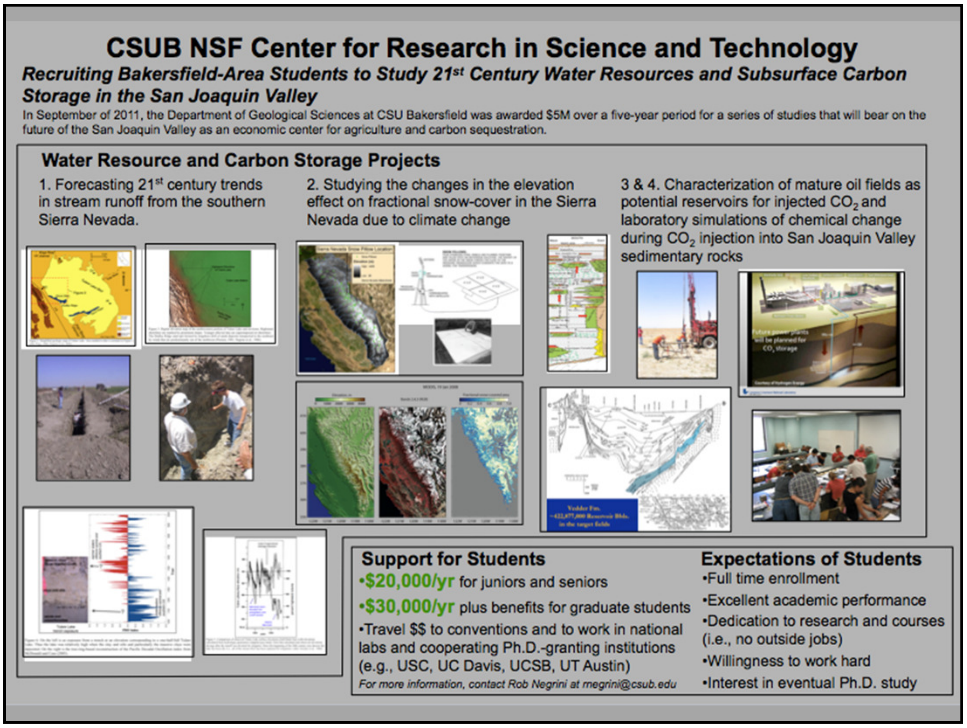

CSUB NSF Center for Research in Science and Technology

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For more information, contact Rob Negrini at rnegrini@csub.edu

Expectations of Students

- Full time enrollment
- Excellent academic performance
- Dedication to research and courses (i.e., no outside jobs)
- Willingness to work hard
- Interest in eventual Ph.D. study

Division of Human Resource Development

Centers of Research Excellence in Science and Technology

CONTACTS

Elevate research in qualified universities to level of national competitiveness

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CONTACTS

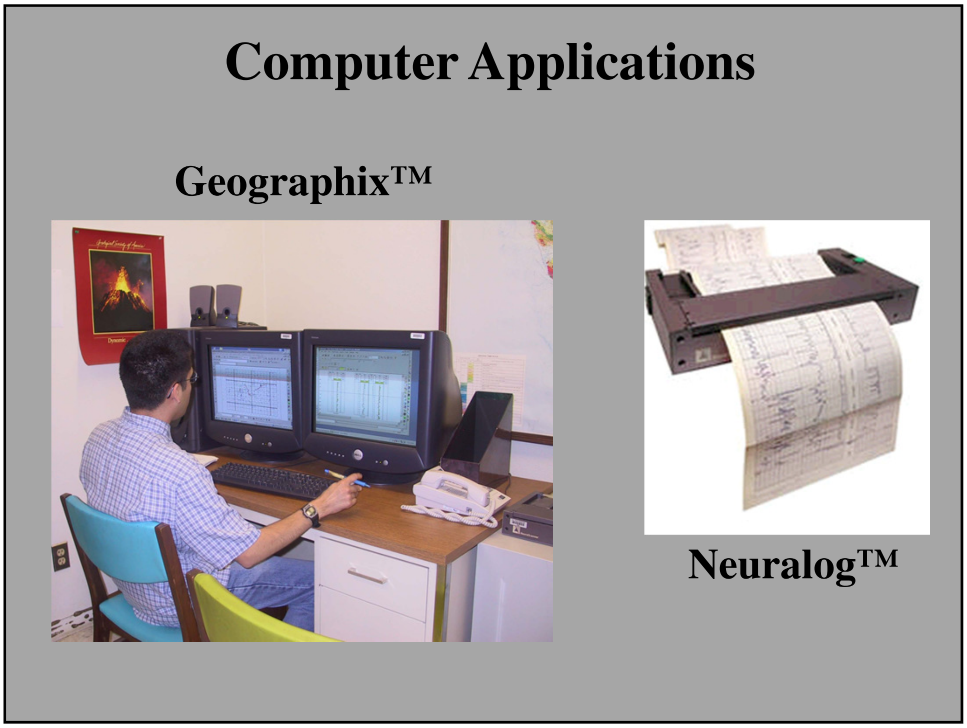
Elevate research in qualified universities to level of national competitiveness

