

NELIA W. DUNBAR

New Mexico Bureau of Geology
Socorro, NM, 87801
Date of Birth: July 1, 1962
nelia.dunbar@nmt.edu

Updated March 2025**EDUCATION:****George School**

Graduated, 1979

Mount Holyoke CollegeBA summa cum laude in geology, 1983
overall GPA 3.76 GPA in geology 3.90

Honors thesis: Mineralogical and geochemical investigation of Cascade Range tephra.

New Mexico Institute of Mining and Technology

MS in geology, 1985

PhD in geochemistry, 1989

Dissertation: Investigation of volatile contents and degassing systematics of rhyolitic magmas from the Taupo Volcanic Zone, New Zealand.

GRANTS AND AWARDS(details about NSF funding levels and grant durations at <http://www.nsf.gov/awardsearch/index.jsp>)

- NSF-Engines Development Award 2303637: Advancing energy and resilience technologies in the Permian Basin (TX, NM)
- New Mexico Interstate Stream Commission. "Leap Ahead" Water and Climate Advisory Board.
- USGS-Earth-MRI. Rare earth elements (REE) deposits in the Gallinas Mountains, Lincoln, and Torrance Counties, central New Mexico.
- NSF-ANT-1745015. Collaborative Research: Constraining West Antarctic Ice Sheet Elevation during the last Interglacial
- NSF-ANT-1543454. Collaborative Research: Tephrochronology of a South Pole ice core
- NSF-ANT-1142115. Tephrochronology of the WAIS Divide Ice Core: Linking ice cores through volcanic records
- NSF-ANT-1142069. Collaborative Research: Developing an Antarctic Tephra Database for Interdisciplinary Paleoclimate Research
- USGS-MRERP- Rare Earth Element (REE) potential and origin of the Cambrian-Ordovician syenite/episyenites in the Caballo and Burro Mountains, southern New Mexico.
- NSF-ANT-. Subcontract to ANDRILL McMurdo Ice Shelf Project. Characterization of the Volcanic Record in the ANDRILL MIS Core
- NSF-ANT-0636515. Collaborative Research: Collaborative Proposal: 2000+ Year Detailed, Calibrated Climate Reconstruction from a South Pole Ice Core Set in an Antarctic-Global Scale Context. Collaborative research with University of Maine
- NSF-ANT-0636767. Collaborative Research: Microparticle/tephra analysis of the WAIS Divide ice core. Collaborative research with University of Maine
- NSF-ANT-0230348. Collaborative Research: Refining a 500-kyr Climate Record from the Mt. Moulton Blue Ice Field in West Antarctica. Collaborative research with University of Pennsylvania and University of Colorado
- NSF-ANT-0125549. A 700-year Tephrochronology of the Law Dome ice core, East Antarctica. Collaborative proposal with University of Maine
- NSF-ANT-9814428. Initial examination of the 500,000-year climate record at Mt. Moulton, West Antarctica. Collaborative proposal with University of Maine
- NSF-ANT-9725910. Late Pleistocene inland West Antarctic Ice Sheet elevations at Mt. Takahe.
- NSF-ANT-9615167. Volcanic record from the Siple and Taylor Dome Ice cores.
- NSF-ANT-9527373. Volcanic record in Antarctic ice: Implications for climatic and eruptive history and ice sheet dynamics of the South Polar region.

- NSF-EAR-9526642. $^{40}\text{Ar}/^{39}\text{Ar}$ dating of fluid inclusions.
- NSF EAR-9413900. Acquisition of an analytical scanning electron microscope.
- NSF EAR-9316467 Acquisition of an X-ray fluorescence spectrometer.
- NSF OPP-9316505. Volcanic Record in Antarctic Ice.
- NSF EAR-9219758. Mobility of elements during potassium metasomatism by alkaline, saline brines (not a PI, but involved in the research).
- NSF EAR-9223802. Determining the Uplift Rate of the Tibetan Plateau from Cosmogenic ^{36}Cl in Volcanic Rocks
- NSF EAR-8916402. Investigation of the pre-Eruptive Volatile Contents of the Taupo Ignimbrite: Implications for Plinian-Ignimbrite transitions, Jan. 1, 1990 to June 30, 1991
- NSF EAR-8803694. Collaborative Research: Investigation of Volatile Gradients in Silicic Magma Chambers (not a PI, but wrote the proposal as a graduate student).

- Investigator on the multi-investigator, multi-institution grant from Molycorp/Chevron to investigate Geological and hydrological characterization at the Molycorp Questa Mine, Taos County, New Mexico. Five year project beginning in 2003.
- Mineral Institute Fellowship (4 years support in graduate school)
- Sigma Xi grant to support graduate research
- Geological society of America grant to support graduate research
- Associated Western Universities grant to support summer research
- American Metals Climax Scholarship (grant for summer field camp)

HONORS:

- New Mexico Network for Women in Science and Engineering "Impact" Award (2023)
- Geological Society of America Frye Award recipient (2023)
- New Mexico Tech Distinguished Research Award (2021)
- Five College Distinguished Lecturer in Geology (2019)
- Geological Society of America Fellow (awarded 2014)
- New Mexico Geological Society Honorary Member (awarded 2014)
- Mary Lyon Scholar (outstanding young alumna, Mt. Holyoke College, awarded 1998)
- Sarah Williston Scholar (top 15% of class after sophomore year)
- Phi Beta Kappa
- Sigma Xi

PROFESSIONAL MEMBERSHIPS/COMMITTEE SERVICE:

- American Association of University Women
- American Geophysical Union
- Association of American State Geologists (Secretary 2018-2023)
- Geological Society of America
- Geological Society of America's Academic & Applied Geoscience Relations Committee (member 2019-)
- International Women's Forum (2021-)
- Microbeam Analysis Society
- National Academy of Science, Engineering and Medicine Board on Earth Sciences and Resources (member 2019-)
- National Academy of Science, Engineering and Medicine "America's Geoh heritage Workshop II" committee (member 2020-2021)
- New Mexico Geological Society Executive Committee (2009-2013)
- New Mexico Geological Society (member since 1983, elected honorary lifetime member 2014)
- New Mexico Tech Comprehensive Campaign Cabinet Co-Chair (2020-)
- New Mexico Tech Foundation Board Member (2021-)

EMPLOYMENT:

Director and State Geologist Emerita/Adjunct Faculty: March 2024-present. New Mexico Bureau of Geology and Mineral Resources/ Earth and Environmental Science Department, New Mexico Institute of Mining and Technology. Research and outreach activities.

Director and State Geologist/Adjunct Faculty: Oct. 2016-March 2024. New Mexico Bureau of Geology and Mineral Resources/ Earth and Environmental Science Department, New Mexico Institute of Mining and Technology. Oversight of research and service activities for the New Mexico state geological survey. Represent the New Mexico Bureau of Geology and Mineral Resources at the state legislature, to other state agencies, and at national meetings. Act as advisor for the electron microprobe laboratory and carry out limited research.

Interim Vice President for Research: March 2022- January 2023 New Mexico Institution of Mining and Technology.

Geochemist/Deputy Director/Adjunct Faculty: Aug. 1992-Oct. 2016. New Mexico Bureau of Geology and Mineral Resources/ Earth and Environmental Science Department, New Mexico Institute of Mining and Technology. Research on volcanology, igneous petrology, and economic geology. Manager of Cameca SX-100 electron microprobe facility.

Research Associate: March, 1991-Aug. 1992. Oak Ridge National Labs. Petrology and gas geochemistry of In Situ Vitrification project.

Post-Doctoral Research Associate: Sept., 1988-Feb, 1991. New Mexico Institute of Mining and Technology. Research on volatile contents and gradients in the Bishop and Bandelier Tuffs and Taupo Ignimbrite. Supported by the National Science Foundation grants.

Antarctic Researcher: Many (1983/84; 1984/85; 1985/86; 1987/88; 1988/89; 1989/90; 1990/91, 1992/93, 1993/94, 1994/95, 1995/96, 1996/97, 1998/99, 1999/2000, 2002/03, 2003/04, 2005/06, 2006/07, 2007/08, 2009/10, 2010/11, 2018/19, 2024/25). Volcanological fieldwork in various parts of Antarctica, as field assistant, graduate researcher, or principal investigator. Work mainly included tephrochronology, mapping recent volcanic rocks, and measuring the volatile outputs of an active volcano.

Field Assistant: Summer, 1985. Inyo domes drilling project. Core logging on a young obsidian dome.

X-Ray Lab Technician: Summer, 1984. New Mexico Bureau of Mining and Mineral Resources. Preparing and analyzing standards for x-ray fluorescence and diffraction.

Petrology Internship: Summer, 1983. Chevron Oil Field Research Company, La Habra, CA. Preparing and analyzing standards for x-ray diffraction.

TEACHING EXPERIENCE:

Adjunct Faculty member: New Mexico Institute of Mining and Technology Earth and Environmental Science Department. Responsibilities include advising graduate students, and teaching Geoc. 575 "Theory and Practice of Electron Microprobe analysis". This class was taught by me every semester from 1998-2016. Spring 2009 co-taught a web-based class on "Calderas". Collaborating instructors: John Stix (McGill), Fraser Goff (LANL), Tobias Fischer (UNM), Jeff Johnson (NMT).

Teaching Assistant: New Mexico Institute of Mining and Technology. Preparing, teaching and grading work for mineralogy labs (fall, 1983, 1984) and x-ray fluorescence labs (spring, 1984).

Teaching Assistant: Mount Holyoke College. Preparing, teaching and grading labs for physical geology (fall, 1981,1982) and historical geology (spring, 1982).

GRADUATE STUDENTS ADVISED:

Cox, J. (MS), Barton, M. (MST), Bell, S. (MS), Crain, J. (MS), Dickens, a. (MS), Ennis, D. (MS), Eschenbacher, a. (MS), Frey, B. (MS), Frisch, P. (MS), Hartman, L., (MS, University of Maine), Hartman, M. (MS), Helmick, M. (MS, University of Maine), Isopolatov, V. (PhD), Iverson, N. (MS/PhD), D. Kalteyer (MS, Univerisity of Maine), Kammerer, M. (MS), Koffman, B. (PhD, University of Maine), Kelly, P. (MS), Kimball, C. (MS), Kulis, J. (MS), Harpel, C. (MS), Horning, R. (MS), Iverson, N. (MS), Latysh, N. (MS),), Lauman, L. (MS), Law, R. (MS), Lynch, S. (MS), Marrero, S (MS/PhD), Nenuji, V. (PhD), Nybo, J. (MS) O'Keefe, M. (MS), Parmelee, D., (MS) Phillips, E. (MS), Randall, E. (MS), Rasmussen, D (MS), Riggins, A., (MS), Rinkleff, P. (MS), Ross, J. (MS/PhD), Rourke, R. (MS), Sherwood, W. (MsT), Sweeney, D. (MS), Voisons, D. (MS, University of New Hampshire), Wardell, J. (PhD), White, R. (MS), Wilson, J. (PhD), Wilson, S. (MS), Winick, J. (MS)

List of Publications

For a list of publications and presentations listed by year, with links to abstracts, please refer to the following URL: <http://geoinfo.nmt.edu/staff/dunbar/publications/home.html>

Publications in Refereed Journals

- Alexiades, V., Jacobs, G.K., and Dunbar, N.W., 1994. Constraints on mass balance of soil moisture during in situ vitrification. *Envir. Geol.*, 23, 83-88.
- Antibus, J.V., Panter, K.S., Wilch, T.I., Dunbar, N., McIntosh, W., Tripathi, A., Bindeman, I., Blusztajn, J., 2014. Alteration of volcanoclastic deposits at Minna Bluff: Geochemical insights on mineralizing environment and climate during the Late Miocene in Antarctica. *Geochemistry Geophysics Geosystems* 15, 3258-3280.
- Aster, R., Mah, S., Kyle, P., McIntosh, W., Dunbar, N., Johnson, J., Ruiz, M., and McNamara, S., 2003, Very long period oscillations of Mount Erebus Volcano: *Journal of Geophysical Research-Solid Earth*, v. 108, p. 2522-2544.
- Aster, R., McIntosh, W., Kyle, P., Esser, R., Bartel, B., Dunbar, N., Johns, B., Johnson, J., Karstens, R., Kurnik, C., MCGowan, M., McNamara, S., Meertens, C., Pauly, B., Richmond, M., and Ruiz, M., 2004, Real-time data received from Mount Erebus Volcano, Antarctica: *EOS Transactions of the American Geophysical Union*, v. 85, no. 10, p. 97-101.
- Bensing, J.P., Mozley, P.S., and Dunbar, N.W., 2005, Importance of clay in iron transport and sediment reddening: Evidence from reduction features of the ABO Formation, New Mexico, USA: *Journal of Sedimentary Research*, v. 75, p. 562-571.
- Beratan, K.K., Peer, B., Dunbar, N.W., and Blom, R., 1997. A remote sensing approach to alteration mapping: AVIRIS data and extension-related potassium metasomatism, Socorro, New Mexico. *Int. J. Remote Sensing*, v. 18, 15 p.
- Braddock, S., Venturelli, R. A., Nichols, K., Moravec, E., Boeckmann, G. V., Campbell, S., Balco, G., Ackert, R., Small, D., Johnson, J. S., Dunbar, N., Woodward, J., Mukhopadhyay, S., and Goehring, B., 2025, Lessons learned from shallow subglacial bedrock drilling campaigns in Antarctica: *Annals of Glaciology*, p. 1-11
- Buizert, C., Adrian, B., Ahn, J., Albert, M., Alley, R. B., Baggenstos, D., Bauska, T. K., Bay, R. C., Bencivengo, B. B., Bentley, C. R., Brook, E. J., Chellman, N. J., Clow, G. D., Cole-Dai, J., Conway, H., Cravens, E., Cuffey, K. M., Dunbar, N. W., Edwards, J. S., Fegyveresi, J. M., Ferris, D. G., Fitzpatrick, J. J., Fudge, T. J., Gibson, C. J., Gkinis, V., Goetz, J. J., Gregory, S., Hargreaves, G. M., Iverson, N., Johnson, J. A., Jones, T. R., Kalk, M. L., Kippenhan, M. J., Koffman, B. G., Kreutz, K., Kuhl, T. W., Lebar, D. A., Lee, J. E., Marcott, S. A., Markle, B. R., Maselli, O. J., McConnell, J. R., McGwire, K. C., Mitchell, L. E., Mortensen, N. B., Neff, P. D., Nishiizumi, K., Nunn, R. M., Orsi, A. J., Pasteris, D. R., Pedro, J. B., Pettit, E. C., Price, P. B., Priscu, J. C., Rhodes, R. H., Rosen, J. L., Schauer, A. J., Schoenemann, S. W., Sendelbach, P. J., Severinghaus, J. P., Shturmakov, A. J., Sigl, M., Slawny, K. R., Souney, J. M., Sowers, T. A., Spencer, M. K., Steig, E. J., Taylor, K. C., Twickler, M. S., Vaughn, B. H., Voigt, D. E., Waddington, E. D., Welten, K. C., Wendricks, A. W., White, J. W. C., Winstrup, M., Wong, G. J., Woodruff, T. E., and Members, W. D. P., 2015, Precise inter-polar phasing of abrupt climate change during the last ice age: *Nature*, v. 520, no. 7549, p. 661-U169. doi: 10.1038/nature14401
- Buizert, C., Fudge, T. J., Roberts, W. H. G., Steig, E. J., Sherriff-Tadano, S., Ritz, C., Lefebvre, E., Edwards, J., Kawamura, K., Oyabu, I., Motoyama, H., Kahle, E. C., Jones, T. R., Abe-Ouchi, A., Obase, T., Martin, C., Corr, H., Severinghaus, J. P., Beaudette, R., Epifanio, J. A., Brook, E. J., Martin, K., Chappellaz, J., Aoki, S., Nakazawa, T., Sowers, T. A., Alley, R. B., Ahn, J., Sigl, M., Severi, M., Dunbar, N. W., Svensson, A., Fegyveresi, J. M., He, C. F., Liu, Z. Y., Zhu, J., Otto-Bliesner, B. L., Lipenkov, V. Y., Kageyama, M., and Schwander, J., 2021, Antarctic surface temperature and elevation during the Last Glacial Maximum: *Science*, v. 372, no. 6546, p. 1097-+ 10.1126/science.abd2897

