

**Helen Mango**  
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## Education

Dartmouth College: Doctor of Philosophy (Geology), 1992.  
Thesis: Origin of Epithermal Ag-Au-Cu-Pb-Zn Mineralization on the Veta Madre, Guanajuato, Mexico.

Dartmouth College : Master of Science (Geology), 1988.  
Thesis: A Fluid Inclusion and Isotope Study of the Las Rayas Ag-Au-Pb-Zn Mine, Guanajuato, Mexico.

Williams College: Bachelor of Arts (Major: Geology), 1985.  
Minors: Mathematics, French.

## Professional Experience

Castleton University, Professor of Geology and Chemistry, 1991-present  
(Promoted to associate professor 5/96, tenure 7/97, promoted to full professor 5/02). Courses taught: physical geology, historical geology, igneous and metamorphic petrology, environmental geology, earth resources, hydrogeology, geochemistry, aqueous geochemistry, geology seminars (volcanoes, earthquakes, ore deposits, oceanography, tectonics), the geology of Costa Rica, the geology of Iceland, general chemistry (parts I and II), chemistry for pre-service teachers, introductory astronomy.

Geologic consulting, 1995-present (intermittent): Mapping and analysis for earth resources industries.

Dartmouth College, Teaching and Laboratory Assistant, 1986-1992. Courses: physical geology, historical geology, astronomy and earth history, optical mineralogy, sedimentary petrology, igneous/metamorphic petrology, field geology (Mexico and Costa Rica), earth resources, environmental geology.

Westmont Mining, Inc., Tucson, AZ, Exploration Geologist (summers 1988, 1989). Gold exploration in Arizona and California deserts; detailed sampling, mapping, drilling, and writing project reports.

Indiana University Geologic Field Station, Assistant Instructor (summer 1986). Assistant instructor for geologic field mapping and surveying in southwest Montana.

## Fellowships and Grants

Dartmouth College Graduate Fellowship (1986-1991)  
Albert Cass Travelling Fellowship (1987)  
Explorers Club grant (1987)  
Sigma Xi grants (1989, 1990)  
Geological Society of America grant (1990)  
Society of Economic Geologists Small College grant (1992)  
State of Vermont mapping grants (1993-97)  
Experimental Program to Stimulate Competitive Research (EPSCoR),  
National Science Foundation, OSR 9350540 (1994)  
Castleton State College Faculty Development Grants (1993, 1996)  
National Science Foundation - Research Experience for Undergraduates  
EAR 9424249 (1995-98)  
Central Vermont Public Service grant (1997)  
Vermont Geological Survey grant (2001)  
Lake Champlain Basin Program grant (2001)  
Vermont Genetics Network grant (2004)  
Castleton State College Advanced Study Grant (1995): \$1065  
Castleton State College Sabbatical and Advanced Study Grant (2002-2003): \$5200  
Castleton State College Sabbatical and Advanced Study Grant (2010-2011); \$3450  
Castleton State College Advanced Study Grant (2012): \$950  
Castleton State College Advanced Study Grant (2014): \$1785  
Castleton State College Advanced Study Grant (2015): \$1495  
Castleton University Sabbatical and Advanced Study Grant (2019-2020): \$1763

