

Education

Ph.D. August 2013 expected, University of Colorado, Institute of Arctic and Alpine Research
Advisors: Jim White (james.white@colorado.edu) and John Miller (john.b.miller@noaa.gov)

B.A. May 21, 2007 *cum laude* with distinction in Geological Sciences from Colorado College

Research Interests and Experience

- Development of the first regional inversion for the stable isotope ^{13}C of CO_2 . This tracer-gas combination provides a key constraint on the effects of environmental stresses on plant exchange of CO_2 , a potent greenhouse gas, and water.
- Global analysis of trends in total net surface sinks for CO_2 over the last half century.
- Analysis of mechanistic drivers of variability in global disequilibrium flux: a one-way isoflux arising from a finite residence time of carbon in surface reservoirs combined with a changing atmospheric $\delta^{13}\text{C}$ signature through time.
- Recovery and sampling of lake sediment cores from the Kongress Lake basin in Svalbard and development of novel proxies based on catchment mineralogy and development of an age model allowed for reconstruction of Little Ice Age glaciation history and evidence of recent local climate change. Undergraduate honors thesis at Colorado College.
- Digital elevation model analysis of late Pleistocene glacial outburst flooding in the Colorado Rocky Mountains. Undergraduate research at Colorado College.
- Other field experience includes glacial mapping and sample collection in the Central Icelandic Highlands; fault scarp measurements and glacial geomorphology mapping in New Zealand's North and South Islands; paleontological work in Montana; meteorological station deployment and glacial mapping in Svalbard.

Publications

- **Alden, C.B.**, Miller, J.B., and White, J.W.C. 2010. Can bottom-up ocean CO_2 fluxes be reconciled with atmospheric ^{13}C observations? *Tellus B.* 10.1111/j.1600-0889.2010.00481.x
- Townsend, A.R., Cleveland, C.C., Houlton, B.Z., **Alden, C.B.**, White, J.W.C. 2011. Multi-element Regulation of the Tropical Forest Carbon Cycle. *Frontiers in Ecology and the Environment.* 10.1890/100047
- Ballantyne, A.P., **Alden, C.B.**, Miller, J.B., Tans, P.P., White, J.W.C. 2012. Increasing trend in observed global net CO_2 uptake over the last 50 years. *Nature.* 10.1038/nature11299

Technical Skills

- Fluent in IDL, Matlab, Excel, Word, Powerpoint

Research Talks and Presentations

- **Alden C.B.**, Miller, J.B., White, J.W.C., Yadav, V., Michalak, A.M., and Andrews, A. 2012. “Using regional-scale atmospheric $\delta^{13}\text{C}$ of CO_2 as an indicator of ecosystem health and function.” Talk, AGU Fall meeting, California.
- **Alden, C.B.**, White, J.W.C., and Miller, J.B. 2011. “Inverting $^{13}\text{CO}_2$ for terrestrial carbon fractionation in North America.” Talk, AGU Fall meeting, California. Poster, NOAA/ESRL Global Monitoring Conference, Colorado.
- Ballantyne, A.P., Miller, J.B., Baker, I.T., van der Velde, I., Tans, P.P., Peters, W., White, J.W., and **Alden, C.** 2011. “Hydrologic Constraints on Future Carbon Assimilation by the Terrestrial Biosphere.” AGU Fall meeting, California.
- **Alden, C.** 2011. “Inverting $^{13}\text{CO}_2$ for terrestrial carbon fractionation in North America.” Talk, INSTAAR Graduate Student Seminar.
- Miller, J., **Alden, C.**, Andrews, A., and White, J. 2011. “Regional Lagrangian Modeling of CO_2 and $^{13}\text{CO}_2$ in North America.” Chapman Conference on Advances in Lagrangian Modeling of the Atmosphere, Switzerland.
- **Alden, C.** 2011 “Carbon dioxide today: Where does it come from and where does it go?” Lunch talk, Colorado College Geology Department.
- **Alden, C.B.**, White, J.W.C., and Miller, J.B. 2010. “Constraining terrestrial $^{13}\text{CO}_2$ surface fluxes on local to regional scales.” Poster, AGU Fall meeting, California.
- **Alden, C.B.**, Miller, J.B., and White, J.W.C. 2010. “Comparison of simulated and observed $^{13}\text{CO}_2$ at North American sites.” Poster, NOAA/ESRL Global Monitoring Conference, Colorado.
- **Alden, C.B.**, White, J.W.C., and Miller, J.B. 2010. “Modeled ocean carbon fluxes and atmospheric ^{13}C observations: A new tool for understanding terrestrial carbon cycling.” Poster, 40th International Arctic Workshop, Colorado.
- Miller, J.B., Ballantyne, A., **Alden, C.**, Berry, J., Peters, W., Andrews, A., Still, C., Tans, P., and White, J. 2010. “New directions for large-scale atmospheric $^{13}\text{CO}_2$ research.” Stable Isotopes and Biogeochemical Cycles in Terrestrial Ecosystems meeting, Switzerland.
- **Alden, C.B.**, White, J.W.C., and Miller, J.B. 2009. “Stable isotopic variability in the carbon cycle: Reconciling ocean model results with atmospheric observations.” Poster, AGU Fall meeting, California.
- **Alden, C.**, White, J., and Miller, J. 2009. “Reconciling Modeled Ocean Carbon Fluxes with Atmospheric ^{13}C Observations.” Talk, International Carbon Dioxide Conference 8, Jena, Germany.
- **Alden, C.B.**, White, J.W.C., and Miller, J.B. 2009. “Reconciling modeled ocean carbon fluxes with atmospheric ^{13}C observations.” Talk, Graduate Climate Conference, Washington. Poster, NOAA/ESRL Global Monitoring Conference, Colorado.
- White, J.W.C., **Alden, C.**, Vaughn, B.H., Dlugokencky, E.J., Tans, P.P., Miller, J.B., and Worthy, D.E.J. 2009. “Stable isotopes as a tool for tracking greenhouse gas sources and sinks.”

