

Elucidating Emergent Rules Governing Marine Snow Properties and Carbon Sequestration using AI and ML

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Emergent Rules/Properties of Marine Snow

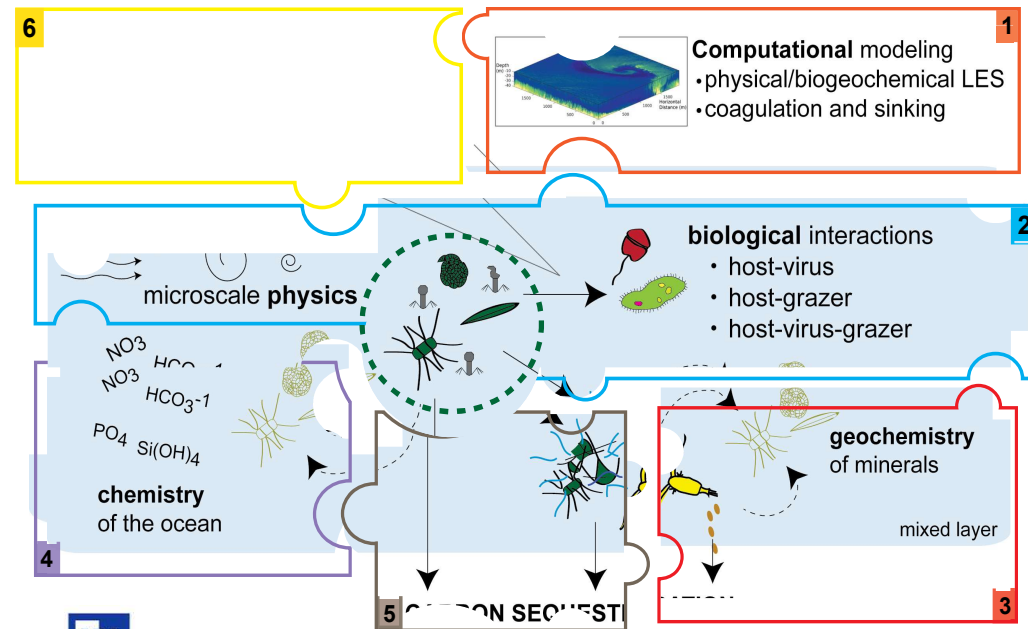
'The convergent impact of marine viruses, minerals, and microscale physics on phytoplankton carbon sequestration'



Growing Convergence Research Program



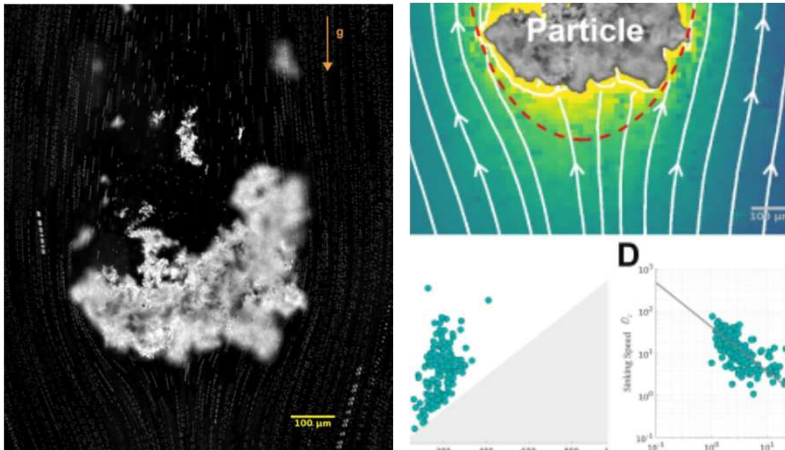
- **Aim:** Elucidate, quantify and develop predictive understanding and rules on how viruses drive Earth's carbon cycle
- **Approach:** Integrative, convergent 'puzzle pieces': innovative conceptual understanding, analyses, and tool development
- **Application:** Get to know...idea incubation...foster a common foundation of understanding...collective hypothesis generation...experiential co-incubation...creating trust and a comfortable space...develop convergence modules



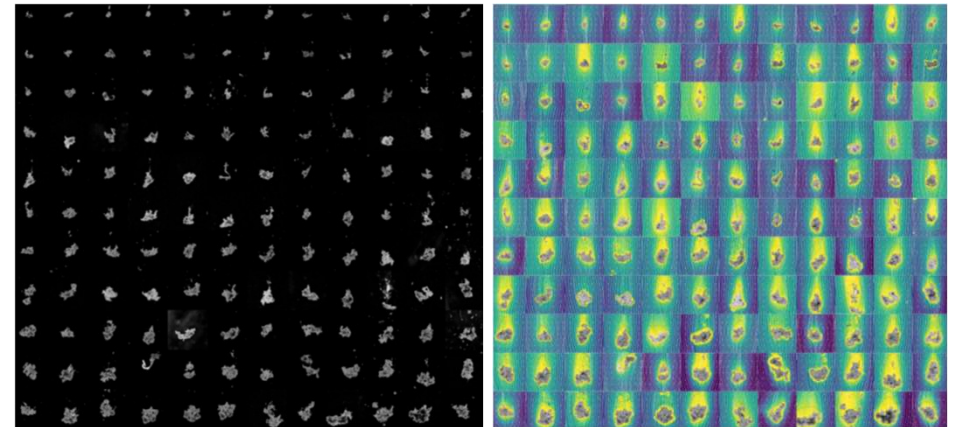
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Emergent Rules/Properties of Marine Snow



Microscale measurements of the flow field around sinking marine snow particles reveals an approximately ellipsoidal mucus halo (comet) enclosing the visible particulate aggregate. These mucous comets have lower density and can act as parachutes that impede sinking speeds of the aggregates.



Analysis of a 'zoo' of particles from the Northwest Atlantic ocean revealed that the mucous tails were universal across a range of hydrodynamic fingerprints. They had escaped previous detection until visualized and analyzed with a novel gravity machine. The presence of the mucous tails fundamentally changes how we view particles and carbon flow in the oceans