

Research Interests

Metal (Li, Mg, Ca, Fe, Cu) and radiogenic isotope (Sr) geochemistry; mass spectrometric techniques; numerical modeling; hyper- and multispectral remote sensing; global geochemical cycling; paleoclimate; chemical weathering; abrupt climate change; geochemical effects of diagenesis on proxy archives; seawater chemical evolution; quantification and mechanistic understanding of isotopic fractionation; dust production and associated mineralogy in arid systems; isotopic biosignatures.

Technical Experience

Analytical

Thermal ionization mass spectrometry (experience with VG Sector 54 and Triton Plus)
 Multiple-collector ICP-MS (experience with Neptune Plus)
 Gas source isotope ratio mass spectrometry (C, N, O; incl. continuous flow/compound-specific)
 ICP-MS and ICP-OES (experience with various instruments)
 Laser ablation (New Wave/ESI 213 nm and 193 nm systems)
 Electron microprobe
 X-ray diffraction
 SEM and TEM microscopy
 Confocal Raman spectroscopy
 Neutron diffraction (via NIST and ORNL)
 Ion exchange chromatography
 Wet sample digestion

Computational

Simple reactive transport and box model simulations (finite difference approaches)
 Competence with R programming language, STELLA software, and PHREEQC

Professional Preparation

University of California, Berkeley	Geology	PhD, 2005
Dartmouth College	Environmental Earth Science w/ High Honors (<i>summa cum laude</i>)	B.A., 1997

Appointments

Pennsylvania State University	Associate Professor	2015 – present
Pennsylvania State University	Assistant Professor	2006 – 2015
University of California, Berkeley	Postdoctoral Researcher	2005
Graduate student instructor	Marine Geochemistry	2000
Graduate student instructor	Structural Geology	1999
Laboratory technician	Carnegie Institution of Washington	1997 – 1998

Papers

(* = student paper)

Fantle M. S., Dittel A. I., Schwalm S. M., Epifanio C. E., and Fogel M. L. (1999) A food web analysis of the juvenile blue crab, *Callinectes sapidus*, using stable isotopes in whole animals and individual amino acids. *Oecologia* **120**(3), 416-426.

Horton T. W., Chamberlain C. P., **Fantle M.**, and Blum J. D. (1999) Chemical weathering and lithologic controls of water chemistry in a high-elevation river system: Clark's Fork of the Yellowstone River, Wyoming and Montana. *Water Resources Research* **35**(5), 1643-1655.

Dittel A. I., Epifanio C. E., Schwalm S. M., **Fantle M. S.**, and Fogel M. L. (2000) Carbon and nitrogen sources for juvenile blue crabs *Callinectes sapidus* in coastal wetlands. *Marine Ecology-Progress Series* **194**, 103-112.

Fantle, M. S. and DePaolo, D. J. (2004) Iron isotopic fractionation during continental weathering, *Earth Planet Sci Lett* **228**(3-4), 547-562.

Fantle, M. S. and DePaolo, D. J. (2005) Variations in the marine Ca cycle over the past 20 million years. *Earth Planet Sci Lett* **237**(1-2), 102-117.

Fantle, M. S. and DePaolo, D. J. (2006) Sr isotopes and pore fluid chemistry in carbonate sediment of the Ontong Java Plateau: Calcite recrystallization rates and evidence for a rapid rise in seawater Mg over the last 10 million years. *Geochim Cosmochim Acta* **70**(15), 3883-3904.

Fantle, M. S. and DePaolo, D. J. (2007) Ca isotopes in carbonate sediment and pore fluid from ODP Site 807A: The Ca²⁺(aq)-calcite equilibrium fractionation factor and calcite recrystallization rates in Pleistocene sediments. *Geochim Cosmochim Acta* **71**(10), 2524-2546, doi: 10.1016/j.gca.2007.03.006.

Medina-Elizalde, M., Lea, D. W., and **Fantle, M. S.** (2008) Proxy and Climate Implications of Past Mg/Ca Variability in Seawater. *Earth Planet Sci Lett* **269**(3-4), 585-595.

Elmore, A. J., Okin, G. S., Kaste, J. M., and **Fantle, M. S.** (2008) Groundwater influences on atmospheric dust generation in deserts. *Journal of Arid Environments* **72**(10): 1753-1765.

