Memorial to Jay Quade
1955–2025

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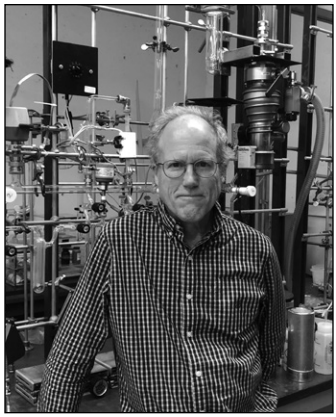
Jay Quade, 69, of Tucson, Arizona, USA, passed away on 17 October 2025. Jay is survived by his wife Barbra Valdez Quade; their daughter Kirstin (Claire Chase) and granddaughter Deluvina; daughter Gratianne and granddaughter Lena; and son Emeric. Barbra and their kids came along on many field excursions. Kirstin, an accomplished writer, reminisced about one such adventure in the Australian Outback in a 2016 *New York Times* article.



Jay Quade in the lab. Courtesy of the University of Arizona.

Jay grew up in Reno, Nevada, the son of Jack Quade, a geologist, and Sally Quade, a schoolteacher and counselor. He set two high school records in Nevada track and field and became a two-time NCAA All-American at the University of New Mexico. Jay's early days included a healthy mix of academic training and industry jobs. He obtained a B.S. from the University of New Mexico (1978) and an M.S. from the University of Arizona (1982). Jay worked summers for the Mineral Exploration Division of Utah International, Inc. in Oregon (1977), Phillips Petroleum in Alaska (1982), and Noranda Exploration, Inc. (1982–1984), the Desert Research Institute (1984–1986), and Mifflin and Associates (1986–1989) in Nevada. He received his Ph.D. in geochemistry from the University of Utah in 1990, and he was awarded a postdoctoral fellowship at the Australian National University in 1991. At the University of Arizona, Jay was appointed assistant professor (1992), associate professor (1998), and full professor (2003), a position he held until his death. From 1992 to 2007, he served as director of the University's Desert Laboratory on Tumamoc Hill.

A premier field geologist and geochemist, Jay is recognized for trailblazing field studies and novel use of stable, radiogenic, and cosmogenic isotopes to date, reconstruct, and understand Earth system history across six continents. Over a career that spanned more than four decades, Jay published two books and more than 220 journal articles in a staggering array of topics and journals. His passion for deserts and their latent stories of environmental history started in the American Great Basin, but Jay also is well known for his work in Australia, Argentina, Bolivia, Chile, Peru, Ethiopia, Pakistan, Nepal, Tibet, Greece, Turkey, and Israel.

The range and depth of Jay's geochemical insights and his understanding of surficial processes came from an exceptional ability to see landscapes and ecosystems in four dimensions, and over a continuum of time that is not instinctive to most people. Despite being totally at home in the lab and the classroom, Jay's acumen in the field was akin to sorcery; it forced his field mates to scurry after him for fear of missing seminal discoveries. His keen awareness of information available in soil carbonates, fossil teeth, wood cellulose, alluvial and wetland stratigraphies, lake shorelines, speleothems, and even desert pavement (Quade, 2001) and the surfaces of isolated boulders (Quade et al., 2012) drove him to creatively develop and refine a wide array of approaches to age, reconstruct, and understand geologic processes.

With colleagues and students, Jay helped pioneer new isotopic methods and improved existing ones to address major questions in tectonics, global climate change, and evolution. This included calibrating the stable isotope systematics of soil carbonate with Thure Cerling in the Great Basin and Pakistan (Quade et al., 1989a, 1989b) and trekking the Himalaya while mapping with Pete DeCelles to quantify chemical weathering using strontium isotopes (Quade et al., 1997) and estimate paleoaltimetry using oxygen isotopes with Carmie Garzione (Garzione et al., 2000). He also tested analytical protocols and calibration of volcanic glass for the reconstruction of hydrogen isotopes in paleoprecipitation with Matt Dettinger (Dettinger and Quade, 2015); calibrated cosmogenic production of ^{14}C with Nat Lifton (Lifton et al., 2001); took the clumped isotope paleothermometer out of the laboratory and into soil pits with John Eiler (Quade et al., 2013); and explored the realm of low-level radiocarbon with Jeff Pigati (Pigati et al., 2007). In his last decade, Jay was part of a group at the University of Arizona developing an instrument for the simultaneous measurement of clumped isotopes and triple oxygen isotopes in carbonates based on infrared laser absorption analysis (Yanay et al., 2022).

