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Supplementary Materials for

Exponential increase of plastic burial in mangrove sediments as a major plastic sink

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The PDF file includes:

Other Supplementary Material for this manuscript includes the following:

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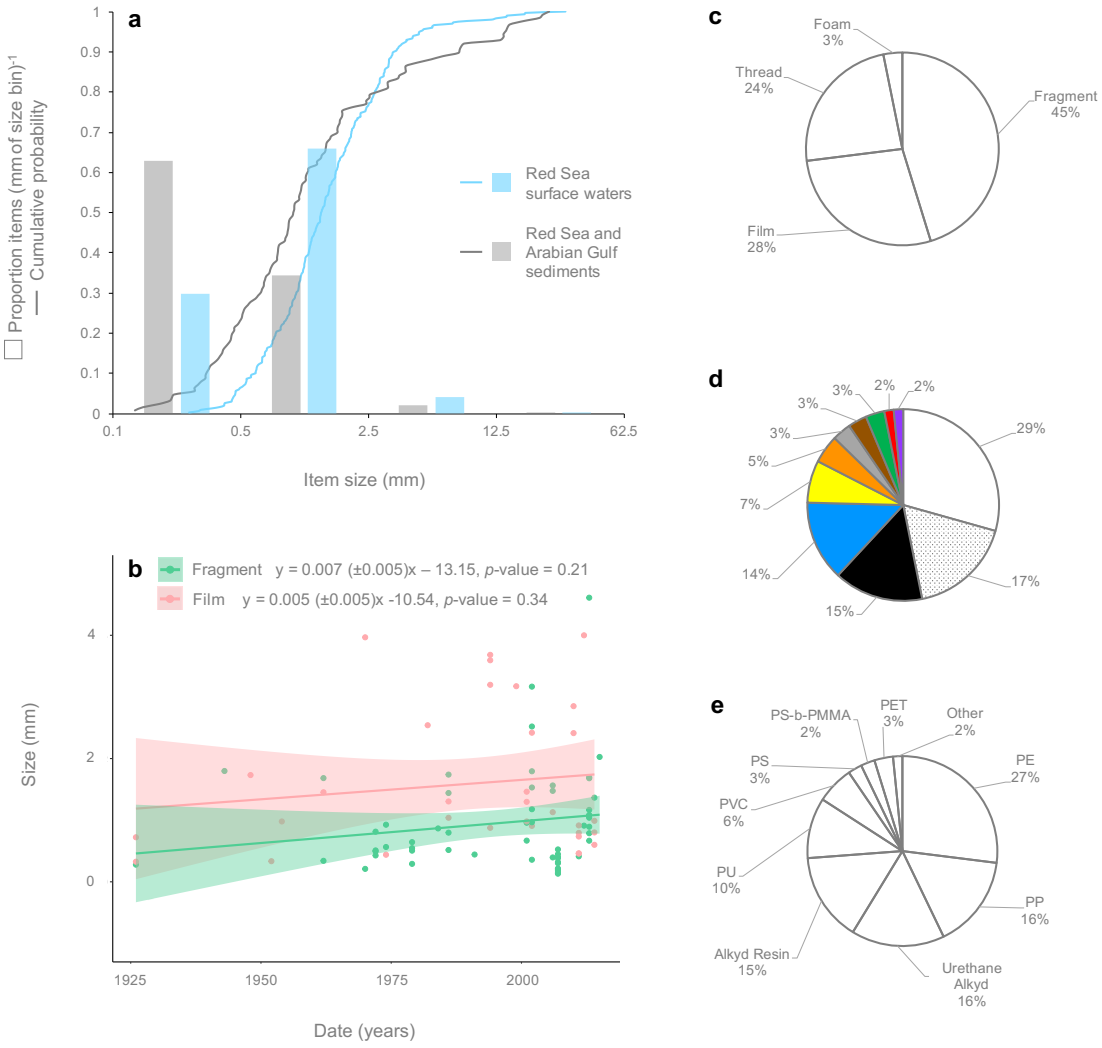

Fig. S1 Composition of plastic items (N=126) recovered from processed sediment samples. A. Distribution of plastic items from sediments (in grey) and from Red Sea surface waters (in blue, data from Martì et al. 2017) in 4 size classes whose bins follow a 5-log scale and cumulative distribution (probability that objects with a size X are smaller than a given size x, $F(x) = P[X \leq x]$) of the same items compared with a Two-Sample Kolmogorov Smirnov test (D=0.232, p-value=1.5e^{-4}). **B.** Distribution of fragment (in green) and film (in pink) sizes through time. Lines and shades represent the loess fit and the interval of confidence. The relationship between deposition date and size of the plastic items was tested with a Linear Model (for Fragments: F=1.644, 1 and 55 df, p-value=0.21; for Films: F=0.9366, 1 and 33 df, p-value=0.34). **C.** Shapes of recovered plastic items (N=126). **D.** Colors of recovered plastic items (the patterned slice represents transparent color. **E.** Polymers of recovered plastic (PE=polyethylene, PP=polypropylene, PU=polyether urethane, PVC=polyvinyl chloride, PS=polystyrene, PS-b-PMMA=polystyrene-b-poly(methyl methacrylate), PET=polyethylene terephthalate and Others includes polyvinylidene fluoride and acrylonitrile Butadiene).