Fantle, M. S. and Bullen, T. D. (2009) Essentials of Fe and Ca isotope analysis of natural materials by thermal ionization mass spectrometry. *Chem Geol.* **258**(1-2): 50-64.

Fantle, M. S. (2010) Evaluating the Ca isotope proxy. *Am J Sci.* **310**: 194-230, doi: 10.2475/03.2010.03.

Fantle, M. S., Maher, K., and DePaolo, D. J. (2010) Isotopic Approaches for Quantifying the Rates of Marine Burial Diagenesis. *Reviews of Geophysics.* **48**: RG3002, doi:10.1029/2009RG000306.

Parizek, R. R., Moneim, A. A. A., **Fantle, M. S.**, Westerman, J. S., and Issawi, B. (2010) Isotopic data: Implications for the source(s) of Osireion groundwater, Abydos, Egypt. *Bulletin of the Tethys Geological Society.* **5**: 23-34.

Fantle, M. S., Tollerud, H., Eisenhauer, A, and C. Holmden. (2012) The Ca isotopic composition of dust-producing regions: measurements of surface sediments in the Black Rock Desert, Nevada. *Geochim Cosmochim Acta.* doi:10.1016/j.gca.2012.03.037

* Yesavage, T., **Fantle, M. S.**, et al. (2012) Fe cycling in the Shale Hills Critical Zone Observatory, Pennsylvania: An analysis of chemical weathering and Fe isotope fractionation. *Geochim*

Cosmochim Acta **99**:18-38, doi:10.1016/j.gca.2012.09.029 [student paper; Fantle wrote parts of manuscript]

- * Wieczorek, R. W., **Fantle, M. S.**, Kump, L. R., and Ravizza, G. (2013) Geochemical evidence for volcanic activity prior to and enhanced terrestrial weathering during the PETM. *Geochim Cosmochim Acta*. **119**: 391-410, doi: 10.1016/j.gca.2013.06.005 [student paper; Fantle corresponding author = wrote paper]
- Fantle, M. S.** and Tipper, E. (2014) Calcium isotopes in the global biogeochemical Ca cycle: Implications for development of a Ca isotope proxy. *Earth-Sci Rev.* **129**: 148-177, doi: 10.1016/j.earscirev.2013.10.004.
- * Harouaka, K., Eisenhauer, A., and **Fantle, M. S.** (2014) Experimental investigation of Ca isotopic fractionation during abiotic gypsum precipitation. *Geochim Cosmochim Acta*, **129**: 157-176, doi:10.1016/j.gca.2013.12.004 [student paper; Fantle = advisor]
- Balashov, V. N., Engelder, T., Gu, X., **Fantle, M. S.**, Brantley, S. L.. (2014) A model describing flowback chemistry changes with time after Marcellus Shale hydraulic fracturing. *AAPG Bull.* doi:10.1306/06041413119.
- Fantle, M. S.** and Higgins, J. (2014) The effects of diagenesis and dolomitization on Ca and Mg isotopes in marine platform carbonates: Implications for the geochemical cycles of Ca and Mg. *Geochim Cosmochim Acta*. **142**: 458-481, doi:10.1016/j.gca.2014.07.025.
- * Tollerud, H. and **Fantle, M. S.** (2014) The temporal variability of centimeter-scale surface roughness in a playa dust source: Synthetic aperture radar investigation of playa surface dynamics. *Remote Sens Environ*, **154**: 285-297, doi:10.1016/j.rse.2014.08.009 [student paper]
- Fantle, M. S.** (2015) Calcium isotopic evidence for rapid recrystallization of bulk marine carbonates and implications for geochemical proxies. *Geochim Cosmochim Acta*. **148**: 378-401, doi:10.1016/j.gca.2014.10.005.
- Griffith, E. M., **Fantle, M. S.**, Eisenhauer, A., Bullen, T. D., and Paytan, A. (2015) Effects of ocean acidification on the marine calcium isotope record at the Paleocene-Eocene Thermal Maximum. *Ear Planet Sci Lett.* **419**: 81-92, doi:10.1016/j.epsl.2015.03.010.
- * Mansor, M., Hamilton, T., **Fantle, M. S.**, and Macalady, J. M. (2015) Metabolic diversity and ecological niches of *Achromatium* populations revealed with single-cell genomic sequencing. *Frontiers in Microbiology*. **6**: 822, doi:10.3389/fmicb.00822.
- Mathur, R. and **Fantle, M. S.** (2015) Copper Isotopic Perspectives on Supergene Processes: Implications for the Global Cu Cycle. *Elements*. **11**(5):323-329. doi:10.2113/gselements.11.5.323.
- * Yesavage, T., Stinchcomb, G. E., **Fantle, M. S.**, Sak, P., Kasnel, A., Brantley, S. L. (2016) Investigation of a Diabase-derived Regolith Profile from Pennsylvania: Mineralogy, Chemistry and Fe Isotope Fractionation (U.S.A). *Geoderma*. **273**: 83-97, doi:10.1016/j.geoderma.2016.03.004.