Jay's geochemical analysis of paleosols and fossil teeth to reconstruct and understand late Cenozoic environments was a revolutionary contribution. Quade et al. (1989a) documented isotopic diffusion as the determining factor in soil carbonate profiles. Based on a sequence of soils along an elevation gradient in the Great Basin, this study demonstrated how physicochemical principles can be tested and calibrated using careful field observations. Resulting insights, for example, allowed Jay to show that layered carbonates in the fault fractures in the notorious Trench 14 at the Nevada Test Site formed from infiltrating soil waters. These carbonates did not represent vein cements and travertine from groundwater flow, a key finding for the licensing process of Yucca Mountain as a high-level nuclear waste repository (Quade et al., 1990).

Jay's careful work in the Great Basin informed his other dissertation research on paleosol sequences in the Siwalik Group of Pakistan, documenting a major shift in carbon and oxygen isotopes of soil carbonate during the latest Miocene (ca. 7.4–7.0 Ma). Jay, Cerling, and other co-authors attributed this shift to strengthening of the Asian monsoon during a time of global cooling and regional aridity, which shifted floodplain vegetation in the foreland basin of the Himalayas from forests (C_3) to grasslands (C_4) with different photosynthetic pathways and isotopic signatures (Quade et al., 1989b). This research initiated a series of isotopic studies showing near synchronous vegetation changes around the world (Latorre et al., 1997; Cerling et al., 1997).

Jay extended his foundational work on soil carbonates to paleoaltimetry (Quade et al., 2007), which he applied in Tibet (Quade et al., 2011, 2020) and the central Andes, where he and his students reinvigorated the use of hydrogen isotopes absorbed into volcanic glass contained in paleosols as a paleothermometer (Quade et al., 2015). Through a series of important experiments with Eiler, Jay contributed to the $CaCO_3$ clumped isotope thermometer, which can be used to infer formation temperatures in soil carbonates (Quade et al., 2013). Jay's work with paleosols moved into deeper time with great success. Jay and others used these approaches to interpret the propagation of foreland depocenters and fold-and-thrust belts in Nepal (DeCelles et al., 1998, 2000). In a seminal review on the past use of carbonate isotope ratios to reconstruct the uplift history of Tibet, Quade

et al. (2020) suggested that older carbonates in the southern Tibetan Plateau were altered by deep burial and thermal resetting, which erased the original isotopic record of uplift. Jay's approach toward paleoaltimetry was uniquely holistic: he relied first on lithologic indicators of paleoenvironment, and he always held the isotopic data to account for not stacking up with the lithofacies data.

For nearly four decades, Jay was a leader in the field of Quaternary paleohydrology in arid lands worldwide. It began with a series of papers on spring deposits exposed throughout the northern Mojave Desert and southern Great Basin (Quade, 1986; Quade and Pratt, 1989; Quade et al., 1995, 1998). Previously, these deposits (green mudstones associated with aquatic mollusks, cropping out at similar elevations) were described as lacustrine. However, Jay correctly identified them as spring deposits contemporaneous with pluvial lake highstands during the late Pleistocene. Lake and spring deposits are still commonly misidentified by geologists, and Jay's careful field studies continue to be used to rectify this error in other parts of the world, such as the Atacama Desert (Rech et al., 2003), the Arabian Peninsula (Pigati et al., 2014), and the Sahara (Quade et al., 2018). More recently, Jay applied his diverse skillset to revisit with students and colleagues the late Quaternary histories of actual pluvial lakes in the American Southwest, including Lake San Agustin (Hudson et al., 2023) in New Mexico and Lake Bonneville in the Great Basin (Hart et al., 2004; McGee et al., 2012).

