

DEEP Lab Lecture Series

(*D*efense, *E*nergy, *E*nvironment, *P*hysics)

Web-Casting

Spring 2005, UCB



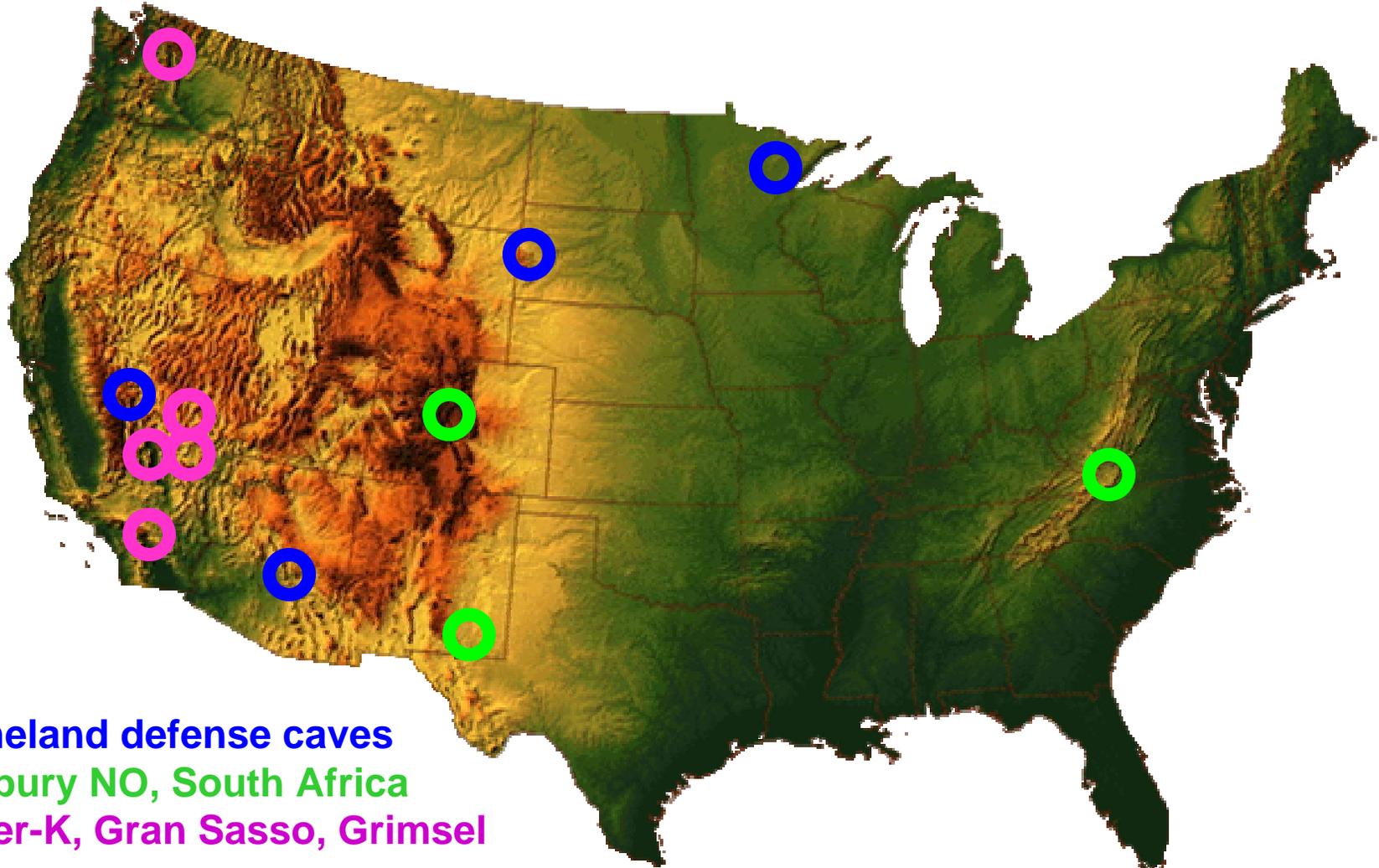
Joe Wang, LBNL

DUSEL S-1 Workshop

August 14, 2004 – Berkeley, CA



U.S. Abandoned Mines, Active Mines, and Tunnels Considered for the DEEP Lab Lecture Series



