

William P. Clement

Department of Geosciences
1910 University Drive
Boise, ID 83725

Work: (208) 426-3645
e-mail: wclement@boisestate.edu
web: <http://cgiss.boisestate.edu/~billc>

Professional Experience

Temporary Special Lecturer. Department of Geosciences, January, 2009 to present.

Associate Research Professor. Center for Geophysical Investigation of the Shallow Subsurface, Boise State University, Boise, ID. July, 2006 – June, 2008.

Assistant Research Professor. Center for Geophysical Investigation of the Shallow Subsurface, Boise State University, Boise, ID. November, 1997 - June, 2006.

Environmental Geophysicist/Research Scientist. Institute for Scientific Research, Boston College, Hanscom Air Force Base, MA. January, 1997 - November, 1997.

Post Doctoral Research Associate. Northeast Consortium for Engineering Education, Phillips Laboratory, Hanscom Air Force Base, MA. January, 1996 - December, 1996.

Post Doctoral Research Associate. University of Wyoming, Laramie, WY. August, 1995 - December, 1995.

Appointments

Affiliate, Center for Advanced Energy Studies, Idaho National Laboratory, June, 2007 – August, 2008.

Graduate Faculty, Boise State University, January, 1998 - present.

Education

Ph.D. Geophysics. *University of Wyoming*, Laramie, WY.

M.S. Geophysics. *Stanford University*, Stanford, CA.

M.S. Geology. *University of Montana*, Missoula, MT.

A.B. Geology. *Dartmouth College*, Hanover, NH.

Teaching Experience

Boise State University:

Introductory Geoscience Classes:

Geology 100: Fundamentals of Geology, 2009 to present.

Geology 101: Environmental Geology, 2009 to present.

Geology 102: Historical Geology, 2009.

Geophysics 300: Physics of the Earth, 2008.

Mathematics 147: Precalculus, 2007.

Engineering 110: Introducing Engineering, (Learning Community with Math 147), 2007.

Geophysics/Geology 497/597: Hydrogeophysics, 2 week Summer Program, 2007.

Inland Northwest Research Alliance Geophysical workshop, 2005, 2006, 2007.

Geophysics 697: Geophysical Inverse Theory, 2004, 2005.

Geophysics 680: Tomography, 2002.

Geophysics 197: Earth in Space, an Honors course for non-majors, 2000, 2001.

Teaching Assistant: Stanford University, 1986 - 1990 (Centennial Teaching Assistant, awarded for outstanding teaching); University of Wyoming, 1990 - 1991.
St. Sebastian's Country Day School, Needham, MA. Mathematics teacher, grades 7-11. Assistant Varsity Coach: Soccer and Basketball. Yearbook dedication, 1983. September, 1980 - June, 1983.

Professional Service

Member, Research Council, Boise State University, 2007 - 2008.
Member, Search Committee for the Vice President for Research, Boise State University, 2005.
Member, Advisory Group for the Geophysics Module, Consortium of Universities for the Advancement of Hydrologic Sciences, 2005.
Co-Chair, Research Faculty Policy Committee, Department of Geosciences, Boise State University, 2005.
Graduate Advisor: Murari Khatiwadi, Joshua Nichols, Marc Buursink, Sarah Goldstein, Heather Best, Geoff Moret.
Faculty Advisor, Society of Exploration Geophysicists, Student Section, Boise State University, 2006.
Undergraduate Geophysics Advisor, 2006.

