

Kitty L. Milliken

Professional Summary

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Professional Preparation

Academic Background

Ph.D. Geology, The University of Texas at Austin, 1985

M.A. Geology, The University of Texas at Austin, 1977

B.A. Geology, Vanderbilt University, 1975

Professional Appointments

Present Position: Senior Research Scientist, Bureau of Economic Geology (May 2008 - Present). ExxonMobil/BEG Unconventional Resources Project and Mudrock Systems Research Laboratory.

Senior Research Scientist, Jackson School of Geosciences, The University of Texas at Austin (2004 - May 2008). Microbeam and XRD facilities.

Research Scientist, Department of Geological Sciences, The University of Texas at Austin (1999 - 2004). Microbeam and XRD facilities.

Research Associate, Department of Geological Sciences, The University of Texas at Austin (1997 - 1999). Microbeam and XRD facilities.

Visiting Researcher, Institut Français du Pétrole (1996 - 1997).

Research Scientist Associate, Department of Geological Sciences (1987 - 1997).

Lecturer, Department of Geological Sciences (1991 - 1995). Also 1998-present.

Research Geologist, Exxon Production Research Company (1985 - 1986).

Research Associate, Bureau of Economic Geology, The University of Texas at Austin (1979 - 1980).

Teaching Assistant, Department of Geological Sciences, The University of Texas at Austin (1975 - 1979). Also in 1981.

Research Assistant, Geology Department, Vanderbilt University (1971 - 1975).

Areas of Expertise

Areas of Expertise

Combining petrographic and geochemical methods to decipher histories of chemical and mechanical modification in sedimentary rocks. I have experience with sandstone, limestone, mudrock, dolomite, chert, and serpentinite.

Geochemical methods: electron microprobe analysis; stable isotopes

Petrographic methods: conventional transmitted and reflected light microscopy; statistical

analysis of detrital and authigenic components; electron microbeam imaging techniques (secondary and back-scattered electron imaging; EDS X-ray mapping; cathodoluminescence imaging; charge-contrast imaging)

Awards

Awards and Honorary Societies

Doris Malkin Curtis Medal of the Gulf Coast Section of SEPM, 2023

Sidney Powers Memorial Award, American Association of Petroleum Geologists, 2023

Honorary Membership in the Society for Sedimentary Geology (SEPM), 2021

AAPG Distinguished Lecturer, 2016-2017

Pratt Award for Best Paper (2013) in AAPG Bulletin, 2015

Robert Berg Outstanding Research Award, AAPG, 2015

Bronze Award for "Teaching with Technology," IITAP Program, The University of Texas at Austin, 2008

Fellow, Geological Society of America, 2008

AAPG J. Ben Carsey Distinguished Lecturer, 2005 - 2006

Bronze Award for "Teaching with Technology," IITAP Program, The University of Texas at Austin, 2003

SEPM Excellence in Poster Presentation Award (with co-authors), 2001

Industry-Supported Fellowship, The University of Texas at Austin, 1982 - 1983

Petrography Award, The University of Texas at Austin, 1982

Second Place, GSA South-Central Section Annual Meeting, Best Presentation, 1977

Scholarships, Vanerbilt University, 1971 - 1975

Fellowship, National Association of Geology Teachers, 1974

Service

External Committees Participation

Co-Chair, Distinguished Lecture Committee, AAPG, June 1, 2017-May 31, 2020

Co-Chair, Gussow Conference Diagenesis Session, Canadian Society of Petroleum Geology, Banff, Canada, October 15-17, 2019

Member, Distinguished Lecture Committee, American Association of Petroleum Geologists, 2009 - 2011

Co-Chair, Siliciclastic Diagenesis--New Insights, 2009 Annual American Association of Petroleum Geologists Convention, Denver, Colorado June, 2009

Member, Readiness Assessment Team for the JOIDES Resolution, IODP Expedition 320T February, 2009

Shipboard Sedimentologist, Expedition 316, NanTroSEIZE, Shallow Megasplay and Frontal Thrusts, ODP/IODP, 2007 - 2008

Co-Editor, Journal of Sedimentary Research, SEPM (Society for Sedimentary Geology), 2004 - 2008

Co-Convenor, Folk Symposium on Petrographic Methods, Salt Lake City, Geological Society of America, 2005

At-Large Member, Education Committee, Geological Society of America, 2002 - 2005

Chair, Clastic Diagenesis Research Group, SEPM (Society for Sedimentary Geology), 1991 - 2003

