



Gail Mahood

Professor of Geological Sciences, Emerita

Bio

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Geological Sciences

ADMINISTRATIVE APPOINTMENTS

- Geoarchaeologist, Proyecto Arqueologico Copan, Honduras, (1978-1978)
- Assistant Professor of Geology, Stanford University, (1979-1987)
- Visiting Assistant Professor Dept. of Geosciences,, Pennsylvania State University, (1983-1983)
- Associate Professor of Geology, Stanford University, (1987-1993)
- Visiting Assoc. Professor Dept. of Geological Sciences, University of Michigan, (1989-1989)
- Professor, Department of Geological & Environmental Sciences, Stanford University, (1993- present)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, SES Space Allocation and Use Committee, SES, Stanford University (2011 - present)
- Faculty leader, Stanford Alumni Association trip to Mongolia, Stanford Alumni Association (2011 - 2011)
- Chair, Reappointment Committee for Assistant Professor Kate Maher, GES, Stanford University (2011 - 2011)
- Member, Search Committee, Head Earth Sciences Librarian, Stanford University (2010 - 2011)
- Co-Chair, GES Search Committee for Geochronologist, GES, Stanford University (2006 - 2008)
- Associate Vice Provost for Graduate Education, Stanford University (2006 - 2007)
- Member, Review Committee on future of Stanford-USGS Microanalytical Center, Stanford University, USGS (2006 - 2007)
- Associate Dean for Graduate Policy, Stanford University (2005 - 2006)
- Member, Steering Committee of the Faculty Senate, Stanford University (2005 - 2006)
- Member, Faculty Senate, Stanford University (2005 - 2007)
- Member, Provost's Diversity Cabinet, Stanford University (2005 - 2006)
- Member, Committee on Graduate Studies, Stanford University (2005 - 2006)
- Member, Executive Committee, Archaeology Center, Stanford University (2004 - 2008)
- Member, Subcommittee on University Honors, Stanford University (2004 - 2004)
- GES Graduate Student Coordinator, GES, Stanford University (2004 - 2005)
- Member, Board of Trustees Committee on Land and Buildings, Stanford University (2003 - 2005)
- Faculty leader, Stanford Alumni Travel trip to Baja California, Stanford Alumni Association (2002 - 2002)

