# Lava caves of Hawai'i: Cave Conservancy of Hawai'i Field Season 2011

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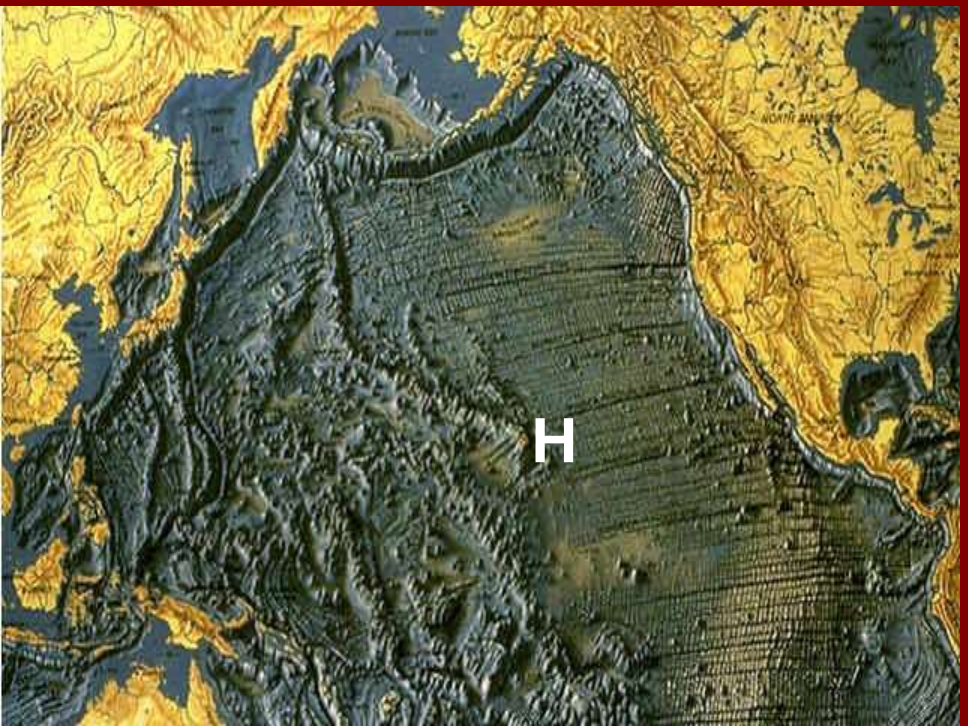
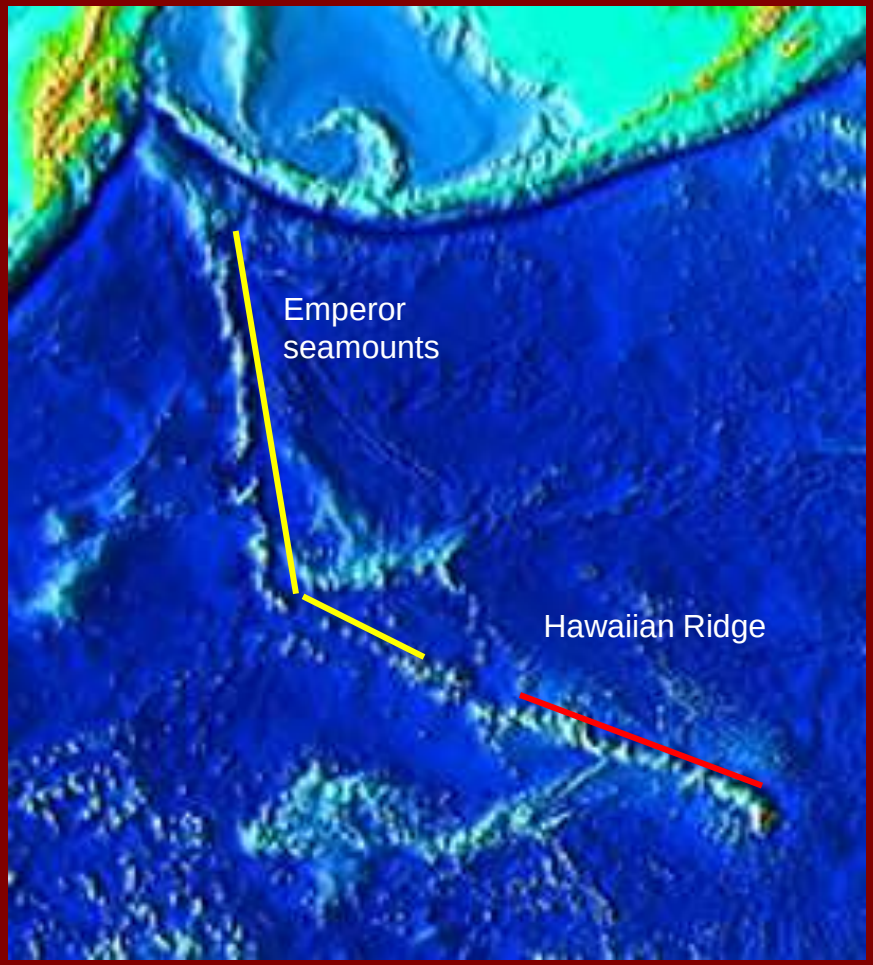
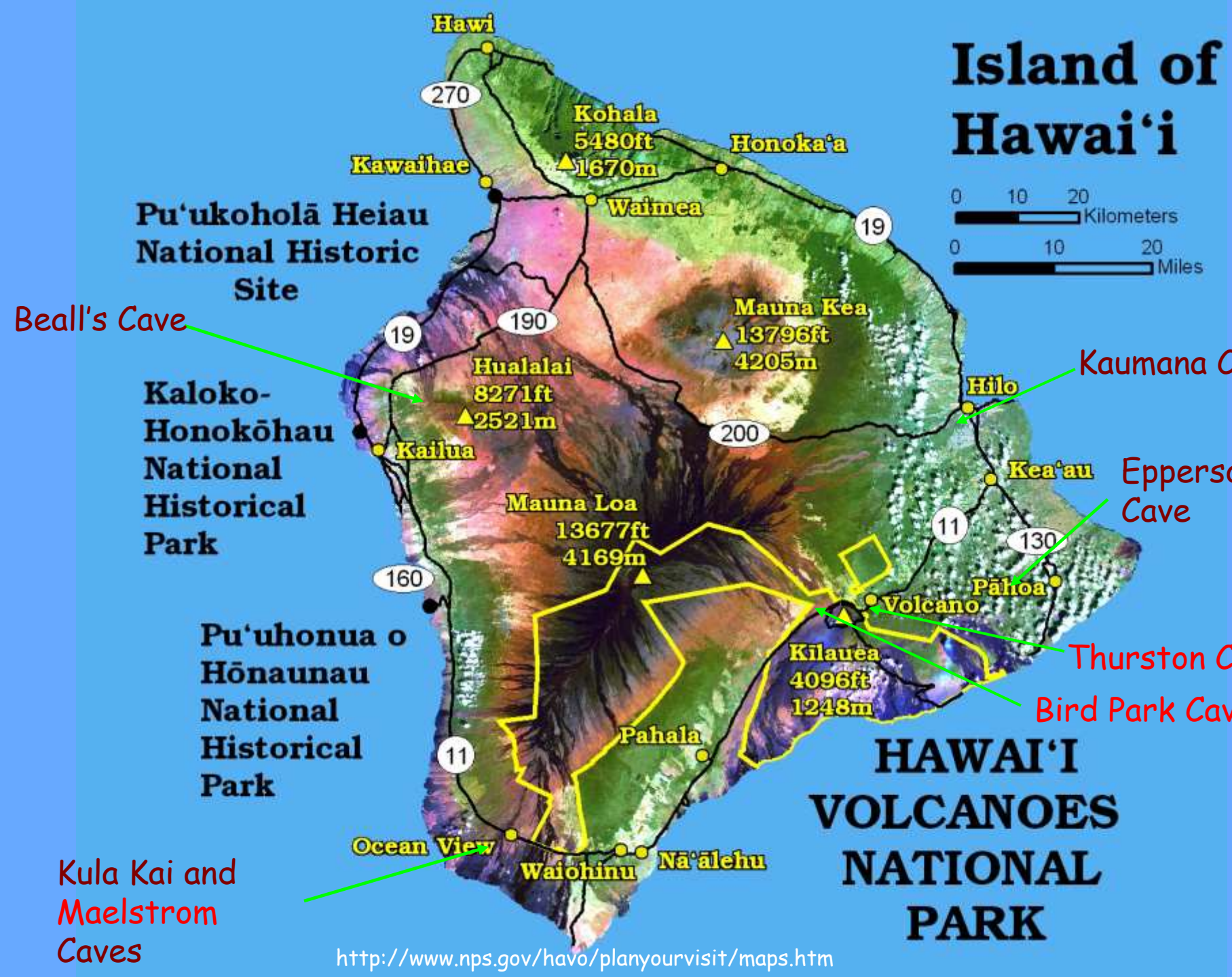
Acknowledgements to Diana Northup & Ken Ingham for the bacteria details & the photos!

