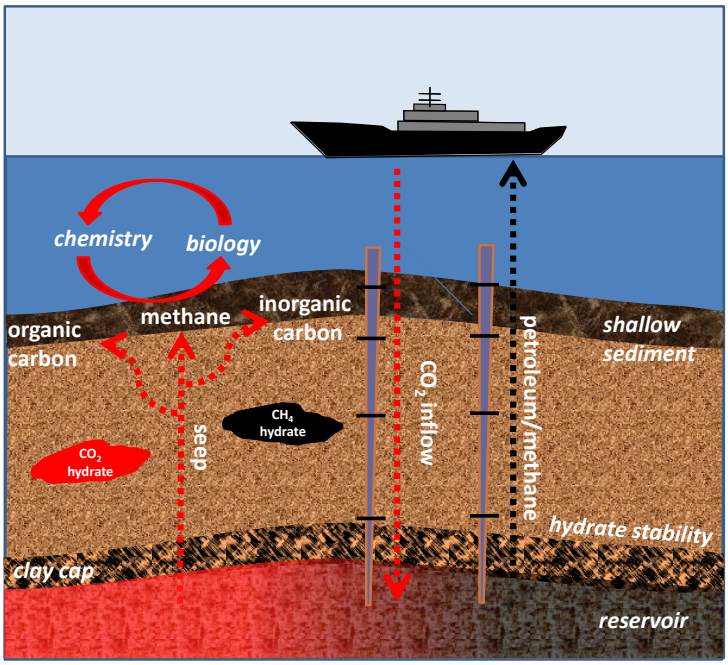
CHINA COASTAL ENVIRONMENTAL ASSESSMENT RELATED TO HYDRATE MINING

OVERVIEW – Future plans for Chinese sediment methane hydrate and petroleum mining, as well as carbon dioxide sequestration, require credible environmental assessments to confirm that anthropogenic compounds released to shallow sediment and the water column during mining will not adversely affect food chain cycling. These seeps could also cause gradual geothermal warming and have a subsequent impact on platform or coastal stability. Conversely, it is necessary to determine that deep sediment carbon sequestration does not block natural methane and oil seepage, resulting in overall lower biologic activity. Strategic Carbon is well positioned to provide detailed environmental impact assessments for global ocean mining and carbon sequestration efforts (www.strategic-carbon.com).



APPROACH – Bacterial and geochemical cycles can be monitored to predict ecosystem health during mining and sequestration. Acquisition of preliminary data starts with initial site assessment during the geochemical assessment for field activities. During mining operations, elevated methane to the shallow sediment and the deep water column can result in hypoxia, critical changes in nutrient cycling biological diversity. Monitoring elevated methane fluxes can also help assess deep sediment hydrate concentrations and stability. For example, high methane advection coupled with chloride in porewaters was concluded to signal hydrate instability in the Gulf of Mexico because of deep sediment salt diapirs. The ecosystem assessment requires a thorough integration of physical, biological, and chemical parameters monitor carbon cycling into the microbial community and subsequently higher trophic levels. Approaches for the field assessment include: 1) visual observations with ROVs can be used for continual observation of key regions; 2) molecular biology can be applied to the sediment community diversity to monitor changes in the ecosystem carbon cycling; 3) carbon isotope analysis can be applied for clear delineation of the biogeochemical cycles; and 4) long term monitoring can be developed with deployment of incubation chambers. This approach couples expertise available through the Strategic Carbon consortium with Norwegian Institute for Water Research (NIVA) and University of Hawaii (HNEI).

EXPECTED SIGNIFICANCE – Monitoring of key parameters at sequestration or mining sites provides a thorough assessment of ecosystem impact and system stability. The field plan also can be used to confirm carbon sequestration efficiency and determine environmental damage created by CO_2 leakage. Acquired data provide distinct financial advantages to field operations.

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