Member, Committee for Core and Sample Preservation, American Association of Petroleum Geologists, 2000 - 2002

Associate Editor, Journal of Sedimentary Research, SEPM (Society for Sedimentary Geology), 1993 - 2000

Session Co-Chair, Sandstone Diagenesis and Reservoir Characteristics, American Association of Petroleum Geologists Annual Convention, Salt Lake City, 1998

Member, Publications Committee, American Association of Petroleum Geologists, 1990 - 1995

Shipboard Sedimentologist, Leg 149, Iberia Abyssal Plain, ODP/IODP, 1993

Published Interviews

Milliken, K., 2020, Nash, S., 2020, Interview with Kitty Milliken, BEG--science and technology showcase: AAPG Learn! Blog, <https://www.aapg.org/publications/blogs/learn/article/articleid/57233/interview-with-kitty-milliken-beg-science-and-technology-showcase>.

Outreach Activities

Instructor, GeoFORCE Young Geoscientists Program: West Texas and New Mexico, June 1-7, 2014.

Teaching and Advising

University Courses Taught

Siliciclastic Petrology: presented to Jackson School of Geosciences, August to December from 2002 to present.

Continuing Education Courses Taught

Mudrock Petrology and Pore-Scale Imaging: presented to Society for Sedimentary Geology, presented at AAPG/SEPM Annual Meeting, Denver, Colorado, June 4, 2015.

Siliciclastic petrology for reservoir quality assessment: presented to Repsol S.A., Madrid, Spain, December 10-12, 2014.

Petrography in the 21st century: modern tools for elucidating reservoir quality in sandstone reservoirs: presented to AAPG, presented at Continuing Education Program, Houston, Texas, November 10, 2014.

Basic mudrock petrology for reservoir quality assessment: presented at Conoco-Phillips, Houston, Texas, April 14-15, 2012.

Basic Mudrock Petrology: presented (with Rob Reed) at MSRL meeting, Austin, Texas, June 2010.

Basic Mudrock Petrology: presented (with Rob Reed) at MSRL meeting, Austin, Texas, January 2010.

Student Committee Supervision

Supervisor, MS thesis committee, Maxwell Pommer, Quantitative Assessment of Pore Types and Pore Size Distribution Across Thermal Maturity, Eagle Ford Formation, South Texas, The University of Texas at Austin, Austin, Texas, 2014

Supervisor, MS thesis committee, Suzan Ergene, Lithologic Heterogeneity of the Eagle Ford Formation, The University of Texas at Austin, Austin, Texas, 2014

Co-Supervisor, M.S. Thesis Committee, David Hull, Stratigraphic architecture, depositional systems, and reservoir characteristics of the Pearsall shale-gas system, Lower Cretaceous, South Texas: The University of Texas at Austin, completed, 2011

Co-Supervisor, Ph.D. Dissertation Committee, Aysen Ozkan, The University of Texas at Austin, 2009

Supervisor, B.S. with Honors Thesis Committee, Emily Comer, The University of Texas at Austin, Graduated spring, 2009

Supervisor, M.A., Thesis, Glen Mackey, The University of Texas at Austin, 2009

Student Committee Participation

Member, M.S. Thesis Committee, Benjamin Siks, Sedimentary, structural, and provenance record of the Ciano Basin, Puna Plateau-Eastern Cordilleran boundary, NW Argentina: The University of Texas at Austin, completed, 2012

Presentations

Invited Presentations

Mudrocks (shales, mudstones) at the scale of grains and pores: Current Understanding: presented to Department of Earth and Atmospheric Sciences, presented at University of Melbourne, Melbourne, Australia, October 5, 2023.

Mudrocks (Shales, Mudstones) at the Scale of Grains and Pores: Current Understanding: presented to School of Earth Sciences, Western Australia University, Perth, Australia, August 25, 2022.

Mudrocks (Shales, Mudstones) at the Scale of Grains and Pores: Current Understanding: presented to Curtin University/CSIRO; Geophysics research group, Perth, Australia, August 17, 2022.

Mudrock heterogeneity, rock properties, and reservoir quality---a survey of 18 shale units: presented to CSIRO Energy Group, Perth, Australia, March 24, 2022.

Quartz Cement in Mudrocks: Detection, Significance, and Distribution: presented to Curtin University, presented at departmental seminar, Perth, Australia (online), November 11, 2020.

