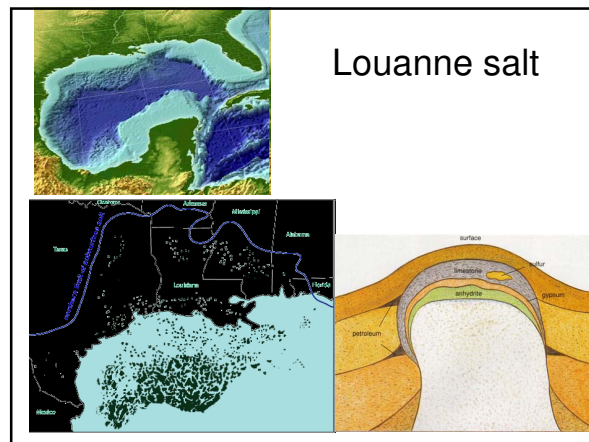


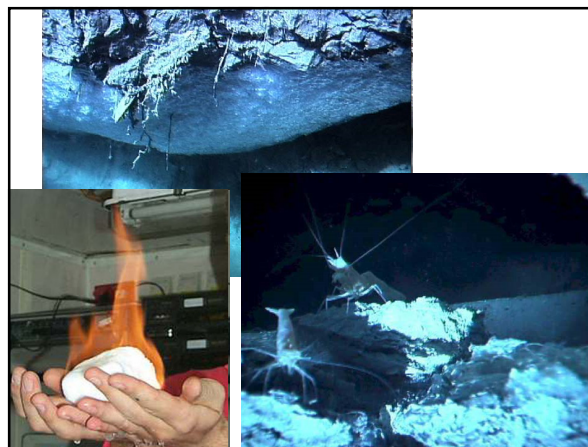
Hydrocarbon seep communities in the Gulf of Mexico

- Methane, salt, and hydrocarbon rich fluids
- Methane is the energy source for the food chain
- These fluids come from buried Jurassic salt deposits that are also rich in crude oil



Methane gas hydrate

- Crystalline water and methane
- Stable at high pressure and low temperature
- Can sometimes “explode” violently and leave pockmarks on the seafloor
- May explain the Bermuda triangle
- <http://www.youtube.com/watch?v=ahmjHLyF9GM&feature=related>
- <http://www.youtube.com/watch?v=y7dmRtlXaYQ&feature=related>
- <http://www.youtube.com/watch?v=KzUEr7uMnXU&feature=related>

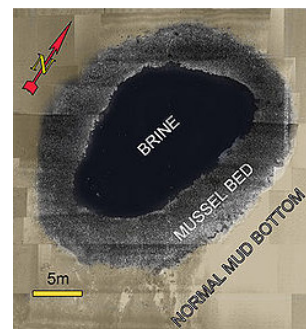


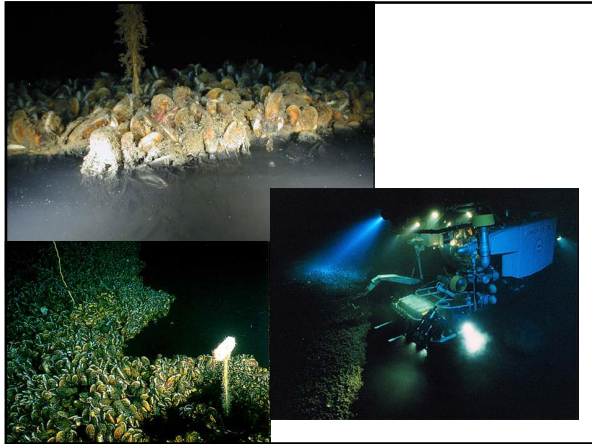
Hydrocarbon seep communities in the Gulf of Mexico

- Methane, salt, and hydrocarbon rich fluids
- Methane is oxidized free-living bacteria and symbiotic bacteria in mussels and tubeworms

The Brine Pool

- Formed by a hydrate explosion, then filled with salt saturated fluid
- Pool is surrounded by mussels



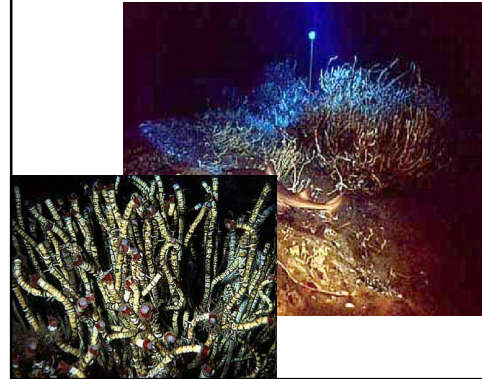


mussels

- Have symbiotic bacteria that use methane
- Brine pool is a rich source of methane, but is also extremely salty and has sulfide (poison)
- Gradient of mussels around brine pool
- Diverse other consumer organisms live associated with the mussels

tubeworms

- Have sulfide oxidizing symbiotic bacteria
- Acquire sulfide from the sediment via permeable “roots”
- Can live hundreds of years
- Many of other organisms live in and around tubeworm bushes

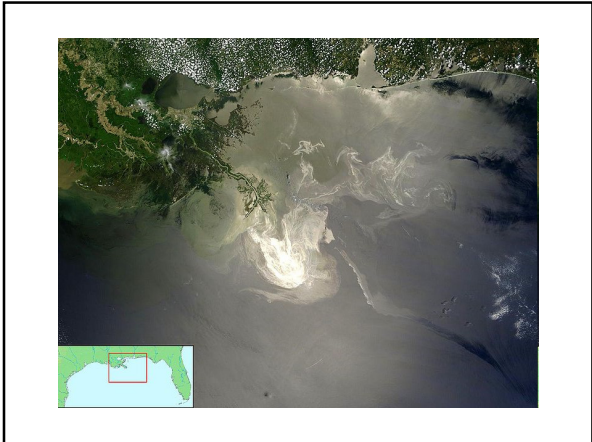


Ecology of hydrocarbon seeps

- Patches of methane seepage and also hydrogen sulfide
- Bacteria, mussels, and tubeworms are primary producers using methane or sulfide
- Other organisms are consumers on primary producers
- Patches appear to be fairly long lived (several decades)

Deepwater horizon oil spill

- April 20, 2010, an explosion on the Deepwater Horizon drilling platform in the Gulf of Mexico
- largest spill in American history
- 87 days an estimated 4.9 million barrels of oil were released into the Gulf.
- 80,000 square miles of commercial and recreational fishing grounds were closed



- ## Consequences
- Damages to organisms and communities
 - Toxicity in seafood
 - Use of dispersants
 - Contributing to gulf hypoxia

 - Deep water expedition after spill
 - <http://oceanexplorer.noaa.gov/explorations/10lophelia/welcome.html>
 - <http://live.psu.edu/flickrset/72157625597515684>

