
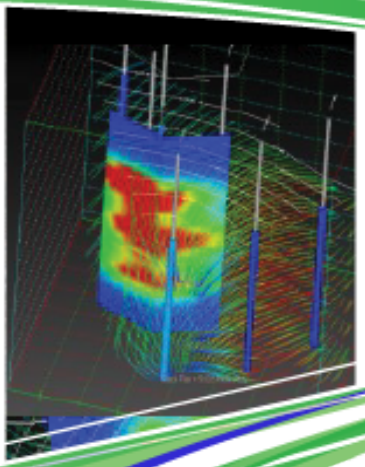


NARPM Presents…
Focus on Geology for Improved Remediation Decision-Making
Introduction

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United States Environmental Protection Agency

26th NARPM Training Program

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Outline

- Conceptual site models and geology
- Hydrogeology terms and concepts
- Unconsolidated geologic settings
- Bedrock geology
- Discussion

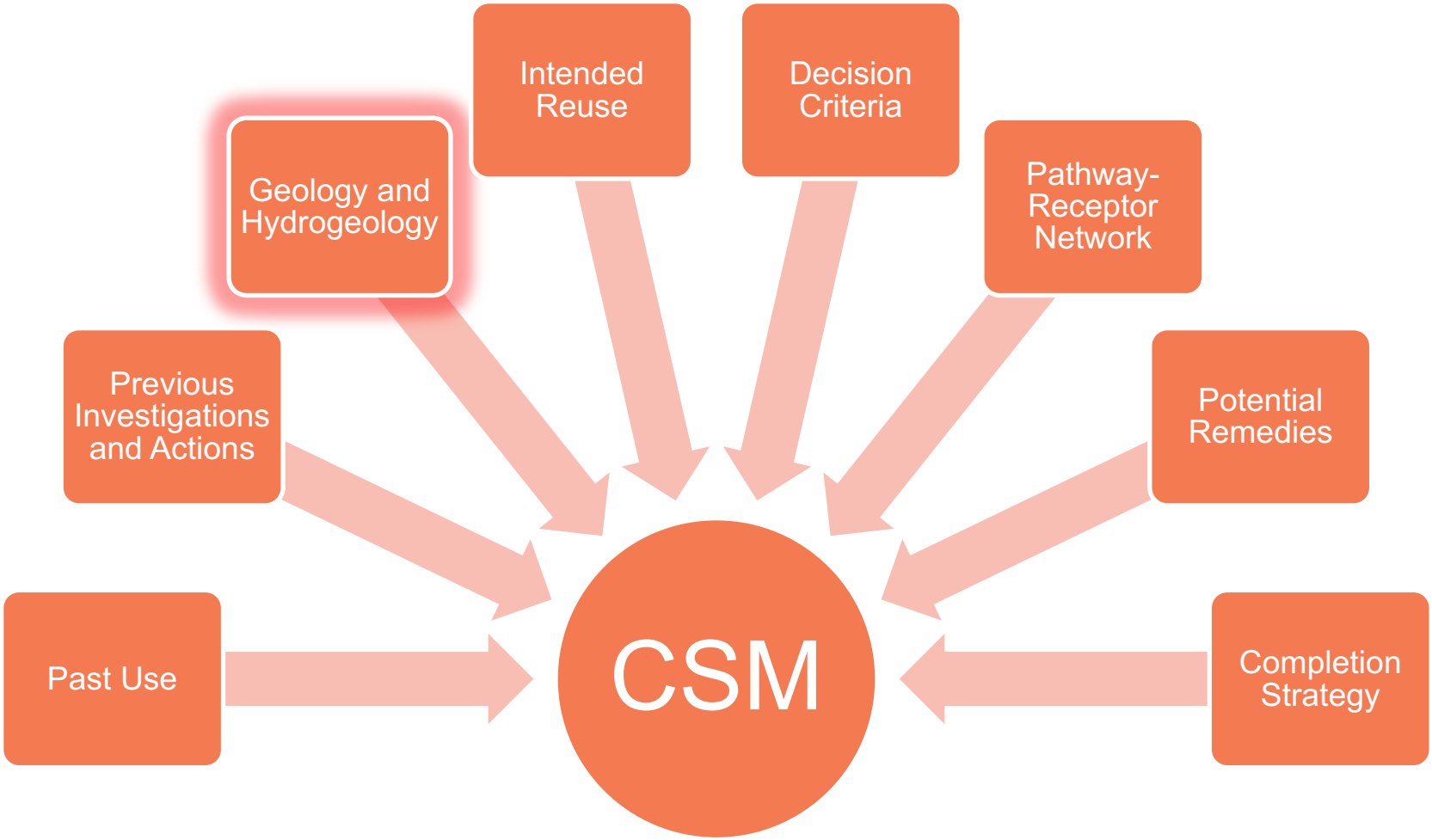
Conceptual Site Model (CSM)

