

## Curriculum Vitae

**Rodney V. Metcalf**

**Department of Geoscience**

**University of Nevada, Las Vegas**

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### **Educational Background**

Ph.D. Geology, 1990, University of New Mexico; supervisor: Jeffrey A. Grambling (deceased)

Dissertation: *Petrogenesis of Proterozoic Migmatites and Associated Plutonic Rocks, Central Santa Fe Range, New Mexico*

M.S. Geology, 1984, University of Kentucky; supervisor: William H. Blackburn

Thesis: *A Study of Uranium and Thorium in the Precambrian Old Rag Granite, Madison County, Virginia*

B.S. Geology, 1979, University of Kentucky

### **Specialties**

*Medical Geology; Igneous & Metamorphic Petrology; Geochemistry*

Origin of Fibrous Amphibole

Magma Chamber Processes

Origin and Evolution of Supra-Subduction Zone Ophiolites

Tectonic Evolution of the Klamath Mountains

Origin and Evolution of Plutonic Rocks & Migmatites

### **Professional Experience**

Department Chair & Associate Professor: UNLV, starting July 2018

Associate Professor: UNLV, 2008-2018

Associate Dean for Planning and Facilities: UNLV, 2004-2008

Department Chair & Associate Professor: UNLV, 2001-2004

Associate Professor: UNLV, 1997-2000

Assistant Professor: UNLV, 1991-1997

Visiting Assistant Professor: UNLV, 1990-1991 academic year

Instructor (part-time): University of New Mexico, 1987-1989

Instructor (part-time): University of Kentucky, 1982

Independent Geological Consultant (part-time): 1981-1982

Exploration Geologist: Marathon Minerals, 1980

### **Professional Affiliations**

Geological Society of America

Membership in GSA Divisions:

*Mineralogy, Petrology, Volcanology & Geochemistry*

*Geology and Health*

*Geology and Public Policy*

Mineralogical Society of America

International Medical Geology Association

International Association for Promoting Geoethics

**Published Papers (peer reviewed)**

- Pfau, Jean C., Buck, Brenda J., **Metcalf, Rodney V.**, Kaupish, Zoie, Stair, Caleb, Rodriguez, Maria, Keil, Deborah E. (2017) Comparative Health Effects in Mice of Libby Amphibole Asbestos and a Fibrous Amphibole from Arizona. *Toxicology and Applied Pharmacology*, v. 334, p. 24-34, [doi.org/10.1016/j.taap.2017.08.022](https://doi.org/10.1016/j.taap.2017.08.022).
- Buck, Brenda, Londono, Sandra C., McLaurin, Brett, **Metcalf, Rodney**, Mouri, Hassina, Selinus, Olle, Shelembe, Refilwe, (2016) The emerging field of medical geology in brief: Some examples. *Environmental Earth Sciences*, v. 75:449, doi 10.1007/s12665-016-5362-6.
- Metcalf, R.V.** & Buck, B.J. (2015) Genesis and health risk implication of an unusual occurrence of NaFe<sup>3+</sup>-amphibole. *Geology*, vol. 43, p. 63-66. doi:10.1130/G36199.1
- Baumann, F., Buck, B. J., **Metcalf, R. V.**, McLaurin, B. T., Merkler, D., Carbone, M., (2015) Reply: No increased risk for mesothelioma in relation to naturally occurring asbestos in southern Nevada. *Journal of Thoracic Oncology*, vol. 10 no. 10, pages e64-e65. doi:10.1097/JTO.0000000000000565
- Baumann, F., Buck, B. J., **Metcalf, R. V.**, McLaurin, B. T., Merkler, D., Carbone, M., (2015) The presence of asbestos in the natural environment is linked to mesothelioma in young individuals and women in Southern Nevada. *Journal of Thoracic Oncology*, vol. 10, pages 731-737. doi:10.1097/JTO.0000000000000506
- Baumeister, J. L., Hausrath, E. M., Olsen, A. A., Tschauer, O. D., Adcock, C. T., **Metcalf, R. V.** (2015) Biogeochemical weathering of serpentinites: An examination of incipient dissolution affecting serpentine soil formation. *Applied Geochemistry*, 54, 74-84. <http://dx.doi.org/10.1016/j.apgeochem.2015.01.002>
- Buck, B.J., Goosens, D., **Metcalf, R.V.**, McLaurin, B., Ren, M., Freudenberger, F. (2013) Naturally occurring asbestos: Potential for human exposure, southern Nevada, USA: *Soil Science Society of America Journal*, vol. 77, p. 2192-2204. doi:10.2136/sssaj2013.05.0183
- Metcalf, R.V.** and Shervais, J. W. (2008) Supra-subduction zone ophiolites: Is there really an ophiolite conundrum? in James Wright and John Shervais eds., *Ophiolites, Arcs, and Batholiths, A Tribute to Cliff Hobson*: Geological Society of America Special Paper 438, 191-222. doi: 10.1130/2008.2438(07).
- Barrow, W. M. and **Metcalf, R.V.** (2006) A reevaluation of the paleotectonic significance of the Paleozoic central metamorphic terrane, eastern Klamath Mountains, California: New constraints from trace element geochemistry and <sup>40</sup>Ar/<sup>39</sup>Ar thermochronology: in A. W. Snoke and C. G. Barnes eds., *Geological Studies in the Klamath Mountains province, California and Oregon*, Geological Society of America Special Paper v. 410, p. 393-410. doi:10.1130/2006.2410(19)
- Metcalf, R.V.** (2005) Volcanic-Plutonic Links, Plutons as Magma Chambers and Crust Mantle Interaction: A Lithospheric Scale View of Magma Systems: in S. Ishihara, W.E. Stephens, S.L. Harley, S. Arima and T. Nakajima, eds., *Geological Society of America Special Paper no. 392, Fifth Hutton Symposium: The Origin of Granites and Related Rocks*, p. 357-374. (*Note: this paper is a reprint of the Transactions of the Royal Society of Edinburgh – Earth Sciences paper below published in 2004*)