Jay exhibited his virtuosity in mapping, dating, and interpreting spring diatomite and carbonate deposits and lake shoreline stratigraphy in the Central Andes and the Atacama Desert. At Barrancas Blancas in the Atacama region, Jay's dating and isotopic analysis of spring carbonates showed that the Pacific slope of the Andes between 21° and 25°S was highly evaporative and nearly plantless when these springs discharged over the last 11.5 Ma. The Barrancas Blancas springs strongly resemble those found at Devils Hole and Furnace Creek in Death Valley, USA (Quade et al., 2017). In the Atacama and Bolivian Altiplano, Jay, his colleagues, and their students defined what is now known as the Central Andean Pluvial Event (CAPE), a two-part period of increased summer precipitation that elevated groundwater tables and filled megalakes between 18 and 10 ka (Placzek et al., 2006, 2013; Quade et al., 2008b). And on the eastern side of the central Andes, Jay documented CAPE's influence on flooding of an immense wetland in west-central Argentina during the last 25,000 years (Quade et al., 2022). Farther south, he mapped and dated paleoshorelines around Lago Cardiel in southern Argentina to reconstruct lake levels since the Last Glacial Maximum and relate them to the position and local strength of the Southern Hemisphere Westerlies (Quade and Kaplan, 2017). Later Jay and his students expanded this novel paleohydrologic approach to lakes and paleowetlands on the Qinghai-Tibet plateau, where they identified an important east-west asymmetry in late Quaternary monsoon intensification (Quade and Hudson, 2023).

In 1999, Jay became a major player in paleoanthropology when he was asked to serve as the principal geologist on an expedition to the northern Awash River in Ethiopia, a site that figures prominently in human evolution. Jay contributed to major discoveries, including remains of *Ardipithecus ramidus*, a Pliocene hominin from 4.5 to 4.3 Ma (Simpson et al., 2019), the world's oldest stone artifacts dating to between 2.6 and 2.5 Ma (Semaw et al., 2003), and early *Homo* at ca. 1.7 Ma, and *Homo erectus* at ca. 1.1 Ma (Simpson et al., 2008). The $^{40}Ar/^{39}Ar$ dating, paleomagnetic dates, and tephrostratigraphic correlations (Quade et al., 2008a; Quade and Wynn, 2008) established the time span for the fluvio-lacustrine sediments encompassing nearly 6 million years of hominin evolution, where carbon isotopes from soil carbonates and herbivore tooth enamel were used to reconstruct past vegetation (Quade et al., 2004; Levin et al., 2004, 2008; Cerling et al., 2011).

Jay was revered by undergraduate and graduate students alike at the University of Arizona, where he taught many popular courses, including Introduction to Geochemistry, Stable Isotope Geochemistry and Paleoenvironments; Quaternary Geochronology; Co-Evolution of the Earth and the Biosphere; and Geology Field Camp. Many of Jay's former M.S. and Ph.D. students now are notable scientists. Jay was a legendary field worker, able to move rapidly and dexterously over

any type of ground, from low-elevation jungles to 6000-m-high peaks. In Nepal he walked many hundreds of kilometers on several regional mapping and sampling transects. Over nine years, Jay estimated that he logged ~3200 km on foot prospecting for hominin fossils and related evidence in Ethiopia. A consummate field geologist, he had the ability to work in any type of geologic materials, from high-grade metamorphic rocks to unconsolidated sediments. He had a genius for converting geological sequences of events into benchtop experiments to document chemical and physical processes.

