

Sonja A. Behnke

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SUMMARY Dr. Behnke is a lightning scientist in the Space and Remote Sensing group at Los Alamos National Laboratory. She received her PhD in Atmospheric Physics from the New Mexico Institute of Mining and Technology in Socorro, NM, where she used 3-D lightning mapping sensors to study the distribution of charge in volcanic plumes of Redoubt Volcano (Alaska) and Eyjafjallajokull (Iceland). Since then her research has centered around Sakurajima Volcano in Japan, where she has studied the physical differences among different types of volcanic lightning discharges and developed methods for using lightning observations for volcano monitoring. She also currently leads a NASA-funded project to develop a CubeSat-sized radio frequency sensor to map lightning in 3D from low-Earth orbit with a constellation of CubeSats.

EDUCATION **PhD, Physics with Dissertation in Atmospheric Physics, 2013**
New Mexico Institute of Mining and Technology, Socorro, NM USA
Dissertation title: “Studies of Volcanic Lightning using the Lightning Mapping Array”
Advisor: Ronald J. Thomas

B.S., Physics with Astrophysics option, High Honors, 2003
New Mexico Institute of Mining and Technology, Socorro, NM USA

EMPLOYMENT HISTORY **Scientist - ISR-2, Space and Remote Sensing** **2015 - Present**
Los Alamos National Laboratory, Los Alamos, NM USA

Postdoctoral Scholar – Research **2013 - 2015**
University of South Florida, Tampa, FL USA
Supervisor: Stephen R. McNutt

Research Scientist **2013**
Langmuir Laboratory, New Mexico Institute of Mining and Technology, Socorro, NM USA

Graduate Research Assistant **2008 - 2012**
New Mexico Institute of Mining and Technology, Socorro, NM USA

Teaching Assistant **2007 - 2008**
New Mexico Institute of Mining and Technology, Socorro, NM USA

Math Tutor **2007**
Central New Mexico Community College, Albuquerque, NM USA

Math Instructor, Americorps Volunteer **2006 - 2007**
SER de New Mexico, Albuquerque, NM USA

Systems Engineer **2004 - 2006**
Lockheed Martin, Aurora, CO USA

Lab Tech II **2003 - 2004**
New Mexico Institute of Mining and Technology, Socorro, NM USA

PUBLICATIONS Haley, S., S.A. Behnke, H.E. Edens, and R.J. Thomas (2021), Observations show charge density of volcanic plumes is higher than thunderstorms, *J. Geophys. Res., Atmos.* 129 (19).

Behnke, S.A., H.E. Edens, S. Senay, M. Iguchi, and D. Miki (2021), Radio frequency characteristics of volcanic lightning and vent discharges, *J. Geophys. Res., Atmos.* 129 (18).

Smith, C.M., D. Gaudin, A.R. Van Eaton, S.A. Behnke, S. Reader, R.J. Thomas, H. Edens, S.R.

McNutt, and C. Cimarelli (2021), Impulsive volcanic plumes generate volcanic lightning and vent discharges: A statistical analysis of Sakurajima Volcano in 2015, *Geophys. Res. Lett.* 48 (11).

Smith, C.M., G. Thompson, S. Reader, S.A. Behnke, S.R. McNutt, R.J. Thomas, and H.E. Edens (2020), Examining the statistical relationships between volcanic seismic, infrasound, and electrical signals: A case study of Sakurajima volcano, 2015, *J. Volcanol. Geoth. Res.*, 402.

Behnke, S.A., H.E. Edens, R.J. Thomas, C.M. Smith, S.R. McNutt, A. Van Eaton, C. Cimarelli, and V. Cigala (2018), Investigating the origin of continual radio frequency impulses during explosive volcanic eruptions, *J. Geophys. Res., Atmos.*, doi:10.1002/2017JD027990.

Smith, C.M., A.R. Van Eaton, S. Charbonnier, S.R. McNutt, S.A. Behnke, R.J. Thomas, H.E. Edens, and G. Thompson (2018), Correlating the electrification of volcanic plumes with ashfall textures at Sakurajima Volcano, Japan, *Earth and Planetary Science Letters* 492, 47-58, doi:10.1016/j.epsl.2018.03.052.

Van Eaton, A.R., A. Amigo, D. Bertin, L.G. Mastin, R.E. Giacosa, J. Gonzalez, O. Valderrama, K. Fontijn, and S.A. Behnke (2016), Volcanic lightning and plume behavior reveal evolving hazards during the April 2015 eruption of Calbuco volcano, Chile, *Geophys. Res. Lett.* 43 (7), 3563-3571, doi: 10.1002/2016GL068076.

Behnke, S.A., and E.C. Bruning (2015), Changes to the turbulent kinematics of a volcanic plume inferred from lightning data, *Geophys. Res. Lett.* 42, 4232-4239, doi:10.1002/2015GL064199.

Behnke, S.A., and S.R. McNutt (2014), Using lightning observations as a volcanic eruption monitoring tool, *Bull. Volcanol.*, 76 (8), doi:10.1007/s00445-014-0847-1.

Woodhouse, M.J., and S.A. Behnke (2014), Charge structure in volcanic plumes: a comparison of plume properties predicted by an integral plume model to observations of volcanic lightning during the 2010 eruption of Eyjafjallajökull, Iceland, *Bull. Volcanol.*, 76 (8), doi:10.1007/s00445-014-0828-4.

Behnke, S.A., R.J. Thomas, H.E. Edens, P.R. Krehbiel, and W. Rison (2014), The 2010 eruption of Eyjafjallajökull: lightning and plume charge structure, *J. Geophys. Res.*, 119 (2), 833-859.

Behnke, S.A., R.J. Thomas, S.R. McNutt, D.J. Schneider, P.R. Krehbiel, W. Rison, and H.E. Edens (2013), Observations of volcanic lightning during the 2009 eruption of Redoubt Volcano, *J. Volc. Geoth. Res.*, 259, 214-234.

Edens, H.E., K.B. Eack, E.M. Eastvedt, J.J. Trueblood, W.P. Winn, P.R. Krehbiel, G.D. Aulich, S.J. Hunyady, W.C. Murray, W. Rison, S.A. Behnke, and R.J. Thomas (2012), VHF lightning mapping observations of a triggered lightning flash, *Geophys. Res. Lett.*, 39, L19807, doi:10.1029/2012GL053666.

Behnke, S.A., R.J. Thomas, P.R. Krehbiel, and W. Rison (2005), Initial leader velocities during intracloud lightning: Possible evidence for a runaway breakdown effect, *J. Geophys. Res.*, 110, D10207.

HONORS AND AWARDS

Best Oral Presentation, American Meteorological Society, AMS 91st Annual Meeting, 2011.
Outstanding Student Paper Award, American Geophysical Union, Fall Meeting, 2010.

PROFESSIONAL SOCIETY MEMBERSHIPS

American Geophysical Union
European Geosciences Union