- Metcalf, R.V.** (2004) Volcanic-Plutonic Links, Plutons as Magma Chambers and Crust Mantle Interaction: A Lithospheric Scale View of Magma Systems: Transactions of the Royal Society of Edinburgh – Earth Sciences, v. 95, p. 357-374.  
DOI:<http://dx.doi.org/10.1017/S0263593300001127>
- Metcalf, R.V.**, Wallin, E.T., Willse, K.R. and Muller, E.R. (2000), Geology and geochemistry of the ophiolitic Trinity Terrane, California; Evidence of mid-Paleozoic ultradepleted supra-subduction zone magmatism in a proto-arc setting: *in* Y. Dilek, E. Moores, D. Elthon, and A. Nicolas eds., *Geological Society of America Special Paper no. 349, Ophiolites and Oceanic Crust: New Insights from Field Studies and Oceanic Drilling*, p. 409-426. doi:10.1130/0-8137-2349-3.419
- Wallin, E.T., and **Metcalf, R.V.**, (1998) Supra-subduction zone ophiolite formed in an extensional forearc: Trinity Terrane, Klamath Mountains, California: *Journal of Geology*, v. 106, p. 591-608. DOI: 10.1086/516044
- Metcalf, R.V.**, Smith E.I., Walker, J.D., Reed, R.C.\*, and Gonzales, D.A. (1995) Isotopic disequilibrium among commingled hybrid magmas: Evidence of a two-stage magma mixing-commingling process in the Mt. Perkins Pluton, Arizona: *Journal of Geology*, v. 103, p.509-527. <http://www.jstor.org/stable/30070774>
- Metcalf, R.V.** and Smith, E.I. (1995) Introduction to special section: Magmatism and extension: *Journal of Geophysical Research*, v.100, p. 10249-10253. DOI:10.1029/95JB00759
- Faulds, J.E., Feuerbach, D., Reagan, **Metcalf, R.V.**, Gans, P., and Walker J.D., (1995) The Mt. Perkins block, northwestern Arizona: An exposed cross-section of an evolving, pre- to syn-extensional magma system: *Journal of Geophysical Research*, v.100, p.15249-15,266.  
DOI:10.1029/95JB01375
- Metcalf, R.V.** (1995) Geochemistry of Proterozoic plutonic rocks of the central Santa Fe Range, northern New Mexico: Trace element signature of subduction zone magmatism: *New Mexico Geol. Soc. 46nd Guidebook*, p. 185-191.
- Blackburn, W.H., **Metcalf, R.V.**, and Ragland, P.C. (1994) Uranium and Thorium in the Precambrian Old Rag Granite: Testing an Exploration Model: *Chemical Geology*, v.111, p.177-206.
- Metcalf, R.V.**, Smith, E.I., and Mills, J.G. (1993) Magma mixing and commingling in the northern Colorado River extensional corridor: Constraints on the production of intermediate magmas: *in* Lahren, M.M., Trexler, J.H., Jr., and Spinoso, C., eds., *Crustal Evolution of the Great Basin and Sierra Nevada: Cordilleran/Rocky Mountain Sections*, Geol. Soc. Amer., Univ. of Nevada, Reno, p. 35-46.
- Metcalf, R.V.** (1990) Proterozoic geology of the central Santa Fe Range, New Mexico: *New Mexico Geol. Soc. 41st Guidebook*, p. 179-187.
- Edited Volumes**
- Smith, E.I. and **Metcalf, R.V.** (1995) Special Section on Magmatism and Extension: *Journal of Geophysical Research*, v. 100, p. 10249-10557. (*collection of 17 papers dealing with magmatism and crustal extension worldwide*)