Grants

Quantifying the Capacity of Coarse Grained Vadose Zones to Treat Class V Well Injected Storm Water that Recharges Aquifers Managed for Water Supply, AWWARF and Mountain Water Company, \$33,061 contract to Boise State University, January 1, 2008 to December 30, 2008, Primary Investigator for Boise State University.
Suitability of Layered Basalt Deposits as Targets for Industrial Carbon Dioxide Sequestration, LDRD/Idaho National Laboratory, \$61,248, June 7, 2007 to September 30, 2009, Primary Investigator.
Assessment of Ground Penetrating Radar capabilities in terrestrial analogs of Martian aeolian environments, NASA/Idaho Space Grant Consortium, \$61,231, March 15, 2006 to March 14, 2008, Co-Primary Investigator.
Time Lapse 3D GPR Characterization and Monitoring of Near-Surface Groundwater and Contaminant Flows, SBIR, Phase II, Department of Energy, \$199,920, October 1, 2006 to September 30, 2008, Primary Investigator for Boise State University.
Identification, Assessment and Evaluation of GHG sources and Carbon Sequestration Sinks in the Northern Rockies, Phase II, Department of Energy, \$280,000, October 1, 2005 to September 30, 2009, Primary Investigator.
Collaborative Research: Water Storage and Routing within glaciers via planar voids, a new model of glacier hydrology, National Science Foundation, \$297,827, March 1, 2005 to February 29, 2008, Co-Primary Investigator.
Time Lapse 3D GPR Characterization and Monitoring of Near-Surface Groundwater and Contaminant Flows, SBIR, Department of Energy, \$33,000, June 27, 2005 to March 31, 2006, Co-Primary Investigator.
Surface-based geophysical survey of the 300-FF-5 and 100-NR-2 Operable Units, Pacific Northwest National Laboratory, Richland, WA, Department of Energy, \$57,571, May 24, 2005 to September 30, 2005, Primary Investigator.

Identification, Assessment and Evaluation of GHG sources and Carbon Sequestration Sinks in the Northern Rockies, Phase I, Department of Energy, \$100,000, September 26, 2003 to September 25, 2005, Primary Investigator.

Geophysical Investigation of Archaeological Site at Mountain Home Air Force Base, Department of Defense, \$11,902, June 1, 2005 - January 30, 2006, Primary Investigator.

Geophysical Investigations of Archaeological Sites at Mountain Home Air Force Base, Department of Defense, \$43,996, March 1, 2004 to December 31, 2004, Primary Investigator.

Time lapse GPR tomography to image an infiltration test in the vadose zone at the Hanford site, WA, Department of Energy, \$70,000, April 30, 2001 to September 30, 2002, Primary Investigator.

Electromagnetic conductivity and GPR survey across a Landfill Cap, Department of Energy, \$36,300, February 1, 2001 to September 30, 2002, Primary Investigator.

Research on Inverse Methods Applied to Geophysical and Hydrologic Field Techniques in Support of Development of the Boise Hydrogeophysical Research Site, Department of Defense, DEPSCoR, \$333,000, April 1, 2000 to March 31, 2003, Co-Primary Investigator.

Influence of Clastic Dikes on Vertical Migration of Contaminants in the Vadose Zone at Hanford, Department of Energy, \$9,700, May 1, 2000 to September 30, 2000, Primary Investigator.

Invited Talks

“Principles of Tomography: CAT scans of the Earth”, Kutztown University, Kutztown, PA, March 20, 2008.

“Relating Surface and Downhole GPR to the Physical Characteristics of the Shallow Subsurface”, Bucknell University, Lewisburg, PA, January 28, 2008.

“Crosshole Radar Tomography in a Fluvial Aquifer near Boise, Idaho: Relating Well Logs to Radar Velocities”, University of Montana, Missoula, MT, October 31, 2006.

"Tomography of the Near Surface", Army Advanced Concept Workshop on Shallow Tunnel Detection, National Center for Physical Acoustics, University of Mississippi, Oxford, MS, February 13-16, 2006.

Publications

Hess, S., J. P. Fairley, J. Bradford, M. Lyle, and W. Clement, Evidence for composite hydraulic architecture in an active fault system based on 3D seismic reflection, time-domain electromagnetics and temperature data, *Near Surface Geophysics*, **7**, 341-352, 2009.