- Already performing well despite adverse conditions
- Serve population of students not inclined to go on to graduate school
- Capable of 3-5 research proposed research projects that pass peer review and lead to societally relevant results preferably with both regional and global impact

microwave digestion

HF & HNO_3

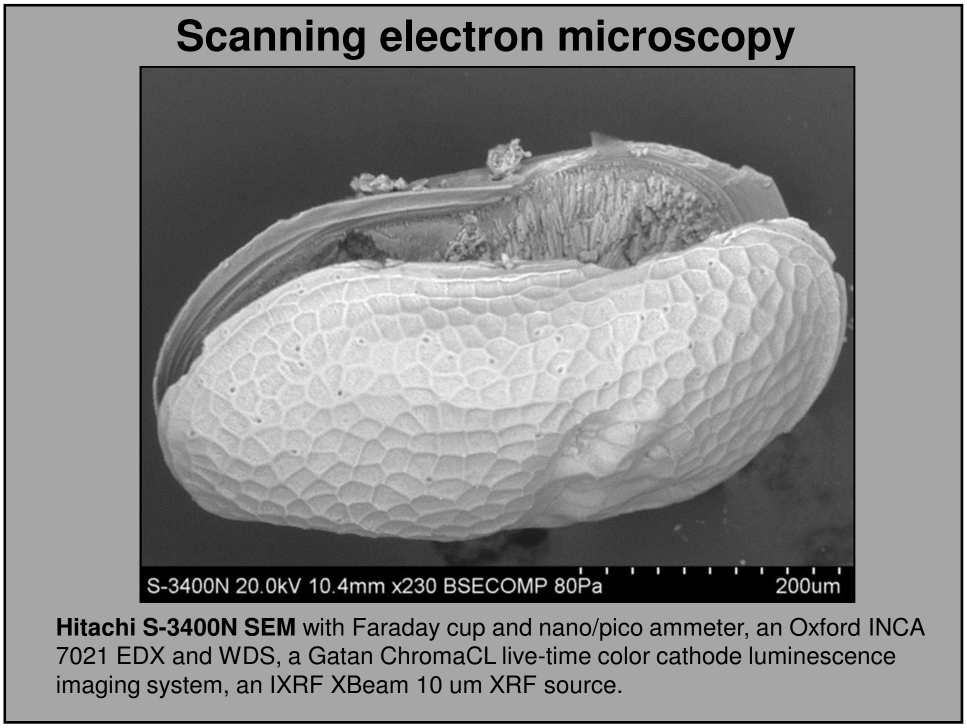
ICP-MS



Computer Applications

Geographix™

Neuralog™



Scanning electron microscopy

Hitachi S-3400N SEM with Faraday cup and nano/pico ammeter, an Oxford INCA 7021 EDX and WDS, a Gatan ChromaCL live-time color cathode luminescence imaging system, an IXRF XBeam 10 um XRF source.

California Well Sample Repository

The California Well Sample Repository is California's only facility for the permanent storage and public use of cores, sidewall samples, drill cuttings, outcrop samples, microfaunal slides, foundation borings, and mineral suites. The repository, founded in 1975, consists of two buildings---each 6,000 square feet in area---that are located on the campus of California State University at Bakersfield.

