

Rebecca Chappell. Smyth

Professional Summary

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Professional Preparation

Academic Background

M.A. (with specialty in Hydrogeology), Geology, The University of Texas at Austin, 1995

B.S. Geology, Virginia Polytechnic Institute and State University, 1980

Professional Appointments

Project Manager, Bureau of Economic Geology, The University of Texas at Austin (September 2007-Present)

Present Position: Research Scientist Associate, Bureau of Economic Geology, The University of Texas at Austin (February 1997 - Present). Hydrogeologic studies to assess deep saline reservoirs for potential CO₂ storage and assessment of impacts to fresh-water resources in Texas and Southeastern U.S.

Environmental assessment and hydrogeologic characterization of Railroad Commission of Texas priority sites impacted by oil- and gas-production activities in Harris, Howard, Jones, and Wharton Counties.

Airborne lidar (light detection and ranging) and GPS (global positioning system) data acquisition and processing. Mapping of coastal erosion and coastal wetlands environment to support informed decision making by local and state government; mapping of urban areas for flood hazard prediction. Areas: Texas urban areas and Gulf of Mexico shoreline, southern California shoreline, Orinoco Delta of Venezuela, and 15 urban areas in Honduras following Hurricane Mitch.

Database compilation of Carrizo-Wilcox aquifer hydrologic properties in Texas for the Texas Water Development Board.

Study of selected oil-producing fields in Texas to assess the feasibility of issuing a variance to EPA/RRC-based Area of Review requirements for permitting of Class II injection wells.

Hydrogeologist, McCulley, Frick and Gilman, Inc., Austin, TX (1989 - 1997). Hydrogeologic investigations to support lignite-mine permitting in East Texas (Bastrop, Freestone, Leon, Limestone, Milam, and Titus Counties). Assessed baseline geology and groundwater conditions; oversight of groundwater-flow modeling to design groundwater control plans and probable hydrologic consequences. Design, installation, and monitoring of a dewatering well field in low-permeability mine spoil.

Project management of quarterly groundwater monitoring of a bulk petroleum storage-tank facility in Austin, Texas. Municipal and industrial landfill permitting studies in Anderson, Colorado, Hays, Somervell, and Tarrant Counties, Texas. Hazardous-waste-site assessment and remedial investigations in Texas, Kansas, and Idaho.

Petrographic characterization of lead-smelter slag, mine tailings, and residential soil samples at Superfund site in Idaho to discern sources of lead contamination in residential properties.

Supervision of borehole drilling and sampling by mud-rotary, hollow-stem auger, and air-percussion methods. Characterization of soil and rock properties via geophysical log

interpretation, continuous cores, split-spoon, and Shelby tube collection of geotechnical samples.

Design and supervision of groundwater monitoring and production-well installations using above drilling methods. Design, performance, and analysis of slug and pumping tests in both unconfined and confined aquifers.

Graduate Research Assistant, The University of Texas at Austin, Department of Geological Sciences (1993 - 1994). Maintenance and operation of physical hydrogeology research laboratory.

Geologist, Hall Southwest Water Consultants, Inc., Austin, TX (1987 - 1989). Geologic and hydrologic studies within the East Texas Wilcox Lignite Belt; geologic field and subsurface mapping of Carrizo/Wilcox Formation ironstone layers in pre-mine study areas.

Independent Travel, The University of Texas at Austin, Bureau of Economic Geology (1985 - 1986). Independent travel: Austria, Cyprus, Czechoslovakia, Denmark, England, Finland, France, Germany, Greece, Ireland, Israel, Italy, Poland, Norway, Switzerland, Yugoslavia, and U.S.S.R (1985-1986).

Research Scientist Assistant, The University of Texas at Austin, Bureau of Economic Geology (1983 - 1985). Investigation of Tertiary volcanic rocks of Trans-Pecos Texas, including petrographic thin-section description and electron microprobe analysis.

Hydrologic Technician, U.S. Geological Survey, Water Resources Division, Austin, Texas (1982 - 1984). Geohydrology work for the West Gulf Coast Regional Aquifer Systems Analysis project; Interpretation of geophysical well logs of Gulf Coast Tertiary units.

Petrologist II, Core Laboratories Inc., Geochemistry and Petrology Section, Dallas, Texas (1981 - 1982). Data collection and preparation of core-sample reports. Petrographic thin-section description of clastic sediments, hydrothermally altered volcanic rocks from the Philippines, and oil-bearing volcanic rocks from Japan. Interpretation of X-ray diffraction traces and scanning electron micrographs. Supervision of thin-section preparation.

Professional Registrations and Certificates

Texas Association of Professional Geoscientists, License No. 68

Theses

Porosity and permeability controls in the Santana Ash-Flow Tuff, Trans-Pecos Texas, 100 p

Continuing Education Courses Taken

Analysis and Design of Aquifer Tests--Including Slug and Fracture Flow: NGWA Short Course, March 1996

Probability, Statistics, and Geostatistics for Environmental Professionals: NGWA Short Course, November 1995

Hazardous Materials Personal Protection and Safety (40 hours), (Most recent annual 8-hour refresher course completed in April 1999): Austin, Texas, 1989

Areas of Expertise

Areas of Expertise

Hydrogeologic assessment of sites impacted by petroleum exploration and production activities

Hydrogeology of ash-flow tuffs

Light detection and ranging (lidar) and global positioning system (gps) data acquisition and processing

Studies related to geologic sequestration of carbon dioxide

Service

Published Interviews

Clayton, Mark, Smyth, R. C., and Hovorka, S. D., 2007, Earth too warm? Bury the CO₂, in Christian Science Monitor, July 31, <http://www.csmonitor.com/2007/0731/po1s05-wogi.html>
Article in which Smyth and Hovorka are heavily quoted.

Outreach Activities

CO₂ outreach demonstration: presented to High School Science Fair winners and their parents, hosted by Austin Geological Society at the Bureau of Economic Geology, Austin, Texas, March 5, 2007.

Rock garden outside the Geology Building: presented at ExploreUT, Austin, Texas, March 3, 2007.

Landslides and Flooding in Honduras: Results of Hurricane Mitch, 1998: presented at Gulf Coast Association of Geological Societies 52nd Annual Convention Teachers Workshop, Austin, Texas, October 30, 2002.