- * Harouaka, K., Mansor, M., Macalady, J. M. and **Fantle, M. S.** (2016) Calcium isotopic fractionation in microbially mediated gypsum precipitates. *Geochim Cosmochim Acta*. 184: 114-131, doi:10.1016/j.gca.2016.03.003.
- Gorski, C. A. and **Fantle, M. S.** (2017) Stable Mineral Recrystallization in Low Temperature Aqueous Systems: A Critical Review. *Geochim Cosmochim Acta*, 198: 439-465, doi:10.1016/j.gca.2016.11.013.
- * Chanda, P. and **Fantle, M. S.** (2017) Quantifying the effect of diagenetic recrystallization on $\delta^{26}\text{Mg}$ in marine carbonates. *Geochim Cosmochim Acta*, 204:219-239, doi: 10.1016/j.gca.2017.01.010.
- Stevenson, E., **Fantle, M. S.**, Das, S. B., Williams, H. M., and Aciego, S. M. (2017) Fractionation of iron isotopes in subglacial systems. *Geochim Cosmochim Acta*. 213: 237-254. doi:10.1016/j.gca.2017.06.002.
- Huber, C., Druhan, J., and **Fantle, M. S.** (2017) Perspectives on geochemical proxies: the impact of model and parameter selection on carbonate recrystallization rates. *Geochim Cosmochim Acta*. 217: 171-192, doi:10.1016/j.gca.2017.08.023.
- * Harouaka, K., Kubicki, J., and **Fantle, M. S.** (2017) Effect of amino acids on the precipitation kinetics and Ca isotopic composition of gypsum. *Geochim Cosmochim Acta*. 218: 343-364, doi:10.1016/j.gca.2017.09.010.
- * Joshi, P., **Fantle, M. S.**, Larese-Casanova, P., Gorski, C. (2017) Susceptibility of goethite to Fe^{2+} -catalyzed recrystallization over time. *Environmental Science & Technology*. 51 (20), 11681-11691, doi:10.1021/acs.est.7b02603.
- * Mansor, M., Harouaka, K., Gonzales, M. S., Macalady, J. L., and **Fantle, M. S.** (2017) Transport-induced spatial patterns of sulfur isotopes ($\delta^{34}\text{S}$) as biosignatures. *Astrobiology*. 18(1), 59-72, doi:10.1089/ast.2017.1650.

In press/revision

- * Mansor, M., Schaperdoth, I., Macalady, J. L., and **Fantle, M. S.** (*in revision*) Chemical signatures of biofilm-associated pyrite. *Geochem Res Perspectives*.

Submitted

Professional Accomplishments and Honors

Andrew W. Mellon Foundation Research Grant	1995
Francis L. Town Scientific Award	1995
Rufus Choate Scholar	1995-1997
Andrew W. Mellon Foundation Research Grant	1996
Paul K. Richter Memorial Trust Research award	1996
Presidential Scholar Research Assistantship	1996
Sigma Xi Christopher G. Reed Prize (3 rd place)	1997

John Ebers Award, Outstanding Earth Science Undergraduate	1997
Phi Beta Kappa Honors Society	1997–present
Presidential Scholar	1997
National Science Foundation Graduate Research Fellowship	1998–2001
NASA Earth System Science Graduate Fellowship	2000–2003
Center for Integrative Planetary Science (CIPS) mini-grant	2001–2002
American Geophysical Union Outstanding Student Paper	2002
Wilson Travel Award	2008, 2011
MRI Seed Grant Award	2008
Deike Research Award (\$50,000)	2009

Invited Talks [24]

