Todd Gregory Caldwell, Ph.D.

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DRI Page, Google Scholar Profile, ResearchGate

Biography

Dr. Caldwell is an associate research professor in the Division of Hydrologic Sciences at the Desert Research Institute. His research focuses on field investigations and numerical modeling of unsaturated zone processes and remotely sensed soil moisture.

Education

2011	Ph.D.	Hydrogeology, University of Nevada, Reno Dissertation: Soil Heterogeneity in Arid Shrublands: Biotic and Abiotic Processes
1999	M.S.	Hydrogeology, University of Nevada, Reno Thesis: Prescription Fire and Nutrient Dynamics in Tahoe Forest Soils
1997	B.S.	Earth and Planetary Sciences, University of New Mexico

Professional Appointments

2025 – pres.	Associate Research Professor	Desert Research Institute Division of Hydrologic Sciences Reno, NV
2021 – 2025	Research Hydrologist	U.S. Geological Survey
2019 – 2021	Hydrologist	Nevada Water Science Center Carson City, NV
2018 – 2019	Research Scientist	Jackson School of Geosciences
2012 – 2018	Research Associate	University of Texas at Austin Austin, TX
2011 – 2012	Assistant Research Professor	Desert Research Institute
2005 – 2011	Research Hydrologist	Division of Earth and Ecosystem Sciences
2001 – 2005	Instrumentation Technician	Reno, NV
2000 – 2001	Hydrologist	Pacific Northwest National Lab Richland, WA

Honors and Awards

2025	Soil Moisture Community Leadership Award, National Coordinated Soil Moisture Monitoring Network, National Oceanic and Atmospheric Administration.
2021	Editor's Citation for Excellence Award for Outstanding Service – Associate Editor
2017	Vadose Zone Journal Editor's Citations for Excellence in Review
2013	Bureau of Economic Geology - Author Achievement Award
2011	Runner up Graduate Student Poster Competition (S1), ASA-CSSA-SSSA Annual Meeting

2011 Western Association of Agricultural Experiment Station Directors' Award for Excellence

2009 The Colin Warden Memorial Endowment, Nevada System of Higher Education

Relevant Experience

- **Managed** a $1.5M annual budget encompassing staffing, operations, maintenance, and travel for six directly managed and three co-managed projects sponsored by the Bureau of Land Management, U.S. Forest Service, U.S. Nuclear Regulatory Agency, and multiple appropriated programs focused on groundwater drought and next-generation monitoring.
- **Led** the development and implementation of over 30 advanced hydrometeorological stations nationwide, providing real-time and post-processed data for the USGS Next Generation Water Observing Systems.
- **Led** the development of national guidelines and standards for precipitation, soil moisture, snow water equivalent, and evapotranspiration measurements for the USGS.
- **Served** as the technical lead for water budget measurements in the USGS and on the National Coordinate Soil Moisture Monitoring Network, leading a NOAA-partnered inter-agency program to advance soil moisture monitoring, including strategy development and video documentation of field techniques.
- **Directed** USGS Research and Development program resources for the external evaluation and adaptation of next-generation water resource monitoring technologies, including cosmic ray neutron sensors (University of Nebraska-Lincoln), evapotranspiration measurement technologies (Desert Research Institute), profiling soil moisture sensors (Industry partners), and unmanned aircraft systems with L-band radiometers (University of Virginia). Each project is impacting national-scale water resource monitoring.

Teaching and Mentorship

Advanced Vadose Zone Processes (GEO 391), Instructor, University of Texas at Austin, Spring semester 2016, 10 graduate students.

Field Methods in Hydrology (GEO 376L/382C), Co-Instructor with P. Bennet, University of Texas at Austin, Summer semester 2015, 10 graduate students, 14 undergraduates.

Field Methods in Hydrology (GEO 376L/382C), Co-Instructor with B. Cardenas, University of Texas at Austin, Summer semester 2014, 7 graduate students, 15 undergraduates.

Soil Physics (NRES 422/622), Instructor, University of Nevada, Reno, Spring semester 2012, 4 graduate students, 8 undergraduates.

Graduate Co-Supervisor:

- Chelsea Halley, M.S., Jackson School of Geosciences, University of Texas at Austin, 2016, with M. Young, "Laboratory Calibration of the CS655 Soil Moisture Sensor."
- Raquel Flinker, M.S., Jackson School of Geosciences, University of Texas at Austin, 2014, with B. Cardenas, "Modeling of Soil Moisture Dynamics of Grasslands in Response to CO_2 and Biodiversity Manipulations at BIOCON."
- Ryan Soutter, B.S., Jackson School of Geosciences, University of Texas at Austin, Spring 2014, senior honor thesis, with K. Moffet, "a Study on the Thermal Properties and Water Retention of Green Roof Substrates."

Committee Member at Large:

- Emmanuel Cobbinah, Ph.D., ~2026, Graduate Program of Hydrologic Sciences, University of Nevada, Reno, TBD.
- Nicole Gearhart, M.S., 2023, Civil and Environmental Engineering, "Indicator and pathogenic virus removal in bench scale soil aquifer treatment."
- Charles Abolt, Ph.D., 2019, Jackson School of Geosciences, 2019, "Trajectories of land surface evolution in polygonal tundra."

- Gaston Quaglia, Ph.D., 2017, Cockrell School of Engineering, "Hydro-Mechanical Characterization of Unsaturated Clays Using Centrifuge Technology."
- Marcelo Azevedo, Ph.D., 2017, Cockrell School of Engineering, "Performance of Geotextiles with Enhanced Drainage."
- Mathew Gore, Ph.D., 2015, Cockrell School of Engineering, "Geotechnical Behavior of Bauxite Residue."

Laboratory Supervisor: managed graduate (18) and undergraduate (10) student workers in the Soil Characterization Laboratory, Desert Research Institute, Reno, NV, over an eight-year period.