Teaching and Advising

University Courses Taught

Forensic hydrogeology applied to a half-century-old crude-oil seep, Colorado River, Wharton County, Texas, U.S.A.: presented at BEG technical seminar, Austin, Texas, March 21, 2003.

Continuing Education Courses Taught

Lidar surveys for coastal hazards and resource mapping: presented at Coastal Zone 2003 Conference (with Jim Gibeaut), Baltimore, Maryland, July 14, 2003.

Presentations

Invited Presentations

U.S. CCS Policy and Regulation: presented to International Energy Agency, Greenhouse Gas Control Program, presented at CO₂ Capture and Storage (CCS) Summer School, Austin, TX, July 7, 2014.

Presentations

SACROC EOR Pilot: introduction and groundwater results: presented at Southwest Partnership on Carbon Sequestration Phase II Annual Meeting, Socorro, New Mexico, September 29, 2009.

Assessing risk to fresh water resources from long term CO₂ injection--laboratory and field studies: presented at the GHGT-9 (Green House Gas Technology) Conference, Washington, D.C., November 16-20, 2008.

SACROC TX groundwater monitoring project results to date: presented at DOE Southwest CO₂ Sequestration Partnership Annual Meeting, Albuquerque, New Mexico, July 26, 2007.

Potential saline reservoir sinks for storage of CO₂ generated in North and South Carolina: presented at Sixth Annual Conference on Carbon Capture & Sequestration: Expediting deployment of industrial scale systems: Can it be done? How? Concerns to be addressed, Pittsburgh, Pennsylvania, May 9, 2007.

SACROC/Claytonville Groundwater Study Progress Report: presented at the Southwest Regional Carbon Sequestration Partnership 2007 workshop, Austin, Texas, April 17, 2007.

Characterization of the Carolinas: presented at the SECARB 2007 Stakeholder's meeting, Atlanta, Georgia, March 8, 2007.

GPS exercise: presented to Girl Scout troops, Enchanted Rock, Texas, January 5, 2007.

Let's Rock!: led group of Junior Girl Scouts on Geology Badge weekend, Enchanted Rock, Texas, December 1-3, 2006.

Potential subseafloor Atlantic units for geologic storage of carbon dioxide: presented at the 2006 annual Geological Society of America meeting, Philadelphia, Pennsylvania, October 22, 2006.

Assessing impacts to groundwater from CO₂ flooding of SACROC and Claytonville oil fields in West Texas: presented at the 2006 UIC Conference of the Groundwater Protection Council, Austin, Texas, January 24, 2006.

Assessing impacts to groundwater from CO₂ flooding of SACROC and Claytonville oil fields in West Texas: presented at the 2006 UIC Conference of the Groundwater Protection Council, Austin, Texas, January 24, 2006.

Use of lidar to improve estimates of hydrologic modeling parameters: presented at the National Groundwater Association 2005 Groundwater Summit, San Antonio, Texas, April 17-20, 2005.

Using airborne lidar to assess coastal environments: presented to Texas Coastal Erosion Technical Conference, Galveston, Texas, September 25, 2003.

Forensic hydrogeology applied to a half-century-old crude-oil seep, Colorado River, Wharton County, Texas: presented at the 52nd Annual GCAGS Convention, Austin, Texas, November 1, 2002.

Lidar at UT Austin: presented at Texas Water Development Board Brown Bag Lunch Lecture Series, Austin, Texas, January 30, 2002.

Airborne lidar (Light Detection and Ranging) at The University of Texas at Austin: presented to representatives from FUMEC (U.S.-Mexico Foundation for Science), Mexican Universities, and NASA, Matamoros, Mexico, October 2001.

Airborne lidar (Light Detection and Ranging) at The University of Texas at Austin: presented to the Austin Geological Society, Austin, TX, February 2001.

Analysis of soil remediation requirements at abandoned oil-field waste disposal sites in Louisiana, New Mexico, Oklahoma, and Texas: presented at Ground Water Protection Council Annual Underground Injection Control Meeting, Houston, Texas, January 2000.

Mn-oxide concentration as evidence of a pathway for infiltration of crude oil into a shallow aquifer, West Texas: presented to the American Association of Petroleum Geologists, San Antonio, Texas, April 1999.

Striking oil at 20 ft: a petroleum geologist's dream or a hydrogeologist's nightmare: presented at The University of Texas at Austin, Geology Department, Hydrology Brown Bag, Austin, Texas, April 1998.

Activities of a Professional Nature

Professional Societies

Austin Geological Society

National Ground Water Association

Texas Ground Water Association

Activities of a Professional Nature

Austin Geological Society, President (August 1, 2015-July 31, 2016)

Publications

Peer Reviewed Journal Articles

Nicot, J.-P., Smyth, R. C., Darvari, R., and McKinney, S. T., 2022, New hydrogeochemical insights on a West Texas desert spring cluster: Trans-Pecos Balmorhea-Area Springs: Applied

Geochemistry, v. 142, no. 105331, 14 p., <http://doi.org/10.1016/j.apgeochem.2022.105331>.

Lu, J., Larson, T. E., and Smyth, R. C., 2015, Carbon isotope effects of methane transport through Anahuac Shale -- a core gas study: *Journal of Geochemical Exploration*, v. 148, p. 138-149, <http://doi.org/10.1016/j.gexplo.2014.09.005>.

Wolaver, B. D., Hovorka, S. D., and Smyth, R. C., 2013, Greensites and brownsites: Implications for CO₂ sequestration characterization, risk assessment, and monitoring: *International Journal of Greenhouse Gas Control*, v. 19, p. 49-62, doi: <http://dx.doi.org/10.1016/j.ijggc.2013.07.020>.

Lu, J., Cook, P. J., Hosseini, S. A., Yang, C., Romanak, K. D., Zhang, T., Freifeld, B. M., Smyth, R. C., Zeng, H., and Hovorka, S. D., 2012, Complex fluid flow revealed by monitoring CO₂ injection in a fluvial formation: *Journal of Geophysical Research*, v. 117, B03208, doi:10.1029/2011JB008939.

Romanak, K. D., Smyth, R. C., Yang, C., Hovorka, S. D., Rearick, M., and Lu, J., 2012, Sensitivity of groundwater systems to CO₂: application of a site-specific analysis of carbonate monitoring parameters at the SACROC CO₂-enhanced oil field: *International Journal of Greenhouse Gas Control*, v. 5, no. 1, p. 142?-152.