Why Do We Care About Mudrocks? And, If We Do, How Can We Proceed to Study Them?: presented to graduate petrology course, Department of Geological Sciences, California State University, Northridge, online presentation, October 5, 2020.

Quantifying Mechanisms of Porosity Decline in Mudrocks: presented to Hildebrand Department of Petroleum and Geosystems Engineering, presented at The University of Texas at Austin, Austin, Texas, November 11, 2019.

How Depositional Environment, Diagenesis, and Thermal Maturity Affect the Evolution and Significance of Organic and Mineral Pore Systems in Unconventional Oil and Gas Reservoirs: Current Understanding and Future Research: presented at AAPG Hedberg Conference, Houston, Texas, March 4-May 6, 2019.

Cathodoluminescence for Understanding Cementation in Mudrocks: presented to Australian Microbeam Analysis Society, presented at 15th Biennial Symposium, Melbourne, Australia, February 13, 2019.

CL for Characterization of Components in Oil and Gas Shales: presented to Australian Microbeam Analysis Society, presented at Workshop on Cathodoluminescence Spectroscopy, Melbourne, Australia, February 12, 2019.

Mudrocks (Shales, Mudstones) at the Scale of Grains and Pores: Current Understanding: presented to Petroleum Exploration Society of Australia (PESA) monthly luncheon, Melbourne, Australia, October 17, 2018.

Keynote Speaker: Quantifying Mechanisms of Porosity Decline in Mudrocks: presented to International Sedimentological Congress, 20th meeting, Quebec City, Canada, August 13-17, 2018.

Cathodoluminescence Imaging for Understanding Mechanisms of Rock Property Evolution in Mudrocks: presented to Dallas Geological Society monthly luncheon, Dallas, Texas, March 20, 2018.

Quartz Cementation in Mudrocks: How Common Is It?: presented to Houston Geological Society Mudrocks Conference, Houston, Texas, March 6, 2018.

Mudrocks (shales, mudstones) at the scale of grains and pores: current understanding: presented to SIPES (Austin), presented at monthly luncheon meeting, Austin, Texas, November 2, 2017.

Mudrocks and the scale of grains and pores: presented to South Texas Geological Society, San Antonio, Texas, April 12, 2017.

AAPG Distinguished Lecture Tour: Mudrocks (shales, mudstones) at the scale of grains and pores: current understanding: presented to SUNY Binghamton, Virginia Tech, University of West Virginia, University of Nebraska, Pittsburgh Association of Petroleum Geologists, St. Mary's University (Halifax, Nova Scotia): March 19-31, 2017.

Diagenesis of mudrocks (day of lecture and laboratory exercises): presented to Colorado School of Mines, Golden, Colorado, March 7-10, 2017.

AAPG Distinguished Lecture Tour: Mudrocks (Shales, Mudstones) at the Scale of Grains and Pores: Current Understanding: presented to UT-El Paso, Panhandle Geological Society, Texas A&M University, Montana Geological Society, Tulsa Geological Society, Idaho State University, University of Saskatchewan, November 7-19, 2016.

Half-day short course on Micro- to Nano-scale Features of Mudrocks: presented to University of Saskatchewan, Saskatoon, Canada, November 18, 2016.

Cathodoluminescence imaging for linking cementation and compaction in mudrocks: presented to industry participants, presented at FEI Digital Rock Workshop, Houston, Texas, May 19, 2016.

Cementation and compaction in mudrocks: current understanding: presented to Aramco Services, presented at internal seminar, Houston, Texas, May 17, 2016.

Organic Matter under the SEM: presented to DPMS Shortcourse: Maturation of Carbonaceous Matter: Methods and Applications, presented at Section of Earth and Environmental Sciences, University of Geneva, Geneva, Switzerland, April 18-20, 2016.

Cathodoluminescence for Understanding Cementation in Mudrocks: presented to Department of Geology and Geological Engineering, presented at Colorado School of Mines, Golden, Colorado, March 8-11, 2016.

Shale Types and Shale Porosity: presented to Southern Gas Association, presented at BEG/SGA joint meeting, Austin, Texas, December 2, 2015.

Getting Kids Excited about Geoscience: presented to monthly learning session for volunteers, presented at Austin Nature Center, Austin, Texas, November 19, 2015.

Compositional Classification for Fine-Grained Sediments and Sedimentary Rocks: Foundation of Porosity Prediction: presented to AAPG Geoscience Technology Conference, Austin, Texas, November 3, 2015.