Journal Publications (reverse chronological, *student)

Google Scholar *h-Index* of 38; ISI *h-Index* of 30, H-5129-2011

61. Wolaver, B. D., L. V. Reynolds, T. G. Caldwell, T. Bongiovanni, J. P. Pierre, C. Breton, and K. B. Mayes (2024), Hydrologic changes in the Brazos River Basin and implications for Great Plains fishes, *Journal of Hydrology*, *629*, 130351, https://doi.org/10.1016/j.jhydrol.2023.130351.
60. Colliander, A., Y. Kerr, J. P. Wigneron, et al., including T. Caldwell (2023), Performance of SMOS Soil Moisture Products Over Core Validation Sites, *IEEE Geoscience and Remote Sensing Letters*, *20*, 1-5, https://doi.org/10.1109/lgrs.2023.3272878.
59. Fuhrmann, M., T. G. Caldwell, W. J. Likos, W. J. Waugh, M. M. Williams, and C. H. Benson (2023), Evolving radon diffusion through earthen barriers at uranium waste disposal sites, *Journal of Environmental Radioactivity*, *262*, 107140, https://doi.org/10.1016/j.jenvrad.2023.107140.
58. Baker, C. B., M. Cosh, J. Bolten, et al., including T. Caldwell (2022), Working toward a National Coordinated Soil Moisture Monitoring Network: Vision, Progress, and Future Directions, *Bulletin of the American Meteorological Society*, *103*, E2719-E2732, https://doi.org/10.1175/bams-d-21-0178.1.
57. Caldwell, T. G., M. H. Cosh, S. R. Evett, N. Edwards, H. Hofman, B. G. Illston, T. Meyers, M. Skumanich, and K. Sutcliffe (2022), *In situ* Soil Moisture Sensors in Undisturbed Soils, *Journal of Visualized Experiments*, e64498, https://doi.org/10.3791/64498.
56. Caldwell, T. G., S. Tabatabai, J. M. Huntington, G. E. Davies, and M. Fuhrmann (2022), Evapotranspiration covers at uranium mill tailings sites, *Vadose Zone Journal*, https://doi.org/10.1002/vzj2.20222.
55. Chaubell, J., S. Yueh, R. S. Dunbar, et al., including T. Caldwell (2022), Regularized Dual-Channel Algorithm for the Retrieval of Soil Moisture and Vegetation Optical Depth From SMAP Measurements, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *15*, 102-114, https://doi.org/10.1109/jstars.2021.3123932.
54. Colliander, A., R. Reichle, W. Crow, et al., including T. Caldwell (2022), Validation of Soil Moisture Data Products From the NASA SMAP Mission, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *15*, 364-392, https://doi.org/10.1109/jstars.2021.3124743.
53. Gao, Y., A. Colliander, M. S. Burgin, et al., including T. Caldwell (2022), Multi-frequency radiometer-based soil moisture retrieval and algorithm parameterization using in situ sites, *Remote Sensing of Environment*, *279*, 113113, https://doi.org/10.1016/j.rse.2022.113113.
52. Hammond, J. C., C. Simeone, J. S. Hecht, et al., including T. Caldwell (2022), Going Beyond Low Flows: Streamflow Drought Deficit and Duration Illuminate Distinct Spatiotemporal Drought Patterns and Trends in the U.S. During the Last Century, *Water Resources Research*, *58*, e2022WR031930, https://doi.org/10.1029/2022wr031930.
51. Cosh, M. H., T. G. Caldwell, C. B. Baker, et al. (2021), Developing a strategy for the national coordinated soil moisture monitoring network, *Vadose Zone Journal*, *e20139*, 1-13, https://doi.org/10.1002/vzj2.20139.
50. Flinker*, R. H., M. B. Cardenas, T. G. Caldwell, G. N. Flerchinger, R. Rich, and P. B. Reich (2021), Promise and pitfalls of modeling grassland soil moisture in a free-air CO_2 enrichment experiment (BioCON) using the SHAW model, *Pedosphere*, *31*, 783-795, https://doi.org/10.1016/s1002-0160(21)60037-1.

49. Caldwell, T. G., B. D. Wolaver, T. Bongiovanni, J. P. Pierre, S. Robertson, C. Abolt*, and B. R. Scanlon (2020), Spring discharge and thermal regime of a groundwater dependent ecosystem in an arid karst environment, *Journal of Hydrology*, *587*, 124947, https://doi.org/10.1016/j.jhydrol.2020.124947.

48. Chaubell, M. J., S. H. Yueh, R. S. Dunbar, et al., including T. Caldwell (2020), Improved SMAP Dual-Channel Algorithm for the Retrieval of Soil Moisture, *IEEE Transactions on Geoscience and Remote Sensing*, *58*, 3894-3905, https://doi.org/10.1109/tgrs.2019.2959239.

47. Colliander, A., T. J. Jackson, A. Berg, et al. , including T. Caldwell (2020), Effect of Rainfall Events on SMAP Radiometer-Based Soil Moisture Accuracy Using Core Validation Sites, *Journal of Hydrometeorology*, *21*, 255-264, https://doi.org/10.1175/jhm-d-19-0122.1.

46. Caldwell, T. G., T. Bongiovanni, M. H. Cosh, et al. (2019), The Texas Soil Observation Network: A comprehensive soil moisture dataset for remote sensing and land surface model validation, *Vadose Zone Journal*, *18:100034*, https://doi.org/doi:10.2136/vzj2019.04.0034.

45. Chen, F., W. T. Crow, M. H. Cosh, et al. , including T. Caldwell (2019), Uncertainty of Reference Pixel Soil Moisture Averages Sampled at SMAP Core Validation Sites, *Journal of Hydrometeorology*, *20*, 1553-1569, https://doi.org/doi:10.1175/jhm-d-19-0049.1.

44. Das, N. N., D. Entekhabi, R. S. Dunbar, et al. , including T. Caldwell (2019), The SMAP and Copernicus Sentinel 1A/B microwave active-passive high resolution surface soil moisture product, *Remote Sensing of Environment*, *233*, 111380, https://doi.org/10.1016/j.rse.2019.111380.

43. Gholoubi*, A., H. Emami, and T. Caldwell (2019), Deforestation effects on soil aggregate stability quantified by the high energy moisture characteristic method, *Geoderma*, *355*, 113919, https://doi.org/10.1016/j.geoderma.2019.113919.

42. Abolt*, C., T. Caldwell, B. Wolaver, and H. Pai (2018), Unmanned aerial vehicle-based monitoring of groundwater inputs to surface waters using an economical thermal infrared camera, *Optical Engineering*, *57*, 053113, https://doi.org/10.1117/1.Oe.57.5.053113.

41. Bindlish, R., M. H. Cosh, T. J. Jackson, et al., including T. Caldwell (2018), GCOM-W AMSR2 soil moisture product validation using core validation sites, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *11*, 209-219, https://doi.org/10.1109/Jstars.2017.2754293.

40. Caldwell, T. G., T. Bongiovanni, M. H. Cosh, C. Halley*, and M. H. Young (2018), Field and Laboratory Evaluation of the CS655 Soil Water Content Sensor, *Vadose Zone Journal*, *17*, 1-16, https://doi.org/10.2136/vzj2017.12.0214.

39. Chan, S. K., R. Bindlish, P. O'Neill, et al. , including T. Caldwell (2018), Development and assessment of the SMAP enhanced passive soil moisture product, *Remote Sensing of Environment*, *204*, 931-941, https://doi.org/10.1016/j.rse.2017.08.025.

