

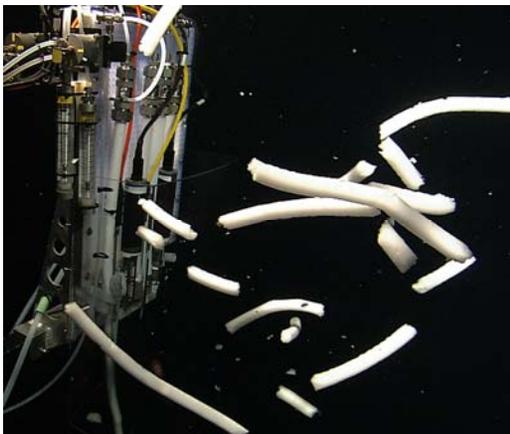
# Successful Field Experiment: Direct Injection of CO<sub>2</sub> Hydrate Particles in the Ocean

Research Supported by U.S. Department of Energy, Office of Science, Biological and Environmental Research

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ORNL, MIT, IOS, and MBARI researchers aboard the MBARI ship *Western Flyer* during a field experiment off the Monterey Bay in April 2006. The remotely operated submersible vehicle *Triburon*, visible in the background, was used to conduct the experiments at depth.



CO<sub>2</sub> composite material produced at 1500 m depth. Materials are well consolidated and sink, indicating possibility for long-term sequestration

- ORNL's continuous-jet hydrate reactor (CJHR) for CO<sub>2</sub> injection in the ocean has been scaled up 100 times.
- CJHR was successfully tested in ocean experiments, producing consolidated, negatively buoyant hydrate particles suitable for carbon sequestration.
- Particles were followed for long periods of time to quantify dissolution rate and sinking velocity.
- Tests conducted at various depths (1200-2000 m) and flow rates (1.5–4.5 L/min for CO<sub>2</sub> and 4–12 L/min for seawater) indicate this method is robust and scaleable.
- Further experiments are needed to investigate plume formation and transport.

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