- Professional Affiliations** Geological Society of America  
Society of Economic Geologists  
Sigma Xi  
National Association of Geoscience Teachers  
Vermont Geological Society
- Languages** French, Spanish
- Offices held** Co-Chair, New England Intercollegiate Geological Conference/New York State Geological Society (joint meeting), 2018  
Technical Co-Chair, Geological Society of America Northeast Section 2016 meeting  
Geological Society of America, Northeast Section Management Board, Vice Chair (2009-2010), Chair (2010-2011), Past Chair (2011-2012)  
Geological Society of America, Northeast Section Management Board, Member-at-Large (2005-2007)  
Co-chair, New England Intercollegiate Geologic Conference, 1997  
Vermont Geological Society, Board of directors, 1994-95  
Vermont Natural Resource Council, Board of directors, 2023-present
- Publications** Grover, T. and Mango, H. (eds.), 2018, Guidebook for Field Trips in New York and Vermont, New England Intercollegiate Geological Conference 110<sup>th</sup> Annual meeting/New York State Geological Association 90<sup>th</sup> Annual meeting, 301 pp.
- Mango, H., Droege, M., McHugh, M. and Hluchy, M., 2018, Heavy metal contamination from illegal burn piles in an ecologically sensitive site in West Haven, VT, 2018 New England Intercollegiate Geological Conference Guidebook, pp. 291-301.
- Mango, Helen, 2016, Silver: Element and geochemistry, *in* White, William, ed., Encyclopedia of Geochemistry, 3rd ed., Springer.
- Mango, H. and Ryan, P., 2014, Source of arsenic-bearing pyrite in southwestern Vermont: Sulfur isotope evidence, *Science of the Total Environment*, doi: 10.1016/j.scitotenv.2014.03072.
- Kissin, S.A. and Mango, H., 2013, Silver Vein Deposits, *in* Turekian, K.K. and Holland, H.D., eds., Treatise on Geochemistry, 2<sup>nd</sup> edition, Vol. 13, Elsevier.
- Ryan, P., Kim, J., Mango, H., Hattori, K., and Thompson, A., 2013, Dissolved arsenic in a fractured slate aquifer system, New England, USA: Influence of bedrock geochemistry, groundwater flow paths, redox and ion exchange, *Applied Geochemistry*, Vol. 39, p. 181-192.
- Mango, H., Arehart, G., Oreskes, N. and Zantop, H., 2013, Origin of epithermal Ag-Au-Cu-Pb-Zn mineralization in Guanajuato, Mexico, *Mineralium Deposita*, DOI 10.1007/s00126-013-0478-z
- Mango, H., 2011, What's in your drinking water?, Rutland Herald (March 6, 2011), p. B4.
- Mango, H., 2009, Geology of Marble Belt, Rutland Herald (May 10, 2009), p. B5.
- Armienta, M.A., Ongley, L.K., Rodriguez, R., Cruz, O., Mango, H. and Villasenor, G., 2008, Arsenic distribution in mesquite (*Prosopis laevigata*) and huizache (*Acacia farnesiana*) in the Zimapan mining area, Mexico, *Geochemistry: Exploration, Environment and Analysis*, vol. 8, p. 191-197.
- Ongley, L.K., Armienta, A., and Mango, H., 2003, Concentrations of heavy metals in soil, Zimapan, México, *J. Phys. IV France*, vol. 107, p. 983-986.
- Mango, H., 2002, The Geology of the Mount Independence State Historic Site, Orwell, Vermont, 2002 New England Intercollegiate Geological Conference Guidebook, pp. C1-C19 .

Ongley, L. K., Heggeman, K., Armienta, M.A., Lathrop, A.S., Mango, H., Miller, W. and Pickelner, S., 2001, Arsenic sorption from contaminated groundwater by the Soyatal Formation, Zimapán mining district, Mexico - preliminary results, *Geochemistry: Exploration, Environment and Analysis*, vol. 1, p. 23-31.

Armienta, M.A., Villaseñor, G., Rodriguez, R., Ongley, L.K. and Mango, H., 2001, The role of arsenic-bearing rocks in groundwater pollution at Zimapán Valley, Mexico, *Environmental Geology*, vol. 40, no. 4-5, p. 571-581.

Mango, H., 2000, A reading and writing approach to teaching environmental geology, *Journal of Geoscience Education*, v. 48, p. 514-518.

Mango, H., 1999, Silver: Element and geochemistry, *in* Marshall, Clare P. and Fairbridge, Rhodes W., eds., *Encyclopedia of Geochemistry*, 2nd ed., Kluwer Academic Publishers, p. 575-577.

Mango, H., 1999, Complexes, *in* Marshall, Clare P. and Fairbridge, Rhodes W., eds., *Encyclopedia of Geochemistry*, 2nd ed., Kluwer Academic Publishers, p. 99-100.