38. Colliander, A., T. J. Jackson, S. K. Chan, et al. , including T. Caldwell (2018), An assessment of the differences between spatial resolution and grid size for the SMAP enhanced soil moisture product over homogeneous sites, *Remote Sensing of Environment*, *207*, 65-70, https://doi.org/10.1016/j.rse.2018.02.006.

37. Das, N. N., D. Entekhabi, R. S. Dunbar, et al. , including T. Caldwell (2018), The SMAP mission combined active-passive soil moisture product at 9 km and 3 km spatial resolutions, *Remote Sensing of Environment*, *211*, 204-217, https://doi.org/10.1016/j.rse.2018.04.011.

36. Kolassa, J., R. H. Reichle, Q. Liu, et al. , including T. Caldwell (2018), Estimating surface soil moisture from SMAP observations using a Neural Network technique, *Remote Sensing of Environment*, *204*, 43-59, https://doi.org/10.1016/j.rse.2017.10.045.

35. Sun, A. Y., Y. L. Xia, T. G. Caldwell, and Z. C. Hao (2018), Patterns of precipitation and soil moisture extremes in Texas, US: A complex network analysis, *Advances in Water Resources*, *112*, 203-213, https://doi.org/10.1016/j.advwatres.2017.12.019.

34. Abolt*, C. J., M. H. Young, and T. G. Caldwell (2017), Numerical Modelling of Ice-Wedge Polygon Geomorphic Transition, *Permafrost and Periglacial Processes*, *28*, 347-355, https://doi.org/10.1002/ppp.1909.

33. Clewley, D., J. B. Whitcomb, R. Akbar, A. R. Silva, A. Berg, J. R. Adams, T. Caldwell, D. Entekhabi, and M. Moghaddam (2017), A method for upscaling in situ soil moisture measurements to satellite footprint scale using random forests, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *10*, 2663-2673, https://doi.org/10.1109/JSTARS.2017.2690220.

32. Colliander, A., T. J. Jackson, R. Bindlish, et al., including T. Caldwell (2017), Validation of SMAP surface soil moisture products with core validation sites, *Remote Sensing of Environment*, *191*, 215-231, https://doi.org/10.1016/j.rse.2017.01.021.

31. Degre, A., M. J. van der Ploeg, T. Caldwell, and H. P. A. Gooren (2017), Comparison of Soil Water Potential Sensors: A Drying Experiment, *Vadose Zone Journal*, *16*, https://doi.org/10.2136/vzj2016.08.0067.

30. Kim, S. B., J. J. van Zyl, J. T. Johnson, et al. , including T. Caldwell (2017), Surface soil moisture retrieval using the L-band synthetic aperture radar onboard the Soil Moisture Active-Passive satellite and evaluation at core validation sites, *IEEE Transactions on Geoscience and Remote Sensing*, *55*, 1897-1914, https://doi.org/10.1109/Tgrs.2016.2631126.

29. Kolassa, J., R. Reichle, Q. Liu, et al., including T. Caldwell (2017), Data assimilation to extract soil moisture information from SMAP observations, *Remote Sensing*, *9*, 1179, https://doi.org/10.3390/rs9111179.

28. Ouellette, J. D., J. T. Johnson, A. Balenzano, et al. , including T. Caldwell (2017), A time-series approach to estimating soil moisture from vegetated surfaces using L-band radar backscatter, *IEEE Transactions on Geoscience and Remote Sensing*, *55*, 3186-3193, https://doi.org/10.1109/TGRS.2017.2663768.

27. Reichle, R. H., G. J. M. De Lannoy, Q. Liu, et al. , including T. Caldwell (2017), Assessment of the SMAP Level-4 Surface and Root-Zone Soil Moisture Product Using In Situ Measurements, *Journal of Hydrometeorology*, *18*, 2621-2645, https://doi.org/10.1175/Jhm-D-17-0063.1.

26. Young, M. H., J. H. Andrews, T. G. Caldwell, and K. Saylam (2017), Airborne LiDAR and Aerial Imagery to Assess Potential Burrow Locations for the Desert Tortoise (*Gopherus agassizii*), *Remote Sensing*, *9*, 458, https://doi.org/10.3390/rs9050458.

25. Chan, S. K., R. Bindlish, P. E. O'Neill, et al., including T. Caldwell (2016), Assessment of the SMAP passive soil moisture product, *IEEE Transactions on Geoscience and Remote Sensing*, *54*, 4994-5007, https://doi.org/10.1109/Tgrs.2016.2561938.

24. Shellito*, P. J., E. E. Small, A. Colliander, et al. , including T. Caldwell (2016), SMAP soil moisture drying more rapid than observed in situ following rainfall events, *Geophysical Research Letters*, *43*, 8068-8075, https://doi.org/10.1002/2016gl069946.

23. Zhu, J. T., D. M. Sun, M. H. Young, T. G. Caldwell, and F. Pan (2015), Shrub spatial organization and partitioning of evaporation and transpiration in arid environments, *Ecohydrology*, *8*, 1218-1228, https://doi.org/10.1002/eco.1576.

22. Rau, B. M., J. C. Chambers, D. A. Pyke, B. A. Roundy, E. W. Schupp, P. Doescher, and T. G. Caldwell (2014), Soil Resources Influence Vegetation and Response to Fire and Fire-Surrogate Treatments in Sagebrush-Steppe Ecosystems, *Rangeland Ecology and Management*, *67*, 506-521, https://doi.org/10.2111/Rem-D-14-00027.1.

21. Caldwell, T. G., T. Wöhling, M. H. Young, D. P. Boyle, and E. V. McDonald (2013), Characterizing Disturbed Desert Soils Using Multiobjective Parameter Optimization, *Vadose Zone Journal*, *12*, 1-23, https://doi.org/10.2136/vzj2012.0083.

20. Caldwell, T. G., M. H. Young, E. V. McDonald, and J. Zhu (2012), Soil heterogeneity in Mojave Desert shrublands: Biotic and abiotic processes, *Water Resources Research*, *48*, W09551, https://doi.org/10.1029/2012wr011963.

19. Flerchinger, G. N., T. G. Caldwell, J. Cho, and S. P. Hardegree (2012), Simultaneous Heat and Water (SHAW) Model: Model Use, Calibration, and Validation, *Transactions of the ASABE*, *55*, 1395-1411, https://doi.org/10.13031/2013.42250.

18. Wilcox, B. P., L. Turnbull, M. H. Young, et al., including T. Caldwell (2012), Invasion of shrublands by exotic grasses: ecohydrological consequences in cold versus warm deserts, *Ecohydrology*, *5*, 160-173, https://doi.org/10.1002/eco.247.

17. Rau*, B. M., D. W. Johnson, R. R. Blank, A. Lucchesi, T. G. Caldwell, and E. W. Schupp (2011), Transition From Sagebrush Steppe to Annual Grass (*Bromus tectorum*): Influence on Belowground Carbon and Nitrogen, *Rangeland Ecology and Management*, *64*, 139-147, https://doi.org/10.2111/Rem-D-10-00063.1.