Warne, A. G., Meade, R. H., White, W. A., Guevara, E. H., Gibeaut, J. C., Smyth, R. C., Aslan, Andres, and Tremblay, T. A., 2002, Regional controls on geomorphology, hydrology, and ecosystem integrity in the Orinoco Delta, Venezuela: *Geomorphology*, v. 44, p. 273-307.

Aslan, Andres, Warne, A. G., White, W. A., Guevara, E. H., Smyth, R. C., Raney, J. A., and Gibeaut, J. C., 2001, Mud volcanoes of the Orinoco delta, eastern Venezuela: *Geomorphology*, v. 41, p. 323-336.

Gutiérrez, Roberto, Gibeaut, J. C., Smyth, R. C., Hepner, Tiffany, Andrews, J. R., Weed, C., Gutelius, Bill, and Mastin, M., 2001, Precise airborne LIDAR surveying for coastal research and geohazards applications: *International Archives of Photogrammetry and Remote Sensing*, v. 34, part 3/W4, p. 185-192.

Henry, C. D., Price, J. G., and Smyth, R. C., 1988, Chemical and thermal zonation of a mildly alkaline magma system, Infiernito Caldera, Trans-Pecos Texas: *Contributions to Mineralogy and Petrology*, v. 98, p. 194-211.

Non Peer Reviewed Authored Books

Mace, R. E., and Smyth, R. C., 2003, Hydraulic properties of the Carrizo-Wilcox aquifer in Texas: information for groundwater modeling, planning, and management: The University of Texas at Austin, Bureau of Economic Geology, Report of Investigations, no. 269, 40 p.

Non Peer Reviewed Journal Articles

Meckel, T. A., Hovorka, S. D., Treviño, R. H., Smyth, R. C., and Romanak, K. D., 2014, Toward an international program for offshore storage of CO₂: international Initiative for CCS sub-sea (iCCSc): *Energy Procedia, Proceedings of 12th International Conference on Greenhouse Gas Control Technologies GHGT12*, v. 63, p. 5015-5020, <http://doi.org/10.1016/j.egypro.2014.11.531>.

Smyth, R. C., and Heiligenstein, C., 2014, Concerning offshore geologic storage of carbon dioxide in the U.S.A.: *Energy Procedia, Proceedings of 12th International Conference on Greenhouse Gas Control Technologies GHGT12*, v. 63, p. 5822-5826, <http://doi.org/doi:10.1016/j.egypro.2014.11.615>.

Smyth, R. C., Hovorka, S. D., Romanak, K. D., Wolaver, B. D., Mickler, P., and Yang, C., 2014, Monitoring CO₂: The quest for a clean signal (examples from UT Austin BEG research): *Energy Procedia, Proceedings of 12th International Conference on Greenhouse Gas Control Technologies GHGT12*, v. 63, p. 4035-4042, <http://doi.org/doi:10.1016/j.egypro.2014.11.435>.

Olson, H. C., Olson, J., Bryant, Steve, Lake, L. W., Bommer, P., Romanak, Katherine, Hovorka, S. D., Smyth, R. C., and Williams, I., 2013, Meeting the grand challenge for future carbon management engineers and scientists: Stimulating workforce capacity through teacher professional development: *Energy Procedia*, v. 37, p. 7265-7272.

Romanak, K. D., Smyth, R. C., Yang, Changbing, Hovorka, S. D., and Lu, J., 2010, Role of dedolomitization in the detection of anthropogenic CO₂ in freshwater aquifers, in *Proceedings, 13th International Conference on Water-Rock Interaction, WRI-13, Guanajuato, Mexico, August 16-20*, p. 887-890.

Smyth, R. C., 2009, After the rain, in Laubach, S. E., and Tinker, S. W., eds., 2009, *Earth's art: celebrating the Centennial of the Bureau of Economic Geology, 1909-2009: The University of Texas at Austin, Bureau of Economic Geology*, p. 112-113.

Smyth, R. C., 2009, Orinoco Delta, in Laubach, S. E., and Tinker, S. W., eds., 2009, *Earth's art: celebrating the Centennial of the Bureau of Economic Geology, 1909-2009: The University of Texas at Austin, Bureau of Economic Geology*, p. 16-17.

Smyth, R. C., Hovorka, S. D., Lu, Jiemin, Romanak, Katherine, Partin, J. W., Wong, Corinne, and Yang, Changbing, 2009, Assessing risk to fresh water resources from long term CO₂ injection--laboratory and field studies: *Energy Procedia*, v. 1, p. 1957-1964.

Ambrose, W. A., Holtz, M. H., Nuñez-Lopez, Vanessa, Breton, C. L., Gülen, Gürcan, Duncan, Ian, Smyth, R. C., Foss, M. M., Lakshminarasimhan, Srivatsan, and Hovorka, S. D., 2006, FutureGen: clean-coal and near-zero-emission power generation technology for the Gulf Coast: *Gulf Coast Association of Geological Societies Transactions*, v. 56, p. 5-13.

Duncan, I. J., Ambrose, W. A., Holtz, M. H., Hovorka, S. D., Esandoh-Yeddu, Joseph, Nuñez López, Vanessa, Nicot, J. -P., Smyth, R. C., and Lakshminarasimhan, Srivatsan, 2006, The Gulf Coast Carbon Center: developing a carbon sequestration industry in the Gulf Coast region, in *8th International Conference on Greenhouse Gas Control Technologies, Trondheim, Norway, June 19-22*, CD-ROM [4 p.].

Paine, J. G., White, W. A., Smyth, R. C., Andrews, J. R., and Gibeaut, J. C., 2005, Combining EM and lidar to map coastal wetlands: an example from Mustang Island, Texas, in *Geophysical solutions for today's challenges: 18th Annual Symposium on the Application of Geophysics to Engineering and Environmental Problems, April 3-7, Atlanta: Environmental and Engineering Geophysical Society*, p. 745-756, CD-ROM.

Collins, E. W., Tremblay, T. A., Raney, J. A., Paine, J. G., Hovorka, S. D., Gutiérrez, Roberto, Smyth, R. C., and Hepner, Tiffany, 2004, Geologic mapping and construction of digital map data sets of the Edwards aquifer region, Central Texas, in Hovorka, Sue, ed., *Edwards water resources in Central Texas: retrospective and prospective: South Texas Geological Society and Austin Geological Society*, CD-ROM, p. 1-15.

