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RUBIDIUM, STRONTIUM, AND STRONTIUM ISOTOPIC DATA FOR A SUITE OF GRANITOID
ROCKS FROM THE BASIN AND RANGE PROVINCE, ARIZONA, CALIFORNIA, NEVADA, AND
UTAH

by

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Rubidium, Strontium, and Strontium Isotopic Data for a Suite of Granitoid Rocks from the Basin and Range Province

By R. W. Kistler and D. E. Lee

INTRODUCTION

This report presents rubidium and strontium concentrations, and strontium isotopic data for a suite of granitoid rocks from the Basin and Range province of Arizona, California, Nevada, and Utah. Two random samples were collected from each of two randomly selected plutons within each 1' x 1' area shown on figure 1. A total of 230 samples was collected. However, samples GR-127 and GR-177 were lost and are excluded from this study. The general distribution of samples is shown on figure 1, where only odd-numbered samples are shown for the sake of simplicity. At the map scale of figure 1, the even-numbered samples would plot at or near the locations of their odd-numbered counterparts. Exact locations of all samples are listed in table 1.

About 80 percent of the samples were collected by D. E. Lee, and about 20 percent were collected by D. E. Lee with the assistance of R. E. Van Loenen. Thus, for practical purposes, terrane not accessible to a single worker with a reasonable degree of safety was not amenable to sampling. In addition to being chosen at random, the samples were both fresh (zones of alteration, iron staining, and friable rock were avoided) and typical of the main intrusive phase in the area of the sample site (inclusions, dikes, and other minor variants were rejected).

Usually a minimum of 4 hours was spent on the study of each pluton sampled. Samples that could not be broken out with a 5-kg sledge hammer were essentially inaccessible because no drilling or blasting was done. In the study area, many plutons display an erosion pattern of large rounded monoliths, impossible to break open with a sledge hammer. In such terrane, road cuts and rock falls often provided the only access to fresh material.

Because we sampled only fresh material, the sample suite as a whole is no doubt biased in favor of those igneous materials that were originally relatively impermeable. Few of the plutons in the study area appear in outcrop as uniformly fresh and coherent rock. Commonly the area properly mapped as intrusive igneous rock contains monoliths ranging in size from a few meters to a few tens of meters across surrounded by igneous rubble: in other words, the monoliths appear as large raisins floating in a pudding of igneous rubble. In deep road cuts and in canyons exposing a vertical section, the same relationship between coherent rock and grus commonly was seen to persist for tens of meters below the surface. The different susceptibility to weathering from place to place within a pluton must result from original differences in permeability and access to surface waters.

ANALYTICAL METHODS

Rubidium and strontium concentrations >50 ppm in the granitoid rocks were determined by energy dispersive X-ray fluorescence whereas concentrations <50 ppm were determined by isotope dilution on whole-rock powders of less than 200 mesh. Concentrations are ± 3 percent of the values reported at two standard deviations. Strontium isotopic compositions were determined on two different mass spectrometers and are normalized to $86\text{Sr}/88\text{Sr} = 0.1194$. NBS strontium carbonate standard SRM 987 has a measured $87\text{Sr}/86\text{Sr} = 0.710239 \pm 0.000015$ at