On this website, you can find extensive catalogs that contain information about the thousands of oil, gas, water and core wells from California that are in our collection. There are tens of thousands of entries in our catalogs that list available core, cuttings, well logs, and paleo samples. Our files are in Microsoft Excel (.XLS) format, and they can be downloaded from this site by any interested party. Or, you can visit us at our present facility on the campus of the California State University at Bakersfield.

click here to learn about our collection

wellsample.com

Baron, D., C. Palmer, 1996. Solubility of jarosite at 4-35^{o}C, *Geochimica et Cosmochimica Acta*, 60, pp. 185-195.

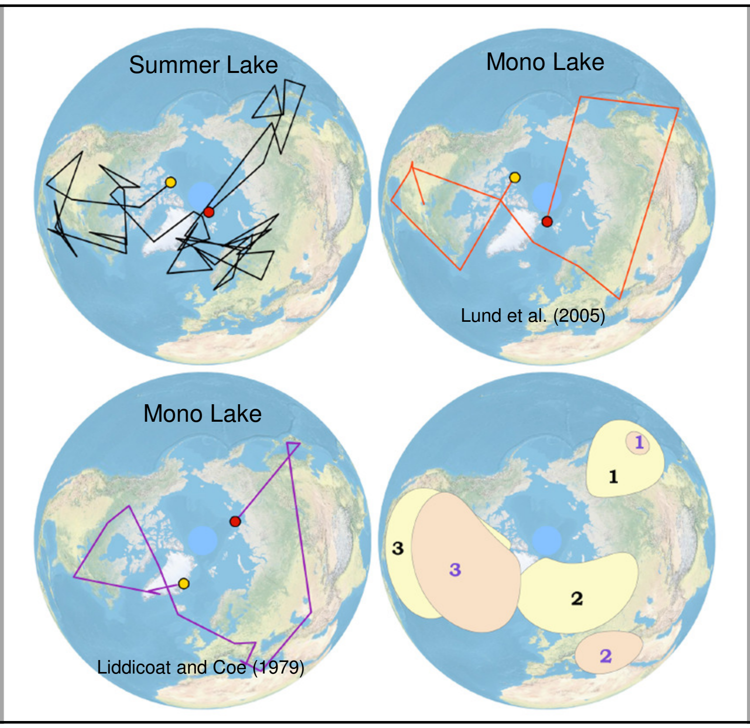
Mickler et al., 2004. *Stable isotope variations in modern tropical speleothems: Evaluating equilibrium vs. kinetic isotope effects*, *Geochimica et Cosmochimica Acta*, 118, pp. 65-81.

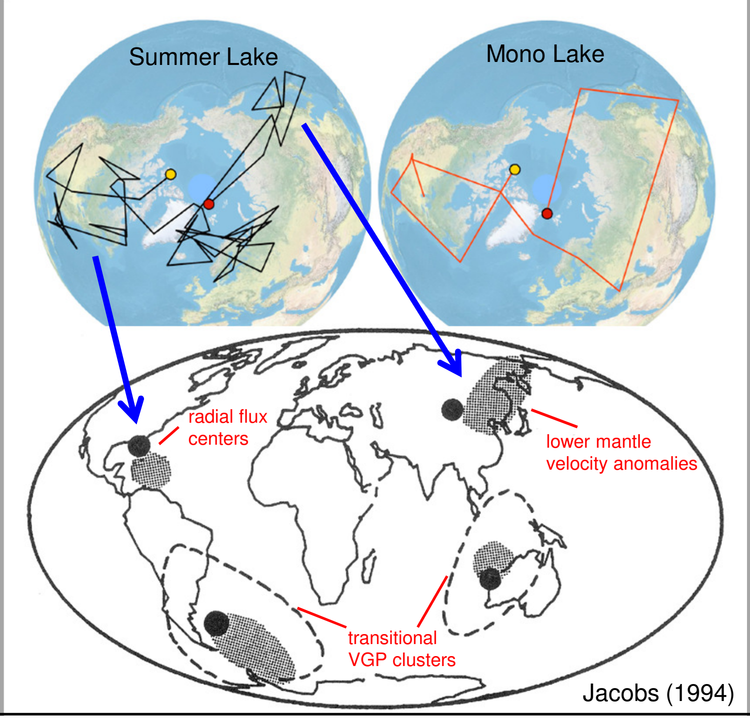
National Science Foundation Research Grants: Geophysics Program

