

Directions

Answer the questions on the following slides with this guidance:

- *limit text to bullets that are easy to read (i.e., use large font)*
- *be concise*
- *assume you're audience is the "informed general public"*
- *Additional details can be added in the notes section, if needed.*

902306 – SINKing Ecology Robot (SINKER)

What's the fundamental problem, question, or issue you are addressing?

- *SINKER will measure variability of carbon flux to the seafloor and the ecological source of this variation over seasonal time scales.*

Why is it important/why should anyone care?

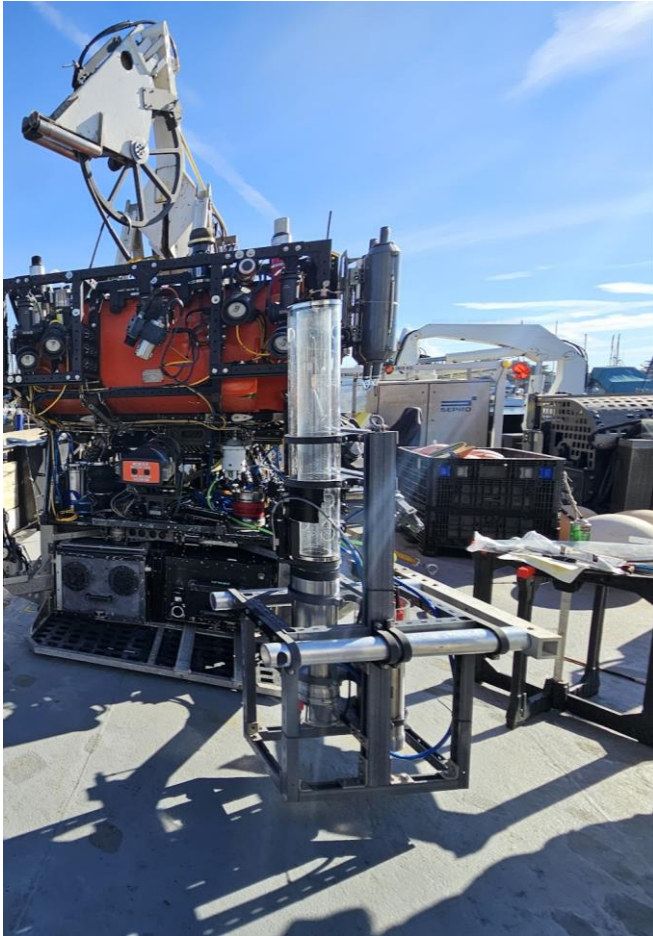
- *The amount of carbon exported to the deep ocean is poorly quantified and modeled, and there is growing consensus that ecological mechanisms of particle export must be accounted for to improve estimates.*

What are we doing about it/what's MBARI's unique contribution?

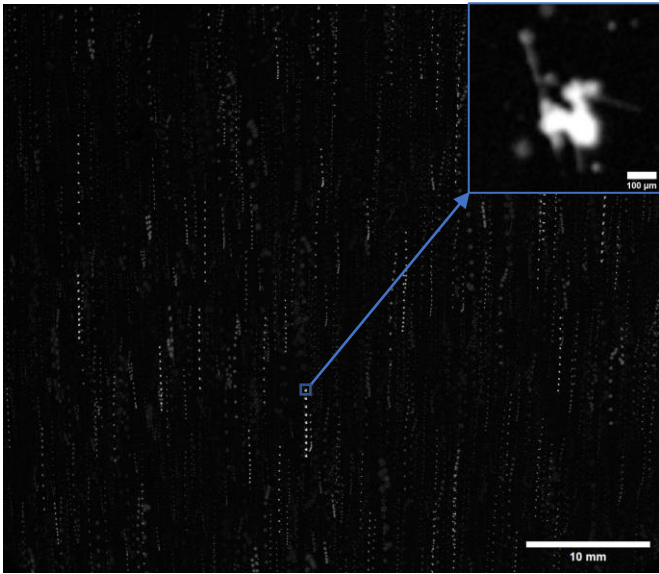
- *SINKER leverages MBARI's unique access to the deep sea and MARS along with our expertise in underwater imaging to enable unprecedented observations of sinking particles.*

What are your project plans for next year (2025)?