Honors and awards bestowed to Jay over his brilliant career include the GSA (Geological Society of America) Farouk El Baz Award (2001); the Ben Tor Award from Hebrew University (2014); GSA Fellow (2015); AGU (American Geophysical Union) Fellow (2015); the Lady Davis Fellowship (Hebrew University, 2016); the Japan Society for the Promotion of Science Fellowship (University of Tokyo, 2017); Geochemical Society Fellow, European Association of Geochemistry (2017); GSA Arthur L. Day Medal (2018); U.S. National Academy of Sciences Fellow (2024); and Distinguished Alumni Award (University of Utah, 2025).

Jay left an indelible mark on the many of us who had the pleasure of knowing and working with him. He had the adventurous spirit, endless curiosity, and fearless heart of an explorer, coupled with the toughness and stamina of a champion athlete. Jay had an innate ability to recall obscure facts, especially dates of historical events in meticulous detail. He was a skilled carpenter, a competent auto mechanic, a prolific gardener, and an indefatigable angler. Jay Quade raised all those around him to higher levels of perception and happiness.

REFERENCES CITED

Valdez Quade, K., 2026 (20 Sept.), The season of the skulls: New York Times, https://www.nytimes.com/2016/09/25/travel/australia-kangaroo-season-of-the-skulls.html.

**Denotes Jay Quade as first author of a single or multi-authored paper*

1986* Late Quaternary environmental changes in the upper Las Vegas Valley, southern Nevada: Quaternary Research, v. 26, p. 340–357, https://doi.org/10.1016/0033-5894(86)90094-3.

1989a* (with Cerling, T.E., and Bowman, J.R.) Systematic variation in the carbon and oxygen isotopic composition of Holocene soil carbonate along elevation transects in the southern Great Basin, USA: Geological Society of America Bulletin, v. 101, p. 464–475, https://doi.org/10.1130/0016-7606(1989)101<0464:SVITCA>2.3.CO;2.

1989b* (with Cerling, T.E., and Bowman, J.R.) Development of the Asian monsoon revealed by marked ecological shift in the latest Miocene in northern Pakistan: Nature, v. 342, p. 163–166, https://doi.org/10.1038/342163a0.

1989c* (with Pratt, W.L.) Late Wisconsin ground-water discharge environments of the southwestern Indian Springs Valley, southern Nevada: Quaternary Research, v. 31, p. 351–370, https://doi.org/10.1016/0033-5894(89)90042-2.

1990* (with Cerling, T.E., and Bowman, J.R.) Stable isotopic evidence for a pedogenic origin of carbonates in Trench 14 near Yucca Mountain, Nevada: Science, v. 250, p. 1549–1552, https://doi.org/10.1126/science.250.4987.1549.

1995* (with Mifflin, M.D., Pratt, W.L., McCoy, W., and Burckle, L.) Fossil spring deposits in the southern Great Basin and their implications for changes in water-table levels near Yucca Mountain, Nevada, during Quaternary time: Geological Society of America Bulletin, v. 107, no. 2, p. 213–230, https://doi.org/10.1130/0016-7606(1995)107<0213:FSDITS>2.3.CO;2.

1997 (with Cerling, T.E., Harris, J.M., MacFadden, B.J., Ehleringer, J.R., Leakey, M.G., and Eisenman, V.) Global vegetation change through the Miocene/Pliocene boundary: Nature, v. 389, p. 153–157, https://doi.org/10.1038/38229.

1997 (with Latorre, C., and McIntosh, W.C.) The expansion of C_4 grasses and global change in the late Miocene: Stable isotope evidence from the Americas: Earth and Planetary Science Letters, v. 146, p. 83–96, https://doi.org/10.1016/S0012-821X(96)00231-2.

1997* (with Roe, L., DeCelles, P.G., and Ojha, T.P.) The Late Neogene $^{87}Sr/^{86}Sr$ record of lowland Himalayan rivers: Science, v. 276, p. 1828–1831, https://doi.org/10.1126/science.276.5320.1828.

1998 (with DeCelles, P.G., Gehrels, G.E., and Ojha, T.P.) Eocene–Early Miocene foreland basin development and the history of Himalayan thrusting, western and central Nepal: Tectonics, v. 17, p. 741–765, https://doi.org/10.1029/98TC02598.

