

**NELIA W. DUNBAR**

New Mexico Bureau of Geology  
Socorro, NM, 87801  
Date of Birth: July 1, 1962  
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**Updated November 2022****EDUCATION:****George School**

Graduated, 1979

**Mount Holyoke College**BA 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>)

- 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. <sup>40</sup>Ar/<sup>39</sup>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 <sup>36</sup>C1 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 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- )
- 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:**

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

Director and State Geologist/Adjunct Faculty: Oct. 2016-present. 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 meeting. Act as advisor for the electron microprobe laboratory, and carry out limited research.

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). Volcanological field work in various parts of Antarctica, as field assistant, graduate researcher, or principal investigator. Work mainly included mapping recent volcanic rocks and measuring 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, University 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.
- 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  $^{36}\text{Cl}$ -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 H<sub>2</sub>O, 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 <sup>36</sup>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  $^{238}\text{U}$ ,  $^{230}\text{Th}$ , and  $^{231}\text{Pa}$  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.
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- 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.
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