Mango, H., 1997, Bedrock geologic map of the Orwell 7.5' Quadrangle, VGS Open File Report 97-6.

Mango, H., 1997, Stratigraphy and structure of the Orwell 7.5' quadrangle, west-central Vermont, 1997 New England Intercollegiate Geological Conference Guidebook, pp. C-2: 1-13.

Grover, T.W., Mango, H.N. and Hasenohr, E.J., eds., 1997, Guidebook to Field Trips in Vermont and Adjacent New Hampshire and New York, 1997 New England Intercollegiate Geological Conference.

Armienta, M.A., Rodriguez, R., Ongley, L., Villaseñor, G., Lathrop, A., Mango, H., Aguago, A., Cenicerros, N., Cruz, O., 1997, Origen y transporte del arsenico en el acuífero de Zimapán, Hidalgo, IGF UNAM, Mexico, D.F.

Mango, H., 1996, ¿Por favor, donde estan las rocas interesantes? (Excuse me, where are the interesting rocks?): Taking Vermont students south of the border, *The Green Mountain Geologist*, vol. 23, no. 1, pp. 16-18.

Mango, H., 1994, A geochemical study of Dorset Mountain, VT, Vermont Geological Survey publication VG94-1, 8 pp.

Cronan, T., Slattery, M. and Mango, H., 1994, Geologic mapping in the Proctor quadrangle, VT, Vermont Geological Survey publication VG94-2, 4 pp.

Mango, H. 1992, Origin of epithermal Ag-Au-Cu-Pb-Zn mineralization on the Veta Madre, Guanajuato, Mexico, Unpub. Ph.D. thesis, Dartmouth College.

Mango, H., Oreskes, N., and Zantop, H., 1991, A fluid inclusion and isotope study of the Las Rayas Ag-Au-Pb-Cu mine, Guanajuato, Mexico, *Economic Geology*, vol. 86, pp. 1554-1561.

Mango, H., 1988, A fluid inclusion and isotope study of the Las Rayas Ag-Au-Pb-Cu mine, Guanajuato, Mexico, Unpub. Master thesis, Dartmouth College.

#### Abstracts:

Mango, H., Palmer, C., Semanchik, G. and Perry, D., 2022, Rock, sediment and soil geochemistry of an afforestation site, Reykjanes Peninsula, Iceland, *Geol. Soc. Amer. Abstr. Progr.*, Vol. 54.

Mango, H. and Hluchy, M., 2016, Vertical and horizontal migration of metal contaminants from illegal garbage burn piles in West Haven, Vermont, *Geol. Soc. Amer. Abstr. Progr.*, Vol. 48.

Mango, H., 2014, Heavy metal contamination of soil and plants associated with illegal garbage burn piles, West Haven, VT, USA, *Geol. Soc. Amer. Abstr. Progr.*, Vol. 46, No. 6.