16. Rau*, B. M., D. W. Johnson, R. R. Blank, R. J. Tausch, B. A. Roundy, R. F. Miller, T. G. Caldwell, and A. Lucchesi (2011), Woodland expansion's influence on belowground carbon and nitrogen in the Great Basin U.S, *Journal of Arid Environments*, *75*, 827-835, https://doi.org/10.1016/j.jaridenv.2011.04.005.

15. Bacon, S. N., E. V. McDonald, T. G. Caldwell, and G. K. Dalldorf (2010), Timing and distribution of alluvial fan sedimentation in response to strengthening of late Holocene ENSO variability in the Sonoran Desert, southwestern Arizona, USA, *Quaternary Research*, *73*, 425-438, https://doi.org/10.1016/j.yqres.2010.01.004.

14. Caldwell, T. G., D. W. Johnson, W. W. Miller, R. G. Qualls, and R. R. Blank (2009), Prescription Fire and Anion Retention in Tahoe Forest Soils, *Soil Science*, *174*, 594-600, https://doi.org/10.1097/SS.0b013e3181bf2f71.

13. Caldwell, T. G., E. V. McDonald, and M. H. Young (2009), The seedbed microclimate and active revegetation of disturbed lands in the Mojave Desert, *Journal of Arid Environments*, *73*, 563-573, https://doi.org/10.1016/j.jaridenv.2008.12.008.

12. Young, M. H., T. G. Caldwell, D. G. Meadows*, and L. F. Fenstermaker (2009), Variability of soil physical and hydraulic properties at the Mojave Global Change Facility, Nevada: Implications for water budget and evapotranspiration, *Journal of Arid Environments*, *73*, 733-744, https://doi.org/10.1016/j.jaridenv.2009.01.015.

11. Bacon, S. N., E. V. McDonald, S. E. Baker, T. G. Caldwell, and G. Stullenbarger (2008), Desert terrain characterization of landforms and surface materials within vehicle test courses at US Army Yuma Proving Ground, USA, *Journal of Terramechanics*, *45*, 167-183, https://doi.org/10.1016/j.jterra.2008.09.005.

10. Caldwell, T. G., E. V. McDonald, S. N. Bacon, and G. Stullenbarger (2008), The performance and sustainability of vehicle dust courses for military testing, *Journal of Terramechanics*, *45*, 213-221, https://doi.org/10.1016/j.jterra.2008.10.002.

9. Caldwell, T. G., M. H. Young, J. Zhu, and E. V. McDonald (2008), Spatial structure of hydraulic properties from canopy to interspace in the Mojave Desert, *Geophysical Research Letters*, *35*, L19406, https://doi.org/10.1029/2008gl035095.

8. Shafer, D. S., M. H. Young, S. F. Zitzer, T. G. Caldwell, and E. V. McDonald (2007), Impacts of interrelated biotic and abiotic processes during the past 125 000 years of landscape evolution in the Northern Mojave Desert, Nevada, USA, *Journal of Arid Environments*, *69*, 633-657, https://doi.org/10.1016/j.jaridenv.2006.11.011.

7. Caldwell, T. G., E. V. McDonald, and M. H. Young (2006), Soil disturbance and hydrologic response at the National Training Center, Ft. Irwin, California, *Journal of Arid Environments*, *67*, 456-472, https://doi.org/10.1016/j.jaridenv.2006.02.019.

6. Johnson, D. W., J. F. Murphy, R. B. Susfalk, T. G. Caldwell, W. W. Miller, R. F. Walker, and R. F. Powers (2005), The effects of wildfire, salvage logging, and post-fire N-fixation on the nutrient budgets of a Sierran forest, *Forest Ecology and Management*, *220*, 155-165, https://doi.org/10.1016/j.foreco.2005.08.011.

5. Young, M. H., E. V. McDonald, T. G. Caldwell, S. G. Benner, and D. G. Meadows* (2004), Hydraulic Properties of a Desert Soil Chronosequence in the Mojave Desert, USA, *Vadose Zone Journal*, *3*, 956-963, https://doi.org/10.2136/vzj2004.0956.

4. Caldwell, T. G., D. W. Johnson, W. W. Miller, and R. G. Qualls (2002), Forest Floor Carbon and Nitrogen Losses Due to Prescription Fire, *Soil Science Society of America Journal*, *66*, 262-267, https://doi.org/10.2136/sssaj2002.2620.

3. Gee, G. W., A. L. Ward, T. G. Caldwell, and J. C. Ritter (2002), A vadose zone water fluxmeter with divergence control, *Water Resources Research*, *38*, 1141, https://doi.org/10.1029/2001wr000816.

2. Sisson, J. B., G. W. Gee, J. M. Hubbell, W. L. Bratton, J. C. Ritter, A. L. Ward, and T. G. Caldwell (2002), Advances in Tensiometry for Long-Term Monitoring of Soil Water Pressures, *Vadose Zone Journal*, *1*, 310-315, https://doi.org/10.2136/vzj2002.3100.

1. Johnson, D. W., R. B. Susfalk, R. A. Dahlgren, T. G. Caldwell, and W. W. Miller (2001), Nutrient fluxes in a snow-dominated, semi-arid forest: Spatial and temporal patterns, *Biogeochemistry*, *55*, 219-245, https://doi.org/10.1023/A:1011863216017.

Book Sections and Proceedings

13. McDonald, E.V., M.R. Sweeney, S.N. Bacon, T.G. Caldwell, and S. Baker, *in review*, Definition of dust in desert military operating environments: Just dust in the wind?, *in* GSA Special Paper Volume: Military Geosciences: Past Lessons and Modern Challenges.

12. Caldwell, T., M. H. Cosh, and N. Gaur (2024), Sensor Selection, in *Soil Moisture Data Quality Guidance*, edited by N. Gaur, M. R. Levi and P. Knox, pp. 25-29, NOAA-NIDIS, Boulder, CO. Link.

11. Cosh, M. H., E. Ayres, T. Caldwell, V. Sehgal, Z. Libohova, and N. Gaur (2024), Quality Control and Quality Assurance of Soil Moisture Data, in *Soil Moisture Data Quality Guidance*, edited by N. Gaur, M. R. Levi and P. Knox, pp. 45-54, NOAA-NIDIS, Boulder, CO. Link.

10. Cosh, M. H., L. Rivera, E. Ayres, V. Sehgal, E. Becker, T. Caldwell, and N. Gaur (2024), Producing representative soil moisture data: sensor calibration and post-deployment strategies, in *Soil Moisture Data Quality Guidance*, edited by N. Gaur, M. R. Levi and P. Knox, pp. 30-44, NOAA-NIDIS, Boulder, CO. Link.