Homeland defense caves
Sudbury NO, South Africa
Super-K, Gran Sasso, Grimsel

DEEP Lab Lecture Series

Preliminary Listing of 15 Lectures for Spring, 2005

Abandoned Mines	Active Facilities	Tunnels
Homestake Mine, SD / from mining gold to science in Black Hills	Henderson Mine, CO / precious metal resources in Rockies	Death Valley Telescope Peak & Mt. Charleston / excavation into pristine sites
Pine Creek , Owens Valley CA / “mine in the sky” & snows in High Sierras	Kimballton Mine, VA / natural and manmade large caverns in Appalachians	Icicle Creek , WA / deep microbial communities at depths in Cascades
Soudan , MN & IAEA URLs / from abandoned mines to research facilities	Sudbury , Canada / neutrino observatory coordinated with active mining	San Jacinto Mt., CA / intrusions, faults, & inflow case studies
Superior mine, AZ / boom and bust in copper production	South Africa diamond mines / origin of life studies at depth	Super-K , Japan; Gran Sasso , Italy; Grimsel , Swiss / highway labs
Underground Caves , / usage and detection, homeland security	WIPP , Carlsbad NM / salt for storage transuranic wastes	Yucca Mountain , NV / nuclear waste repository in desert setting

Cross-Cutting PROBLEMS in GeoScience

Environmental Clean-Up

Natural Attenuation

Bio/GeoEngineering

Remediation

Water

Recharge

Quality

Supply

CO₂ Sequestration

Storage

Leakage/"Plugging"

