Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Dissolution of methane bubbles with hydrate armoring in deep ocean conditions[1] MARGARITA KOVALCHUK, Cal State Univ - Sacramento, SCOTT SOCOLOFSKY, Texas A&M University, College Station — The deep ocean is a storehouse of natural gas. Methane bubble moving upwards from marine sediments may become trapped in gas hydrates. It is uncertain precisely how hydrate armoring affects dissolution, or mass transfer from the bubble to the surrounding water column. The Texas A&M Oilspill Calculator was used to simulate a series of gas bubble dissolution experiments conducted in the United States Department of Energy National Energy Technology Laboratory High Pressure Water Tunnel. Several variations of the mass transfer coefficient were calculated based on gas or hydrate phase solubility and clean or dirty bubble correlations. Results suggest the mass transfer coefficient may be most closely modeled with gas phase solubility and dirty bubble correlation equations. Further investigation of hydrate bubble dissolution behavior will refine current numeric models which aid in understanding gas flux to the atmosphere and plumes such as oil spills.

[1]Research funded in part by the Texas A&M University 2017 Undergraduate Summer Research Grant and a grant from the Methane Gas Hydrates Program of the US DOE National Energy Technology Laboratory.

Margarita Kovalchuk
California State University, Sacramento

Date submitted: 02 Aug 2017 Electronic form version 1.4