



The Geochemical News

Biannual Newsletter of the Geochemical Society

Number 72

September 1987

Meetings and Symposia

GEOCHEMICAL SOCIETY 1987 ANNUAL MEETING in conjunction with the Annual Meeting of the Geological Society of America, Phoenix, Arizona, 25 through 29 October. Hotel reservation deadline October 2 (reservation form on p. 6); preregistration deadline September 25 (registration form on p. 7). For further information, see GSA News and Information Vol. 9 No. 8, August 1987, or apply to GSA Meetings Department, P.O. Box 9140, Boulder, CO 80301, Tel. 303-447-2020.

SUNDAY OCTOBER 25

GEOCHEMICAL SOCIETY SYMPOSIUM: CENOZOIC POTASSIUM-RICH IGNEOUS ROCKS OF THE COLORADO PLATEAU AND SURROUNDING REGIONS

Yuma 21-23, Phoenix Civic Plaza, 8:15 A.M.

G. Nell Tyner, (all day) James H. Wittke, (AM) and William E. Brooks (PM), Presiding

MORNING SESSION

INTRODUCTION, G. Nell Tyner	8:15 A
1 Wolfgang E. Elston*, Richard J. Abitz: CHARACTERIZATION OF NON-BASALTIC POST-40 MA MAGMATIC-TECTONIC PROVINCES OF SOUTHWESTERN NORTH AMERICA BY POTASSIUM CONTENTS [126425]	8:30 A
2 James K. Meen*: EXPERIMENTAL EVIDENCE FOR PRODUCTION OF K ₂ O-ENRICHMENT WITHOUT SiO ₂ -ENRICHMENT BY FRACTIONAL CRYSTALLIZATION OF DRY BASALTIC MAGMA AT 10-15 kb [129895]	8:45 A
3 William P. Leeman*: MAGMATIC RESPONSE TO LATE CENOZOIC GEODYNAMIC PROCESSES AFFECTING THE WESTERN U.S. CORDILLERA [142775]	9:00 A
4 James F. Luhr*, Ian S.E. Carmichael: QUATERNARY MINETTES OF WESTERN MEXICO: COLIMA AND MASCOTA [129014]	9:15 A
5 James H. Wittke*: THE SIGNIFICANCE OF FLUORINE IN LAMPROITES FROM THE TRANSITION ZONE OF THE COLORADO PLATEAU, JEROME AREA, CENTRAL ARIZONA [127140]	9:30 A
6 L. David Nealey*: OPEN-SYSTEM DIFFERENTIATION IN THE MOUNT BALDY ALKALIC SERIES, EASTERN ARIZONA [142801]	9:45 A
COFFEE BREAK	10:00 A
7 Howard G. Wilshire*: MULTISTAGE GENERATION OF ALKALIC BASALT IN THE MANTLE: THE CIMA VOLCANIC FIELD, CALIFORNIA [134268]	10:30 A
8 D. J. Schulze*, H. Helmstaedt, D. M. Carmichael: HYDRATED PYROXENITE XENOLITHS FROM NAVAJO DIATREMES, COLORADO PLATEAU: PRESSURE-TEMPERATURE ESTIMATES AND METASOMATIC REACTIONS IN THE MANTLE WEDGE ABOVE THE FARALLON PLATE [142308]	10:45 A
9 M. F. Roden*: NAVAJO MINETTES AS PROBES OF PROTEROZOIC CONTINENTAL LITHOSPHERE [142772]	11:00 A
10 A. W. Laughlin*, R. W. Charles, D. G. Brookins: CENOZOIC LOW-SILICA POTASSIC DIKES OF THE NAVAJO VOLCANIC FIELD [132805]	11:15 A
11 M. J. Aldrich, Jr.*, C. E. Chapin, A. W. Laughlin, M. L. Zoback: COLORADO PLATEAU Oligocene to QUATERNARY STRESS HISTORY [132799]	11:30 A
AFTERNOON SESSION	
12 C. E. Chapin*, J. Ione Lindley: POTASSIUM-METASOMATISM OF ROCKS OF DIVERSE INITIAL COMPOSITION BY SALINE, ALKALINE BASIN BRINES [142802]	1:15 P
13 Wa. A. Rehrig*, Robert Kerrich: K-METASOMATIZED ALKALI BASALTS: THEIR RELATIONSHIP TO EXTENDED METAMORPHIC CORE COMPLEX TERRANES OF THE SOUTHWEST UNITED STATES [142805]	1:30 P

SUNDAY OCTOBER 25

14 M. S. Roddy*, S. J. Reynolds, B. M. Smith, J. Ruiz: K-METASOMATISM OF MID-TERTIARY ROCKS IN THE UPPER-PLATE OF THE BULLARD DETACHMENT FAULT, WEST-CENTRAL ARIZONA [138887]	1:45 P
15 William E. Brooks*: SPATIAL RELATIONSHIP OF K ₂ O METASOMATISM AND BASE METALS TO THE PICACHO PEAK DETACHMENT FAULT, PINAL COUNTY, ARIZONA [135295]	2:00 P
16 Ardyth M. Simmons*: GEOCHEMISTRY OF THE MOHON MOUNTAIN VOLCANIC FIELD, AZ: MILD POTASSIC ENRICHMENT [142800]	2:15 P
COFFEE BREAK	2:30 P
17 Paul E. Damon*: THE ROLE OF BIOTITE IN THE GENESIS OF POTASSIUM-RICH CALCIC LATITES IN THE BASIN AND RANGE PROVINCE [130727]	3:00 P
18 G. Nell Tyner*, Robert D. Shuster, Paul A. Mueller, D. Smith: GEOCHEMICAL MODELS OF THE POTASSIC, XENOLITH-BEARING SULLIVAN BUTTES LATITE, ARIZONA: COMBINED ASSIMILATION AND FRACTIONAL CRYSTALLIZATION [120880]	3:15 P
19 Sonia Esperanza*: THE ROLE OF THE LOWER CRUST IN THE PETROGENESIS OF POTASSIC LATITES AND MINETTES [128724]	3:30 P
20 M. T. Colucci*, K. M. Ferguson, M. A. Dungan, P. W. Lipman: GENESIS OF HIGH-K CALC-ALKALINE LAVAS AND ASH-FLOW TUFFS FROM ALKALINE AND SUBALKALINE PARENT MAGMAS: PLATORO-SUMMITVILLE CALDERA COMPLEX, SE SAN JUAN VOLCANIC FIELD, CO [142776]	3:45 P
21 Michael Bikerman*: OBSERVATIONS ON THE GEOCHEMISTRY OF THE MOGOLLON-DATIL VOLCANICS [142808]	4:00 P
DISCUSSION	4:15 P

OGD SYMPOSIUM: ORIGINS OF METHANE IN THE EARTH
Yuma 26-33, Phoenix Civic Plaza, 8:15 A.M.

W. M. Sackett, D. Des Marais, N. Blair, and M. Schoell, Presiding

MORNING SESSION

INTRODUCTION	8:15 A
1 E. M. Galimov*: SOURCES AND MECHANISMS OF FORMATION OF METHANE [137364]	8:20 A
2 D. H. Welte*: GAS PRODUCTION FROM SOURCE ROCKS - ASPECTS OF A QUANTITATIVE TREATMENT [137370]	8:45 A
3 Eckhard Faber*, Wolfgang Stahl, Michael J. Whittaker: ISOTOPIC PROPERTIES IN C ₁ -C ₃ n-ALKANES AND THEIR DEPENDENCE ON MATURITY AND TYPE OF SOURCE ROCKS [143148]	9:05 A
4 B. Moses Chung*: ORIGIN OF GASEOUS HYDROCARBONS IN SUBSURFACE ENVIRONMENTS: THEORETICAL CONSIDERATIONS OF CARBON ISOTOPIC DISTRIBUTION [143167]	9:20 A
5 Jean K. Whelan*, Martha E. Tarafa: THERMAL DESORPTION AND PYROLYSIS OF C ₂ -C ₃ HYDROCARBONS IN DEEP OVERMATURE SEDIMENTS - INDICATOR OF MATURITY AND GAS GENERATION POTENTIAL [137362]	9:35 A
6 Detlev Leythaeuser*, Bernhard M. Krooss: MECHANISMS AND EXTENT OF REDISTRIBUTION OF LIGHT HYDROCARBONS IN THE SUBSURFACE [143159]	9:50 A

*denotes speaker. [126425] etc. are abstract numbers (refer to GSA Abstracts with Programs).