- Chair, Search Committee for Academic Secretary, Stanford University (2002 - 2002)
- Member, Advisory committee on the Institute for Research on Women and Gender, Stanford University (2001 - 2002)
- Member, Committee on Faculty Diversity, Stanford University (2001 - 2004)
- Member, Executive Committee, Interdisciplinary Program in Archeology, Stanford University (2000 - 2004)
- Member, NCAA Compliance Committee (intercollegiate athletics), Stanford University (2000 - 2001)
- Faculty leader, Stanford Alumni Travel trip to Baja and Copper Canyon, Stanford Alumni Association (2000 - 2000)
- Faculty leader, Stanford Alumni Travel trip to southeast Alaska, Stanford Alumni Association (1999 - 1999)
- Member, Academic Standing Committee (considers cases of students in academic difficulty), Stanford University (1999 - 2002)
- Member, Faculty Steering Committee on the Campaign for Undergraduate Education, Stanford University (1999 - 2003)
- Member, Committee on Nominations, Stanford Board of Trustees, Stanford University (1997 - 1999)
- Member, Search committee, Assistant University Librarian for Collection Development, Stanford University (1997 - 1998)
- Member, Search committee for Assistant University Librarian, Stanford University (1997 - 1997)
- External Reviewer, Dept. of Earth Sciences, Dalhousie University, Halifax, Canada, Dalhousie University (1997 - 1997)
- Associate Editor, Bulletin, Geological Society of America (1997 - 2000)
- Member, Subcommittee on Fiscal Integrity, Self-Study for NCAA Certification, Stanford University (1997 - 1998)
- Member, Faculty Senate Planning and Policy Board, Stanford University (1996 - 1999)
- Member (Vice Chair, 1997-98, 1999-2000; Chair 2000-2001) Advisory Board (7-member board that reviews all appointments, promotions, dismissals, dissolutions of departments, etc.), Stanford University (1996 - 2001)
- Member, Audit Committee, Geological Society of America (1996 - 1999)
- Chair, Department of Geological and Environmental Sciences, GES, Stanford University (1996 - 1998)
- Councillor, Geological Society of America (1996 - 1999)
- Chair, Faculty Senate, Stanford University (1995 - 1996)
- Congressional testimony concerning the role of the U.S. Geological Survey, Stanford University (1995 - 1995)
- Instructor, Stanford Sophomore College, Stanford University (1995 - 1998)
- Member, UPS Endowment Advisory Committee to Provost, Stanford University (1994 - 1998)
- Member, "Ungroup", Provost's advisory committee on budget and strategic planning, Stanford University (1994 - 1998)
- Member, Design Committee, Science Core for Nonscientists, Stanford University (1994 - 1995)
- Member, Review Committee, Program on Writing and Critical Thinking, Stanford University (1994 - 1994)
- Member, Steering Committee of the Faculty Senate, Stanford University (1994 - 1996)
- Co-Chair, GES Graduate Admissions Committee, GES, Stanford University (2012 - present)
- Member, Steering Committee of Program in Earth Systems, Stanford University (1994 - 1999)
- Chair, Advisory Group on Sponsored Projects Administration, Stanford University (1994 - 1994)
- Member, President's Commission on Undergraduate Education, Stanford University (1993 - 1994)
- Member, Faculty Senate, Stanford University (1992 - 1996)
- Member, Stanford Judicial Council, Stanford University (1990 - 2004)
- Associate Chair, Department of Geological and Environmental Sciences, GES, Stanford University (1990 - 1995)

PROFESSIONAL EDUCATION

- Ph.D., University of California , Geology (1980)
- M.A., University of California , Geology (1976)

- A.B., University of California , Geology (1974)

LINKS

- Silicic Magmatism and Volcanology: <http://earthsci.stanford.edu/research/mahood/volc.htm>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Research

I am interested in understanding the processes that assemble and occur in the bodies of silicic magma that give rise to huge, explosive eruptions that spread ash continent-wide. My students and I study young volcanoes to determine how large and how explosive future eruptions might be, how frequently they are likely to occur, and what mechanisms trigger eruptions. We also do field-based studies in mountainous areas where plutons and the guts of volcanoes are well-exposed, mapping them and then analyzing their products in the laboratory, in order to reconstruct the life histories of these systems. To these ends we make extensive use of ⁴⁰-³⁹Ar geochronology and use the Stanford-USGS ion probe to determine U-Pb and U-series ages. The main foci of our current research are (1) widespread Mid-Miocene silicic volcanism and calderas associated with the Columbia River flood basalts; (2) controls on the pre-eruptive concentrations of energy-critical elements in silicic magmas as evidenced by melt inclusions; (3) petrologic evidence for volcanic hazards in the Long Valley--Mammoth Mountain--Mono Craters--Mono Basin region; and (4) volcanic hazards of western Saudi Arabia at Harrat Rahat and petrologic study of the origin of trachytes associated with young basaltic lavas. I also have an interest in geoarchaeology, especially in the application of petrologic and geochemical techniques to determining the provenance of obsidian and ceramics.

Teaching

I teach an introductory physical geology course that culminates in a field trip to Death Valley and the eastern Sierra Nevada. My upper-division-level course on volcanology includes a field trip to young volcanism of the eastern Sierra Nevada (Long Valley, Mammoth Mountain, Mono Craters, Mono Lake). I teach a graduate-level course on igneous petrogenesis, and field seminars in physical volcanology of the southern Cascade arc and transform-related volcanism in the Coast Range of California, as well as specialized graduate seminars in petrology and physical volcanology from time to time.