Paine, J. G., White, W. A., Smyth, R. C., Andrews, J. R., and Gibeaut, J. C., 2004, Mapping coastal environments with lidar and EM on Mustang Island, Texas, U.S.: *The Leading Edge*, v. 23, no. 9, p. 894-898.

Gibeaut, J. C., Hepner, T. L., Waldinger, Rachel, Andrews, J. R., Smyth, R. C., and Gutiérrez, Roberto, 2003, Geotubes for temporary erosion control and storm surge protection along the Gulf of Mexico shoreline of Texas, in *Proceedings, 13th Biennial Coastal Zone Conference: Coastal Zone 3: Coastal Zone Management through Time: Baltimore, National Oceanic and Atmospheric Administration*, 5 p., CD-ROM.

Gibeaut, J. C., White, W. A., Smyth, R. C., Andrews, J. R., Tremblay, T. A., Gutiérrez, Roberto, Hepner, T. L., and Neuenschwander, Amy, 2003, Topographic variation of barrier island subenvironments and associated habitats, in *Coastal Sediments '03: Crossing disciplinary boundaries: Proceedings, Fifth International Symposium on Coastal Engineering and Science of Coastal Sediment Processes, Clearwater Beach, Florida, May 18-23*, 10 p., CD-ROM.

Smyth, R. C., Dutton, A. R., and Gutiérrez, Roberto, 2002, Forensic hydrogeology applied to a half-century-old crude oil seep, Colorado River, Wharton County, Texas: Gulf Coast Association of Geological Societies Transactions, v. 52, p. 907-917.

Dutton, A. R., Smyth, R. C., Nance, H. S., Mullican, J. W., and Gu, Yaguang, 2000, History, regulation, and closure of abandoned centralized and commercial drilling-fluid disposal sites in Louisiana, New Mexico, Oklahoma, and Texas, in Proceedings, Ground Water Protection Council Annual Forum, p. 133-138.

Smyth, R. C., and Dutton, A. R., 1999, Use of inactive production wells to obtain a variance to area of review requirements for injection well permitting in Texas: Eye on Environment, v. 4, no. 1, p. 1-3.

Sharp, J. M., Jr., Robinson, N. I., Smyth-Boulton, R. C., and Milliken, K. L., 1995, Fracture skin effects in groundwater transport, in Rossmanith, H.-P., and others, eds., Mechanics of jointed and faulted rock, in Proceedings of the 2nd International Conference, Vienna: Rotterdam, A.A. Balkema, p. 449-454.

Non Peer Reviewed Book Chapters

Smyth, R. C., and Sharp, J. M., Jr., 2006, Chapter 4.1. The hydrology of tuffs, in Heiken, Grant, Tuffs--Their properties, uses, hydrology, and resources: Geological Society of America, Special Paper 408, 91-111.

Non Peer Reviewed Atlases and Maps

Gibeaut, J. C., Hopkinson, Christopher, Gutiérrez, R. C., Smyth, R. C., Andrews, J. R., and Stephens, D. M., 2001, Digital elevation model, Austin, Texas (oversize, color lidar poster (2.5 x 5.25 ft): The University of Texas at Austin, Bureau of Economic Geology, including 1-p text.

Contract Reports

Nicot, J.-P., Smyth, R. C., Darvari, R., Bongiovanni, T., Pierre, J. P., McKinney, S. T., Wolaver, B. D., and Mickler, P., 2021, Revisiting hydrogeology of a West Texas desert spring cluster: a data-rich geochemical and physical study of the Trans-Pecos Balmorhea-Area Springs: The University of Texas at Austin, Bureau of Economic Geology, contract report prepared for Apache Corporation, 234 p.

Wolaver, B. D., Sun, A. Y., Caldwell, T., Smyth, R. C., Mickler, P., Bongiovanni, T., Pierre, J. P., Sharp, J. M., Jr., Uliana, M., and Breton, C., 2019, Report on year one preliminary results: hydrogeologic evaluation and vulnerability analysis for Balmorhea-area springs: Bureau of Economic Geology, The University of Texas at Austin, Annual Report prepared for Apache Corporation, 52 p.

Caldwell, T., Bongiovanni, T., Wolaver, B. D., and Smyth, R. C., 2017, Monitoring hydrologic effects of saltcedar control efforts in the Upper Brazos River Basin, Texas: Final Report prepared for Texas Parks and Wildlife Department, under contract no. 483138, 83 p.

Nicot, J.-P., Mickler, P., Larson, T., Castro, M. C., Darvari, R., Smyth, R. C., Uhlman, K., and Omelon, C., 2015, Understanding and managing environmental roadblocks to shale gas development: an analysis of shallow gas, NORM, and trace metals: Bureau of Economic Geology, The University of Texas at Austin, Contract Report prepared for RPSEA, under contract no. 11122-56, 272 p.

Smyth, R. C., Hovorka, S. D., and Treviño, R. H., 2015, Best management practices for offshore sub-seabed geologic storage of carbon dioxide: Draft contract report prepared for Department of Interior Bureau of Ocean Energy Management, under contract no. M10PC00091, 135 p. + appendices.

Nuñez-López, V., and Smyth, R. C., 2014, Geologic carbon sequestration resource of references: Final Report prepared for Chevron Energy Technology Company, Houston, TX, under contract no. UTA13-000694, 51 p.

Núñez-López, V., Hovorka, S. D., Carr, D. L., Sun, A. Y., and Smyth, R. C., 2014, Above-zone monitoring plan report for the West Ranch CO₂ EOR oilfield: Final Report prepared for NRG Energy Company, Petra Nova LLC, under contract no. 4501477652, 17 p.

Smyth, R. C., Núñez López, Vanessa, Hovorka, S. D., Wolaver, B. D., Hosseini, S. A., Ambrose, W. A., Lu, Jiemin, Mickler, P., Zahid, K., Zeidouni, M., and Sun, A. Y., 2013, Draft final monitoring plan report, Phase I at West Ranch Field: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for NRG Energy Company, Petra Nova LLC, DOE Award Number: DE-FE-0003311.