### Published Road Logs

- Metcalf, R.V.**, Hanson, A. and Reed, R.C. (2002) Geologic History of the Lake Mead Area, Northern Black Mountains, Arizona: An Exercise in Classical Techniques of Relative Dating: National Association of Geoscience Teachers, Spring 2002 Field Conference
- Metcalf, R.V.**, and C. Daniel (1995) Proterozoic geology of the central Santa Fe Ranges, Santa Fe County, New Mexico: A roadlog of NM475: New Mexico Geological Society 42nd Guidebook, p. 71-73.
- Metcalf, R.V.**, Smith, E.I. and Mills, J.G. (1993) Magma mixing and commingling in the Colorado River Extensional Corridor; Constraints on the production of intermediate magmas-Part II: Road Log: *in* Lahren, M.M., Trexler, J.H., Jr., and Spinosa, C., eds., *Crustal Evolution of the Great Basin and Sierra Nevada: Cordilleran/Rocky Mountain Sections*, Geol. Soc. Amer., Univ. of Nevada, Reno, p.46-55.

### Published Reports (non-peer reviewed)

- Buck, Brenda J., McLaurin, B.T., and **Metcalf, R.V.**, 2018. Chapter 5: Quantitative Assessment of Naturally-Occurring Asbestos (NOA) in Unpaved Roads and Playas in Southern Nevada, *IN* Brenda Buck, **Rodney Metcalf** and Brett McLaurin (Editors), Naturally-Occurring Asbestos in Southern Nevada, Final Report to Bureau of Land Management Task Agreement Number L13AC00237; p. 172-197.
- Buck, Brenda J., McLaurin, B.T., and **Metcalf, R.V.**, 2018. Chapter 4: Distribution, Mineralogy, and Morphology of Naturally-Occurring Asbestos in Southern Nevada, *IN* Brenda Buck, **Rodney Metcalf** and Brett McLaurin (Editors), Naturally-Occurring Asbestos in Southern Nevada, Final Report to Bureau of Land Management Task Agreement Number L13AC00237; p. 42-171.
- Metcalf, R.V.**, Buck, B.J., Austin\*, T., 2018. Chapter 3: Petrogenesis of Amphibole Asbestos in Clark County, Nevada and Adjacent Areas, *IN* Brenda Buck, **Rodney Metcalf** and Brett McLaurin (Editors), Naturally-Occurring Asbestos in Southern Nevada, Final Report to Bureau of Land Management Task Agreement Number L13AC00237; p. 28-41.
- Metcalf, R.V.**, Buck, B.J., and McLaurin, B., 2018. Chapter 2: Chemical Classification of Naturally-Occurring Asbestos, *IN* Brenda Buck, **Rodney Metcalf** and Brett McLaurin (Editors), Naturally-Occurring Asbestos in Southern Nevada, Final Report to Bureau of Land Management Task Agreement Number L13AC00237; p. 17-27.
- Metcalf, R.V.**, Buck, B.J., and McLaurin, B., 2018. Chapter 1: Life Cycle of Asbestos, *IN* Brenda Buck, **Rodney Metcalf** and Brett McLaurin (Editors), Naturally-Occurring Asbestos in Southern Nevada, Final Report to Bureau of Land Management Task Agreement Number L13AC00237; p. 9-16.
- Brenda Buck, **Rodney Metcalf** and Brett McLaurin (Editors). 2018. Naturally-Occurring Asbestos in Southern Nevada, Final Report to Bureau of Land Management Task Agreement Number L13AC00237, 213 p.
- Buck, B.J., **Metcalf, R.V.**, and McLaurin, B. 2017. CESU Managing Human Health Preventing Exposure to Carcinogenic Minerals, Annual Report to Bureau of Land
- Buck, B.J., **Metcalf, R.V.**, and McLaurin, B. 2016. CESU Managing Human Health Preventing Exposure to Carcinogenic Minerals, Annual Report to Bureau of Land Management, Task Agreement Number L13AC00237, p. 1-7