- Campbell, A.R., Lundberg, S.A., and Dunbar, N.W., 2000. Solid inclusions of halite in quartz: Evidence for the halite trend. *Chemical Geology*, 173, p. 175-191.
- Cather, S.M., Read, A.S., Dunbar, N.W., Kues, B.S., Krainer, K., Lucas, S.G., and Kelley, S.A., 2011, Provenance evidence for major post-early Pennsylvanian dextral slip on the Picuris-Pecos fault, northern New Mexico: *Geosphere*, v. 7, p. 1175-1193.
- Chapin, C.E. And Dunbar, N.W., 1995. A regional perspective on arsenic in waters of the middle Rio Grande Basin, New Mexico. *Proceedings of the 39th Annual New Mexico Water Conference*. WRRRI Report No. 290, p. 257-276.
- Connell, S., S. Cather, N. Dunbar, and W. McIntosh, 2002. Stratigraphy of the Tanos and Blackshare Formations (lower Santa Fe Group), Hagan embayment, Rio Grande rift, New Mexico, *New Mexico Geology*, 24 (4), 107-120.
- Cooper, K.M., M.R. Reid, N.W. Dunbar, and W.C. McIntosh, 2002. Origin of mafic magmas beneath northwestern Tibet: Constraints from Th-230-U-238 disequilibria : art. no. 1065, *Geochemistry Geophysics Geosystems*, 3, 1065-1065.
- Crow, R., Karlstrom, K.E., McIntosh, W., Peters, L., and Dunbar, N., 2008, History of Quaternary volcanism and lava dams in western Grand Canyon based on lidar analysis, $^{40}\text{Ar}/^{39}\text{Ar}$ dating, and field studies: Implications for flow stratigraphy, timing of volcanic events, and lava dams: *Geosphere*, v. 4, p. 183-206.
- de Moor, J. M., Aiuppa, A., Avard, G., Wehrmann, H., Dunbar, N., Muller, C., Tamburello, G., Giudice, G., Liuzzo, M., Moretti, R., Conde, V., and Galle, B., 2016, Turmoil at Turrialba Volcano (Costa Rica): Degassing and eruptive processes inferred from high-frequency gas monitoring: *Journal of Geophysical Research-Solid Earth*, v. 121, no. 8, p. 5761-5775.
- Dunbar, N. W., 2020, Kilbourne Hole Volcanic Crater National Natural Landmark, New Mexico Bureau of Geology and Mineral Resources, 279-282 p
- Dunbar, N. W., 2020, Valley of Fires recreation area, New Mexico Bureau of Geology and Mineral Resources, 183-186 p
- Dunbar, N.W., 2014. Review of 'Metasomatism and the Chemical Transformation of Rock- The Role of Fluids in Terrestrial and Extraterrestrial Processes'. *Geofluids*.
- Dunbar, N.W., 2010, Bandelier National Monument, *in* Price, L.G., ed., *The Geology of Northern New Mexico's Parks, Monuments and Public Lands, Volume 1: Socorro NM*, New Mexico Bureau of Geology and Mineral Resources, p. 145-152.
- , 2010, El Malpais National Monument, *in* Price, L.G., ed., *The Geology of Northern New Mexico's Parks, Monuments and Public Lands, Volume 1: Socorro NM*, New Mexico Bureau of Geology and Mineral Resources, p. 25-34.
- , 2010, Kasha-Katuwe Tent Rocks National Monument, *in* Price, L.G., ed., *The Geology of Northern New Mexico's Parks, Monuments and Public Lands, Volume 1: Socorro NM*, New Mexico Bureau of Geology and Mineral Resources, p. 153-158.
- , 2010, Valles Caldera National Preserve, *in* Price, L.G., ed., *The Geology of Northern New Mexico's Parks, Monuments and Public Lands, Volume 1: Socorro NM*, New Mexico Bureau of Geology and Mineral Resources, p. 135-144.
- Dunbar, N. W., 2005, Quaternary Volcanism in New Mexico: *New Mexico Museum of Natural History and Science Bulletin*, v. 28, p. 95-106.
- Dunbar, N.W., 2002, History of the Geochronology of the Carrizozo Lava Flows, *New Mexico Geol. Soc. Guidebook*, 53, 6-8.
- Dunbar, N.W., 1999. Cosmogenic ^{36}Cl -determined age of the Carrizozo lava flows, south-central New Mexico. *New Mexico Geology*, 21, 25-28.
- Dunbar, N. W., Chapin, C. E., and Brandvold, L. A., 2002, arsenic in New Mexico's Water, *Earth Matters*, New Mexico Bureau of Geology and Mineral Resources, 1-4.
- Dunbar, N.W., Chapin, C.E., Ennis, D.J., and Campbell, A.R., 1994. Trace element and mineralogical alteration associated with moderate and advanced degrees of K-metasomatism in a rift basin at Socorro, New Mexico. *N. M. Geol. Soc. Guidebook*, 45, 225-232.

- Dunbar, N.W., Campbell, A.R., and Candela, P.A., 1996. Physical, chemical and mineralogical evidence for magmatic fluid migration within the Capitan pluton, southeastern New Mexico. *Geol. Soc. Am. Bull.*, 108, 313-333.
- Dunbar, N.W., Cashman, K.V., and Dupre, R., 1994. Crystallization processes of anorthoclase phenocrysts in the Mount Erebus magmatic system: Evidence from crystal composition, crystal size distributions and volatile contents of melt inclusions. In: *Volcanological Studies of Mount Erebus. Antarctic Research Series*, 66, 129-146.
- Dunbar, N. W., and Gutzler, D. S., 2022, Introduction, in Dunbar, N. W., Gutzler, D. S., Pearthree, K. S., Phillips, F. M., and Bauer, P., eds., *Climate Change in New Mexico Over the Next 50 Years: Impacts on Water Resources*, Volume Bulletin 164: Socorro, NM, New Mexico Bureau of Geology and Mineral Resources, p. 1-7
- Dunbar, N. W., Gutzler, D. S., Pearthree, K. S., Phillips, F. M., and Bauer, P., eds., *Climate Change in New Mexico Over the Next 50 Years: Impacts on Water Resources*, Volume Bulletin 164: Socorro, NM, New Mexico Bureau of Geology and Mineral Resources, p. 1-175.
- Dunbar, N.W. and Hervig, R.L., 1992A. Petrogenesis and volatile stratigraphy of the Bishop Tuff: Evidence from melt inclusion analysis. *J. Geophys. Res.*, 97, 15129-15150.
- Dunbar, N.W. and Hervig, R.L., 1992B. Volatile and trace element composition of melt inclusions from the Lower Bandelier Tuff: Implications for eruptive style and magma chamber processes. *J. Geophys. Res.*, 97, 15151-15170.
- Dunbar, N.W., Hervig, R.L., and Kyle, P.R., 1989. Determination of pre-eruptive H₂O, F and Cl contents of silicic magmas using melt inclusions: Examples from Taupo volcanic center, New Zealand. *Bull. Volcanol.*, 51, 177-184.
- Dunbar, N. W., Iverson, N. A., Smellie, J. L., McIntosh, W. C., Zimmerer, M. J., and Kyle, P. R., 2021, Active Volcanoes of Marie Byrd Land, in Smellie, J. L., Panter, K.S., and Geyer, A., ed., *Volcanism in Antarctica: 200 Million Years of Subduction, Rifting and Continental Break-up*, Volume 55: London, Geological Society, London, Memoirs 10.1144/M55-2019-29
- Dunbar, N. W., Iverson, N. A., Van Eaton, A. R., Sigl, M., Alloway, B. V., Kurbatov, A. V., Mastin, L. G., McConnell, J. R., and Wilson, C. J. N., 2017, New Zealand supereruption provides time marker for the Last Glacial Maximum in Antarctica: *Scientific Reports*, v. 7.
- Dunbar, N.W., Jacobs, G.K. And Naney, M.T., 1995. Crystallization processes in an artificial magma: variations in crystal shape, growth rate and composition with melt cooling history. *Contrib. Mineral. Petrol.* 120, 412-425.
- Dunbar, N. W., Kelley, S. A., Goff, F., and McIntosh, W. C., 2013, Rhyolitic pyroclastic deposits at Mount Taylor, New Mexico: Insights into early eruptive processes of a major composite volcano: *New Mexico Geol. Soc. Guidebook*, v. 64, p. 72-74.
- Dunbar, N.W., and Kurbatov, A.V., 2011, Tephrochronology of the Siple Dome ice core, West Antarctica: correlations and sources: *Quaternary Science Reviews*, v. 30, p. 1602-1614.
- Dunbar, N.W., and Kyle, P.R., 1993. Lack of volatile gradient in the Taupo plinian-ignimbrite transition: Evidence from melt inclusion analysis. *Am. Mineral.*, 78, 612-618.
- Dunbar, N.W., and Kyle, P.R., 1992. Volatile contents of obsidian clasts in tephra from the Taupo Volcanic Zone, New Zealand: Implications to eruptive processes. *J. Volcanol. Geotherm. Res.*, 49, 127-145.
- Dunbar, N.W., Kyle, P.R., and Wilson, C.J.N., 1989. Evidence for limited zonation in silicic magma systems, Taupo Volcanic Zone, New Zealand. *Geology*, 17, 234-236.
- Dunbar, N.W., McIntosh, W.C., Cather, S.M., Chamberlin, R.C., Harrison, J.B.J., Kyle, P.R., 1996. Distal tephra from the Jemez volcanic center as potential time-stratigraphic markers in ancestral Rio Grande sediments from the Socorro Area. *N.M.G.S., Fall 1996 Guidebook*.
- Dunbar, N.W., McIntosh, W.C., and Esser, R.P., 2008, Physical setting and tephrochronology of the summit caldera ice record at Mount Moulton, West Antarctica: *Geological Society of America Bulletin*, v. 120, p. 796-812.

- Dunbar, N., and Phillips, F., 2004, Cosmogenic ^{36}Cl ages of lava flows in the Zuni-Bandera volcanic field, north-central New Mexico, USA: New Mexico Bureau of Mines and Mineral Resources Bulletin, v. 160, p. 51-59.
- Dunbar, N. W., Phillips, F. M., and Gutzler, D. S., 2022, Summary of Statewide and Regional Impacts of Climate Change on Water Resources, in Dunbar, N. W., Gutzler, D. S., Pearthree, K. S., Phillips, F. M., and Bauer, P., eds., Climate Change in New Mexico Over the Next 50 Years: Impacts on Water Resources, Volume Bulletin 164: Socorro, NM, New Mexico Bureau of Geology and Mineral Resources, p. 123-131
- Dunbar, N.W., Riciputi, L.R., Jacobs, G.K., and Naney, M.T., 1993. Generation of rhyolitic melt in an artificial magma: Implications for fractional crystallization process in natural magmas. *J. Volcanol. Geotherm. Res.*, 57, 157-166.
- Dunbar, N., G. Zielinski, and D. Voisins, 2003, Tephra layers in the Siple and Taylor Dome Ice Cores, Antarctica: Correlations and Sources. *Journal of Geophysical Research*, 108, 2374-2385.
- Elkins, L.J., Sims, K.W.W., Prytulak, J., Elliott, T., Mattielli, N., Blichert-Toft, J., Blusztajn, J., Dunbar, N., Devey, C., Mertz, D.F., Schilling, J.G., and Murrell, M., 2011, Understanding melt generation beneath the slow-spreading Kolbeinsey Ridge using ^{238}U , ^{230}Th , and ^{231}Pa excesses: *Geochimica et Cosmochimica Acta*, v. 75, p. 6300-6329.
- Ennis, D.J., Dunbar, N.W., Campbell, A., and Chapin, C.E., 1999. The effects of K-metasomatism on the mineralogy and geochemistry of silicic ignimbrites near Socorro, New Mexico. *Chemical Geology*, 167, 285-312.
- Gamble, J., Price, R., Smith, I., McIntosh, W., and Dunbar, N., 2003, $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of magmatic activity, magma flux and hazards at Ruapehu volcano, Taupo Volcanic Zone, New Zealand: *Journal of Volcanology & Geothermal Research*, v. 120, p. 271-287.
- Garcia, L., Petronis, M., Koning, D.J., Zimmerer, M., and Dunbar, N., 2011, Structural, anisotropy of magnetic susceptibility, geochemistry, and paleomagnetic investigations of a steeply dipping, welded tuff (Amalia Tuff) south of Petaca, New Mexico: *Guidebook - New Mexico Geological Society*, v. 62, p. 105-108.
- Geedipally, P., McLemore, V. T., and Dunbar, N. W., 2012, Geology and mineral deposits in the Hillsboro mining district, Sierra County, New Mexico *Geology of the Warm Springs region New Mexico Geol. Soc. Guidebook*, v. 63, p. 559-568.
- Goff, F., Warren, R.G., Goff, C.J., Dunbar, N., 2014. Eruption of reverse-zoned upper Tshirege Member, Bandelier Tuff from centralized vents within Valles caldera, New Mexico. *Journal of Volcanology and Geothermal Research* 276, 82-104.
- Harpel, C.J., Kyle, P.R., and Dunbar, N.W., 2008, Englacial tephrostratigraphy of Erebus volcano, Antarctica: *Journal of Volcanology and Geothermal Research*, v. 177, p. 549-568.
- Hartman, L. H., Kurbatov, A. V., Winski, D. A., Cruz-Uribe, A. M., Davies, S. M., Dunbar, N. W., Iverson, N. A., Aydin, M., Fegyveresi, J. M., Ferris, D. G., Fudge, T. J., Osterberg, E. C., Hargreaves, G. M., and Yates, M. G., 2019, Volcanic glass properties from 1459 CE volcanic event in South Pole ice core dismiss Kuwae caldera as a potential source: *Scientific Reports*, v. 9.
- Harvey, R.P., Dunbar, N.W., McIntosh, W.C., Esser, R.P., Nishiizumi, K, and Taylor, S., 1998. A meteoritic event recorded in Antarctic ice. *Geology*, 26, 607-610.
- Hawley, R. L., E. D. Waddington, D. L. Morse, N. W. Dunbar, and G. A. Zielinski, 2002, Dating firn cores by vertical strain measurements: *Journal of Glaciology*, 48, 401-406.
- Hervig, R.L. and Dunbar, N.W., 1992. Cause of chemical zoning in the Bishop and Bandelier magma chambers. *Earth Planet. Sci. Lett.*, 111, 97-108.
- Hervig, R.L., Dunbar, N.W., Westrich, H.R., and Kyle, P.R., 1989. Pre-eruptive water content of rhyolitic magmas as determined by ion microprobe analyses of melt inclusions in phenocrysts. *J. Volcanol. Geotherm. Res.*, 36, 293-302.
- Horning, R.R., Dunbar, N.W., Baldrige, W.S., and Kyle, P.R., 2003, Geology and Petrogenesis of Magmatic Veins at El Porticito Volcanic Vent, Catron County, New Mexico: *New Mexico Geol. Soc. Guidebook*, v. 54, p. 139-154.
- Iverson, N.A., Kyle, P.R., Dunbar, N.W., McIntosh, W.C., Pearce, N.J.G., 2014. Eruptive history and