1998* (with Forester, R.M., Pratt, W.L., and Carter, C.) Black mats, spring-fed streams, and late-glacial-age recharge in the southern Great Basin: Quaternary Research, v. 49, p. 129–148, https://doi.org/10.1006/qres.1997.1959.

2000 (with DeCelles, P.G., Gehrels, G.E., LaReau, B., and Spurlin, M.) Tectonic implications of U-Pb zircon ages of the Himalayan orogenic belt in Nepal: Science, v. 288, p. 497–499, https://doi.org/10.1126/science.288.5465.497.

2000 (with Garzione, C.N., DeCelles, P.G., and English, N.B.) Predicting paleoelevation of Tibet and the Himalaya from $\delta^{18}O$ versus altitude gradients in meteoric water across the Nepal Himalaya: Earth and Planetary Science Letters, v. 183, p. 215–229, https://doi.org/10.1016/S0012-821X(00)00252-1.

2001* Desert pavements and associated rock varnish in the Mojave Desert: How old can they be?: Geology, v. 29, p. 855–858, https://doi.org/10.1130/0091-7613(2001)029<0855:DPAARV>2.0.CO;2.

2001 (with Lifton, N.A., and Jull, A.J.) A new extraction technique and production rate estimate for in situ cosmogenic ^{14}C in quartz: Geochimica et Cosmochimica Acta, v. 65, p. 1953–1969, https://doi.org/10.1016/S0016-7037(01)00566-X.

2003 (with Rech, J., Pigati, J., and Betancourt, J.L.) Re-evaluation of mid-Holocene deposits at Quebrada Puripica, northern Chile: Palaeoecology, Palaeogeography, Palaeoclimatology, v. 194, p. 207–222, https://doi.org/10.1016/S0031-0182(03)00278-5.

2003 (with Semaw, S., Rogers, M.J., Renne, P.R., Butler, R.F., Dominguez-Rodrigo, M., Stout, D., Hart, W.S., Pickering, T., and Simpson, S.W.) 2.6-million-year-old stone tools and associated bones from OGS-6 and OGS-7, Gona, Afar, Ethiopia: Journal of Human Evolution, v. 45, p. 169–177, https://doi: 10.1016/s0047-2484(03)00093-9.

2004 (with Hart, W.S., Madsen, D., and Kauffman, D.) The $^{87}Sr/^{86}Sr$ ratios of lacustrine carbonates and lake-level history of the Bonneville paleolake basin: Geological Society of America Bulletin, v. 116, p. 1107–1119, https://doi.org/10.1130/B25330.1.

2004 (with Levin, N., Simpson, S., Semaw, S., and Rogers, M.) Isotopic evidence for Plio-Pleistocene environmental change at Gona, Ethiopia: Earth and Planetary Science Letters, v. 219, p. 93–110, https://doi.org/10.1016/S0012-821X(03)00707-6.

2004* (with Levin, N., Semaw, S., Simpson, S., Rogers, M., and Stout, D.) Paleoenvironments of the earliest toolmakers: Geological Society of America Bulletin, v. 116, no. 11–12, p. 1529–1544, https://doi.org/10.1130/B25358.1.

2006 Geochronology and stratigraphy of late Pleistocene lake cycles on the southern Bolivian Altiplano: Implications for causes of tropical climate change: Geological Society of America Bulletin, v. 118, no. 5–6, p. 515–532, https://doi.org/10.1130/B25770.1.

2007 (with Pigati, J.S., Wilson, J., Jull, A.J.T., and Lifton, N.A.) Development of low-background vacuum extraction and graphitization systems for ^{14}C dating of old (40–60 ka) samples: Quaternary International, v. 166, p. 4–14, https://doi.org/10.1016/j.quaint.2006.12.006.

2007* (with Garzione, C., and Eiler, J.) Paleoelevation reconstruction using pedogenic carbonates: Reviews in Mineralogy and Geochemistry, v. 66, p. 53–87, https://doi.org/10.2138/rmg.2007.66.3.