9. Mayes, K. B., G. R. Wilde, M. E. McGarrity, B. Wolaver, and T. G. Caldwell (2019), Watershed-Scale Conservation of Native Fishes in the Brazos River Basin, Texas, in *Multispecies and Watershed Approaches to Freshwater Fish Conservation*, edited by D. C. Dauwalter, T. Birdson and G. P. Garret, pp. 315–343, American Fisheries Society Symposia 91, Bethesda, MD. Link.

8. Robertson, S., B. Wolaver, T. G. Caldwell, T. Birdson, R. Smith, T. Hardy, J. Lewey, and J. Joplin (2019), A multidisciplinary approach to developing the science and public support needed to maintain instream flows in the Devils River Basin, Texas, in *Multispecies and Watershed Approaches to Freshwater Fish Conservation*, edited by D. C. Dauwalter, T. Birdson and G. P. Garret, pp. 293–314, American Fisheries Society Symposia 91, Bethesda, MD. Link.

7. Caldwell, T. (2017), Soft Money Research: Understanding the Basics and Keys to Success, *Crops, Soils, Agronomy News*, *62*, 33-34, https://doi.org/10.2134/csa2017.62.0407.

6. Mattia, F., A. Balenzano, G. Satalino, et al., including T. Caldwell (2017), Sentinel-1 high resolution soil moisture, in *2017 IEEE International Geoscience and Remote Sensing Symposium*, edited, pp. 5533-5536. https://doi.org/10.1109/IGARSS.2017.8128257

5. Young, M. H., T. G. Caldwell, L. Chen, D. S. Shafer, J. J. Miller, and W. J. Meyer 2011, Multi-scale characterization of arid soil properties for predicting hydrologic processes, paper presented at Proceedings of the 4th International Perspective on Water Resources & the Environment (EWRI), Singapore.

4. Stevenson, B. A., E. V. McDonald, and T. G. Caldwell (2009), Root Patterns of *Larrea tridentata* in Relation to Soil Morphology in Mojave Desert Soils of Different Ages, in *The Mojave Desert: Ecosystem Processes and Sustainability*, edited by R. H. Webb, et al., pp. 312-338, University of Nevada Press, Reno, NV.

3. McDonald, E. V., and T. G. Caldwell (2008), Geochemical characteristics of Iraqi dust and soil samples and related impacts to weapon malfunctions, in *Military Geography and Geology: History and Technology*, edited by C. P. Nathanail, R. J. Abrahart and R. P. Bradshaw, pp. 258-265, Land Quality Press, Nottingham.

2. Berli, M., T. G. Caldwell, E. V. McDonald, and D. A. Gilewitch 2007, Modeling desert pavement deterioration due to heavy vehicle traffic, paper presented at Proceedings of the Joint North American, Asia-Pacific ISTVS Conference and Annual Meeting of the Japanese Society for Terramechanics, Fairbanks, AK. Link.

1. Shafer, D. S., M. H. Young, S. F. Zitzer, E. V. McDonald, and T. G. Caldwell (2006), Coupled Environmental Processes in the Mojave Desert and Implications for ET Covers as Stable Landforms, in *Unsaturated Soils 2006*, edited by G. A. Miller, et al., pp. 718-729, American Society of Civil Engineers. https://doi.org/10.1061/9780784408025

Indexed Technical Reports

16. Caldwell, T.G., *in production*, Methods for Continuous Precipitation Measurements for the United States Geological Survey, *Open-file Report*, 79 pp.

15. Caldwell, T. G., J. M. Huntington, G. E. Davies, S. Tabatabai, and M. Fuhrmann (2022), Basis for Technical Guidance to Evaluate Evapotranspiration Covers, U.S. Nuclear Regulatory Commission, *NUREG/CR-7297*, 102 pp, Rockville, MD. https://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr7297/index.html

14. Caldwell, T., R. C. Naranjo, D. Smith, and C. Kropf (2021), Surface infiltration and unsaturated zone characterization in support of managed aquifer recharge in Bedell Flat, Washoe County, Nevada, U.S. Geological Survey, *Scientific Investigations Report 2021-5137*, 52 pp, Reston, VA, https://doi.org/10.3133/sir20215137

13. Montzka, C., M. Cosh, B. Bayat, et al., including T. Caldwell (2020), Soil Moisture Product Validation Good Practices, Protocol Version 1.0., Committee on Earth Observation Satellites, Working Group on Calibration and Validation, Land Product Validation Subgroup, 123 pp, https://doi.org/10.5067/doc/ceoswgcv/lpv/sm.001

12. Sun, A. Y., T. Bongiovanni, T. G. Caldwell, and M. H. Young (2020), Quantifying Diffuse Recharge at Camp Bullis, TX: Integrating Soil Water, Evapotranspiration, and Remote Sensing, Edwards Aquifer Authority, 55 pp, San Antonio, TX. Link.

11. O' Neill, P., S. Chan, R. Bindlish, et al., including T. Caldwell (2019), Soil Moisture Active Passive (SMAP) Project: Calibration and Validation for the L2/3_SM_P Version 6 and L2/3_SM_P_E Version 3 Data Products, Jet Propulsion Laboratory, *JPL D-56297*, 44 pp, Pasadena, CA. Link,

10. Jackson, T. J., P. O' Neill, S. Chan, et al., including T. Caldwell (2018), Soil Moisture Active Passive (SMAP) Project: Calibration and Validation for the L2/3_SM_P Version 5 and L2/3_SM_P_E Version 2 Data Products, Jet Propulsion Laboratory, *JPL D-56297*, 44 pp, Pasadena, CA. Link.

9. Caldwell, T. G., J. Huntington, B. R. Scanlon, A. Joros, and T. Howard (2017), Improving Irrigation Water Use Estimates with Remote Sensing Technologies: A feasibility study for Texas, Texas Water Development Board, *1313581612*, 126 pp, Austin, TX. Link.

8. Nielson-Gammon, J. W., G. Fipps, T. G. Caldwell, D. B. McRoberts, and D. Conlee (2017), Feasibility Study for Development of Statewide Evapotranspiration Network, Texas Water Development Board, *1613581995*, 97 pp, Austin, TX. Link.

7. Heyvaert, A. C., D. M. Nover, T. G. Caldwell, W. B. Trowbridge, G. Schladow, and J. E. Reuter (2011), Assessment of Particle Size Analysis in the Lake Tahoe Basin, Desert Research Institute, 156 pp, Reno, NV. Link.

6. Shoop, S. A., R. T. Affleck, S. D. Fleming, S. N. Bacon, L. M. Spears, and T. G. Caldwell (2009), Cold Regions Test Center (CRTC) cross-country trail characterization, U.S. Army Corps of Engineers, *ERDC/CRREL TR-09-16*, 108 pp, Washington, DC.

