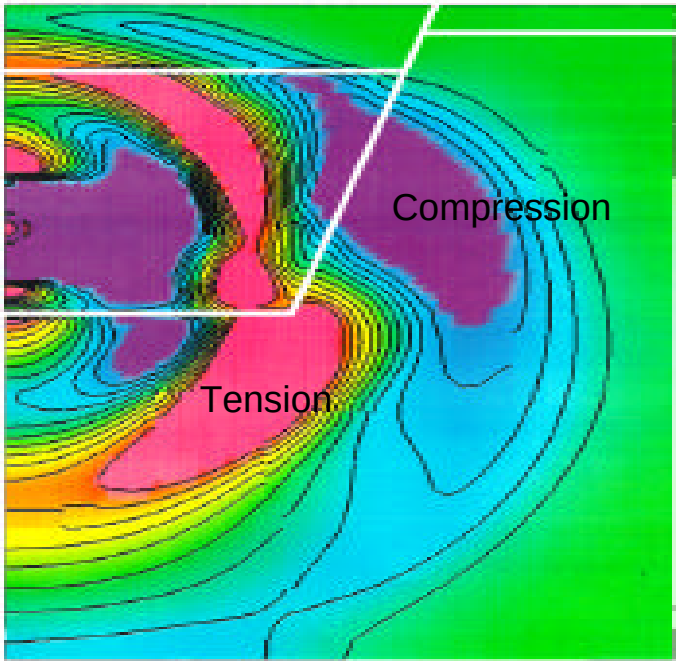
Earth & Environmental Sciences Division

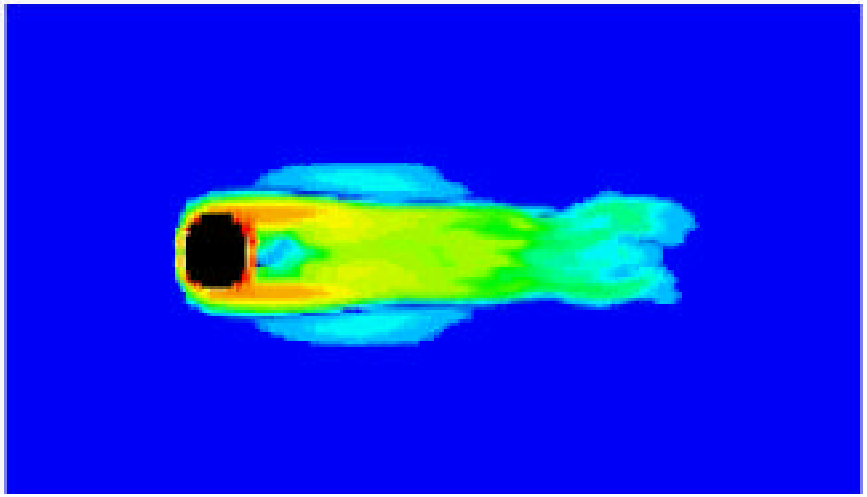
National Defense

- **Explosive test detection**
- **Homeland defense**
- **Weapon effects**

Conventional explosives used at Black Thunder, WY



3-D modeling of weapon effects