Smyth, R. C., Núñez, Vanessa, Hovorka, S. D., Wolaver, B. D., Hosseini, S. A., Ambrose, W. A., Lu, Jiemin, Mickler, P., Zahid, K., Zeidouni, M., Sun, A. Y., 2013, Monitoring Plan Report: Phase I at West Ranch Field, Gulf Coast Carbon Center at the Bureau of Economic Geology, a unit of The University of Texas at Austin, draft final report, prepared for NRG Energy Inc., Petra Nova LLC, DOE award number DE-FE-0003311.

Romanak, Katherine, Smyth, R. C., Yang, Changbing, Hovorka, S. D., Nicot, J. -P., and Lu, Jiemin, 2009, Recent results of the SACROC Groundwater Geochemistry Study: The University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, report prepared for U.S. EPA, NODA, 5 p..

Yang, Changbing, Nicot, J. -P., Smyth, R. C., Romanak, Katherine, and Hovorka, S. D., 2009, The importance of considering rock-water interaction when studying potential impacts of geological CO₂ sequestration on drinking water resources: The University of Texas at Austin, Bureau of Economic Geology, Gulf Coast Carbon Center, report prepared for U.S. EPA, NODA, 5 p..

Smyth, R. C., Hovorka, S. D., Meckel, T. A., Breton, C. A., Paine, J. G., and Hill, G. R., 2007, Potential sinks for geologic storage of CO₂ generated in the Carolinas: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for Southern States Energy Board and Electric Power Research Institute (http://www.beg.utexas.edu/enviroqlty/co2seq/pubs_presentations/CarolinasSummary_16April07.pdf), 14 p.

Collins, E. W., Tremblay, T. A., Gibeaut, J. C., Waldinger, R. L., White, W. A., Raney, J. A., Smyth, R. C., Hepner, T. A., Andrews, J. R., and Gutiérrez, Roberto, 2006, Summary report for the 2005-2006 STATEMAP Project: geologic mapping to support improved database development and understanding of urban corridors, critical aquifers, and special areas of environmental concern in Texas: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for U.S. Geological Survey, under cooperative agreement no. 05HQAG0046, 20 p. + maps.

Paine, J. G., Ruppel, S. C., Nance, H. S., Smyth, R. C., Breton, Caroline, and Duncan, I. J., 2006, Subsurface data response, Odessa Site, Texas: The University of Texas at Austin, Bureau of Economic Geology, report prepared for the FutureGen Alliance, 113 p.

Hovorka, S. D., Holtz, M. H., Smyth, R. C., Núñez-Lopez, Vanessa, Kim, E. M., Breton, Caroline, Scanlon, B. R., and Reedy, R. C., 2005, Southeast regional carbon sequestration partnership: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for the U.S. Department of Energy, under DOE award number DE-FC26-03NT41980, 40 p.

Scanlon, B. R., Nicot, J. -P., Reedy, R. C., Tachovsky, J. A., Nance, H. S., Smyth, R. C., Keese, Kelley, Ashburn, R. E., and Christian, Lance, 2005, Evaluation of arsenic contamination in Texas: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for Texas Commission on Environmental Quality, under umbrella contract no. 582-4-56385 and work order no. UT-08-5-70828, 167 p.

Gibeaut, J. C., Hepner, Tiffany, Waldinger, R. L., Andrews, J. R., Smyth, R. C., and Gutiérrez, Roberto, 2003, Geotextile tubes along the upper Texas Gulf Coast, May 2000 to March 2003:

The University of Texas at Austin, Bureau of Economic Geology, report of the Texas Coastal Coordination Council pursuant to National Oceanic and Atmospheric Administration Award No. NA07OZ0134, GLO Contract Mp/ 02-493 R, 102 p. + 3 pls.

Smyth, R. C., Gibeaut, J. C., Andrews, John, Hepner, Tiffany, and Gutiérrez, Roberto, 2003, The Texas Shoreline Change Project: coastal mapping of West and East Bays in the Galveston Bay System using airborne lidar: The University of Texas at Austin, final report prepared for the Texas General Land Office, under GLO Contract Number 02-520 C, 41 p.

Gibeaut, J. C., Hepner, Tiffany, Waldinger, R. L., Andrews, J. R., Smyth, R. C., and Gutiérrez, Roberto, 2002, Geotubes along the Gulf shoreline of the upper Texas coast: observations during 2001: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for Texas Coastal Coordination Council pursuant to National Oceanic and Atmospheric Administration Award No. NA97OZ0179, under GLO contract number 01-597 R, 24 p. + apps.

Gibeaut, J. C., Hepner, Tiffany, Waldinger, R. L., Andrews, J. R., Gutiérrez, Roberto, Tremblay, T. A., and Smyth, R. C., 2001, Changes in Gulf shoreline position, Mustang and North Padre Islands, Texas: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for the Texas Coastal Coordination Council pursuant to National Oceanic and Atmospheric Administration, under Award No. NA97OZ0179 and GLO Contract No. 00-002R, 28 p.

Gibeaut, J. C., White, W. A., Hepner, Tiffany, Gutiérrez, Roberto, Tremblay, T. A., Smyth, R. C., and Andrews, J. R., 2000, Texas Shoreline Change Project: Gulf of Mexico Shoreline change from the Brazos River to Pass Cavallo: The University of Texas at Austin, Bureau of Economic Geology, report prepared for the Texas Coastal Coordination Council pursuant to National Oceanic and Atmospheric Administration Award No. NA87OZ0251, 32 p.

Mace, R. E., Smyth, R. C., Xu, Liying, and Liang, Jinhua, 2000, Transmissivity, hydraulic conductivity, and storativity of the Carrizo-Wilcox aquifer in Texas: The University of Texas at Austin, Bureau of Economic Geology, technical report prepared for the Texas Water Development Board, under TWDB Contract No. 99-483-279, Part 1, 76 p.

Smyth, R. C., Dutton, A. R., and Gutiérrez, Roberto, 2000, Site investigation and preliminary assessment of the Colorado River Seep site in Wharton County, Texas: The University of Texas at Austin, Bureau of Economic Geology, technical report prepared for the Railroad Commission of Texas, under Interagency Contract No. UTA98-0380 (Work Order No. 4), 27 p. + apps.