DISCUSSION 10:05 A
 COFFEE BREAK 10:15 A
 7 W. M. Sackett*, M. E. Conkright, L. J. Doyle:
 STABLE ISOTOPE CHARACTERIZATION OF DEEP
 SOURCE METHANE: LIMITS SET BY LABORATORY
 SIMULATIONS [140825] 10:30 A
 8 John A. Welhan*, Harmon Craig: ORIGINS OF
 METHANE IN HYDROTHERMAL SYSTEMS [143150] 10:45 A
 9 David J. Des Marais*, A. H. Truesdell:
 METHANE AND HIGHER HYDROCARBONS IN
 GEOTHERMAL ENVIRONMENTS OF WESTERN NORTH
 AMERICA [125831] 11:00 A
 10 Graeme L. Lyon*, John R. Hulston: ISOTOPIIC
 EVIDENCE FOR THE ORIGIN OF METHANE FROM NEW
 ZEALAND GEOTHERMAL SYSTEMS [143158] 11:15 A
 11 Bernd R. T. Simoneit*: ORIGIN OF GASES IN THE
 GUAYMAS BASIN HYDROTHERMAL SYSTEM [143152] 11:30 A
 12 Alan W. A. Jeffrey*, Ian R. Kaplan:
 GEOCHEMISTRY OF GASES IN THE SILJAN WELL,
 SWEDEN [143145] 11:45 A
 DISCUSSION 12:00 P

AFTERNOON SESSION

13 Neal E. Blair*, Susan E. Boehme, William D.
 Carter, Jr., Jeffrey G. Gowers, William J.
 Showers, Jeffrey P. Chanton, Christopher S.
 Martens: THE CARBON ISOTOPE BIOGEOCHEMISTRY
 OF METHANE FROM COASTAL SEDIMENTS [143170] 1:30 P
 14 Roger A. Burke, Jr.*: STABLE ISOTOPE
 VARIATIONS IN METHANE FROM SHALLOW AQUATIC
 ENVIRONMENTS [143153] 1:45 P
 15 Martin Schoell*, K. Tietze, B. Schobberth:
 ORIGIN OF METHANE IN LAKE KIVU [137363] 2:00 P
 16 Keith A. Kvenvolden*: METHANE HYDRATE: A
 MAJOR RESERVOIR OF CARBON IN THE SHALLOW
 GEOSPHERE [143160] 2:15 P
 17 James M. Brooks*, Mahlon C. Kennicutt II,
 H. B. Cox, Ronald C. Pflaum: THE ORIGIN OF SEEP
 GASES AND HYDRATES IN THE DEEP GULF OF
 MEXICO [143169] 2:30 P
 18 Robert E. Sweeney*: PETROGENIC GAS SEEPAGE
 IN NORTH SEA SEDIMENTS AND BOTTOM WATERS
 [143147] 2:45 P
 DISCUSSION 3:00 P
 COFFEE BREAK 3:15 P
 19 Robert J. Poreda*, Harmon Craig, Alan Jeffrey,
 Peter D. Jenden, Ian R. Kaplan: HELIUM
 ISOTOPES IN NATURAL GASES [138435] 3:30 P
 20 B. A. Sherwood, S. K. Frapce, P. Pritz*,
 S. Macko, S. M. Weise, J. A. Welhan: METHANE
 AND ASSOCIATED GASES IN THE CANADIAN SHIELD
 [143163] 3:45 P
 21 Peter D. Jenden*, Isaac R. Kaplan, K. David
 Newell, W. Lynn Watney: CHEMICAL AND STABLE
 ISOTOPIIC COMPOSITION OF NATURAL GASES FROM
 KANSAS, MID CONTINENT, USA [143161] 4:00 P
 22 Dudley D. Rice*, Joseph R. Hatch, Katherine B.
 Krystinik: COMPOSITION, ORIGIN, AND
 SOURCE OF NATURAL GASES IN THE ANADARKO
 BASIN, KANSAS, OKLAHOMA, AND TEXAS [143155] ... 4:15 P
 23 Dennis D. Coleman*, Chao-Li Llu, Kerry M. Riley:
 MICROBIAL METHANE IN THE SHALLOW PALEOZOIC
 SEDIMENTS AND GLACIAL DEPOSITS OF ILLINOIS
 [130556] 4:30 P
 DISCUSSION 4:45 P

MONDAY OCTOBER 26

GEOCHEMISTRY I: DISSOLUTION KINETICS
 Tucson 38-39, Phoenix Civic Plaza, 8:00 A.M.

David Wesolowski and Susan C. Webb, Presiding

1 Eric H. Oelkers*, Harold C. Helgeson:
 CALCULATION OF DISSOCIATION CONSTANTS FOR
 ION PAIRS IN HIGH TEMPERATURE HYDROTHERMAL
 SOLUTIONS FROM CONDUCTANCE DATA AND
 (INDEPENDENTLY) BJERRUM'S THEORY OF ION
 ASSOCIATION [125095] 8:00 A
 2 D. A. Sverjensky*, E. L. Shock, H. C. Helgeson:
 PREDICTION OF THE DISSOCIATION CONSTANTS OF
 AQUEOUS INORGANIC METAL COMPLEXES TO 1000
 DEGREES C AND 5 kb [143389] 8:15 A
 3 Lynn M. Walter*, Elizabeth A. Burton: ACTIVE
 DISSOLUTION IN MODERN SHALLOW MARINE
 CARBONATE SEDIMENTS: GLOBAL IMPLICATIONS?
 [143763] 8:30 A
 4 Roland Hellmann*, David A. Crerar, Ronghua
 Zhang: HYDROTHERMAL DISSOLUTION KINETICS OF
 ALBITE [118472] 8:45 A
 5 Alex E. Blum*, Antonio C. Lasaga: THE ROLE
 OF SURFACE SPECIATION IN THE LOW
 TEMPERATURE DISSOLUTION OF OLIVINE AND
 ALBITE [118359] 9:00 A
 6 Patrick V. Brady*, John V. Walther: QUARTZ
 DISSOLUTION AS A FUNCTION OF pH AT 40
 DEGREES AND 60 DEGREES C [140344] 9:15 A
 7 Philip C. Bennett*: THE ACCELERATED
 DISSOLUTION OF QUARTZ IN AQUEOUS ORGANIC
 ACID SOLUTIONS AT 25 DEGREES C [139651] 9:30 A
 8 P. E. Rosenberg, S. U. Aja*, B. M. Sass,
 J. A. Kitchick: MULTI-PHASE SOLUBILITY IN
 NATURAL ILLITES BETWEEN 25 DEGREES AND 250
 DEGREES C [136876] 9:45 A

9 Jonathan M. Lincoln*, John V. Walther:
 INCONGRUENCE AND pH DEPENDENCE OF ANDALUSITE
 DISSOLUTION AT 60 DEGREES C [127890] 10:00 A
 10 D. Wesolowski*, D. A. Palmer: SOLUBILITY OF
 GIBBSITE IN NaCl-NaOH AND NaCl-HCl BRINES
 FROM 6.4 TO 80.0 DEGREES C AND IONIC
 STRENGTHS OF 0.001 TO 5.0 molal [137067] 10:15 A
 11 C. M. Eggleston*, M. F. Hochella, Jr., G. A.
 Parks: EVOLUTION OF THE SURFACE COMPOSITION
 OF DISSOLVING SILICATES [138539] 10:30 A
 12 H. B. Ponder*, M. F. Hochella, Jr.: THE
 COMPLEXITY OF MINERAL DISSOLUTION AS VIEWED
 BY HIGH RESOLUTION SCANNING AUGER
 MICROSCOPY: LABRADORITE UNDER HYDROTHERMAL
 CONDITIONS [133635] 10:45 A
 13 Susan C. Webb*, John V. Walther: SURFACE
 COMPLEXATION REACTIONS AND THE pH DEPENDENCE
 OF CORDUNDUM DISSOLUTION [140347] 11:00 A
 14 A. Lawrence Roe, Kim F. Hayes, Catherine J.
 Chisholm*, Gordon E. Brown, Jr., George A.
 Parks, Keith O. Hodgson, James O. Leckie:
 SPECTROSCOPIC EVIDENCE FOR SURFACE
 COMPLEXES OF Pb(II) AT THE ALUMINA/WATER
 AND GETHITE/WATER INTERFACES [133587] 11:15 A
 15 Carl O. Moses*, Janet S. Herman: PYRITE
 OXIDATION KINETICS AT CIRCUMNEUTRAL pH
 [144152] 11:30 A
 16 L. E. Bary*: RATES OF AS (III) OXIDATION BY
 DISSOLVED OXYGEN AT 25 AND 90 DEGREES C
 [126130] 11:45 A

TUESDAY OCTOBER 27

GEOCHEMISTRY II: LOW TEMPERATURE AND ORGANIC GEOCHEMISTRY
 Tucson 36-37, Phoenix Civic Plaza, 1:30 P.M.