2008* (with Wynn, J.G., eds.) The Geology of Early Humans in the Horn of Africa: Geological Society of America Special Paper 446, 234 p., https://doi.org/10.1130/SPE446.

2008 (with Levin, N.E., Simpson, S.W., Cerling, T.E., and Frost, S.R.) Herbivore enamel carbon isotope composition and the environmental context of *Ardipithecus* at Gona, Ethiopia, *in* Quade, J., and Wynn, J.G., eds., The Geology of Early Humans in the Horn of Africa: Geological Society of America Special Paper 446, p. 215–234, https://doi.org/10.1130/2008.2446(10).

2008a* (with Levin, N.L, Simpson, S.W., Butler, R., McIntosh, W., Semaw, S., Kleinsasser, L., Dupont-Nivet, G., Renne, P., and Dunbar, N.) The geology of Gona, Afar, Ethiopia, *in* Quade, J., and Wynn, J.G., eds., The Geology of Early Humans in the Horn of Africa. Geological Society of America Special Paper 446, p. 1–31, https://doi.org/10.1130/2008.2446(01).

2008b* (with Rech, J.A., Betancourt, J., Latorre, C., Quade, B., Fisher, T., and Rylander, K.A.) Paleowetlands and regional climate change in the central Atacama Desert, northern Chile: Quaternary Research, v. 69, p. 343–360, https://doi.org/10.1016/j.yqres.2008.01.003.

2008 (with Simpson, S.W., Levin, N.E., Butler, R.F., Dupont-Nivet, G., Everett, M., and Semaw, S.) A female *Homo erectus* pelvis from Gona, Ethiopia: Science, v. 322, p. 1089–1092, https://doi.org/10.1126/science.1163592.

2011 (with Cerling, T.E., Wynn, J.G., Andanje, S.A., Bird, M.I., Korir, D.K., Levin, N.E., Mace, W., Macharia, A.N., and Remien, C.H.) Woody cover and hominin environments in the past million years: Nature, v. 476, p. 51–56, https://doi.org/10.1038/nature10306.

2011* (with Breecker, D., Daëron, M., and Eiler, J.) The paleoaltimetry of Tibet: An isotopic perspective: American Journal of Science, v. 311, p. 77–115, https://doi.org/10.2475/02.2011.01.

2012 (with McGee, D., Edwards, L., Broecker, W., and Cheng, H.) Lacustrine cave carbonates: Novel archives of paleohydrologic change in the Bonneville Basin (Utah, USA): Earth and Planetary Science Letters, v. 351–352, p. 182–194, https://doi.org/10.1016/j.epsl.2012.07.019.

2012* (with Reiners, P., Matmon, A., Placzek, C., Pepper, M., and Murray, K.) Seismicity and the strange rubbing boulders of the Atacama Desert, northern Chile: Geology, v. 40, no. 9, p. 851–854, https://doi.org/10.1130/G33162.1.

2013 (with Placzek, C.P., and Patchett, J.P.) 130-ka reconstruction of rainfall on the Bolivian Altiplano: Earth and Planetary Science Letters, v. 363, p. 97–108, https://doi.org/10.1016/j.epsl.2012.12.017.

2013* (with Eiler, J., Daëron, M., and Achuythan, H.) The clumped isotope paleothermometer in soils and paleosol carbonate: Geochimica et Cosmochimica Acta, v. 105, p. 92–107, https://doi.org/10.1016/j.gca.2012.11.031.

2014 (with Pigati, J.S., Rech, J.A., and Bright, J.A.) Desert wetlands in the geologic record: Annual Review of Earth and Planetary Sciences, v. 132, p. 67–81, https://doi.org/10.1016/j.earscirev.2014.02.001.