- magmatic stability of Erebus volcano, Antarctica: Insights from englacial tephra. *Geochemistry Geophysics Geosystems* 15, 4180-4202.
- Iverson, N. A., Kaltefleiter, D., Dunbar, N. W., Kurbatov, A., and Yates, M., 2017, Advancements and best practices for analysis and correlation of tephra and cryptotephra in ice: *Quaternary Geochronology*, v. 40, p. 45-55.
- Iverson, N. A., Lieb-Lappen, R., Dunbar, N. W., Obbard, R., Kim, E., and Golden, E., 2017, The first physical evidence of subglacial volcanism under the West Antarctic Ice Sheet: *Scientific Reports*, v. 7.
- Jacobs, G.K., Dunbar, N.W., Naney, M.T., and Williams, R.T., 1992. In Situ Vitrification: Observations of petrological processes in a man-made magmatic system. *EOS, Trans. AGU*, 73, 401-411.
- Kelley, S. A., Dunbar, N. W., McIntosh, W. C., and Goff, F., 2013. Tuffs of San Mateo Canyon. Road log for Trip 2: New Mexico Geol. Soc. Guidebook, v. 64, p. 70-75.
- Kelly, P.J., Dunbar, N.W., Kyle, P.R., and McIntosh, W.C., 2008, Refinement of the late Quaternary geologic history of Erebus volcano, Antarctica using Ar-40/Ar-39 and Cl-36 age determinations: *Journal of Volcanology and Geothermal Research*, v. 177, p. 569-577.
- Kelly, P.J., Kyle, P.R., Dunbar, N.W., and Sims, K.W.W., 2008, Geochemistry and mineralogy of the phonolite lava lake, Erebus volcano, Antarctica: 1972-2004 and comparison with older lavas: *Journal of Volcanology and Geothermal Research*, v. 177, p. 589-605.
- Koffman, B. G., Dowd, E. G., Osterberg, E. C., Ferris, D. G., Hartman, L. H., Wheatley, S. D., Kurbatov, A. V., Wong, G. J., Markle, B. R., Dunbar, N. W., Kreutz, K. J., and Yates, M., 2017, Rapid transport of ash and sulfate from the 2011 Puyehue-Cordón Caulle (Chile) eruption to West Antarctica: *J. Geophys. Res. Atmos.*, v. 122.
- Koffman, B. G., Kreutz, K. J., Kurbatov, A. V., and Dunbar, N. W., 2013, Impact of known local and tropical volcanic eruptions of the past millennium on the WAIS Divide microparticle record: *Geophysical Research Letters*, v. 40, no. 17, p. 4712-4716.
- Koning, D., Aby, S., and Dunbar, N., 2004a, Middle-upper Miocene stratigraphy of the Velarde graben, north-central New Mexico: *New Mexico Geol. Soc. Guidebook*, v. 55, p. 358-373.
- Koning, D. J., Cikoski, C., and Dunbar, N. W., 2013, Deciphering local landscape stability and surficial processes at a paleovalley margin during a pluvial-interpluvial transition, central New Mexico: *New Mexico Geol. Soc. Guidebook*, v. 64, p. 181-198.
- Koning, D.J., McIntosh, W.C., and Dunbar, N., 2011, Geology of southern Black Mesa, Espanola Basin, New Mexico; new stratigraphic age control and interpretations of the southern Embudo fault system of the Rio Grande Rift: *Guidebook - New Mexico Geological Society*, v. 62, p. 191-214.
- Koning, D.J., Newell, D.L., Sarna-Wojcicki, A., Dunbar, N., Karlstrom, K.E., Salem, A., and Crossey, L.J., 2011, Terrace stratigraphy, ages, and incision rates along the Rio Ojo Caliente, north-central New Mexico: *Guidebook - New Mexico Geological Society*, v. 62, p. 281-300.
- Korotkikh, E.V., Mayewski, P.A., Handley, M.J., Sneed, S.B., Introne, D.S., Kurbatov, A.V., Dunbar, N.W., and McIntosh, W.C., 2011, The last interglacial as represented in the glaciochemical record from Mount Moulton Blue Ice Area, West Antarctica: *Quaternary Science Reviews*, v. 30, p. 1940-1947.
- Kurbatov, A.V., Zielinski, G.A., Dunbar, N.W., Mayewski, P.A., Meyerson, E.A., Sneed, S.B., and Taylor, K.C., 2006, a 12,000 year record of explosive volcanism in the Siple Dome Ice Core, West Antarctica: *Journal of Geophysical Research-Atmospheres*, v. 111, p. D12307.
- Kyle, P.R., Eggleston, T.E., McIntosh, W.C., Dunbar, N.W., Hammond, C.M., Johnson, W.D., Knoper, M., and Moore, J., 1986. Pyroclastic rocks associated with the Taylor Creek Rhyolite, Scales Canyon, New Mexico. *N. M. Geol. Soc. Guidebook*, 37, 197-202.
- Lamb, M., Hickson, T., Umhoefer, P., Anderson, Z., Pusztai, Z., Dunbar, N., and McIntosh, W., 2021, Intracontinental rift basin stratigraphy records middle Miocene extension, faulting evolution and climatic influences on deposition, upper Horse Spring Formation and Red Sandstone Unit, Lake Mead region, Nevada: *Abstracts with Programs - Geological Society of America*, v. 53, no. 5 10.1130/abs/2021AM-370775
- Lamb, M. A., Beard, L. S., Dragos, M., Hanson, A. D., Hickson, T. A., Sitton, M., Umhoefer, P. J., Karlstrom, K. E., Dunbar, N., and McIntosh, W., 2018, Provenance and paleogeography of the 25-

- 17 Ma Rainbow Gardens Formation; evidence for tectonic activity at ca. 19 Ma and internal drainage rather than throughgoing paleorivers on the southwestern Colorado Plateau: *Geosphere* (Boulder, CO), v. 14, no. 4, p. 1592-1617 10.1130/ges01127.1
- Lamb, M., Beard, L. S., Hickson, T., Umhoefer, P., Dunbar, N., Schleicher, J., and McIntosh, W., 2015, Late Oligocene-early Miocene landscape evolution of the Lake Mead region during the transition from Sevier contraction to Basin and Range extension: *Geological Society of America Bulletin*, p. 899-925. doi: 10.1130/b31144.1
- Licht, K.J., Dunbar, N.W., Jennings, A.E., and Andrews, J.T., 1997. Sedimentological evidence for the maximum extent of grounded ice in the western Ross Sea, Antarctica during the last glacial maximum. *Geol. Soc. Am. Bull.*, 111, 91-103.
- Lucas, S.G., Morgan, G., Love, D.W., Bejnar, C., Sion, B., Dunbar, N., Chamberlin, R., 2014. Description, classification, and geologic context of a lower Pleistocene primitive mammoth jaw from Matanza Arroyo near Socorro, New Mexico. *New Mexico Geology* 36, 48-58.
- Mailloux, B., M. Person, S. Kelly, N. Dunbar, L. Strayer, S. Cather, and P. Hudleston, 1999, Tectonic controls on the present-day and paleohydrology of the Rio Grande Rift, New Mexico: *Water Resources Research*, 35, 2641-2659.
- McConnell, J. R., Burke, A., Dunbar, N. W., Koehler, P., Thomas, J. L., Arienzo, M. M., Chellman, N. J., Maselli, O. J., Sigl, M., Adkins, J. F., Baggenstos, D., Burkhart, J. F., Brook, E. J., Buizert, C., Cole-Dai, J., Fudge, T. J., Knorr, G., Graf, H.-F., Grieman, M. M., Iverson, N., McGwire, K. C., Mulvaney, R., Paris, G., Rhodes, R. H., Saltzman, E. S., Severinghaus, J. P., Steffensen, J. P., Taylor, K. C., and Winckler, G., 2017, Synchronous volcanic eruptions and abrupt climate change similar to 17.7 ka plausibly linked by stratospheric ozone depletion: *Proceedings of the National Academy of Sciences of the United States of America*, v. 114, no. 38, p. 10035-10040.
- McLemore, V. T., and Dunbar, N. W., 2020, Rockhound State Park and Spring Canyon Recreation Area, New Mexico Bureau of Geology and Mineral Resources, 111-116 p
- McLemore, V., N. Dunbar, P. Kosunen, T. Rämö, M. Heizler, and I. Haapala, 2003, Geology and Geochemistry Of The Redrock Granite and Anorthosite Xenoliths (Proterozoic) in the Northern Burro Mountains, Grant County, New Mexico, USA: *Bulletin of Geological Society of Finland*, p. 7-52.
- McLemore, V.T., Dunbar, N.W., Heizler, L., Heizler, M., 2014. Geology and mineral deposits of the Orogrande mining district, Jarilla Mountains, Otero County, New Mexico. *New Mexico Geological Society Guidebook* 65, 247-259.
- McLemore, V.T., Dunbar, N.W., Love, J.C., Lewis, C.J., 2014. Women in geology in New Mexico, in: Kues, B.S., Lewis, C.J. (Eds.), *A brief history of geological studies in New Mexico; with biographical profiles of notable New Mexico geologists*. New Mexico Geological Society, pp. 4-8.
- McLemore, V.T., Dunbar, N.W., Tachie-Menson, S., and Donahue, K., 2010, The effect of weathering on the acid-producing potential of the Goathill North Rock Pile, Questa mine, NM, Tailings and Mine Waste '10, Volume Proceedings of the 14th International Conference on Tailings and Mine Waste: *Vail, CO*, p. 213-227.
- Moussallam, Y., Oppenheimer, C., Scaillet, B., Buisman, I., Kimball, C., Dunbar, N., Burgisser, A., Schipper, C. I., Andujar, J., and Kyle, P., 2015, Megacrystals track magma convection between reservoir and surface: *Earth and Planetary Science Letters*, v. 413, p. 1-12. doi: 10.1016/j.epsl.2014.12.022
- Oppenheimer, C., Kyle, P., Jones, L., McIntosh, W., Dunbar, N., Ilanko, T., Peters, N., Moussallam, Y., Iacovino, K., Boichu, M., Sawyer, G., Tsanev, V., Scaillet, B., Pichavant, M., Burgisser, A., Alletti, M., and Molina, I., 2011, Erebus; a laboratory volcano in Antarctica: *Mineralogical Magazine*, v. 75, no. 3, p. 1572.
- Oppenheimer, C., Moretti, R., Kyle, P.R., Eschenbacher, a., Lowenstern, J.B., Hervig, R.L., and Dunbar, N.W., 2011, Mantle to surface degassing of alkalic magmas at Erebus volcano, Antarctica: *Earth and Planetary Science Letters*, v. 306, p. 261-271.
- Phillips, E.H., Goff, F., Kyle, P.R., McIntosh, W.C., Dunbar, N.W., and Gardner, J.N., 2007, The Ar-40/Ar-39 age constraints on the duration of resurgence at the Valles caldera, New Mexico: *Journal of*