James M. Hill and J. Bruno Risatti, Presiding

1 Raymond Siever*: THE SILICA CYCLE IN THE
 PRECAMBRIAN [127561] 1:30 P
 2 J. B. Martin*, P. A. Baker, R. C. Marty, M. R.
 Allen, R. B. Dunbar: ORIGIN OF EOCENE
 THROUGH MIOCENE AGED ORGANIC DOLOMITES:
 PISCO BASIN, PERU [120521] 1:45 P
 3 Sandra L. Jones*, William M. Lewis, Jr.,
 Donald D. Rummels: HIGH RATE OF WEATHERING
 OF GUAYANA SHIELD ROCKS IN THE CAURA RIVER
 BASIN, A TROPICAL DRAINAGE IN VENEZUELA
 [142794] 2:00 P
 4 D. C. Marozas*: THE INFLUENCE OF
 LOW-TEMPERATURE MINERAL REACTIONS ON THE
 SEPARATION OF TRACE METALS IN GROUNDWATER
 OF THE LOWER SANTA CRUZ BASIN, ARIZONA
 [138044] 2:15 P
 5 George N. Breit*, Martin B. Goldhaber: USE
 OF EPIGENETIC BARITE TO DOCUMENT THE ORIGIN
 AND MOVEMENT OF BRINES ON THE COLORADO
 PLATEAU, COLORADO AND UTAH [143757] 2:30 P
 6 Richard B. Wanty*, Martin B. Goldhaber:
 EXPERIMENTAL EVIDENCE FOR THE FORMATION OF
 COLORADO PLATEAU V-U DEPOSITS BY A
 REDUCTION REACTION INVOLVING HYDROGEN
 SULFIDE [143758] 2:45 P
 7 M. L. Tuttle*, M. B. Goldhaber, C. A. Rice:
 SULFUR DIAGENESIS IN ALKALINE, SULFUR-RICH
 SOAP LAKE, WASHINGTON: A MODERN GEOCHEMICAL
 ANALOGUE FOR GREEN RIVER OIL SHALES?
 [130630] 3:00 P
 8 Donald B. MacGowan*, Ronald C. Surdam: THE
 ROLE OF CARBOXYLIC ACID ANIONS IN FORMATION
 WATERS, SANDSTONE DIAGENESIS AND PETROLEUM
 RESERVOIR MODELING [133178] 3:15 P
 9 Joseph L. Domagalski*, Hans P. Eugster:
 TRACE METAL GEOCHEMISTRY IN CLOSED BASIN
 LAKES [139271] 3:30 P
 10 Amy L. Mills*, Carol Kendall: SEASONAL
 VARIATION IN THE C-13 CONTENT OF STREAM
 BICARBONATE IN TWO SMALL SOUTHEASTERN
 UNITED STATES WATERSHEDS--IMPLICATIONS FOR
 SOURCES OF ALKALINITY [128520] 3:45 P
 11 James M. Hill*: SEDIMENTARY CARBON AND
 SULFUR AS INDICATORS OF BIOGEOCHEMICAL
 PROCESSES IN CHESAPEAKE BAY [119736] 4:00 P
 12 J. L. Schleusener*, S. E. Drummond, D. A.
 Palmer, H. L. Barnes: EFFECTS OF COMMON
 MINERALS ON ACETATE DECARBOXYLATION
 KINETICS [137068] 4:15 P
 13 Xue-lei Chu*, Hiroshi Ohmoto: KINETICS OF
 CARBON ISOTOPE EXCHANGE AMONG CO₂, CH₄ AND
 ACETIC ACID: EXPERIMENTAL RESULTS AT 250
 DEGREES C [132846] 4:30 P
 14 T. H. Giordano*, S. E. Drummond: ZINC
 ACETATE COMPLEXING IN HYDROTHERMAL
 SOLUTIONS [144312] 4:45 P
 15 Jeffrey L. Bada*, Giorgio Belluomini: THE
 APPLICATION OF THREE COMPONENT KINETIC
 ANALYSIS TO AMINO ACID DIAGENETIC REACTIONS
 [126191] 5:00 P
 16 J. Bruno Risatti*: BIOGEOCHEMISTRY OF A
 TEMPERATE ZONE PEAT BOG [134537] 5:15 P

GEOCHEMISTRY III: ISOTOPE GEOCHEMISTRY
Phoenix 11-15, Phoenix Civic Plaza, 8:00 A.M.

Bruno J. Giletti and Peter Deines, Presiding

- 1 Bruno J. Giletti*: DIFFUSION EFFECTS ON Rb-Sr MINERAL ISOCHRONES [144041] 8:00 A
 - 2 K. A. Foland*: DIFFUSION OF Ar IN IRRADIATED HOMOGENEOUS ORTHOCLASE: IMPLICATIONS FOR 40Ar/39Ar SPECTRA [116210] 8:15 A
 - 3 B. E. Faggart, Jr.*, Asish R. Basu: EVOLUTION OF THE KINGS MOUNTAIN BELT OF THE CAROLINAS: IMPLICATIONS FROM Sm-Nd SYSTEMATICS [139672] 8:30 A
 - 4 R. D. Dallmeyer, A. N. Sial, L. E. Long, J. McMurry*: NEW EVIDENCE FOR POLYPHASE TECTONOTHERMAL EVOLUTION OF THE BRAZILIANO OROGEN, NORTHEASTERN BRAZIL [144371] 8:45 A
 - 5 Matthew Heizler*, T. M. Harrison: THE UPS AND DOWNS OF THE NORTHEASTERN USA FROM THE PROTEROZOIC TO THE JURASSIC [139529] 9:00 A
 - 6 P. R. Dixon*, A. P. Le Huray, D. M. Rye: Pb ISOTOPIC EVIDENCE FOR BASEMENT STRUCTURE AND COMPOSITION IN CENTRAL IRELAND [138173] ... 9:15 A
 - 7 S. W. Nicholson*, S. B. Shirey: 1100-Ma MIDCONTINENT RIFT DEVELOPMENT: EVIDENCE FROM Nd and Sr ISOTOPE COMPOSITION OF KEWEENAWAN VOLCANIC ROCKS, NORTHERN MICHIGAN [141928] 9:30 A
 - 8 Thomas E. Musselman*, E. Craig Simmons: A CRUSTAL SOURCE FOR A MAFIC ALKALIC SUITE FROM THE COLORADO MINERAL BELT, WITH EVIDENCE FOR REGIONAL METASOMATISM [137019] ... 9:45 A
 - 9 P. Deines*, J. W. Barris: C-13, O-18 AND NITROGEN CONTENT STUDIES OF GRAPHITE AND DIAMOND ECLOGITES FROM ORAPA, BOTSWANA [132914] 10:00 A
 - 10 F. A. Caporuscio*, J. R. Smyth: VARIABLE LREE ENRICHMENT OF MANTLE ECLOGITES FROM SOUTH AFRICA BY MARID FLUIDS [130415] 10:15 A
 - 11 Candace E. Martin*, Karl R. Turekian: OSMIUM ISOTOPE SYSTEMATICS IN ABYSSAL PERIDOTITES: IMPLICATIONS FOR MANTLE EVOLUTION [118362] 10:30 A
 - 12 H. K. Brueckner*, A. Zindler, M. Seyler, E. Bonatti: ZABARGAD AND THE PAN-AFRICAN AND MIOCENE ISOTOPIC EVOLUTION OF THE SUB-RED SEA MANTLE AND CRUST [127747] 10:45 A
 - 13 Stephen H. Wickham*, Hugh P. Taylor: GEOCHEMICAL AND PETROLOGICAL CONSEQUENCES OF CRUSTAL EXTENSION; EXAMPLES FROM NEVADA AND THE PYRENEES [127879] 11:00 A
- Geochemical Society Presidential Address:
Stanley R. Hart, "Mantle Geodynamics: An Interfruitful Disciplinary Arena" 11:15 A

GEOCHEMICAL SOCIETY LUNCHEON AND AWARDS CEREMONY
Hyatt Regency Ballroom A, 12:30-1:30. Tickets (\$15) available with preregistration (see p. 7) or at GSA registration desk until noon on Tuesday October 27.