- Mango, H., 2014, Soil contamination associated with illegal burn piles in West Haven, Vermont, Geol. Soc. Amer. Abstr. Prog., 2013 Northeast section meeting, vol. 46, no. 2, p. 100.
- Mango, H. and Ryan, P., 2013, Source of arsenic bearing pyrite in southwestern Vermont: Sulfur isotope evidence, Geol. Soc. Amer. Abstr. Prog., 2013 Northeast section meeting, vol. 44, no. 1, p. 46.
- Mango, H., 2012, Estimating discharge of flooding of the Castleton River, Vermont, resulting from Tropical Storm Irene, Geol. Soc. Amer. Abstr. Prog., 2012 Northeast section meeting, vol. 44, no. 1, p. 166.
- Mango, H. and Ryan, P., 2011, Pyrite as the source of groundwater arsenic in Taconic slates, southwestern Vermont, Geol. Soc. Amer. Abstr. Prog., 2011 Northeast section meeting, vol. 43, no. 1, p. 135.
- Clark, A.L., Smith, T.T., Kim, J., Ryan, P.C. and Mango, H., 2010, Elevated arsenic in domestic wells from the Taconic allochthons in southern Vermont, Geol. Soc. Amer. Abstr. Prog., 2010 Northeast section meeting, vol. 42, no. 1, p. 185.
- Mango, H., 2009, A simple, inexpensive method for measuring aquifer sediment characteristics in the lab or classroom, Geol. Soc. Amer. Abstr. Prog., 2009 Annual Meeting, vol. 41, no. 7, p. 447.
- Mango, H., 2009, Source of arsenic in groundwater in southwestern Vermont, Geol. Soc. Amer. Abstr. Prog., 2007 Northeast section meeting, vol. 39, no. 1, p. 71.
- Mango, H., 2008, Source and transport of arsenic in drinking water and groundwater flow pathways in southwestern Vermont, Geol. Soc. Amer. Abstr. Prog., 2009 Northeast section meeting, vol. 41, no. 3, p. 8.
- Mango, H., Mach, D. and Lea, P., 2006, Service learning for sixth graders in southwestern Vermont: Arsenic contamination of groundwater and civic involvement, Geol. Soc. Amer. Abstr. Prog., 2006 Northeast section meeting, vol. 38, no. 2, p. 18.
- Mango, H., 2005, Geology as an integral part of K-8 Master of Arts in Science Education, Geol. Soc. Amer. Abstr. Prog., 2005 Annual Meeting, vol. 37, no. 7, p. 85.
- Mango, H. and Mach, D., 2005, Arsenic contamination in groundwater in southwestern Vermont, Geol. Soc. Amer. Abstr. Prog., 2005 Northeast section meeting, vol. 37, no. 1, p. 80.
- Mango, H., Ryan, P. and Kim, J., 2004, Elevated radioactivity in groundwater in southwestern Vermont, Geol. Soc. Amer. Abstr. Prog., 2004 Annual Meeting, vol. 36, no. 5, p. 561.
- Mango, H., 2003, Costa Rica as Ideal Geology Field Trip, Geol. Soc. Amer. Abstr. Prog., 2003 Annual Meeting, vol. 35, no. 6, p. 359.
- Mango, H. N., 2001, The Guanajuato mining district, Mexico: Half Zantop's contributions and guidance, Geol. Soc. Amer. Abstr. Prog., 2001 Annual Meeting, vol. 33, no. 6, p. A97.
- Motilla, J.L. and Mango, H., 2000, Paragenetic sequence of mineralization of the Veta Madre, Guanajuato, Mexico, obtained from factor analysis of geochemical data, Geol. Soc. Amer. Abstr. Prog., 2000 Annual Meeting, vol. 32, no. 7, p. A84.
- Mango, Helen, Armienta, A., Villaseñor, G., Lathrop, A., Ongley, L., 1998, Fluid inclusions indicate lack of relationship between skarn orebodies and outlying veins in Zimapán, Mexico, Geol. Soc. Amer. Abstr. Prog., 1998 Annual Meeting, vol. 30, no. 7, p. A77.