Extended Abstract #37 First International Greenhouse Gas Measurement Symposium, California.

- **Alden, C.** 2009. “If only we had a Flux Capacitor: Using the stable carbon isotope to track fluxes, sources, and sinks of atmospheric CO₂.” Talk, INSTAAR Graduate Student Seminar.
- **Alden, C.**, White, J.W., and Miller, J.B. 2008. “Reconciling modeled ocean carbon fluxes with atmospheric ¹³C observations.” Talk, AGU Fall meeting, California.
- **Alden, C.**, Leonard, E., Werner, A., and Retelle, M. 2007. “Lake sedimentation and glacial history of Kongressvatnet, Svalbard.” Poster presentation, 37th International Arctic Workshop, Iceland. Poster, GSA Annual meeting, Colorado.
- **Alden, C.**, Calhoun, N., and Leonard, E. 2007. “A GIS-based analysis of late Pleistocene glacial outburst flooding in the Colorado Rocky Mountains.” Poster, GSA Annual Meeting, Colorado.

Teaching Experience

- Completed the University of Colorado Certificate in College Teaching (GTP.colorado.edu/certification/gtc). August 2012.
- Visiting Professor at Quest University Canada, taught 3.5 week intensive course (one block): Earth’s Climate and Carbon Cycle. January 2012.
- Teaching Assistant, GEOL 3090: Developing Scientific Writing Skills, for Rebecca Flowers (rebecca.flowers@colorado.edu). Fall semester 2011 and 2012.
- Grader, GEOL 2100: Environmental Geology, for Alexis Templeton (alexis.templeton@colorado.edu). Fall semester 2011.
- Teaching Assistant / Sole Instructor, GEOL 1030: Introduction to Geology Lab. Spring semester 2008.
- Grader, ATOC/GEOL 3070: Introduction to Oceanography, for Nikki Lovenduski (nicole.lovenduski@colorado.edu). Fall semester 2010.
- Grader, GEOL 1010: Introduction to Geology I, for Shemin Ge (shemin.ge@colorado.edu). Spring semester 2009.
- Student Athlete Tutor for CU Herbst Academic Center, Mindy Sclaro (mindy.sclaro@colorado.edu). September 2009 through December 2010.
- Member, inaugural class, “Peak-to-Peak” Teaching Sustainability Workshop at CU Boulder. August 2011.

Awards and Scholarships

- Scholar, 4th Annual Aspen Environment Forum May – June 2011
- Recipient, Phi Beta Kappa Graduate Study Scholarship 2007
- Recipient, Colorado College William A. Fischer Special Recognition Award 2007
- Phi Beta Kappa 2007 - present
- Recipient, Colorado College Dean’s Advisory Committee Venture Grant – awarded to present thesis research in Iceland 2007
- National Science Foundation Research Experience for Undergraduates 2006
- Blue Key Honors Society of Colorado College 2005 - 2007
- Recipient, National Merit Scholarship 2003 - 2007
- Recipient, Colorado College Trustee Scholarship 2003 - 2007

Foreign Language Skills

- Spanish: speak, read and write
- French: speak, read and write

Extracurricular Interests

- Paid Blog Writer, Burn Journal (burnanenergyjournal.com), 2013-present
- Production Assistant, Interviews 50 cents with Alex Chadwick, 2009-2011
- Coordinator, INSTAAR Graduate Student Seminar, 2009-2010
- Boulder Chorale, Ellement a cappella, Colorado College Chamber Chorus, 2003-2008
- Volunteer, food delivery for Boulder Homeless Shelter
- Rock, alpine and big-wall climbing, skiing and ski touring
- Piano, guitar, mandolin
- Reading and writing