Stanford University (2005)	University of Pittsburgh (2011)
Penn State University (2005)	Rutgers (2012)
San Diego State University (2006)	Cornell (2012)
AGU Fall Meeting (2006)	Goldschmidt Conference (2012)
Lafayette College (2007)	EME Graduate Colloquium (2012)
Goldschmidt Conference (2008 – Keynote Speaker)	AGU Fall Meeting (2012)
University of Maryland Center for Environmental Science (Appalachian Laboratory, 2009)	University of Texas, Arlington (2013)
Stanford University (2009)	Student Association of Environmental Sciences and Engineering, PSU (2014)
IFM-GEOMAR, Kiel, Germany (2009)	MRI Millenium Café, PSU (2014)
Rensselaer Polytechnic Institute (2009)	U.S.G.S. Menlo Park (2015)
Carnegie Institution of Washington Geophysical Laboratory (2010)	Stanford University (2015)
Yale University (2011)	Goldschmidt Conference (2015)
	Lawrence Berkeley National Laboratory (2017)
	Goldschmidt Conference (2018)

Service Activities

Professional

Grant proposal reviewer (32+ total)

NSF, NASA, Israel Science Foundation, France-Berkeley Fund, Goldschmidt Conference Travel Grant, NIST Center for Neutron Research, DOE Office of Basic Energy Sciences, Chemical Sciences, Geosciences & Biosciences Program

Grant review panel member (NASA Exobiology) 2012

Manuscript reviewer (103 since 2001)

Americal Journal of Science, Analytical Chemistry, Astrobiology, Chemical Geology, Earth and Planetary Science Letters, Earth Processes and Surface Landforms, Geobiology, Geochemistry Geophysics Geosystems, Geochemical Perspectives Letters, Geochimica et Cosmochimica Acta, Geoderma, Geology, Global Biogeochemical Cycles, GSA Today, J. Analytical Atomic Spectroscopy, Soil Science Society of America Journal, Nature, Paleoceanography, Pedosphere, PNAS, Precambrian Research, Science Magazine

Conference session convener

AIG Conference, Tarragona SPAIN 2011

AGU Conference, San Francisco, CA	2011
Goldschmidt Conference, Cologne, GER	2007
Goldschmidt Conference, Knoxville, TN	2010
Goldschmidt Conference, Prague CZH	2011
Goldschmidt Conference, Florence ITALY	2013
AGU Conference, San Francisco, CA	2013
Goldschmidt Conference, Sacramento, CA	2014
AGU Conference, San Francisco, CA	2014
NASA NAI Strategic Science Initiative workshop (Biosignatures group leader)	2009
NASA NAI Executive Council meeting (PSARC representative)	2013
Scientific committee member (Applied Isotope Geochemistry, Tarragona SPAIN)	2011
Editorial Board member, Chemical Geology	2016-
Goldschmidt conference mentor	2016, 2017
IODP Science Evaluation Panel (SEP) member	2017-
College and Departmental Level	
<i>Record of committee work</i>	
Member, Graduate Program Committee	2006–present
Member, Graduate Admissions Committee	2007, 2008, 2009
Member, CECG Board/CECG Faculty Affiliate	2007–present
Member, new graduate student advising committee	2008, 2009, 2014
Judge, graduate student colloquium	2006–present
Member, Geosciences Dept. Executive Committee	2012-13, 2014–15
Geosciences Colloquium faculty advisor	2012
Deike Bldg safety monitor	2011–2013
Chair, Metal Isotope Laboratory (MIL) Steering Committee	2011–present
Member, EIEE! Instrumentation committee	2013
Co-leader, “Sustainable Tech” theme, Geosciences Strategic Planning	2013–14
Member, search committee, Radiogenic Isotope Geology	2013–2014
Member, Geosciences Safety Committee	2014–present
Chair, Sustainable Technical Support Committee,	2014–present
Member, Deike Renovation Feasibility Study team	2014
Member, 18 Hosler Renovation Feasibility Study team	2014
Member, Management of Core Instruments & Facilities for Research Committee	2014–present
Member, Executive Advisory Committee, Energy and Environment Sustainability Laboratory	2016-present
<i>Record of administrative support work</i>	
Head, Astrobiology Minor	2008–present
Director, Metal Isotope Laboratory (MIL)	2011–present
UPC Proposal for Upgrades to Hosler Teaching Laboratory	2012
Advisor, “Efficient Earth”, undergraduate student organization	2016–present
Chair, EESL Advisory Committee	2017-present

Record of contributions to the University's programs to enhance equal opportunity and cultural diversity