- Geophysical Research-Solid Earth, v. 112, p. B08201.
- Phillips, F.M., McIntosh, W.C., and Dunbar, N.W., 2011, Chronology of late Cenozoic volcanic eruptions onto relict surfaces in the south-central Sierra Nevada, California: Geological Society of America Bulletin, v. 123, p. 890-910.
- Piva, S. B., Barker, S. J., Iverson, N. A., Winton, V. H. L., Bertler, N. A., Sigl, M., Wilson, C. J., Dunbar, N. W., Kurbatov, A. V., and Carter, L., 2023, Volcanic glass from the 1.8 ka Taupō eruption (New Zealand) detected in Antarctic ice at ~ 230 CE: Scientific Reports, v. 13, no. 1, p. 16720
- Rawling, G.C., McLemore, V., Timmons, S., Dunbar, N.W., 2014. Geology of the Sacramento Mountains Region Guidebook 65. New Mexico Geological Society.
- Ross, J. I., McIntosh, W. C., and Dunbar, N. W., 2012, Development of a precise and accurate age-depth model based on $^{40}\text{Ar}/^{39}\text{Ar}$ dating of volcanic material in the ANDRILL (1B) drill core, Southern McMurdo Sound, Antarctica: Global and Planetary Change, v. 96-97, p. 118-130.
- Quade, J., Levin, N., Simpson, S., Butler, R., McIntosh, W.C., Semaw, S., Kleinsasser, L., Dupont-Nivet, G., Renne, P., and Dunbar, N., 2008, The geology of Gona, Afar, Ethiopia: Geological Society of America Special Paper, v. 446, p. 1-31.
- Seaman, S.J., Dyar, M.D., Marinkovic, N., and Dunbar, N.W., 2006, an FTIR study of hydrogen in anorthoclase and associated melt inclusions: American Mineralogist, v. 91, p. 12-20.
- Semaw, S., Rogers, M. J., Simpson, S. W., Levin, N. E., Quade, J., Dunbar, N., McIntosh, W. C., Caceres, I., Stinchcomb, G. E., Holloway, R. L., Brown, F. H., Butler, R. F., Stout, D., and Everett, M., 2020, Co-occurrence of Acheulian and Oldowan artifacts with Homo erectus cranial fossils from Gona, Afar, Ethiopia: Science Advances, v. 6, no. 10.
- Sigl, M., Fudge, T. J., Winstrup, M., Cole-Dai, J., Ferris, D., McConnell, J. R., Taylor, K. C., Welten, K. C., Woodruff, T. E., Adolphi, F., Bisiaux, M., Brook, E. J., Buizert, C., Caffee, M. W., Dunbar, N. W., Edwards, R., Geng, L., Iverson, N., Koffman, B., Layman, L., Maselli, O. J., McGwire, K., Muscheler, R., Nishiizumi, K., Pasteris, D. R., Rhodes, R. H., and Sowers, T. A., 2016, The WAIS Divide deep ice core WD2014 chronology - Part 2: Annual-layer counting (0-31 ka BP): Climate of the Past, v. 12, no. 3, p. 769-786.
- Simpson, S. W., Kleinsasser, L., Quade, J., Levin, N. E., McIntosh, W. C., Dunbar, N., Semaw, S., and Rogers, M. J., 2015, Late Miocene hominin teeth from the Gona Paleoanthropological Research Project area, Afar, Ethiopia: Journal of Human Evolution, v. 81, p. 68-82. doi: 10.1016/j.jhevol.2014.07.004
- Sims, K. W. W., Pichat, S., Reagan, M. K., Kyle, P. R., Dulaiova, H., Dunbar, N. W., Prytulak, J., Sawyer, G., Layne, G. D., Blichert-Toft, J., Gauthier, P. J., Charette, M. A., and Elliott, T. R., 2013, On the time scales of magma genesis, melt evolution, crystal growth rates and magma degassing in the Erebus Volcano magmatic system using the ^{238}U , ^{235}U and ^{232}Th decay series: Journal of Petrology, v. 54, no. 2, p. 235-271.
- Smellie, J.L., Rocchi, S., Wilch, T.I., Gemelli, M., Di Vincenzo, G., McIntosh, W., Dunbar, N., Panter, K., Fargo, A., 2014. Glaciovolcanic evidence for a polythermal Neogene East Antarctic Ice Sheet. Geology 42, 39-42.
- Spaulding, N. E., Higgins, J. A., Kurbatov, A. V., Bender, M. L., Arcone, S. A., Campbell, S., Dunbar, N. W., Chimiak, L. M., Introne, D. S., and Mayewski, P. A., 2013, Climate archives from 90 to 250 ka in horizontal and vertical ice cores from the Allan Hills Blue Ice Area, Antarctica: Quaternary Research, v. 80, no. 3, p. 562-574.
- Spaulding, N. E., Spikes, V. B., Hamilton, G. S., Mayewski, P. A., Dunbar, N. W., Harvey, R. P., Schutt, J., and Kurbatov, A. V., 2012, Ice motion and mass balance at the Allan Hills blue-ice area, Antarctica, with implications for paleoclimate reconstructions: Journal of Glaciology, v. 58, no. 208, p. 399-406.
- Wardell, L.J., Kyle, P.R., and Dunbar, N.W., 2000. White Island Volcano, New Zealand: Carbon dioxide and sulfur dioxide emission rates and melt inclusion studies. Chemical Geology, 177, 187-200.
- White, R.J., Spinelli, G.A., Mozley, P.S., and Dunbar, N.W., 2011, Importance of volcanic glass alteration to sediment stabilization: offshore Japan: Sedimentology, v. 58, p. 1138-1154.

- Wilch, T.I., McIntosh, W.C., and Dunbar, N.W., (1999). Late Quaternary volcanic activity in Marie Byrd Land: Potential $^{40}\text{Ar}/^{39}\text{Ar}$ dated time horizons in West Antarctic ice and marine cores. *Geol. Soc. Am. Bull.*, 111, 1563-1580.
- Wilson, G. S., and others, 2012, Neogene tectonic and climatic evolution of the Western Ross Sea, Antarctica - Chronology of events from the AND-1B drill hole: *Global and Planetary Change*, v. 96-97, p. 189-203.
- Winski, D. A., Fudge, T. J., Ferris, D. G., Osterberg, E. C., Fegyveresi, J. M., Cole-Dai, J., Thundercloud, Z., Cox, T. S., Kreutz, K. J., Ortman, N., Buizert, C., Epifanio, J., Brook, E. J., Beaudette, R., Severinghaus, J., Sowers, T., Steig, E. J., Kahle, E. C., Jones, T. R., Morris, V., Aydin, M., Nicewonger, M. R., Casey, K. A., Alley, R. B., Waddington, E. D., Iverson, N. A., Dunbar, N. W., Bay, R. C., Souney, J. M., Sigl, M., and McConnell, J. R., 2019, The SP19 chronology for the South Pole Ice Core - Part 1: volcanic matching and annual layer counting: *Climate of the Past*, v. 15, no. 5, p. 1793-1808.

Publications in non-refereed journals and reports

- Donahue, K., Dunbar, N.W., Heizler, L., McLemore, V., and Campbell, A., 2008, Characterization of the clay mineralogy within the rock piles on the Molycorp Questa mine site, Decision and Reliability Analysis reports prepared for Chevron Mining Inc. Questa, New Mexico, p. 9.
- Donahue, K.M., Dunbar, N.W., Heizler, L., and McLemore, V.T., 2008, Origins of clay minerals in the Molycorp Mine Goathill North rock pile, unpublished report to Molycorp.
- Dunbar, N.W., 2023, Climate change and water resources in New Mexico- shaping legislative agendas through effective science communication, Geological Society of America Annual Meeting: Pittsburgh, PA
- Dunbar, N.W., 1999. Could New Mexico see Lava Flow again? Insights and Opinion article requested by Albuquerque Tribune, published Oct.7, 1999
- Dunbar, N.W., 1996. Popocatepetl Volcano: past eruptions - future dangers? *Lite Geology*, Summer 1996, p. 1-2.
- Dunbar, N.W., 1996. Have you ever wondered.... How volcanologists help solve environmental problems? *Lite Geology*, Spring 1996. P. 2-5.
- Dunbar, N.W., 1993. High adventure on the Tibetan Plateau. *Lite Geology*, Winter 1993, 6-10.
- Dunbar, N.W., 1988. Pre-eruptive volatile contents and degassing systematics of rhyolitic magmas from the Taupo Volcanic Zone, New Zealand. New Mexico Institute of Mining and Technology. 362 p.
- Dunbar, N.W., 1983. Recurrence intervals of Mount St. Helens Tephra Eruptions. Mount Holyoke College. 76 p.
- Dunbar, N., and Aster, R., 2002, How can earthquakes be useful?: *Lite Geology*, no. 24, p. 1-3.
- Dunbar, N.W., Chapin, C.E., and Brandvold, L.A., 2002. Arsenic in New Mexico's Water. *Earth Matters*, published by the New Mexico Bureau of Geology and Mineral Resources, Volume 2, Number 2.
- Dunbar, N.W., Kyle, P.R., McIntosh, W.C., and Esser, R.P., 1996. Tephra layers in blue ice, Allan Hills, Antarctica: A new source of glacial tephrochronological data. *Antarct. J. U.S.*
- Dunbar, N.W. and Kyle, P.R., 1990. Volatile contents of melt inclusions in anorthoclase phenocrysts from Mount Erebus: Implications for magmatic crystallization. *Antarct. J. U.S.* XXV, 9-11.
- Dunbar, N.W., Kyle, P.R., McIntosh, W.C., and Esser, P.R., 1995. Geochemical Composition and Stratigraphy of Tephra Layers in Antarctic Blue Ice : Insights into Glacial Tephrochronology. *Ant. Jour. of the U.S.*
- Dunbar, N.W., Heizler, L., and Sweeney, D., 2008, Mineralogical characterization of Questa rock-pile samples by petrographic and electron microprobe analysis, Decision and Reliability Analysis reports prepared for Chevron Mining Inc. Questa, New Mexico, p. 19.
- Dunbar, N.W., McIntosh, W.C., Cather, S.M., Chamberlin, R.M., Harrison, B., and Kyle, P.R., 1996. Distal tephra from the Jemez volcanic center as potential time-stratigraphic markers in the ancestral Rio Grande sediments from the Socorro area. *N. M. Geol. Soc. Guidebook*, 47.

- Dunbar, N. W., Esser, R.P. And McIntosh, W.C., 1998, Englacial tephra layers in West Antarctica: Implications for the history of the West Antarctic Ice Sheet: Antarctic Journal of the U.S., v. XXXIII- Review 1998.
- Dunbar, N. W., McIntosh, W.C., and R. P. Esser, 1998, Englacial tephra layers as indicators of ice flow patterns at the margins of the East Antarctic Ice Sheet: Antarctic Journal of the U.S., v. XXXIII-Review 1998.
- Dunbar, N.W., Welch, S., and Hoffman, G., 1999. Miniature Minerals (and glass!). *Lite Geolgy*, No.22, 11-13
- Heizler, M., Dunbar, N.W., 2014. Analytical laboratories at the New Mexico Bureau of Geology. *New Mexico Earth Matters* 14, 1-5.
- Kyle, P.R., Meeker, K.A., McIntosh, W.C., Dunbar, N.W., Andres, B., and Caldwell, D., 1990. Volatile Emissions from Mount Erebus. *Antarct. J. U.S.*, XXV, 9.
- McIntosh, W.C., Lemasurier, W.E., Ellerman, P.J., and Dunbar, N.W., 1985. A re-interpretation of glacio-volcanic interaction at Mount Takahe and Mount Murphy, Marie Byrd Land, Antarctica. *Antarct. J. U.S.*, 20, 57-59.
- McLemore, V., Heizler, L., and Dunbar, N.W., 2008, Humidity cell mineralogy and characterization, Decision and Reliability Analysis reports prepared for Chevron Mining Inc. Questa, New Mexico, p. 35.
- McLemore, V.T., Ayakwah, G., Boakye, K., Campbell, A., Donahue, K., Dunbar, N., Gutierrez, L., Heizler, L., Lynn, R., Lueth, V., Osantowski, E., Phillips, E., Shannon, H., Smith, M., Tachie-Menson, S., Van Dam, R., Viterbo, V.C., Walsh, P., and Wilson, G.W., 2008, Characterization of Goathill North Rock Pile, revised unpublished report to Molycorp.
- McLemore, V.T., Donahue, K., Dunbar, N., and Heizler, L., 2008, Characterization of physical and chemical weathering in the rock piles and evaluation of weathering indices for the Questa rock piles, unpublished report to Chevron.
- McLemore, V.T., Heizler, L., Dunbar, N., Phillips, E., Donahue, K., Sweeney, D., Dickens, A., and Ennin, F., 2008, Petrographic Analysis of Humidity Cell Samples, unpublished report to Chevron.
- McLemore, V.T., Sweeney, D., Dunbar, N.W., Heizler, L., Campbell, A., and Phillips, E., 2008, Determining quantitative mineralogy using a modified MODAN approach (combination of petrographic techniques, whole rock chemistry, and MODAN), Decision and Reliability Analysis reports prepared for Chevron Mining Inc. Questa, New Mexico.
- Spalding, B.P., Jacobs, G.K., Dunbar, N.W., Naney, M.T., Tixier, J.S., and Powell, T.D. (1992): Tracer level radioactive pilot-scale test of ISV technology for the stabilization of contaminated soil sites at ORNL. Environmental Science Division Publication 3962.
- Stinchcomb, G. E., Quade, J., Levin, N. E., Iverson, N., Dunbar, N., McIntosh, W., Arnold, L. J., Demuro, M., Duval, M., Gruen, R., Zhao, J. X., White, M., Hynek, S. A., Brown, F. H., Rogers, M. J., and Semaw, S., 2023, Fluvial response to Quaternary hydroclimate in eastern Africa: Evidence from Gona, Afar, Ethiopia: *Quaternary Science Reviews*, v. 309 10.1016/j.quascirev.2023.108083
- Sweeney, D., Dunbar, N.W., Logston, M., McLemore, V., Heizler, L., and Dickens, A., 2008, Boulder Study, Decision and Reliability Analysis reports prepared for Chevron Mining Inc. Questa, New Mexico, p. 27.
- Timmerman, C.L., Campbell, B.E., Bergsman, T.M., Callow, R.A., Dunbar, N.W., Slater, C.E., and Thompson, L.E., 1992. Large-scale hazardous waste ISV system Operational Acceptance Test (OAT-2) Hood event- Final Report. Informal Report, 1-39.
- Welch, S., Dunbar, N.W., and Chapin, C.E., 1999. Canadian prospecting finally pays off. *Lite Geology*, No. 21, 1-2
- Wilch, T.I., McIntosh, W.C., Panter, K.S., and Dunbar, N.W., 1993. Preliminary report on field investigations and $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology of the Crary Mountains volcanoes, Marie Byrd Land, West Antarctica. *Antarct. J. U.S.*, 28, 7-9.

Talks presented at Professional Meetings or Invited Talks

- Anderson, R. S., Fawcett, P., Brown, E., Werne, J., Toney, J., Garcia, D., Garrett, H., and Dunbar, N., 2015,