Warne, A. G., Aslan, Andres, White, W. A., Gibeaut, J. C., Tremblay, T. A., Smyth, R. C., Guevara, E. H., Gutiérrez, Roberto, Hovorka, S. D., Raney, J. A., Crawford, Melba, Smith, Solar, and Neuenschwander, A. L., 1999, 1999 final report year two: geo-environmental characterization of the Delta del Orinoco, Venezuela: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for Petróleos de Venezuela, S.A., and Coordinación Desarrollo Armónico de Oriente, 99 p. + figures, tables, and appendices.

Smyth, R. C., Blum, M. D., Dutton, A. R., Gibeaut, J. C., and Nava, Robin, 1998, Site investigation and evaluation of remedial alternatives for the Vinson site, Jones County, Texas: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for the Railroad Commission of Texas, 87 p. + apps.

Smyth, R. C., Dutton, A. R., Nava, Robin, Mahoney, Matthew, and Elam, Jack, 1998, Site investigation and evaluation of remedial alternatives for the Wharton County site, East Bernard, Texas: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for the Railroad Commission of Texas, under interagency contract no. 96-0050, 35 p.

Smyth, R. C., Elliott, B. P., Mahoney, Matthew, Nava, Robin, and Dutton, A. R., 1998, Determination of Texas oil fields eligible for variance from area-of-review requirements in underground injection control regulations for Class II injection wells: The University of Texas at Austin, Bureau of Economic Geology, data report prepared for Oil and Gas Division, Railroad Commission of Texas, 6 p. + tables and appendices.

Smyth, R. C., Nava, Robin, Sullivan, E. J., and Mace, R. E., 1998, Methodology for determination of Texas oil fields eligible for variance from area of review requirements in underground injection control regulations for Class II injection wells: The University of Texas at Austin, Bureau of Economic Geology, final report prepared for the Railroad Commission of Texas, variously paginated.

Published Reports

Meckel, T., Hovorka, S. D., Romanak, K. D., Treviño, R. H., Smyth, R. C., and CSLF Task Force on Offshore Storage, 2015, Technical Barriers and R&D Opportunities for Offshore, Sub-seabed Geologic Storage of Carbon Dioxide: Carbon Sequestration Leadership Forum, 128 p.

Henry, C. D., McDowell, F. D., Price, J. G., and Smyth, R. C., 1986, Compilation of potassium-argon ages of Tertiary igneous rocks, Trans-Pecos, Texas: The University of Texas at Austin, Bureau of Economic Geology Geological Circular 86-2, 34 p.

Published Abstracts

Darling, B., Nicot, J.-P., Nunu, R., Smyth, R. C., Wolaver, B.D., and Sharp, J., Jr., 2021, Evaluation of a regional karstic flow system in a semiarid climate (abs.): Geological Society of America Abstracts with Programs, v. 53, no. 6, paper no. 206-8, <http://doi.org/10.1130/abs/2021AM-364948>.

Nicot, J.-P., Mickler, P., Larson, T., Darvari, R., and Smyth, R. C., 2015, Dissolved methane occurrences in aquifers in the footprint of Texas shale plays and their controls (abs.): AGU Fall Meeting, December 14-18, San Francisco, Calif., H31E-1456.

Meckel, T., Hovorka, S. D., Treviño, R. H., Smyth, R. C., and Romanak, K. D., 2014, Toward an international program for offshore storage of CO₂: international Initiative for CCS sub-sea (iCCSc) (ext. abs.): Energy Procedia, v. 63, p. 5015-5020, <http://doi.org/10.1016/j.egypro.2014.11.531>.

Nicot, J. -P., Mickler, P., Hildenbrand, Z. L., Larson, T., Darvari, R., Uhlman, K., Smyth, R. C., and Scanlon, B. R., 2014, Preliminary results of dissolved methane sampling in the footprint of Texas shale plays (abs.): Geological Society of America Abstracts with Programs, v. 46, no. 6, p. 692.

Nicot, J. -P., Mickler, P., Hildenbrand, Z., Larson, T., Darvari, R., Uhlman, K., Smyth, R. C., and Scanlon, B. R., 2014, Screening for dissolved methane in groundwater across Texas shale plays (abs.): 2014 American Geophysical Union Fall Meeting, San Francisco, California, December 15-19, 2014, no. H23C-0895.

Yang, C., Hovorka, S. D., Young, M. H., Porse, S. L., Romanak, K. D., and Smyth, R. C., 2013, Geochemical (and pressure) sensitivities to CO₂ leakage in shallow aquifers (abs.): presented at the AAPG 2013 International Conference and Exhibition, Cartagena, Colombia, September 10, 2013.

Zahid, K., Wolaver, B. D., Ambrose, W. A., and Smyth, R. C., 2013, Effect of shallow subsurface heterogeneities in CO₂ storage monitoring for EOR: Case studies from the Gulf Coast (abs.): in American Association of Petroleum Geologists Annual Convention and Exhibition, Pittsburgh, Pennsylvania, May 19-22, abstracts, CD-ROM.

Smyth, R. C., Yang, C., Romanak, K., Mickler, P., Lu, J., and Hovorka, S. D., 2012, Detecting potential impacts of deep subsurface CO₂ injection on shallow drinking water (abs.), in AGU Fall Meeting, December 3-7, San Francisco, California.

Romanak, Katherine, Smyth, R. C., Yang, Changbing, and Hovorka, S. D., 2011, Sensitivity of shallow groundwater systems to CO₂: lessons from the NETL SWP study at the SACROC oilfield (abs.), in 10th Annual Conference on Carbon Capture and Sequestration, Pittsburgh, May.

Yang, Changbing, Romanak, Katherine, Lindler, J. S., Roecker, Frank, Hovorka, S. D., Treviño,

R. H., Paine, J. G., Holt, B., Smith, L., Xia, Y., Smyth, R. C., and Rearick, Michael, 2011, Sensitivity of shallow groundwater systems to CO₂: case studies from the Cranfield and SACROC EOR fields, in Carbon and Capture Conference 6, Trondheim, Norway, June 14-16.

Yang, Changbing, Romanak, Katherine, Smyth, R. C., and Hovorka, S. D., 2011, Sensitivity of shallow groundwater systems to CO₂: case studies from the Cranfield and SACROC EOR fields (abs.), in 6th Trondheim CCS Conference (TCCS-6), Trondheim, Norway, June 14-16.