Faculty mentor, SEEMS summer program	2012
Faculty mentor, Space Grant and Science Mission Directorate Internship Program, female undergraduate Jenny Verniero	2012
Faculty mentor, SEEMS summer program	2013

Post-Doctoral/Staff Mentoring

Dr. Huimin Yu, laboratory manager, Metal Isotope Laboratory	2011–2013
Dr. Grit Steinhofel, PSIEE post-doctoral fellow, Biogeochemical Cycles	2013–2015
Dr. Scott Hynek, laboratory manager, Metal Isotope Laboratory	2013–2016
Matthew Gonzales, Research Associate, LIME/EESL	2016-present

Student Supervision*PhD (Completed)*

- Dan Jones (2011) *Chemistry and Mineralogy of H₂S Speleogenesis* (Biogeochemistry Dual Title co-advisor)
- Heather Tollerud (2014) *Controls on Spatial and Temporal Evolution of Arid Playa Dust Sources* (advisor)
- Piyali Chanda, *Investigations of Carbonate Diagenesis in Natural Systems* (advisor)
- Khadouja Harouaka, *Investigating the Utility of Ca Isotopes as a Biosignature* (advisor)
- Muammar Mansor, *Elucidating biological isotope effects* (co-advised with J. Macalady)

PhD (In Progress)

none

MS (Completed)

- Khadouja Harouaka (2011) *Ca Isotope Fractionation during Gypsum Precipitation* (advisor)
- Rebecca Wiczorek (2012) *Os isotopes as Indicators of Enhanced Weathering over the Paleocene-Eocene Thermal Maximum* (primary advisor; co-advised with L. Kump)
- Matthew Gonzales (2014) *In-situ observations of calcium carbonate phase heterogeneity during mineral precipitation: Implications for the interpretation of calcium carbonate based proxies* (advisor)

MS (In Progress)

- Elizabeth Andrews, *Evaluating Li isotopes as a tool in groundwater systems* (advisor)
- Jared Carte, *Application of Cu isotopes to wastewater irrigation systems* (advisor)

Undergraduate Theses/Projects Supervised

- Zoe Ruge (2007) REU Summer Research
- Paolo Roffo (2008) *Assessing the environmental impacts of Interstate 99 highway construction*. Senior thesis.
- Theodore Present (2011) *Ca Isotope Exchange during Gypsum to Anhydrite Transformation* [currently PhD student at Cal Tech]. Senior thesis.
- Jenny Verniero (2012) Space Grant and Science Mission Directorate Summer Internship Program.
- Amanda Fobes (2012-13) *Effects of solution chemistry on mineral morphology*. Senior thesis.
- Hanna Quinn (2013-4) *Mössbauer spectroscopic investigations of the PETM*. Senior thesis.
- James Hemmerly (2013-14) *Mössbauer spectroscopic investigations of microbially-catalyzed Fe-*

sulfide precipitation. Senior thesis.

Nathan Meier (2014) COMSOL modeling independent research project.

Evan Onuskanych (2014-15) *Laser ablation studies of metals in tree cores as indicators of airborne pollution*

Elizabeth Roddy (2014-15) *Nitrogen isotopes as indicators of the effects of wastewater treatment at the Living Filter*

Lisa Glendinning (2015-17) *Nitrogen and carbon isotopic signals of wastewater irrigation*

Jack Phillips (2016-17) *Metal uptake in plants at the Living Filter wastewater irrigation system*

Priyanka Bose (2017-18) *Geochemical constraints on the accomodation of diagenetic alteration in heterogeneous marine carbonates*

Dan Heilemann (2017-18) *Metal distributions and plant uptake of metals at the Living Filter wastewater irrigation system*

Stephen Williamson (2017-18) *Effects of diffusion on the isotopic composition of dissolved Cu*

Charles Huang (2017-18) *Morphological expression of saturation state and inhibition in gypsum*