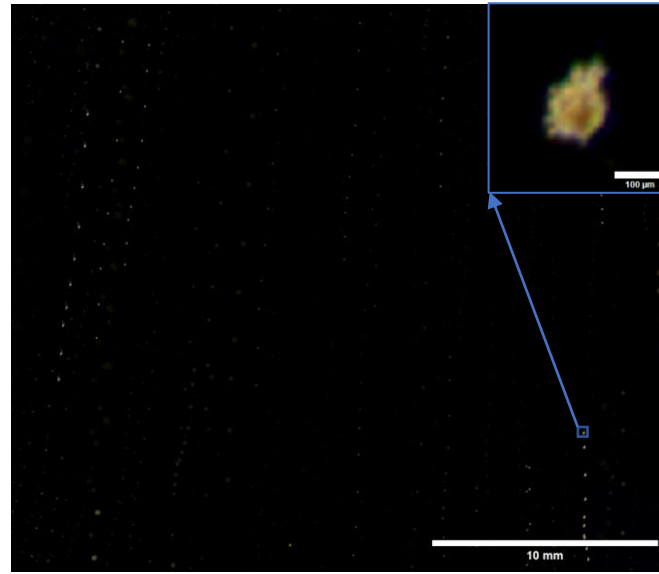
- *In 2025 we plan to deploy SINKER in a stand-alone configuration if MARS is not available and install permanently on MARS by the end of the year.*



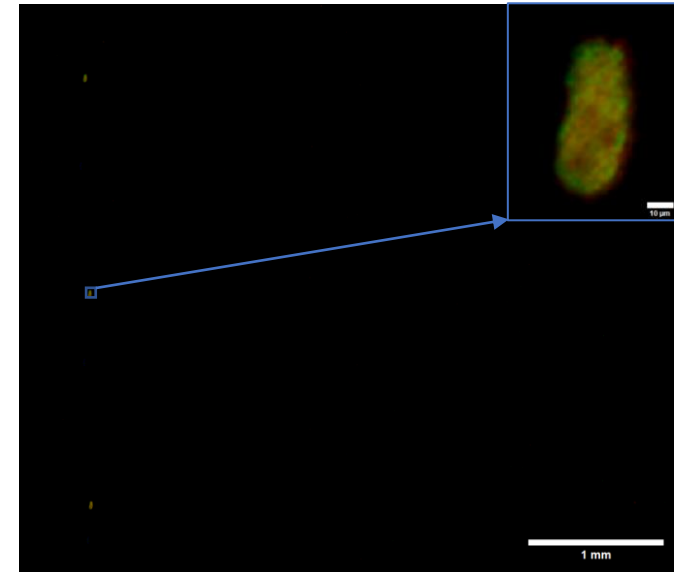
Evolution of the SINKER instrument during field testing in 2024. The initial version of sediment camera and sinking column were deployed twice in March on ROV *Ventana* (left). These deployments revealed that the sinking column must be sealed at the bottom to yield quantitative measurements of sinking particle flux. Revisions to the design (middle) added a linear actuator to move the sediment camera vertically to allow sealing on a gasket and wiping with the rotary brush. In addition, side-looking camera ports with o-ring seals were added with a 3D printed fixture incorporated into the sinking column. Deployments with the complete system in October (Right) validated the design revisions and demonstrated excellent capabilities with all 5 imaging modalities.