NSF – Award Search – Program Information

8/17/09 1:37 PM

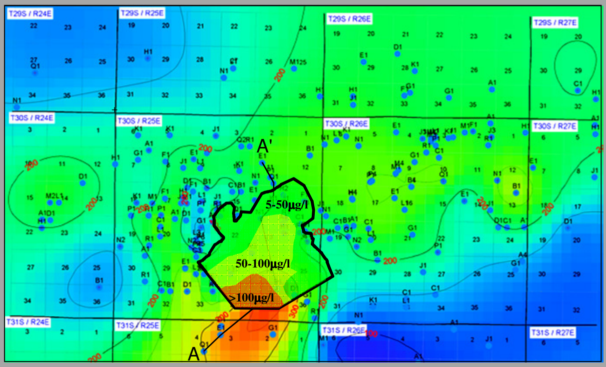
0838093	Collaborative Research: Studies of the Structure of the Earth's Interior	EAR	GEOPHYSICS	08/15/2009	Ekstrom, Goran	NY	Columbia University	$70,000.00
0838304	Collaborative Research: Studies of the Structure of the Earth's Interior	EAR	GEOPHYSICS	08/15/2009	Dziewonski, Adam	MA	Harvard University	$130,000.00
0847382	CAREER: Integrated Study of Shallow Subduction Seismogenesis and Locking Along the Middle America Trench	EAR	COLLABORATIVE RESEARCH, GEOPHYSICS	08/15/2009	Newman, Andrew	GA	GA Tech Research Corporation - GA Institute of Technology	$411,477.00
0910779	Friction and aging of silica: atomistic simulations for fundamental understanding of earthquake mechanics	EAR	GEOPHYSICS	08/15/2009	Szlufarska, Izabela	WI	University of Wisconsin-Madison	$220,006.00
0910911	Study of Coseismic Damage and Post-mainshock Healing on the Longmen-Shan Fault Ruptured in the 2008 M8 Wenchuan Earthquake in China	EAR	GEOPHYSICS	08/15/2009	Li, Yong-Gang	CA	University of Southern California	$108,558.00
0926503	Acquisition of a new stable isotope mass spectrometer	EAR	MARINE GEOLOGY AND GEOPHYSICS, INSTRUMENTATION & FACILITIES	08/15/2009	Swart, Peter	FL	University of Miami Rosenstiel School of Marine&Atmospheric Sci	$319,703.00
0911351	RUI: The Laschamp and Mono Lake Excursions in High Deposition Rate Sediments from Summer Lake, Oregon, USA	EAR	GEOPHYSICS	08/15/2009	Negrini, Robert	CA	California State University-Bakersfield	$183,440.0
0909622	Core-Mantle Interaction and Evolution of the Geodynamo	EAR	GEOPHYSICS	08/01/2009	Olson, Peter	MD	Johns Hopkins University	$413,351.00
0910987	Collaborative Research: Thermochemical Models of Mantle Dynamics and Plate Motions	EAR	GEOPHYSICS	08/01/2009	Becker, Thorsten	CA	University of Southern California	$88,885.00
0911221	How Deep Do Ruptures Penetrate in Large Earthquakes?	EAR	GEOPHYSICS	08/01/2009	Shaw, Bruce	NY	Columbia University	$164,576.00
0911255	Collaborative Research: Thermochemical models of mantle dynamics and plate motions	EAR	GEOPHYSICS	08/01/2009	Buffett, Bruce	CA	University of California-Berkeley	$93,076.00
0911318	Collaborative Research: Postseismic deformation of the Earth after the great 2006-2007 Kuril earthquake doublet:	EAR	GEOPHYSICS	08/01/2009	Kogan, Mikhail	NY	Columbia University	$211,083.00