Pores in Fine-grained Sediments and Sedimentary Rocks: presented to AAPG Geoscience Technology Workshop, presented at Unconventionals Update, Austin, Texas, November 3, 2015.

Cements precipitate in shales, but when, where, and why?: presented to Sandia National Laboratory, presented at Shales at All Scales Conference, Santa Fe, New Mexico, June 8-11, 2015.

Proposed classification of fine-grained sedimentary rocks: presented to Tulsa Geological Society, presented at monthly luncheon, Tulsa, Oklahoma, May 12, 2015.

Lead-off discussion on the nature of porosity and its measurement: presented to Society of Petroleum Engineers, presented at SPE Forum on Physics and Chemistry in Nanoscale Rocks, La Jolla, California, April 22-26, 2015.

Proposed classification of fine-grained sedimentary rocks: presented to the local petroleum geology community and organized by FEI Company, presented at a workshop, Digital Rock Technology and Pore-Scale Imaging, Modeling, and Analysis, Denver, Colorado, April 1, 2015.

Proposed classification of fine-grained sedimentary rocks: presented to Rocky Mountain Section, Society for Sedimentary Geology (SEPM), presented at monthly luncheon, Denver, Colorado, March 31, 2015.

Seeing reservoir quality at the appropriate scale: a look at tools for high-resolution imaging and our evolving understanding of pore-scale processes in fine-grained systems: presented to American Geosciences Institute, presented at AGI Critical Issues Forum: America's Increasing Reliance on Natural Gas: Benefits and Risks of the Methane Economy, Fort Worth, Texas, November 19-20, 2014.

Mudrock (shale) heterogeneity: insights from high-resolution SEM imaging: presented to State Key Laboratory, presented at 2014 International Symposium on Unconventional Petroleum Exploration and Exploitation, Chengdu, China, July 25-26, 2014.

Presentations

New Technology to Unlock the Secrets of Core: presented at Houston Research Center 10th Anniversary Celebration, Houston, Texas, May 2013.

Mudrock Heterogeneity: Insights from High-resolution SEM Imaging: presented at Special Plenary Session on Unconventionals; PGCE 2013, Kuala Lumpur, Malaysia, March 2013.

Petrologic Characterization of Oil and Gas Shales: sponsored by Geological Society of Malaysia and organized by EAGE, Kuala Lumpur, Malaysia, March 2013.

Organic-Rich Rocks: workshop presented at 49th Annual Meeting of the Clay Minerals Society, Golden, Colorado, July 7-8, 2012.

Seminar talk: presented at Baylor University, Waco, Texas, October 21, 2011.

Unconventional Reservoirs: Integrated Workflows (keynote speech): presented at Reservoir Quality Mini-Conference, ConocoPhillips, Houston, Texas, April 2011.

Rock-property evolution in the most abundant sedimentary rocks: presented at Unconventional Workshop sponsored by UT AAPG Student Chapter, Houston, Texas, April 10-13, 2011.

Keynote speech: presented at 2nd ExxonMobil Microscopy Symposium, Houston, Texas, October 2010.

Microscale imaging and controls on mudrock composition: toward an understanding of mudrock compaction and classification: presented at MSRL meeting, Austin, Texas, January 2010.

Mudrock deformation in early burial: Nankai accretionary prism: presented (with Rob Reed) at MSRL meeting, Austin, Texas, January 2010.

Particle sources and mudrock properties: contrasting examples from Cenozoic mudrocks of the Gulf of Mexico and Paleozoic siliceous mudrocks of the North American Mid-Continent: presented at Lunch and Learn Program, EnCana, Denver, Colorado, March 2009.

Heterogeneity in mudrocks: presented at the Department of Geological Sciences, The University of Texas at Arlington, Arlington, Texas, January 22, 2009.

Heterogeneity in mudrocks: presented at Society of Petrophysicists and Well Log Analysts Spring Topical Conference: Gas Shale Evaluation and Completions, Houston, Texas, 2009.

