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The vertical distribution and biological transport of marine microplastics across the epipelagic and mesopelagic water column

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Plastic waste has been documented in nearly all types of marine environments and has been found in species spanning all levels of marine food webs. Within these marine environments, deep pelagic waters encompass the largest ecosystems on Earth. We lack a comprehensive understanding of the concentrations, cycling, and fate of plastic waste in sub-surface waters, constraining our ability to implement effective, large-scale policy and conservation strategies. We used remotely operated vehicles and engineered purpose-built samplers to collect and examine the distribution of microplastics in the Monterey Bay pelagic ecosystem at water column depths ranging from 5 to 1000 m. Laser Raman spectroscopy was used to identify microplastic particles collected from throughout the deep pelagic water column, with the highest concentrations present at depths between 200 and 600 m. Examination



POLICY

SCIENCE

COMMS



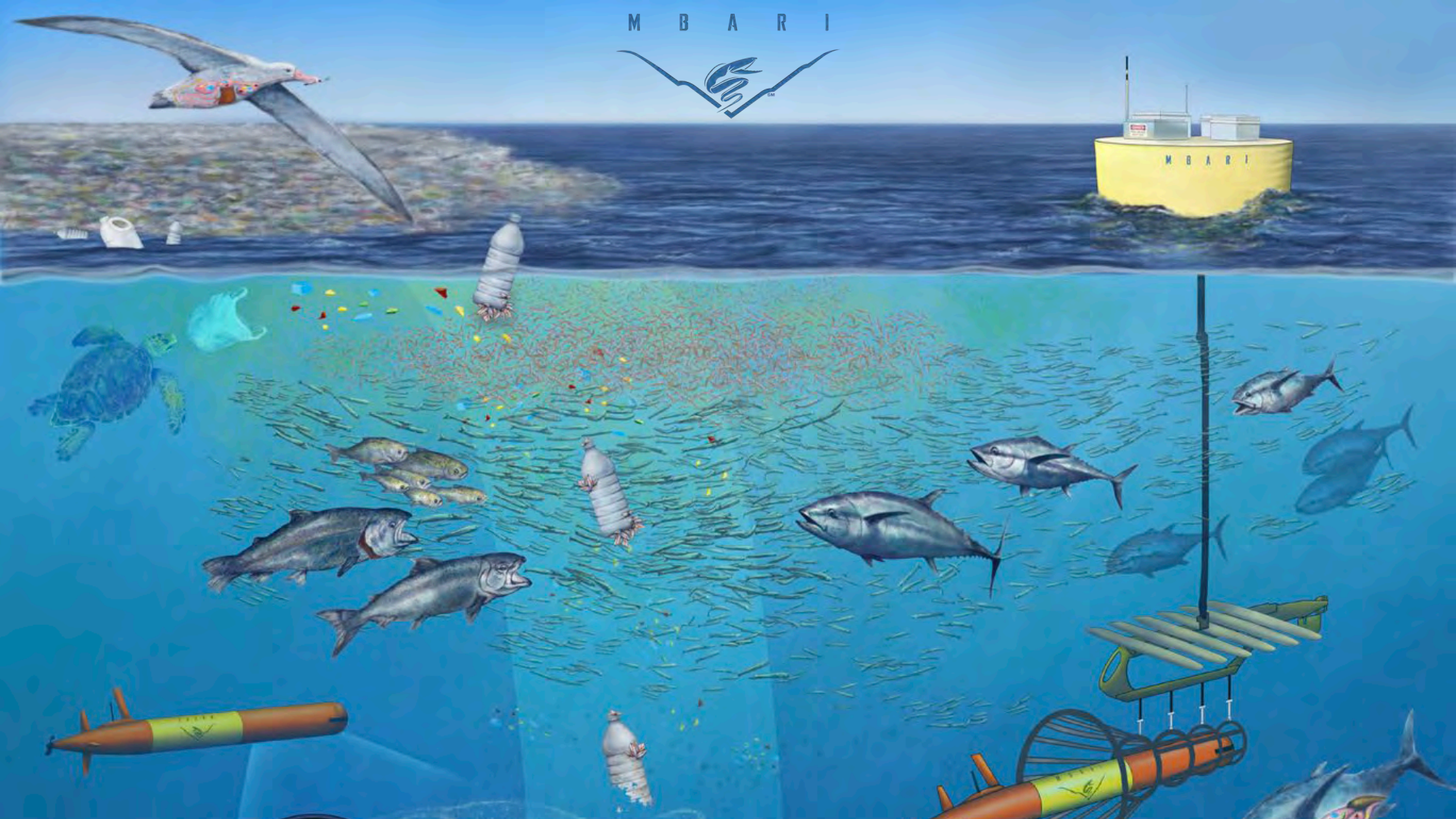
Monterey Bay Aquarium®

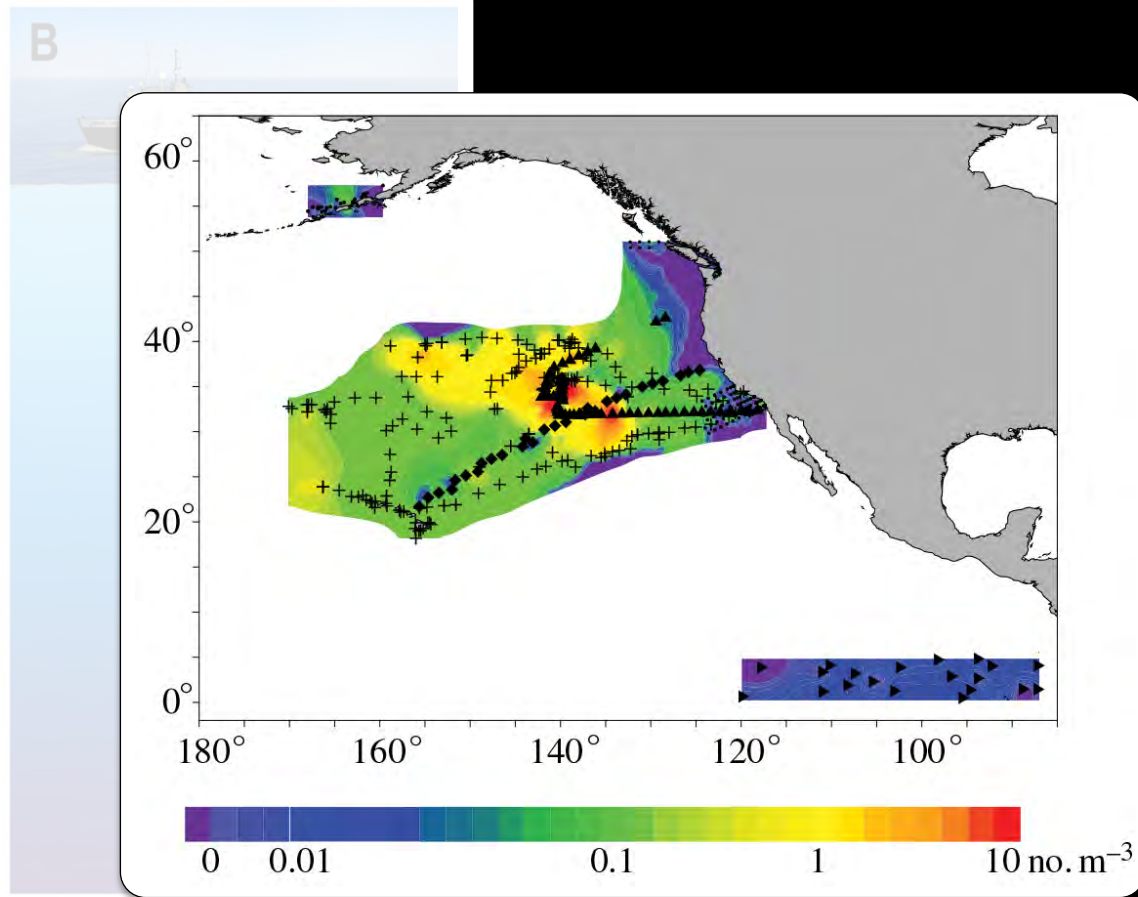
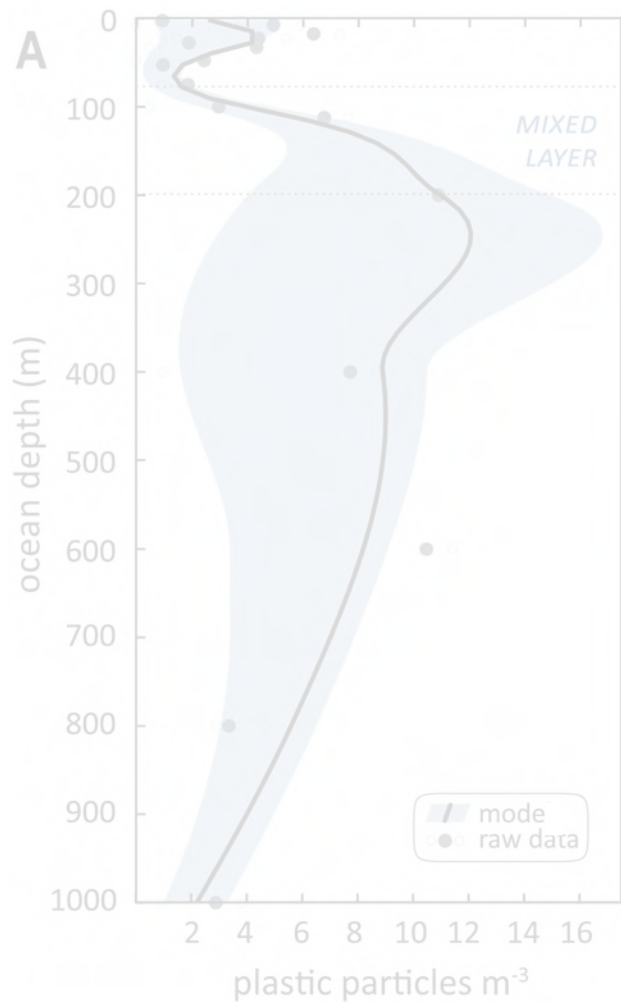
PROBLEM