Sequestration

Nuclear Waste

Flow Paths

Transport

Isolation

Fossil

Flow Paths

Enhancement

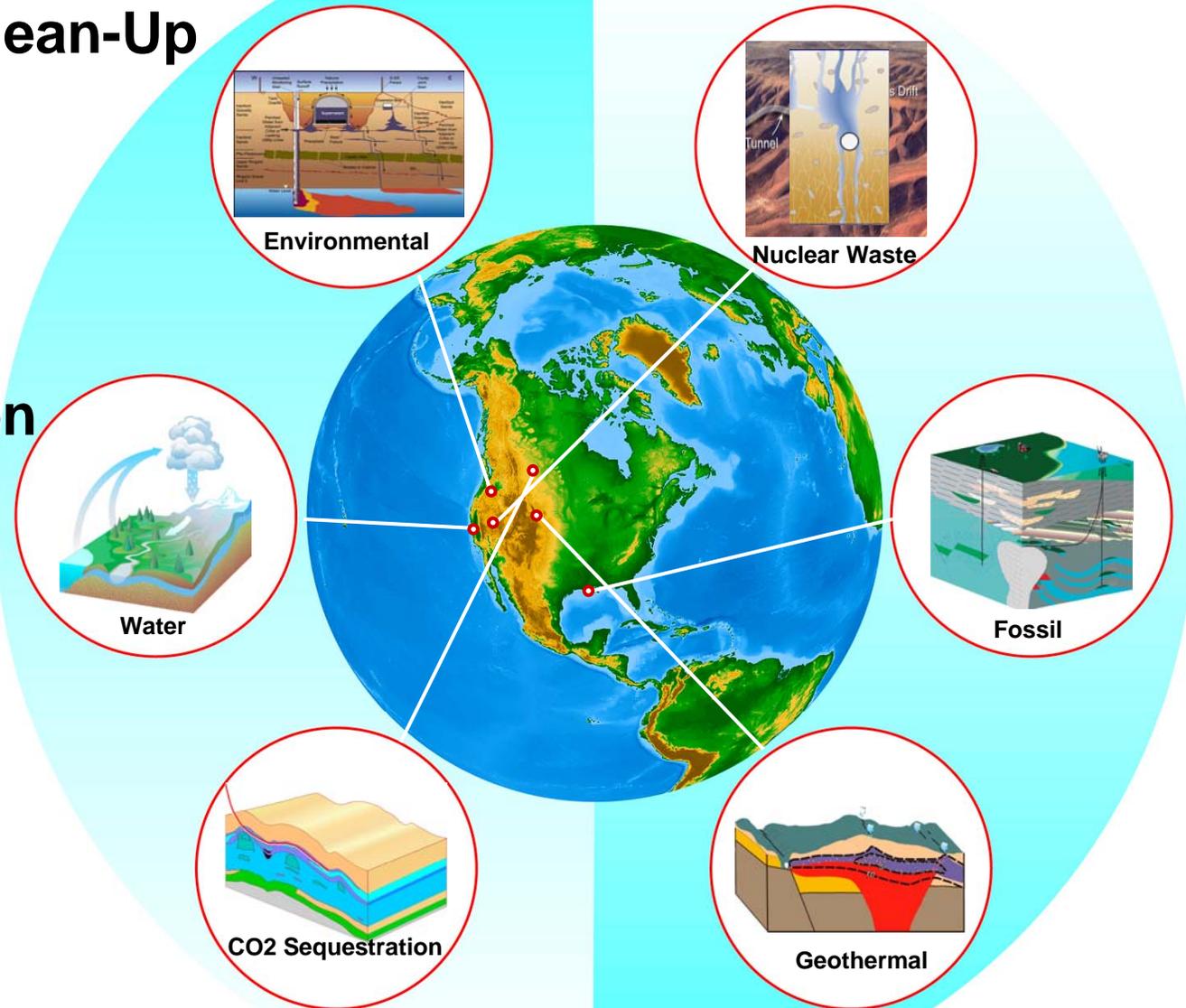
Recovery

Geothermal

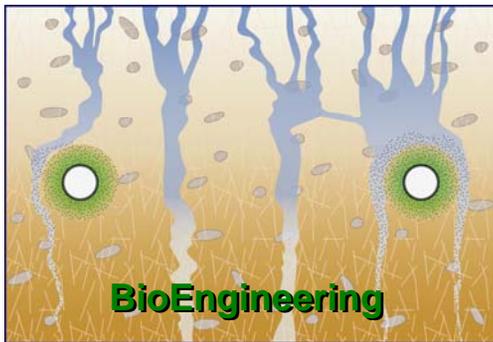
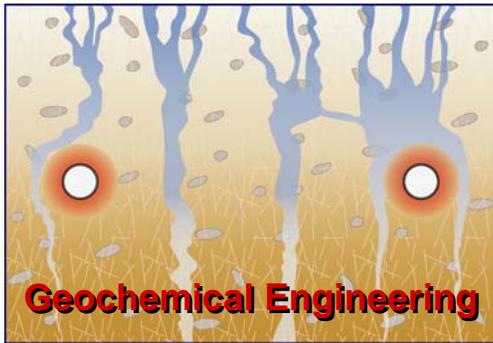
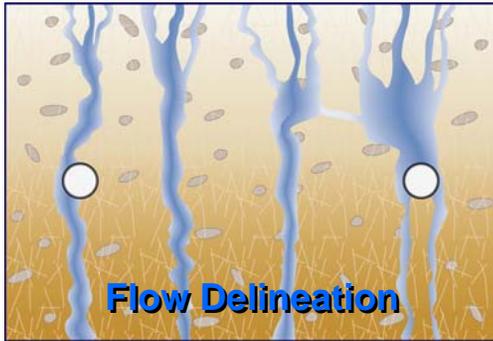
Fracturing