- "The conceptual site model (CSM) is an iterative, 'living representation' of a site that summarizes and helps project teams visualize and understand available information."

  -Environmental Cleanup Best Management Practices: Effective Use of the Project Life Cycle Conceptual Site Model, 2011, OSWER

- Written and graphical (2-D and 3-D) expression of site knowledge
- Primary basis for project design and execution
- Effective platform for maintaining stakeholder consensus
- Updated throughout project life cycle
- ***Essential*** to successful projects

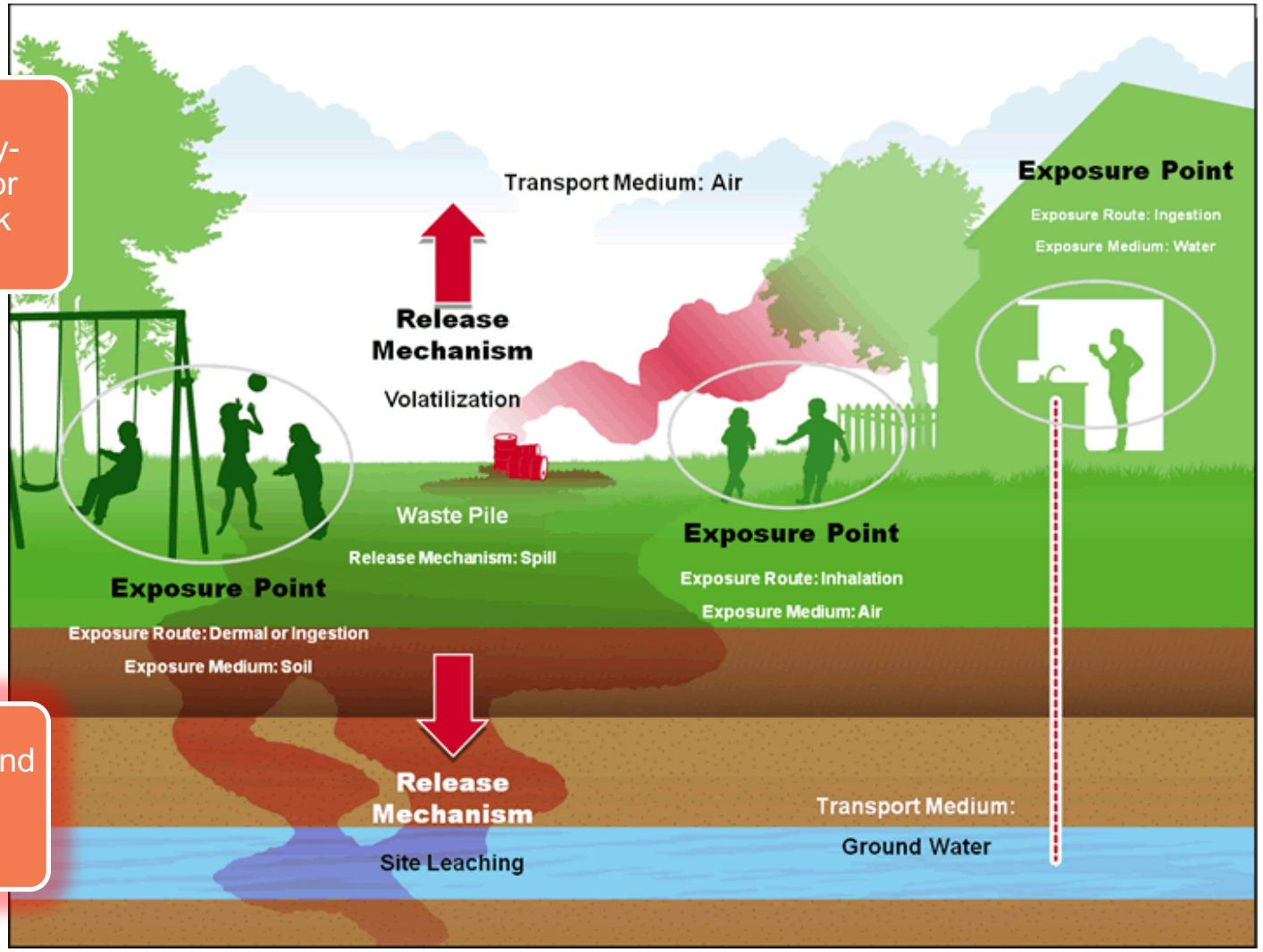
Conceptual Site Model (CSM)