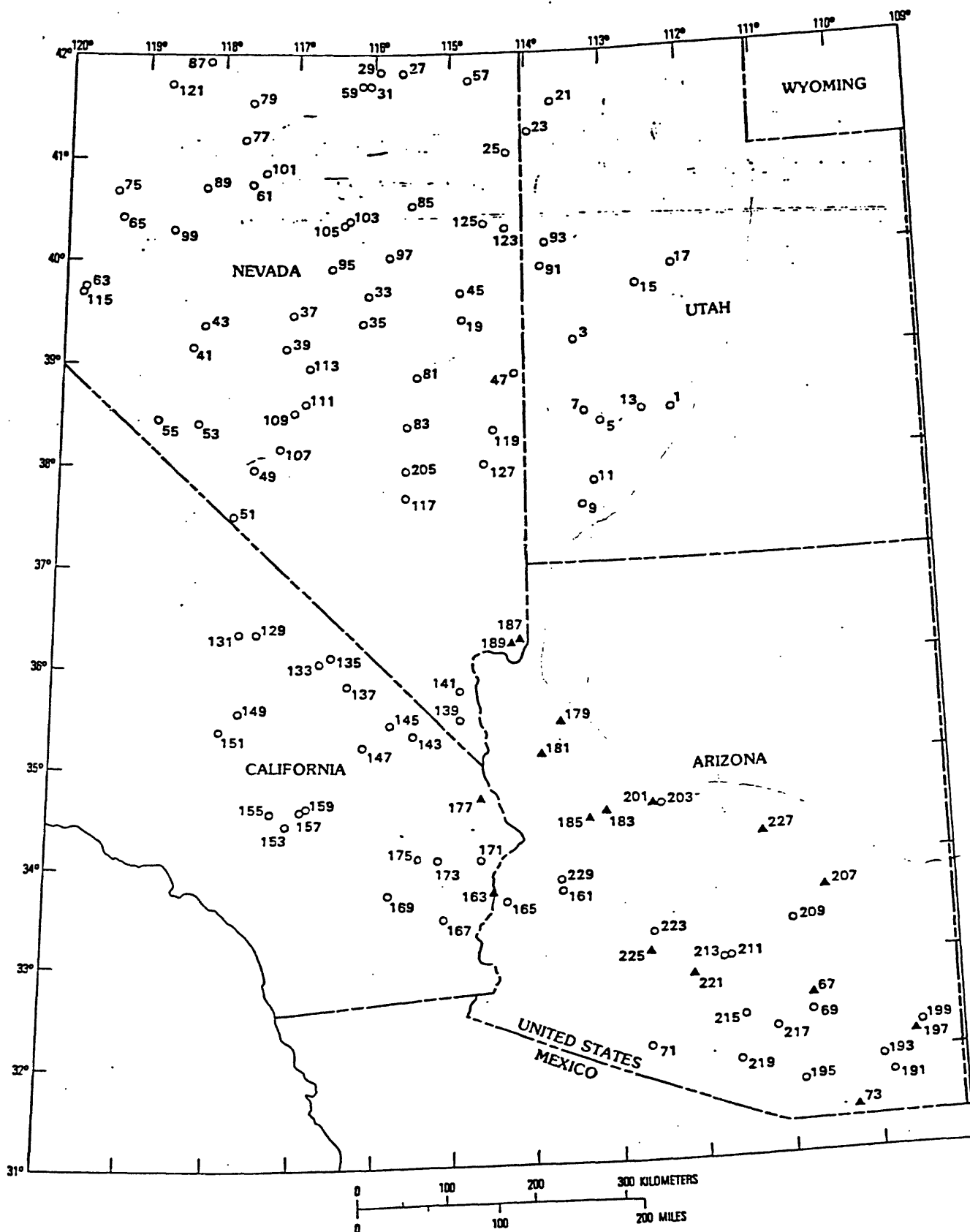


Figure 1. Outline map showing general distribution of samples included in tables 1 and 2. Solid triangle—Precambrian intrusion; open circle—post-Cambrian intrusion.

our laboratory. Uncertainties in whole-rock $^{87}\text{Sr}/^{86}\text{Sr}$ values are about $\pm 0.008\%$. The decay constant for rubidium used to calculate initial $^{87}\text{Sr}/^{86}\text{Sr}$ values for the plutons is from Steiger and Jager (1977).

Rubidium and strontium concentrations in parts per million (ppm), Rb/Sr (weight ratio), $^{87}\text{Rb}/^{86}\text{Sr}$ (atom ratio), $^{87}\text{Sr}/^{86}\text{Sr}$ (atom ratio, measured), $^{87}\text{Sr}/^{86}\text{Sr}$ (atom ratio, calculated and called Sri), and best estimate of age in millions of years are given in table 2 for each granitoid rock collected.

OTHER DATA AVAILABLE FOR THESE ROCKS

Other reports that concern studies of powders of these same rocks are a statistical analysis of their uranium and thorium concentrations (McNeal and others, 1981), barium concentrations (Lee and others, 1980), and oxygen isotopic values for the odd-numbered samples of the suite (Lee and others, 1981). Major element analyses, minor element semiquantitative spectrographic analyses, and quantitative spectrographic analyses for antimony, arsenic, bismuth, cadmium, cesium, lithium, mercury, thallium, and zinc for each sample are given in Lee (1984).

ACKNOWLEDGMENTS

A. C. Robinson determined the Rb and Sr concentrations, and A. C. Robinson, Anne Tapay, and R. W. Kistler determined the strontium isotopic compositions.

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TABLE 1

Sample	State	N. Lat	W. Long	Remarks
GR-1	Utah	38°30'17''	112°11'12''	Piute Co., Marysville pluton
GR-2	Utah	38°30'08''	112°11'48''	do , do
GR-3	Utah	39°11'15''	113°23'05''	Millard Co., Notch Peak pluton
GR-4	Utah	39°11'05''	113°26'10''	do , do
GR-5	Utah	38°21'30''	113°04'40''	Beaver Co., Star Range pluton
GR-6	Utah	38°20'20''	113°04'20''	do , do
GR-7	Utah	38°27'50''	113°17'35''	Beaver Co., San Francisco Mts.
GR-8	Utah	38°29'30''	113°17'05''	do , do
GR-9	Utah	37°34'00''	113°21'15''	Iron Co., Stoddard Mtn. pluton
GR-10	Utah	37°33'00''	113°25'00''	do , do
GR-11	Utah	37°46'10''	113°10'10''	Iron Co., Three Peaks pluton
GR-12	Utah	37°46'50''	113°10'40''	do , do
GR-13	Utah	38°26'00''	112°33'00''	Beaver Co., Indian Creek pluton
GR-14	Utah	38°26'15''	112°34'30''	do , do
GR-15	Utah	39°43'00''	112°35'35''	Juab Co., Desert Mtn. pluton
GR-16	Utah	39°44'25''	112°35'35''	do , do
GR-17	Utah	39°53'55''	112°06'40''	Juab Co., East Tintic Mts. pluton
GR-18	Utah	39°54'30''	112°07'45''	do , do
GR-19	Nevada	39°23'48''	114°51'45''	White Pine Co., Heusser Mtn. pluton
GR-20	Nevada	39°23'45''	114°51'59''	do , do
GR-21	Utah	41°31'55''	113°45'35''	Box Elder Co., Grouse Creek pluton
GR-22	Utah	41°31'30''	113°43'35''	do , do
GR-23	Utah	41°14'00''	113°59'35''	Box Elder Co., Pilot Range pluton
GR-24	Utah	41°12'00''	113°59'55''	do , do
GR-25	Nevada	41°00'20''	114°17'40''	Elko Co., Toano Range pluton
GR-26	Nevada	41°00'35''	114°17'30''	do , do
GR-27	Nevada	41°47'47''	115°38'04''	Elko Co., Coffee Pot pluton
GR-28	Nevada	41°48'15''	115°38'58''	do , do
GR-29	Nevada	41°49'16''	115°55'37''	Elko Co., Golden Ensign pluton
GR-30	Nevada	41°51'03''	115°53'23''	do , do
GR-31	Nevada	41°40'45''	116°04'11''	Elko Co., Columbia stock
GR-32	Nevada	41°40'57''	116°04'39''	do , do
GR-33	Nevada	39°38'48''	116°04'40''	Eureka Co., Whistler Mtn. pluton
GR-34	Nevada	39°39'52''	116°06'07''	do , do
GR-35	Nevada	39°22'53''	116°08'42''	Eureka Co., Wood Cone Peak pluton
GR-36	Nevada	39°22'38''	116°09'06''	do , do
GR-37	Nevada	39°29'38''	117°03'34''	Lander Co., Austin pluton
GR-38	Nevada	39°28'46''	117°02'15''	do , do
GR-39	Nevada	39°08'09''	117°07'54''	Nye Co., central Toiyabe Range pluton
GR-40	Nevada	39°07'16''	117°09'28''	do , do
GR-41	Nevada	39°08'25''	118°20'35''	Churchill Co., Sand Springs Range
GR-42	Nevada	39°09'40''	118°21'15''	do , do
GR-43	Nevada	39°39'44''	118°12'40''	Churchill Co., Stillwater Range
GR-44	Nevada	39°38'30''	118°11'30''	do , do
GR-45	Nevada	39°37'45''	114°54'20''	White Pine Co., Warm Springs pluton
GR-46	Nevada	39°40'10''	114°51'50''	do , do
GR-47	Nevada	38°51'28''	114°12'24''	White Pine Co., Lexington Cr. pluton
GR-48	Nevada	38°50'57''	114°11'04''	do , do
GR-49	Nevada	37°57'15''	117°31'10''	Esmeralda Co., Weepah pluton
GR-50	Nevada	37°57'35''	117°32'00''	do , do
GR-51	Nevada	37°31'45''	117°48'15''	Esmeralda Co., Palmetto Wash pluton
GR-52	Nevada	37°27'35''	117°46'00''	do , do
GR-53	Nevada	38°24'04''	118°14'00''	Mineral Co., Garfield Hills pluton
GR-54	Nevada	38°24'32''	118°13'52''	do , do