# Location

- Oceanic volcanic island on mid-ocean ridge
- Basalt volcanic shield






http://www.nps.gov/havo/planyourvisit/maps.htm

# Cave Conservancy of Hawai’i

Non-profit corporation which aims to

- acquire & manage caves for scientific study,
- educate individuals interested in speleology
- conserve cave resources on the islands of Hawai`i.

Hawai`i caves are threatened in many areas!

# Lava cave features

# Lava cave features



# Cave passages

# Bacteria on lava cave walls

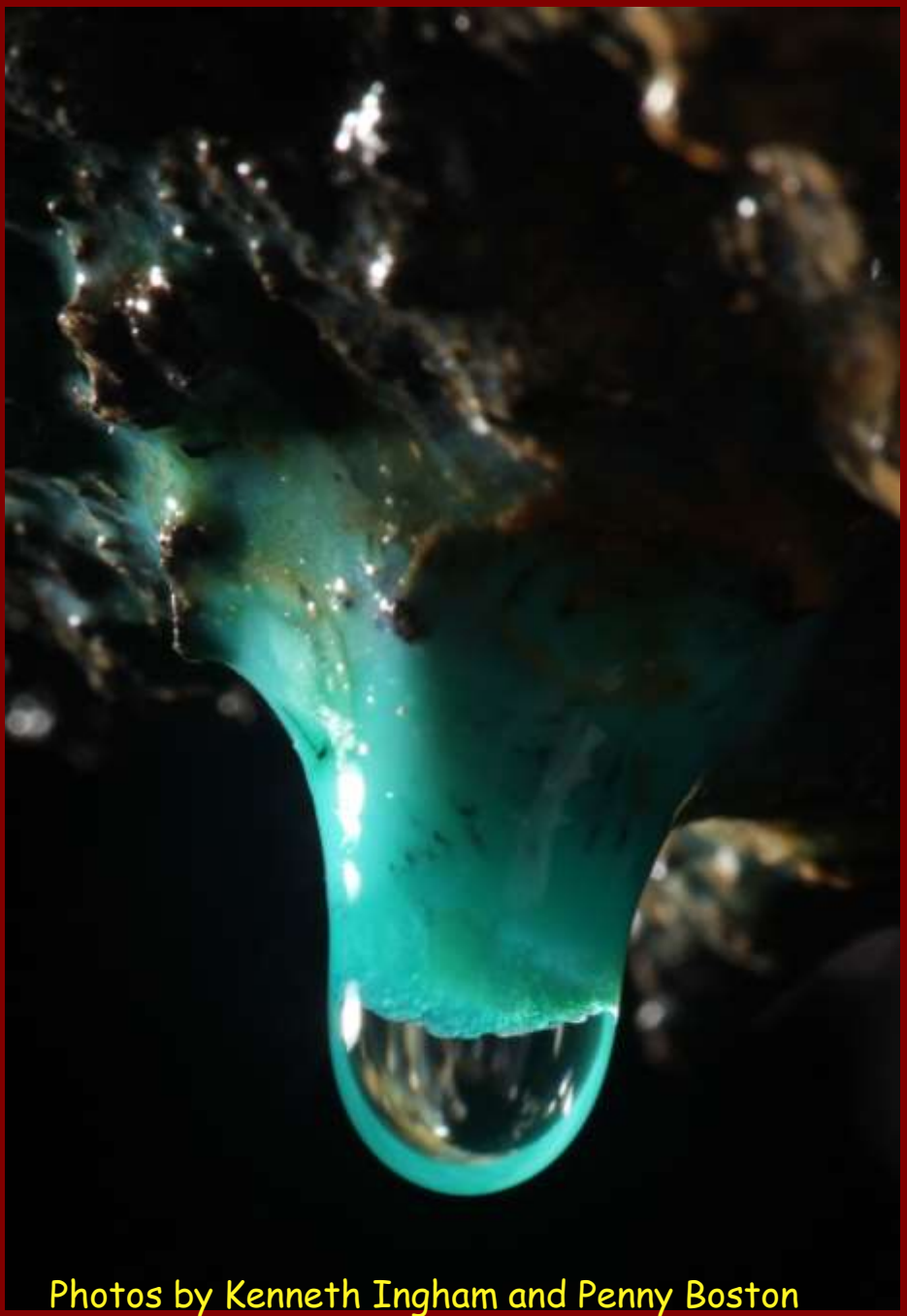
- Interesting bacterial colonies and mats on the cave walls
- Variety of colours and shapes
- Collaboration with Dr Diana Northup (University of New Mexico, Albuqueque)
- World wide collaboration involving New Mexico, Hawai'i, Undara, Western Victoria, Azores et al…..