- A Long Pleistocene Paleoclimate Record from Stoneman Lake, Arizona American Geophysical Union Fall 2015 Meeting Abstracts, Volume PP13C-2306.
- Anderson, R. S., Fawcett, P., Brown, E. T., Werne, J., Jimenez-Moreno, G., Toney, J., Dunbar, N. W., Stockhecke, M., Garrett, H., and Garcia, D., 2016, The Long Pleistocene Paleoclimate Record from Stoneman Lake, Arizona: an Update Abstract PP13B-2071 presented at 2016 Fall Meeting, AGU.
- Antibus, J.V., Panter, K., Dunbar, N., Wilch, T., and McIntosh, W., 2010, Oxygen isotope and cation chemistry: Evidence of multiple water sources influencing the alteration of Antarctic hyaloclastites: *Geochimica et Cosmochimica Acta*, v. 74, p. A26.
- , 2010, Stable isotope, cation chemistry and petrographic evidence of multiple water sources influencing the alteration of Antarctic hyaloclastites, abstract AV13E-2402 presented at 2010 Fall Meeting, AGU, Volume San Francisco.
- Antibus, J.V., Panter, K., Wilch, T., Blusztajn, J., Dunbar, N.W., and McIntosh, W., 2011, a meteoric water source for the formation of hyaloclastites at Minna Bluff, Ross Sea, Antarctica: A petrographic, geochemical and isotopic (Sr & O) investigation: 11th International Symposium on Antarctic Earth Sciences, 10-16 July, Edinburgh, Scotland, p. PO5.6.
- Antibus, J. V., Panter, K., Wilch, T., Dunbar, N. W., McIntosh, W. C., Blusztajn, J., Tripathi, a. K., and Bindeman, I., 2012, A petrographic, geochemical and isotopic (O, H, C and Sr) investigation of secondary minerals in volcanoclastic rocks at Minna Bluff, Antarctica: Petrogenesis of alteration and implications for paleoenvironmental conditions Abstract V21A-2758 presented at 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Aster, R., S. Mah, S. Mcnamara, M. Ruiz, P. Kyle, W. McIntosh, and N. Dunbar, 2002. VLP-discriminated Strombolian event families and video observations at Mount Erebus, Antarctica, *EOS*, Transactions of the American Geophysical Union, 83.
- Aster, R., Mah, S., Johnson, J., Kyle, P., McIntosh, W., Dunbar, N., Ruiz, M., and Desmarais, E., 2001, Seismic, acoustic, and video observations of conduit processes during Strombolian explosions at Mount Erebus, Antarctica: *EOS*, Transactions of the American Geophysical Union, v. 82, no. 47, p. F1413.
- Aster, R. C., Mah, S., Ruiz, M., D., F., Desmarais, E., Kyle, P., McIntosh, W., and Dunbar, N., 2002, Strombolian-eruption-associated Very Long-period Oscillations of Mount Erebus, Antarctica: Seismological Society of America Annual Meeting Abstract Volume.
- Aster, R. C., Mah, S. Y., Kyle, P. R., Dunbar, N., and McIntosh, W., 2001, VLP Displacements Observed with Broadband Seismometers at Mount Erebus Volcano Modeled as a Lava Lake Seiche: Seismological Society of America Annual Meeting Abstract Volume.
- Borunda, A., Koffman, B.G., Kaplan, M., Winckler, G., Goldstein, S., Pena, L., Kreutz, K., Vandergoes, M., Dunbar, N.W., McConnell, J.R., Biscaye, P.E., Bory, A., Koffman, T., Vallelonga, P., 2014. Dust provenance in West Antarctica. West Antarctic Ice Sheet Research Meeting, September 20-22, La Jolla, CA.
- Borunda, A., Winkler, G., Goldstein, S., Kaplan, M., McConnell, J.R., Dunbar, N., 2014. Local Sources for the "Megadust" Events at the WAIS Divide Ice Core. AGU Fall Meeting 2014.
- Bosket, M.E., Wilch, T.I., Panter, K.S., Dunbar, N.W., and McIntosh, W.C., 2008, Explosively Erupted Hydrovolcanic Deposits at Minna Saddle, Antarctica: Evidence of Limited Ice-Magma Interaction Geological Society of America Abstract Volume- Annual Meeting, p. 157-3.
- Buizert, C., Sowers, T., Brook, E., Severinghaus, J., Fudge, T. J., Ferris, D., Osterberg, E., Winski, D., Fegyveresi, J., Kurbatov, A., Iverson, N., Dunbar, N., Cole-dai, J., and Bay, R., 2017, SPICEcore Timescale: Delta-age and the gas age scale, South Pole Ice Core Science Meeting: Seattle, WA.
- Buizert, C., Fudge, T., Roberts, W., Ritz, C., Lefebvre, E., Sherriff-Tadano, S., Abe-Ouchi, A., Martin, C., Corr, H. F., Severinghaus, J. P., Beaudette, R., Steig, E. J., Epifanio, J., Siler, N., Brook, E., Kawamura, K., Oyabu, I., Sowers, T., Sigl, M., Severi, M., and Dunbar, N., 2019. How cold was Antarctica during the Last Glacial Maximum?, in Proceedings AGU Fall Meeting 2019, AGU.
- Campbell, A.R., Heizler, M.T., and Dunbar, N.W., 1996. $^{40}\text{Ar}/^{39}\text{Ar}$ dating of fluid inclusions in quartz from the Capitan Pluton, New Mexico. *New Mexico Geology*, 18, 43.

- Campbell, A.R., Heizler, M.T., and Dunbar, N.W., 1994. $^{40}\text{Ar}/^{39}\text{Ar}$ dating of fluid inclusions in quartz from the Capitan Pluton, New Mexico. *P.A.C.R.O.F.I.*, 5, 11.
- Casadevall, T., Cook, T. L., Connors, T., and Dunbar, N., 2019, Advancing geoheritage in the United States: Partnering with the states: Geological Society of America Annual Meeting.
- Cather, S.M., Dunbar, N.W., Mcdowell, F.W., McIntosh, W.C., and Scholle, P.A., 2003, Early Oligocene Global Cooling, Volcanic Iron Fertilization, and the Ignimbrite Flare-Up of Southwestern North America: Geological Society of America Annual Meeting Abstracts with Program.
- Chamberlin, R. M., McIntosh, W. C., Dunbar, N. W., and Dimeo, M. I., 2012, Ignimbrite Calderas and a Large Radiating Mafic Dike Swarm of Oligocene Age, Rio Grande Rift, New Mexico: Possible Implications to Restless Calderas: U.S. Geological Survey Open-File Report 2013-1026, 39 p. (Available at <http://pubs.usgs.gov/of/2013/1026/>).
- Connell, S.D., Smith, G.A., Geissman, J.W., McIntosh, W., Dunbar, N.W., Love, D.W., and Cather, S.M., 2010, $^{40}\text{Ar}/^{39}\text{Ar}$ geochronology, magnetic polarity stratigraphy, and tephrochronology of Plio-Pleistocene deposits in the Albuquerque basin, Rio Grande Rift, New Mexico: New Mexico Geological Society Abstract Volume, p. 9.
- Cooper, K., Reid, M., Dunbar, N.W., McIntosh, W.C., Phillips, F.M., 1996. $^{238}\text{U}/^{236}\text{Th}$ disequilibrium in Quaternary volcanic rocks from the Ashikule Basin, Northwestern Tibetan Plateau. *EOS*, v. 77 no. 46, p. F790.
- Crowe, R.S., Karlstrom, K., McIntosh, W.C., Peters, L., and Dunbar, N.W., 2006, Interactions Between Volcanism, River Incision, and Normal Faulting In Western Grand Canyon And Implications For Neotectonic Models: Geological Society of America Abstracts with Program, v. 2006 Annual Meeting, Philadelphia, p. 112-25.
- Crowe, R.S., Karlstrom, K., McIntosh, W.C., Peters, L., and Dunbar, N.W., 2007, History Of Quaternary Volcanism In Western Grand Canyon Based On Lidar Analysis, $^{40}\text{Ar}/^{39}\text{Ar}$ Dating, and Field Studies: Implications For Flow Stratigraphy, Timing Of Volcanic Events, and Lava Dam Stability: Geological Society of America Abstracts with Program, v. 2007 Annual Meeting, Denver, p. 66-12.
- Crow, R., Karlstrom, K., McIntosh, W., Peters, L., and Dunbar, N., 2010, Reconstructing western Grand Canyon's lava dams and their failure mechanisms: new insights from geochemical correlation and $^{40}\text{Ar}/^{39}\text{Ar}$ dating, abstract EP43B-0754 presented at 2010 Fall Meeting, AGU, Volume San Francisco.
- Dickens, A.K., McIntosh, W.C., and Dunbar, N.W., 2006, Investigation of obsidian hydration and implications for the $^{40}\text{Ar}/^{39}\text{Ar}$ dating method: *New Mexico Geology*, v. 28, p. 59.
- Donahue, K.M., Dunbar, N.W., T., M.V., Lueth, V.W., L., H.P., and Heizler, L., 2005, Clay mineralogy of the Goathill North Mine rock pile and the Goathill and Straight Creek hydrothermal alteration scars, Questa area, New Mexico, *in* Geological Society of America, 2005 annual meeting, Volume 37, Geological Society of America (GSA), p. 394.
- Donahue, K.M., Dunbar, N.W., McLemore, V., Lueth, V.W., Hauff, P.L., and Heizler, L., 2005, The Goathill North Mine Rock Pile And The Goathill And Straight Creek Hydrothermal Alteration Scars, Questa Area, New Mexico: Geological Society of America Abstracts with Program.
- Donahue, K.M., Hauff, P.L., Dunbar, N.W., Lueth, V.W., McLemore, V.T., and Heizler, L., 2005, Clay Mineralogy Of Alteration Scars And Rock Piles, Questa Area, New Mexico.: New Mexico Geological Society Abstract Volume.
- Donahue, K.M., Hauff, P.L., Dunbar, N.W., Lueth, V.T., and Heizler, L., 2005, Clay mineralogy of alteration scars and rock piles, Questa area, New Mexico, *in* New Mexico Geological Society spring meeting, Volume 27, New Mexico Bureau of Mines and Mineral Resources, p. 50.
- Dunbar, N. W., A day in the life of a state geologist- Understanding climate change and water resources in New Mexico, *in* Proceedings Geological Society of Annual Meeting, Denver, 2022, Volume 54, Geological Society of America.
- Dunbar, N. W., 2019, The role of state surveys in promoting geoscience and geoheritage: Examples from New Mexico: Geological Society of America Annual Meeting.
- Dunbar, N. W., 2018, Geoheritage in New Mexico- Jemez Mountain Volcanic Field and Valles Caldera (invited) in Town Hall US Geoheritage and Geoparks Advisory Group / Association of American

- State Geologists (AASG) Town Hall Meeting on Geoheritage, Geological Society of America: Indianapolis, IN
- Dunbar, N.W., 2006, The "Short-Course" Approach For Teaching Electron Microprobe Analysis At The Graduate Level: Geological Society of America Abstracts with Program, v. 2006 Annual Meeting Philadelphia, p. 113-12.
- Dunbar, N.W., 2002. Origin of rhyolitic spherulites at Rockhound State Park, *Gemstone Deposits of Colorado and the Rocky Mountain Region Abstract Volume, Sept. 7-10, 29-32.*
- Dunbar, N.W., 1999, Meteorites, ice, and time: Stranding surfaces as a window into the history of the East Antarctic Ice Sheet: Invited talk at William A. Cassidy retirement symposium.
- Dunbar, N.W., 2005, Tephrochronology Of The Siple Dome, Antarctica, Ice Core: Analytical Challenges And Results: Geological Society of America Abstracts with Program.
- Dunbar, N.W., 1998. Cl-36 dating of the upper and lower Carrizozo lava flows, south-central New Mexico. *New Mexico Geology*, 20: 53.
- Dunbar, N.W., 1997. Innovations in geochemical and geochronological techniques: Implications for the next 50 years of New Mexico geology. NMGS spring meeting, p 14.
- Dunbar, N.W., 2003, From Africa to Antarctica: Adventures in Living and Working in Remote Deserts: Women in Polar Regions Meeting, Columbus OH, Oct. 9-10.
- Dunbar, N. W., Brown, F. H., Levin, N. E., McIntosh, W. C., Rogers, M., Semaw, S., Simpson, S. W., and Stinchcomb, G. E., 2016, Rhyolitic tephra record of the Gona region, southern Afar Rift, Ethiopia: Characteristics correlation and chronology Abstract V11A-2756 presented at 2016 Fall Meeting, AGU.
- Dunbar, N.W. And Chapin, C.E., 1995. Arsenic mobility during geological processes: Implications for tracing groundwater flow. SEGH Second International Conference on Arsenic Exposure and Health Effects, p. 50.
- Dunbar, N.W., Chapin, C.E., and Ennis, D.J., 1995. Arsenic enrichment during potassium metasomatism and hydrothermal processes in the Socorro, NM area- Implications for tracing groundwater flow. *New Mexico Geology*, 17, 26.
- Dunbar, N.W. And Chapin, C.E., 1995. Arsenic mobility during geological processes: Implications for tracing groundwater flow. SEGH Second International Conference on Arsenic Exposure and Health Effects, p. 50.
- Dunbar, N.W., Chapin, C.E., and Campbell, A.R., 1994. Trace element and mineralogical alteration associated with moderate and advanced degrees of K-metasomatism in a rift basin at Socorro, NM. SME Technical Program, Feb 14-17, 48.
- Dunbar, N.W., Chapin, C.E., and Ennis, D.J., 1995. Arsenic enrichment during potassium metasomatism and hydrothermal processes in the Socorro, NM, area- Implications for tracing groundwater flow. *N.M. Geol.*, 17, 26.
- Dunbar, N.W., Ennis, D.J., and Chapin, C.E., 2005, Geochemistry, mineralogy, and chronology of K-metasomatism of volcanic rocks near Socorro, New Mexico, USA, 15th annual V M Goldschmidt conference, Volume 69, Pergamon, p. 786.
- Dunbar, N.W., Esser, R.P., McIntosh, W.C., Zielinski, G.A., and Kyle, P.R., 1997. Englacial Tephra Layers in West Antarctica: Implications for the history of the West Antarctic Ice Sheet. Fourth Annual West Antarctic Ice Sheet Initiative Workshop.
- Dunbar, N.W., Esser, R.P., McIntosh, W.C., Kyle, P.R., and Zielinski, G.A., 1997. Englacial Tephra Layers in the East and West Antarctic Ice Sheets: Indicators of Glacial Flow Patterns on Ice Sheet Margins. Fall AGU meeting
- Dunbar, N. W., Iverson, N. A., Kurbatov, A., Kalteyer, D., McConnell, J. R., and Sigl, M., 2015, Volcanic Ash from the Oruanui 25.4 ka Eruption in Antarctic Ice: Implications for Mechanism of Distal Ash Transport, 2015 WAIS Divide-SPICECORE Science Meeting: La Jolla, CA, p. 22.
- Dunbar, N.W., Iverson, N.A., Kurbatov, A., McIntosh, W.C., 2014. Antarctic tephrochronology: A maturing tephra record from ice cores, blue ice sites and local volcanism, Tephra 2014- Maximizing the potential of tephra for multidisciplinary studies, Portland, Oregon.
- Dunbar, N. W., Iverson, N. A., Kurbatov, A., and McIntosh, W. C., 2013, Continued Investigation and