Pathway-Receptor Network

Pathway-Receptor Network

Geology and Hydro-geology



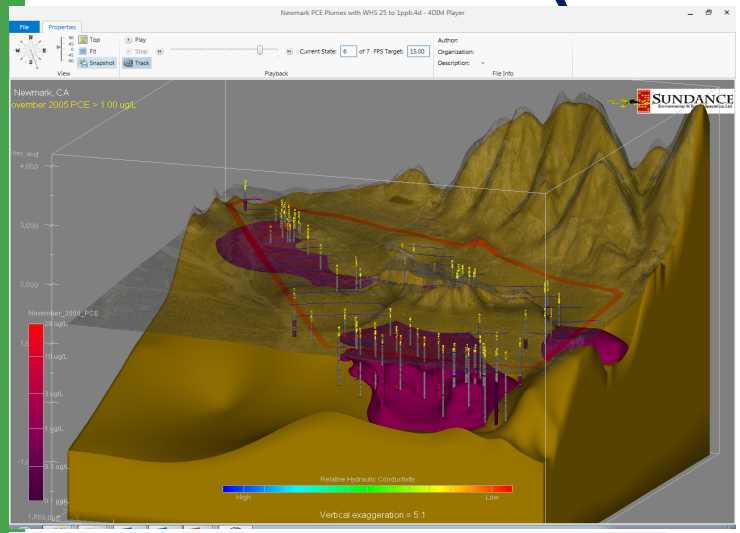
Why and How to Focus on Geology

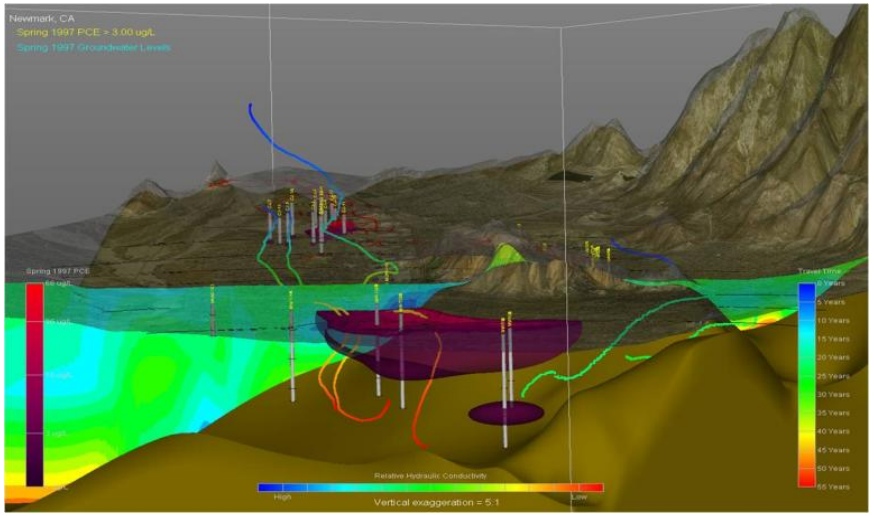
- Understanding site geology is imperative for creating a robust conceptual site model (CSM)
- CSM is the basis for site remedial decisions
  - Key elements for a robust CSM
  - Resources for creating and improving CSMs
    - Regional experts
    - 3D Visualization
    - EPA “Best Practices” documents
- Update Project Life Cycle CSM with new geology information at every phase