Acknowledgements to Diana Northup & Ken Ingham for the bacteria details & the photos!

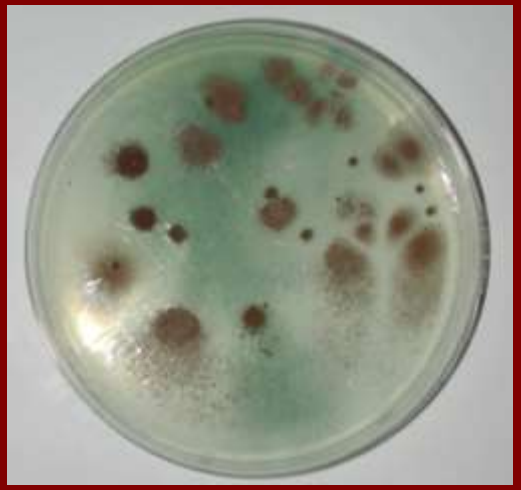
# Maelstrom lava tube

Photo by Kenneth Ingham

- Location: Kipuka Kanohina Cave Preserve, Kula Kai Caverns
- Blue/green deposits. White colonies.




Blue-green deposits: Maelstrom, Hawai‘i: a hydrated copper silicate with an interesting microbial community.



# Pointillistic Deposits, Epperson's, Hawai'i

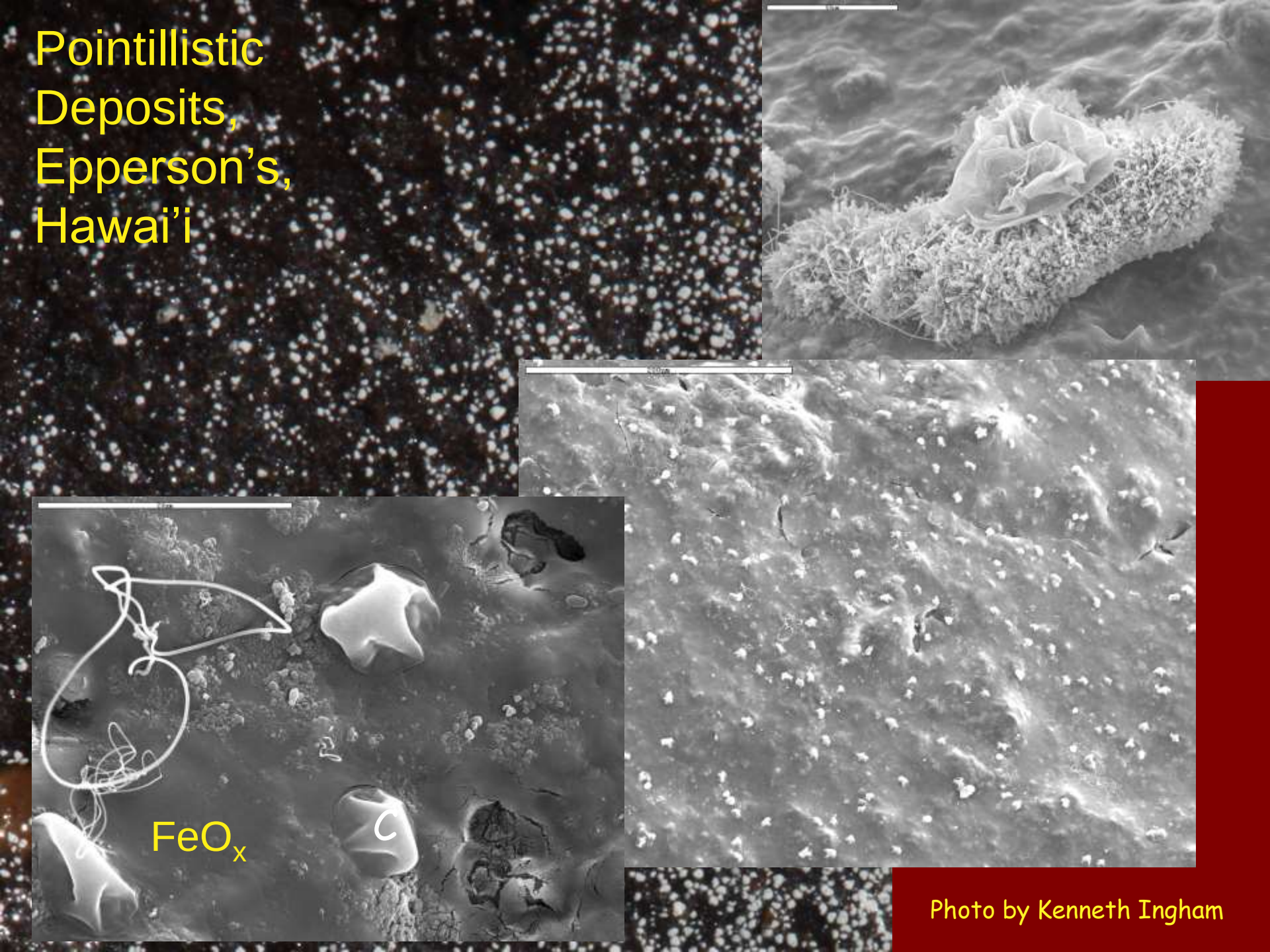
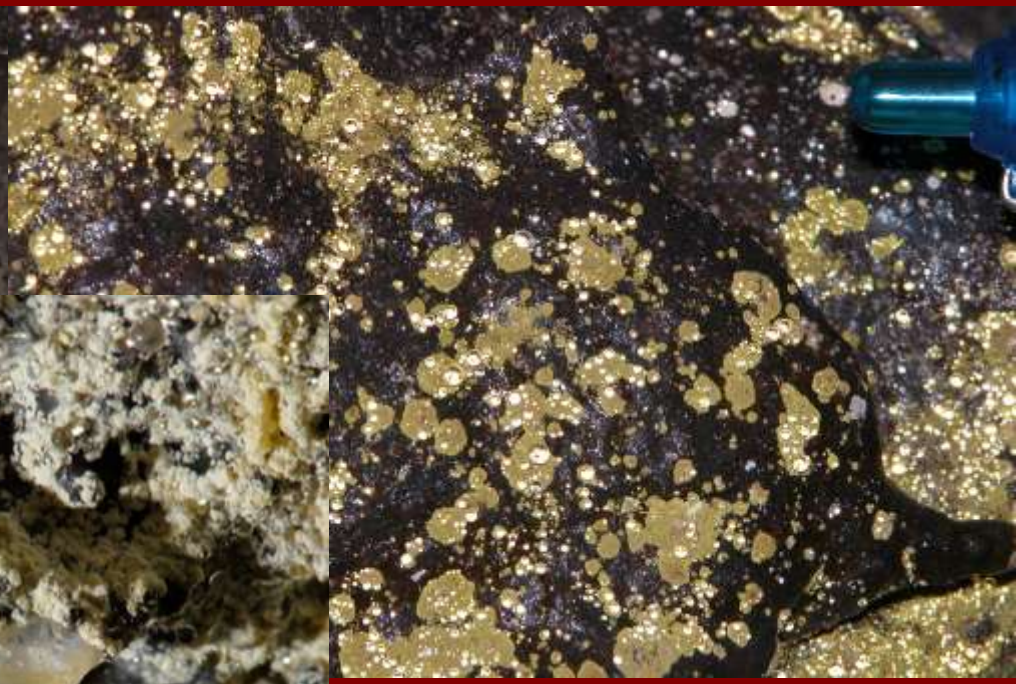