Romanak, K. D., Smyth, R. C., Yang, C., and Hovorka, S. D., 2010, Detection of anthropogenic CO₂ in dilute groundwater: field observations and geochemical modeling of the Dockum aquifer at the SACROC oilfield, West Texas, USA (abs.), in National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, May 10-13, Pittsburgh.

Romanak, Katherine, Smyth, R. C., Yang, Changbing, and Hovorka, S. D., 2010, Detection of anthropogenic CO₂ in dilute groundwater: field observations and geochemical modeling of the Dockum aquifer at the SACROC oilfield, West Texas, USA (abs.) In Ninth Annual Conference on Carbon Capture & Sequestration, Pittsburgh, May 10-13, CD-ROM.

Yang, C., Romanak, K. D., Hovorka, S. D., Linder, J., Smyth, R. C., Treviño, R. H., Paine, J. G., Holt, R. M., Smith, L. T., Xia, Y., and Lu, J., 2010, Geochemical characterization of shallow groundwater at the Cranfield aquifer and numerical simulation: can pH and carbonate parameters be used to detect potential CO₂ leakage at geological CO₂ sequestration sites? (abs.), in National Energy and Technology Laboratory (NETL) Annual Carbon Capture and Storage (CCS) Meeting, May 10-13, Pittsburgh.

Yang, Changbing, Romanak, Katherine, Hovorka, S. D., Linder, J., Smyth, R. C., Treviño, R. H., Paine, J. G., Holt, B., Smith, L., Xia, Y., and Lu, Jiemin, 2010, Geochemical characterization of shallow groundwater at the Cranfield aquifer and numerical simulation: can pH and carbonated parameters be used to detect potential CO₂ leakage at geological CO₂ sequestration sites? (abs.) In Ninth Annual Conference on Carbon Capture & Sequestration, Pittsburgh, May 10-13, CD-ROM.

Romanak, K. D., Smyth, R. C., Yang, C., and Hovorka, S. D., 2009, Modeling shallow groundwater geochemistry and carbon isotopes: test of methodology for CO₂ storage evaluation at an EOR site, West Texas, USA (abs.): Eos, v. 90, no. 22, Abstract V13C-03.

Romanak, Katherine, Smyth, R. C., Yang, Changbing, and Hovorka, S. D., 2009, Modeling shallow groundwater geochemistry and carbon isotopes: test of methodology for CO₂ storage evaluation at an EOR site, West Texas, USA (abs.): Eos, v. 90 no. 22, Abstract V13C-03.

Smyth, R. C., and Bonnaffe, Florence, 2009, Complexity of the Dockum aquifer in Scurry County, Texas (abs.): Geological Society of America, South-Central Section, Abstracts with Programs, v. 41, no. 2, p. 6.

Smyth, R. C., Romanak, Katherine, Yang, Changbing, and Hovorka, S. D., 2009, Shallow groundwater monitoring at the SACROC oilfield, Scurry County, TX: good news for geologic storage of CO₂ despite a complex hydrogeologic and geochemical setting (abs.): Eos, v. 90, no. 52, Fall Meeting Supplement, Abstract No. H13I-02.

Romanak, K. D., and Smyth, R. C., 2008, Geochemical effects of CO₂-enhanced oil recovery on the shallow Dockum aquifer, west Texas (abs.), in 7th Annual Conference on Carbon Capture & Sequestration, May 5th-8th, 2008, Pittsburgh, Pennsylvania.

Smyth, R. C., Hovorka, S. D., Romanak, K. D., Lu, J., Partin, J. W., and Wong, C., 2008, Assessing risk to fresh water resources from long term CO₂ injection--laboratory and field studies (abs.), in Ninth International Conference on Greenhouse Gas Control Technologies, November, Washington D.C.

Smyth, R. C., Hovorka, S. D., Romanak, K. D., Partin, J. W., Meckel, Timothy, Wong, Corinne, Nicot, J. -P., and Holt, R. M., 2008, Assessing risk to fresh water resources from long term CO₂ injection--laboratory and field studies (abs.), in 9th International Conference on Greenhouse Gas

Technologies, November 16-20, Washington, D.C.

Gibeaut, J. C., Tremblay, T. A., Waldinger, Rachel, Collins, E. W., Smyth, R. C., White, W. A., Hepner, T. L., Andrews, J. R., and Gutiérrez, Roberto, 2007, Developing a barrier island geohazards map: Galveston Island, Texas (abs.), in Coastal Zone 07 final program, Portland, Oregon, July 22-26, CD-ROM.

Smyth, R. C., Hovorka, S. D., and Meckel, T. A., 2007, Potential saline reservoir sinks for storage of CO₂ generated in North and South Carolina (abs.), in Sixth Annual Conference on Carbon Capture & Sequestration: Expediting deployment of industrial scale systems: Can it be done? How? Concerns to be addressed, May 7-10, Pittsburgh, Abstract #138.

Holtz, M. H., Nuñez, Vanessa, and Smyth, R. C., 2006, CO₂ carbonate reef sequestration, SACROC/Claytonville Southwest Partnership Phase 2 Project (abs.), in Fifth Annual Conference on Carbon Capture & Sequestration: Taking steps toward deployment utilizing the accumulated knowledge base, May 8-11, Alexandria, Virginia, unpaginated.

Holtz, M. H., Smyth, R. C., McPherson, Brian, and Han, Weonshik, 2006, Subsurface characterization of CO₂ sequestration sites--example from a carbonate reef setting (ext. abs.), in Proceedings, CO₂SC Symposium, Lawrence Berkeley National Laboratory, Berkeley, California, March 20-22, p. 127-129 + CD-ROM.

Hovorka, S. D., Smyth, R. C., and Paine, J. G., 2006, Downscaling capacity from a regional to a site scale--a case for the southeastern U.S. (abs.), in Fifth Annual Conference on Carbon Capture & Sequestration: Taking steps toward deployment utilizing the accumulated knowledge base, May 8-11, Alexandria, Virginia, unpaginated.

Scanlon, B. R., Nicot, J. -P., Reedy, R. C., Tachovsky, J. A., Nance, H. S., and Smyth, R. C., 2006, Evaluation of arsenic contamination in the Southern High Plains (abs.): Austin Geological Society Bulletin, v. 2, p. 13-14.

Smyth, R. C., and Hovorka, S. D., 2006, Potential of subseafloor Atlantic units for geologic sequestration of carbon dioxide (abs.): Geological Society of America Abstracts with Programs, v. 38, no. 7, p. 15.