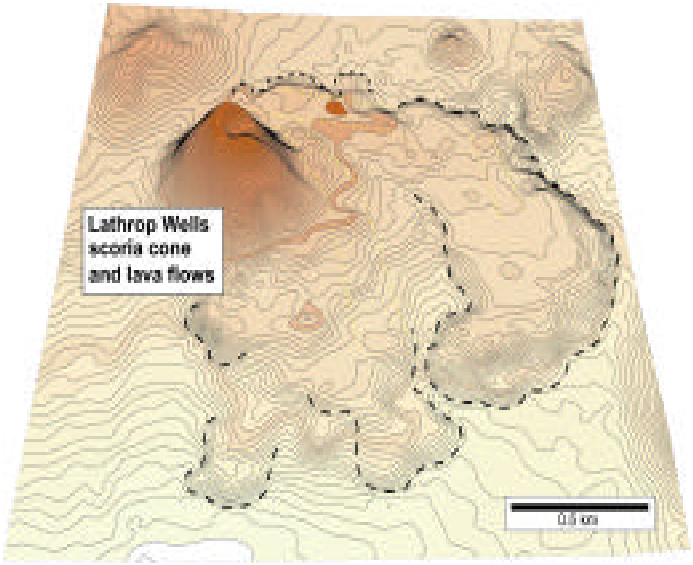


Building flow simulation

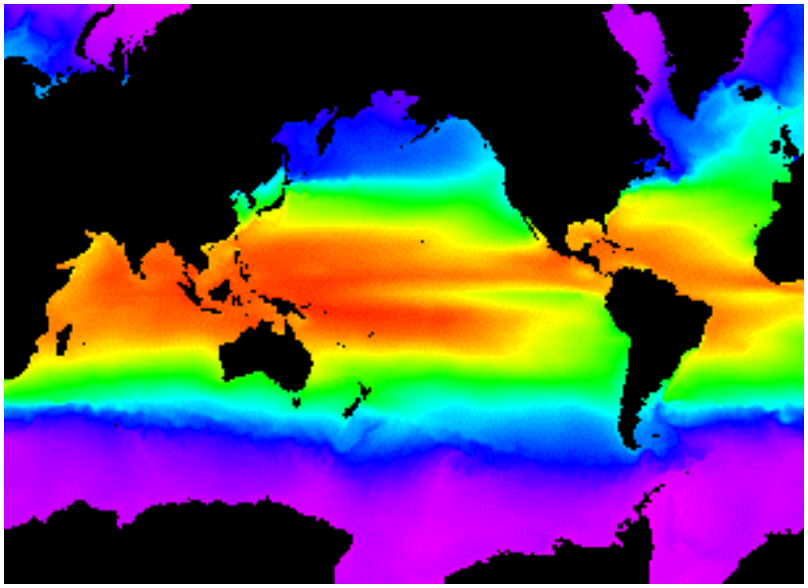
Earth & Environmental Sciences Division

Environmental Consequences

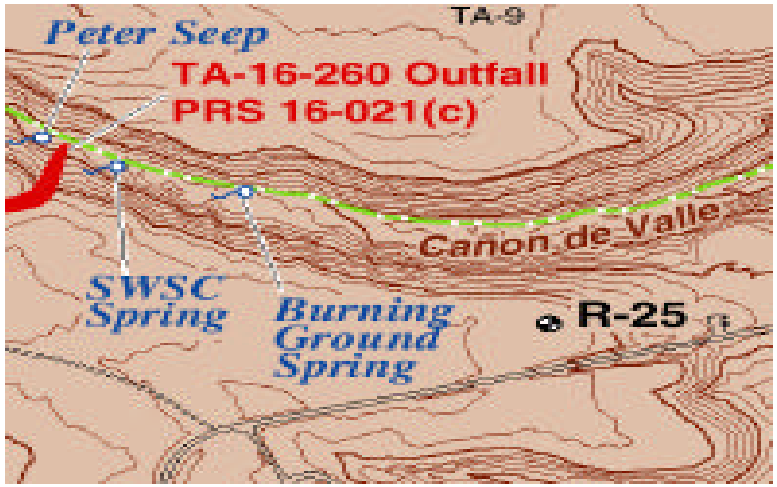
- Carbon dioxide management
- Climate change
- Water resources
- Yucca Mountain Project