Bradford, J. H., W. P. Clement, and W. Barrash, Estimating porosity with ground-penetrating radar reflection tomography: A controlled 3-D experiment at the Boise Hydrogeophysical Research Site, *Water Research Resources*, **45**, W00D26, doi:10.1029/2008WR006960, 2009.

Clement, W. P., and A. L. Ward, GPR surveys across a prototype surface barrier to determine temporal and spatial variations in soil moisture content, *in Handbook of Agricultural Geophysics*, American Society of Agricultural Engineers, Barry J. Allred, Jeffrey J. Daniels, and M. Reza Ehsani (*eds.*), CRC Press, 305-315, 2008.

Clement, W. P., and C. J. Murray, GPR data acquired to image clastic dikes at the Hanford Site, Hanford, Washington, *in Stratigraphic Analyses Using GPR*, Baker, G. S. and H. M. Jol (*eds.*), Geological Society of America, Special Paper 432, 169-178, 2007.

- Wilkins, D. E., and W. P. Clement, Palaeolake Shoreline Sequencing using Ground-Penetrating Radar: Lake Alvord, Oregon and Nevada, *in* Stratigraphic Analyses Using GPR, Baker, G. S. and H. M. Jol (eds.), Geological Society of America, Special Paper 432, 103-110, 2007.
- Johnson, T. C., P. S. Routh, T. Clemo, W. Barrash, W. Clement, Incorporating geostatistical constraints in nonlinear inverse problems, *Water Resources Research*, **43**, W10422, doi:2006WR005185, 2007.
- Clement, W. P., W. Barrash, and M. D. Knoll, Reflectivity modeling of ground penetrating radar, *Geophysics*, **71**, K59-K66, 2006.
- Clement, W. P., and M. D. Knoll, Traveltime inversion of vertical radar profiles, *Geophysics*, **71**, K67-K76, 2006.
- Clement, W. P., Issues During the Inversion of Crosshole Radar Data: Can We Have Confidence in the Outcome?, *Journal of Engineering & Environmental Geophysics*, **11**, 269-287, 2006.
- Clement, W. P., and W. Barrash, Crosshole Radar Tomography in a Fluvial Aquifer near Boise, Idaho, *Journal of Engineering & Environmental Geophysics*, **11**, 171-184, 2006.
- Moret, G. J. M., M. D. Knoll, W. Barrash, and W. P. Clement, Investigating the stratigraphy of an alluvial aquifer using crosswell seismic traveltime tomography, *Geophysics*, **71**, B63-B73, 2006.
- Bradford, J. H., L. M. Liberty, M. W. Lyle, W. P. Clement, and S. Hess, Imaging complex structure in shallow seismic-reflection data using prestack depth migration, *Geophysics*, **71**, B175-B181, 2006.
- Moret, G. J. M., W. P. Clement, M. D. Knoll, and W. Barrash, VSP traveltime inversion: Near-surface issues, *Geophysics*, **69**, 345-351, 2004.
- Endres, A. L., W. P. Clement, and D. L. Rudolph, Ground penetrating radar imaging of an aquifer during a pumping test, *Ground Water*, **38**, 566-577, 2000.
- Cardimona, S., W. P. Clement, and K. Kadinsky-Cade, Seismic reflection and ground penetrating radar imaging of a shallow aquifer, *Geophysics*, **63**, 1310-1317, 1998.
- Clement, W. P., S. J. Cardimona, A. L. Endres, and K. Kadinsky-Cade, Site characterization at the Groundwater Remediation Field Laboratory, Dover Air Force base, Dover, Delaware, *The Leading Edge*, **16**, 1617-1621, 1997.
- Carbonell, R., M. A. Speece, W. P. Clement, and S. B. Smithson, Anisotropy measurements and the deep structure of a passive continental margin: southwestern Greenland, *in* Rifted Ocean-Continent Boundaries, Banda, E., M. Torné, and M. Talwani (eds.), NATO ASI Series C: Mathematics and Physical Sciences, **463**, 121-146, 1995.
- Clement, W. P., R. Carbonell, and S. B. Smithson, Shear-wave splitting in the lower crust beneath the Archean crust of southwest Greenland, *Tectonophysics*, **232**, 195-210, 1994.
- Carbonell, R., W. P. Clement, and S. B. Smithson, Joint P- and S-wave velocity determination from reflected PP, SS and converted PS/SP phases from large aperture seismic reflection measurements, *Tectonophysics*, **232**, 379-389, 1994.
- Rey, P. F., D. M. Fountain, and W. P. Clement, P wave velocity across a noncoaxial ductile shear zone and its associated strain gradient: Consequences for upper crustal reflectivity, *Journal of Geophysical Research*, **99**, 4533-4548, 1994.
- 1986 PASSCAL Basin and Range Lithospheric Seismic Experiment Working Group, The 1986 PASSCAL Basin and Range Lithospheric Seismic Experiment, *Eos*, **69**, 563-598, 1988.
- Clement, W. P., D. Esp, and J. Melesh, Earthquake Hazards, *in* Montana Hazard/Vulnerability Analysis, Montana Disaster and Emergency Division, Department of Military Affairs, 1987.