GR-55	Nevada	38°26'45''	118°45'25''	Mineral Co., Wassuk Range
GR-56	Nevada	38°25'15''	118°46'15''	do , do
GR-57	Nevada	41°44'55''	114°46'10''	Elko Co., Contact pluton
GR-58	Nevada	41°43'25''	114°43'20''	do , do
GR-59	Nevada	41°42'06''	116°09'00''	Elko Co., White Rock pluton
GR-60	Nevada	41°42'30''	116°09'57''	do , do
GR-61	Nevada	40°45'26''	117°36'56''	Humboldt Co., Sonoma Range
GR-62	Nevada	40°45'26''	117°37'40''	do , do
GR-63	Nevada	39°47'35''	119°40'20''	Washoe Co., Pah Rah Range
GR-64	Nevada	39°47'50''	119°41'10''	do , do
GR-65	Nevada	40°26'05''	119°15'45''	Pershing Co., Selenite Range
GR-66	Nevada	40°24'30''	119°17'35''	do , do
GR-67	Arizona	32°35'10''	110°44'45''	Pinal Co., Oracle Hill pluton
GR-68	Arizona	32°35'40''	110°45'00''	do , do
GR-69	Arizona	32°26'45''	110°46'10''	Pima Co., Santa Catalina Mtns.
GR-70	Arizona	32°25'50''	110°44'50''	do , do
GR-71	Arizona	32°09'15''	112°38'50''	Pima Co., Gunsight Hills
GR-72	Arizona	32°09'30''	112°38'25''	do , do
GR-73	Arizona	31°27'10''	110°18'20''	Cochise Co., Huachuca Mtns.
GR-74	Arizona	31°26'25''	110°16'55''	do , do
GR-75	Nevada	40°40'35''	119°23'05''	Washoe Co., Granite Range pluton
GR-76	Nevada	40°40'15''	119°22'25''	do , do
GR-77	Nevada	41°10'19''	117°44'28''	Humboldt Co., Bloody Run pluton
GR-78	Nevada	41°11'10''	117°43'29''	do , do
GR-79	Nevada	41°29'30''	117°38'35''	Humboldt Co., Santa Rosa pluton
GR-80	Nevada	41°33'13''	117°35'56''	do , do
GR-81	Nevada	38°50'46''	115°28'52''	Nye Co., White Pine Range
GR-82	Nevada	38°50'40''	115°28'58''	do , do
GR-83	Nevada	38°20'55''	115°34'40''	Nye Co., Grant Range, Troy Canyon
GR-84	Nevada	38°21'05''	115°35'20''	do , do
GR-85	Nevada	40°19'34''	115°30'30''	Elko Co., Harrison Pass pluton
GR-86	Nevada	40°19'46''	115°30'52''	do , do
GR-87	Nevada	41°55'45''	118°12'00''	Humboldt Co., Disaster Peak area
GR-88	Nevada	41°54'50''	118°12'25''	do , do
GR-89	Nevada	40°41'48''	118°14'46''	Pershing Co., Rye Patch Reservoir
GR-90	Nevada	40°42'12''	118°14'10''	do , do
GR-91	Utah	39°51'20''	113°48'25''	Juab Co., Deep Creek Range
GR-92	Utah	39°47'40''	113°53'15''	do , do
GR-93	Utah	40°08'45''	113°45'12''	Tooele Co., Gold Hill pluton
GR-94	Utah	40°07'25''	113°45'24''	do , do
GR-95	Nevada	39°55'12''	116°33'20''	Eureka Co., Simpson Park Mtns.
GR-96	Nevada	39°54'50''	116°34'00''	do , do
GR-97	Nevada	40°00'50''	115°50'15''	Eureka Co., Davis Canyon
GR-98	Nevada	40°01'05''	115°50'20''	do , do
GR-99	Nevada	40°17'20''	118°37'25''	Pershing Co., Trinity Range
GR-100	Nevada	40°17'10''	118°38'25''	do , do
GR-101	Nevada	40°49'05''	117°26'00''	Humboldt Co., Edna Mtns.
GR-102	Nevada	40°49'20''	117°26'40''	do , do
GR-103	Nevada	40°21'50''	116°21'05''	Eureka Co., Cortez Mtns.
GR-104	Nevada	40°22'10''	116°20'55''	do , do
GR-105	Nevada	40°19'50''	116°24'10''	Eureka Co., Cortez Mtns.
GR-106	Nevada	40°20'10''	116°23'20''	do , do
GR-107	Nevada	38°09'05''	117°12'10''	Nye Co., Black Mtn. area
GR-108	Nevada	38°09'05''	117°11'50''	do , do
GR-109	Nevada	38°30'30''	117°01'15''	Nye Co., S. of Pipe Spring
GR-110	Nevada	38°30'00''	117°01'05''	do , do