Professional Activities

Associate Vice Provost for Graduate Education (2006-07); Associate Dean for Graduate Policy (2005-06); Member, Faculty Steering Committee, Campaign for Undergraduate Education (2000-05); Member, Executive Committee, Interdisciplinary Program in Archaeology (2000-2008); Faculty leader, Stanford Alumni trip to Mongolia

PROJECTS

- Volcanic hazards of Harrat Rahat, western Saudi Arabia - cooperative study with the U.S. Geological Survey and the Saudi Geologic Survey
- Magma mixing as a trigger for silicic eruptions in Long Valley and Mono Basin - Stanford University, U.S. Geological Survey
- Widespread Mid-Miocene rhyolitic magmatism associated with flood basalts in western U.S. - Stanford University
- Controls on concentrations of energy-critical elements in rhyolitic magmas - Stanford University, U.S. Geological Survey
- Timing of Mid-Miocene climate events relative to flood basalt and rhyolite eruptions in the Pacific Northwest - Stanford University

Teaching

COURSES

2019-20

- Physical Volcanology: GEOPHYS 385R (Sum)

2018-19

- California Desert Geologic Field Trip: EARTH 183, GEOLSCI 183 (Win)
- Field Trip to Volcanoes of the Eastern Sierra Nevada: GEOLSCI 184 (Spr)
- Physical Volcanology: GEOPHYS 385R (Win, Spr, Sum)

2017-18

- Field Trip to Volcanoes of the Eastern Sierran Volcanism: GS 184 (Spr)
- Physical Volcanology: GEOPHYS 385R (Aut, Win, Spr)
- Volcanology: GS 185, GS 285A (Aut, Win)

2016-17

- California Desert Geologic Field Trip: GS 183 (Win)
- Field Trip to Cascade Volcanoes of California: GS 182 (Aut)
- Igneous Petrology and Petrogenesis Seminar: GS 381 (Aut)
- Physical Volcanology: GEOPHYS 385R (Aut, Win, Spr)

Publications

PUBLICATIONS

- **Lithium enrichment in intracontinental rhyolite magmas leads to Li deposits in caldera basins** *NATURE COMMUNICATIONS*
Benson, T. R., Coble, M. A., Rytuba, J. J., Mahood, G. A.
2017; 8: 1-9
- **Geology of the High Rock caldera complex, northwest Nevada, and implications for intense rhyolitic volcanism associated with flood basalt magmatism and the initiation of the Snake River Plain-Yellowstone trend** *GEOSPHERE*
Coble, M. A., Mahood, G. A.
2016; 12 (1): 58-113
- **Geology of the Mid-Miocene Rooster Comb Caldera and Lake Owyhee Volcanic Field, eastern Oregon: Silicic volcanism associated with Grande Ronde flood basalt** *JOURNAL OF VOLCANOLOGY AND GEOTHERMAL RESEARCH*
Benson, T. R., Mahood, G. A.
2016; 309: 96-117
- **Initial impingement of the Yellowstone plume located by widespread silicic volcanism contemporaneous with Columbia River flood basalts** *GEOLOGY*
Coble, M. A., Mahood, G. A.
2012; 40 (7): 655-658
- **Silicic calderas in arc settings: Characteristics, distribution, and tectonic controls** *GEOLOGICAL SOCIETY OF AMERICA BULLETIN*
Hughes, G. R., Mahood, G. A.
2011; 123 (7-8): 1577-1595
- **Strontium Isotopic Evidence for Prehistoric Transport of Gray-Ware Ceramic Materials in the Eastern Grand Canyon Region, USA** *GEOARCHAEOLOGY-AN INTERNATIONAL JOURNAL*
Carter, S. W., Wiegand, B., Mahood, G. A., Dudas, F. O., Wooden, J. L., Sullivan, A. P., Bowring, S. A.
2011; 26 (2): 189-218
- **New Ar-40/Ar-39 ages reveal contemporaneous mafic and silicic eruptions during the past 160,000 years at Mammoth Mountain and Long Valley caldera, California** *GEOLOGICAL SOCIETY OF AMERICA BULLETIN*
Mahood, G. A., Ring, J. H., Manganelli, S., McWilliams, M. O.
2010; 122 (3-4): 396-407
- **Tectonic controls on the nature of large silicic calderas in volcanic arcs** *GEOLOGY*
Hughes, G. R., Mahood, G. A.
2008; 36 (8): 627-630
- **New ages for the climactic eruptions at Yellowstone: Single-crystal Ar-40/Ar-39 dating identifies contamination** *GEOLOGY*