Proceedings

- Callahan, J. M., S. Y. Chyung, J. Guild, J. Guarino, D. Bullock, C. Schrader, and W. Clement, Enhancing Precalculus Curricula with E-Learning: Implementation and Assessment Proceedings of the 2008 American Society for Engineering Education Annual Conference & Expo, Pittsburgh PA, AC 2008-1703, 2008.
- Guarino, J., J. M. Callahan, S. Y. Chyung, R. Walters, and W. Clement, Developing and Assessing Engineering-based Modules for a Freshman Engineering Class, Proceedings of the 2008 American Society for Engineering Education Annual Conference & Expo, Pittsburgh PA, AC 2008-1128, 2008.
- Clement, W. P., and W. Barrash, Crosshole radar tomography in an alluvial aquifer near Boise, Idaho, *SAGEEP2006*, 2006.
- Clement, W. P., and A. L. Ward, Using ground penetrating radar to measure soil moisture content, American Society of Agricultural Engineering Meeting, Paper No. 032275, Las Vegas, NV, July 27-30, 2003.
- Goldstein, S., M. Knoll, W. Barrash, and W. Clement, Borehole radar attenuation tomography during the Tracer/Time-Lapse Test at the Boise Hydrogeophysical Research Site, *SAGEEP2003*, 2003.
- Buursink, M. L., J. W. Lane, W. P. Clement, and M. D. Knoll, Use of vertical-radar profiling at two New England sites and comparison with neutron log porosity, *SAGEEP2002*, 2002.
- Moret, G., W. P. Clement, and M. D. Knoll, Curved-ray travelttime inversion of shallow vertical seismic profiles, *SEG expanded abstracts*, 2002.
- Clement, W. P. and M. D. Knoll, A comparison of vertical and horizontal GPR velocity estimates in alluvial sediments, *SAGEEP2001*, GP2-4, 2001.
- Clement, W. P. and M. D. Knoll, Tomographic inversion of crosshole radar data: Confidence in results, *SAGEEP2000*, 553-562, 2000.
- Liberty, L. M., W. P. Clement, and M. D. Knoll, Crosswell seismic reflection imaging of a shallow cobble-and-sand aquifer: An example from the Boise Hydrogeophysical Research Site, *SAGEEP2000*, 545-552, 2000.
- Clement, W. P., L. M. Liberty, and M. D. Knoll, Reverse VSPs and crosshole seismic tomography while coring, *SAGEEP'99*, 713-722, 1999.
- Clement, W. P., M. D. Knoll, L. M. Liberty, P. R. Donaldson, P. Michaels, W. Barrash, and J. R. Pelton, Geophysical surveys across the Boise Hydrogeophysical Research Site to determine geophysical parameters of a shallow, alluvial aquifer, *SAGEEP'99*, 399-408, 1999.
- Knoll, M. D., and W. P. Clement, Vertical radar profiling to determine dielectric constant, water content and porosity values at well locations, *SAGEEP'99*, 821-830, 1999.
- Liberty, L. M., W. P. Clement, and M. D. Knoll, Surface and borehole seismic characterization of the Boise Hydrogeophysical Research Site, *SAGEEP'99*, 723-732, 1999.
- Peretti, W. R., M. D. Knoll, W. P. Clement, and W. Barrash, 3-D GPR imaging of complex fluvial stratigraphy at the Boise Hydrogeophysical Research Site, *SAGEEP'99*, 555-564, 1999.
- Endres, A. L. and W. P. Clement, Relating cone penetrometer test information to geophysical data: A case study, *SAGEEP'98*, 295-303, 1998.