Yucca Mountain



Ocean modeling



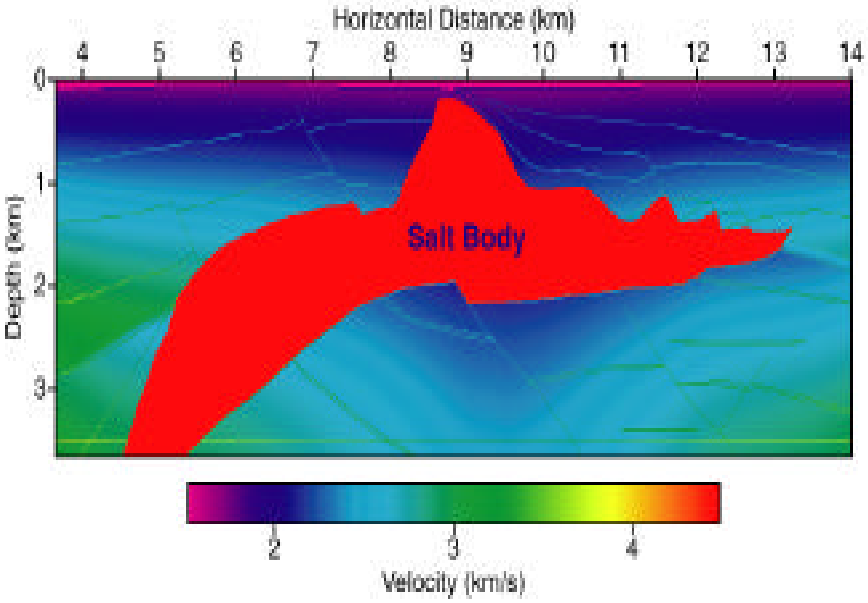
Hydrogeochemistry

Earth & Environmental Sciences Division

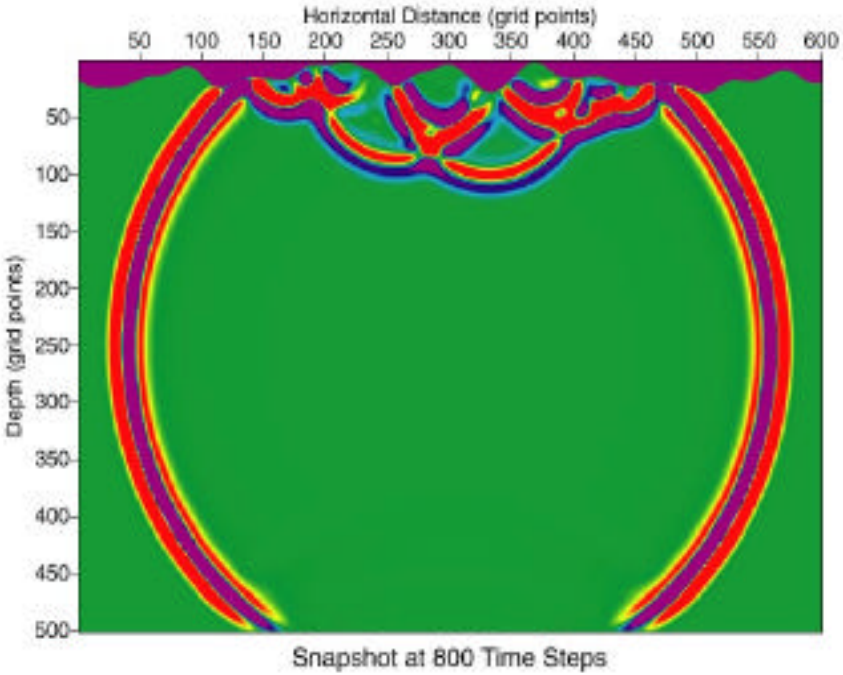
Energy Security

- **Zero emission coal**
- **Seismic imaging**
- **Innovative drilling techniques**