OGD BEST PAPER AWARD: M. J. Whiticar, E. Faber and M. Schoell, Bundesanstalt für Geowissenschaften und Rohstoffe, Hanover, West Germany

F. W. CLARKE MEDAL: Eichii Takahashi, Okayama University

ALFRED TREIBS MEDAL: Thomas Hoering, Carnegie Institution of Washington

V.M. GOLDSCHMIDT MEDAL and LESTER W. STROCK and FAMILY HONORARIUM: Wallace S. Broecker, Columbia University

GEOCHEMISTRY IV/IGNEOUS PETROLOGY III
Phoenix 11-15, Phoenix Civic Plaza, 1:30 P.M.

Barry L. Weaver and Russell S. Harmon, Presiding

- 1 Mike A. Hamilton*: GEOCHEMISTRY OF ARCHEAN AND PROTEROZOIC ROCKS OF THE CENTRAL NAIN PROVINCE, LABRADOR: IMPLICATIONS FOR CONTAMINATION OF ELSONIAN MAGMAS [134742] 1:30 P
- 2 R. I. Kalamarides*, P. J. Wiese: OXYGEN ISOTOPES OF HEPABASITES IN THE KIGLAPAIT AUREOLE [127912] 1:45 P
- 3 K. R. Simmons*, E. C. Simmons: PETROGENETIC IMPLICATIONS OF Pb- AND Sr-ISOTOPIC COMPOSITIONS FOR ROCKS FROM THE NAIN ANHOTHOSITE COMPLEX, LABRADOR [144423] 2:00 P
- 4 E. Y. Anthony, T. V. Segalstad*, E.-R. Neumann: CHARACTERIZATION OF MANTLE SOURCE REGIONS FOR ALKALI BASALTS FROM A CONTINENTAL RIFT ZONE: THE OSLO REGION, NORWAY [136100] 2:15 P
- 5 Richard D. Lewis*, Roger E. Mitchell: ALNOITE INTRUSIONS ASSOCIATED WITH PERMIAN RIFTING IN THE NEW MADRID SEISMIC RIFT COMPLEX [128897] 2:30 P
- 6 C. M. Allen*: MULTIPLE SOURCES OF CRETACEOUS MAGMAS, SOUTHERN TURTLE MTS., S.E. CALIFORNIA [128525] 2:45 P
- 7 Marta J. K. Flohr*, Malcolm Ross: GEOCHEMICAL TRENDS OF AND RELATIONSHIPS BETWEEN ALKALINE ROCKS FROM THE MAGNET COVE IGNEOUS COMPLEX, ARK. [136399] 3:00 P

- 8 D. S. Coleman*, J. D. Walker, M. E. Bickford: GEOCHEMISTRY OF MIO-PLIOCENE VOLCANIC ROCKS FROM NORTHERN PANAMINT MOUNTAINS AND DARWIN PLATEAU, BASIN AND RANGE PROVINCE: IMPLICATIONS FOR EXTENSION AND REGIONAL GEOLOGY [143080] 3:15 P
- 9 Yuch-Ning Shieh*, Marc De Mulder: OXYGEN AND STRONTIUM ISOTOPE CONSTRAINTS ON THE ORIGIN OF THE KARISIMBI POTASSIC LAVA SERIES, VIRUNGA, EAST AFRICAN RIFT VALLEY [128406] 3:30 P
- 10 Barry L. Weaver*: TRACE ELEMENT FRACTIONATION DURING DIFFERENTIATION OF SOUTH ATLANTIC OCEAN ISLAND ALKALINE IGNEOUS SUITES [136302] 3:45 P
- 11 Russell S. Harmon*, Jon P. Davidson: LESSER ANTILLES ISLAND ARC O-ISOTOPE GEOCHEMISTRY [141637] 4:00 P
- 12 S. S. Sorensen*, J. N. Grossman: INCOMPATIBLE-ELEMENT ENRICHMENTS CONTROLLED BY GARNET AND ACCESSORY MINERALS IN MAFIC MIGMATITES FROM A SUBDUCTION COMPLEX [128247] 4:15 P
- 13 Douglas Smith*: CARBONATES AND Ba, Cl-RICH HYDRATES IN MANTLE PYROXENE RECORDS OF SUBDUCTION, METASOMATISM, OR BOTH? [123837] ... 4:30 P
- 14 Scott E. Thibben*, Donald J. DePaolo, Arthur L. Boettcher: TRACE ELEMENT PARTITIONING BETWEEN DIOPSIDE AND AQUEOUS VAPOR AT HIGH PRESSURES AND TEMPERATURES [124770] 4:45 P
- 15 G. J. Nimz*, K. L. Cameron: RARE EARTH ELEMENT (REE) EVIDENCE FOR THE PETROGENESIS OF MANTLE PYROXENITES FROM LA OLIVINA, CHIHUAHUA, MEXICO [125929] 5:00 P
- 16 Richard J. Abitz*, Ronald K. Matheny: Sr AND O ISOTOPE DISEQUILIBRIUM IN A WELDED HIGH-SILICA RHYOLITE TUFF [143388] 5:15 P

POSTER SESSION V

Exhibit Hall C, Phoenix Civic Plaza, 8:00 A.M. - 12:00 Noon

Authors will be present from 9:00 A.M. - 11:00 A.M.

GEOCHEMISTRY

- Marilyn G. Truscott*, Denis M. Shaw: COMPOSITION OF LOWER AND INTERMEDIATE CONTINENTAL CRUST, KAPUSKASING STRUCTURAL ZONE, ONTARIO [143486] Booth 1
- R. L. Hervig*, M. F. Sheridan, V. I. Kovalenko: HIGH WATER CONTENTS IN MELT INCLUSIONS FROM PAETELLERITE AND TRACE ELEMENTS IN GLASS AND COEXISTING PHENOCRYSTS [126299] Booth 2
- R.T.D. Teng*, U. Fehn, D. Elmore, P. W. Kubik, T. Hemmick, H. E. Gove: DETERMINATION OF OSMIUM ISOTOPES AND Re/Os RATIOS USING ACCELERATOR MASS SPECTROMETRY [128059] Booth 3
- Leslie K. Manning*, Carol D. Frost: NEODYMIUM ISOTOPES: A POTENTIAL GEOCHEMICAL TRACER FOR PETROLEUM EXPLORATION [124434] Booth 4
- C. D. Frost*, D. S. Coombs: Nd ISOTOPE ANALYSIS OF NEW ZEALAND TERRANES [133175] Booth 5
- Jerry P. Magloughlin*: MULTIPLE Rb-Sr WHOLE-ROCK ISOCHRONES FROM METASEDIMENTARY ROCKS: AN EXAMPLE FROM THE CHIWAKUMUK AND SETTLER SCHISTS, WASHINGTON AND BRITISH COLUMBIA [135708] Booth 6
- Lee R. Kump*: IRON ISOTOPIC VARIABILITY IN GEOLOGICAL SETTINGS [129001] Booth 7
- B. D. Leavy*, P. M. Phillips, S. Smith, N. O. Jannik, D. Elmore, P. W. Kubik: MEASUREMENT OF WHOLE-ROCK IN-SITU 36Cl/Cl BUILDUP BY ACCELERATOR MASS SPECTROMETRY (AMS): APPLICATIONS IN GEOCHRONOLOGY [132806] Booth 8
- J. K. Bohlke*, C. Kirschaum, J. J. Irwin, W. E. Glassley: LASER-MICROPROBE ANALYSES OF NOBLE GAS ISOTOPES IN FLUID INCLUSIONS IN NEUTRON-IRRADIATED QUARTZ VEINS [132599] Booth 9
- Kerri L. Nelson*, Dennis O. Nelson, Brian S. Brister: ISOTOPIC AND TRACE ELEMENTAL CONSTRAINTS ON THE GENESIS OF RHYOLITES IN THE EAGLE AND VAN HORN MOUNTAINS CALDERAS, TRANS-PECOS, TEXAS [137861] Booth 10
- June T. Fabryka-Martin*, Stanley N. Davis, Laurie Wirt, David Elmore, Peter W. Kubik: COMPARISON OF THEORETICAL AND MEASURED DEEP SUBSURFACE PRODUCTION OF CHLORINE-36 [141483] .. Booth 11
- Linda Bonnell*, Keith Hackley: YIELD AND ISOTOPIC COMPOSITION OF DISULFIDE SULFUR EXTRACTED BY LAH, CHROMIUM CHLORIDE AND NITRIC ACID METHODS [130591] Booth 12
- D. Z. Xu*, J. H. Tan: A STUDY OF THE RELATIONSHIP BETWEEN URANIUM AND CLAY MINERALS IN 901 URANIUM DEPOSIT [128547] Booth 13
- Robert A. Zielinski*, Randall R. Schumann: RESPONSE OF DOUGLAS FIR TO URANIFEROUS GROUND WATER--A CASE STUDY WITH IMPLICATIONS FOR ENVIRONMENTAL MONITORING [135220] Booth 14
- Dagan Yu*, Minghui Rao: DISCUSSION ON EFFECT OF CARBON DIOXIDES IN MINERALIZATION PROCESS OF HYDROTHERMAL URANIUM DEPOSIT [143117] Booth 15
- Weijun Shi*: PROBE INTO THE MAIN EXISTING FORMS OF URANIUM IN NATURAL WATER OF HYPOGENE ZONE [136788] Booth 16
- D. A. Vanko*, R. J. Bodnar, S. M. Sterner: PHASE EQUILIBRIA IN THE SYSTEM SODIUM CHLORIDE-CALCIUM CHLORIDE-WATER: DETERMINATION OF THE HALITE LIQUIDUS [120746] .. Booth 17