- Crawford, Sherry, Mango, Helen, Armienta, Ma. Aurora, Ongley, Lois K., 1998, Using biogeochemistry to trace arsenic contamination in groundwater in Zimapán, Mexico, Geol. Soc. Amer. Abstr. Prog., 1998 Northeast section meeting, vol. 30, no. 1, p. 12.
- Buchanan, Norman, Mango, Helen, Lini, Andrea, Abbott, Michael, Ongley, Lois, 1997, Using oxygen isotopes to constrain the source and flow of arsenic-contaminated groundwater in Zimapán, Mexico, Geol. Soc. Amer. Abstr. Prog., 1997 Northeast section meeting, vol. 29, no. 1, p.33-4.
- Mango, Helen, 1997, A new Taconic slice (albeit a small one), Geol. Soc. Amer. Abstr. Prog., 1997 Northeast section meeting, vol. 29, no. 1, p. 63.
- Lor, Chenda and Mango, Helen, 1997, Characterization of igneous dikes and their contribution to As contamination in groundwater, Zimapán valley, Hidalgo, Mexico, Geol. Soc. Amer. Abstr. Prog., 1997 Northeast section meeting, vol. 29, no. 1, p. 62.
- Mango, Helen, Alberico, Bonnie, Bowen, Bill, Buchanan, Scott, Foran, Julie, Foster, Shannon, King, Chris, Parmley, Mike, Patterson, Marlene and Slattery, Mike, 1996, Real research as a geochemistry teaching tool, Geol. Soc. Amer. Abstr. Prog., 1996 Annual Meeting, vol. 28, no. 7, p. A342.
- Lathrop, Alison S., Armienta, M. Aurora, Mango, Helen and Ongley, Lois, 1996, Undergraduate research in an international collaborative setting: Hydrogeology in Maine and Mexico, Geol. Soc. Amer. Abstr. Prog., 1996 Annual Meeting, vol. 28, no. 7, p. A332.
- Ongley, Lois K., Mango, Helen, Lathrop, Alison S., Armienta, M. Aurora, Kinch, Judith and Tichenor, Sara, 1996, Geochemical analysis of arsenic-polluted water from Zimapán, State of Hidalgo, Mexico, Geol. Soc. Amer. Abstr. Prog., 1996 Annual Meeting, vol. 28, no. 7, p. A288.
- Mango, H., 1995, Teaching current issues in environmental geology: A reading and writing approach, Geol. Soc. Amer. Abstr. Prog., 1995 Annual Meeting, vol. 27, no. 7, p. A299.
- Armienta, M. A., Rodríguez, R., Ongley, L., Villaseñor, G., Lathrop, A., Mango, H., Aguayo, A., Cenicerros, N. and Cruz, O., 1995, Origen y transporte del arsenico en el acuífero de Zimapán, Hidalgo, 3er congreso Latinoamericano de Hidrología Subterránea, Mexico City.
- Mango, H., Arehart, G. and Howe, S., 1994, Determination of ore fluid history in Guanajuato, Mexico: Oxygen, hydrogen and sulfur isotope evidence, Geol. Soc. Amer. Abstr. Prog., 1994 Annual Meeting, vol. 26, no. 7, p. A222.
- Mango, H., Arehart, G. and Howe, S., 1993, Ore fluid evolution in Guanajuato, Mexico: Stable isotope evidence from sulfides and fluid inclusions, Geol. Soc. Amer. Abstr. Prog., 1993 Annual Meeting, vol. 25, no. 6, p. A469.
- Mango, H. and Zantop, H., 1992, Patterns and sources of Ag-mineralization in Guanajuato, Mexico: New evidence from the San Ignacio Mine, Geol. Soc. Amer. Abstr. Prog., 1992 Annual Meeting, vol. 24, no. 7, p. A317.
- Mango, H., et al., 1991, The Guanajuato mining district: A "classic" epithermal deposit?, Geol. Soc. Amer. Abstr. Prog., 1991 Annual Meeting, vol. 23, no. 5, p. A229.
- Conrad, M., Mango, H., Chamberlain, C. and Zantop, H., 1991, High- $\delta^{18}\text{O}$  fluids in the Guanajuato and Fresnillo epithermal vein systems: Meteoric or magmatic water?, Geol. Soc. Amer. Abstr. Prog., 1991 Annual Meeting, vol. 23, no. 5, p. A229.
- Mango, H., et al., 1990, Pb isotopic values of Mexican Cenozoic ores and volcanics, Geol. Soc. Amer. Abstr. Prog., 1990 Annual Meeting, vol. 22, no. 7, p. A135.
- Mango, H., 1989, The Guanajuato Ag-Au-Cu-Pb-Zn district Mexico: Fluid inclusion analysis, Geol. Soc. Amer. Abstr. Prog., 1989 Annual Meeting, vol. 21, no. 6, p. A149.

Mango, H., et al., 1988, A fluid inclusion and isotope study of the Las Rayas Ag-Au-Pb-Cu mine, Guanajuato, Mexico, Geol. Soc. Amer. Abstr. Prog., 1988 Annual Meeting, vol. 20, no. 7, p. A37.