GR-111	Nevada	38°34'24''	116°53'05''	Nye Co., Belmont pluton
GR-112	Nevada	38°35'24''	116°52'25''	do , do
GR-113	Nevada	38°57'10''	116°50'35''	Nye Co., N. Umler Canyon pluton
GR-114	Nevada	38°57'10''	116°50'35''	do , do
GR-115	Nevada	39°43'20''	119°42'35''	Washoe Co., W. of Hungry Valley
GR-116	Nevada	39°43'55''	119°42'25''	do , do
GR-117	Nevada	37°39'10''	115°37'45''	Lincoln Co., Tempiute pluton
GR-118	Nevada	37°39'20''	115°37'20''	do , do
GR-119	Nevada	38°18'25''	114°27'55''	Lincoln Co., Wilson Creek Range
GR-120	Nevada	38°18'25''	114°27'55''	do , do
GR-121	Nevada	41°41'35''	118°42'10''	Humboldt Co., Pine Forest Range
GR-122	Nevada	40°40'35''	118°43'00''	do , do
GR-123	Nevada	40°15'55''	114°17'10''	Elko Co., Whitehorse Pass pluton
GR-124	Nevada	40°15'15''	114°18'00''	do , do
GR-125	Nevada	40°20'30''	114°33'30''	Elko Co., Dolly Varden Mtns.
GR-126	Nevada	40°21'40''	114°34'25''	do , do
GR-127	Nevada	37°59'05''	114°36'30''	Lincoln Co., Blind Mountain pluton
GR-128	Nevada	37°59'20''	114°36'45''	do , do
GR-129	Calif.	36°20'15''	117°28'30''	Inyo Co., Argus Range
GR-130	Calif.	36°20'25''	117°28'50''	do , do
GR-131	Calif.	36°19'25''	117°41'10''	Inyo Co., Coso Range near Darwin
GR-132	Calif.	36°19'00''	117°40'35''	do , do
GR-133	Calif.	36°02'20''	116°40'35''	Inyo Co., Armagosa Range
GR-134	Calif.	36°02'40''	116°40'25''	do , do
GR-135	Calif.	36°06'55''	116°32'30''	Inyo Co., Greenwater Range
GR-136	Calif.	36°06'10''	116°33'30''	do , do
GR-137	Calif.	35°47'25''	116°20'00''	San Bernadino Co., Kingston Range
GR-138	Calif.	35°47'15''	116°19'30''	do , do
GR-139	Nevada	35°27'45''	114°54'50''	Clark Co., Searchlight area
GR-140	Nevada	35°27'20''	114°54'50''	do , do
GR-141	Nevada	35°43'00''	114°55'25''	Clark Co., Opal Mtns.
GR-142	Nevada	35°42'40''	114°55'20''	do , do
GR-143	Calif.	35°18'00''	115°32'20''	San Bernadino Co., Kessler Springs
GR-144	Calif.	35°18'50''	115°32'50''	do , pluton
GR-145	Calif.	35°24'30''	115°48'10''	San Bernadino Co., Halloran Pass area
GR-146	Calif.	35°24'40''	115°47'20''	do , do
GR-147	Calif.	35°11'10''	116°08'40''	San Bernadino Co., 8 mi. SW of Baker
GR-148	Calif.	35°11'45''	116°09'00''	do , do
GR-149	Calif.	35°32'30''	117°41'34''	Kern Co., Laurel Mtn. area
GR-150	Calif.	35°31'15''	117°40'20''	do , do
GR-151	Calif.	35°22'20''	117°54'35''	Kern Co., El Paso Mountains
GR-152	Calif.	35°22'05''	117°55'20''	do , do
GR-153	Calif.	34°27'30''	117°03'35''	San Bernadino Co., Granite Mtns.
GR-154	Calif.	34°28'05''	117°04'55''	do , Lucerne Valley
GR-155	Calif.	34°32'35''	117°16'35''	San Bernadino Co., Victorville
GR-156	Calif.	34°32'45''	117°17'15''	do , Apple Valley area
GR-157	Calif.	34°33'25''	116°54'30''	San Bernadino Co., S. of Ord Mtns.
GR-158	Calif.	34°33'05''	116°54'25''	do , Apple Valley area
GR-159	Calif.	34°34'30''	116°49'00''	San Bernadino Co., S. of Ord Mtns.
GR-160	Calif.	34°34'25''	116°49'35''	do , Apple Valley area
GR-161	Arizona	33°44'20''	113°40'15''	Yuma Co., Granite Wash Pass pluton
GR-162	Arizona	33°44'40''	113°40'10''	do , do
GR-163	Calif.	33°44'35''	114°30'45''	Riverside Co., Blythe pluton
GR-164	Calif.	33°44'30''	114°31'10''	do , do
GR-165	Arizona	33°39'40''	114°19'25''	Yuma Co., Dome Rock Mtns. pluton
GR-166	Arizona	33°39'00''	114°22'45''	do , do