- Clement, W. P., S. J. Cardimona, and K. Kadinsky-Cade, Geophysical and geotechnical site characterization data at the Groundwater Remediation Field Laboratory, Dover Air Force base, Dover, Delaware, *SAGEEP '97*, 665-673, 1997.
- Endres, A. L., D. L. Rudolph, and W. P. Clement, Monitoring of a pumping test in an unconfined aquifer with ground penetrating radar, *SAGEEP '97*, 483-492, 1997.
- Cardimona, S., K. Kadinsky-Cade, and W. P. Clement, Coincident ground penetrating radar and seismic imaging of an aquitard boundary, *SEG expanded abstracts*, 66, 825-828, 1996.

Technical Reports

- Clement, W. P., Ground Penetrating Radar Profiling of the Sedimentary Deposit at Juniper Butte, ID, Technical Report, U. S. Air Force, Contract No. W9126G-05-D-0010, 2006.
- Clement, W. P., Ground Penetrating Radar at Juniper Butte, ID, Technical Report BSU CGISS 04-04, U. S. Air Force, Contract No. DACA63-00-D-0006, 2004.
- Knoll, M. D., and W. P. Clement, Crosswell Radar Characterization of the Kansas Geohydrologic Experimental and Monitoring Site: Traveltime Tomography for the GEMS4N-GEMS4S Transect, Subcontract No. FY2000-063, NSF Project EAR-9903103, 50 p., 2004.
- Clement, W. P., Time lapse tomography to image an infiltration test in the vadose zone at the Hanford site, Washington, Technical report BSU CGISS 03-01, report to the Pacific Northwest National Laboratory, 42 pp., 2003.
- Ward, A. L., W. P. Clement, and G. W. Gee, Use of electromagnetic induction and ground-penetrating radar to monitor sediment-water storage in a prototype surface barrier, in Handford Site Environmental Report for Calendar Year 2002, Poston, T. M., R. W. Hanf, R. L. Dirkes, and L. F. Morasch, (eds.), Pacific Northwest National Laboratory, U.S. Department of Energy, Richland, WA, PNNL-14295, 7.23-7.24, 2003.
- Clement, W. P., Electromagnetic conductivity and GPR surveys across a prototype surface barrier to determine variations in soil moisture content, Technical report BSU CGISS 02-05, report to the Pacific Northwest National Laboratory, 32 pp., 2002.
- Clement, W. P., GPR data acquired to image clastic dikes at the Hanford site, Hanford, Washington, Technical report BSU CGISS 00-07, report to the Pacific Northwest National Laboratory, 13 pp., 2000.

Abstracts

- Swierc, J., W. Woessner, and W. P. Clement, Application of field scale infiltration and heat transport methods to estimate the hydraulic conductivity of coarse grained vadose zone materials, *GSA Abstracts with Programs*, 62-12, 2008.
- Khatiwada, M., K. van Wijk, and W. P. Clement, Numerical modeling of time-lapse monitoring of CO₂ sequestration in a layered basalt reservoir, 78th Ann. Internat. Mtg: Soc. of Expl. Geophys., 2008.
- Barrash, W., T. Clemo, W. P. Clement, B. Malama, and J. Bradford, Field-scale control volume/test cell to advance parameter estimation and flow and transport modeling with geophysics, Boise Hydrogeophysical Research Site, Proceedings of the 2008 Computational Methods in Water Resources, XVII International Conference, July 6-10, San Francisco, CA, 2008.