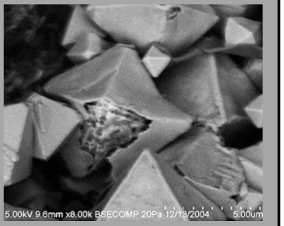


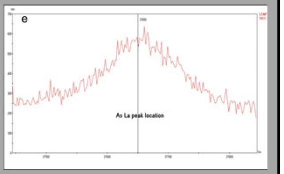


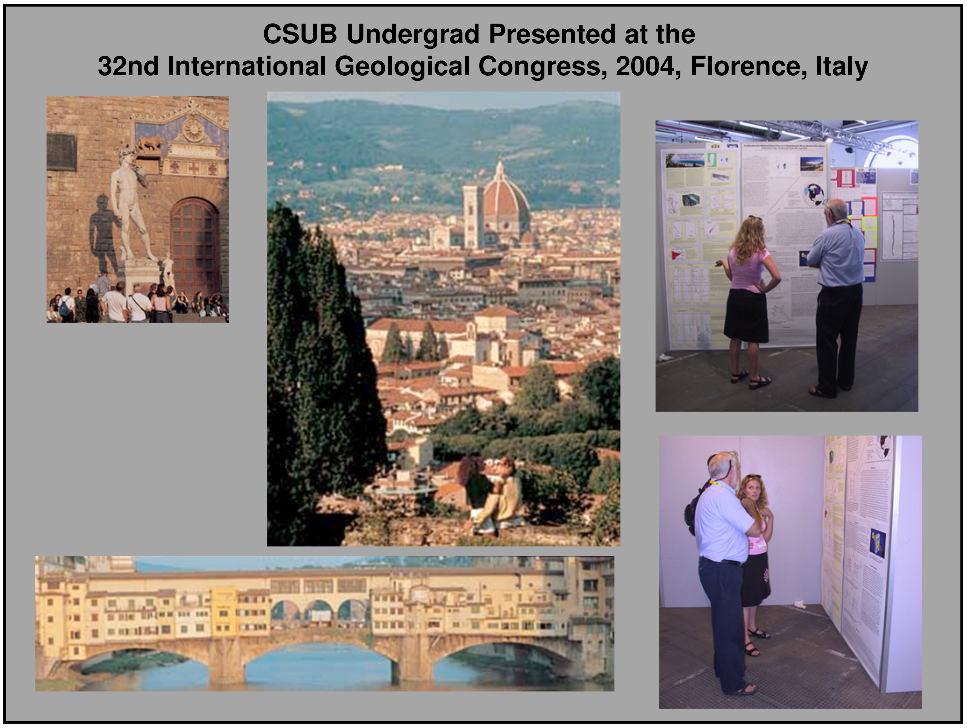
Jacobs (1994)

CSUB Kern Water Bank Project:
Relationship between Depositonal Environments and Groundwater Arsenic Concentrations

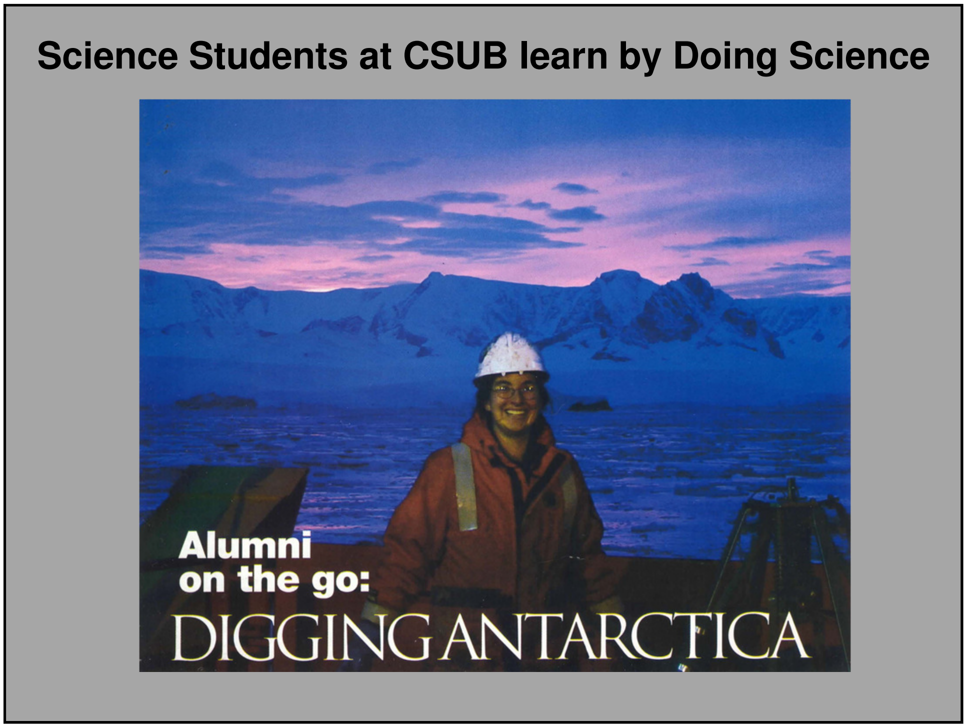








CSUB Undergrad Presented at the
32nd International Geological Congress, 2004, Florence, Italy