Flow Manipulations

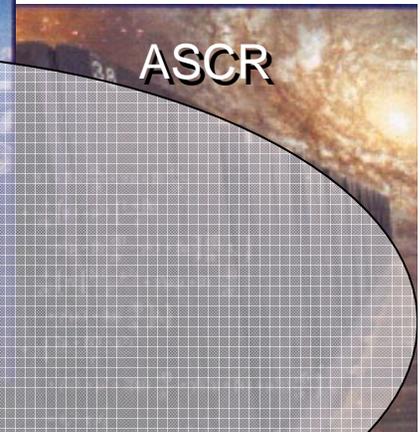
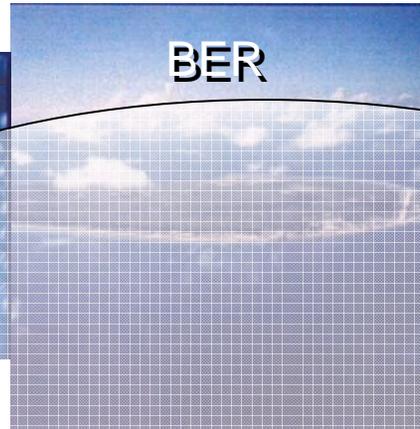
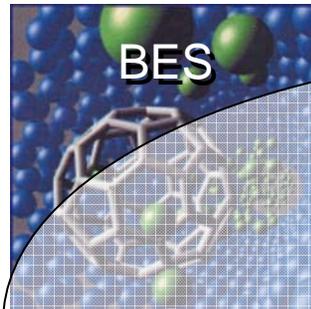
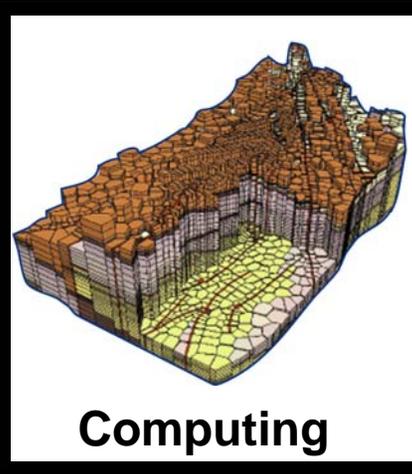
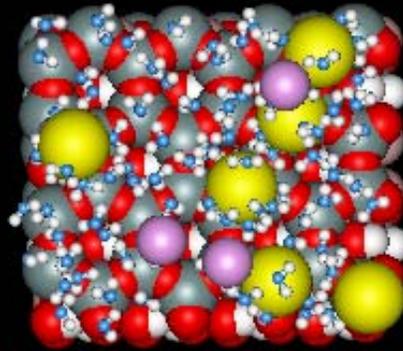
Production



