

**Mary E. Whelan**

Carnegie Institution for Science  
Department of Global Ecology  
260 Panama St. Stanford, CA 94305

**Research Interests**

biochemical cycling, biosphere-atmosphere interactions, atmospheric chemistry,  
novel approaches for estimating carbon uptake

**Education**

Ph.D., Geography University of California, Berkeley 2013 Fall  
Dissertation title: Terrestrial-Atmospheric Exchange  
of Reduced Sulfur Compounds in Natural Ecosystems

B.A., with honors New College of Florida 2004 Spring  
the honors college of the Florida state university system  
Concentration: Chemistry / Political Science

**Appointments**

*Researcher* 2018-present  
Department of Atmospheric and Ocean Sciences  
University of California, Los Angeles

*Postdoctoral Research Fellow* 2015-2017  
NSF Atmospheric and Geospace Sciences,  
Carnegie Institution for Science (at Stanford) and  
University of California, Merced

*Postdoctoral Scholar* 2014-2017  
Sierra Nevada Research Institute,  
University of California, Merced  
joint appointment with Lawrence Livermore National Laboratory

*Instructor/Researcher* 2013-2015  
Future Scientists Improving the Public's Climate Literacy  
NSF Geoscience Education Program  
Lawrence Hall of Science

*Graduate Student Researcher* 2007-2013  
Berkeley Atmospheric Sustainability Laboratory  
University of California, Berkeley

*Staff Chemist* 2005-2006  
Dept of Chemical Ecology, Mote Marine Laboratory and Aquarium  
Sarasota, FL

## Publications

14. Zumkehr, A, TW Hilton, **ME Whelan**, S Smith, L Kuai, J Worden, JE Campbell, Global gridded anthropogenic emissions inventory of carbonyl sulfide, *Atmospheric Environment*, 2018.
13. Campbell, JE, **ME Whelan**, JA Berry, TW Hilton, A Zumkehr, J Stinecipher, Y Lu, A Kornfeld, U Seibt, TE Dawsome, SA Montzka: Coastal redwood sink of atmospheric carbonyl sulfide provides a new biogeochemical tracer for coastal fog-mediated processes, *JGR-Biogeosciences*, 2017.
12. **Whelan, ME**, ST Lennartz, TE Gimeno, R Wehr, G Wohlfahrt, Y Wang, L Kooijmans, TW Hilton, S Belviso, P Peylin, R Commane, W Sun, H Chen, L Kuai, I Mammarella, K Maseyk, M Berkelhammer, K-F Li, D Yakir, A Zumkehr, Y Katayama, J Ogée, FM Spielmann, F Kitz, B Rastogi, J Kesselmeier, J Marshall, K-M Erkkilä, L Wingate, LK Meredith, W He, R Bunk, T Launois, T Vesala, JA Schmidt, CG Fichot, U Seibt, S Saleska, ES Saltzman, SA Montzka, JA Berry, and JE Campbell: Reviews and Syntheses: Carbonyl Sulfide as a Multi-scale Tracer for Carbon and Water Cycles, *Biogeosciences Discussions*, 2017.
11. Hilton, TW, **ME Whelan**, A Zumkehr, S Kulkarni, JA Berry, I Baker, SA Montzka, C Sweeney, BR Miller, JE Campbell: Peak growing season gross uptake of carbon in North America is largest in the Midwest, USA, *Nature Climate Change*, 2017.
10. Zumkehr, A, TW Hilton, **ME Whelan**, S Smith, JE Campbell: Gridded anthropogenic emissions inventory and atmospheric transport of carbonyl sulfide in the U.S., *JGR-Atmospheres*, 2017.
9. **Whelan, ME**, TW Hilton, JA Berry, M Berkelhammer, AR Desai, and JE Campbell: Carbonyl sulfide exchange in soils for better estimates of ecosystem carbon uptake, *Atmospheric Chemistry and Physics*, 16, 3711-3726, 2016.
8. **Whelan, ME** and RC Rhew: Reduced sulfur trace gas exchange between a seasonally dry grassland and the atmosphere, *Biogeochemistry*, 128, 2016.
7. Campbell JE, **ME Whelan**, U Seibt, SJ Smith, JA Berry, and TW Hilton: Atmospheric carbonyl sulfide sources from anthropogenic activity: Implications for carbon cycle constraints, *Geophysical Research Letters*, 42, 2015GL063445, 2015.
6. Hilton TW, A Zumkehr, S Kulkarni, JA Berry, **ME Whelan**, and JE Campbell: Large variability in ecosystem models explains uncertainty in a critical parameter for quantifying GPP with carbonyl sulphide, *Tellus B*, 67, 2015.
5. **Whelan, ME** and RC Rhew: Carbonyl sulfide produced by abiotic thermal and photo-degradation of soil organic matter from wheat field substrate, *Journal of Geophysical Research Biogeosciences*, 2014JG002661, 2015.
4. Rhew, RC, **ME Whelan**, and D-H Min: Large methyl halide emissions from south Texas salt marshes, *Biogeosciences*, 11, 6427-6434, 2014.