- Gansecki, C. A., Mahood, G. A., McWilliams, M.
1998; 26 (4): 343-346
- **Seeing past the effects of re-equilibration to reconstruct magmatic gradients in plutons: La Gloria Pluton, central Chilean Andes** *CONTRIBUTIONS TO MINERALOGY AND PETROLOGY*
CORNEJO, P. C., Mahood, G. A.
1997; 127 (1-2): 159-175
 - **Ar-40/Ar-39 geochronology of rhyolites erupted following collapse of the Yellowstone caldera, Yellowstone Plateau volcanic field: Implications for crustal contamination** *EARTH AND PLANETARY SCIENCE LETTERS*
Gansecki, C. A., Mahood, G. A., McWilliams, M. O.
1996; 142 (1-2): 91-107
 - **Zoning patterns and petrologic processes in peraluminous magma chambers: Hall canyon pluton, Panamint mountains, California** *GEOLOGICAL SOCIETY OF AMERICA BULLETIN*
Mahood, G. A., Nibler, G. E., Halliday, A. N.
1996; 108 (4): 437-453
 - **ISOTOPIC CONSTRAINTS ON THE PRODUCTION-RATES, CRYSTALLIZATION HISTORIES AND RESIDENCE TIMES OF PRE-CALDERA SILIC MAGMAS, LONG VALLEY, CALIFORNIA** *EARTH AND PLANETARY SCIENCE LETTERS*
Davies, G. R., Halliday, A. N., Mahood, G. A., Hall, C. M.
1994; 125 (1-4): 17-37
 - **THE OCCURENCE AND DISTRIBUTION OF MO AND MOLYBDENITE IN UNALTERED PERALKALINE RHYOLITES FROM PANTELLERIA, ITALY** *CONTRIBUTIONS TO MINERALOGY AND PETROLOGY*
Lowenstern, J. B., Mahood, G. A., Hervig, R. L., Sparks, J.
1993; 114 (1): 119-129
 - **FLUID INCLUSIONS IN XENOLITHS YIELD EVIDENCE FOR FLUID EVOLUTION IN PERALKALINE GRANITIC BODIES AT PANTELLERIA (ITALY)** *JOURNAL OF VOLCANOLOGY AND GEOTHERMAL RESEARCH*
DeVivo, B., Frezzotti, M. L., Mahood, G.
1992; 52 (4): 295-301
 - **EVIDENCE FOR ASCENT OF DIFFERENTIATED LIQUIDS IN A SILICIC MAGMA CHAMBER FOUND IN A GRANITIC PLUTON** *2ND HUTTON SYMP ON THE ORIGIN OF GRANITES AND RELATED ROCKS*
Mahood, G. A., CORNEJO, P. C.
ROYAL SOC EDINBURGH.1992: 63-69
 - **PETROGENESIS OF HIGH-SILICA RHYOLITE ON THE ALASKA PENINSULA** *GEOPHYSICAL RESEARCH LETTERS*
Lowenstern, J. B., Mahood, G. A.
1991; 18 (8): 1565-1568
 - **EVIDENCE FOR EXTREME PARTITIONING OF COPPER INTO A MAGMATIC VAPOR-PHASE** *SCIENCE*
Lowenstern, J. B., Mahood, G. A., Rivers, M. L., Sutton, S. R.
1991; 252 (5011): 1405-1409
 - **DEVELOPMENT OF THE LONG VALLEY, CALIFORNIA, MAGMA CHAMBER RECORDED IN PRECALDERA RHYOLITE LAVAS OF GLASS MOUNTAIN** *CONTRIBUTIONS TO MINERALOGY AND PETROLOGY*
Metz, J. M., Mahood, G. A.
1991; 106 (3): 379-397
 - **TRACE-ELEMENT PARTITIONING IN PANTELLERITES AND TRACHYTES** *GEOCHIMICA ET COSMOCHIMICA ACTA*
Mahood, G. A., Stimac, J. A.
1990; 54 (8): 2257-2276
 - **EVIDENCE FOR LONG RESIDENCE TIMES OF RHYOLITIC MAGMA IN THE LONG VALLEY MAGMATIC SYSTEM - THE ISOTOPIC RECORD IN PRECALDERA LAVAS OF GLASS MOUNTAIN** *EARTH AND PLANETARY SCIENCE LETTERS*
Halliday, A. N., Mahood, G. A., Holden, P., Metz, J. M., Dempster, T. J., Davidson, J. P.
1989; 94 (3-4): 274-290
 - **MECHANICAL MODELS FOR CORRELATION OF RING-FRACTURE ERUPTIONS AT PANTELLERIA, STRAIT OF SICILY, WITH GLACIAL SEA-LEVEL DRAWDOWN** *BULLETIN OF VOLCANOLOGY*