Science Students at CSUB learn by Doing Science

Cal State Student in the Mars Program

Former intern on Mars project to watch launch

By CHARLES ADAMSON
Californian staff writer
e-mail: cadamson@bakersfield.com

What child doesn't dream of becoming an astronaut?

Rick Schroeder did, and at 21 years old he still is.

The Cal State Bakersfield senior plans to be at Florida's Kennedy Space Center in three weeks to watch one of two Mars Exploration Rovers being launched this month.

Schroeder worked on the Mars projects as an intern last summer at the National Aeronautics and Space Administration's Jet Propulsion Laboratory in Pasadena.

He logged rock shapes seen from previously photographed landscapes on Mars to determine whether proposed landing sites were safe.

Both rovers, if launched on schedule, should reach Mars in January 2004.

The internships usually are reserved for students at the California Institute of Technology.

"He's one of the two or three best in the geology major (at CSUB), one of the few best we've seen in several years," said CSUB physics and geology professor Rob Negrini. "If anyone is going to realize their dream of becoming an astronaut, it will be Rick."

Schroeder, who is a double major in geology and computer science, has two quarters left at CSUB and plans to apply for doctorate geology programs at Stanford University, the University of Southern California and Cal Tech. He also has considered going into the Air Force and becoming a pilot.

Negrini said Schroeder will do well regardless of whether he reaches his dream of becoming an astronaut.

His two undergraduate majors are some of the most employable, Negrini said.

He is now an intern at Aera Energy.

Schroeder, a 1999 Stockdale High School graduate, said his greatest inspiration is his 17-year-old sister, Heidi, who has cystic fibrosis and is awaiting a lung transplant.

She will be with him for the launch in Florida. Immediately after the launch, he'll leave for a five-week geology camp in Utah.

Schroeder said he likes adventure and is drawn to space because of the unknowns. He dreams of being on a manned mission to Mars.

"It's kind of a childhood fantasy that stuck with me," Schroeder said. "If I don't become an astronaut, I'm sure I'll enjoy where I end up along the way."

Schroeder

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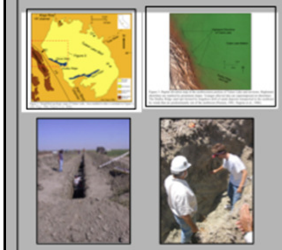

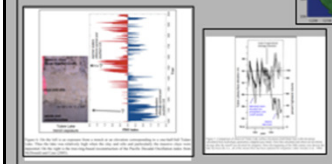

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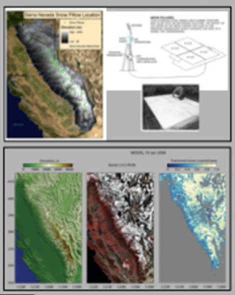
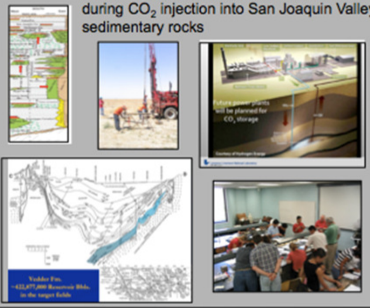


3 & 4. Characterization of mature oil fields as potential reservoirs for injected CO_2 and laboratory simulations of chemical change during CO_2 injection into San Joaquin Valley sedimentary rocks