Artist's concept of Zero Coal Alliance



Kirchhoff Imaging



Lattice-Boltzmann modeling

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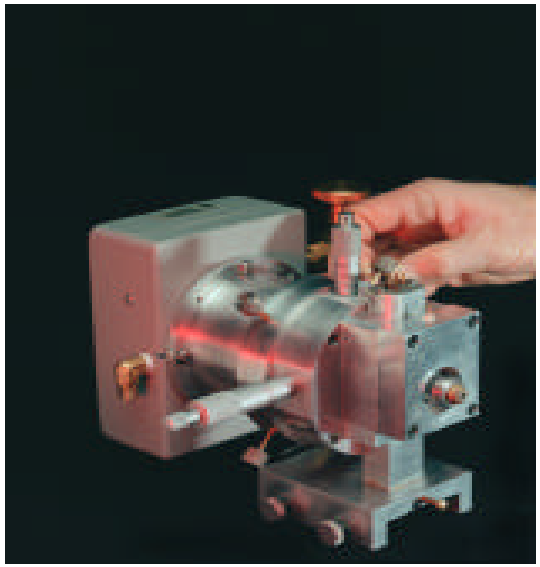
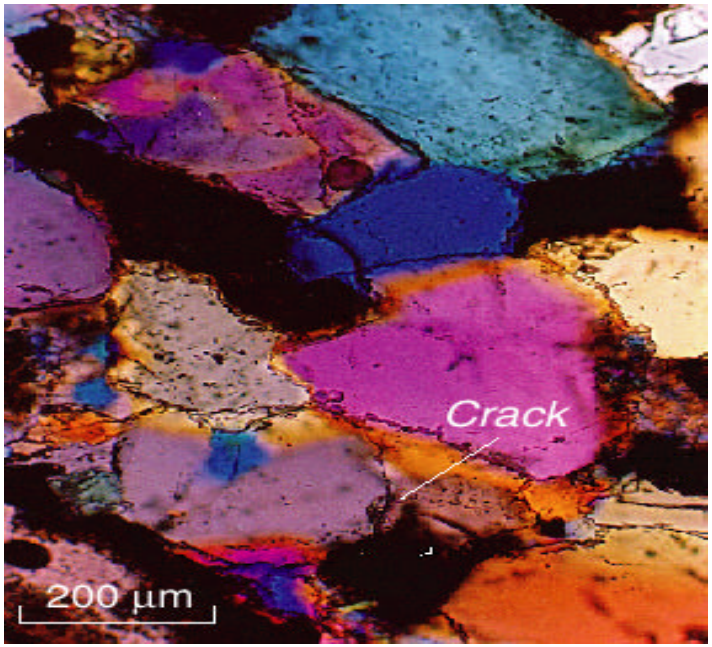
Basic & Applied Research

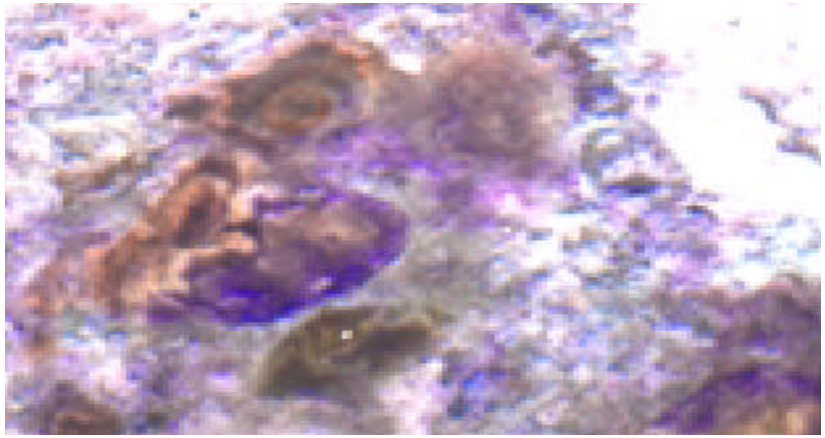
- Geophysics, Geochemistry, Biogeophysics
- Material properties
- Nonlinear mesoscopic elasticity



CHEMIN



Nonlinear Response



Concrete degradation