Photo by Kenneth Ingham

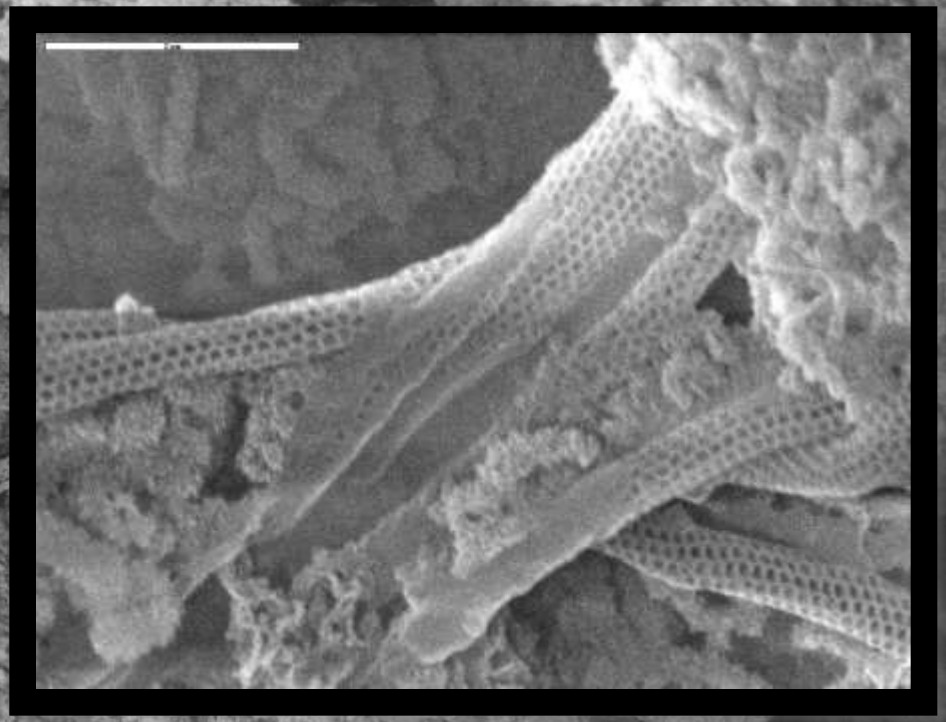
# In addition to the obviously biological microbial mats:

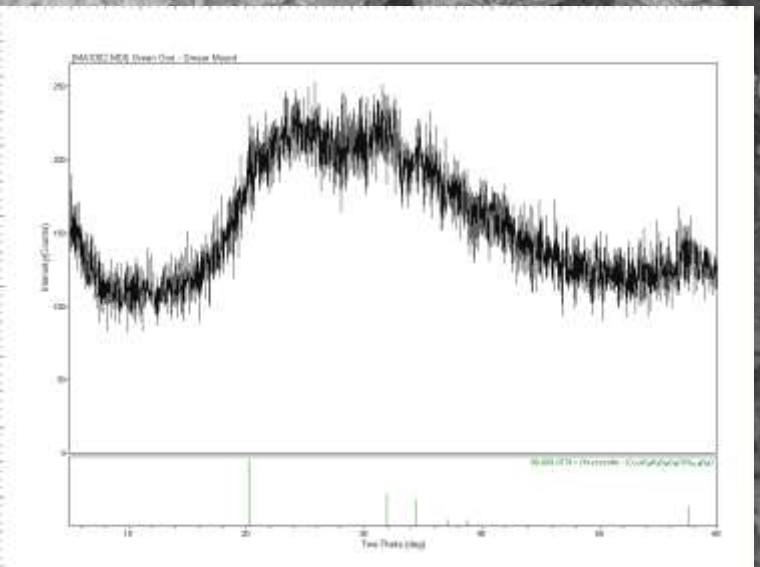


# there are microbes that masquerade as mineral deposits

# Maelstrom blue/green deposits

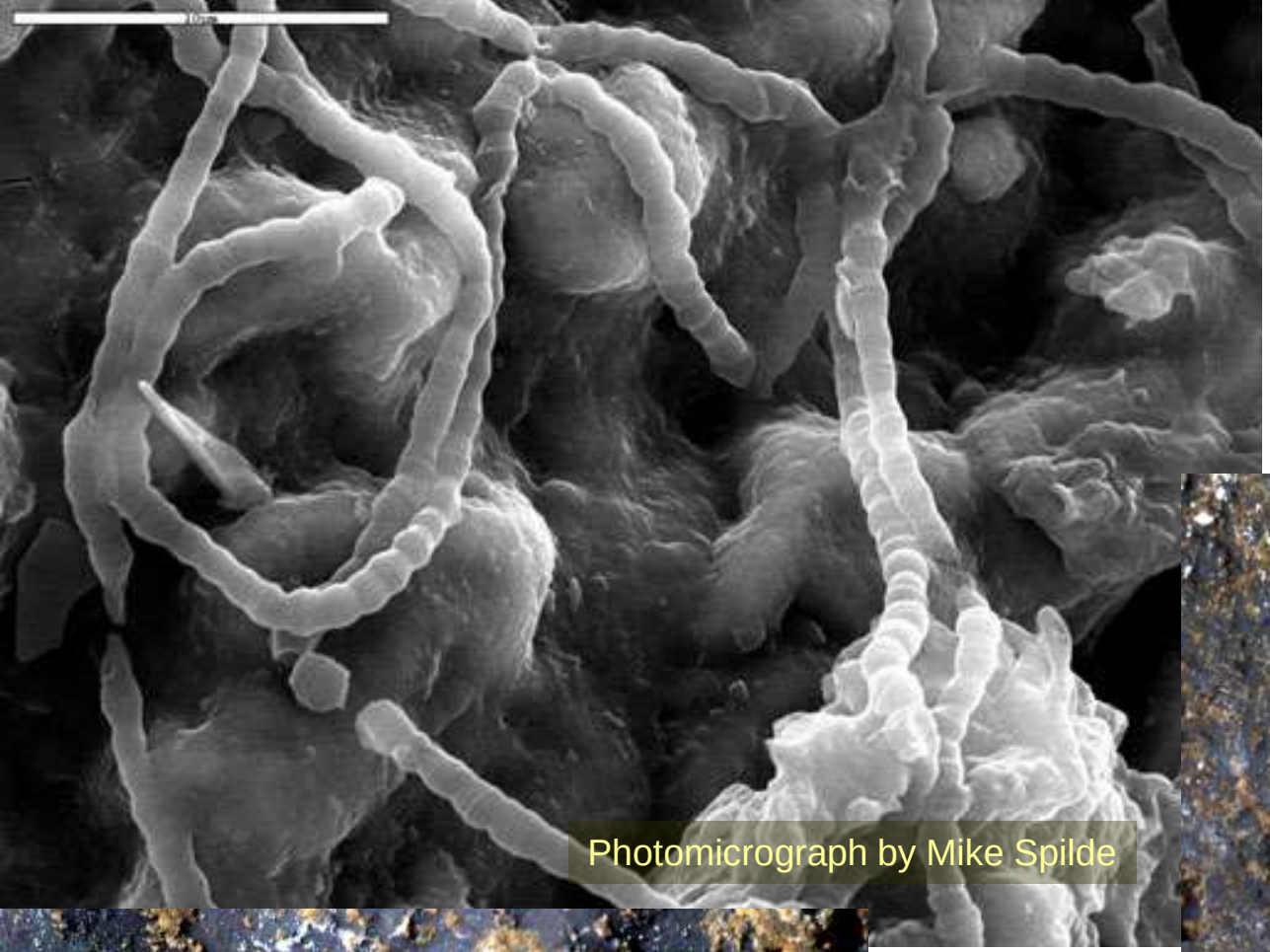
**XRD suggests poorly crystalline chrysocolla.**