- Wilkins, D. E., and W. P. Clement, Comparison of effectiveness of ground-penetrating radar in imaging siliciclastic and mafic volcanoclastic dune sands, *Eos. Trans. AGU*, 88 (52), Fall Meet. Suppl., H53C-1386, 2007.
- Bradford, J. H., W. Clement, J. Nichols, J. Brown, D. Mikesell, J. T. Harper, N. Humphrey, and T. Schetter, Geophysical imaging of a temperate glacier's hydrologic system in 1, 2, and 3 dimensions, *Eos. Trans. AGU*, 88 (52), Fall Meet. Suppl., H23H-06, 2007.
- Clement, W. P., D. E. Wilkins, and R. L. Ford, Using ground penetrating radar to image terrestrial analogs of Martian aeolian deposition: The Coral Pink Sand dunes, *Eos. Trans. AGU*, 87 (52), Fall Meet. Suppl., Abstract, NS41A-1125, 2006.
- Bradford, J., and W. Clement, Accuracy and precision of porosity estimates based on velocity inversion of surface ground-penetrating radar data: A controlled experiment at the Boise Hydrogeophysical Research Site, *Eos. Trans. AGU*, 87 (52), Fall Meet. Suppl., Abstract, H43G-06, 2006.
- Lumley, D. E., R. J. Wright, M. A. Meadows, J. H. Bradford, M. D. Knoll, W. P. Clement, and R. B. Szerbiak, State-of-the-art 4D seismic imaging and its application to GPR monitoring of groundwater contaminants, Society of Geophysicists, 2006 Hydrogeophysics Workshop, July 31-August 2, Vancouver, B.C., Canada, 2006.
- Johnson, T. C., P. S. Routh, T. Clemo, W. Barrash, W. P. Clement, Geostatistically Constrained Inversion and Uncertainty Estimation, *Eos. Trans. AGU*, 86 (52), Fall Meet. Suppl., Abstract, H13C-1345, 2005.
- Wilkins, D., R. L. Ford, K. Nicoll, and W. Clement, Little Ice Age behavior of the Coral Pink Sand Dunes, Kane County, Utah: *GSA Abstracts with Programs*, **37**, 2005.
- Clement, W. P., W. Barrash, and M. D. Knoll, Reflectivity modeling of ground penetrating radar, *Eos. Trans. AGU*, **86** (18), Spring Meet. Suppl., Abstract, NS11A-03, p. 182, 2005.
- Clement, W. P., J. H. Bradford, M. W. Lyle, P. S. Routh, L. M. Liberty, and S. S. Hess, Geophysical investigation of a hydrothermal system in southeastern, Oregon, *FastTimes*, Environmental and Engineering Geophysical Society, **10**, 32-33, 2005.
- Clement, W.P., W. Barrash, and M. D. Knoll, Crosshole radar tomography in an alluvial aquifer near Boise, Idaho: *GSA Abstracts with Programs*, **36**, 31, 2004.
- Barrash, W., M. Knoll, W. Clement, T. Clemo, and P. Michaels, Determining distributions of hydrologic and geophysical parameters in a heterogeneous fluvial aquifer, Boise Hydrogeophysical Research Site: *GSA Abstracts with Programs*, **36**, 76, 2004.
- Hess, S., J. Bradford, M. Lyle, C. F. Paul, W. P. Clement, L. M. Liberty, and P. R. Donaldson, 3D seismic characterization of the Borax Lake hydrothermal system in the Alvord Desert, southeastern Oregon: *GSA Abstracts with Programs*, **36**, 32, 2004.
- Bradford, J., L. M. Liberty, M. Lyle, W. P. Clement, and S. Hess, Imaging complex structure in shallow seismic reflection data using prestack depth migration, 74th Ann. Internat. Mtg. Soc. of Expl. Geophys., 2004.
- Moret, G.J.M., M. D. Knoll, W. P. Clement, and W. Barrash, Investigating the hydrostratigraphy of an unconsolidated aquifer using crosswell seismic travelttime tomography: *Eos. Trans. AGU*, **85** (17), Fall Meet. Suppl., Abstract, NS22A-06, 2004.
- Smith, R. W., T. L. McLing, W. Barrash, W. P. Clement, and N. P. Erickson, Geologic Sequestration of CO₂: A uniform strategy for assessing mineralization trapping potential across rock types: Carbon Sequestration Conference, Washington DC, May, 2004.

