Red Rocks and Marbles
From Earth to Mars:
Tales of Science and Crime

Dr. Marjorie A. Chan
Dept. Geology & Geophysics
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1. Perceptions
   based on available data

New Era for Mars Explorations!

A new perspective

2. Earth analogs & diagenesis
   • rocks = color coded
   • reflect iron cycling
   • “marbles” ->
     groundwater fluid flow
   • applications to
     reservoirs, hematite on
     Mars

Concretion = cemented
mineral mass
Opportunity rover
Meridiani Planum:
- 2° S of equator
- crystalline hematite

- Iron = fluid flow indicator
- Implications for groundwater, host rock properties, & pathways

MSL Curiosity Rover inside Gale Crater, Mars

Inselberg weathering pit, GSENMM (cosmic navel, cosmic ashtray)

3. Case of the Missing Marbles

Unique case, marbles had specific value

Future for marbles:
- Return to setting with sign
- Visitor centers, museums, university programs, K-12 education
- Public building display

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4. Future, Tech

- Drones, hi resolution imagery
- More information, awareness, social media
- New app TerraTRUTH: users report damage on Utah’s public lands (e.g., outcrop damage, oil spills, stolen rock art, etc.)
- Future apps - combining science

Cybertechnology & Science = HOT!

- Will allow our science new integrations, discoveries, visualization, & aid networking
- Exciting future!

Summary

- Red rocks tell about past groundwaters, chemistry
- Sedimentary records on Earth = important analogs for Mars
- Conserve & protect our heritage
- Integration, technology, & the next generation will guide us to new heights