GR-167	Calif.	33°27'20''	115°08'00''	Riverside Co., Graham Pass pluton
GR-168	Calif.	33°28'35''	115°07'15''	do , do
GR-169	Calif.	33°42'40''	115°48'20''	Riverside Co., Cottonwood Pass pluton
GR-170	Calif.	33°43'40''	115°49'25''	do , do
GR-171	Calif.	34°03'55''	114°39'15''	Riverside Co., W. Riverside Mtns.
GR-172	Calif.	34°04'45''	114°40'00''	do , pluton
GR-173	Calif.	34°04'50''	115°11'05''	San Bernadino Co., Iron Mtns. pluton
GR-174	Calif.	34°02'25''	115°12'55''	Riverside Co., Iron Mtns. pluton
GR-175	Calif.	34°05'40''	115°24'35''	San Bernadino Co., Twentynine Palms
GR-176	Calif.	34°06'30''	115°27'35''	do , Highway pluton
GR-177	Calif.	34°40'20''	114°41'40''	San Bernadino Co., Sacramento Mtns.
GR-178	Calif.	34°40'15''	114°38'55''	do , pluton
GR-179	Arizona	35°25'20''	113°39'00''	Mohave Co., Hackberry pluton
GR-180	Arizona	35°24'05''	113°39'20''	do , do
GR-181	Arizona	35°06'00''	113°52'35''	Mohave Co., Hualapi pluton
GR-182	Arizona	35°07'15''	113°54'45''	do , do
GR-183	Arizona	34°31'25''	113°07'15''	Yavapi Co., southeast of Bagdad
GR-184	Arizona	34°31'05''	113°05'40''	do , do
GR-185	Arizona	34°28'15''	113°19'05''	Yavapi Co., southwest of Bagdad
GR-186	Arizona	34°28'55''	113°22'00''	Mohave Co., southwest of Bagdad
GR-187	Nevada	36°16'25''	114°11'35''	Clark Co., Armed Boy pluton
GR-188	Nevada	36°15'50''	114°09'15''	do , do
GR-189	Nevada	36°13'50''	114°15'25''	Clark Co., wrong location pluton
GR-190	Nevada	36°12'00''	114°15'10''	do , do
GR-191	Arizona	31°45'20''	109°52'25''	Cochise Co., SE Dragoon Mtns.
GR-192	Arizona	31°45'00''	109°51'55''	do , pluton
GR-193	Arizona	31°55'15''	109°57'55''	Cochise Co., Cochise Stronghold
GR-194	Arizona	31°55'50''	109°57'55''	do , pluton
GR-195	Arizona	31°44'40''	110°53'15''	Pima Co., Madera Canyon pluton
GR-196	Arizona	31°44'00''	110°52'55''	do , do
GR-197	Arizona	32°10'05''	109°35'15''	Cochise Co., SE Dos Cabezas Mtns.
GR-198	Arizona	32°10'00''	109°34'50''	do , pluton
GR-199	Arizona	32°14'00''	109°29'45''	Cochise Co., Nine Mile Ranch pluton
GR-200	Arizona	32°14'30''	109°30'30''	do , do
GR-201	Arizona	34°35'05''	112°34'00''	Yavapi Co., 3 mi. W-NW of Prescott
GR-202	Arizona	34°34'55''	112°33'20''	do , do
GR-203	Arizona	34°34'20''	112°30'00''	Yavapi Co., Prescott pluton
GR-204	Arizona	34°34'00''	112°26'25''	do , do
GR-205	Nevada	37°56'25''	115°36'00''	Lincoln Co., Worthington Mtns. pluton
GR-206	Nevada	37°56'15''	115°36'15''	do , do
GR-207	Arizona	33°39'00''	110°34'45''	Gila Co., Timber Camp Mtn. pluton
GR-208	Arizona	33°39'00''	110°34'15''	do , do
GR-209	Arizona	33°21'50''	110°58'10''	Gila Co., Inspiration pluton
GR-210	Arizona	33°22'10''	110°56'45''	do , do
GR-211	Arizona	33°02'20''	111°43'45''	Pinal Co., Sacaton Mtns. east
GR-212	Arizona	33°02'20''	111°43'25''	do , do
GR-213	Arizona	33°01'50''	111°46'20''	Pinal Co., Sacaton Mtns. west
GR-214	Arizona	33°01'35''	111°46'35''	do , do
GR-215	Arizona	32°25'55''	111°32'55''	Pima Co., Silver Bell Mountains
GR-216	Arizona	32°25'55''	111°33'35''	do , do
GR-217	Arizona	32°17'30''	111°09'45''	Pima Co., Tucson Mountains
GR-218	Arizona	32°17'00''	111°10'20''	do , do
GR-219	Arizona	31°59'10''	111°36'00''	Pima Co., Kitt Peak pluton
GR-220	Arizona	31°58'15''	111°37'10''	do , do
GR-221	Arizona	32°50'15''	112°08'50''	Pinal Co., Antelope Peak pluton
GR-222	Arizona	32°50'15''	112°09'20''	do , do

GR-223	Arizona	33°18'00''	112°37'45''	Maricopa Co., Buckeye Hills
GR-224	Arizona	33°18'45''	112°37'15''	do , do
GR-225	Arizona	33°11'50''	112°38'55''	Maricopa Co., Maricopa Mountains
GR-226	Arizona	33°11'35''	112°38'55''	do , do
GR-227	Arizona	34°15'00''	111°16'15''	Gila Co., Payson pluton
GR-228	Arizona	34°15'50''	111°14'45''	do , do
GR-229	Arizona	33°50'40''	113°40'55''	Yuma Co., Tank Pass pluton
GR-230	Arizona	33°51'20''	113°41'35''	do , do

