.47	0.75
950	11.45	0.00686	0.01372	0.52549	0.06791	-0.10833	0.00	12	0.00	n/a	0.00156	0.30	0.70
1095	10.09	0.00597	0.01194	0.46169	0.31235	-0.05527	0.00	11	0.00	n/a	0.01862	0.42	0.70
1524	6.78	0.00686	0.01372	0.37997	0.30721	-0.20858	0.00	11	0.00	n/a	0.01940	0.28	0.70
1437	7.45	0.00573	0.01146	-0.07923	0.09928	-0.04851	0.00	11	0.00	n/a	-0.00568	0.47	0.70
670	14.01	0.00597	0.01194	-0.02661	0.01102	-0.20020	0.00	11	0.00	n/a	-0.01381	0.42	0.70
424	17.61	0.00667	0.01333	0.25223	0.22313	-0.13097	0.00	11	0.00	n/a	0.00258	0.30	0.70
240	21.85	0.00573	0.01146	0.57302	0.26517	-0.13582	0.00	11	0.00	n/a	0.00398	0.47	0.70
1824	4.24	0.00686	0.01372	-0.04689	0.00000	-0.17624	0.00	10	0.00	n/a	-0.00182	0.25	0.70
34	34.53	0.00571	0.01142	0.39569	-0.05997	-0.22063	0.00	10	0.00	n/a	0.07133	0.43	0.70
342	19.45	0.00667	0.01333	0.09863	0.14229	-0.14875	0.00	10	0.00	n/a	-0.00556	0.27	0.70
1924	3.25	0.00536	0.01073	0.20211	0.11318	-0.11965	0.00	10	0.00	n/a	-0.00229	0.52	0.70
1281	8.73	0.00536	0.01073	0.04689	0.10671	-0.03234	0.00	9	0.00	n/a	0.00249	0.47	0.70
882	12.01	0.00536	0.01073	0.47051	-0.01293	-0.12935	0.00	9	0.00	n/a	0.00452	0.47	0.70
350	19.30	0.00536	0.01073	0.34763	0.26355	-0.01132	0.00	9	0.00	n/a	-0.00033	0.47	0.70
1899	3.50	0.00536	0.01073	-0.12127	0.31853	-0.21828	0.00	9	0.00	n/a	0.00390	0.47	0.70
804	12.82	0.00536	0.01073	0.20373	-0.06144	-0.22151	0.00	9	0.00	n/a	0.01197	0.47	0.70
510	16.31	0.00536	0.01072	0.07923	0.16492	-0.13258	0.00	9	0.00	n/a	-0.00831	0.47	0.70
561	15.58	0.00536	0.01073	0.26679	0.52710	-0.13582	0.00	9	0.00	n/a	0.03139	0.47	0.70
2012	1.99	0.00536	0.01073	0.14552	0.07761	-0.10833	0.00	9	0.00	n/a	-0.00765	0.47	0.70

Capture from: Top 1 | Delete selected
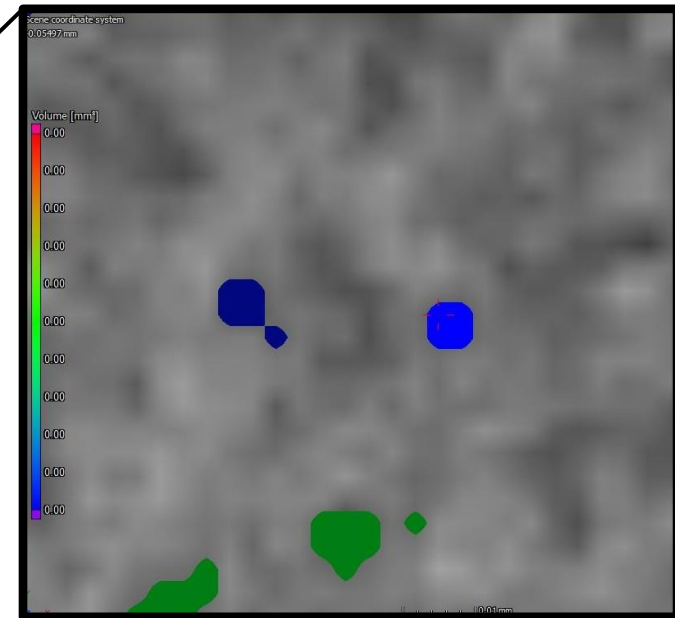
Result is up to date

Calculate | Close

Selection of particles by using software query. Light blue particles are standard polymer particles of 10 micrometers in diameter
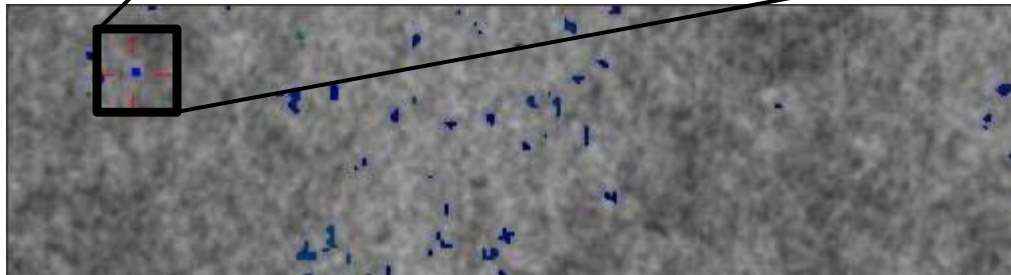
- A view from above.
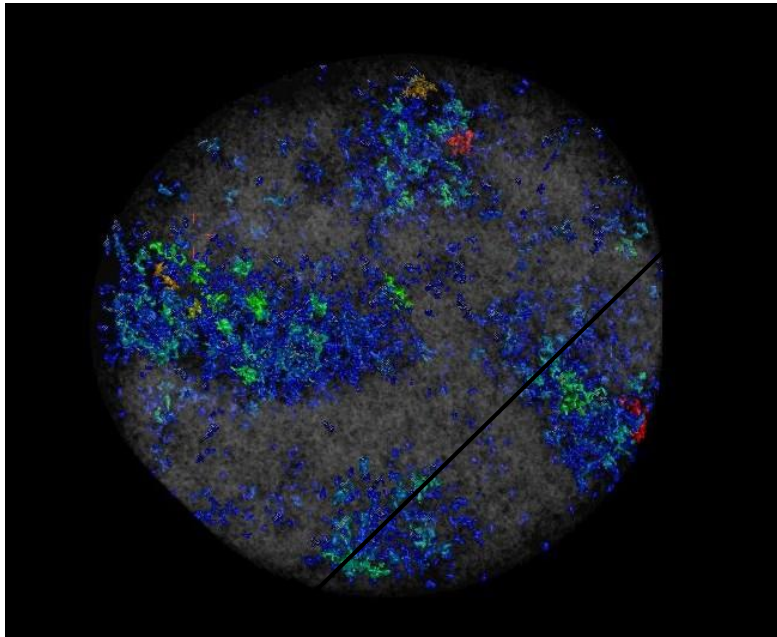
- A detail.

- A vertical profile.

Thank you for your attention!