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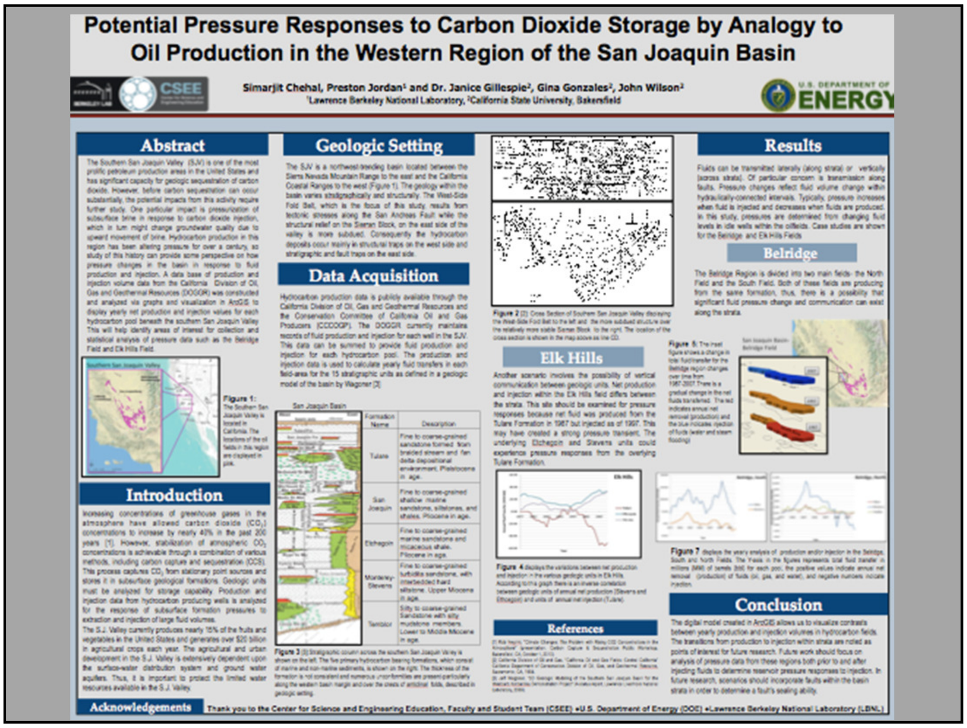

Potential Pressure Responses to Carbon Dioxide Storage by Analogy to Oil Production in the Western Region of the San Joaquin Basin

Simarjit Chehal, Preston Jordan[1] and Dr. Janice Gillespie[2], Gina Gonzales[2], John Wilson[2]
[1]Lawrence Berkeley National Laboratory, [2]California State University, Bakersfield

Abstract

The Southern San Joaquin Valley (SJV) is one of the most prolific petroleum production areas in the United States and has significant capacity for geologic sequestration of carbon dioxide. However, before carbon sequestration can occur substantially, the potential impacts from this activity require further study. One particular impact is pressurization of subsurface brine in response to carbon dioxide injection, which in turn might change groundwater quality due to upward movement of brine. Hydrocarbon production in this region has been altering pressure for over a century, so study of this history can provide some perspective on how pressure changes in the basin in response to fluid production and injection. A data base of production and injection volume data from the California Division of Oil, Gas and Geothermal Resources (DOGGR) was constructed and analyzed via graphs and visualization in ArcGIS to display yearly net production and injection values for each hydrocarbon pool beneath the southern San Joaquin Valley. This will help identify areas of interest for collection and statistical analysis of pressure data such as the Belridge Field and Elk Hills Field.

Figure 1: The Southern San Joaquin Valley is located in California. The locations of the oil fields in this region are displayed in pink.

Introduction

Increasing concentrations of greenhouse gases in the atmosphere have allowed carbon dioxide (CO_2) concentrations to increase by nearly 40% in the past 200 years [1]. However, stabilization of atmospheric CO_2 concentrations is achievable through a combination of various methods, including carbon capture and sequestration (CCS). This process captures CO_2 from stationary point sources and stores it in subsurface geological formations. Geologic units must be analyzed for storage capability. Production and injection data from hydrocarbon producing wells is analyzed for the response of subsurface formation pressures to extraction and injection of large fluid volumes.

The S.J. Valley currently produces nearly 15% of the fruits and vegetables in the United States and generates over $20 billion in agricultural crops each year. The agricultural and urban development in the S.J. Valley is extensively dependent upon the surface-water distribution system and ground water aquifers. Thus, it is important to protect the limited water resources available in the S.J. Valley.