TABLE 2

Sample	State	Rb(ppm)	Sr(ppm)	Rb/Sr	⁸⁷ Rb/ ⁸⁶ Sr	⁸⁷ Sr/ ⁸⁶ Sr	Sr1	Age
Gr-1	Utah	250	719	.348	1.01	.70567	.7056	21
GR-2	Utah	301	557	.54	1.56	.70588	.7056	21
GR-3	Utah	176	356	.494	1.43	.70945	.706	169
GR-4	Utah	181	370	.489	1.42	.70983	.7064	169
GR-5	Utah	118	534	.221	.64	.70945	.7093	22
GR-6	Utah	154	467	.33	.95	.7091	.7088	22
GR-7	Utah	111	678	.164	.47	.70649	.7063	32
GR-8	Utah	147	589	.25	.72	.70673	.7064	32
GR-9	Utah	118	658	.179	.52	.70729	.706	169
GR-10	Utah	124	638	.194	.56	.70725	.7059	169
GR-11	Utah	118	659	.179	.52	.70733	.7061	169
GR-12	Utah	115	612	.188	.54	.70734	.7065	169
GR-13	Utah	195	779	.25	.72	.70574	.7055	21
GR-14	Utah	205	695	.29	.85	.70576	.7055	21
GR-15	Utah	183	453	.404	1.17	.70995	.7075	147
GR-16	Utah	179	348	.514	1.49	.71055	.7075	147
GR-17	Utah	125	624	.2	.58	.70926	.708	147
GR-18	Utah	141	622	.226	.65	.70868	.7073	147
GR-19	Nev.	174	282	.617	1.79	.7142	.7133	34
GR-20	Nev.	161	280	.575	1.66	.71422	.7134	34
GR-21	Utah	132	208	.635	1.84	.71229	.7113	38
GR-22	Utah	119	192	.62	1.79	.71054	.7096	38
GR-23	Utah	111	300	.37	1.07	.70761	.7071	37
GR-24	Utah	106	248	.427	1.24	.70764	.707	37
GR-25	Nev.	167	193	.865	2.15	.72938	.7268	80
GR-26	Nev.	183	144	1.27	3.68	.7294	.7252	80
GR-27	Nev.	110	710	.154	.45	.70522	.7046	90
GR-28	Nev.	93	671	.139	.4	.70519	.7047	90
GR-29	Nev.	129	458	.282	.81	.70541	.7044	90
GR-30	Nev.	127	460	.276	.8	.70557	.7045	90
GR-31	Nev.	39	654	.059	.172	.70489	.7045	150
GR-32	Nev.	54	847	.064	.184	.70505	.7047	150
GR-33	Nev.	148	204	.725	2.1	.71314	.7085	156
GR-34	Nev.	144	213	.676	1.96	.71309	.7088	156
GR-35	Nev.	118	510	.231	.67	.70965	.7093	38
GR-36	Nev.	128	443	.289	.84	.70972	.7093	38
GR-37	Nev.	136	432	.315	.91	.70905	.7081	155
GR-38	Nev.	145	475	.305	.89	.70923	.7073	155
GR-39	Nev.	91	718	.127	.37	.70634	.7055	155
GR-40	Nev.	139	570	.243	.71	.7071	.7055	155
GR-41	Nev.	90	615	.146	.42	.70492	.7044	82
GR-42	Nev.	156	321	.485	1.41	.70627	.7046	82
GR-43	Nev.	121	692	.175	.51	.7051	.7049	28
GR-44	Nev.	159	541	.294	.85	.70541	.7051	28
GR-45	Nev.	398	24	16.6	48.12	.73772	.712	38
GR-46	Nev.	227	176	1.289	3.74	.71604	.714	38
GR-47	Nev.	102	593	.172	.5	.71191	.7113	86
GR-48	Nev.	113	637	.177	.51	.71203	.7114	86
GR-49	Nev.	144	78.9	1.82	5.27	.70754	.7063	18.3
GR-50	Nev.	179	222	.806	2.33	.70681	.7062	18.3
GR-51	Nev.	145	746	.194	.562	.70829	.7071	155
GR-52	Nev.	127	784	.162	.468	.70787	.7068	155
GR-53	Nev.	278	28	9.92	29.02	.81146	.7657	111
GR-54	Nev.	226	36.4	6.21	18.09	.78031	.7518	111