5. Young, M. H., T. G. Caldwell, J. J. Miller, and G. K. Dalldorf (2007), Hydraulic Characteristics of Soil Contributing to the Windmill Wash Detention Basin near Bunkerville, Nevada, Desert Research Institute, *Publication No. 41240*, 48 pp, Reno, NV.

4. Etyemezian, V., M. R. Sweeney, E. V. McDonald, T. G. Caldwell, J. K. Gillies, G. Nikolich, J. Xu, W. G. Nickling, and T. Macpherson (2006), Measurement of windblown dust emission potential and soil characteristics at the Salton Sea in support of the programmatic environmental impact report, Desert Research Institute, 78 pp, Las Vegas, NV.

3. Last, G. V., and T. G. Caldwell (2001), Core Sampling in Support of the Vadose Zone Transport Field Study, U.S. Department of Energy, Pacific Northwest National Laboratory, *PNNL-13454*, 11 pp, Richland, WA. Link.

2. Last, G. V., T. G. Caldwell, and A. T. Owen (2001), Sampling of Boreholes WL-3A through -12 in Support of the Vadose Zone Transport Field Study, U.S. Department of Energy, Pacific Northwest National Laboratory, *PNNL-13631*, 16 pp, Richland, WA. Link.
1. Ward, A. L., T. G. Caldwell, and G. W. Gee (2000), Vadose Zone Transport Field Study: Soil Water Content Distributions by Neutron Moderation, U.S. Department of Energy, Pacific Northwest National Laboratory, *PNNL-13795*, 19 pp, Richland, WA. Link

Indexed Data Sets

9. Weaver, M.R., B.J. Fleming, T.G. Caldwell, P.K. Anzman, E.S. Whitehead-Zimmers, and G.E. Davies, 2025, Groundwater Levels, Precipitation, and Soil Moisture Data from DE 723 Delaware County Observation Well, Delaware County, Pennsylvania (2022-2024), *data release*, U.S. Geological Survey. https://doi.org/10.5066/P1NUHESQ
8. Caldwell, T. G., and M. Wieczorek (2023), Daily average soil moisture and ancillary data from the Noah land surface model in the National Land Data Assimilation version 2 extracted for GAGES-II watersheds, 1980 to 2020, *data release*, U.S. Geological Survey. https://doi.org/10.5066/P9IKHEM3
7. Hammond, J. C., C. Simeone, J. S. Hecht, et al., including T. Caldwell (2022), U.S. Streamflow Drought During the Last Century: annual drought and low flow metrics, annual climate, and trends for the periods 1921-2020, 1951-2020 and 1981-2020, data *release*, U.S. Geological Survey. https://doi.org/10.5066/P96TXHDD
6. Smith, D. W., R. C. Naranjo, T. G. Caldwell, and K. E. O'Connor (2021), Supplemental Data: Surface Infiltration and Unsaturated Zone Characterization in Support of Managed Aquifer Recharge in Bedell Flat, Washoe County, Nevada, *data release*, U.S. Geological Survey. https://doi.org/10.5066/P9OAF8L8
5. Naranjo, R., D. W. Smith, and T. G. Caldwell (2021), Documentation of VS2DH Seepage Models: Surface Infiltration and Unsaturated Zone Characterization in Support of Managed Aquifer Recharge, Washoe County, Nevada, U.S. Geological Survey, *data release*, https://doi.org/10.5066/P9U9Q5PC
4. Bongiovanni, T., and T. G. Caldwell (2019), Texas Soil Observation Network (TxSON), Texas Data Repository Dataverse. https://doi.org/10.18738/T8/JJ16CF
3. Das, N., D. Entekhabi, R. S. Dunbar, et al., including T. Caldwell (2020), SMAP/Sentinel-1 L2 Radiometer/Radar 30-Second Scene 3 km EASE-Grid Soil Moisture, Version 3, Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/ASB0EQO2LYJV
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1. Colliander, A., Al Jassar, H., Asanuma, et al., including T. Caldwell (2017), SMAP/In Situ Core Validation Site Land Surface Parameters Match-Up Data, Version 1. Boulder, Colorado, NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/DXAVIXLY18KM

Professional Service

Professional Societies: American Geophysical Union, Geological Society of America, Soil Science Society of America, American Association of State Climatologists, W-5188 USDA Multi-State Soil Physics Research Project, Nevada Water Resources Association.

Committees: National Water Science Workshop, scientific program coordinator (USGS); Don and Betty Kirkham Soil Physics Award (2024–2026); Soil Science Society of America, Fellows (2025–2027); Henry Lin Travel Grant Award (2024–2026), National Coordinated Soil Moisture Network Executive Committee (2019–pres.); Texas Mesonet Steering Committee (2021–2024); National Ecological Observation Network (NEON), Soil Sensors Technical Work Group (2018–pres.); NSF Consortium for the Advancement of Hydrologic Science, Inc. (CUAHSI) UT-Austin (2013–2019); Don and Betty Kirkham Soil Physics Award (2019–2021); Soil Science Society of America, Early Career Award

Member (2017–2019); Agronomy Society of America, Early Career Member (2014–2017); Soil Science Society of America, Lectureship Task Force (2013–2015).

Editorial: Associate Editor (2025–2027), Vadose Zone Journal; Associate Editor (2023–2025), Geoderma; Associate Editor (2022–2024), Vadose Zone Journal; Associate Editor (2019–2021), Vadose Zone Journal; Associate Editor (2019–2022), Geoderma; Associate Editor (2016–2018), Vadose Zone Journal.

Formal Collaborations: World Meteorological Organization, Soil Moisture Measurement Update Team; TexMesonet, Co-PI and Board Member; NASA Soil Moisture Active Passive (SMAP) Calibration/Validation Partner; ESA Soil Moisture Ocean Salinity (SMOS) ground validation data provider, Ground-Based Observations for Validation (GBOV) of Copernicus Global Land Products for Sentinel-1/3 validation.

Science Program Coordinator, "National Water Science Workshop", U.S. Geological Survey, St. Louis, MO, 5-9 May 2025.

Scientific Organizing Committee, *"*Coordinated Cosmic-Ray Observing Systems Workshop*"*, supported by the National Science Foundation under Award No. AGS-2401074, Lincoln, NE, 14-16 October 2024. Link

Workshop Organizing Committee, "2024 National Soil Moisture Workshop", 15-18 July 2024, Logan, UT. Link.

Symposium Planning Committee Member, "The 2nd Global Evapotranspiration Symposium: Advances, Challenges, and Future Needs in Measurements, Modeling, and Applications", American Society of Agricultural and Biological Engineers, State College, PA, 23-27 October 2023. Link

Workshop Organizing Committee, "2023 National Soil Moisture Workshop", Beltsville, MD, 14-17 August 2023. Link.