B. E. Nesbitt*, S. E. Drummond, J. G. Blencoe: DEVELOPMENT AND TESTING OF A VIBRATING TUBE DENSIMETER FOR THE DETERMINATION OF FLUID DENSITIES AT HIGH TEMPERATURES AND PRESSURES [120273] Booth 18

C. J. Bray, A. V. Thomas*, E.T.C. Spooner: FLUID INCLUSION GAS GEOCHEMISTRY OF THE BERYL FRINGE AND QUARTZ ZONE, TANCO GRANITIC PEGMATITE, S.E. MANITOBA [120223] Booth 19

J. B. Murowchick*, H. L. Barnes: EFFECTS OF DEGREE OF SUPERSATURATION AND TEMPERATURE ON THE MORPHOLOGY OF HYDROTHERMAL PYRITE CRYSTALS [132865] Booth 20

Janet K. Pitman*, Warren W. Dickinson: PETROLOGY AND ISOTOPE GEOCHEMISTRY OF MINERALIZED FRACTURES IN CRETACEOUS ROCKS: EVIDENCE FOR CEMENTATION IN A CLOSED HYDROLOGIC SYSTEM [130918] Booth 21

J. Donald Rimstidt*, Patrick M. Gagen: ARSENOFYRITE AND CHALCOPYRITE OXIDATION RATES IN ACIDIC FERRIC CHLORIDE SOLUTIONS [128589] ... Booth 22

Tula Economou*, Alan R. Bowers: INTERACTION OF Fe+3 WITH CLAY MINERALS [135916] Booth 23

Gene Whitney*, E. Roy Northrop: AN EXPERIMENTAL STUDY OF ILLITE/SMECTITE FORMATION: OXYGEN ISOTOPE SYSTEMATICS AND EVIDENCE FOR DUAL REACTION MECHANISMS [144427] Booth 24

Douglas M. Yates*, Philip E. Rosenberg: MUSCOVITE STABILITY IN SOLUTIONS BETWEEN 100 DEGREES AND 250 DEGREES C [136875] Booth 25

Kevin G. Knauss*, Thomas J. Wolery: MUSCOVITE DISSOLUTION KINETICS AS A FUNCTION OF pH AND TIME AT 70 DEGREES C [137748] Booth 26

Stacy A. Seaman*, Brad K. Smith: THEORETICAL ENERGETICS OF NUCLEATION AND GROWTH FOR TOPOTACTIC OLIVINE/SPINEL INTERGROWTHS [143889] Booth 27

William L. Bourcier*, Kevin G. Knauss, Kenneth J. Jackson: ALUMINUM HYDROLYSIS CONSTANTS TO 250 DEGREES C DETERMINED FROM BOEHMITE SOLUBILITY MEASUREMENTS [125872] Booth 28

Nancy E. Fegan*, David T. Long, W. Berry Lyons, Mark E. Hines, Robert Lent, Philip G. Macumber: HYDROGEOCHEMICAL PROCESSES ASSOCIATED WITH ACID GROUNDWATERS IN A MODERN PLAYA: LAKE TYRRELL, AUSTRALIA [135442] Booth 29

S. A. Macko*, R. Bidigare, D. Biggs, M. Altebet, P. Barker, J. Kennett: SEDIMENT TRAP RESULTS FROM ODP LEG 113, WEDDELL SEA, ANTARCTICA [142325] Booth 30

Ethan L. Grossman*, Steven J. Pritz: GEOCHEMICAL TRENDS IN CRINOIDS FROM PENNSYLVANIAN SHALES [143934] Booth 31

Long-Cheng Liang*, James L. Carter: ELECTRON MICROPROBE ANALYSIS OF ORGANICALLY-BOUND ELEMENTS IN SOME TEXAS LIGNITES [141651] Booth 32

N. E. Ostrom*, C. G. Troke, S. A. Macko: CHARACTERIZATION OF SOURCES AND FATE OF ORGANIC MATTER IN NORTHERN NEWFOUNDLAND BAYS [130143] Booth 33

Thomas H. Brown*, Robert G. Berzhan, Ernest H. Perkins: GEO-CALC: A SOFTWARE PACKAGE FOR RAPID CALCULATION OF STABLE PRESSURE-TEMPERATURE-ACTIVITY PHASE DIAGRAMS [142370] Booth 34

S. M. Sterner*, R. J. Bodnar, D. L. Hall: SOLUBILITY RELATIONS IN THE SYSTEM NaCl-KCl-H2O: EXPERIMENTAL DETERMINATION AND COMPUTER PROGRAM [139292] Booth 35

8 Jay L. Banner*, G. J. Wasserburg: Sr AND Nd ISOTOPIES IN SALINE GROUNDWATER FROM SALINE COUNTY, MISSOURI: IMPLICATIONS FOR FLUID-ROCK INTERACTION [143453] 9:45 A

9 Ann S. Maest*, Sofie Pasilis, James W. Ball, D. Kirk Nordstrom: MONO LAKE: AN EPISODIC, EPHEMERAL ORE-FORMING SOLUTION? [125812] 10:00 A

10 Anthony J. Park*, Peter J. Ortoleva: REACTION TRANSPORT MODELING OF MINERAL ZONING SEQUENCES: APPLICATIONS TO DOLOMITIZATION AND CLAY MINERALOGY [135620] ... 10:15 A

11 Martin B. Goldhaber*, Mark R. Stanton: EXPERIMENTAL FORMATION OF MARCASITE AT 150-200 DEGREES C; IMPLICATIONS FOR CARBONATE HOSTED Pb/Zn DEPOSITS [143334] 10:30 A

12 L. Taras Bryndzia*, O. J. Kleppa: THERMOCHEMISTRY OF LIQUID AND SOLID PHASES ON THE QUASI-BINARY Ag2S-Sb2S3 JOIN BY HIGH-TEMPERATURE REACTION CALORIMETRY [125581] 10:45 A

13 C. H. Gammons*, H. L. Barnes: STABILITY OF SILVER-BISULFIDE COMPLEXES UNDER HYDRO-THERMAL CONDITIONS: APPLICATIONS TO METAL TRANSPORT IN GEOTHERMAL SYSTEMS [132855] 11:00 A

14 James W. Johnson*: CHEMICAL EQUILIBRIA IN THE H2O CRITICAL REGION [126356] 11:15 A

15 Nilanjan Chatterjee*: AN INTERNALLY CONSISTENT THERMODYNAMIC DATA BASE IN THE CaO-FeO-MgO-AL2O3-SiO2 SYSTEM AND ITS APPLICATIONS [143940] 11:30 A

16 Yingwei Fei*: EQUILIBRIUM PHASE RELATIONS IN THE SYSTEM MgO-SiO2 AT HIGH PRESSURE AND TEMPERATURE [143941] 11:45 A

GEOCHEMISTRY VI: MISCELLANEOUS

Phoenix 11-15, Phoenix Civic Plaza, 1:00 P.M.