3. Khan, MAH, RC Rhew, K Zhou, and **ME Whelan**: Halogen biogeochemistry of invasive perennial pepperweed (*Lepidium latifolium*) in a peatland pasture, *Journal of Geophysical Research Biogeosciences*, 118, 2013.

### Publications (continued)

2. **Whelan, ME**, D-H Min, and RC Rhew: Salt marshes as a source of atmospheric carbonyl sulfide, *Atmospheric Environment*, 131–137, 2013.

1. Khan, MAH, **ME Whelan**, and RC Rhew: Analysis of low concentration reduced sulfur compounds (RSCs) in air: storage issues and measurement by gas chromatography with sulfur chemiluminescence detection, *Talanta*, 88, 581–586, 2012.

### Honors and Awards

Postdoctoral Innovation Award, Carnegie Institution for Science	2017
NSF Atmospheric and Geospace Sciences Postdoctoral Fellowship	2015-2017
Janet Witter Award for Environmental Science Research	2013
Outstanding Graduate Student Instructor Award	2012
Martin Foundation Research Funding Award	2012
UC Berkeley Graduate Division Summer Grant	2012
Graduate Student Association Community Leader Award	2010

### Invited Seminars

USGS Research Seminar Series Golden, CO <i>The carbon cycle via gas tracers and satellites</i>	Mar 2018
Carbonyl Sulfide Research Group Workshop Hyytiälä, Finland <i>Many paths to GPP estimates</i>	Sept 2016
Lawrence Livermore National Laboratory Biogeochemistry Seminar Series <i>New approaches to evaluate land carbon models</i>	Aug 2016
Wayne State University, Department of Geology <i>Intertwining the fast C and S cycles</i>	Apr 2016
Carnegie Institution for Science, Department of Plant Biology <i>Better estimates of ecosystem carbon uptake using measurements of COS exchange</i>	Feb 2015
Carnegie Institution for Science, Department of Global Ecology <i>Soils, complexity, and ecosystem carbon exchange</i>	Oct 2014
Lawrence Livermore National Laboratory Center for Accelerator Mass Spectrometry <i>Connecting C and S biogeochemical cycles: GPP, mineralization in soil and rainfall events</i>	Jun 2013