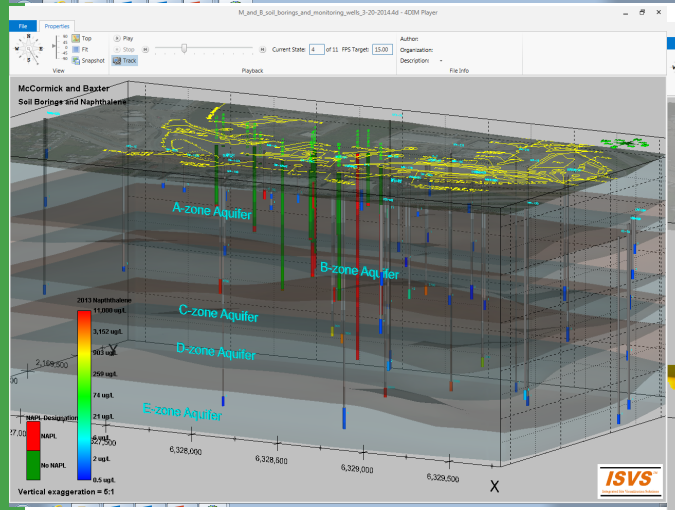
Project Life Cycle CSM Supports Project Phases

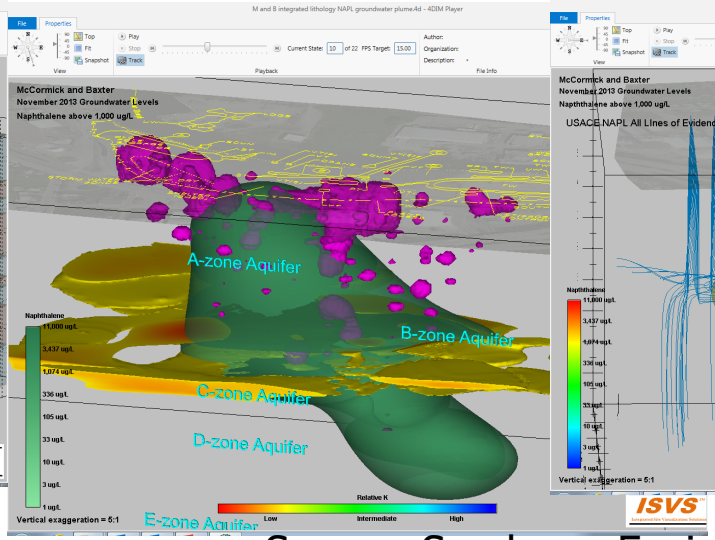
- Preliminary CSM
- Baseline CSM
- Characterization Stage
- Design Stage
- Remediation/Mitigation Stage
- Post Remedy(s) Stage

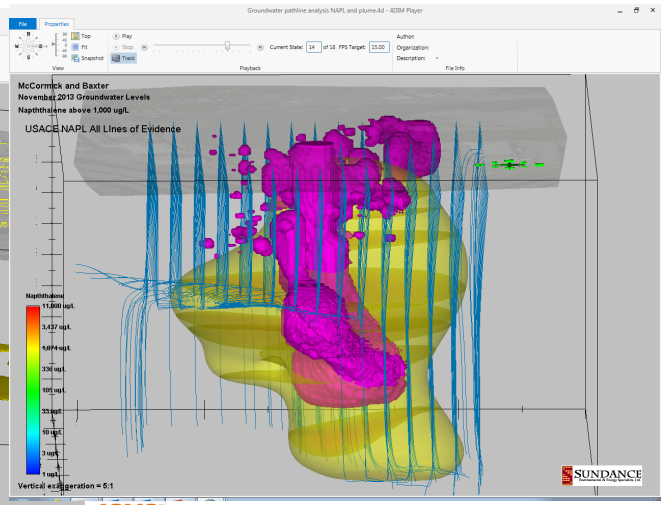
Emerging CSMs: 3-D Visualization and 4-D (Time) Visualization