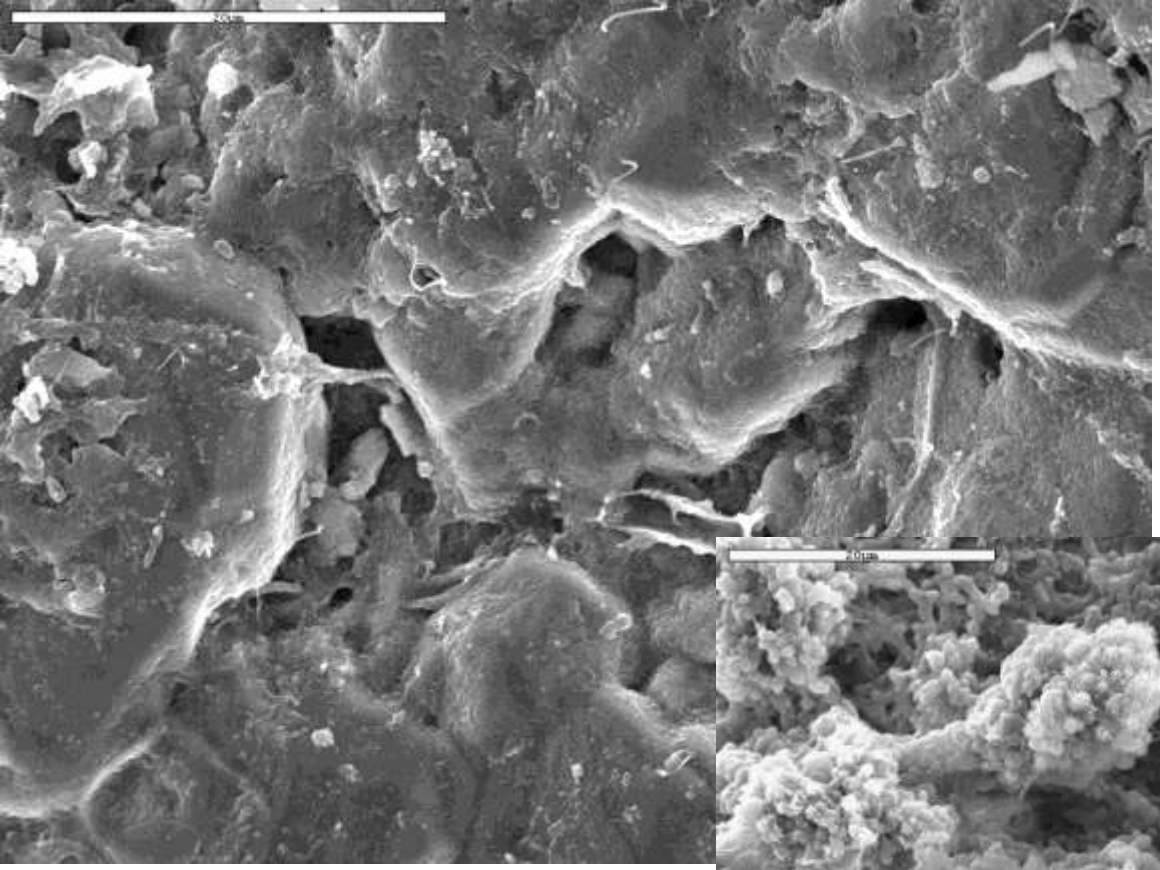
**Actinobacterial-like morphologies**

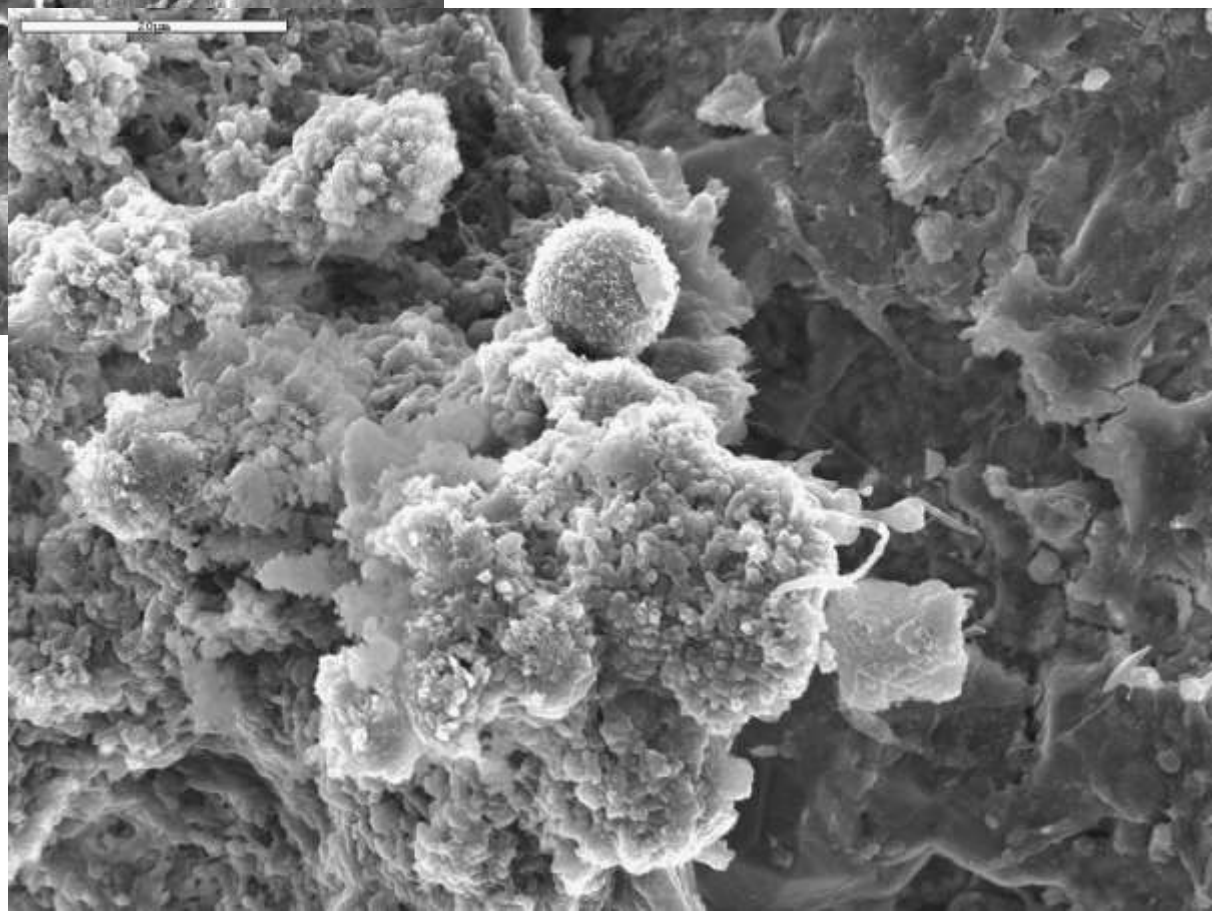
Scanning Electron Microscopy (SEM) of gold-colored vein formations.