- Buck, B.J., **Metcalf, R.V.**, and McLaurin, B. 2015. CESU Managing Human Health Preventing Exposure to Carcinogenic Minerals, Annual Report to Bureau of Land Management, Task Agreement Number L13AC00237, p. 1-25
- Buck, B.J., **Metcalf, R.V.**, and McLaurin, B. 2014. CESU Managing Human Health Preventing Exposure to Carcinogenic Minerals, Annual Report to Bureau of Land Management, Task Agreement Number L13AC00237, p. 1-13

### Published Abstracts

- Renkes\*, N., **Buck, B.J.**, and Metcalf, R.V., 2019. Can Recrystallization of Magmatic Hornblende Produce Asbestos Morphologies? Paper No. 187-5. *Geological Society of America Abstracts with Programs*. Vol. 51, No. 5 doi: 10.1130/abs/2019AM-335233
- Buck, B.J.**, Metcalf, R.V., and McLaurin, B.T., 2019. Naturally-Occurring Asbestos and Increased Urbanization in Clark County, Nevada. Geological Society of America Program with Abstracts. Paper No: 19-15. *Geological Society of America Abstracts with Programs*. Vol. 51, No. 5 doi: 10.1130/abs/2019AM-338728
- Metcalf, Rodney V.**, and Buck, Brenda J. (2018) Naturally-occurring asbestos and public health: The importance of interdisciplinary research: *Geological Society of America Abstracts with Programs*. Vol. 50, No. 6 doi: 10.1130/abs/2018AM-324931. (Invited presentation)
- Renkes, Natalie\*\*, Buck, Brenda J., and **Metcalf, Rodney V.** (2018) Morphology of recrystallized vs neocrystallized fibrous amphibole: Implications for potential health risks: *Geological Society of America Abstracts with Programs*. Vol. 50, No. 6 doi: 10.1130/abs/2018AM-325136.
- Metcalf, Rodney V.**, and Buck, Brenda J. (2018) Petrogenesis of fibrous amphiboles in hydrothermally-altered granitoid rocks: An unusual setting for naturally-occurring asbestos: XIII International Association of Engineering Geologists Congress.
- Metcalf, Rodney V.**, Buck, Brenda J., McLaurin, Brett, and Pfau, Jean C. (2017) In defense of the term “Naturally-Occurring Asbestos” : *Geological Society of America Abstracts with Programs*. Vol. 49, No. 6 doi: 10.1130/abs/2017AM-307158.
- Pfau, Jean C., Keil, Deborah E., Buck, Brenda J., and **Metcalf, Rodney V.** (2017) Paradigm shift in evaluating health effects of asbestos: Non-cancer outcomes: *Geological Society of America Abstracts with Programs*. Vol. 49, No. 6 doi: 10.1130/abs/2017AM-295486
- Metcalf, Rodney V.**, Buck Brenda J., Sumner-Moore, Meg,\* and Austin, Tomoyo\*\* (2016) Growth of fibrous amphibole during hydrothermal alteration: Implications for non-occupational exposure to amphibole asbestos: *Geological Society of America Abstracts with Programs*. Vol. 48, No. 7, doi: 10.1130/abs/2016AM-282169.
- Austin, Tomoyo\*\*, **Metcalf, Rodney V.**, and Buck Brenda J. (2016) Metasomatic microtextures and the petrogenesis of amphibole asbestos: *Geological Society of America Abstracts with Programs*. Vol. 48, No. 7, doi: 10.1130/abs/2016AM-281939.
- Buck, Brenda J., **Metcalf, Rodney V.**, Berry, David, McLaurin, Brett (2016) Naturally occurring asbestos in soils, southern Nevada: Interpretations for wind distribution and human exposure: *Geological Society of America Abstracts with Programs*, Vol. 48, No.7, doi: 10.1130/abs/2016AM-278831.
- Metcalf, Rodney V.**, Buck Brenda J., Berry, David, Kent, Douglas, McLaurin, Brett, Sumner-Moore, Meg,\* Urso, Anna,\* Goossens, Dirk, Merkler, Doug, Jaunch, Jed (2015) Naturally occurring

asbestos near populated areas of southern Nevada: Unusual occurrences of fibrous actinolite and Libby-type Na-Amphibole: MedGeo2015: Book of Abstracts of the 6th International Conference on Medical Geology, UA Editora, Universidade de Aveiro, Portugal, p. 112.