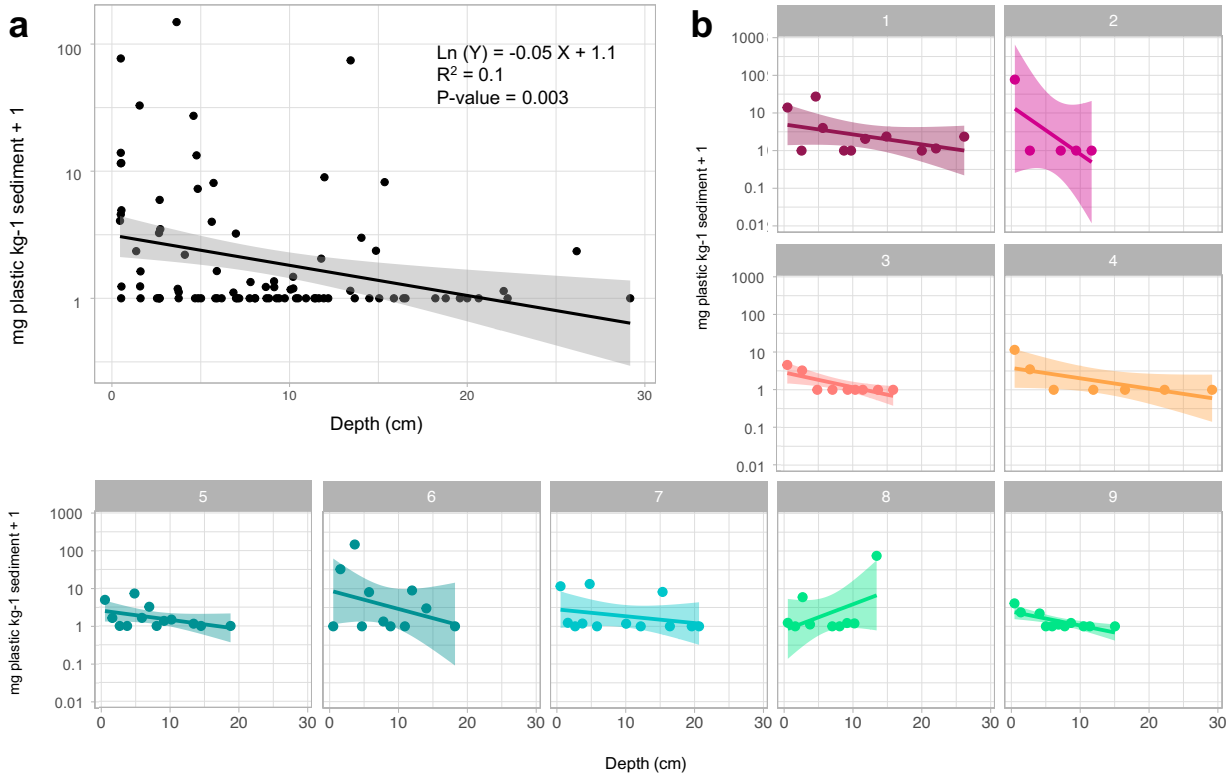

Fig. S2 Plastic concentration along a depth profile. Plastic concentration (in mg of plastic kg^{-1} of sediment) in each sample as a function of the sample depth for the 9 sampled cores combined (a) and in each of the 9 sampled cores (b). Cores 1 to 4 were sampled in the Red Sea and 5 to 9 in the Arabian Gulf (see Table 2). Each color corresponds to a mangrove site, hence, cores represented with the same color are replicates from the same site. The lines show the exponential fit (note that the y-axis is in logarithmic scale) and the shaded area represents the standard error of the fit.