Activities of a Professional Nature

Professional Societies

American Association of Petroleum Geologists

Geological Society of America

SEPM (Society for Sedimentary Geology)

Activities of a Professional Nature

President, SEPM (June 2014-June 2015)

Life on a Ship with a Big Hole in the Middle of It: presented at BEG summer seminar series, June 12, 2009

Rock and mineral ID at Identification Day, Texas Memorial Museum, August 30, 2009

Rock and mineral ID at Identification Day, Texas Memorial Museum, January 25, 2009

Publications

Peer Reviewed Authored Books

Marsaglia, K. M., and Milliken, K. L., 2023, Practical guide for description and analysis of sedimentary cores: practices developed aboard the JOIDES Resolution during ODP and IODP: College Station, Tex., International Ocean Discovery Program, Technical Note, v. 5, 83 p., <http://doi.org/10.14379/iodp.tn.5.2023>.

Peer Reviewed Journal Articles

Perrotta, S., Barone, M., Marsaglia, K. M., Milliken, K. L., Perrone, V., and Critelli, S., 2024, Detrital signatures of clastic serpentinite in tectonically diverse settings and interpretation of an example from the Northern Apennines: *Journal of Sedimentary Research*, v. 94, no. 2, p. 207-230, <http://doi.org/10.2110/jsr.2022.093>.

Eakin, A. L., Reece, J. S., Milliken, K. L., Locklair, R., and Rathbun, A. P., 2023, Classification of elemental chemofacies as indicators of cement diagenesis in mudrocks of the Permian Spraberry Formation and Wolfcamp formation, western Texas: *AAPG Bulletin*, v. 107, no. 6, p. 863-886, <http://doi.org/https://doi.org/10.1306/10242221142>.

Bihani, A., Daigle, H., Santos, J. E., Landry, C., Prodanovic, M., and Milliken, K., 2022, MudrockNet: semantic segmentation of mudrock SEM images through deep learning: *Computers & Geosciences*, v. 158, no. 104952, 10 p., <http://doi.org/10.1016/j.cageo.2021.104952>.

Han, S., L?hr, S. C., Abbott, A. N., Baldermann, A., Farkas, J., McMahon, W., Milliken, K. L., Rafiei, M., Wheeler, C., and Owen, M., 2022, Earth system science applications of next-generation SEM-EDS automated mineral mapping: *Frontiers in Earth Science*, v. 10, no. 956912, 22 p., <http://doi.org/10.3389/feart.2022.956912>.

Lahiri, S., Milliken, K., Vrolijk, P., Desbois, G., and Urai, J. L., 2022, Mechanical compaction mechanisms in the input sediments of the Sumatra subduction complex - insights from microstructural analysis of cores from IODP Expedition 362: *Solid Earth*, v. 13, p. 1513-1539, <http://doi.org/10.5194/se-13-1513-2022>.

Shao, D., Zhang, T., Li, Y., Milliken, K. L., Zhang, Y., and Song, H., 2022, Effects of confining pressure and microscale heterogeneity on hydrocarbon retention and pore evolution from

artificial maturation of Eagle Ford Shale: *International Journal of Coal Geology*, v. 260, no. 104057, 18 p., <http://doi.org/10.1016/j.coal.2022.104057>.

Torres, M. E., Milliken, K. L., Hüpers, A., Kim, J.-H., and Lee, S.-G., 2022, Authigenic clays versus carbonate formation as products of marine silicate weathering in the input sequence to the Sumatra subduction zone: *Geochemistry, Geophysics, Geosystems*, v. 23, no. 4, article no. e2022GC010338, 17 p., <http://doi.org/10.1029/2022GC010338>.

Davletshin, A., Ko, L. T., Milliken, K., Periwai, P., Wang, C.-C., and Song, W., 2021, Detection of framboidal pyrite size distributions using convolutional neural networks: *Marine and Petroleum Geology*, v. 132, no. 105159, 11 p., <http://doi.org/10.1016/j.marpetgeo.2021.105159>.

Milliken, K. L., Zhang, T., Chen, J., and Ni, Y., 2021, Mineral diagenetic control of expulsion efficiency in organic-rich mudrocks, Bakken Formation (Devonian-Mississippian), Williston Basin, North Dakota, U.S.A.: *Marine and Petroleum Geology*, v. 127, no. 104869, 24 p., <http://doi.org/10.1016/j.marpetgeo.2020.104869>.

Ramirez, S. G., Hayman, N. W., Gulick, S. P. S., Milliken, K. L., Stockli, D. F., and Masago, H., 2021, Sediment provenance, routing and tectonic linkages in the Nankai forearc region, Japan: *Basin Research*, v. 33, no. 6, p. 3231-3255, <http://doi.org/10.1111/bre.12601>.