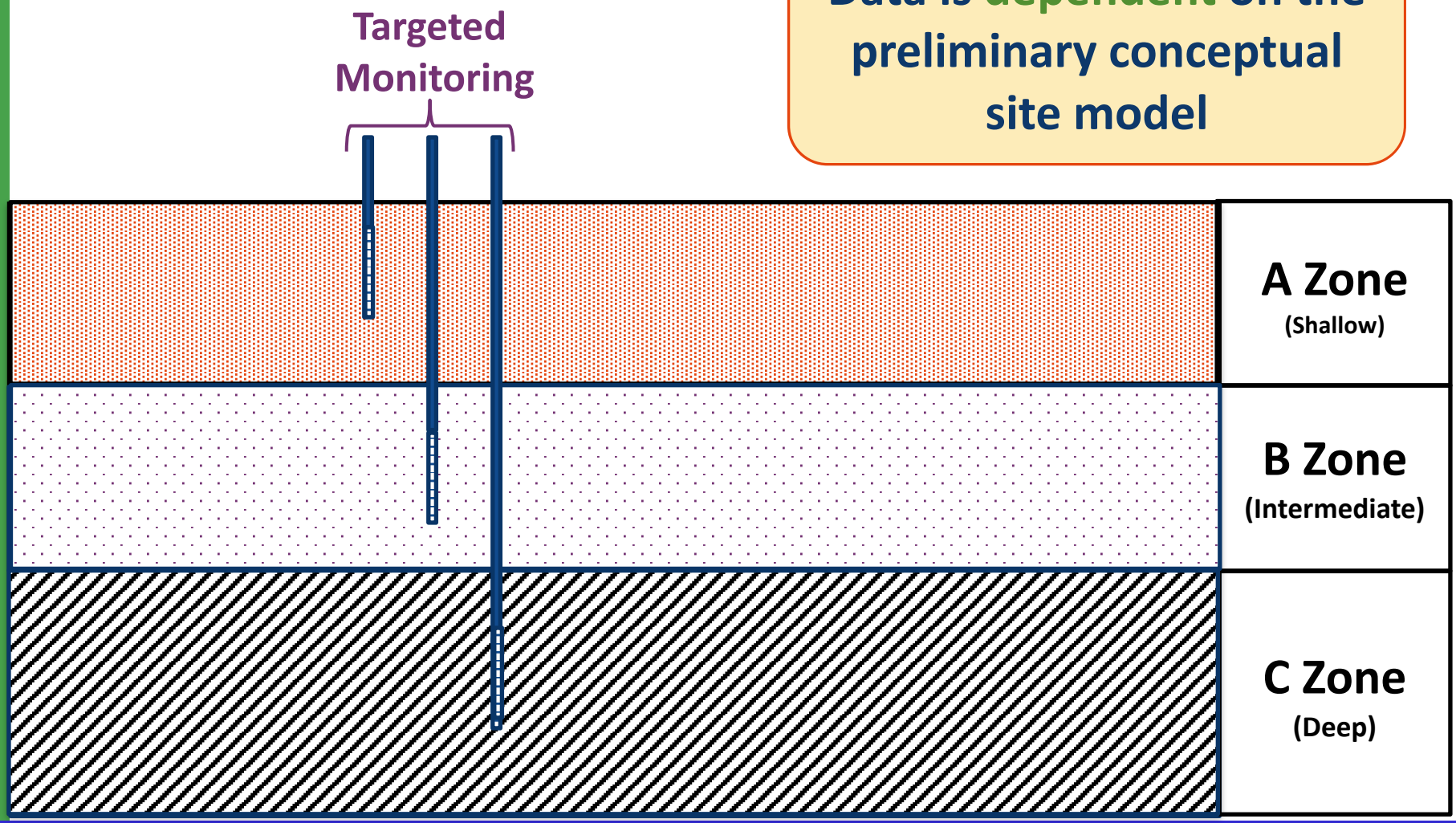
Source: Sundance Environmental & Energy

Definitions

- Geology: Study of Earth's structure, composition, and processes
- Hydrology: Study of Earth's water and movement relative to land [typically refers to surface water]
- Hydrogeology: Study of groundwater distribution and movement through Earth's subsurface