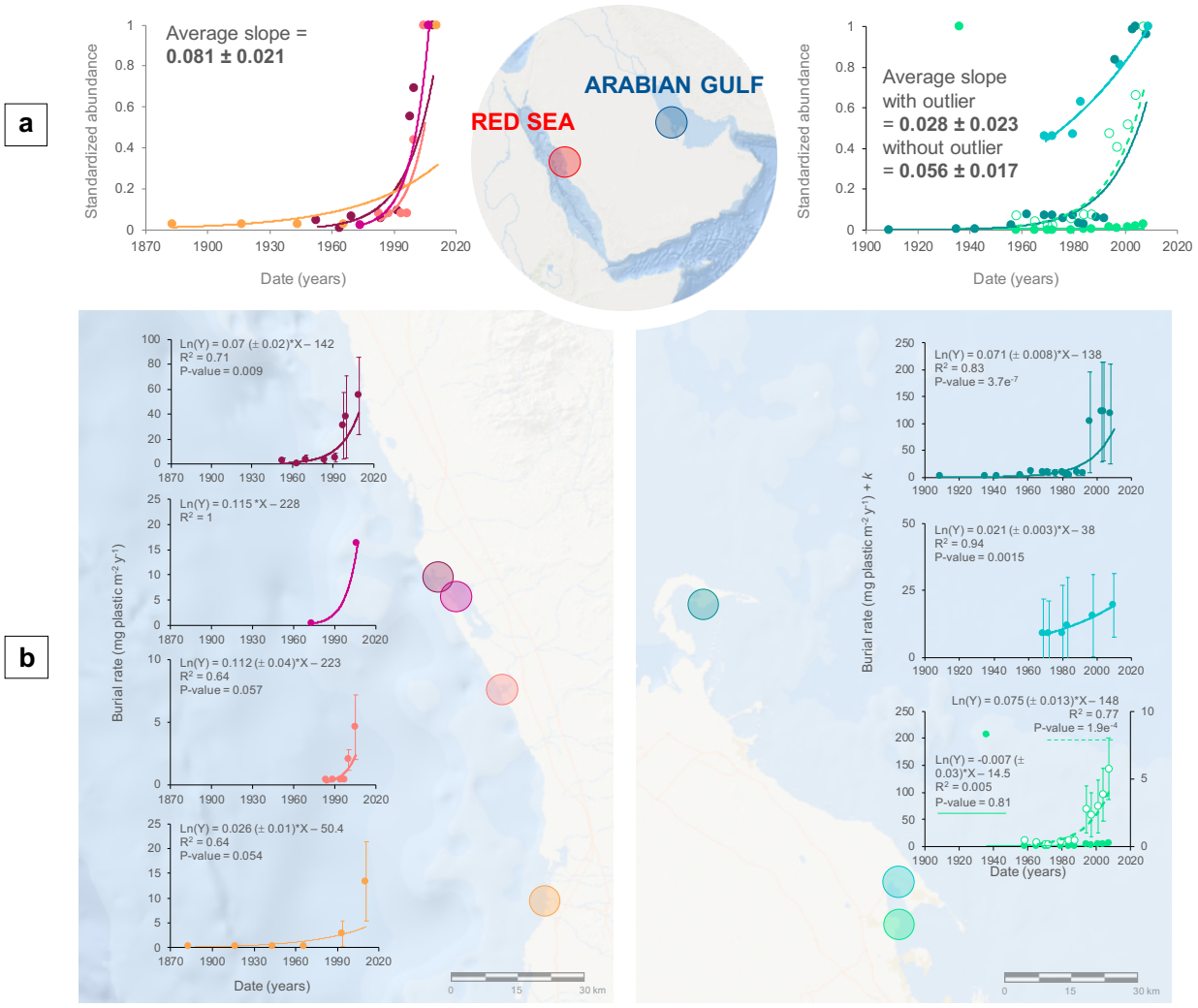

Fig. S3 Exponential increase of plastic burial rates in mangrove sediments. Historical increases in (a) standardized (to the maximum burial rate of each site) plastic burial rates in Red Sea and Arabian Gulf mangrove sites and in each (b) of the 4 Red Sea and 3 Arabian Gulf studied mangrove sites (see details in Data S1 and in Materials and Methods). Solid lines represent the exponential fit, for which the fitted equation, including the SE of the slope, R^2 and *p*-value are reported. For the last site of the Arabian Gulf, we provide the exponential fit including (solid line) and excluding (dashed line) the outlier point derived from the extremely high and anomalous value of plastic burial rate encountered in a sample corresponding to the 1920s. By excluding the outlier, the exponential increase is confirmed also for this site.