Paul Aharon and Elizabeth Zbinden, Presiding

1 Lei Zhou*: TRACE ELEMENT GEOCHEMISTRY OF THE PERMIAN-TRIASSIC BOUNDARY [124767] 1:00 P

2 S. K. Saxena*: METHANE IN THE MANTLE [143938] 1:15 P

3 J. A. Beier*: GEOCHEMICAL EVIDENCE FOR PALEOREDOX CONDITIONS DURING DEPOSITION OF THE DEV.-MISS. NEW ALBANY SHALE (INDIANA) [140074] 1:30 P

4 William B. W. Berry*, Mary S. Quinby-Hunt, Pat Wilde, Charles J. Orth: USE OF THE CERIUM ANOMALY IN BLACK SHALES - CLIMATIC INTERPRETATION IN THE ORDOVICIAN-SILURIAN BOUNDARY INTERVAL, DOB'S LINN, SCOTLAND [132603] 1:45 P

5 Donald E. Canfield*: WORLDWIDE SULFATE REDUCTION AND SEDIMENTARY PYRITE FORMATION [144313] 2:00 P

6 Elizabeth A. Burton*, Lynn M. Walter: INFLUENCE OF SEAWATER CHEMISTRY ON CALCITE CEMENT MINERALOGY: EFFECTS OF PCO2 AND SULFATE [143764] 2:15 P

7 Scott J. Carpenter*, K. C. Lohmann: DIAGENETIC EFFECTS ON PRIMARY $\delta^{18}O, \delta^{13}C$ COMPOSITIONS OF MARINE CEMENTS FROM GOLDEN SPIKE REEF, ALBERTA, CANADA [140127] 2:30 P

8 Edward L. Dromgoole*, Lynn M. Walter: IRON AND MANGANESE INCORPORATION INTO CALCITE CEMENTS: IMPLICATIONS FOR DIAGENETIC STUDIES [143766] 2:45 P

9 Paul Aharon*: ON THE NATURE AND ORIGIN OF STRATA-BOUND MASSIVE MAGNESITES: A NEGLECTED PROBLEM OF SEDIMENTARY GEOLOGY [143815] 3:00 P

10 Mark D. Feldman*, L. Paul Knauth: PALEOATMOSPHERIC GASES IN BRINE INCLUSIONS IN HALITE [143897] 3:15 P

11 Robert A. Berner*, Gary P. Landis: CHEMICAL ANALYSIS OF GASEOUS BUBBLE INCLUSIONS IN AMBER: THE COMPOSITION OF ANCIENT AIR? [115137] 3:30 P

12 E. A. Zbinden*, H. D. Holland: A PALEOSOL NEAR FLIN FLON, MANITOBA, AND ITS IMPLICATIONS FOR ATMOSPHERIC OXYGEN 1.8 B.Y.B.P. [144051] 3:45 P

13 J. D. Pasteris*, B. J. Wanawaker: USE OF THE LASER RAMAN MICROPROBE TO MONITOR REACTIONS IN INDIVIDUAL FLUID INCLUSIONS [137049] 4:00 P

14 Greg E. Ravizza*, Karl K. Turekian: Re/Os GEOCHRONOMETRY OF BLACK SHALES: AN ISOCRON FOR THE BAKKEN SHALE (L. MISS.) NORTH DAKOTA [127667] 4:15 P

15 Jeffrey Klein*, Pankaj Sharma, Roy Middleton: 10Be AND 26Al CHRONOLOGIES OF FERROMANGANESE NODULES AND PHILLIPSITES [136417] 4:30 P

16 Jong H. Hahn, Renato Zanobi*, Jeffrey L. Bada, Richard N. Zare: COSMOCHEMICAL/GEOCHEMICAL APPLICATIONS OF TWO-STEP LASER DESORPTION/MULTIPHOTON IONIZATION MASS SPECTROMETRY [126190] 4:45 P

THURSDAY OCTOBER 29

GEOCHEMISTRY V: HYDROTHERMAL FLUIDS AND PROCESSES
Phoenix 11-15, Phoenix Civic Plaza, 8:00 A.M.

Teresa S. Bowers and Michael R. Perfit, Presiding

1 Lawrence M. Cathles*, Teresa Suter Bowers: A SIMPLIFIED APPROACH TO FLUID/ROCK MODELING: 1. KINETIC AND COMPUTATIONAL ADVANTAGES [142042] 8:00 A

2 Teresa Suter Bowers*, Lawrence M. Cathles: A SIMPLIFIED APPROACH TO FLUID/ROCK MODELING: 2. REQUIREMENTS FOR LOW WATER/ROCK RATIOS [143146] 8:15 A

3 A. C. Campbell*, Teresa S. Bowers, John M. Edmond, Chris I. Measures, Kelly Kenison-Falkner: A TIME SERIES STUDY OF HYDROTHERMAL FLUID CHEMISTRY IN THE GUAYMAS BASIN, GULF OF CALIFORNIA [127547] 8:30 A

4 Michael E. Berndt*, William E. Seyfried, Jr.: THE CHEMISTRY OF RIDGE CREST HYDROTHERMAL FLUIDS: CATION BUFFERING BY PLAGIOCLASE AND EPIDOTE SOLID SOLUTIONS [135699] 8:45 A

5 M. F. Smith, M. R. Perfit*, I. R. Jonasson, R. W. Embley: GEOCHEMICAL/ISOTOPIC VARIATIONS ON MACRO- AND MICRO-SCALE IN THE GALAPAGOS FOSSIL HYDROTHERMAL SYSTEM [140862] 9:00 A

6 J. C. Alt*, T. Anderson, L. Bonnell: GEOCHEMISTRY OF SULFUR IN HYDROTHERMALLY ALTERED SEAFLOOR ROCKS [127783] 9:15 A

7 Charles J. Kaiser*, Hiroshi Ohmoto: THE KINETICS OF SULFATE REDUCTION BY ORGANIC MATTER UNDER HYDROTHERMAL CONDITIONS [132848] 9:30 A

TRANSPORTATION

AIRLINE

GSA has designated The Cain Travel Group of Boulder, Colorado, as the official airline reservation agent for the Phoenix meeting. United and Delta/Western Airlines are the official co-airlines. Cain Travel has served the GSA Annual Meeting for the past six years. The agency service is free, and it can save you both time and money.

Reduced rates will be up to 40% off coach, depending on the dates of travel. United and Delta/Western have also offered an additional 5% off any available fare, but restrictions will apply. The reduced rates will be available only to GSA travelers and their companions.

All participants booking through Cain Travel will automatically become eligible for inclusion in a drawing for two round-trip tickets to anywhere in the continental United States prior to August 31, 1988, subject to certain restrictions. In addition, clients will be eligible for a second drawing for \$500 in travel credits through Cain Travel.

Reservation Procedures

1. Book early. Understand restrictions, if applicable.
2. Call Cain Travel for reservations: (800) 346-4747 (toll free outside Colorado) or (303) 443-2246, Monday-Friday, 7:30 a.m.-5:30 p.m. Mountain Time. Identify yourself as a GSA traveler.
3. Payment options: Check payable to Cain Travel group, major credit card, or invoice to company. The final payment must reach Cain Travel no later than seven days prior to departure to allow for mailing time.
4. Tickets will be mailed via certified mail upon receipt of payment.
5. Airfares are subject to increase or decrease at any time. After the ticket is issued, you are protected against a fare increase. If a fare should decrease, contact Cain Travel for an adjustment.
6. There will be an on-site customer service desk at the Civic Plaza staffed by Cain Travel employees to assist with itinerary changes or problems.

GROUND

The Phoenix Sky Harbor International Airport is 7 miles from the Civic Plaza and downtown area—an approximately 15-minute ride. The Financial Center is 12 miles from the airport—an approximately 25-minute ride. Means of transportation are as follows:

Super Shuttle

Airport to hotel. Operates 24 hours a day, 7 days a week. Departs every 15 minutes from outside the baggage area. The blue vans are designated with red, diamond-shaped signs. Identify yourself as a GSA delegate and get a discount. Guaranteed cost: \$5.

Hotel to Airport. Call 24 hours in advance for reservations, 244-9000. Hotel pick-ups are NOT automatic. Guaranteed cost: \$5.

Taxi Cabs

Airport service. Three cab companies service the airport. They offer either a flat rate of \$5 to \$10 (based on destination), or metered charges ranging from \$1.80 to \$2.10 for the first mile and \$0.80 to \$1.10 for each additional mile. Charges vary depending on cab company.