- Correlations of Tephra in the WAIS Divide WDC06A Ice Core: WAIS Divide Science Meeting, Sept. 24-25, 2013, La Jolla, CA, p. 37.
- Dunbar, N. W., Iverson, N., Kurbatov, A., and McIntosh, W. W., 2017, Case Study: Antarctic tephra overview, IAVCEI- Best Practices in Tephra Collection, Analysis, and Reporting: Leading Toward Better Tephra Databases: Portland, OR.
- Dunbar, N. W., Iverson, N. A., Kurbatov, A., McIntosh, W. C., Hartman, L., Wheatley, S., Yates, M., Bay, R., Fudge, T. J., Fegyveresi, J., Ferris, D., Osterberg, E., and Winski, D., Geochemical measurements and correlations of Antarctic and tropical tephra in the SPICE core., *in* Proceedings South Pole Ice Core Science Meeting, Seattle, WA, Sept. 19-20, 2017.
- Dunbar, N., Iverson, N. A., Kurbatov, A., McIntosh, W., Kalteyer, D., Koffman, B. G., and Yates, M., 2015, Antarctic tephra research: source volcanoes, blue ice sites, and ice cores, SCAR Kickstart meeting for working group on Antarctic Volcanism: Catania, Italy.
- Dunbar, N.W., Kelley, S.A., Goff, F., McIntosh, W., and Heizler, L., 2010, Stratigraphy and geochemistry of early pyroclastic eruptions at Mt. Taylor volcano, New Mexico: New Mexico Geological Society Abstract Volume, p. 12.
- Dunbar, N. W., Kelley, S. A., Goff, F., McIntosh, W., and Heizler, L., 2012, Stratigraphy and geochemistry of early pyroclastic eruptions at Mount Taylor volcano, New Mexico: Geological Society of America Abstracts with Programs, v. 44, no. 6, p. 29.
- Dunbar, N.W., Kelley, S., and Miggins, D., 1996. Chronology and thermal history of potassium metasomatism in the Socorro, NM, area: Evidence from $^{40}\text{Ar}/^{39}\text{Ar}$ dating and fission track analysis. *New Mexico Geology*, 18, 50.
- Dunbar, N.W., Kurbatov, A.V., Koffman, B.G., and Kreutz, K.J., 2010, Tephra Record of Local and Distal Volcanism in the WAIS Divide Ice Core, 2010 WAIS Divide Science Meeting: La Jolla, CA.
- Dunbar, N. W., Kurbatov, A., and McIntosh, W. C., 2012, Antarctic Tephrochronology: A Maturing Record of Visible Layers and Cryptotephra: Abstract V31F-06 presented at 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Dunbar, N. W., Kurbatov, A., and McIntosh, W. C., 2012, Further development of the robust Antarctic volcanic record using tephra layers from the WAIS Divide WDC06A ice core: WAIS Divide Science Meeting, Sept. 11-12, 2012, La Jolla, CA.
- Dunbar, N.W., Kurbatov, A.V., McIntosh, W., and Koffman, B.G., 2011, Antarctic tephrochronology: From visible layers to cryptotephra: 11th International Symposium on Antarctic Earth Sciences, 10-16 July, Edinburgh, Scotland, p. PS5.12.
- Dunbar, N.W., Kurbatov, A.V., and McIntosh, W.C., 2011, a Maturing Tephra Record in the West Antarctic Ice Sheet: Abstract presented at 2011 Fall Meeting, AGU, San Francisco, Calif, 5-9 Dec., v. V11D-2538 p. V11D-2538.
- , 2011, a Rich Tephra Record in the WAIS Divide (WDC06A) Ice Core: WAIS Divide Science Meeting, Sept. 28-29, 2011, La Jolla, CA, p. 21.
- Dunbar, N.W., Kurbatov, A., Zielinski, G., McIntosh, W.C., Price, P.B., and Bay, R.C., 2003, Volcanic ash records in the Siple Dome Ice Core: West Antarctic Ice Shelf Research Meeting.
- Dunbar, N.W., Kyle, P.R., McIntosh, W.C., and Esser, R.P., 1995a. Geochemical composition and stratigraphy of tephra layers in Antarctic blue ice: Insights into glacial tephrochronology. VII International Symposium of Antarctic Earth Sciences, Siena, Italy. p. 115.
- Dunbar, N.W., Kyle, P.R., McIntosh, W.C., and Esser, R.P., 1995b. Tephra layers in blue ice, Allan Hills, Antarctica: A new source of glacial tephrochronological data. IUGG XXI General Assembly, abstracts, P. A303.
- Dunbar, N. W., and McIntosh, W. C., 2012, Volcanism in New Mexico: Past activity and future expectations: Zuni-Bandera Volcanic Field, Valles Caldera, Socorro magma body, and beyond.: U.S. Geological Survey Open-File Report 2013-1026, 39 p. (Available at <http://pubs.usgs.gov/of/2013/1026/>).
- Dunbar, N. W., McIntosh, W.C., Esser, R.P., Wilch, T., and G. Zielinski, 1998, Direct dating and geochemical correlations of englacial tephra layers at two sites in West Antarctica: Proceedings of the West Antarctic Ice Sheet Meeting Chapman Conference, Sept. 13-18, 1998, p. 18-19.

- Dunbar, N.W., McIntosh, W., Esser, R., Wilch, T. And Zielinski, G., 1999. Englacial tephrochronology in West Antarctica: Constraints on Ice Sheet History, and potential longer ice records, 8th International Symposium on Antarctic Earth Science, Victoria University of Wellington, New Zealand, pp. 95.
- Dunbar, N. W., McIntosh, W. C., Kurbatov, A., and Zielinski, G. A., 2004, Tephrochronology of Antarctic blue ice areas and ice cores: IAVCEI International Volcanological Congress, Pucon, Chile.
- Dunbar, N.W., McIntosh, W.C., Kurbatov, A.V., and Wilch, T.I., 2007, Integrated Tephrochronology of the West Antarctic Region- Implications for a potential tephra record in the West Antarctic Ice Sheet (WAIS) Divide Ice Core: 2007 WAIS Divide Science Meeting.
- Dunbar, N.W., McIntosh, W.C., Kurbatov, A.V., and Wilch, T.I., 2007, Integrated tephrochronology of the West Antarctic region; implications for a potential tephra record in the West Antarctic ice sheet (WAIS) Divide ice core, *in* Cooper, A., and Raymond, C., eds., Tenth international symposium on Antarctic earth sciences; Antarctica; a keystone in a changing world, U. S. Geological Survey.
- Dunbar, N.W., McIntosh, W.C., and Kurbatov, A.V., 2008, Integrated tephrochronology of the West Antarctic region - Implications for a potential tephra record in the West Antarctic Ice Sheet (WAIS) divide ice core: *Geochimica Cosmochimica Acta*, v. 72 (supplement- abstract volume), p. A232-A232.
- Dunbar, N.W., McIntosh, W.C., and Phillips, F.M., 1996. Field relationships, chronology and petrology of a volcanic system in the northern Tibetan plateau. *EOS, Trans. AGU*, 77, S292.
- Dunbar, N. W., McIntosh, W. C., Umhoefer, P. J., Lamb, M. A., and Hickson, T., 2013, Tephra Deposits in Lake Mead Miocene Sediments: Characteristics, Chronology, and Sources: Abstract V13D-2641 Presented at the 2013 Fall AGU meeting, San Francisco, CA, Dec. 9-12.
- Dunbar, N. W., and McLemore, V. T., 2004, Evidence for high temperature, diffusion-controlled crystallization of spherulites in a rhyolitic lava flow: IAVCEI International Volcanological Congress, Pucon, Chile.
- Dunbar, N.W., Panter, K., Scanlan, M., Fargo, A., McIntosh, W., and Wilch, T., 2011, Petrogenesis of alkaline magmas at Minna Bluff, Antarctica: evidence for high pressure fractionation and complex mixing processes: 11th International Symposium on Antarctic Earth Sciences, 10-16 July, Edinburgh, Scotland, p. PO5.10.
- Dunbar, N.W., Panter, K.S., Scanlan, M.K., Fargo, A.F., McIntosh, W.C., and Wilch, T.I., 2008, Evidence for Complex Mixing Processes Controlling the Composition of a Wide Range of Alkaline Volcanic Rocks at Minna Bluff, Antarctica.: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., p. V13C-2128.
- Dunbar, N.W., and Phillips, F.M., 1994. ^{36}Cl surface exposure determinations of eruption ages for quaternary lava flows of the Zuni-Bandera Volcanic field. *N.M Geology*, 16, p. 80.
- Dunbar, N.W., Phillips, F.M., McIntosh, W.C., 1996. Uplift of the Northern Tibetan Plateau: Insights from $^{40}\text{Ar}/^{39}\text{Ar}$ and ^{36}Cl analysis of young lava flows. *EOS*, v. 77 no. 46, p. F694.
- Ennis, D.J., Dunbar, N.W., and Campbell, A.R., 1994. Potassium Metasomatism of silicic ignimbrites: The relationship between the mineralogical assemblage and the chemical changes associated with potassic alteration. *N.M.G.S. Abstr. Vol.*
- Eschenbacher, A. J., P. R. Kyle, J. Lowenstern, and N. W. Dunbar, 1998, Melt inclusion investigation of the volatile behavior of fractionating, alkaline, magma, Mount Erebus, Ross Island, Antarctica: PACROFI VII.
- Eschenbacher, A. J., P. R. Kyle, J. Lowenstern, and N. W. Dunbar, 1998, Pre-eruptive volatile contents of an evolving, alkaline, magma system, Mount Erebus, Ross Island, Antarctica: IAVCEI International Volcanological Congress, p. 18.
- Esser, R., Kyle, P.R. And Dunbar, N., 1999. $^{40}\text{Ar}/^{39}\text{Ar}$ chronology of the Pleiades Volcanic Centre, Northern Victoria Land, Antarctica: A potential source of late-Pleistocene englacial tephra layers, 8th International Symposium on Antarctic Earth Science, Victoria University of Wellington, New Zealand, pp. 100.

- Fargo, A., McIntosh, W., and Dunbar, N., 2008, $^{40}\text{Ar}/^{39}\text{Ar}$ geochronological analysis of Minna Bluff, Antarctica- Evidence for past glacial events within the Antarctic cryosphere: *New Mexico Geology*, v. 30, no. 2, p. 64.
- Fargo, A., McIntosh, W., and Dunbar, N.W., 2008, $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology of Minna Bluff, Antarctica: Timing of Mid-Miocene Glacial Erosional Events Within the Ross Embayment: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl. , p. V13C-2127.
- Foster, M., Lamb, M. A., Beard, S., Pomerleau, C., Dunbar, N., and McIntosh, W., 2013, Sandstone provenance of the Rainbow Gardens member, Miocene Horse Spring Formation, southern Nevada, provides evidence of regional uplift: *Geological Society of America Abstract Volume- Annual Meeting*, v. 45, no. 7, p. 562.
- Fouché, E., Shaya, M., Fudge, T. J., Holschuh, N., and Dunbar, N. W., 2023, Understanding Ice Flow and Deformation in the Allan Hills Through Satellite Imagery, Tephra Layers, and Steepest Flowlines: AGU23
- Frempong, K. B., McLemore, V. T., Dunbar, N. W., and Riggins, a. M., 2013, Cambrian-Ordovician(?) rare earth element (REE)-bearing episyenites in the Caballo and Burro Mountains, southern New Mexico; insights into a metasomatic origin: *New Mexico Geology*, v. 35, no. 2, p. 50-51.
- Fudge, T. J., Bay, R. C., Brook, E., Buizert, C., Clow, G. D., Cole-Dai, J., Conway, H., Cuffey, K. M., Dunbar, N., and others, a., 2012, WDC06A-6 Annual timescale to 30 ka and methane and dust match to 62 ka: WAIS Divide Science Meeting, Sept. 11-12, 2012, La Jolla, CA.
- Fudge, T. J., Buizert, C., Steig, E. J., and Dunbar, N. W., 2019, Antarctic Accumulation-Temperature Sensitivity on centennial to multi-millennial timescales: AGU Fall Meeting 2019.
- Fudge, T. J., Ferris, D., Osterberg, E., Winski, D., Fegyveresi, J., Kurbatov, A., Iverson, N., Dunbar, N., Cole-dai, J., Buizert, C., Bay, R., Brook, E., Severinghaus, J., and Sowers, T., 2017, SPICEcore Timescale: Stratigraphic matching. , South Pole Ice Core Science Meeting: Seattle, WA.
- Geedipally, P., McLemore, V. T., and Dunbar, N., 2012, Trace elements in the Copper Flat porphyry deposit, Hillsboro mining district, Sierra County, New Mexico: *New Mexico Geology*, v. 34, no. 2, p. 53-53.
- Geedipally, P., McLemore, V. T., and Dunbar, N. W., 2012, Geology and mineral deposits in the Hillsboro mining district, Sierra County, New Mexico *Geology of the Warm Springs region New Mexico Geol. Soc. Guidebook*, v. 63, p. 559-568.
- Goff, F., Dunbar, N.W., Kelley, S.A., Peters, L., McIntosh, W., Heizler, L.L., and Goff, C.J., 2011, Three Rivers Stock and Palisades Tuff: Correlating Intrusive Source with Ignimbrite Sheet in the Tectonically Disrupted Sierra Blanca Igneous Complex, New Mexico 2011 Geological Society of America Annual Meeting, Minneapolis, NM (9-12 October 2011), v. Paper No. 272-5.
- Goff, F., Kelley, S.A., Osburn, G.R., Lawrence, J.R., Goff, C.J., Ferguson, C.A., McIntosh, W., Fella, K., Dunbar, N.W., and Wolff, J.A., 2010, Evolution of Mount Taylor composite volcano, New Mexico: *New Mexico Geological Society Abstract Volume*, p. 17.
- Harpel, C. J., Kyle, P. R., and Dunbar, N. W., 2004, Englacial tephra from Mount Erebus, Antarctica: IAVCEI International Volcanological Congress, Pucon, Chile.
- Harvey, R.P., Dunbar, N.W., McIntosh, W.C., Esser, R.P., Nishiizumi, K, and Taylor, S., 1995, a meteoritic event recorded in Antarctic ice *Geol. Soc. Am. Abstr. w/ Prog.*, v.27, no. 6, p. A-210.
- Helmick, M., Kurbatov, A., Yates, M., Dunbar, N., Iverson, N., and Winski, D., 2022, New Tricks for Old Tephra, EGU22, Volume EGU22-8881, Copernicus Meetings
- Hervig, R. L., Carlson, E. N., and Dunbar, N. W., 2023, Microanalyses of Chalcophile Elements in Melt Inclusions Zoom in on Recharge Events in High-Silica Magma Chambers, American Geophysical Union Fall Annual Meeting Abstract V31A-03
- Horning, R. R., N. W. Dunbar, P. R. Kyle, and W. S. Baldrige, 1998, Evolution and emplacement of an unusual veined tephrite-basanite intrusion at El Porticito, NM: *Geological Society of America Abstracts with Program*, v. 30, p. 10.
- Horning, R.R., Dunbar, N.W., Kyle, P.R., and Baldrige, W.S., 1996. Evolution of igneous veins intruding basanite at El Porticito, Quemado, NM. *New Mexico Geology*, 18, 53.
- Iverson, N. A., and Dunbar, N. W., 2013, Preparation Techniques for Microanalysis of Fine-Grain Tephra