GR-55	Nev.	118	226	.522	1.51	.70601	.7045	77
GR-56	Nev.	136	585	.232	.67	.70624	.7055	77
GR-57	Nev.	128	785	.163	.47	.7063	.7053	155
GR-58	Nev.	112	821	.136	.39	.70642	.7056	155
GR-59	Nev.	69.7	586	.119	.34	.7058	.705	155
GR-60	Nev.	75.1	572	.131	.38	.70581	.705	155
GR-61	Nev.	225	333	.676	1.96	.71222	.7079	155
GR-62	Nev.	243	434	.56	1.62	.71148	.7079	155
GR-63	Nev.	71	457	.16	.45	.70448	.70391	90
GR-64	Nev.	60.4	456	.132	.38	.70454	.704	90
GR-65	Nev.	66	619	.107	.31	.70469	.7043	90
GR-66	Nev.	84.9	574	.148	.43	.70495	.7044	90
GR-67	Ariz.	184	165	1.12	3.24	.77103	.703	1400
GR-68	Ariz.	182	162	1.12	3.24	.77223	.703	1400
GR-69	Ariz.	190	307	.619	1.79	.71188	.71023	65
GR-70	Ariz.	146	262	.557	1.61	.71267	.71118	65
GR-71	Ariz.	105	655	.16	.46	.70772	.7066	170
GR-72	Ariz.	99	655	.151	.44	.70776	.7067	171
GR-73	Ariz.	408	24.9	16.39	48.47	.93486	.703	1400
GR-74	Ariz.	313	126	2.48	7.29	.85065	.703	1400
GR-75	Nev.	70	504	.139	.402	.70488	.7044	90
GR-76	Nev.	73.9	448	.164	.48	.70496	.70435	90
GR-77	Nev.	81	561	.144	.417	.70567	.7051	90
GR-78	Nev.	91.1	524	.173	.502	.70604	.7054	90
GR-79	Nev.	51.5	573	.09	.26	.705	.7047	100
GR-80	Nev.	51.4	564	.091	.263	.70512	.7048	100
GR-81	Nev.	126	427	.295	.854	.71177	.7114	33
GR-82	Nev.	137	425	.322	.933	.7121	.7117	33
GR-83	Nev.	109	774	.141	.408	.71114	.711	23
GR-84	Nev.	113	724	.156	.452	.71147	.7113	23
GR-85	Nev.	128	418	.306	.887	.71147	.711	38
GR-86	Nev.	140	419	.334	.967	.71058	.7101	38
GR-87	Nev.	51	768	.067	.192	.70416	.7039	91
GR-88	Nev.	62.4	743	.084	.242	.70429	.704	91
GR-89	Nev.	108	452	.239	.691	.70607	.7051	103
GR-90	Nev.	92	496	.185	.537	.70589	.7051	103
GR-91	Utah	150	290	.517	1.5	.71482	.714	38
GR-92	Utah	244	188	1.3	3.76	.71905	.717	38
GR-93	Utah	128	722	.177	.51	.71067	.7096	155
GR-94	Utah	169	864	.195	.56	.70918	.7079	155
GR-95	Nev.	141	454	.311	.899	.70786	.7074	33
GR-96	Nev.	159	470	.338	.979	.7078	.7074	33
GR-97	Nev.	90	691	.13	.377	.70794	.7078	35
GR-98	Nev.	88	726	.121	.351	.70788	.7077	35
GR-99	Nev.	119	312	.381	1.103	.70651	.705	100
GR-100	Nev.	122	310	.394	1.139	.7067	.7051	100
GR-101	Nev.	86.3	525	.164	.476	.70691	.7062	103
GR-102	Nev.	89	664	.134	.388	.707	.7064	103
GR-103	Nev.	115	368	.312	.904	.70915	.7072	150
GR-104	Nev.	113	291	.388	1.124	.70944	.7071	150
GR-105	Nev.	79.4	592	.134	.388	.70702	.7062	150
GR-106	Nev.	46	507	.091	.262	.70626	.7057	150
GR-107	Nev.	120	712	.169	.488	.70694	.7056	200
GR-108	Nev.	130	865	.15	.434	.70637	.7051	200
GR-109	Nev.	120	735	.163	.472	.7063	.7058	80
GR-110	Nev.	113	676	.167	.483	.70653	.706	80

GR-111 Nev.	174	799	.218	.63	.70688	.7061	85
GR-112 Nev.	150	806	.186	.538	.70671	.7061	85
GR-113 Nev.	73.1	575	.127	.368	.70631	.7055	155
GR-114 Nev.	70.5	524	.134	.389	.70645	.7056	155
GR-115 Nev.	110	452	.243	.704	.7054	.7043	90
GR-116 Nev.	61.8	636	.097	.281	.70439	.704	90
GR-117 Nev.	175	740	.236	.684	.70838	.7075	95
GR-118 Nev.	180	927	.194	.561	.70788	.7071	95
GR-119 Nev.	142	452	.314	.909	.70944	.709	38
GR-120 Nev.	139	457	.304	.88	.70965	.7092	38
GR-121 Nev.	59	591	.1	.289	.7044	.704	90
GR-122 Nev.	77.6	423	.183	.53	.70489	.7042	90
GR-123 Nev.	151	399	.378	1.095	.70965	.707	150
GR-124 Nev.	137	452	.303	.877	.7088	.707	150
GR-125 Nev.	211	934	.226	.653	.70812	.7067	150
GR-126 Nev.	149	602	.247	.716	.70889	.7074	150
GR-127	LOST						
GR-128 Nev.	152	381	.398	1.155	.70817	.7076	35
GR-129 Cal.	94	1434	.066	.19	.70652	.7061	170
GR-130 Cal.	88	1137	.077	.223	.70688	.7063	170
GR-131 Cal.	129	213	.606	1.75	.71184	.7076	170
GR-132 Cal.	133	264	.503	1.46	.71137	.7078	170
GR-133 Cal.	70.5	476	.148	.429	.70805	.707	20
GR-134 Cal.	102	414	.246	.713	.70878	.7086	20
GR-135 Cal.	77	284	.271	.785	.70859	.7084	18
GR-136 Cal.	65.5	290	.225	.653	.70978	.7096	18
GR-137 Cal.	166	167	.994	2.877	.71101	.7103	18
GR-138 Cal.	187	255	.733	2.123	.71147	.7109	18
GR-139 Nev.	118	563	.21	.607	.70944	.7093	20
GR-140 Nev.	111	670	.166	.479	.70945	.7093	20
GR-141 Nev.	197	29.5	8.041	23.29	.71645	.7098	20
GR-142 Nev.	205	29.3	7	20.26	.71603	.7103	20
GR-143 Cal.	110	686	.16	.464	.71133	.7107	100
GR-144 Cal.	120	591	.203	.588	.71072	.7099	100
GR-145 Cal.	159	155	1.026	2.97	.71276	.7098	71
GR-146 Cal.	97.4	212	.459	1.33	.71123	.7099	71
GR-147 Cal.	180	7.5	24	70.37	.84483	.754	90.5
GR-148 Cal.	188	5.4	34.81	102.49	.88612	.754	90.5
GR-149 Cal.	169	310	.545	1.578	.71175	.708	170
GR-150 Cal.	197	261	.754	2.185	.71321	.708	170
GR-151 Cal.	36.9	564	.065	.189	.70424	.7036	250
GR-152 Cal.	28.2	584	.048	.14	.70392	.7034	250
GR-153 Cal.	128	1264	.101	.293	.70867	.7079	180
GR-154 Cal.	144	1653	.087	.252	.70757	.7069	180
GR-155 Cal.	113	513	.22	.638	.7101	.7091	107
GR-156 Cal.	141	291	.485	1.402	.71127	.7091	107
GR-157 Cal.	181	196	.923	2.675	.72197	.71855	90
GR-158 Cal.	177	189	.936	2.714	.72275	.71938	90
GR-159 Cal.	120	555	.216	.626	.71039	.7096	90
GR-160 Cal.	139	474	.293	.849	.70998	.7089	90
GR-161 Ariz.	99.6	586	.17	.492	.70829	.7072	150
GR-162 Ariz.	103	623	.165	.478	.70833	.7073	150
GR-163 Ariz.	330	46.5	7.1	21.07	.97422	.776	613
GR-164 Ariz.	293	51.6	5.68	16.8	.93183	.776	613
GR-165 Ariz.	172	294	.585	1.69	.71313	.70816	207
GR-166 Ariz.	185	271	.683	1.98	.71396	.70816	207