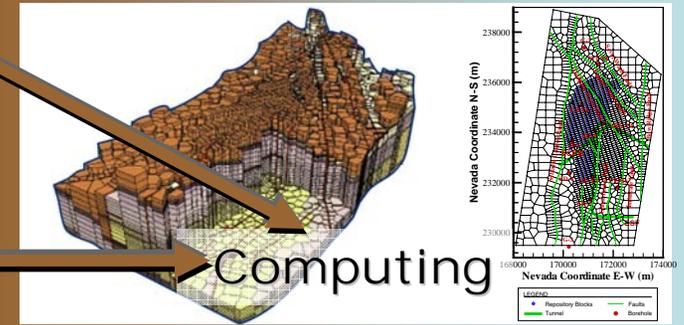
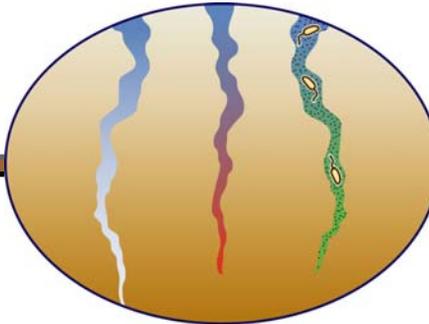
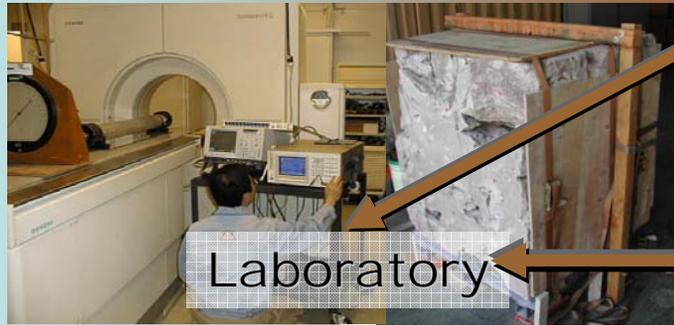
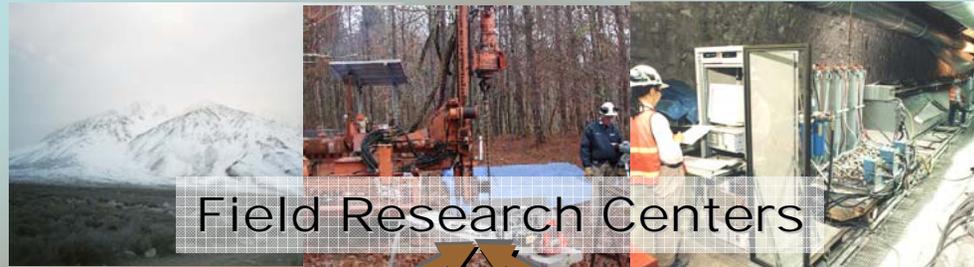
Cross-Cutting CHALLENGES



Flow Evolution



Research APPROACH



Presented to BER, BES



Enthusiastic Support from
Scientific Community, Agencies,
Labs, Universities, Industry

National Research Council

Workshop: July 14-15, 2004

Backups

DEEP Lab Lecture Series

Spring 2005, Web-Based Seminars University of California – Berkeley

Focus / Rationale:

- **Integrating** Defense, Energy, Environment, and Physics (**DEEP**) experiments in underground facilities (mines and tunnels)
- **Educating** research students to develop their interests in underground science and engineering for next-generation geoscience, biology, physics, and multi-disciplinary experiments
- **Coordinating** joint participation and collaboration in new **national initiatives**:
 - >NSF: **Deep Underground Science and Engineering Laboratory(ies) (DUSEL)**
 - * Nuclear physics, Particle physics, Astrophysics
 - * Geosciences, Biology, and Engineering
 - >DOE: **Scientific Environmental/Energy Cross-cutting Underground Research** for urgent solutions to secure **Earth's** future (**SECUREarth**)
 - * Flow delineation
 - * Geochemical engineering
 - * Bioengineering
 - >DOD, DHD, NASA, NIH: **in development**

DEEP Lab Lecture Series

Current Status

- ❑ Consult with UCB Faculty and LBNL Scientists so far:
Bo Bodvarson, George Brimhall, Steven Glaser, Kevin Lesko, T.N. Narasimhan, Bernard Sadoulet
- ❑ Proposed and Organized by *Joe Wang*
- ❑ Plan to Contact **DUSEL** PIs and Berkeley Workshop Participants for Inputs and Suggestions
- ❑ Plan to Interact with **SECUREarth** Investigators in the Next DC SC-OCRWM Meeting
- ❑ Enhance Contacts with **Defense** and **Homeland Security** and Other Agencies
- ❑ Formalize Web-Casting and Interactive Processes and Develop Lectures with Potential Speakers
- ❑ Promote Lecture Series with Faculty, Students and Staffs, both at UCB and Universities, National Labs, Institutions, and Industry at Large