- Clement, W. P., C. J. Murray, Imaging clastic dikes at the Hanford site with ground penetrating radar, *GSA Abstracts with Programs*, 2003.
- Wilkins, D. E., W. P. Clement, and M. Lyle, Palaeolake shoreline sequencing using ground-penetrating radar: Palaeolake Alvord, Oregon and Nevada, *GSA Abstracts with Programs*, 2003.
- Bradford, J. H., and W. P. Clement, Using GPR to estimate water content at the Hanford site: Acquisition and processing methodologies, *GSA Abstracts with Programs*, 2003.
- Lenhartzen, V. J., J. J. Thomas, D. Wilkins, and W. P. Clement, Bruneau sand dunes, Eagle Cove, ID: A geomorphic study, *GSA Abstracts with Programs*, 2003.
- Goldstein, S. E., T. C. Johnson, M. D. Knoll, W. Barrash, and W. P. Clement, Crosswell radar attenuation-difference tomography to monitor a Bromide tracer test, Inland Northwest Research Alliance, 2003 Subsurface Science Symposium, Salt Lake City, UT, October 5-8, 2003.
- Wilkins, D.E., R. L. Ford, and W. P. Clement, GPR and GIS use in documenting a distinctive mode of star dune development, The XVI INQUA Congress, International Quaternary Association, Reno, NV, 2003.
- Barrash, W., M. D. Knoll, W. P. Clement, T. Clemo, and P. Michaels, Determining the three-dimensional distribution of permeability in a heterogeneous fluvial aquifer with hydrologic and geophysical methods, Boise Hydrogeophysical Research Site, *Eos. Trans. AGU*, 83 (47), Fall Meet. Suppl., Abstract, H52F-09, 2002.
- Bradford, J. M. Lyle, W. Clement, L. Liberty, R. Myers, and C. Paul, Initial seismic characterization of a fault controlled hydrothermal area, *Eos. Trans. AGU*, 83(47), Fall Meet. Suppl., Abstract T21A-1065, 2002.
- Wilkins, D. E., R. L. Ford, and W. P. Clement, Internal Structure of a Star Dune Imaged Using Ground-Penetrating Radar, *Eos. Trans. AGU*, 83(47), Fall Meet. Suppl., Abstract, H22B-0881, 2002.
- Murray, C. J., A. L. Ward, J. L. Wilson, P. E. Long, B. J. Lechler, W. P. Clement, P. K. Kannberg, and G. W. Gee, The effects of clastic dikes on vadose zone transport at the Hanford site, southcentral Washington, *Eos. Trans. AGU*, 82(47), Fall Meet. Suppl., Abstract, H52A-0370, 2001.
- Clement, W. P., L. M. Liberty, and W. Barrash, Using cross-hole GPR reflections to improve tomographic imaging and hydrogeologic interpretation, *GSA Abstracts with Programs*, 33, A45, 2001.
- Ford, R. L., D. E. Wilkins, and W. P. Clement, Geomorphic and GPR evidence for structural influence on dunefield formation, Coral Pink Sand Dunes, Utah, *GSA Abstracts with Programs*, 33, A437, 2001.
- Ward, A. L., G. W. Gee, and W. P. Clement, Monitoring water storage changes in a hazardous waste landfill cover with Ground Penetrating Radar, *Soil Science Society of America Annual Meeting*, 2001.
- Murray, C., M. Fayer, D. Horton, P. Long, J. Wilson, and W. Clement, Hydrogeological influence of clastic dikes on vadose zone transport at the Hanford Site, southcentral Washington, *SEPM/ IAS Research Conference*, September, 2000.
- Fayer, M. J., C. J. Murray, D. G. Horton, P. D. Long, G. W. Gee, A. L. Ward, J. Wilson, and W. P. Clement, Hydrogeological measurements and hydrofacies models of clastic dikes at the