Smyth, R. C., Holtz, M. H., and Guillot, S. N., 2006, Assessing impacts to groundwater from CO₂-flooding of SACROC and Claytonville oil fields in West Texas (abs.) in Proceedings of the 2006 UIC Conference of the Groundwater Protection Council, Abstract 15.

Paine, J. G., White, W. A., Smyth, R. C., Andrews, J. R., and Gibeaut, J. C., 2005, Mapping coastal wetlands using EM and airborne lidar: a Texas example (abs.): EOS Transactions of the American Geophysical Union, v. 86, no. 52, Fall Meeting Supplement, Abstract Number H43F-0552 INVITED.

Smyth, R. C., Gutiérrez, Roberto, and Neuenschwander, Amy, 2005, Use of lidar to improve estimates of hydrologic modeling parameters (abs.), in The abstract book of the 2005 Ground Water Summit Program, April 17-20, San Antonio, p. 299-300.

Gibeaut, J. C., White, W. A., Gutiérrez, Roberto, Waldinger, Rachel, Andrews, J. R., Hepner, T. L., Smyth, R. C., and Tremblay, T. A., 2004, The Texas Shoreline Change Project: combining lidar, historical photography, and ground surveys to measure shoreline change rates along bay and gulf shorelines (abs.), in 5th Biennial Texas Coastal Issues Conference bios and abstracts: Texas General Land Office, Coastal Resources Program, CD-ROM.

Gibeaut, J. C., White, W. A., Smyth, R. C., Andrews, J. R., and Tremblay, T. A., 2004, Modeling change in barrier island habitats during rising relative sea level: Texas coast (abs.), in ASBPA Conference and Annual Meeting, New Orleans, September 13-15, CD-ROM.

Gibeaut, J. C., White, W. A., Smyth, R. C., Andrews, J. R., Tremblay, T. A., and Hepner, T. L., 2004, Topographic variation of barrier island wetlands: implications for modeling change during rising relative sea level (abs.), in 5th Biennial Texas Coastal Issues Conference bios and

abstracts: Texas General Land Office, Coastal Resources Program, CD-ROM.

Gibeaut, J. C., White, W. A., Gutiérrez, Roberto, Waldinger, Rachel, Andrews, J. R., Hepner, T. L., Smyth, R. C., and Tremblay, T. A., 2003, The Texas Shoreline Change Project: combining lidar, historical photography, and ground surveys to measure shoreline change rates along bay and Gulf of Mexico shorelines (abs.), in Proceedings, 3rd Biennial Coastal GeoTools Conference, Charleston, South Carolina: NOAA Coastal Services Center, CD-ROM.

Smyth, R. C., Ellins, K. K., Bonal, Nedra, Hepner, Tiffany, Morris, Matthew, Christensen, Gail, Gulick, Sean, Dinan, Mae, Fennel, Timothy, and Thomas, Darwin, 2003, Cataclysms and catastrophes: engaging students to address real-world situations using scientific data analysis (abs.): Geological Society of America Abstracts with Programs, v. 35, no. 6, p. 123.

Gibeaut, J. C., Gutiérrez, Roberto, Hepner, Tiffany, Smyth, R. C., and Andrews, J. R., 2002, Shoreline change analysis using airborne lidar (abs.), in Proceedings, Shoreline Change Conference: Charleston, South Carolina, NOAA Coastal Services Center, May 7-9, unpaginated.

Gibeaut, J. C., White, W. A., Gutiérrez, Roberto, Waldinger, R. L., Andrews, J. R., Hepner, Tiffany, Smyth, R. C., and Tremblay, T. A., 2002, Measuring shoreline change along bays and oceans using historical aerial photography and airborne topographic LIDAR surveys (abs.): Gulf Coast Association of Geological Societies Transactions, v. 52, p. 336.

Smyth, R. C., Dutton, A. R., and Gutiérrez, Roberto, 2002, Forensic hydrology applied to a half-century-old crude-oil seep, Colorado River, Wharton County, Texas (abs.): Gulf Coast Association of Geological Societies Transactions, v. 52, p. 103-104.

Gibeaut, J. C., Gutiérrez, Roberto, Hepner, Tiffany, Andrews, J. R., and Smyth, R. C., 2001, Shoreline mapping with airborne LIDAR (abs.), in Proceedings, 2nd Biennial Coastal GeoTools '01 Conference, Charleston, South Carolina, January 8-11, unpaginated.

Gibeaut, J. C., Crawford, Melba, Gutiérrez, Roberto, Neuenschwander, A. L., Slatton, K. C., and Smyth, R. C., 1999, Mapping topography and bathymetry of barrier islands using airborne, terrestrial, and marine systems (abs.), in AAPG Annual Convention official program: American Association of Petroleum Geologists, p. A46.

Smyth, R. C., 1999, Mn-oxide concentration as evidence of a pathway for infiltration of crude oil into a shallow aquifer, West Texas (abs.), in AAPG Annual Convention official program: American Association of Petroleum Geologists, p. A132.

Warne, A. G., Guevara, E. H., Gibeaut, J. C., White, W. A., Smyth, R. C., Aslan, Andres, and Raney, J. A., 1999, The Orinoco River and delta, Venezuela: a comparison with other major fluvio-deltaic systems (abs.), in Proceedings, IAG Yangtze Fluvial Conference, Shanghai, China, October 28-November 6: International Association of Geomorphologists, p. 29.

Smyth, R. C., Sharp, J. M., Jr., and Auer, L. A., 1995, Matrix hydrogeological properties and their relationship to fracture spacings of columnar cooling joints in the Santana Tuff, Trans-Pecos Texas (abs.): Geological Society of America Abstracts with Programs, v. 27, no. 26, p. A-424.

Smyth, R. C., Sharp, J. M., Jr., and Auer, L. A., 1994, Matrix hydrogeological properties of a variably welded ash-flow tuff, Trans-Pecos Texas (abs.): AGU Fall Meeting, EOS, v. 75, no. 44, p. 257.

Smyth, R. C., and Henry, C. D., 1987, Thermal stratification in the compositionally homogeneous Mitchell Mesa rhyolite, Trans Pecos Texas (abs.): Geological Society of America, Abstracts with Programs, v. 19, no. 3, p. 178.