GR-167	Cal.	94.2	549	.171	.496	.70889	.7083	90
GR-168	Cal.	104	454	.229	.663	.70969	.7088	90
GR-169	Cal.	132	226	.584	1.692	.72088	.7187	90
GR-170	Cal.	108	136	.794	2.3	.71676	.7138	90
GR-171	Cal.	81	605	.134	.387	.70701	.7065	90
GR-172	Cal.	93.9	613	.153	.443	.70711	.7065	90
GR-173	Cal.	107	459	.233	.675	.71215	.7104	182
GR-174	Cal.	88.7	556	.159	.462	.7116	.7104	182
GR-175	Cal.	142	298	.476	1.38	.71167	.7099	90
GR-176	Cal.	124	362	.343	.992	.71464	.7135	90
GR-177	LOST						.702	1650
GR-178	Cal.	174	149	1.168	3.4	.77684	.702	1650
GR-179	Ariz.	99.4	458	.217	.629	.7172	.702	1650
GR-180	Ariz.	96.2	756	.127	.368	.71115	.702	1650
GR-181	Ariz.	173	842	.205	.595	.7159	.702	1650
GR-182	Ariz.	160	551	.29	.841	.72013	.702	1650
GR-183	Ariz.	193	164	1.18	3.43	.7841	.702	1650
GR-184	Ariz.	229	98.3	2.33	6.84	.8573	.702	1650
GR-185	Ariz.	235	260	.904	2.63	.75908	.707	1400
GR-186	Ariz.	349	123	2.84	8.35	.87735	.707	1400
GR-187	Nev.	234	199	1.18	3.42	.76459	.707	1200
GR-188	Nev.	126	319	.395	1.14	.7246	.707	1200
GR-189	Nev.	83.5	251	.333	.964	.72669	.707	1200
GR-190	Nev.	137	240	.571	1.66	.73485	.707	1200
GR-191	Ariz.	285	23.8	11.98	34.91	.7857	.7104	152
GR-192	Ariz.	213	145	1.47	4.26	.71955	.7104	151
GR-193	Ariz.	290	36.9	7.86	22.77	.7195	.7113	25
GR-194	Ariz.	296	49.2	6.02	17.42	.71758	.7113	25
GR-195	Ariz.	162	518	.313	.905	.70785	.7069	76.5
GR-196	Ariz.	172	145	1.19	3.43	.7106	.7069	76.5
GR-197	Ariz.	214	163	1.31	3.83	.78549	.702	1650
GR-198	Ariz.	203	163	1.25	3.63	.78852	.702	1650
GR-199	Ariz.	138	280	.493	1.43	.71132	.7096	76.5
GR-200	Ariz.	140	276	.507	1.47	.7112	.7096	76.5
GR-201	Ariz.	121	462	.262	.759	.72013	.702	1650
GR-202	Ariz.	132	472	.28	.81	.72203	.702	1650
GR-203	Ariz.	57.1	692	.083	.239	.70767	.702	1650
GR-204	Ariz.	71.5	460	.155	.45	.71335	.702	1650
GR-205	Nev.	215	247	.87	2.52	.71033	.7098	14.6
GR-206	Nev.	214	76.3	2.8	8.12	.71149	.7098	14.6
GR-207	Ariz.	270	140	1.93	5.64	.81857	.707	1400
GR-208	Ariz.	270	152	1.78	5.19	.80901	.707	1400
GR-209	Ariz.	106	617	.172	.497	.7091	.7086	76.5
GR-210	Ariz.	94.8	739	.128	.371	.70943	.709	76.5
GR-211	Ariz.	71.5	546	.131	.379	.70729	.7069	76.5
GR-212	Ariz.	100	512	.195	.565	.70794	.7073	76.5
GR-213	Ariz.	113	460	.246	.711	.70827	.7075	76.5
GR-214	Ariz.	98.8	539	.183	.53	.70808	.7075	76.5
GR-215	Ariz.	213	171	1.25	3.61	.71298	.7091	76.5
GR-216	Ariz.	217	196	1.11	3.21	.71243	.709	76.5
GR-217	Ariz.	106	768	.138	.399	.70778	.7074	76.5
GR-218	Ariz.	123	744	.165	.478	.70785	.7073	76.5
GR-219	Ariz.	99.7	449	.222	.643	.70944	.7082	134
GR-220	Ariz.	170	150	1.13	3.28	.71445	.7082	134
GR-221	Ariz.	321	61.6	5.21	15.54	1.03672	.707	1400
GR-222	Ariz.	334	53.1	6.29	18.82	1.05874	.707	1400

GR-223	Ariz.	311	175	1.78	5.2	.81633	.702	1650
GR-224	Ariz.	172	317	.542	1.58	.73896	.702	1650
GR-225	Ariz.	229	159	1.44	4.2	.79893	.702	1650
GR-226	Ariz.	213	161	13.2	3.86	.78796	.702	1650
GR-227	Ariz.	150	109	1.38	4.02	.79483	.702	1650
GR-228	Ariz.	152	108	1.41	4.11	.79621	.702	1650
GR-229	Ariz.	126	27.9	4.52	13.08	.72014	.705	80.1
GR-230	Ariz.	136	24.6	5.57	16.15	.72363	.705	80.1