- 
- A close-up photograph of a person's hand holding a large quantity of microplastic debris. The debris consists of numerous small, colorful fragments of plastic in shades of blue, green, red, and white, mixed with fine sand. The background shows a beach of sand and larger pieces of plastic litter. A semi-transparent dark grey rounded rectangle is overlaid on the center of the image, containing a numbered list of five items.
- 1. Entanglement**
 - 2. GI tract blockage**
 - 3. Caloric loss**
 - 4. Material toxins**
 - 5. Surface toxins**

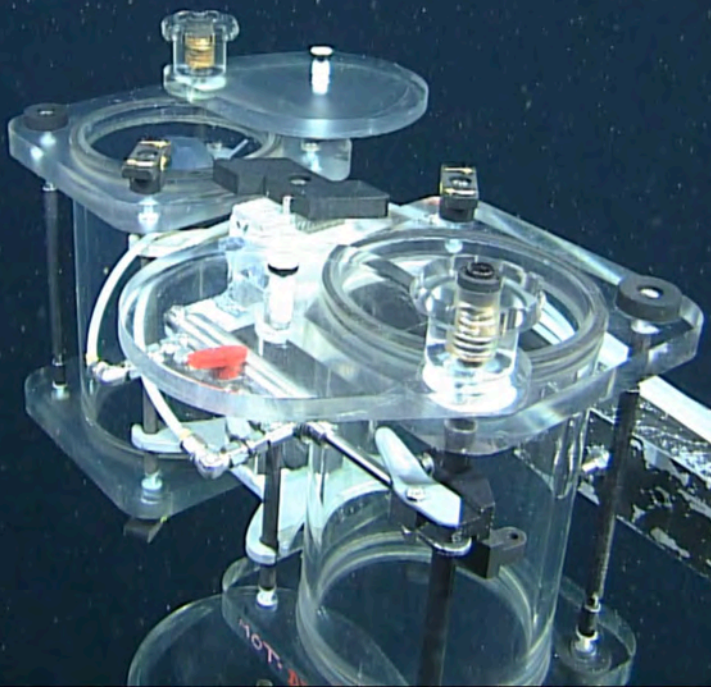
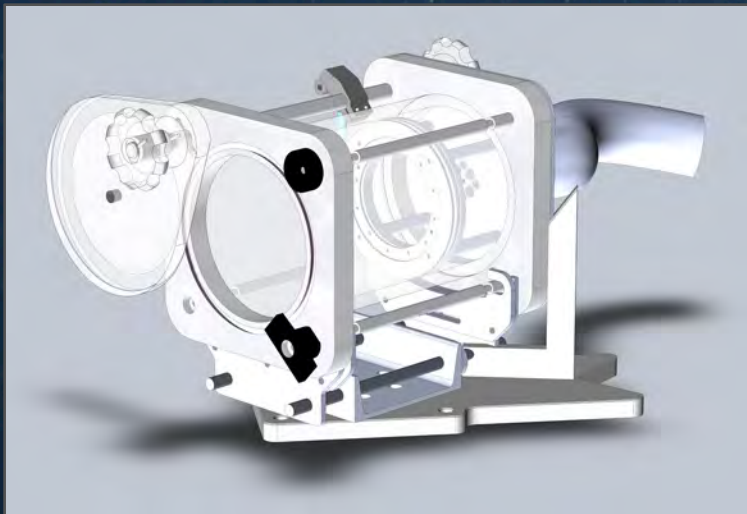
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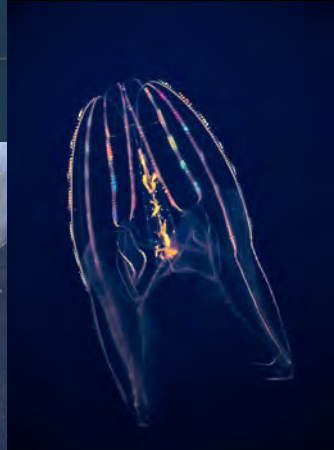