Geologic Setting

The SJV is a northwest-trending basin located between the Sierra Nevada Mountain Range to the east and the California Coastal Ranges to the west (Figure 1). The geology within the basin varies stratigraphically and structurally. The West-Side Fold Belt, which is the focus of this study, results from tectonic stresses along the San Andreas Fault while the structural relief on the Sierran Block, on the east side of the valley is more subdued. Consequently the hydrocarbon deposits occur mainly in structural traps on the west side and stratigraphic and fault traps on the east side.

Data Acquisition

Hydrocarbon production data is publicly available through the California Division of Oil, Gas and Geothermal Resources and the Conservation Committee of California Oil and Gas Producers (CCCOGP). The DOGGR currently maintains records of fluid production and injection for each well in the SJV. This data can be summed to provide fluid production and injection for each hydrocarbon pool. The production and injection data is used to calculate yearly fluid transfers in each field-area for the 15 stratigraphic units as defined in a geologic model of the basin by Wagoner [3].

Formation Name	Description
Tulare	Fine to coarse-grained sandstone formed from braided stream and fan delta depositional environment. Pleistocene in age.
San Joaquin	Fine to coarse-grained shallow marine sandstones, siltstones, and shales. Pliocene in age.
Etchegoin	Fine to coarse-grained marine sandstone and micaceous shale. Pliocene in age.
Monterey-Stevens	Fine to coarse-grained turbidite sandstone, with interbedded hard siltstone. Upper Miocene in age.
Temblor	Silty to coarse-grained Sandstone with silty mudstone members. Lower to Middle Miocene in age.

Figure 3 [3] Stratigraphic column across the southern San Joaquin Valley is shown on the left. The five primary hydrocarbon bearing formations, which consist of marine and non-marine sediments, is shown on the right. The thickness of the formation is not consistent and numerous unconformities are present particularly along the western basin margin and over the crests of anticlinal folds, described in geologic setting.

Figure 2 [3] Cross Section of Southern San Joaquin Valley displaying the West-Side Fold Belt to the left and the more subdued structure over the relatively more stable Sierran Block to the right. The location of the cross section is shown in the map above as line CD.

Elk Hills

Another scenario involves the possibility of vertical communication between geologic units. Net production and injection within the Elk Hills field differs between the strata. This site should be examined for pressure responses because net fluid was produced from the Tulare Formation in 1987 but injected as of 1997. This may have created a strong pressure transient. The underlying Etchegoin and Stevens units could experience pressure responses from the overlying Tulare Formation.

Figure 4 displays the variations between net production and injection in the various geologic units in Elk Hills. According to this graph there is an inverse correlation between geologic units of annual net production (Stevens and Etchegoin) and units of annual net injection (Tulare).

References

Results

Fluids can be transmitted laterally (along strata) or vertically (across strata). Of particular concern is transmission along faults. Pressure changes reflect fluid volume change within hydraulically-connected intervals. Typically, pressure increases when fluid is injected and decreases when fluids are produced. In this study, pressures are determined from changing fluid levels in idle wells within the oilfields. Case studies are shown for the Belridge and Elk Hills Fields.

Belridge

The Belridge Region is divided into two main fields- the North Field and the South Field. Both of these fields are producing from the same formation, thus, there is a possibility that significant fluid pressure change and communication can exist along the strata.

Figure 5: The inset figure shows a change in total fluid transfer for the Belridge region changes over time from 1987-2007. There is a gradual change in the net fluids transferred. The red indicates annual net removal (production) and the blue indicates injection of fluids (water and steam flooding).

Figure 7 displays the yearly analysis of production and/or injection in the Belridge, South and North Fields. The Y-axis in the figures represents total fluid transfer in millions (MM) of barrels (bbl) for each pool, the positive values indicate annual net removal (production) of fluids (oil, gas, and water), and negative numbers indicate injection.

Conclusion

The digital model created in ArcGIS allows us to visualize contrasts between yearly production and injection volumes in hydrocarbon fields. The transitions from production to injection within strata are noted as points of interest for future research. Future work should focus on analysis of pressure data from these regions both prior to and after injecting fluids to determine reservoir pressure responses to injection. In future research, scenarios should incorporate faults within the basin strata in order to determine a fault's sealing ability.

Acknowledgements Thank you to the Center for Science and Engineering Education, Faculty and Student Team (CSEE) •U.S. Department of Energy (DOE) •Lawrence Berkeley National Laboratory (LBNL)