- Sumner-Moore, Meg,\* Buck Brenda J., **Metcalf, Rodney V.**, and McLaurin, Brett (2015) Characterization and potential toxicity of fibrous amphibole minerals near the Las Vegas metropolitan area: MedGeo2015: Book of Abstracts of the 6th International Conference on Medical Geology, UA Editora, Universidade de Aveiro, Portugal, p. 36.
- Metcalf, R. V.**, Buck, B. J., McLaurin, B. (2014) Naturally occurring asbestos near populated areas of southern Nevada: Unusual occurrences of fibrous actinolite and Libby-type Na-Amphibole: Geological Society of America Abstracts with Programs, Vol. 46, No.6, p. 54.
- Beshears, M.,\*\* and **Metcalf, R. V.** (2014) Characterizing the Earliest Stages of Partial Melting: A Study of the Contact Aureole of the Miocene Mt. Perkins Pluton, NW Arizona: Geological Society of America Abstracts with Programs, Vol. 46, No.6, p.554.
- Metcalf, Rodney V.**, Buck, Brenda J, McLaurin, Brett (2014). Unusual Occurrences of Asbestiform Libby-type Sodium Amphibole near Populated Areas of Southern Nevada, USA: Geological Society of America Abstracts with Programs. Vol. 46, No. 5, p.1
- Metcalf, R.V.**, Buck, B.J., and McLaurin, B., 2014a, Unusual occurrence of asbestiform Libby-type sodium amphibole near populated areas of southern Nevada, USA: Geol. Soc. Amer. Abstracts w/ Programs, Vol. 46, No. 5, p.1.
- Metcalf, R.V.**, Miller, C.F., Danielson, Lisa, Rhodes, G.,\* Wooden, J.L., 2013, Timescale of petrogenetic processes in the Mount Perkins magma system, Northern Colorado Extensional Corridor: Arizona: Geol. Soc. Amer. Abstracts w/ Programs, Vol. 45, No. 7, p.229
- Freudenberger, F.,\*\* Buck, B. J., **Metcalf, R. V.**, Nowicki, S., 2013, Geomorphic controls on the morphology of potentially hazardous fibrous amphiboles, Clark County, Nevada, USA: Arizona: Geol. Soc. Amer. Abstracts w/ Programs, Vol. 45, No. 7, p.101
- Metcalf, R. V.**, Baumann, Francine, Buck, Brenda, YANG, Haining, Gaudino, Giovanni, Ren, Minghua, McLaurin, Brett T. and Carbone, Michele, 2012, Potential link between young malignant mesothelioma cases and environmental exposure to fibrous carcinogenic minerals near urban areas of southern Nevada. Geol. Soc. Amer. Abstracts w/ Programs, Vol. 44, No. 7, p. 609.
- Metcalf, R.V.** and Drew, J.\*\* (2011) Cretaceous and Eocene-Oligocene U-Pb Zircon Migmatite Ages from the East Humboldt Range Metamorphic Core Complex, Nevada: Geol. Soc. Amer. Abstracts w/ Programs, Vol. 43, No. 5, p.275
- Tu, V.,\*\* Baumeister, J.L.,\*\* **Metcalf, R.**, Olsen, A., Hausrath, E.M. (2011) Serpentinite Weathering and Implications for Mars: 42<sup>nd</sup> Lunar and Planetary Science Conference, Program & Abstracts, abstr #2303
- Metcalf, R.V.** and Stropky, M.R.\*\* (2011) U-Pb Zircon Ages of Proterozoic Plutons and Migmatite, San Fe Range, New Mexico: Evidence of Mafic Magmatism and Syn-Kinematic Metamorphism as 1.4 Ga: Geol. Soc. Amer. Abstracts w/ Programs, Vol. 43, No. 4, p.72
- Metcalf, R.V.** and Kopietz, C.,\* M.R. (2011) Grain-Scale Pseudomorph Microstructures from the Pyrometamorphic Aureole of the Miocene Mount Perkins Pluton: A Potential Link to open System Processes during Pluton Crystallization: Geol. Soc. Amer. Abstracts w/ Programs, Vol. 43, No. 4, p.72