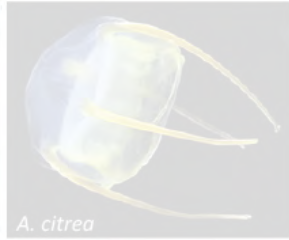
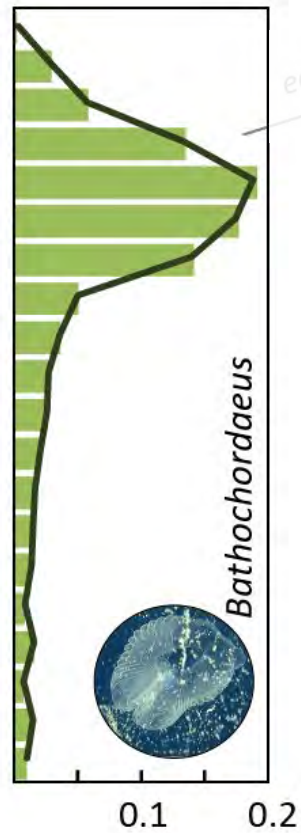
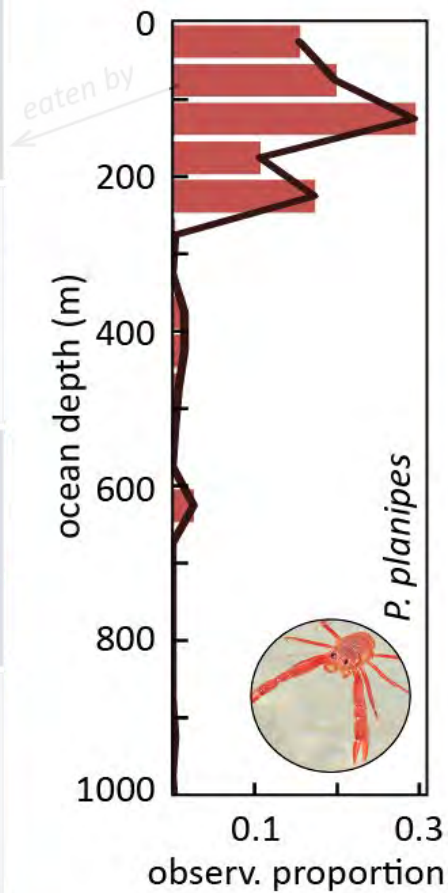