# Gold-colored deposits Thurston's Lava Tube, Hawai'i

Photos by Ken Ingham



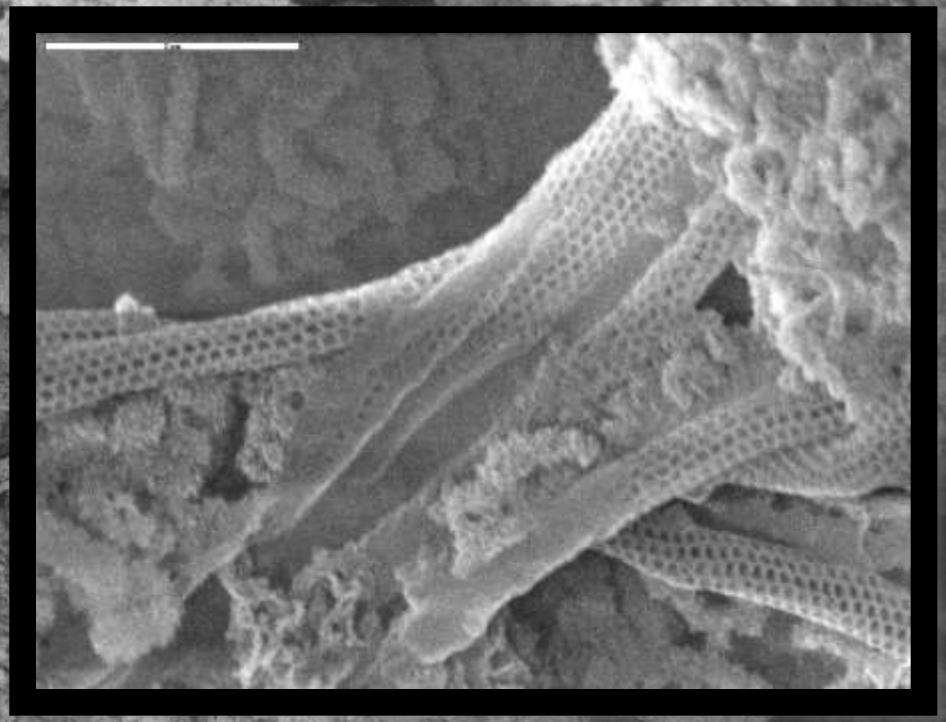


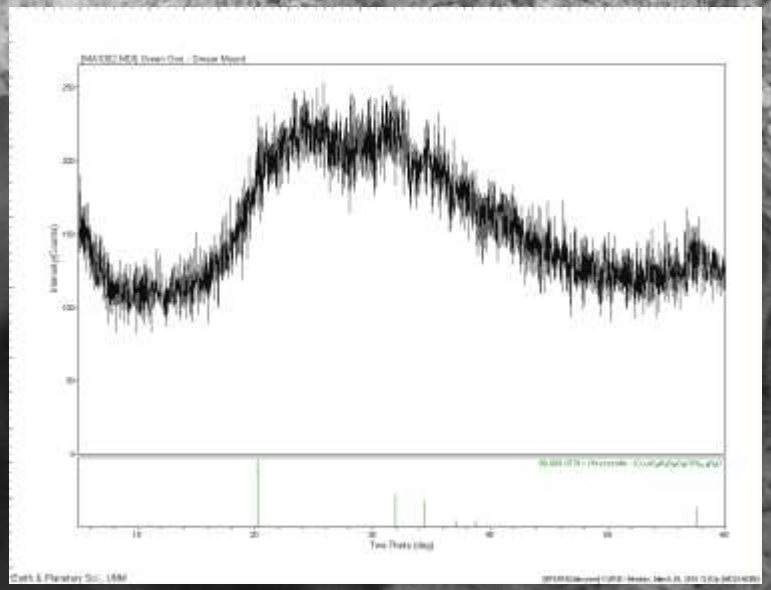
SEMs of gold, shredded deposits, Thurston's Lava Tube, Hawai'i