-
- WALLMANN, P. C., Mahood, G. A., Pollard, D. D.
1988; 50 (5): 327-339
- **PHYSICAL AND CHEMICAL-MODELS OF ZONED SILICIC MAGMAS - THE LOMA SECA TUFF AND CALABOZOS CALDERA, SOUTHERN ANDES** *JOURNAL OF PETROLOGY*
Grunder, A. L., Mahood, G. A.
1988; 29 (4): 831-867
 - **GENERATION OF HIGH-SILICA RHYOLITE - A ND, SR, AND O ISOTOPIC STUDY OF SIERRA-LA-PRIMAVERA, MEXICAN NEOVOLCANIC BELT** *CONTRIBUTIONS TO MINERALOGY AND PETROLOGY*
Mahood, G. A., Halliday, A. N.
1988; 100 (2): 183-191
 - **FIELD, CHEMICAL, AND PHYSICAL CONSTRAINTS ON MAFIC-FELSIC MAGMA INTERACTION IN THE LAMARCK GRANODIORITE, SIERRA-NEVADA, CALIFORNIA** *GEOLOGICAL SOCIETY OF AMERICA BULLETIN*
FROST, T. P., Mahood, G. A.
1987; 99 (2): 272-291
 - **COMPOSITIONAL LAYERS IN THE ZONED MAGMA CHAMBER OF THE GRIZZLY PEAK TUFF** *GEOLOGY*
Fridrich, C. J., Mahood, G. A.
1987; 15 (4): 299-303
 - **STRONG COMPOSITIONAL ZONATION IN A SILICIC MAGMATIC SYSTEM - LOS-HUMEROS, MEXICAN NEOVOLCANIC BELT** *JOURNAL OF PETROLOGY*
FERRIZ, H., Mahood, G. A.
1987; 28 (1): 171-209
 - **RING-FRACTURE ERUPTION OF THE BISHOP TUFF** *GEOLOGICAL SOCIETY OF AMERICA BULLETIN*
Hildreth, W., Mahood, G. A.
1986; 97 (4): 396-403
 - **RISE AND FALL OF A BASALT-TRACHYTE-RHYOLITE MAGMA SYSTEM AT THE KANE-SPRINGS WASH CALDERA, NEVADA** *CONTRIBUTIONS TO MINERALOGY AND PETROLOGY*
Novak, S. W., Mahood, G. A.
1986; 94 (3): 352-373
 - **EXPERIMENTAL CONSTRAINTS ON DEPTHS OF FRACTIONATION OF MILDLY ALKALIC BASALTS AND ASSOCIATED FELSIC ROCKS - PANTELLERIA, STRAIT OF SICILY** *CONTRIBUTIONS TO MINERALOGY AND PETROLOGY*
Mahood, G. A., Baker, D. R.
1986; 93 (2): 251-264
 - **PERALKALINE AND METALUMINOUS MIXED-LIQUID IGIMBRITES OF THE GUADALAJARA REGION, MEXICO** *JOURNAL OF VOLCANOLOGY AND GEOTHERMAL RESEARCH*
Mahood, G. A., Gilbert, C. M., Carmichael, I. S.
1985; 25 (3-4): 259-271
 - **CORRELATION OF ASH-FLOW TUFFS** *GEOLOGICAL SOCIETY OF AMERICA BULLETIN*
Hildreth, W., Mahood, G.
1985; 96 (7): 968-974
 - **PRECURSORS TO THE BISHOP TUFF ERUPTION - GLASS MOUNTAIN, LONG VALLEY, CALIFORNIA** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH AND PLANETS*
Metz, J. M., Mahood, G. A.
1985; 90 (NB13): 1121-1126
 - **VOLCANIC STRATIGRAPHY OF THE LOS AZUFRES GEOTHERMAL AREA, MEXICO** *JOURNAL OF VOLCANOLOGY AND GEOTHERMAL RESEARCH*
Dobson, P. F., Mahood, G. A.
1985; 25 (3-4): 273-287
 - **ERUPTION RATES AND COMPOSITIONAL TRENDS AT LOS-HUMEROS-VOLCANIC-CENTER, PUEBLA, MEXICO** *JOURNAL OF GEOPHYSICAL RESEARCH*