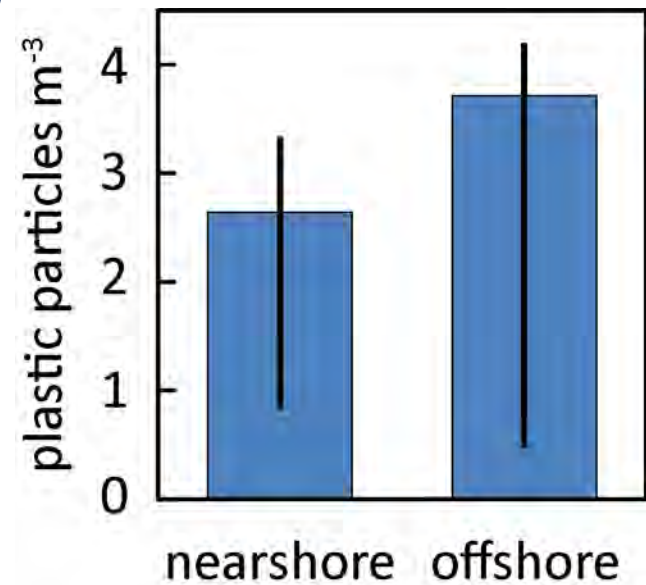
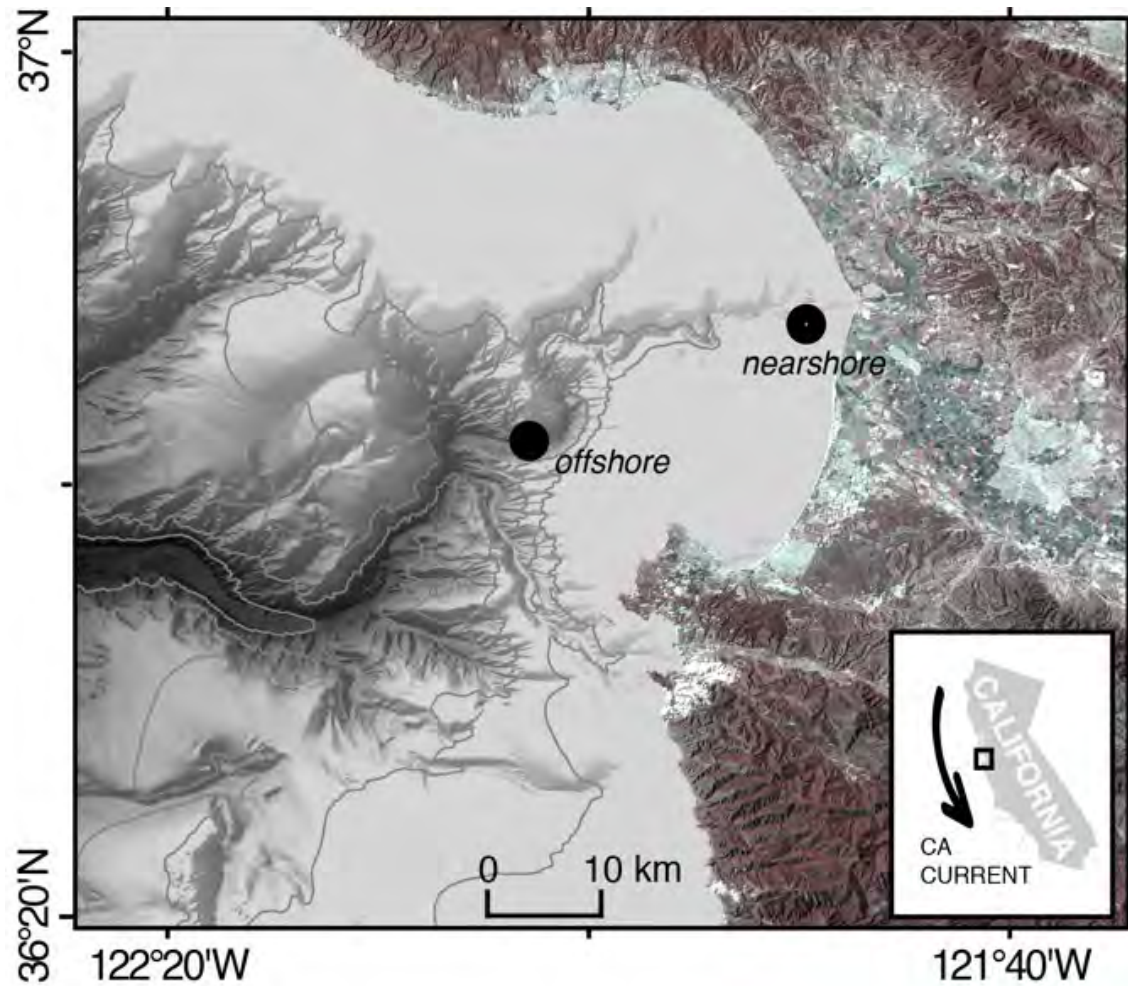
Goldstein et al. 2013

Choy et al. 2019









water

P. planipes

Bathochordaeus

fishery gear

①



②



③



④



⑤



⑥



⑦



⑧



⑨



⑩



⑪



⑫



⑬



⑭



⑮



⑯



⑰



⑱



⑲



⑳



0 0.2 0.4

proportion