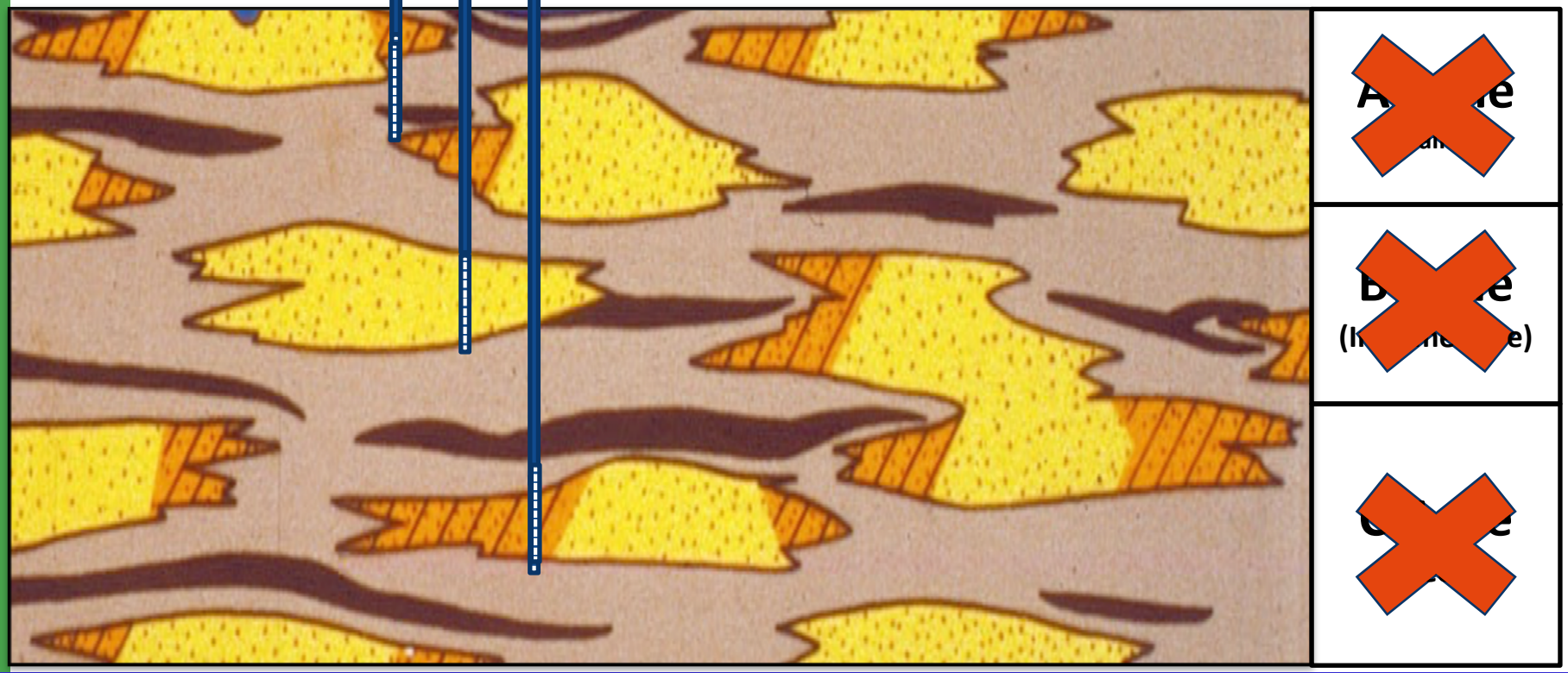
Simplified Geologic CSM

Data is dependent on the preliminary conceptual site model

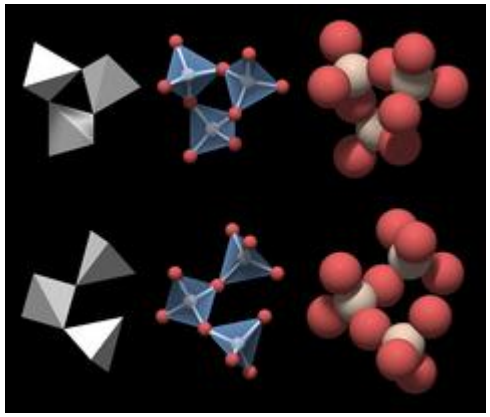


More Realistic Geologic CSM