- Baumeister, J.L.,\*\* Tu, V.,\*\* **Metcalf, R.V.**, Olsen, A.A., Hausrath, E.M. (2011) Chemical Weathering of Serpentine in the Klamath Mountains, CA: *Geol. Soc. Amer. Abstracts w/ Programs*, Vol. 43, No. 5, p.63
- Del Vecchio, P. Jr.,\*\* **Metcalf, R. V.**, and Barrow, W. J,\*\* (2010) Extensional shear sense indicators associated with the Trinity fault, eastern Klamath Mountains Province, CA; *GSA Abstracts with Programs*, Vol. 42, No. 5; ISSN 0016-7592, p. 196-6.
- Shervais, J. and **Metcalf, R.V.** (2009) Supra-subduction zone (SSZ) ophiolites: the fore-arc connection; *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract T33-01.
- Metcalf, R.V.** (2008) Crustal accretion history of the Klamath Mountains Province: Tracking temporal changes in Moho depth (crustal thickness) using basalt trace element geochemistry. Cordilleran/Rocky Mountain Section Meeting, Geological Society of America *Abstracts with Programs*, Vol. 40, No. 1, p. 46.
- Barrow, W.J.\*\* and **Metcalf, R.V.** (2008) Permian exhumation of a large coherent sheet of metabasite at a Pacific-type convergent margin: Central Metamorphic terrane, Klamath Mountains. Cordilleran/Rocky Mountain Section Meeting, Geological Society of America *Abstracts with Programs*, Vol. 40, No. 1, p. 46.
- Barnes, C. G., Miller, K., Snoke, A.W., Yosihinobu, A., Snelson, C. M., Frost, C. D., and **Metcalf, R. V.**, (2007) Imaging accreted terranes at the cascadia margin: The Klamath Mountains Province of California and Oregon: Geological Society of America Abstracts with Programs, 2007 Annual Meeting, Denver, Colorado, v. 39, no. 6
- Metcalf, R.V.** and Barrow, W.M,\*\* 2007, Paleozoic evolution of the Cordilleran convergent margin: A view from the Eastern Klamath Mountains: Geological Society of America Abstracts with Programs, 2007 Cordilleran Annual Meeting, Bellingham, Washington, v. 39, no. 4, p. 70.
- Barrow, W. M.,\*\* **Metcalf, R.V.**, and Fairhurst, R. J., 2006, Late Paleozoic Exhumation of Subducted Oceanic Crust by Extensional Reactivation of a Mid-Paleozoic Subduction Margin: Central Metamorphic Terrane, Klamath Mountains, California: Geological Society of America Abstracts with Programs, 2006 Annual Meeting, Philadelphia, Pennsylvania, v. 38, no. 7, p. 422
- Grady, J.C.,\*\* and **Metcalf, R.V.** (2005) Middle Jurassic Sexton Mountain supra-subduction zone ophiolite complex, Klamath Mountains, Oregon: Geological Society of America Abstracts with Programs, 2004 Annual Meeting, Denver, Colorado, v. 37, No. 7, p. 19
- Barrow , W. M.,\*\* and **Metcalf, R. V.** (2004) The mid-Paleozoic Trinity thrust fault of the Eastern Klamath Mountains, northern California: reactivated in the Permian as an extensional structure: Geological Society of America Abstracts with Programs, 2004 Annual Meeting, Denver, Colorado, v. 36, no. 5, p. 148.
- Metcalf, R.V.** (2004) Evolution and subduction polarity of the mid-Paleozoic Klamath-Sierra volcanic arc: Geological Society of America Abstracts with Programs, v. 36, no. 4, p. 70.
- Metcalf, R.V.** (2003) Volcanic-Plutonic Links, Plutons as Magma Chambers and Crust Mantle Interaction: A Lithospheric Scale View of Magma Systems: *Fifth Hutton Symposium on the Origin of Granites and Related Rocks, abstracts w/ programs, Geol. Survey Japan, Interim-Report 29*, p. 89. (invited speaker)