Downtown service. Several cab companies service the downtown and all other areas by meter. See above charges.

GSA Shuttle

GSA will operate a free shuttle service throughout the meeting. GSA hotel guests will be transported to and from the Civic Plaza during event hours.

NOTE: Hyatt Regency, Adams Hilton, San Carlos, and Park Inn Heritage are within walking distance of the Civic Plaza; therefore, no shuttle will be available from these hotels.

On Sunday, service will run from 9:30 a.m. to 9:30 p.m. Monday through Thursday, service will begin at 6:30 a.m. Depending on the time of day, buses will run in 15- or 30-minute intervals. Length of service will also vary, depending on daily meeting activities.

Look for shuttle schedules posted in all GSA hotel lobbies and in registration packets.

Each bus will be identified by a "GSA Shuttle Bus" sign in the front window.

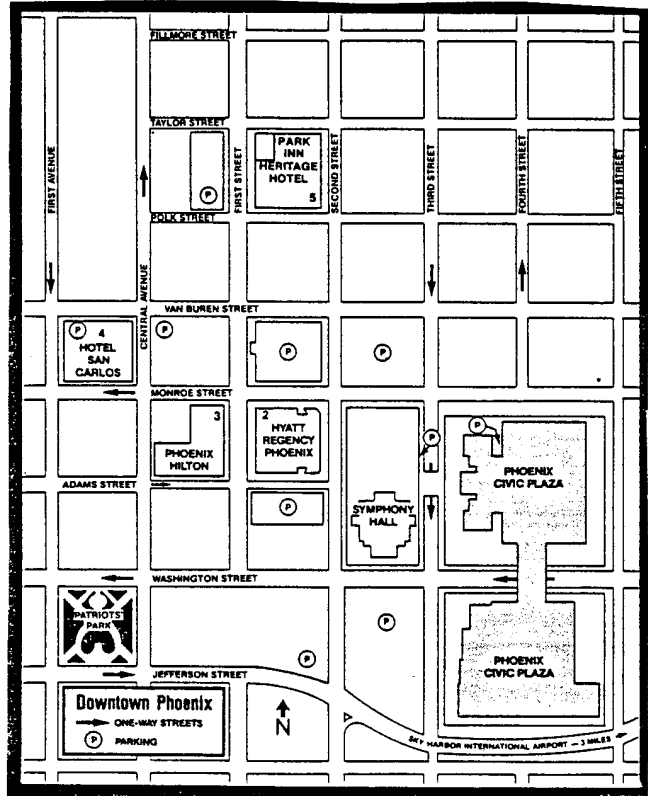
Phoenix Transit

The city transit system services downtown and major sightseeing locations. Phoenix Transit runs from 5:00 a.m. to 8:00 p.m. Monday through Saturday (not on Sunday). Stops every 10 to 20 minutes. Route maps will be provided in registration packets. Cost: \$0.75 per ride (\$0.35 for senior citizens).

Please note: Unless prices are stated as "guaranteed," they are subject to change. Information is current as of press time.

Car Rental

Alamo is the official car rental agency for the meeting. Identify yourself as a GSA delegate and get guaranteed, discounted, daily/weekly rates as follows: Economy—\$21/\$89; compact—\$23/\$109; mid-size—\$25/\$129; full-size (two-door)—\$27/\$149; luxury—\$31/\$189. Add \$2 per day for 4-door models. Unlimited mileage. Vehicles MUST be returned to the same rental location. Call Alamo for advance reservations. (800) 732-3232; in Phoenix, call 244-0753. Give the GSA Group I.D. No. 21123 and the GSA Rate Plan Code No. G9.



1 QUALITY INN AIRPORT
1820 South 7th Street, Phoenix, AZ 85034
(602) 254-9787 (150 rooms)
1.5 miles from Civic Plaza; 10 minutes by car
Single: \$28 Double: \$30 & \$34
Children under 18 accompanied by parent—Free
Restaurant; cocktail lounge; outdoor heated swimming pool; free outside parking; 10 minutes to airport
Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, DC, MC, V

2 HYATT REGENCY PHOENIX—HEADQUARTERS
122 North Second Street, Phoenix, AZ 85004
(602) 252-1234 (600 rooms)
1 block from Civic Plaza
Single: \$80 Double: \$90
Children under 18 accompanied by parent—Free
Full service hotel; 1st floor shopping mall; revolving restaurant and lounge; terrace cafe; cocktail lounge w/piano music; swimming pool & jacuzzi; concierge; laundry and valet service; inside self-parking (currently \$1.00-\$4.50/day); valet parking (currently \$6.25/day)
Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, DC, D, MC, V

3 THE ADAMS HILTON
Central and Adams, Phoenix, AZ 85001
(602) 257-1525 (475 rooms)
2 blocks from Civic Plaza
Single: \$63 Double: \$77
Children any age accompanied by parent—Free
Restaurant; coffee shop; cocktail lounge w/entertainment; free use of 5th floor recreation deck w/heated swimming pool, whirlpool, carpeted jogging track, ping pong; gift shops; florist; inside self-parking (currently \$5/day)
Check-in: 1:00 p.m. Check-out: 1:00 p.m. CC: AX, CB, D, DC, MC, V

4 HOTEL SAN CARLOS
202 North Central Avenue, Phoenix, AZ 85004
(602) 253-4121 (90 rooms)
3 blocks from Civic Plaza
Single: \$37 Double: \$37
Children under 12 accompanied by parent—Free
Deli restaurant open M-F; heated outdoor swimming pool; free continental breakfast in lounge; steam-heated rooms; hotel-regulated air conditioning; showers; bathtubs in most rooms; free parking available
Check-in: 1:00 p.m. Check-out: 12:00 noon CC: AX, MC, V

5 PARK INN HERITAGE HOTEL
401 North First Street, Phoenix, AZ 85004
(602) 258-3411 (100 rooms)
3 blocks from Civic Plaza
Single: \$50 Double: \$50
Children under 18 accompanied by parent—Free
Richard's Restaurant; lounge w/free hors d'oeuvres and cocktails during happy hour; outdoor heated swimming pool; gift shop; one-day valet and laundry service; free outside parking
Check-in: 2:00 p.m. Check-out: 12:00 noon CC: AX, DC, MC, V

6 HOLIDAY INN FINANCIAL CENTER
3600 North Second Avenue, Phoenix, AZ 85013
(602) 248-0222 (275 rooms)
3.5 miles from Civic Plaza; 15 minutes by car
Single: \$52 Double: \$61
Children under 12 accompanied by parent—Free
Restaurant; cocktail lounge w/entertainment; 2 swimming pools; free newspaper; access from shopping mall; free inside parking
Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, D, MC, V

7 LA MANCHA RESORT HOTEL & ATHLETIC CLUB
100 West Clarendon Avenue, Phoenix, AZ 85013
(602) 279-9811 (100 rooms)
3.5 miles from Civic Plaza; 15 minutes by car
Single: \$59 Double: \$59
Children under 18 accompanied by parent—Free
Restaurant; cocktail lounge; free use of full athletic club; 12 racquetball courts, basketball court, outdoor swimming pool, jacuzzis, men's and women's steam and saunas, Nautilus equipment, free weights, aerobic classes
Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, DC, MC, V

8 LES JARDINS HOTEL
3738 North Fourth Avenue, Phoenix, AZ 85013
(602) 234-2464 (50 rooms)
3.5 miles from Civic Plaza; 15 minutes by car
Single: \$60 & \$70 Double: \$60 & \$70
Children under 13 accompanied by parent—Free
Stylishly contemporary/distinctly European; excellent restaurant; heated swimming pool and spa; access to athletic facilities; free morning newspaper
Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, D, MC, V

9 PARK CENTRAL MOTOR HOTEL
3033 North 7th Avenue, Phoenix, AZ 85013
(602) 277-2621 (60 rooms)
3.5 miles from Civic Plaza; 15 minutes by car
Single: \$37 (studio) Double: \$41 (studio)
\$43 (suite) \$47 (suite)
Restaurant; outdoor heated swimming pool; free HBO; spacious studios/apartment-size suites, both with kitchens; free coffee in room; coin-operated laundromat; free outside parking
Check-in: 2:00 p.m. Check-out: 12:00 noon CC: AX, CB, D, DC, MC, V

10 BEST WESTERN ST. FRANCIS HOTEL
4321 North Central Avenue, Phoenix, AZ 85012
(602) 277-8671 (150 rooms)
4 miles from Civic Plaza; 15 minutes by car
Single: \$40 Double: \$44
Children under 12 accompanied by parent—Free
Restaurant located next door; heated outdoor swimming pool; free coffee in lobby; free movie channel; free refrigerator in room upon request; free outside parking
Check-in: 12:00 noon Check-out: 12:00 noon CC: AX, D, DC, V

Credit card codes: AX = American Express / CB = Carte Blanche / D = Discovery / DC = Diners Club / MC = MasterCard / V = VISA
NOTE: Free amenities are specifically stated as such.

