



September 19, 2011

Antarctic Samples
Result of Algalita Marine Research Foundation
Laboratory Analysis

Findings:

Four surface samples were collected between January 3 and January 27, 2011 aboard the vessel Tara in waters between South America and the Antarctic. Samples were collected using a suitcase manta trawl with rectangular opening of 0.6604 m x 0.11524 m (25" x 6"), and a 1.5m long, 333 μ mesh net with a 30 cm x 10 cm collecting bag. The net was towed at the surface outside of the effects of the wake at a nominal speed of approximately 2 knots, actual speed varied due to wind and sea conditions. Each trawl was conducted for a random time duration, ranging from 29 minutes to 113 minutes.

Samples were fixed and stored in 95% ethanol. To separate the plastic from the plankton, the samples were drained and put in seawater, and then the plastic was removed as the samples were inspected under a dissecting microscope. Plastic and plankton were oven dried at 61° C for 24 h and weighed. Plastic was sorted by rinsing through Tyler sieves of 4.76 mm, 2.80 mm, 1.00 mm, 0.71 mm, 0.50 mm, and 0.355 mm. Individual pieces of plastic were categorized into standardized categories by type (fragment, foam, pellet, line, thin plastic film), then they were counted.

A total of 127 small pieces of plastic weighing 0.123 g were collected from the surface water in the gyre, yielding a mean abundance of 23,286 pieces/km² and a mean mass of 22 g/ km². The abundance ranged from 42,826 pieces/km² to 956 pieces/km², and mass ranged from 1 to 57 g/ km².

Plastic fragments accounted for 84 percent of the plastic found, the remaining 16 percent of plastic found was line, such as filament fishing line.

Preliminary Summary:

The presence of plastic in every sample taken indicates a far reaching movement of material within our oceans. The sources of this plastic, the long term prevalence, and the effects of this marine debris on Antarctic waters marine life require further study.

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TABLE 1. Abundance (pieces/km²) by type and size of plastic pieces found in Antarctic waters.

Mesh size (mm)	Fragments	Foam pieces	Pellets	Line	Thin plastic film	Total
>4.760	0	0	0	733	0	733
4.759-2.800	2567	0	0	917	0	3484
2.799-1.000	7884	0	0	917	0	8801
0.999-0.710	6601	0	0	367	0	6968
0.709-0.500	3117	0	0	183	0	3300
0.499-0.355	0	0	0	0	0	0
Total	20169	0	0	3117	0	23286

Station Number	Latitude	Longitude	Trawl Time (Minutes)	Plastic pieces/km ²	Plastic g/km ²	% Fragment	% Line
84	60°20'19.57"S	60°31'57.06"W	68	39,973	57	88	12
87	63°52'31.08"S	56°5'37.32"W	29	42,826	29	85	15
88	63°52'16.32"S	56°48'3.42"W	113	9,389	1	89	11
89	57°45'51.02"S	67°0'12.24"W	76	956	1	75	25
Total				93,144	88		
Mean				23,286	22	84	16