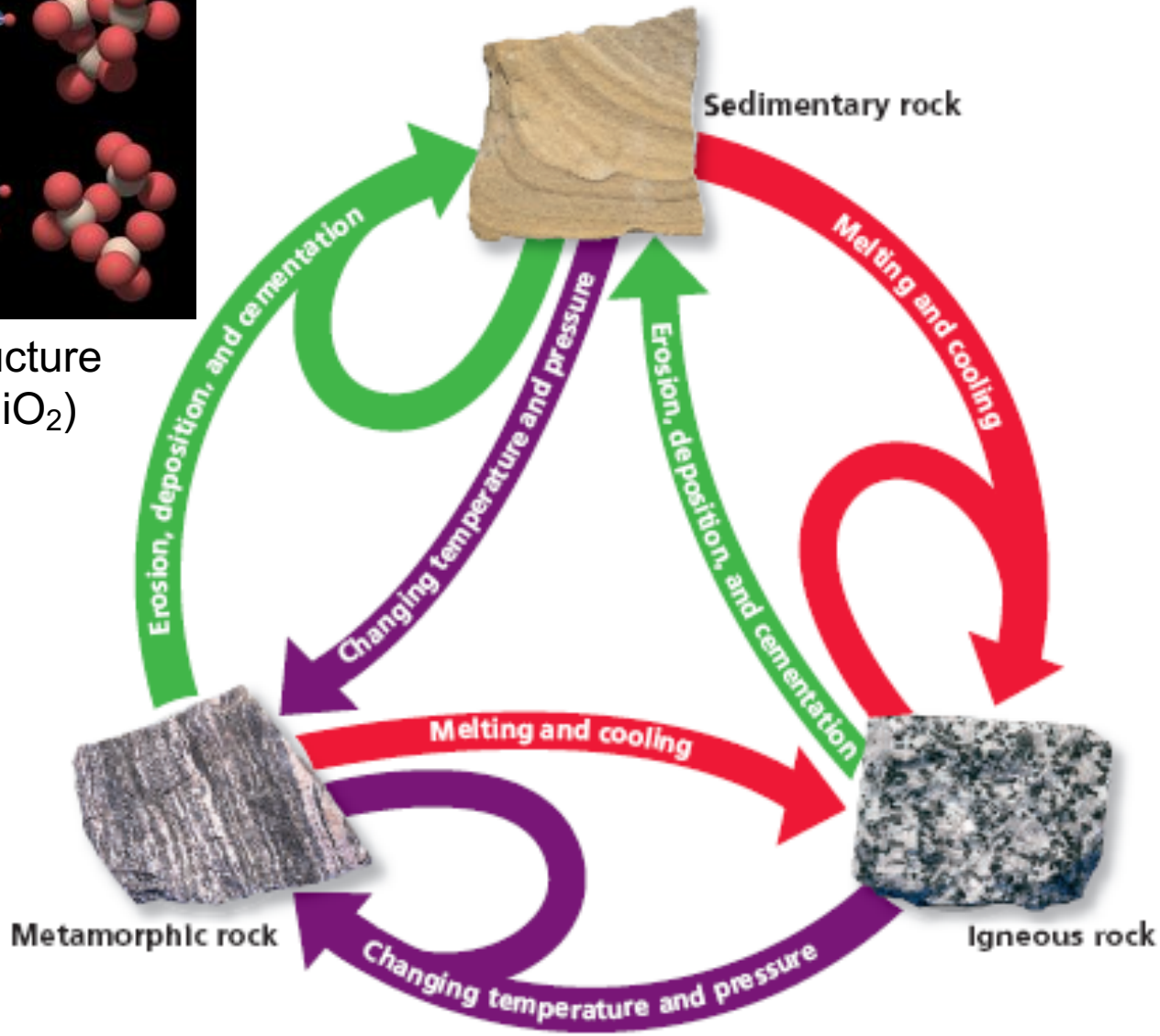
~~Targeted~~ Monitoring



The Rock Cycle



Mineral structure of quartz (SiO_2)



What's Underground?

Dynamic Geologic Processes