2015 (with Dettinger, M.P.) Testing the analytical protocols and calibration of volcanic glass for the reconstruction of hydrogen isotopes in paleoprecipitation, *in* DeCelles, P.G., Ducea, M., Kapp, P., and Carrapa, B., eds., The Geodynamics of a Cordilleran Orogenic System: The Central Andes of Argentina and Northern Chile: Geological Society of America Memoir 212, p. 261–276, https://doi.org/10.1130/2015.1212(14).

2015* (with Dettinger, M.P., Carrapa, B., DeCelles, P., Murray, K.E., Huntington, K.W., Cartwright, A., Canavan, R.R., Gehrels, G., and Clementz, M.) The growth of the Central Andes 22–26°S, *in* DeCelles, P.G., Ducea, M., Kapp, P., and Carrapa, B., eds., The Geodynamics of

a Cordilleran Orogenic System: The Central Andes of Argentina and Northern Chile: Geological Society of America Memoir 212, p. 277–308, https://doi.org/10.1130/2015.1212(15).

2017* (with Kaplan, M.R.) Lake-level stratigraphy and geochronology revisited at Lago (Lake) Cardiel, Argentina, and changes in the Southern Hemispheric Westerlies over the last 25 ka: Quaternary Science Reviews, v. 177, p. 173–188, https://doi.org/10.1016/j.quascirev.2017.10.006.

2017* (with Rasbury, E.T., Huntington, K., Hudson, A.M., Vonhof, H., Anchukaitis, K., Betancourt, J.L, Latorre, C.L., and Pepper, M.) Isotopic characterization of late Neogene travertine deposits at Barrancas Blancas in the eastern Atacama Desert, Chile: Chemical Geology, v. 466, p. 41–56, https://doi.org/10.1016/j.chemgeo.2017.05.004.

2018* (with Dente, E., Armon, M., Ben Dor, Y., Morin, E., Adam, O., and Enzel, Y.) Megalakes in the Sahara? A review: Quaternary Research, v. 90, p. 253–275, https://doi.org/10.1017/qua.2018.46.

2019 (with Simpson, S.W., Levin, N.E., Rogers, M.J., and Semaw, S.) *Ardipithecus ramidus* postcrania from the Gona Project area, Afar Regional State, Ethiopia: Journal of Human Evolution, v. 129, p. 1–45, https://doi.org/10.1016/j.jhevol.2018.12.005.

2020* (with Leary, R., Dettinger, M.P., Orme, D., Krupa, A., DeCelles, P.G., Kano, A., Kato, H., Waldrip, R., Huang, W., and Kapp, P.) Resetting Southern Tibet: The serious challenge of obtaining primary records of paleoaltimetry: Global and Planetary Change, v. 191, https://doi.org/10.1016/j.gloplacha.2020.103194.

2022* (with Dente, E., Cartwright, A., Hudson, A.M., Jimenez-Rodriguez, S., and McGee, D.) Central Andean (28–34°S) flood record 0–25 ka from Salinas del Bebedero, Argentina: Quaternary Research, v. 109, p. 102–127, https://doi.org/10.1017/qua.2022.1.

2022 (with Yanay, N., Wang, Z., Dettman, D.L., Huntington, K.W., Schauer, A.J., Nelson, D.D., McManus, J.B., Thirumalai, K., Sakai, S., Morillo, A.R., and Mallik, A.) Rapid and precise measurement of carbonate clumped isotopes using laser spectroscopy: Science Advances, v. 8, p. 611, https://doi.org/10.1126/sciadv.abq0611.

2023* (with Hudson, A.) Long-term east-west asymmetry in monsoon intensification on the Tibetan Plateau: Geology, v. 41, no. 3, p. 351–354, https://doi.org/10.1130/G33837.1.

2023 (with Hudson, A.M., Holliday, B.T., Fenerty, B., Bright, J.E., Gray, H.J., and Mahan, S.A.) Paleohydrologic history of pluvial lake San Agustin, New Mexico: Tracking changing effective moisture in southwest North America through the last glacial transition: Quaternary Science Reviews, v. 310, https://doi.org/10.1016/j.quascirev.2023.108110.

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