McNeill, L., Dugan, B., Petronotis, K., Milliken, K., Francis, J., and Expedition 362 scientists, 2020, Late Miocene wood recovered in Bengal-Nicobar submarine fan sediments by IODP Expedition 362: *Scientific Drilling*, v. 27, p. 49-52, <http://doi.org/10.5194/sd-27-49-2020>.

Peng, J., Milliken, K. L., and Fu, Q., 2020, Quartz types in the Upper Pennsylvanian organic-rich Cline Shale (Wolfcamp D), Midland Basin, Texas: Implications for silica diagenesis, porosity evolution and rock mechanical properties: *Sedimentology*, v. 67, no. 4, p. 2040-2064, <http://doi.org/10.1111/sed.12694>.

Peng, J., Milliken, K., Fu, Q., Janson, X., and Hamlin, H. S., 2020, Grain assemblages and diagenesis in organic-rich mudrocks, Upper Pennsylvanian Cline shale (Wolfcamp D), Midland Basin, Texas: *AAPG Bulletin*, v. 104, no. 7, p. 1593-1624, <http://doi.org/10.1306/03022018240>.

Pickering, K. T., Carter, A., Andò, A., Garzanti, E., Limonta, M., Vezzoli, G., and Milliken, K. L., 2020, Deciphering relationships between the Nicobar and Bengal submarine fans, Indian Ocean: *Earth and Planetary Science Letters*, v. 544, no. 116329, 14 p., <http://doi.org/10.1016/j.epsl.2020.116329>.

Pickering, K. T., Pouderoux, H., McNeill, L. C., Backman, J., Chemale, F., Kutterolf, S., Milliken, K. L., Mukoyoshi, H., Henstock, T. J., Stevens, D. E., Parnell, C., and Dugan, B., 2020, Sedimentology, stratigraphy and architecture of the Nicobar Fan (Bengal-Nicobar Fan System), Indian Ocean: results from International Ocean Discovery Program Expedition 362: *Sedimentology*, v. 67, no. 5, p. 2248-2281, <http://doi.org/10.1111/sed.12701>.

Tang, D. G., Milliken, K. L., and Spikes, K. T., 2020, Machine learning for point counting and segmentation of arenite in thin section: *Marine and Petroleum Geology*, v. 120, no. 104518, 17 p., <http://doi.org/10.1016/j.marpetgeo.2020.104518>.

Torres, M. E., Hong, W.-L., Solomon, E. A., Milliken, K., Kim, J.-H., Sample, J. C., Teichert, B. M. A., and Wallmann, K., 2020, Silicate weathering in anoxic marine sediment as a requirement for authigenic carbon burial: *Earth-Science Reviews*, v. 200, no. 102960, 15 p., <http://doi.org/10.1016/j.earscirev.2019.102960>.

Mehmani, A., Milliken, K., and Prodanovic, M., 2019, Predicting flow properties in diagenetically-altered media with multi-scale process-based modeling: A Wilcox Formation case study: *Marine and Petroleum Geology*, v. 100, p. 179-194, <http://doi.org/10.1016/j.marpetgeo.2018.09.001>.

Milliken, K. L., Reed, R. M., McCarty, D. K., Bishop, J., Lipinski, C. J., Fischer, T. B., Crousse, L., and Reijenstein, H., 2019, Grain assemblages and diagenesis in the Vaca Muerta Formation

(Jurassic-Cretaceous), Neuquén Basin, Argentina: *Sedimentary Geology*, v. 380, p. 45-64, <http://doi.org/10.1016/j.sedgeo.2018.11.007>.

Milliken, K., McCarty, D. K., and Derkowski, A., 2018, Grain assemblages and diagenesis in the tarl-dominated Lower Silurian mudrock succession of the western margin of the east European craton in Poland and Lithuania: *Sedimentary Geology*, v. 374, p. 115-133, <http://doi.org/10.1016/j.sedgeo.2018.07.011>.

Daigle, H., Hayman, N. W., Kelly, E. D., Milliken, K., and Jiang, H., 2017, Fracture capture of organic pores in shales: *Geophysical Research Letters*, v. 44, p. 2167-2176, <http://doi.org/10.1002/2016GL072165>.

Huepers, A., Torres, M. E., Owari, S., McNeill, L. C., Dugan, B., Henstock, T. J., Milliken, K. L., and 26 additional co-authors, 2017, Release of mineral-bound water prior to subduction tied to shallow seismogenic slip off Sumatra: *Science*, v. 356, p. 841-844, <http://doi.org/10.1126/science.aal3429>.