- Hanford site, southcentral Washington, *Eos. Trans. AGU*, 81(48), Fall Meet. Suppl., Abstract, H51C-07, 2000.
- Clement, W. P., L. M. Liberty, M. D. Knoll, and W. Barrash, Imaging a shallow, unconfined, alluvial aquifer with radar and seismic methods at the Boise Hydrogeophysical Research Site, *GSA Abstracts with Programs*, 31, A144, 1999.
- Cardimona, S., A. Endres, W. Clement, and K. Kadinsky-Cade, Integrated Non-intrusive geophysical methods for site characterization and monitoring, *Joint USAF/Army Contractor/Grantee Meeting*, Panama City, FL, 35-40, 1997.
- Baker, G. S., W. P. Clement, and S. B. Smithson, Amplitude and phase variation with offset in ground penetrating radar for identifying dense and light non-aqueous phase liquid contaminants, *GSA Abstracts with Programs*, 1995.
- Clement, W. P., G. Baker, A. Weedman, J. Atkins, and S. B. Smithson, Near Surface Geophysics in the Northern Rocky Mountains, *Eos*, 76, F417-F418, 1995.
- Clement, W. P., I. B. Morozov, S. B. Smithson, J. Diebold, L. Hollister, and M. L. Crawford, ACCRETE--A comprehensive seismic study of an accretionary continental margin, *XXII meeting of the International Union of Geodesy and Geophysics*, Boulder, Colorado, U.S.A., 1995.
- Clement, W. P. and S. B. Smithson, A seismic study of the Archean crust of southwest Greenland, *Eos*, 73, 355, 1992.
- Clement, W. P. and S. B. Smithson, Crustal structure of the Archean Minnesota Gneiss Terrane from a seismic refraction/wide-angle reflection experiment, *International Symposium on Seismic Reflection Probing of the Continents and their Margins*, Banff, Alberta, Canada, 84, 1992.
- Clement, W. P., Shear wave structure of northern Nevada as recorded by the PASSCAL seismic refraction/wide-angle reflection profile, *Eos*, 70, 1336, 1989.
- Clement, W. P., W. S. Holbrook, R. D. Catchings, and W. D. Mooney, Determination of average crustal Poisson's ratio for northern Nevada from vertical-component recordings of S_mS , *Eos*, 68, 1361, 1987.

Awards

- Northeast Consortium for Engineering Education Phillips Lab Postdoctoral Fellowship, 1996.
- Centennial Teaching Assistant Award for outstanding teaching, Stanford University, 1990.
- Cecil Green Fellow, Stanford University, Spring, 1988.
- Bertha Morton Scholar awarded for outstanding scholarship, University of Montana, 1985.
- Sigma Xi research grant, University of Montana, 1985.
- McDonough Fund research grant, University of Montana, 1985.

Activities

- Member, Society of Exploration Geophysicists, Near Surface Geophysics Group.
- Member, American Geophysical Union.
- Member, Environmental and Engineering Geophysical Society.
- Wyoming State Science Fair Judge, 1995.
- Minority High School Student Research Apprentice Program, Lecturer, 1993, 1994.
- Graduate Council Representative, Arts and Sciences, University of Wyoming, 1991.