**Fieldwork Experience**

<i>Big Sur, CA: Big Creek UC Reserve</i>	2015-2017
Design and construction of “Trees-not-Towers” gas sampling device, diurnal observation of trace gases from different canopy heights in a coastal redwood forest in collaboration with Todd Dawson of UC-Berkeley and Elliott Campbell of UC-Santa Cruz	
<i>Urbana, IL: Bondville FLUXNET site</i>	2015-2016
Deployment of re-designed soil auto-sampling chambers to assess agricultural soil COS fluxes in situ, supported by lab incubation experiments, in collaboration with Max Berkelhammer at the University of Illinois, Chicago.	
<i>Wind River, WA: Wind River Experimental Forest</i>	2015
Re-design of Li-Cor autosampling chambers for COS soil sampling, continuous surface COS fluxes in old growth forest, in collaboration with Chris Still and Bharat Rastogi of Oregon State University	
<i>Santa Cruz, CA: Wilder Ranch State Park</i>	2012-2014
Conducted monthly trace gas sampling campaigns on marine terraces in collaboration with USGS scientist Marjorie Schulz	
<i>Puerto Rico: Luquillo Experimental Forest</i>	2010
Design and construction of chemically inert chambers for reduced sulfur compound sampling, in situ rainforest soil trace gas measurements with Whendee Silver of University of California, Berkeley	
<i>Sacramento Bay Delta, CA: Sherman Island</i>	2009-2010
Conducted year-long monthly field campaign with 4 research assistants, chamber sampling halogenated compounds using isotope tracer techniques	
<i>Port Aransas, TX: Mollie Beattie Coastal Habitat Community</i>	2008-2009
Wetland sampling of sulfur and halogenated compounds with Dong-Ha Min of UT-Austin	
<i>Manhattan, KS: Konza Prairie Long Term Ecological Research Station</i>	2007
Diurnal sampling of halogenated gases using a chamber technique	
<i>Barrow, AK: Barrow Arctic Science Consortium</i>	2007
Construction and deployment of ebullition chambers, high frequency chamber sampling of methane with prototype laser, coastal permafrost erosion methane sampling with Joe von Fischer of Colorado State University	
<i>Gulf of Mexico: Mote Marine Laboratory and Aquarium</i>	2005-2006
Deep and surface water sampling, trace element sampling (e.g. Fe), in situ sample prep, boat piloting/ trailering in inter-coastal waters	

### **Teaching Experience, UC Berkeley**

<i>As Instructor</i>	Promoting Climate Literacy
<i>As Teaching Assistant</i>	Introduction to Earth Science Introduction to Oceans World Regions, Peoples, and States Global Warming
<i>As Guest Lecturer</i>	California Landscapes Gender and Climate Change The Ocean World

### **Teaching Experience, Elsewhere**

<i>Ecophysiology and Land Surface Processes</i> Winter 2017	Guest Lecturer, Stanford University Stanford, CA
<i>Mathematical Methods</i> Fall 2010, Spring 2011	Instructor, San Francisco Art Institute San Francisco, CA
<i>Carbon Cycle Fundamentals</i> Spring 2009	In-class volunteer, Berkeley High School Berkeley, CA
<i>Writing Skills</i> 2002-2004	Peer counselor, Writing Resource Center Sarasota, FL
<i>Remedial Math</i> Summer 2003	Instructor, DePaul School for Dyslexia Clearwater, FL

### **Outreach Activities**

*Public outreach.* Subject specialist for NSF-sponsored Promoting Climate Literacy Project with the Lawrence Hall of Science; developed course curriculum to teach undergraduate and graduate students how to carry out climate change outreach to informal (museum) audiences

*Science community.* Founded COSANOVA.org to develop international collaborations on novel tracer studies; act as a reviewer for PNAS, JGR-Biogeosciences, Biogeosciences (an EGU journal), Frontiers in Ecology, and Atmospheric Chemistry and Physics

*Mentoring.* Trained 12 undergraduate research assistants, 6 from underrepresented backgrounds, in laboratory-based and field-based gas analyses; advised 4 undergraduate students in the completion of their honors theses; 3 assistants have gone on to graduate school

*Multi-disciplinary.* Created FogSci.com for a new social/natural science investigation of coastal redwood conservation; guest lectured in 3 social science courses on related topics in the natural sciences; teaching assistant for 2 multi-disciplinary courses on climate change