Cruise AT-37-04

- Newport, OR to Manzanillo, Mexico October 8 to October 27, 2016
- UM (Kang Ding, W.E. Seyfried, Jr.) *Chemical Senor studies of EPR 9°N Vent fluids: In Situ measurement and monitoring*
- USF/HU (K.T. Scott, Pete Girguis) *Metabolism of Riftia Pachyptila under in-situ conditions*
- Vehicles Used
 - <u> Alvin (Nine dives)(8 +1)</u>
 - Time lost for Weather= 0
 - Time lost for Vehicle equipment= 0
 - Time lost for User provided scientific equipment= 0
 - Average Alvin bottom time = 5H 32M
- Post Cruise Assessment
 - Atlantis and Alvin- Very high marks for all aspects of performance and in meeting goals of the scientific research programs

Chemical Senor studies of EPR 9°N Vent fluids: Measurement and monitoring

104"18'W 104"16'W 9°52'N **Bio Vent** M Vent Mkr 29 (Hobbit Hole) Q Vent **Riftia Field** Mussel Bed East Wall larker F Crab Spa Mkr 28 Tica Vent Mkr 20. **Bio9 Vents** 9°50'N Tamtown P Vents Ty Vent Mkr 16 Mkr 35 Alvinellid Pillar lo Vent Mkr 26 (Arches) Bio 119 Bio 141 Choo Choo **Tubeworm Pillar** Mkr 33 -9°48'N V Vent Akr 19 -2750-2700-2650-2600-2550-2500

Figure 5. Bathymetric map of the East Pacific Rise study area near 9°50'N. The map shown here was compiled using bathymetric data available at the Ridge 2000 data portal (http://www.marine-geo.org/portals/ridge2000).

- Approximately 15 vents studied
 - Real-time and time series deployments
 - Survey completed from Bio vent (north) to Ty vent (south)
 - Bio9 complex

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- Very active venting
- Temp = 380°C
- H₂ (0.8-1.0 mm/kg)
- <u>P vent complex</u>
 - Active, new structures
 - Temp = 360-370
 - H₂ (0.2 mm/kg)



Real Time



Time Series in-situ pH at Tica Vent





Metabolism of Riftia Pachyptila under in-situ conditions

- During cruise AT-37-04, *R. pachyptila* were sampled largely from sites near Tica vent area.
- Incubated in high-pressure aquaria under a variety of conditions spanning those they are known to experience *in situ*.
- Microbial samples will be analyzed at our home institutions to determine enzyme activities, metabolite abundances, and $\delta^{13}C$ analyses.
- Incubations were also undertaken to determine whether *R. pachyptila* can use <u>hydrogen gas as an electron donor</u>.
- Collaborations
 - USGS (Amy Gartman)
 - URI (Brea Govenar)
 - University of Vienna (Monica Bright)
 - University of Hawaii (Dr. Kiana Frank)