FERRIZ, H., Mahood, G. A.
1984; 89 (NB10): 8511-8524

- **REVERSE ZONING IN THE RESURGENT INTRUSIONS OF THE GRIZZLY PEAK CAULDRON, SAWATCH RANGE, COLORADO** *GEOLOGICAL SOCIETY OF AMERICA BULLETIN*
Fridrich, C. J., Mahood, G. A.
1984; 95 (7): 779-787
- **PYROCLASTIC ROCKS AND CALDERAS ASSOCIATED WITH STRONGLY PERALKALINE MAGMATISM** *JOURNAL OF GEOPHYSICAL RESEARCH*
Mahood, G. A.
1984; 89 (NB10): 8540-8552
- **LARGE PARTITION-COEFFICIENTS FOR TRACE-ELEMENTS IN HIGH-SILICA RHYOLITES** *GEOCHIMICA ET COSMOCHIMICA ACTA*
Mahood, G., Hildreth, W.
1983; 47 (1): 11-30
- **NESTED CALDERAS AND TRAPDOOR UPLIFT AT PANTELLERIA, STRAIT OF SICILY** *GEOLOGY*
Mahood, G., Hildreth, W.
1983; 11 (12): 722-726
- **A RECONNAISSANCE GEOCHEMICAL STUDY OF LA-PRIMAVERA GEOTHERMAL AREA, JALISCO, MEXICO** *JOURNAL OF VOLCANOLOGY AND GEOTHERMAL RESEARCH*
Mahood, G. A., Truesdell, A. H., TEMPLOS, L. A.
1983; 16 (3-4): 247-261
- **K-AR DATING YOUNG RHYOLITIC ROCKS - A CASE-STUDY OF THE SIERRA-LA-PRIMAVERA, JALISCO, MEXICO** *GEOLOGICAL SOCIETY OF AMERICA BULLETIN*
Mahood, G. A., Drake, R. E.
1982; 93 (12): 1232-1241
- **A SUMMARY OF THE GEOLOGY AND PETROLOGY OF THE SIERRA LA PRIMAVERA, JALISCO, MEXICO** *JOURNAL OF GEOPHYSICAL RESEARCH*
Mahood, G. A.
1981; 86 (NB11): 137-152
- **CHEMICAL EVOLUTION OF A PLEISTOCENE RHYOLITIC CENTER - SIERRA-LA-PRIMAVERA, JALISCO, MEXICO** *CONTRIBUTIONS TO MINERALOGY AND PETROLOGY*
Mahood, G. A.
1981; 77 (2): 129-149