Photos by Spilde and Moya

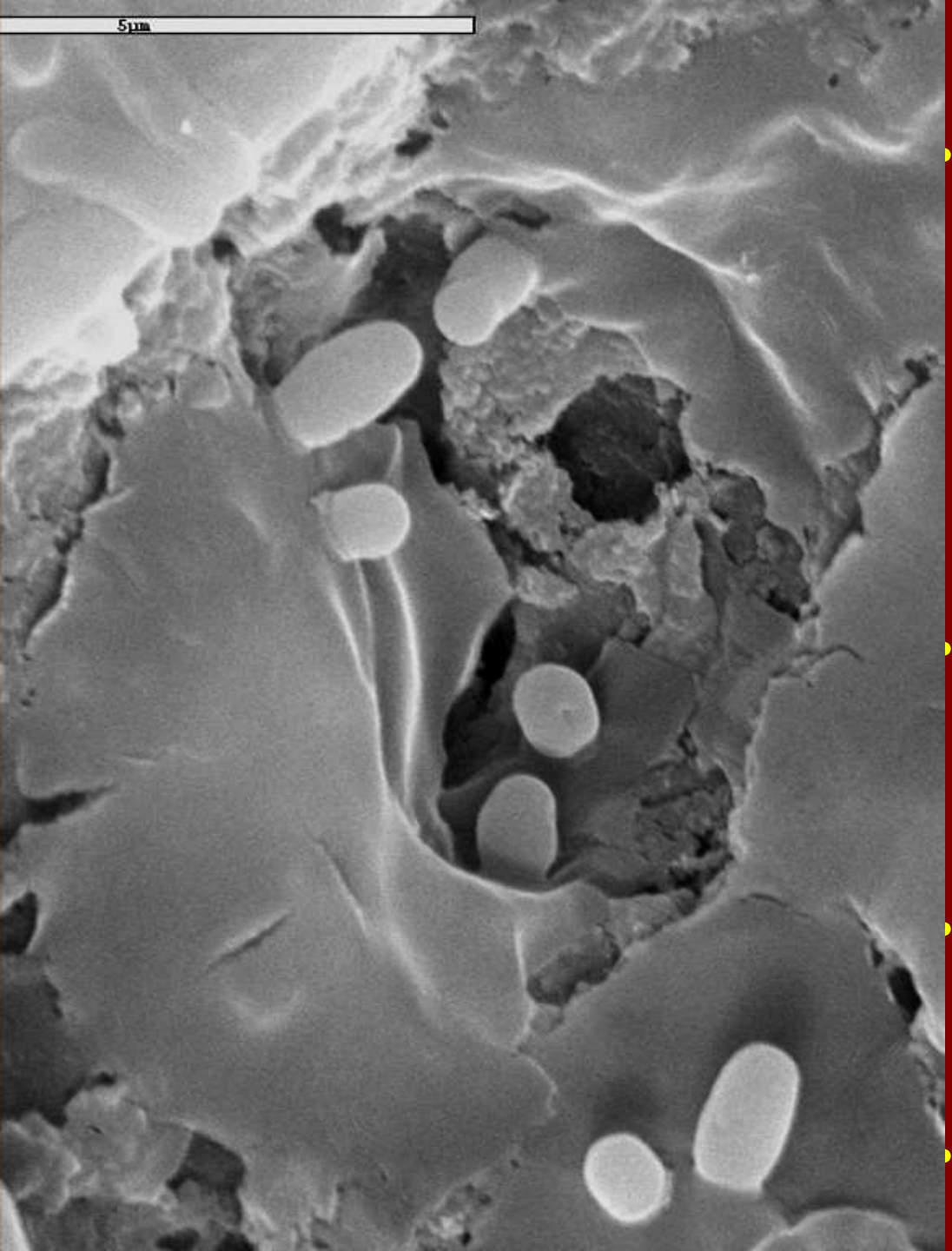
# Maelstrom blue/green deposits

XRD suggests poorly crystalline chrysocolla.





Actinobacterial-like morphologies



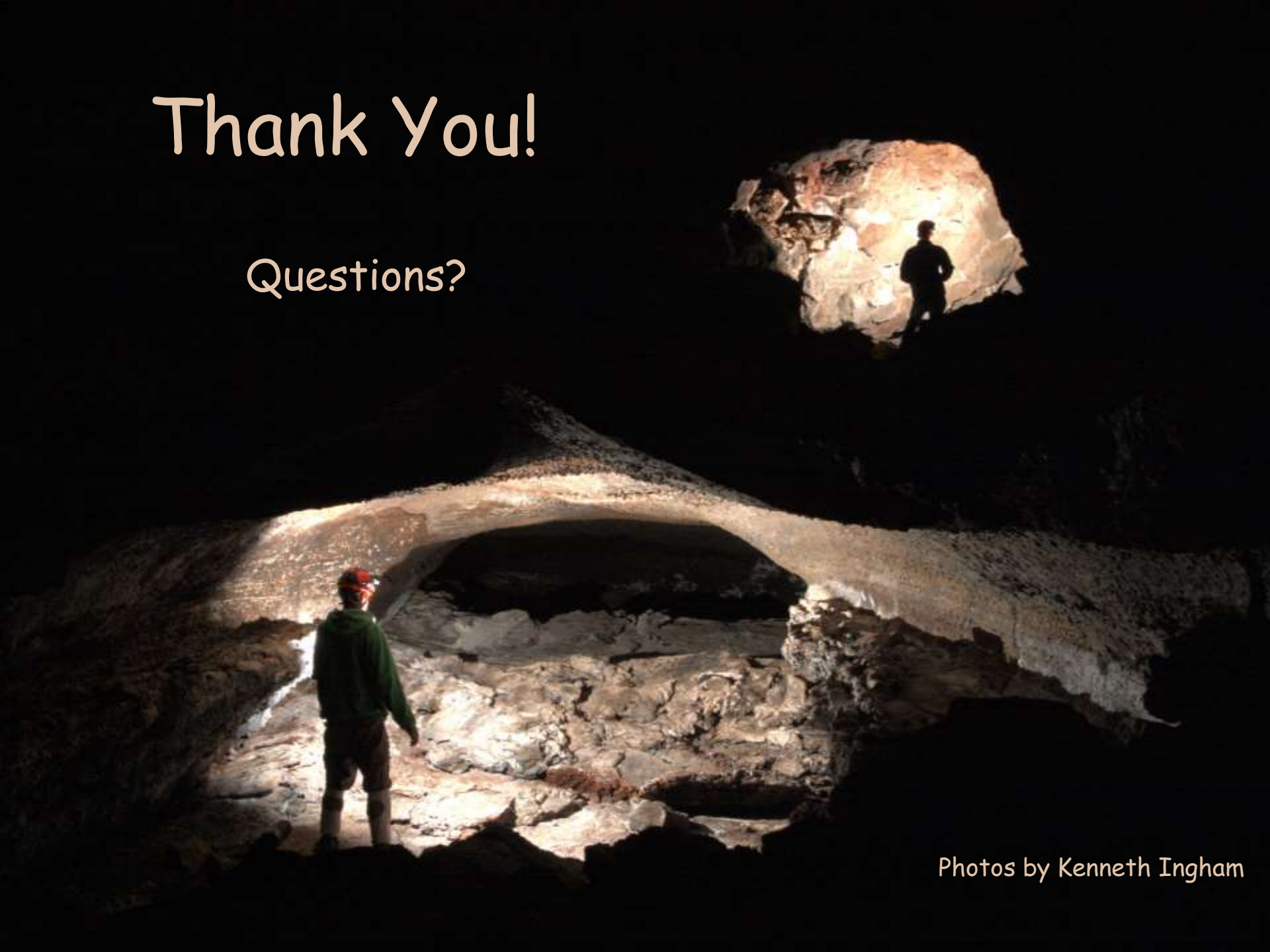

# Biodiversity Conclusions

- Hawaiian lava tubes appear to be more diverse, but both Hawai‘i and Azores have considerable diversity, with many unclassified bacteria, when compared to lava tubes in New Mexico.
- Hawai‘i has a large proportion of Actinobacteria, while Azores have more Acidobacteria.
- Geography is a factor in determining lava tube microbial community composition.
- Actinobacteria are novel.

# Lava Tubes Biovermiculations

# Thank You!

Questions?



Photos by Kenneth Ingham