ITEM NO.	PART NUMBER
1	Flange A
2	Flange B
3	Tube
4	AS568A - 233 - Ø72.62 x CS3.53
5	2.5Inch PVC Ball Valve
6	B18.3.1M - 8 x 1.25 x 30 Hex SHCS -- 30NHX
7	B18.22M - Plain washer, 8 mm, regular
8	B18.2.4.1M - Hex nut, Style 1, M8 x 1.25 --D-N

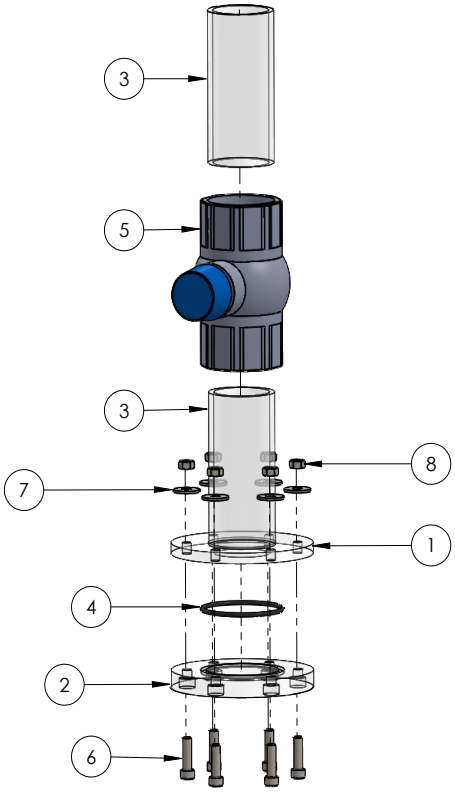

Fig. S4 Sediment-Microplastic Isolation (SMI) unit (design and picture) adapted from the design proposed by Coppock et al., 2017. Differences from the original design include use of poly methyl methacrylate (PMMA) instead than polyvinyl chloride (PVC) tubes and removable base to ease washing. Photo credit: Cecilia Martin, King Abdullah University of Science and Technology.

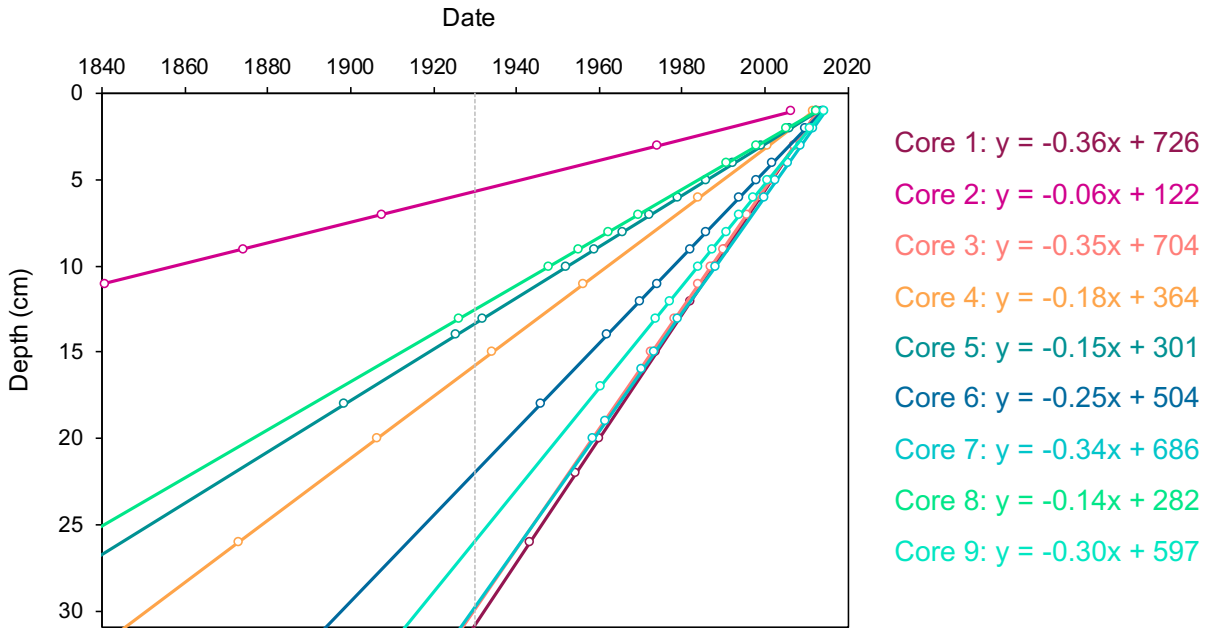

Fig. S5 Relationship between date and depth of the 9 sediment cores processed. The empty dots show the slices that were processed for plastic extraction. Cores are numbered according to Table 2 and the color code is the same used in the previous figures. The grey dashed line shows year 1930 used as a baseline to calculate plastic stocks in mangrove sediments.

Data S1. (separate file)

Abundance, mass, density and burial rates of plastics in each of the 88 samples processed; mean stocks of plastic in each of 9 cores processed; average burial rates in a 20-years window in each of 7 mangrove sites sampled; features (shape, color, size, weight and polymer type) of each of 126 plastic items retrieved.