- that Incorporates Imaging Tephra Particles Prior to Quantitative Analysis: Examples from WDC06A Core: WAIS Divide Science Meeting, Sept. 24-25, 2013, La Jolla, CA, p. 54.
- Iverson, N. A., Dunbar, N. W., Kurbatov, A., Kalteyer, D., Yates, M., McIntosh, W., Sigl, M., McConnell, J. R., and Pearce, J., 2015, Linking the Antarctic tephra record across the continent and beyond American Geophysical Union Fall Meeting 2015, Volume V51F-3107.
- Iverson, N.A., Dunbar, N.W., Kurbatov, A., Kalteyer, D., McIntosh, W.C., Sigl, M., McConnell, J.R., 2014. Integration of the WAIS Divide tephra record into the maturing Antarctic tephra record. West Antarctic Ice Sheet Research Meeting, September 20-22, La Jolla, CA.
- Iverson, N. A., Dunbar, N. W., Kurbatov, A., Kalteyer, D., Yates, M., and McIntosh, W. C., 2015, Linking East and West Antarctica: How SPICECORE will Contribute to the Existing Antarctic Tephra Framework, 2015 WAIS Divide-SPICECORE Science Meeting: La Jolla, CA.
- Iverson, N.A., Dunbar, N.W., Lieb-Lappen, R., Kim, E., Golden, E., Obbard, R., 2014. Phreatomagmatic eruptions under the West Antarctic Ice Sheet: potential hazard for ice sheet stability AGU Fall Meeting 2014.
- Iverson, N.A., Dunbar, N.W., McIntosh, W.C., 2014. How advancements in analytical techniques are improving our understanding of the englacial tephra record in Antarctica, Tephra 2014- Maximizing the potential of tephra for multidisciplinary studies, Portland, OR.
- Iverson, N., Dunbar, N. W., Kurbatov, A., and McIntosh, W., 2017, Antarctica's englacial tephra record: linking source volcanoes, ice cores and blue ice areas IAVCEI General Assembly, Portland, OR, August 2017. Abstract Volume.
- Iverson, N., Dunbar, N., and Kurbatov, A., Transcontinental Tephra: Linking the East and West Antarctica volcanic record through SPICEcore, *in* Proceedings American Geophysical Union Fall Meeting, Washington, DC, 2018.
- Iverson, N. A., Dunbar, N. W., McIntosh, W. C., and Kurbatov, A., 2016, The tephrostratigraphy of Mt. Berlin volcano, Antarctica: Integrating blue ice tephra and ice core tephra records Abstract V11A-2752 presented at 2016 Fall Meeting, AGU.
- Iverson, N. A., Dunbar, N. W., McIntosh, W., Pearce, N. J. G., and Kyle, P., 2013, Improvements in the chronology, geochemistry and correlation techniques of tephra in Antarctic ice Abstract V13D-2642 Presented at the 2013 Fall AGU meeting, San Francisco, CA, Dec. 9-12.
- Iverson, N. A., Kyle, P. R., Dunbar, N. W., and Pearce, N., 2012, Eruptive history and magmatic stability of Erebus volcano, Antarctica: Insights from englacial tephra Abstract V43B-2841 presented at 2012 Fall Meeting, AGU, San Francisco, Calif., 3-7 Dec.
- Iverson, N., Siddoway, C., Zimmerer, M., Smellie, J., Dunbar, N., and Gohl, K., 2021, Rhyolite volcanism in the Marie Byrd Land volcanic province, Antarctica: New evidence for pyroclastic eruptions during latest Pliocene icesheet expansion, virtual EGU General Assembly 2021, Copernicus Meetings.
- Kammerer, M.M., Kyle, P.R., and Dunbar, N.W., 2010, Nature and Origin of Volcanogenic Salts Deposits around the Crater of Erebus volcano, Antarctica, abstract V31C-2339 presented at 2010 Fall Meeting, AGU, Volume San Francisco.
- Karlstrom, K.E., Crow, R.S., Peters, L., McIntosh, W., Raucci, J., Crossey, L.J., Umhoefer, P., and Dunbar, N., 2007, $^{40}\text{Ar}/^{39}\text{Ar}$ and field studies of Quaternary basalts in Grand Canyon and model for carving Grand Canyon: Quantifying the interaction of river incision and normal faulting across the western edge of the Colorado Plateau: Geological Society of America Bulletin, v. 119, p. 1283-1312.
- Kelly, P.J., Kyle, P., and Dunbar, N.W., 2006, Crystallization Processes and Magma Chamber Dynamics at the Mount Erebus Volcano Lava Lake: The Mineralogic Message: EOS, Transactions of the American Geophysical Union, v. 87 (52), p. V53E-04.
- Kim, E., Lieb-Lappen, R., Golden, E., Obbard, R., Iverson, N.A., Dunbar, N.W., 2014. What can the distribution of tephra in ash layers in the West Antarctic Ice Sheet tell us? West Antarctic Ice Sheet Research Meeting, September 20-22, La Jolla, CA.
- Koffman, B.G., Kreutz, K.J., Breton, D.J., Dunbar, N.W., and Kurbatov, A.V., 2011, Depositional phasing of volcanic aerosols in the WAIS Divide ice core over the past 2400 years: Abstract presented at

- 2011 Fall Meeting, AGU, San Francisco, Calif, 5-9 Dec., v. V11D-2539.
- Koffman, B.G., Kreutz, K.J., Breton, D.J., Dunbar, N.W., Kurbatov, A.V., Mayewski, P.A., and Wells, M.L., 2010, Microparticle Concentration in the WAIS Divide Ice Core over the Past 2.3 ka: Seasonal Variation and Volcanic Input, 2010 WAIS Divide Science Meeting: La Jolla, CA.
- Koffman, B. G., Kreutz, K., Kurbatov, A., Dunbar, N. W., and Breton, D. J., 2012, The WAIS Divide microparticle record illuminates the nature of past volcanic eruptions and indicates variability in Southern Hemisphere westerly wind direction: WAIS Divide Science Meeting, Sept. 11-12, 2012, La Jolla, CA.
- Koning, D. J., Connell, S. D., Slate, J. L., Wan, E., Ferguson, J. F., Grauch, V. J. S., Woldegabriel, G., Peters, L., McIntosh, W., Dunbar, N., Broxton, D., and Baldrige, W. S., 2008, Structural control on the eastern Espanola Basin, Rio Grande Rift, north-central New Mexico: *New Mexico Geology*, v. 30, no. 2, p. 54.
- Koning, D., Ferguson, J., Paul, P., Dunbar, N., and Baldrige, W. S., 2004b, Structure and middle-upper Miocene stratigraphy of the Velarde Graben, north-central New Mexico, and late Cenozoic tectonic implications: *New Mexico Geological Society Abstract Volume*, p. 33.
- Koning, D.J., Smith, G., Connell, S.D., Slate, J.L., Woldegabriel, G., Peters, L., McIntosh, W., Dunbar, N., and Horning, R., 2007, Tectonic Evolution Of The Española Basin, Rio Grande Rift, North-Central New Mexico: *Geological Society of America Abstracts with Program*, v. 2007 Annual Meeting, Denver, p. 182-8.
- Kreutz, K.J., Koffman, B.G., Breton, D.J., Dunbar, N.W., and Kurbatov, A.V., 2011, Seasonal to centennial-scale variability of microparticle concentration and size distribution in the WAIS Divide ice core over the past 2.4 ka: Abstract presented at 2011 Fall Meeting, AGU, San Francisco, Calif, 5-9 Dec., v. PP23B-1846.
- Kurbatov, A., Brook, E., Campbell, S., Conway, H., Dunbar, N. W., Higgins, J. A., Iverson, N., Kehrl, L. M., McIntosh, W. C., Spaulding, N. E., Yan, Y., and Mayewski, P., 2016, Allan Hills Pleistocene Ice Project (PIP) Abstract PP31B-2272 presented at 2016 Fall Meeting, AGU.
- Kurbatov, A.V., Dunbar, N.W., Iverson, N.A., Gerbi, C., Yates, M., Kalteyer, D., McIntosh, W.C., 2014. Antarctic Tephra Database (AntT). AGU Fall Meeting 2014.
- Kurbatov, A., Dunbar, N. W., Iverson, N., Royer, M., and Yates, D., 2017, Antarctic tephra database AntT, lessons learned IAVCEI General Assembly, Portland, OR, August 2017. Abstract Volume.
- Kurbatov, A., Dunbar, N.W., Zielinski, G., Mayewski, P., Curran, M., Morgan, V., and Van Ommen, T., 2003, Evaluation of Tephra Found in the Law Dome Ice Core, East Antarctica: *EOS Transactions of the American Geophysical Union*.
- Kyle, P., Dunbar, N.W., and Pearce, N.J.G., 2011, The Quaternary volcanic record in the ANDRILL McMurdo Ice Shelf AND-1B drill core: 11th International Symposium on Antarctic Earth Sciences, 10-16 July, Edinburgh, Scotland, p. PO5.12.
- Lamb, M.A., Anderson, Z.W., Pomerleau, C., Umhoefer, P.J., Dunbar, N.W., McIntosh, W., 2014. Determining styles of hanging-wall deformation in continental extension, the Lovell Wash Member of the Horse Spring Formation, Lake Mead area, Nevada. *Abstracts with Programs - Geological Society of America* 46, 97.
- Lamb, M. A., Beard, S., Foster, M., Dunbar, N., McIntosh, W., Hickson, T., and Umhoefer, P. J., 2013, Pushing back the onset of extension in the east-central Basin And Range: A previously unrecognized unconformity in the Lower Horse Spring Formation, Lake Mead area, southern Nevada: *Geological Society of America Abstract Volume- Annual Meeting*, v. 45, no. 7, p. 56.
- Lamb, M. A., Hickson, T. A., Anderson, Z. W., Umhoefer, P. J., Pomerleau, C., Stevens, E., Dunbar, N., and McIntosh, W., 2018, Intracontinental rift basin stratigraphy records middle Miocene extension, upper Horse Spring Formation in the White Basin, Lake Mead region, NV: *Abstracts with Programs - Geological Society of America*, v. 50, no. 5, p. @Abstract no 40-44
- Lamb, M. A., Hickson, T. A., Umhoefer, P. J., Anderson, Z. W., Pomerleau, C., Souders, K., Lee, L., Dunbar, N., and McIntosh, W., 2022, Middle Miocene faulting and basin evolution during central Basin and Range extension: A detailed record from the upper Horse Spring Formation and red

- sandstone unit, Lake Mead region, Nevada, USA: Geosphere
10.1130/GES02463.1/5683051/ges02463.pdf
- Lamb, M., Hickson, T., Umhoefer, P., Anderson, Z., Puszta, Z., Dunbar, N., and McIntosh, W., 2021, Intracontinental rift basin stratigraphy records middle Miocene extension, faulting evolution and climatic influences on deposition, upper Horse Spring Formation and Red Sandstone Unit, Lake Mead region, Nevada: Abstracts with Programs - Geological Society of America, v. 53, no. 5
10.1130/abs/2021AM-370775
- Love, D.W., Dunbar, N.W., McIntosh, W.C., Sorrell, J., and Pierce, D., 2003, Volcanic Debris From The Jemez Mountains Constrain The Age, Sediment-Source History, and Deformation Of Fluvial Facies Of The Ancestral Rio Grande (Upper Santa Fe Group), Central Albuquerque Basin, New Mexico: Geological Society of America Rocky Mountain Section Annual Meeting.
- Love, D. W., Dunbar, N. W., McIntosh, W. C., Connell, S. D., Sorrell, J., and Pierce, D., 2004, Plio-pleistocene faults and unconformities in and between the Arroyo Ojito and Sierra Ladrones formations and post-Santa Fe group piedmont, Mesa Del Sol, Llano de Manzano, central Albuquerque Basin, New Mexico: New Mexico Geological Society Abstract Volume, p. 39.
- Love, D., F. Maldonado, B. Hallett, K. Panter, C. Reynolds, W. McIntosh, and N. Dunbar, 1999, Preliminary geologic map of the Dalies quadrangle, Valencia County, New Mexico: 1999 USGS Middle Rio Grande Basin Study Workshop.
- Lucas, S. G., Morgan, G., Bejnar, C., Dunbar, N. W., Chamberlin, R., and Love, D., 2013, Primitive mammoth jaw from lower Pleistocene Rio Grande sediment, Socorro, New Mexico: New Mexico Geology, v. 35, no. 2, p. 49.
- Mailloux, B.J., Person, M., Strayer, L., Hudleston, P., Dunbar, N., Kelley, S., Cather, S., 1996. Tectonic controls on the hydrothermal evolution of the LaJencia and Socorro Basins of the Rio Grande Rift. Geol. Soc. America Abst. w/ program, v. 28, p A-255.
- Mallioux, B., Person, M., Hudleston, P., Dunbar, N., Kelly, S., and Cather, S., 1996. Tectonic controls on the hydrothermal evolution of the La Jencia and Socorro Basins of the Rio Grande Rift: Implications for potassium metasomatism. EOS, Trans. AGU, 77, S105.
- Manger, W., a. Fallacaro, and N. Dunbar, 2002. Depositional setting, lithologic character, and origin of chert in the Boone Formation (Lower Mississippian), northern Arkansas, Geological Society of America Abstracts with Program, 34 (6), 554.
- McConnell, J.R., Dunbar, N.W., Kohler, P., others, a., 2014. Accelerated deglaciation linked to volcanic eruptions 17.8k years ago. West Antarctic Ice Sheet Research Meeting, September 20-22, La Jolla, CA.
- McIntosh, W. C., and Dunbar, N. W., 2004, High-precision $^{40}\text{Ar}/^{39}\text{Ar}$ dating of a 10 ka to 492 ka sequence of englacial tephra layers at Mt. Moulton, Antarctica: IAVCEI International Volcanological Congress.
- McIntosh, W.C. And Dunbar, N.W., 1996. Chronology of tephra deposits in Rio Grande basin-fill sequences, central and southern New Mexico. New Mexico Geology, 18, 50.
- McIntosh, W.C., Dunbar, N.W., Iverson, N.A., 2014. New generation mass-spectrometers offer improved $^{40}\text{Ar}/^{39}\text{Ar}$ dating of tephra, Tephra 2014- Maximizing the potential of tephra for multidisciplinary studies, Portland, OR.
- McLemore, V. T., and Dunbar, N. W., 2018, Critical Minerals in New Mexico (invited), Association of American State Geologists Annual Meeting Rehoboth Beach, DE, A.A.S.G. , p. 32
- McLemore, V., Dunbar, N., Heizler, M., and Ramo, O. T., 2015, Origin of the REE-bearing Cambrian-Ordovician episyenites and carbonatites in southern and central New Mexico, USA, Geological Society of America Abstracts with Programs, Volume 47, p. 814.
- McLemore, V.T., Donahue, K., Phillips, E., Dunbar, N., Smith, M., Tachie-Menson, S., Viterbo, V., Lueth, V.W., Campbell, A.R., and Walker, B.M., 2006, Petrographic, mineralogical and chemical characterization of Goathill North Mine Rock Pile, Questa Molybdenum Mine, Questa, New Mexico:: 2006 Billings Land Reclamation Symposium, June, 2006, Billings, Mt. Published by Published by American Society of Mining and Reclamation, 3134 Montavesta Rd., Lexington, KY, CD-ROM.