Ilgen, A. G., Heath, J. E., Akkutlu, I. Y., Bryndzia, T. L., Cole, D. R., Kharaka, Y. K., Kneafsey, T. J., Milliken, K., Pyrak-Nolte, L. J., and Suarez-Rivera, R., 2017, Shales at all scales: exploring coupled processes in mudrocks: *Earth-Science Reviews*, v. 166, p. 132-152, <http://doi.org/10.1016/j.earscirev.2016.12.013>.

Ko, L., Loucks, R. G., Milliken, K., Liang, Q., Zhang, T., Sun, X., Hackley, P. C., Ruppel, S. C., and Peng, S., 2017, Controls on pore types and pore-size distribution in the Upper Triassic Yanchang Formation, Ordos Basin, China: implications for pore-evolution models of lacustrine mudrocks: *Interpretation*, v. 5, no. 2, p. SF127-SF148, <http://doi.org/10.1190/INT-2016-0115.1>.

McNeill, L. C., Dugan, B., Backman, J., Pickering, K. T., Pouderoux, H. F. A., Henstock, T. J., Petronotis, K., Carter, A., Chemale, F., Milliken, K., and 25 additional co-authors, 2017, Understanding Himalayan erosion and the significance of the Nicobar Fan: *Earth and Planetary Science Letters*, v. 475, p. 134-142, <http://doi.org/10.1016/j.epsl.2017.07.019>.

Milliken, K., and Olson, T., 2017, Silica diagenesis, porosity evolution, and mechanical behavior in siliceous mudstones, Mowry Shale (Cretaceous), Rocky Mountains, U.S.A.: *Journal of Sedimentary Research*, v. 87, p. 366-387, <http://doi.org/10.2110/jsr.2017.24>.

Milliken, K., Shen, Y., Ko, L. T., and Liang, Q., 2017, Grain composition and diagenesis of organic-rich lacustrine tarls, Triassic Yanchang Formation, Ordos Basin, China: *Interpretation*, v. 5, no. 2, p. SF189-SF210, <http://doi.org/10.1190/INT-2016-0092.1>.

Rowe, H. D., Wang, X., Fa, B., Zhang, T., Ruppel, S. C., Milliken, K., Loucks, R. G., Shen, Y., Zhang, J., Liang, Q., and Sivil, J. E., 2017, Chemostratigraphic insights into fluvio-lacustrine deposition, Yanchang Formation, Upper Triassic, Ordos Basin, China: *Interpretation*, v. 5, no. 2, p. SF149-SF165, <http://doi.org/10.1190/INT-2016-0121.1>.

Zhang, T., Sun, X., Milliken, K., Ruppel, S. C., and Enriquez, D., 2017, Empirical relationship between gas composition and thermal maturity in Eagle Ford Shale, south Texas: *AAPG Bulletin*, v. 101, no. 8, p. 1277-1307, <http://doi.org/10.1306/09221615209>.

Zhang, T., Wang, X., Zeng, H., Fishman, N., Katz, B. J., Milliken, K., Wei, M., Loucks, R. G., and Ghanizadeh, A., 2017, Introduction to special section: Lacustrine shale characterization and shale resource potential in Ordos Basin, China: *Interpretation*, v. 5, no. 2, p. SF1-SF11, <http://doi.org/10.1190/INT-2017-0314-SPSEINTRO.1>.

Zhang, T., Wang, X., Zhang, J., Sun, X., Milliken, K., Ruppel, S. C., and Enriquez, D., 2017, Geochemical evidence for oil and gas expulsion in Triassic lacustrine organic-rich mudstone, Ordos Basin, China: *Interpretation*, v. 5, no. 2, p. SF41-SF61, <http://doi.org/10.1190/INT-2016-0104.1>.

Milliken, K., 2016, A compositional classification for grain assemblages in fine-grained sediments and sedimentary rocks--reply: *Journal of Sedimentary Research*, v. 86, p. 6-10,

<http://doi.org/10.2110/jsr.2016.2>.

Milliken, K., and Curtis, M. E., 2016, Imaging pores in sedimentary rocks: foundation of porosity prediction: *Marine and Petroleum Geology*, v. 73, p. 590-608, <http://doi.org/10.1016/j.marpetgeo.2016.03.020>.

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