Cheng Tarnq (2017-18) *Sr isotopes as tracers of diet and provenance in lemurs*

Membership on graduate degree candidates' committees

PhD Committees

Comprehensive Exam and Dissertation Defense Committees –

1. Bryn Kimball, Geosciences
2. Andy Wall, Geosciences
3. Dan Jones, Geosciences (co-chair)
4. Heather Tollerud, Geosciences (advisor)
5. Kristina Peterson, Geosciences
6. Tiffany Yesavage, Geosciences
7. Claire Fleeger, Geosciences
8. Jason Boettger, Geosciences
9. Jamie Brainard, Geosciences
10. Rosie Oakes, Geosciences
11. Khadouja Harouaka, Geosciences (advisor)
12. Piyali Chanda, Geosciences (advisor)
13. Jordan Lerach, Chemistry (PhD defense; outside member)
14. Prachi Joshi, Civil & Environmental Engineering (outside member)
15. Travis Tasker, Civil & Environmental Engineering (outside member)
16. Muammar Mansor, Geosciences (co-advisor)
17. Thomas Geeza, Civil & Environmental Engineering (outside member)
18. Beth Hoagland, Geosciences

Candidacy Exam Committees –

1. Kat Dawson, Geosciences
2. Leah Schneider, Geosciences
3. Beth Herndon, Geosciences
4. Clay Magill, Geosciences
5. Heather Tollerud, Geosciences (advisor)
6. Tiffany Yesavage, Geosciences
7. Claire Fleeger, Geosciences
8. Jamie Brainard, Geosciences
9. Piyali Chanda, Geosciences (advisor)
10. Matthew Gonzales, Geosciences (advisor)

11. Khadouja Harouaka, Geosciences (advisor)
12. Xin Gu, Geosciences
13. Muammar Mansor, Geosciences (co-advisor)
14. Beth Hoagland, Geosciences
15. Gregory Wong, Geosciences

MS Committees Served On –

1. Katherine Lindeberg, Soil Science (external member)
2. Rebecca Wiczorek, Geosciences (advisor)
3. Khadouja Harouaka, Geosciences (advisor)
4. Garrison Loope, Geosciences
5. Matthew Gonzales, Geosciences (advisor)
6. Andrew Chorney, Geosciences
7. Matthew Oxman, Geosciences
8. Christine Doman, Geosciences
9. Prachi Joshi, Civil & Environmental Engineering (outside member)
10. Jennifer Estrada, Geosciences (co-advisor)

Professional Memberships

Sigma Xi Scientific Society	1996 – 2008
Geological Society of America	1996 – 2002
Phi Beta Kappa	1997 – present
American Geophysical Union	2002 – present
Geochemical Society	2003 – present

Conference Abstracts

(* = student paper)

1998–2005 [10]

Fantle, M. S. and Fogel, M. L. (1998) A food web analysis of the juvenile blue crab, *Callinectes sapidus*, using stable isotopes in whole animals and individual amino acids. Stable Isotopes in Ecology Conference. Saskatoon, Saskatchewan.

Fantle, M. S. and DePaolo, D. J. (2001) Iron isotopes and isotope fractionation processes at deep sea hydrothermal vents. Applied Isotope Geochemistry IV. Pacific Grove, CA.

Fantle, M. S. and DePaolo, D. J. (2001) Iron isotope variations in minerals from a black smoker: The case for equilibrium and kinetic isotope effects. Geological Society of America. Boston, MA.

Fantle, M. S. and DePaolo, D. J. (2002) The Iron Isotopic Composition of Continental Iron and Implications for the Global Iron Cycle Eos Trans. AGU, **83**(47), Fall Meet. Suppl., Abstract V22B-1234

Fantle, M. S. and DePaolo, D. J. (2003) The Global Iron Budget: Estimates Of Isotopic Composition And Elemental Fluxes. Eos Trans. AGU, **84**(46), Fall Meet. Suppl., Abstract B31E-0356.

Bullen, T. D.; **Fantle, M. S.**; Aggarwal, J. and Bailey, S. W. (2004) An initial assessment of calcium and iron isotope systematics in forest ecosystems: clues to possible linkages? Eos Trans. AGU, **85**(17), Jt. Assem. Suppl., Abstract H21D-06.

Fantle, M. S.; Bullen, T. D.; and DePaolo, D. J. (2004) Fe isotopic composition of rivers. Geochim Cosmochim Acta **68**(11): A433 Suppl. 1.

Fantle, M. S.; Fung, I.; Koven, C.; and DePaolo, D. J. (2004) Hyperspectral remote sensing of mineralogy in African dust-producing regions. First Annual Earth System Scholars Network Symposium. Adelphi, MD.

Fantle, M. S. and DePaolo, D. J. (2004) Variations of the marine Ca cycle and implications for paleo-CO₂ levels over the past 20 myr. Eos Trans. AGU, **85**(47), Fall Meet. Suppl., Abstract V51A-0513.