HOUSING

GSA has blocked rooms at ten hotels that are offering special convention rates to GSA meeting attendees. GSA endorses these hotels for quality, cleanliness, and service.

TO MAKE YOUR HOTEL RESERVATION

BY FRIDAY, OCTOBER 2, fill out the attached Official Housing Request Form and mail it immediately to the address shown on the form. No reservations will be accepted if not submitted on this form.

AFTER FRIDAY, OCTOBER 2, you are responsible for making your own reservation directly with the hotel. Note that (1) many hotels will be filled at this time, and (2) hotels are not required to offer the special GSA rate as shown.

ASSIGNMENT

Hotel rooms will be assigned on a first-come, first-served basis as they are received by the Housing Bureau. Once your request is received, the bureau will

send an acknowledgement to both you and to the hotel in which you have been assigned.

You will then receive a *confirmation* from the hotel. This is a notice that the hotel received the information from the bureau and that the reservation has been input into their system. If you did not include a credit card number on the housing form, you must now send a first night's room deposit directly to the hotel.

ROOM DEPOSITS/ GUARANTEES

All GSA hotels require a first night's room deposit. Deposits can be made by (1) including a credit card number with your housing form, or (2) sending payment directly to the hotel once you have received your confirmation. **NOTE: The housing bureau will ONLY accept credit card numbers. If making payment directly to the hotel, be sure to give them your confirmed reservation number.**

Once the hotel receives your deposit, it automatically *guarantees* your reservation.

The guarantee assures you that no matter what time you arrive on your scheduled arrival day, your room will be held until 6:00 a.m. of the following day.

If you have not guaranteed your reservation, the hotel is not required to hold your room beyond 6:00 p.m. of the scheduled arrival day.

CHANGES AND CANCELLATIONS

BEFORE OCTOBER 2, all changes and cancellations to your room reservation must be sent, in writing, to the Housing Bureau.

AFTER OCTOBER 2, all changes and cancellations to your room reservation must be telephoned in to your hotel.

Supply your hotel reservation number at the time of any change or cancellation.

Your notice of cancellation must be received AT LEAST 48 HOURS in advance of your scheduled arrival in order to receive full refund of your first night's room deposit.

NOTE: All rooms are subject to a 7.6% room tax.

OFFICIAL HOUSING REQUEST FORM

Please complete BY OCTOBER 2 and send to:

Phoenix Convention Bureau
GSA Housing Department
505 North Second Street, Suite 300
Phoenix, AZ 85004

(Please print or type all information below)

HOTEL/MOTEL PREFERENCE:

1. _____
2. _____
3. _____
4. _____

TYPE OF ACCOMMODATIONS NEEDED:

- Single (1 bed, 1 person)
 Double (1 bed, 2 persons)
 Dbl/Dbl (2 beds, 2 persons)
 Triple (2 beds, 3 persons)
 Quad (2 beds, 4 persons)

- 1 Bedroom Suite
 2 Bedroom Suite

Add rollaway to room

NOTE: All rooms are subject to 7.6% tax.

ARRIVAL DAY/DATE _____ TIME _____ a.m./p.m.

DEPARTURE DAY/DATE _____ TIME _____ a.m./p.m.

NAMES OF OCCUPANTS:

1. _____
2. _____
3. _____
4. _____

GUARANTEED ROOM RESERVATION AUTHORIZATION:

I understand that my reservation will not be held after 6:00 p.m. unless I guarantee my reservation. I also understand that the hotel may bill me for one night's housing if I fail to cancel at least 48 hours prior to arrival.

- Credit card information provided below to guarantee my reservation.
 My guarantee will be made directly to the hotel *after* I have received my hotel confirmation.
 I will take my chances. No guarantee deposit will be provided.

PLEASE DO NOT SEND ANY MONIES WITH THIS FORM

Please guarantee my room reservation with the following:

American Express Carte Blanche Diners Club Discovery MasterCard VISA

SIGNATURE _____

CARD NUMBER _____ EXP. DATE _____

MAIL CONFIRMATION TO: (Please type or print)

Name _____ Telephone () _____

Address _____ City _____

State _____ ZIP _____ Country _____

PREREGISTRATION FORM

GSA Annual Meeting • October 26-29, 1987

Preregistration must be RECEIVED by September 25. Payment and form MUST accompany all preregistration requests. Unpaid purchase orders NOT accepted as valid registration. One form per registrant. Cancellation deadline: October 2. No refunds on cancellations received after this date.

Please print • Copy for your records

Name (Last) _____ (First) _____

Institution/Employer _____ Nickname for badge _____

Mailing Address _____

City _____ State _____ ZIP code _____

Country _____ Business phone _____ Home phone _____

Guest/Spouse Name (Last) _____ (First) _____

City _____ State/Country _____

Circle member affiliations: (1) GSA (2) CF (3) GS (4) GIS (5) MSA (6) NAGT (7) PS (8) SEG

		PRICE	QTY	AMOUNT
PREREGISTRATION FEES registration required for participation in all events	Professional Member (member of affiliation checked above)	(1) \$ 90	1	\$ _____
	Member One-Day (circle day S M T W T)	(2) \$ 52	1	\$ _____
	Professional Nonmember	(3) \$130	1	\$ _____
	Nonmember One-Day (circle day S M T W T)	(4) \$ 72	1	\$ _____
	Student Member (member of affiliation checked above)	(5) \$ 45	1	\$ _____
	Member One-Day (circle day S M T W T)	(6) \$ 26	1	\$ _____
	Student Nonmember	(7) \$ 65	1	\$ _____
	Nonmember One-Day (circle day S M T W T)	(8) \$ 36	1	\$ _____
	Guest (fill in name above for badge)	(9) \$ 30		\$ _____

ABSTRACTS WITH PROGRAMS (reserved for on-site pickup) (80) \$ 19 _____

GUEST ACTIVITIES	Trail Ride Superstition Mountain	Oct. 26	(10) \$ 45	\$ _____
	Sedona & Oak Creek Canyon	Oct. 27	(11) \$ 45	\$ _____
	Desert Gardens & Scottsdale	Oct. 28	(12) \$ 30	\$ _____
	Heard Museum	Oct. 29	(13) \$ 4	\$ _____

SPECIAL EVENTS	Invitational Tennis	Oct. 25	(14) \$ 10	\$ _____
	10K Run (check T-Shirt Size __S __M __L __XL)	Oct. 28	(15) \$ 10	\$ _____
	5K Run (check T-Shirt Size __S __M __L __XL)	Oct. 28	(16) \$ 10	\$ _____
	Cookout at GSA Corral	Oct. 28	(17) \$ 16	\$ _____

TICKETED MEAL FUNCTIONS luncheons unless noted	Geoscience Information Society	Oct. 26	(18) \$ 15	\$ _____
	Engineering Geology 40th Anniversary	Oct. 27	(19) \$ 15	\$ _____
	Geophysics Division	Oct. 27	(20) \$ 15	\$ _____
	Hydrogeology Division	Oct. 27	(21) \$ 15	\$ _____
	Mineralogical Society	Oct. 27	(22) \$ 15	\$ _____
	National Association of Geology Teachers	Oct. 27	(23) \$ 15	\$ _____
	Paleontological Society	Oct. 27	(24) \$ 15	\$ _____
	Sedimentary Geology Breakfast	Oct. 27	(25) \$ 10	\$ _____
	Women Geoscientists Breakfast	Oct. 27	(26) \$ 10	\$ _____
	Coal Geology Division	Oct. 28	(27) \$ 15	\$ _____
	*Geochemical Society	Oct. 28	(28) \$ 15	\$ _____
	History of Geology	Oct. 28	(29) \$ 15	\$ _____
Quaternary Geology and Geomorphology	Oct. 28	(30) \$ 15	\$ _____	
Society of Economic Geologists	Oct. 28	(31) \$ 15	\$ _____	

TOTAL REMITTANCE (full payment must be enclosed) \$ _____

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