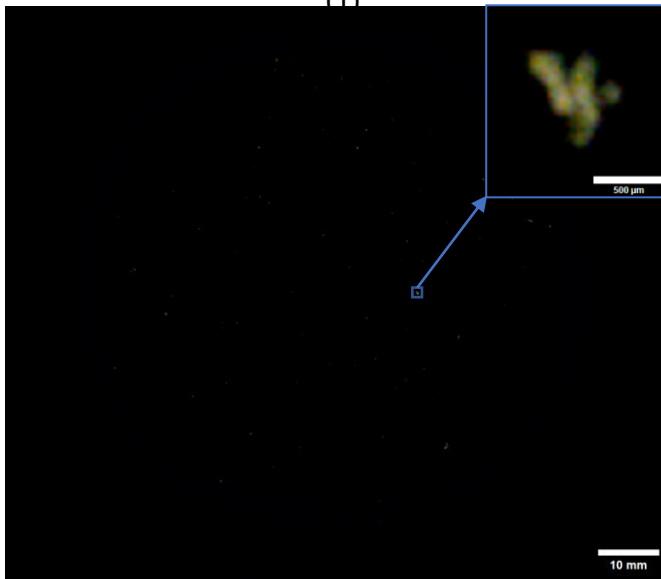
Stack of 10 shadowgraph images (1)



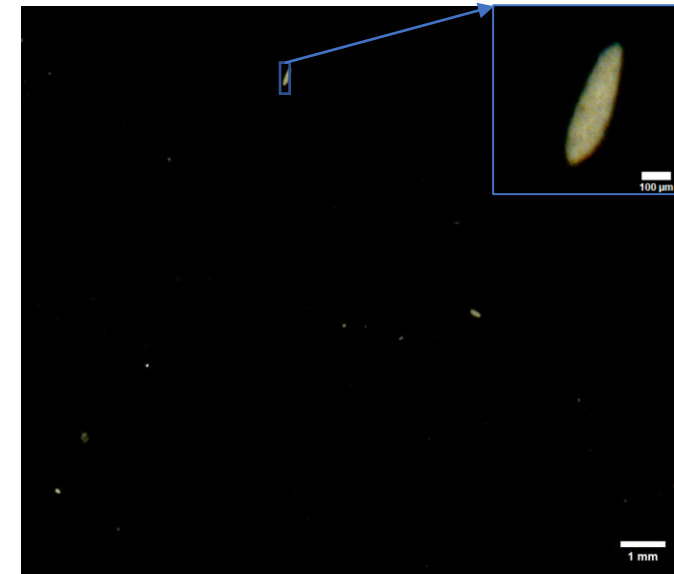
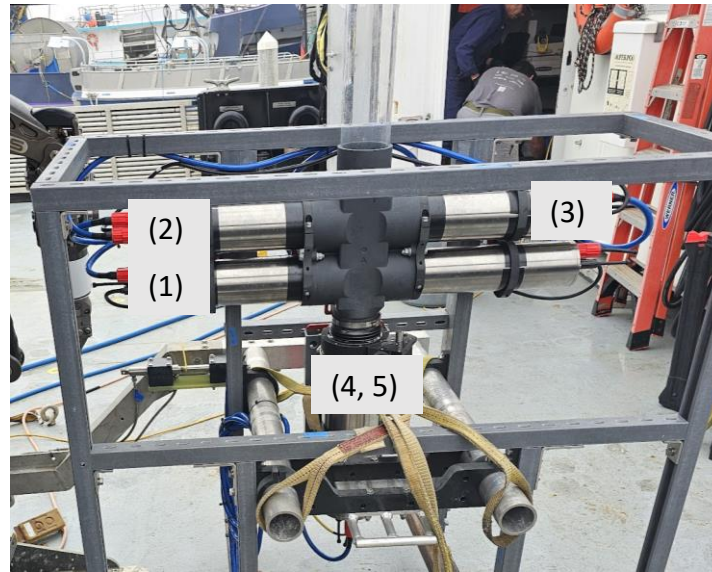
Stack of 10 low-mag darkfield images (2)



Stack of 10 high-mag darkfield images (3)



1 hour accumulation of particles on low-mag sediment camera (4)



1 hour accumulation of particles on high-mag sediment camera (5)

Examples Images from the five different imaging modalities on SINKER covering size ranges from 20 μm to 20 cm, and sinking rates of 1-1000 m/day