- Metcalf, R.V.** and Barrow, W.J.\*\* (2002) Paleozoic-Mesozoic subduction related crustal growth in the Klamath Mountains: a view from the Eastern Klamath terrane: *Geol. Soc. Amer. Abstracts w/programs*, vol. 34 #5, p. A-43.
- Barrow, W.J.\*\* and **Metcalf, R.V.** (2002) Central Metamorphic Terrane, Northern CA: Geochemical Evidence of a Mid-Ocean Ridge Origin: *Geol. Soc. Amer. Abstracts w/programs*, vol. 34 #5, p. A-43.
- Metcalf, R.V.** (2001) Silurian-Devonian Initiation of Subduction along the Proto-Cordilleran Margin of Laurentia: Response to Closure of the Early Paleozoic Iapetus Ocean? *Geol. Soc. of Amer. and Geol. Soc. of London, Earth Systems Processes: Programmes with Abstracts*, p. 42.
- Metcalf, R.V.**, and Shervais, John (2001): Supra-Subduction Zone (SSZ) Ophiolites: Is There Really an "Ophiolite Conundrum"?; *Geol. Soc. Amer., Abstracts with Programs*. vol.33, no.6, p. A-173.
- Metcalf, R.V.**, and Wallin, E.T. (2000) Mid-Paleozoic development of the Klamath-Sierra forearc-arc-backarc subduction system, northern California: *Geol. Soc. Amer.*, abstr. vol.32, no.7, p. A-497.
- Cheversia, M.B., Miller, C.F., **Metcalf, R.V.**, Coath, C.D. (2000) Documenting open-system growth of feldspars by in-situ Pb isotope analysis: Aztec Wash and Mt. Perkins plutons, Nevada-Arizona: *Geol. Soc. Amer.*, abstr. vol.32, no.7, p. A-149.
- Metcalf, R.V.**, Smith, E.I., and Miller, C.F. (2000) Coeval Tertiary volcanic and plutonic rocks, Colorado River Extensional Corridor, USA: Implications for crust-mantle interaction and magma mixing as a petrologic process: *in* Skilbeck, C.G and Hubble, T.C.T., eds., *Understanding Planet Earth: Searching for a Sustainable Future: 15<sup>th</sup> Australian Geological Convention, Sydney, Abstracts #59*, p. 346.
- Metcalf, R.V.**, Danielson, L.R.,\*\* and Camin, M. C.\* (1999) Role of mafic magmatism in the genesis of intermediate I-type granitoid suites: Miocene Mt. Perkins pluton, Arizona: *in* Barbarin, B. ed., *The Origin of Granites and Related Rocks: IVth Hutton Symposium Abstracts*, Documents du BRGM no.290, p. 32.
- Metcalf, R.V.**, Willse, K.R.\*\* and Wallin, E.T. (1999) Trace element and Nd-Sr-Pb isotopic data from the Silurian Bonanza King mafic intrusive complex, Trinity terrane, CA: Evidence of supra-subduction zone magmatism in a proto-arc paleotectonic setting: *Geol. Soc. Amer.*, abstr. vol.31, no.6, p. A-79.
- Muller, E.R.\*\*, **Metcalf, R.V.**, and Wallin, E.T. (1999) Ultradepleted supra-subduction zone magmatism of the Devonian Porcupine Lake mafic intrusive complex, Trinity terrane, California: *Geol. Soc. Amer.*, abstr. vol.31, no.6, p. A-71.
- Camin, Monica C.\*, and **Metcalf, R.V.** (1999) Petrogenetic evolution of the late stage dikes of the Miocene Mt. Perkins pluton, Arizona: Evidence of open system processes: *Geol. Soc. Amer.*, abstr. vol.31, no.6, p. A-43.
- Smith, Jason L.\*, **Metcalf, R.V.**, and Wallin, E.T. (1999) Geochemical comparison of Silurian and Devonian mafic intrusive complexes, Trinity terrane, CA: Evidence of 33 million years of magmatism in a proto-arc setting: *Geol. Soc. Amer.*, abstr. vol.31, no.6, p. A-96.
- Metcalf, R.V.**, Wallin, E.T., Willse, K.R.\*\* (1998) Devonian volcanic rocks of the Eastern Klamath Mountains: An island-arc or volcanic cover of the Trinity Ophiolite: *Geol. Soc. Amer.*, abstr. vol.30, no.5, p.54.



- Willse, K.R.\*\* , **Metcalf, R.V.**, Wallin, E.T. (1998) Emplacement and Petrogenesis of the lower Silurian Bonanza King mafic intrusive complex, Trinity Terrane, Northern California: Geol. Soc. Amer., abstr. vol.30, no.5, p.70.
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\*undergraduate student authors, \*\*graduate student authors

### **Research Grants**

Bureau of Land Management: *L13AC00237-Managing Federal Lands and Human Health: Preventing Human Exposure to Carcinogenic Minerals in Southern Nevada*  
September 2013 – September 2018: \$345,000 (B.J. Buck, R.V. Metcalf, B. McLaurin)

National Science Foundation: *EAR-9628552-Testing Models of Early Paleozoic Ophiolite Genesis: Trinity Terrane, California;*  
July 1996 - June 1999: \$170,000 (R.V. Metcalf, P.I.; E.T. Wallin)

U.S. Navy Geothermal Project Office: *Contract # N68936-96-C-0250-Geochemical and Geological Attributes of Igneous Rocks Associated with Geothermal Fields: Case Studies of Two Coso-Like Volcanic-Geothermal Fields;*  
July 1996 - June 1998: \$310,400 (E.I. Smith, P.I.; R.V. Metcalf)

### **Service to the Profession**

Member: 2017-2020, Geological Society of America Nominations Committee

Member: 2006-present, Alumni Advisory Board, University of Kentucky, Department of Earth and Environmental Science