Workshop Organizing Committee, "2022 National Soil Moisture Workshop", Columbus, OH, 9-10 August 2022. Link.

Local Organizing Chair: National Drought Mitigation Center's Technical Workshop on Drought and Season Forecasting Tools, Austin, TX, 6 December 2017. Link

Local Organizing Committee Chair: 6th International Workshop on Catchment Hydrological Modeling and Data Assimilation (CAHMDA-VI) held jointly with the 3rd International Workshop on Data Assimilation for Operational Hydrology and Water Management of the Hydrologic Ensemble Prediction Experiment (HEPEX-DAFOH III), Austin, Texas, 8 – 12 September 2014. Link

Coordinator, CUASHI 2015 Fall Cyberseminar Series, The Western US Drought on the Ground and from Space: Combining in situ and remotely sensed data to understand and mitigate drought. Link

Technical Session Coordinator:

"Advances in soil water content measurements from sensors, networks, and satellites", CANVAS, Soil Science Society of America Annual Meeting, Salt Lake City, UT, 9-12 November 2025

"Achievements in Soil Moisture Science: In Situ, Modeling, and Remote Sensing", American Geophysical Union Fall Meeting, Washington, D.C., 9-13 December 2024. Link

"Advancing Soil Moisture Science via Monitoring, Modeling, and Remote Sensing", American Geophysical Union Fall Meeting, San Francisco, CA, 11-15 December 2023. Link

"Progress in Monitoring Soil Water Content at a National Scale: The National Coordinated Soil Moisture Monitoring Network", 2023 ASA-CSSA-SSSA International Annual Meeting, St. Louis, MO, 29 October – 1 November 2023. Link

"Advancing Soil Moisture Science via Monitoring, Modeling, and Remote Sensing", American Geophysical Union Fall Meeting, Chicago, IL., 12-16 December 2022. Link

"Advancing Soil Moisture Science via Monitoring, Modeling, and Remote Sensing", American Geophysical Union Fall Meeting, New Orleans, LA, 13-17 December 2021. Link

"Advancing Soil Moisture Science via Monitoring, Modeling, and Remote Sensing", American Geophysical Union Fall Meeting, Virtual, 1-17 December 2020. Link

"Green Water and the Food-Energy-Water Nexus", Soil Science Society of America, International Soils Meeting, San Diego, CA, 6-9 January 2019. Link

"Grant Application Navigation and Resources for Expanding Early Career Opportunities", Soil Science Society of America Annual Meeting, Phoenix, AZ, 6-9 November 2016. Link

"*Remote Sensing of Land Surface and Vadose Zone Hydrologic Processes*" Soil Science Society of America Annual Meeting, Phoenix, AZ, 6-9 November 2016. Link

"Modeling Soil Processes in the Geological Sciences: Status, Gains, and Opportunities", Geological Society of America Annual Meeting, Denver, CO, 25-28 September 2016.

"Remote Sensing of Soil Water: Soil Moisture Active Passive and Beyond", Soil Science Society of America Annual Meeting, Minneapolis, MN, 15 – 18 November 2015. Link

"*Grant Application Navigation and Resources for Expanding Early Career Opportunities*", Soil Science Society of America Annual Meeting, Minneapolis, MN, 18 November 2015.

"*Hillslope Dynamics: Integrating Soils, Hydrology, and Climatic Processes to Understand Weathering and Sediment Transport on Drainage Basin Slopes*", Geological Society of America Annual Meeting, Baltimore, MD, 1 – 4 November 2015. Link

"Soil Development and Pedogenesis in Geosciences", Geological Society of Annual Meeting, Vancouver, BC, 19 – 22 October 2014. Link

"The Co-Evolution of Soils and Landscapes in the Quaternary", Geological Society of America 125th Annual Meeting, Denver, CO, 27 – 30 October 2013, with co-sponsorship from the Soil Science Society of America. Link

"Soil as a Mediator of Geological Processes", South-Central Section, Geological Society of America 47th Annual Meeting, Austin, TX, 4 – 5 April 2013 Link

Invited Presentations

Caldwell, T.G., Next Generation Soil Moisture and Snow Monitoring Using Cosmic Ray Neutron Sensing by the United States Geological Survey, Coordinated Cosmic Ray Observation System Workshop, Lincoln, NE, 14 October 2024. Link.

Sexstone, G. and T. Caldwell, Next generation USGS snow and soil moisture monitoring, USGS National Observational Data Community of Practice, Listening Session, 5 June 2024.

Caldwell, T.G. and T. Franz, Cosmic rays and soil moisture: How neutron sensing can help monitor water, USGS National Innovation Center Webinar Series, 21 March 2024. Link.

Caldwell, T.G., Groundwater drought: Onset, recovery, and propagation, Listening Session, NOAA-NIDIS Drought Prediction: A Focus on Groundwater, 5 May 2022. Webinar.

Caldwell, T.G., Advancing Soil Moisture at the National Scale, USGS Water Mission Area Seminar Series, webinar, 14 July 2021. Internal link.

Caldwell, T.G., Texas Soil Observation Network, NDMC Technical Workshop on Drought and Seasonal Forecasting Tools, Austin, TX, 6 December 2017, Link

Caldwell, T.G., Validation and Application of the Soil Moisture Active Passive Satellite Mission in Texas, BEG Friday Seminar Series, Austin, TX, 3 November 2017, Link

Caldwell, T.G., Drought, flood and everywhere in between: A hydrologic view of Texas from satellites and sensors, Collectors' Society Seminar Series, San Angelo Museum of Fine Art, San Angelo, TX, 2 March 2017. Link

Caldwell, T.G., Validation and application of the Soil Moisture Active Passive Satellite Mission, UNR Graduate Program of Hydrologic Sciences Colloquia, Reno, NV, 9 September 2016. Link

Caldwell, T.G., M.H. Young, B.R. Scanlon, Z-L, Yang, N. Das, A. Colliander, S. Misra, S. Yueh, M. Cosh, R. Bindlish, and T. Jackson, Soil moisture, recharge and runoff in central Texas, NASA SMAP Applications Workshop and Tutorial, Texas Water Development Board, Austin, TX, 4 -5 April 2016. Link

Caldwell, T.G., The validation of soil moisture from sensors, satellites and simulations, University of Texas at Austin Climate Forum, UT-Austin, 23 November 2015. Link

Caldwell, T.G., The Texas Soil Observation Network, Texas Groundwater Summit, San Marcos, TX, 25 – 27 August 2015. Link

Caldwell, T.G., Texas Droughts and Floods, Grace Museum of Modern Art, Abilene, TX, 19 March 2015, Evening Presentation Series.