- McLemore, V.T., Phillips, E.H., Dunbar, N., Walsh, P., Guitierrez, L.A.F., Tachie-Menson, S., Shannon, H.R., Lueth, V.W., Campbell, A.R., Wilson, G.W., and Walker, B.M., 2006, Characterization of Goathill North mine rock pile, Questa molybdenum mine, Questa, New Mexico.: 7th ICARD, March 26-30, 2006, St. Louis MO., American Society of Mining and Reclamation., Lexington, KY, p. 1219-1249.
- McLemore, V., Riggins, A. M., Dunbar, N., Heizler, M. T., McIntosh, W., Ramo, O. T., and Frempong, K. B., 2013, Rare Earth Element (REE) potential and origin of the episyenites in the Caballo, Burro, and Zuni Mountains, southern New Mexico: Geological Society of America Abstract Volume- Annual Meeting, v. 45, no. 7, p. 849.
- Meeks, L.K., Manger, W.L., and Dunbar, N.W., 1997. Diagenetic patterns in the preservation of cephalopod shells, Fayetteville black shale (Chesterian, Upper Missippian), Southern Ozark Region. Geol. Soc. Am. Abstr. w/ program. v. 29, no. 6, p. A-267
- Munroe, E. A., V. McLemore, and N. Dunbar, 1999, Mine waste rock pile mineralogy and geochemistry in select areas of the Hillsboro mining district, Sierra County, New Mexico: Insights into metal mobility: New Mexico Geological Society Abstract Volume, v. 1999, p. 15.
- Panter, K., Antibus, J.V., Wilch, T., Dunbar, N., McIntosh, W.C., Tripathi, A., Bindeman, I., Blusztajn, J., 2014. Alteration of volcanoclastic deposits; geochemical insights on mineralizing environment and climate during the late Miocene in Antarctica. .M. Goldschmidt Conference - Program and Abstracts 24, 1988.
- Panter, K., Dunbar, N.W., Scanlan, M., Wilch, T., Fargo, A., and McIntosh, W., 2011, Petrogenesis of alkaline magmas at Minna Bluff, Antarctica: evidence for multi-stage differentiation and complex mixing processes: Abstract presented at 2011 Fall Meeting, AGU, San Francisco, Calif, 5-9 Dec., v. V31F-2590.
- Person, M., Mailloux, B., Strayer, L., Hudleston, P., Cather, S., Dunbar, N.W., 1995. Tracing groundwater flow across sedimentary basins using geothermal date: A Bredehoeft legacy. Geol. Soc. Am. Abst. w/ Prog., v. 27, no. 6, p. A-312.
- Phillips, E., Goff, F., Kyle, P., Dunbar, N., McIntosh, W., and Gardner, J.E., 2010, $^{40}\text{Ar}/^{39}\text{Ar}$ age constraints on the of resurgence and post-collapse rhyolites at Valles Caldera, Jemez Mountains, New Mexico: Geological Society of America Abstracts with Program, v. 42, p. 52.
- Phillips, F.M., Dunbar, N., Zreda, M.G., 1997. A Test of Chlorine-36 for Dating of Late Quaternary Basaltic Volcanos. Fall AGU meeting
- Pompilio, M., Kyle, P, Wilch, T.I., and Dunbar, N.W., 2007, The volcanic record in the ANDRILL McMurdo Ice Shelf AND-1B drill core, *in* Cooper, a., and Raymond, C., eds., Tenth international symposium on Antarctic earth sciences; Antarctica; a keystone in a changing world, U. S. Geological Survey.
- Popp, T. J., Sowers, T., Dunbar, N. W., McIntosh, W. C., and White, J. W., 2004, Radioisotopically Dated Climate Record Spanning the Last Interglacial in Ice from Mount Moulton, West Antarctica: EOS Trans. Am. Geophys. Union, v. 85, no. 47.
- Riggins, A.M., Dunbar, N.W., McLemore, V., Heizler, M., McIntosh, W.C., Frempong, K.B., 2014. Mineralogy, geochemistry, and chronology of the Caballo and Burro mountains REE-bearing episyenites. New Mexico Geological Society Abstract Volume 2014.
- Riggins, A. M., Dunbar, N., McLemore, V., Heizler, M. T., and McIntosh, W., 2013, Mineralogy, geochemistry, and chronology of the Caballo and Burro Mountains REE-bearing episyenites: Geological Society of America Abstract Volume- Annual Meeting, v. 45, no. 7, p. 500.
- Riggins, A. M., Dunbar, N. W., Heizler, M. T., McLemore, V. T., Frempong, K., and McIntosh, W., 2013, Characterizing high REE occurrences associated with episyenites in the Caballo and Burro Mountains, New Mexico: Abstracts with Programs - Geological Society of America, v. 45, no. 5, p. 40-41.
- Riggins, A. M., Dunbar, N. W., McLemore, V. T., Frempong, K. B., Heizler, M. T., and McIntosh, W., 2013, Genesis of the Caballo and Burro Mountains REE-bearing episyenite: New Mexico Geology, v. 35, no. 2, p. 44.

- Rocchi, S., Smellie, J.L., Wilch, T., Gemelli, M., Di Vincenzo, G., McIntosh, W., Dunbar, N., Panter, K., Fargo, A., 2014. Glaciovolcanic Evidence for a Polythermal Neogene East Antarctic Ice Sheet. Goldschmidt Conference Program and Abstracts 24.
- Ross, J., and McIntosh, W.C., Dunbar, N.W., 2007, Preliminary $^{40}\text{Ar}/^{39}\text{Ar}$ results from the AND-1B core, *in* Cooper, a., and Raymond, C., eds., Tenth international symposium on Antarctic earth sciences; Antarctica; a keystone in a changing world, U. S. Geological Survey.
- Ross, J.I., McIntosh, W.C., and Dunbar, N.W., 2008, $^{40}\text{Ar}/^{39}\text{Ar}$ chronology of volcanic events in the AND-1B drillcore - implications for age models and glacial history of the Ross Embayment: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl. p. C21B-0540.
- Saleh, H., Iverson, N. A., and Dunbar, N. W., 2023, Investigation of volcanic ash deposits from Ecuador and New Mexico, American Geophysical Union Fall Annual Meeting Abstracts V13D-0162
- Scanlan, M., Panter, K., and Dunbar, N., 2007, Evidence for magma mixing/mingling in lavas from Minna Bluff, South Victoria Land, *in* Cooper, a., and Raymond, C., eds., Tenth international symposium on Antarctic earth sciences; Antarctica; a keystone in a changing world, U.S. Geological Survey.
- Scanlan, M., Panter, K., Wilch, T.I., Dunbar, N.W., and McIntosh, W.C., 2008, Petrology of Inclusion-Rich Lavas at Minna Bluff, Antarctica: Implications for Magma Origin, Differentiation and Eruption Dynamics: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., p. V13C-2129.
- Sigl, M., Cole-Dai, J., Ferris, D., Fudge, T.J., McConnell, J.R., Welten, K., Winstrup, M., Woodruff, T.E., Brook, E., Buizert, C., Dunbar, N., Iverson, N.A., Koffman, B.G., Maselli, O., McGuire, K., Muscheler, R., Pasteris, D., Sowers, T., Taylor, K., 2014. The WAIS-Divide deep ice core WD2014 chronology: 1. Annual layer counting (0-31 ka BP). West Antarctic Ice Sheet Research Meeting, September 20-22, La Jolla, CA.
- Sigurdsson, H., W. C. McIntosh, N. W. Dunbar, C. Lacasse, and S. Carey, 1998, Thorsmork Ignimbrite in Iceland: Possible source of North Atlantic ash: *EOS, Transactions of the American Geophysical Union*, v. 1998 Spring Meeting, p. V51A-08.
- Simpson, S.W., Quade, J., Kleinsasser, L., Levin, N., Macintosh, W., Dunbar, N., and Semaw, S., 2007, Late Miocene hominid teeth from Gona project area, Ethiopia: *American Journal of Physical Anthropology*, p. 219-219.
- Sims, K.W.W., Pichat, S., Reagan, M., Dunbar, N.W., Kyle, P., Sawyer, G., Gauthier, P., and Bichert-Toft, J., 2010, Do ^{226}Ra - ^{230}Th isochrons provide realistic crystallization ages?, *Cities of Volcanoes 6: Tenerife, Canary Islands*, p. 17.
- Sims, K.W., Pichat, S., Reagan, M., Dunbar, N.W., Kyle, P., Gauthier, P., and Blichert-Toft, J., 2008, Do ^{226}Ra - ^{230}Th isochrons provide realistic crystallization ages?: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., p. V11D-02.
- Sletten, R.S., Mann, D.H., McIntosh, W.C., Dunbar, N.W., L., P.M., Dickinson, W., and Stone, J.O., 2007, Possible redeposition of volcanic ashes in the Dry Valleys by glacier transport, *in* Cooper, a., and Raymond, C., eds., Tenth international symposium on Antarctic earth sciences; Antarctica; a keystone in a changing world, U. S. Geological Survey.
- Spidell, R., Dunbar, N.W., 2014. Teachers guide to the Valles Caldera: The science, fulfilling the vision of NGSS. Geological Society of America Abstract Volume- Annual Meeting 2014.
- Stinchcomb, G. E., Quade, J., Levin, N. E., Iverson, N., Dunbar, N. W., McIntosh, W. C., Arnold, L. J., Duval, M., Grün, R., and Takashita-Bynum, K. K., 2020, Fluvial response and its implications for human-environment interactions during the Middle to Late Pleistocene and african humid period in Ethiopia, Geological Society of America 2020.
- Sweeney, D., Phillips, E., McLemore, V., Donahue, K., Dunbar, N., and Heizler, L., 2007, Petrographic techniques used to characterize Molycorp rock piles, Questa, New Mexico: *New Mexico Geology*, v. 29, p. 61.
- Sztein, E., Mogk, D., Chan, M., Connors, T., Dunbar, N. W., Tormey, D., and Whitlock, C., 2021, America's geoheritage workshop II; Identifying, developing, and preserving America's natural legacy; workshop proceedings: Abstracts with Programs - Geological Society of America, v. 53, no. 5 10.1130/abs/2021AM-370283

- Takashita-Bynum, K. K., Stinchcomb, G. E., Levin, N., Quade, J., Iverson, N., McIntosh, W., and Dunbar, N., 2018, The Persistence of Salt-Affected Paleosols at Gona, Ethiopia: A Sedimentary Archive of Middle to Late Pleistocene Soil Salinity Within a Corridor of Early Human Migration: Geological Society of America Annual Meeting, Indianapolis, IN.
- Takashita-Bynum, K. K., Stinchcomb, G. E., White, M. N., Driese, S. G., Dworkin, S. I., Levin, N. E., Quade, J., Iverson, N., McIntosh, W. C., and Dunbar, N. W., 2019, Physical and chemical analysis of paleosols before, during and after periods of anatomically modern human migration at Gona, Ethiopia: Geological Society of America Annual Meeting, Phoenix, AZ.
- Umhoefer, P.J., Lamb, M.A., Hickson, T.A., Cains, A., Winston, J., Borer, D., Dunbar, N.W., McIntosh, W., Beard, L.S., 2014. Paleogeography of the Horse Spring Formation in the Lake Mead Domain (Nevada) from 18 to 12 Ma; did a river flow into or through it? Abstracts with Programs - Geological Society of America 46, 97.
- White, M. N., Takashita-Bynum, K. K., Stinchcomb, G. E., Quade, J., Levin, N. E., Iverson, N., McIntosh, W. C., Dunbar, N. W., Arnold, L. J., and Duval, M., 2019, Evidence of Late Pleistocene and Holocene paleo-critical zones archived in paleosols at Gona, Ethiopia: Geological Society of America Annual Meeting, Phoenix, AZ.
- Wilch, T.I., McIntosh, W.C., Panter, K.S., Dunbar, N.W., Smellie, J.L., Fargo, A., Scanlan, M., Zimmerer, M.J., Ross, J., and Bosket, M.E., 2008, Volcanic and Glacial Geology of the Miocene Minna Bluff Volcanic Complex, Antarctica: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., p. V11F-06.
- Wilch, T.I., McIntosh, W.C., Smellie, J.L., Dunbar, N.W., Fargo, A., Scanlan, M.K., Roberts, P.D., and Panter, K.S., 2007, Late Miocene volcanism and glaciation at Minna Bluff, Antarctica, *in* Cooper, A., and Raymond, C., eds., Tenth international symposium on Antarctic earth sciences; Antarctica; A keystone in a changing world, U. S. Geological Survey.
- Wilch, T., McIntosh, W., Panter, K., Dunbar, N.W., Smellie, J.L., Fargo, A., Ross, J.I., Antibus, J.V., and Scanlan, M., 2011, Two-stage growth of the Late Miocene Minna Bluff Volcanic Complex, Ross Embayment, Antarctica: implications for ice-sheet and volcanic histories: Abstract presented at 2011 Fall Meeting, AGU, San Francisco, Calif, 5-9 Dec., v. V31F-2591.
- Wilch, T., Panter, K., McIntosh, W., Dunbar, N., Smellie, J.L., Fargo, A., Ross, J., Antibus, J.V., Scanlan, M., and Zimmerer, M.J., 2011, Late Miocene evolution of the Minna Bluff Volcanic Complex, Ross Embayment, Antarctica: 11th International Symposium on Antarctic Earth Sciences, 10-16 July, Edinburgh, Scotland, p. PS5.10.
- Wilson, G.S., Levy, R.H., Browne, G., Dunbar, N.W., Florindo, F., Henrys, S.A., Graham, I., McIntosh, W.C., McKay, R.M., Naish, T.R., Ohneiser, C., Powell, R.D., Ross, J.I., Sagnotti, L., Scherer, R.P., Sjunneskog, C., Strong, C.P., Taviani, M., and Winter, D.M., 2007, Chronostratigraphic constraints on Pliocene warmth and Pleistocene cooling in the ANDRILL-1B drillcore from beneath the McMurdo Ice Shelf, Antarctica.: *EOS, Transactions of the American Geophysical Union*, p. 88(52), Fall Meeting Supplement.
- Wilson, G.S., Levy, R.H., Browne, G., Dunbar, N.W., Florindo, F., Henrys, S.A., Graham, I., McIntosh, W.C., McKay, R.M., Naish, T.R., Ohneiser, C., Powell, R.D., Ross, J.I., Sagnotti, L., Scherer, R.P., Sjunneskog, C., Strong, C.P., Taviani, M., and Winter, D.M., 2007, Preliminary chronostratigraphy for the upper 700 m (upper Miocene-Pleistocene) of the AND-1B drillcore recovered from beneath the McMurdo Ice Shelf, Antarctica, *in* Cooper, a., and Raymond, C., eds., Tenth international symposium on Antarctic earth sciences; Antarctica; a keystone in a changing world, U. S. Geological Survey.
- Zielinski, G., and N. Dunbar, 1998, Volcanic Record from the Siple and Taylor Domes, Antarctica: WAISCORES Meeting, Sept. 10, 1998.
- Zimmerer, M.J., McIntosh, W.C., and Dunbar, N.W., 2007, The $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology and Thermochronology of the Latir Volcanic Field, New Mexico: Implications for Silicic Caldera Volcanism: *New Mexico Geology*, v. 29, p. 57.
- Zimmerer, M.J., McIntosh, W., and Dunbar, N.W., 2008, a $^{40}\text{Ar}/^{39}\text{Ar}$ Geochronology and Thermochronology Study of Caldera Volcanism and Related Plutonic Processes, Questa Caldera, Northern New Mexico: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., p. V12A-05.

Zimmerer, M., McIntosh, W.C., Heizler, M.T., Dunbar, N.W., Lafferty, J., 2014. A high-precision $^{40}\text{Ar}/^{39}\text{Ar}$ chronology of late-Quaternary volcanism in the Raton-Clayton volcanic field New Mexico Geological Society Abstract Volume 2014.