Bio-Electrical Energy from Seafloor Methane

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Project Objectives:

- Determine power levels readily harvested with a benthic microbial fuel cell (bMFC) from seafloor site venting methane
- Demonstrate active anaerobic methane oxidation coupled to electricity production
- Incubate seep sediments in high pressure reactors to establish microbial response to methane availability and other amendments

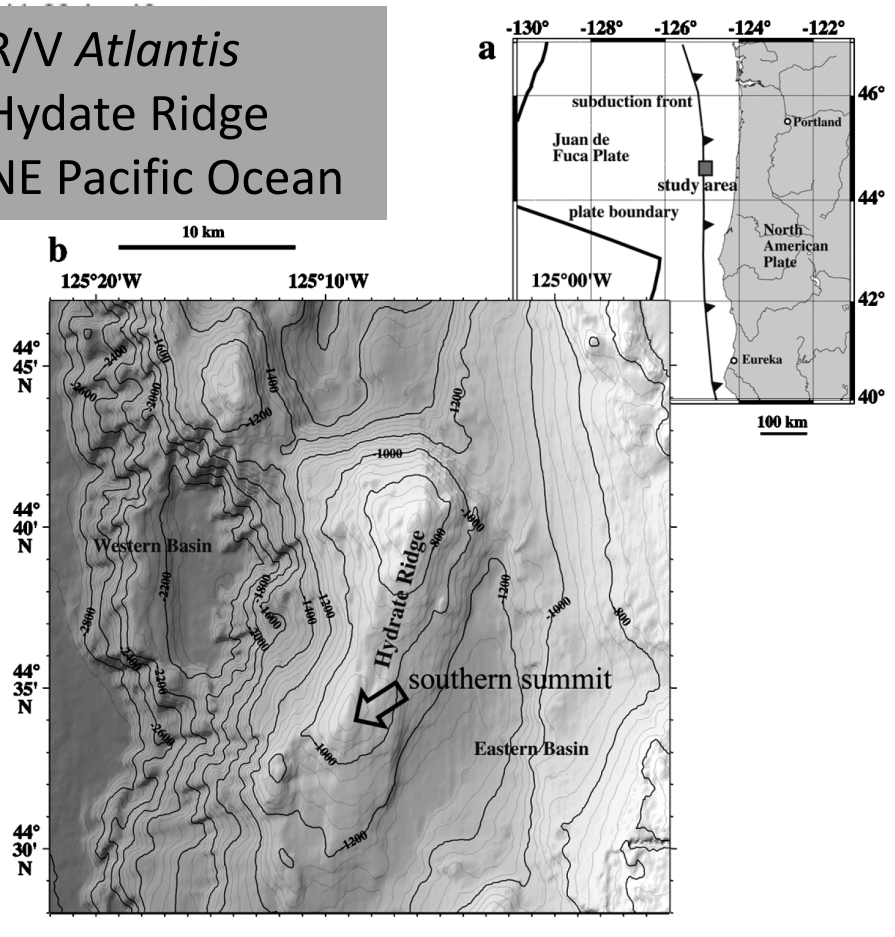
Technical Approach:

- Deploy bMFC; recover seep sediments
- Utilize acoustic modem/power management platform to record bMFC performance, trigger water pumps at methane sensor heads, and transmit records on command

Kelley, D/UW 3 Days 3/INST-UW/F
Kelley, D/UW OOI Cabled Array 3/NSF-OOI-OOI/P
Reimers, C/OS Benthic Observer Pro N00014-16-1-2881 2/NAVY-ONR/F
Kelley, D/UW M3 MARUM 1/OTHER/F

Load: 21 Jun 19 OR Margin-Axial
Dep: 22 Jun 19 Newport NP09 44N/125W Deborah S. Kelley 8/9
Arr: 29 Jun 19 Newport NP09 44N/125W

R/V *Atlantis*
Hydate Ridge
NE Pacific Ocean

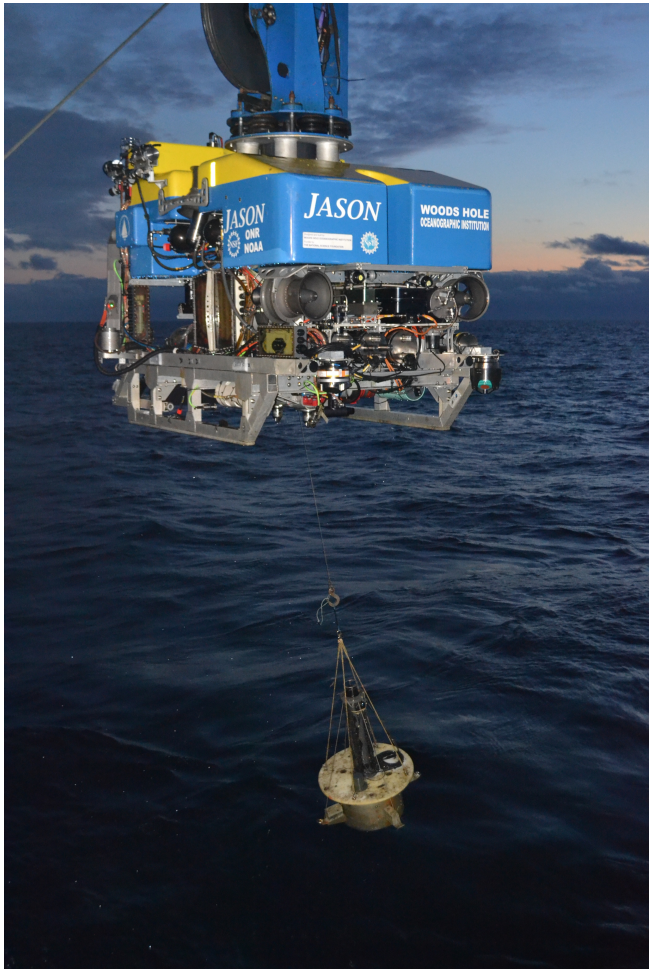


ACCOMPLISHMENTS

- A CH_4-bMFC -replete with methane sensors, gas-tight osmo-samplers, a power management platform, and acoustic modem- was deployed on 06/27/2019 by the *ROV Jason* on Hydrate Ridge off Oregon at 775 m.

- On the same cruise, a similar bMFC system named the Benthic Observer (BeOb) was recovered from a site at 580 m
  - It had been operating since 8/12/2016
  - We conducted sampling of the bMFC electrodes and surrounding sediments.

- ROV *Jason* recovered 16 sediment push cores from the BeOb site, and 20 additional sediment push cores from within 1 m of the CH_4-bMFC as well as from a control site ~75 m away.



2020 RECOVERY ANTICIPATED