Fantle, M. S. and DePaolo, D. J. (2005) Determining the equilibrium fractionation factor between CaCO₃ and Ca²⁺ in solution: Isotope measurements of pore fluids and sediments from ODP Site 807A. Eos Trans. AGU, **86**(52), Fall Meet. Suppl., Abstract PP31B-1529.

2006–2008 [10]

Fantle, M. S. and DePaolo, D. J. (2006) The equilibrium fractionation factor between CaCO₃ and Ca²⁺ (aq): Fractionation mechanisms and diagenetic Ca isotope effects, Eos Trans. AGU, **87**(52), Fall Meet. Suppl., Abstract V14C-07 INVITED.

Fantle, M. S. and DePaolo, D. J. (2007) Constraining reaction rates in marine carbonate sediments using reactive transport modeling: Investigating the effects of diagenesis on Sr, Ca, and Mg. Geochim Cosmochim Acta **71**(15): A267 Suppl. 1.

Fantle, M. S. (2007) Considering the effects of diagenesis on the Ca isotope geochemical proxy, Eos Trans. AGU, **88**(52), Fall Meet. Suppl., Abstract PP41B-0546.

Medina-Elizalde, M., Lea, D. W., and **Fantle, M. S.** (2007) Implications of Seawater Mg/Ca Variability for Plio-Pleistocene Climate reconstruction, Eos Trans. AGU, **88**(52), Fall Meet. Suppl., Abstract PP43C-1535.

DePaolo, D. J., **Fantle, M. S.**, Turchyn, A., Ewing, S., and Yang, W. (2007) Calcium Isotopes in Marine Sediments and Soils: Paleoceanography, Diagenesis, and Soil Processes, *Eos Trans. AGU*, **88**(52), Fall Meet. Suppl., Abstract H41J-08 INVITED.

* Herndon E., Jin L., Olsen A., **Fantle M.**, and Brantley S. (2008) Quantifying aeolian inputs to local soils through analysis of surface manganese enrichment. Environmental Chemistry Student Symposium. University Park, PA. Poster.

* Herndon, E. M., Jin, L., Olsen, A. A., **Fantle, M. S.**, Brantley, S. L.. (2008) Quantifying aeolian additions to Shale Hills soils through analysis of surface manganese enrichment. *Geochim Cosmochim Acta* **72**(12): A372 Suppl. 1.

Fantle, M. S. (2008) Rapid recrystallization of carbonates and implications for geochemical proxies. *Geochim Cosmochim Acta* **72**(12): A255 Suppl. 1. (Keynote presentation)

Fantle, M. S. (2008) Exploring the implications of a dynamic Ca cycle in the Cenozoic, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract PP33B-1545.

Watkins, J. M., DePaolo, D. J., Richter, F. M., **Fantle, M. S.**, Simon, J. I., Ryerson, F. J., Ewing, S. A., Turchyn, A. V., Yang, W., Owens, T. L. (2008) Calcium Isotope Geochemistry: Research Horizons and Nanoscale Fractionation Processes, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract B14B-03.

2009–2011 [15]

Tollerud, H. J. and **Fantle, M. S.** (2009) Evaluating the use of hyperspectral remote sensing for large-scale mineralogical determinations in dust-producing regions. *Eos Trans. AGU*, 90(22), Jt. Assem. Suppl., Abstract H33A-06.

Fantle, M. S. (2009) Ca isotope constraints on diagenetic alteration of Cenozoic paleo-proxies. *Geochim Cosmochim Acta* **73**(13): A353 Suppl. 1.

* Tollerud, H. J., Elmore, A. J., and **Fantle, M. S.** (2009) Mapping composition in dust-producing regions: Extending geochemical measurements over large scales with remote sensing. *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract EP21A-0567.

* Wieczorek, R., **Fantle, M. S.**, Kump, L. R., and Ravizza, G. E. (2009) Responses to Rapid Climate Change: Osmium Isotopic Evidence for Changing Weathering Fluxes in Response to the Paleocene-Eocene Hyperthermal Event. *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract PP23A-1368.

Fantle, M. S., Macalady, J., and Eisenhauer, A. (2009) Ca Isotope Fractionation During Gypsum Precipitation in a Sulfidic Cave. *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract V11C-1980.

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