Secretary-Treasurer: 2009-2017 (two terms), Cordilleran Section of the Geological Society of America

Organizing Chair: 2008 Joint Cordilleran and Rocky Mountain Section Meeting, Geological Society of America, to be held 19-21 March 2008 at UNLV

Associate Editor: *Bulletin of the Geological Society of America* (two three-year terms 2001-2003; 2004-2006)

Manuscript Reviewer for 14 different journals/publications: (1) *Journal of Volcanology and Geothermal Research*; (2) *Bulletin of the Geological Society of America*; (3) *Journal of Geology*; (4) *Journal of Petrology*; (5) *Geology*; (6) *Transactions of the Royal Society of Edinburgh*; (7) *Tectonophysics*; (8) *Geological Society of America Special Papers*; (9) *Lithos*; (10) *Journal of*

*Structural Geology*; (11) *Journal of Geophysical Research*; (12) *Rocky Mountain Geologist*; (13) *Geosphere*; (14) *American Mineralogist*

Proposal Reviewer: National Science Foundation (Tectonics; Petrology and Geochemistry): 1992 to present

Developed Proposal to host the 6<sup>th</sup> Hutton Conference on the Origins of Granites in 2007: one of three proposals presented to attendees of 5<sup>th</sup> Hutton Conference in Toyohashi Japan, Sept 2003; South African proposal was selected, asked to propose again for 7<sup>th</sup> Hutton.

Geological Society of America Research Grants Committee – Member 2001 to 2002: reviewed and ranked 80 student proposals each spring; committee dispersed >\$300,000 in research grants per year.

Session Chair: 5<sup>th</sup> Hutton Conference on the Origin of Granites; Toyohashi Japan, Sept 2003

Session Chair: Geological Society of America Cordilleran Meeting; Corvallis, OR, 14 May 2002

Session Chair, GSA Cordilleran Section meeting, Kona, Hawaii, May 1997

Session chair, Geological Society of America National Meeting, Seattle WA, October 1994

Guest Editor for Journal of Geophysical Research special section entitled *Extension and Magmatism* (co-editor with E.I. Smith); responsible for nine manuscripts (half of those submitted to the special section), thoroughly reviewed each paper, evaluated each paper based two external reviews and made recommendations to the senior editor; provided sole review of revised versions for seven of the nine papers; March 1994 to February 1995

Co-chair and organizer (w/ E.I. Smith and J.G. Mills) of a day-long symposium "Magmatism and Extension; Rocky Mountain-Cordilleran GSA Meeting, Reno, Nevada, May 1993

Co-leader (w/ E.I. Smith and J.G. Mills) of GSA Fieldtrip associated with Rocky Mountain-Cordilleran GSA Meeting; May 1993

Session Chair, Spring Meeting of the Arizona-Nevada Academy of Science, UNLV, April 1993

Session Chair at GSA Rocky Mountain Section Meeting, Albuquerque, April 22-24, 1991

### **Courses Taught at UNLV**

GEOL 100: Natural Disasters; GEOL 102: Historical Geology; GEOL 220: Mineralogy; GEOL 325: Optical Mineralogy; GEOL 348: Field Geology I; GEOL 370: Field Geology II; GEOL 371 (3 cr): Field Geology III; GEOL 429/629: Geochemical Thermodynamics and Kinetics; GEOL 427: Igneous and Metamorphic Petrology; GEOL 493: Independent Study and Research; GEOL 701: Research Methods in Geoscience; GEOL 720 (4 cr): Advanced Geochemistry; GEOL 727: Metamorphic Petrology; GEOL 725 (3 cr): Seminar in Petrology; GEOL 793: Independent Study and Research

### **Graduate Students**

#### **Supervisor:**

Clint Christensen: M.S. degree Aug. 1994 (co-advisor w/ E.M. Duebendorfer)

Scott McDaniel: M.S., degree Dec. 1995

Lisa Danielson: M.S., degree Aug. 1998

Rhonda Knupp: M.S., degree May 1999

Keith Willse: M.S., degree May 1999

Deborah Potts: M.S., degree Dec. 1999

Edward Muller: M.S., degree August 2000

David Shields: M.S. degree May 2003

Jesse Grady: M.S. degree May 2007

Wendy Barrow-Johnson: Ph.D. degree May 2007

Michele Stropky: M.S. degree May 2012

Jordan Drew: M.S. degree May 2013

Mat Beshears: M.S. degree May 2016

Tomoyo Austin: M.S. degree August 2019