Caldwell, T.G., M.H. Young, B.R. Scanlon, Linking soil water to water resources in the Texas Hill Country, ASA, CSSA, and SSSA Annual Meeting, Long Beach, CA, 2 – 5 November 2014. Link

Caldwell, T.G., M.H. Young, and B.P. Wilcox, Transitionary biomes and the vertical flux of water in semiarid rangelands, Geological Society of America Annual Meeting, Denver, CO, 27 – 30 October 2013. Abstract

Caldwell, T.G., B.R. Scanlon, D. Long, and M.H. Young, Ground-based measurements of soil water storage in Texas, Water Forum II: Texas Drought and Beyond, Austin, TX, 22 – 23 October 2012. Agenda

Caldwell, T.G., Soil Moisture and the Drought in Texas, Jackson School Hydrology Brown Bag, Austin, TX, 27 September 2013.

Caldwell, T.G., E.V. McDonald and M.H. Young, Arid soil evolution and pedologic development: Process considerations and applications to engineered barrier design, U.S. Nuclear Regulatory Commission, Workshop on Engineered Barrier Performance Related to Low-Level Radioactive Waste, Decommissioning and Uranium Mill Tailings Facilities, Rockville, MD, 3 – 5 August 2010. Agenda

Caldwell, T.G., M.H. Young, J.M. Miller, L. Chen, G. Dalldorf, S.N. Bacon and E.V. McDonald, Hydrologic prediction of runoff potential using terrain forecasting, American Society of Flood Plain Managers: Tools for Arid Regions Flood Damage Reduction and Restoration, Reno, NV, 18 – 23 May 2008.

Caldwell, T.G., M.H. Young, J. Zhu, and E.V. McDonald, Hydropedology of canopy-interspace ecosystems in the Mojave Desert: Biotic and abiotic processes, Ecological Society of America Annual Meeting, Milwaukee, WI, 4 – 8 August 2008. Link

Caldwell, T.G. M.H. Young, J.M. Miller, and G.K. Dalldorf, Characterizing hydraulic properties in an arid watershed to aid in flood control and uncertainty analysis, Joint Meeting of the Geological Society of America and ASA-CSA-SSSA, Houston, TX, 6 – 10 October 2008.

Caldwell, T.G., E.V. McDonald, and G. McCurdy, Hillslope soils, microclimate and hydrology: Influence of slope and aspect, Oak Ecosystem Restoration Workshop, Catalina Island, CA, 2–4 February 2007.

Caldwell, T.G. and M.H. Young, Heterogeneities of soil hydraulic properties from canopy to interspace, NSF EPCOR Symposium on Scaling Environmental Processes in Heterogeneous Arid Soils, Las Vegas, NV, 30 August 2007.

Caldwell, T.G., E.V. McDonald, and T. Bullard, Linking soils, landscape and geomorphology: Catalina Island, CA, Oak Researchers Workshop, Long Beach CA, 22 March 2005.

Outreach and Multimedia Coverage

Community webinar, Updates on the Next Generation Soil Moisture Monitoring in the Roaring Fork River Basin, Colorado, USGS Upper Colorado Basin Stakeholder Webinar, 28 September 2023.

Soil Moisture Field School, National Soil Moisture Workshop, Beltsville, MD, 14 August 2023. Link.

Webinar, Next Generation Soil Moisture Monitoring in the Roaring Fork River Basin, Colorado, Middle Colorado Watershed Council Webinar, 29 September 2023. Link.

Video, a multi-agency effort to measure soil water content using buried *in situ* sensors, November 2022, Link

Community webinar, Next Generation Soil Moisture Monitoring in the Roaring Fork River Basin, Colorado, USGS Upper Colorado Basin Stakeholder Webinar, 29 November 2022.

Community presentation, "From Drought to Flood: Soil Moisture's Unsung Role in Hill County Hydrology: presented to CAPCOG Homeland Security Task Force Flood Forecast Subcommittee, presented at Kyle Fire Station #1, Kyle, TX., September 26, 2018.

Community presentation, "How Much Water Can Soil Hold? Explore Soil Moisture and Texas Floods," sponsored by the Environmental Science Institute, Hot Science, Cool Activities, Austin, Texas, September 14, 2018.

Media Broadcast, "Virtual Classroom", Soil, Panelist, August 19, 2015, PBS- KLRN San Antonio, TX - https://ovee.itvs.org/screenings/48tac

News article, Medill National Security Zone, June 6, 2015, "NASA's soil-moisture satellite data helps fight California droughts", Link

News article, Wired Magazine, May 29, 2015, "Texas Floods are so big they ended the State's Drought" Link

Featured Story, Texas Water Resources Institute txH2O feature story, Summer 2015 issue, "Satellites, Sensors and Soils: research digs deeper into soil moisture mysteries" Link

News article, Abilene Reporter, March 20, 2015, "Glimmer of hope given at talk about drought" Link

Community presentation, Grace Museum of Art, Abilene, TX, "Science is Awesome" Series, March 15, 2015. Link

Multimedia Story, NASA Jet Propulsion Laboratory, "How Dry is Texas? SMAP, TxSON aim to find out", May 6, 2015, Link

Nature News, January 27, 2015, "Soil-moisture probe readies for launch" http://www.nature.com/news/soil-moisture-probe-readies-for-launch-1.16764

Texas Tribune, February 10, 2015, "Q&A: Todd Caldwell", http://www.texastribune.org/2015/02/10/q-todd-caldwell/

KVUE News, February 8, 2015, Austin, TX, "UT, LCRA team with NASA on $900M forecasting satellite", Link

Physics.org, Spotlight Science News, February 3, 2015, "Drought and flood prediction gets boost from new Texas network and NASA satellite" http://phys.org/news/2015-02-drought-boost-texas-network-nasa.html

NPR News Feature Story, November 24, 2014, "How Underground Sensors in Texas Will Help NASA Predict Drought and Floods" http://kut.org/post/how-underground-sensors-texas-will-help-nasa-predict-drought-and-floods

Texas Commission on Environmental Quality Continuing Education Units (1 unit), presentation and discussion "Drought, Soil Moisture and Water Resources in Texas", April 15, 2014.

Texas Water Development Board, Staff Brown Bag Presentation, December 7, 2012, "Soil Water Storage in Texas: What we are measuring and how it compares to model predictions".

Nevada Agricultural Experiment Station, participant at "Field Day", tour leader of soil micrometeorological stations, September 20, 2008.

American Society of Flood Plain Managers, A Living River Approach to Floodplain Management: 31st Annual Conference of the Association of State Floodplain Managers, Reno, NV, 18-23 May 2008, workshop development for "Tools for Arid Regions Flood Damage Reduction and Restoration" and presentation of "Hydrologic Prediction of Runoff Potential Using Terrain Forecasting, Bunkerville, NV."