DR# 2002097

Table 1. Chemical and isotopic data for important lithologies of the Santaquin complex.[1]

	99HS127A	**99HS127B**	**99HS129A**	**99HS130**	**99HS131**	**99HS132**
	fine-grained leucogranite	*mafic syenite*	*augen gneiss (meta-granite)*	*garmet amphibolite (meta-latite?)*	*pegmatitic granite*	*amphibolite (metabasalt?)*
SiO_2	75.11	50.37	75.56	60.57	76.12	49.86
TiO_2	0.12	3.5	0.16	0.8	0.07	0.52
Al_2O_3	13.9	11.74	12.77	16.79	14.33	13.2
Fe_2O_3	0.72	11.43	1.76	7.39	0.49	11.75
MnO	0.01	0.18	0.03	0.05	0.02	0.19
MgO	0.17	3.06	0.28	3.51	0.05	8.34
CaO	0.8	8.96	1.24	2.39	1.56	10.42
Na_2O	4.14	2.11	2.44	3.17	5.31	2.19
K_2O	4.02	5.98	5.3	2.53	1.62	1.26
P_2O_5	0.03	2.24	0.04	0.17	0.03	0.14
LOI	0.87	0.56	0.59	1.72	0.7	1.57
SUM	99.89	100.13	100.17	99.09	100.3	99.44
Pb	11	19	32	15	23	9
Rb	66	77	100	70	56	31
Ba	1353	2466	1066	573	126	235
Th	n.d.	10	4	n.d.	30	n.d.
U	n.d.	3	n.d.	2	15	2
Nb	12	33	n.d.	11	n.d.	4
La	20	176	27	17	6	4
Ce	33	256	41	38	14	10
Nd[2]	*13.457*	*380.81*	*85.434*	*23.214*	*6.1049*	*5.7449*
Sm[2]	*1.739*	*22.621*	*12.265*	*3.9107*	*1.2184*	*1.3354*
Sr	381	911	159	276	199	358
Zr	97	287	183	128	70	33
Y	11	38	16	14	23	18
Ni	6	25	4	84	7	48
Cr	n.d.	21	n.d.	233	n.d.	468
V	6	121	n.d.	165	n.d.	291
Cu	53	74	5	51	2	35
Zn	n.d.	147	13	117	n.d.	59
$^{87}Sr/^{86}Sr$	0.714032(10)	0.708054(11)	0.752393(10)	0.720467(10)	0.719787(10)	0.708823(11)
$^{87}Sr/^{86}Sr_i$	0.70178	0.702079	0.707742	0.702517	0.699872	0.702701
$^{147}Sm/^{144}Nd$	0.078112	0.035907	0.08678289	0.10183	0.12063	0.14051
$^{143}Nd/^{144}Nd$	0.51146	0.51159	0.5115	0.51196	0.51194	0.51229
εNd	-22.98	-20.44	-22.2	-13.23	-13.62	-6.79
εNd_i	2.9	14.69	1.78	7.5	2.99	5.49
T_{CHUR}	1.51	0.99	1.57	1.09	1.4	0.94
T_{DM}	1.75	1.25	1.81	1.46	1.76	1.54
$^{206}Pb/^{204}Pb$	38.744	39.196	37.061	37.661	41.556	38.472
$^{207}Pb/^{204}Pb$	15.714	16.052	15.475	15.884	17.89	15.948
$^{208}Pb/^{204}Pb$	20.825	23.633	17.355	22.567	45.03	22.074

[1]Major and trace elements were determined by wavelength-dispersive X-ray fluorescence spectrometry at Brigham Young University (BYU), with accuracy and precision similar to values reported in Nelson and Tingey (1997). Sr-, Nd-, and Pb-isotope ratios were measured at the Keck Isotope Laboratory at the University of California, Los Angeles.

[2]Sm and Nd concentrations in italics were determined by isotope dilution at the Keck Isotope Laboratory at the University of California, Los Angeles.

Table 2A. Electron microprobe data (elemental wt. %) and ages for monazite in sample 01HS101, a garnet-biotite schist, sampled near sample FCC-111 of Barnett et al. (1993).[1]

	Y	Pb	Th	U	Age (Ma)
grain 1					
	1.973	0.373	3.178	0.331	1809
	1.956	0.342	2.879	0.374	1720
	2.105	0.360	2.653	0.452	1815
	2.055	0.358	2.771	0.354	1864
	2.105	0.372	2.727	0.461	1794
	2.146	0.369	2.689	0.455	1801
	2.123	0.444	3.657	0.398	1846
grain 2					
	1.718	0.310	3.343	0.393	1410
	2.190	0.372	2.936	0.424	1768
	2.352	0.329	2.355	0.411	1808
	1.893	0.377	3.038	0.452	1721
grain 3					
	1.884	0.345	3.200	0.245	1795
	1.777	0.319	3.212	0.200	1730
	1.946	0.393	3.123	0.426	1790
	1.526	0.343	3.294	0.310	1665
grain 4					
	1.186	0.357	3.266	0.390	1642
	1.225	0.317	2.698	0.406	1635
	1.206	0.310	2.556	0.354	1727
	0.637	0.370	3.639	0.366	1611
	1.227	0.326	2.707	0.358	1740
grain 5					
	1.123	0.376	3.568	0.367	1652
	1.366	0.398	3.393	0.475	1671
	0.685	0.415	3.975	0.400	1650
	0.425	0.340	3.292	0.242	1752
grain 6					
	1.154	0.320	2.725	0.355	1709
	1.432	0.392	3.381	0.466	1661

	1.291	0.349	2.979	0.374	1723
	1.412	0.391	3.379	0.457	1668
	1.376	0.392	3.362	0.459	1675
grain 7					
	0.488	0.385	3.722	0.381	1630
	0.582	0.357	3.713	0.356	1549
	0.857	0.376	3.725	0.320	1659
	0.716	0.395	3.781	0.387	1645
	1.051	0.348	3.418	0.316	1642

Table 2B. Electron microprobe data (elemental wt. %) and ages from monazite sample 99HS102, a garnet-biotite schist from the Santaquin complex.[1]

	Y	**Pb**	**Th**	**U**	**Age (Ma)**
grain 1					
	1.110	0.520	2.261	1.213	1681
	1.058	0.532	2.190	1.249	1699
grain 2					
	1.088	0.263	1.902	0.433	1630
	1.208	0.260	1.793	0.426	1670
	0.740	0.393	2.609	0.699	1649
	0.963	0.346	2.548	0.537	1657
grain 3					
	0.848	0.551	2.117	1.51	1579
	1.152	0.226	1.202	0.484	1641
	1.118	0.255	1.502	0.446	1742
grain 4					
	1.107	0.254	1.597	0.386	1800
	1.093	0.197	1.363	0.265	1798
	1.093	0.18	1.139	0.234	1903

[1]Microprobe analyses of monazite were conducted at BYU with a Cameca SX50 electron microprobe using the methods similar to Williams et al. (1999). A 15 kV and 200 nA beam and 300 S counting times were used with a large PET crystal to enhance count rates for Th Mα, Pb Mα, and U Mβ x-rays.

TABLE3. U-Pb isotopic data and ages for sample 99HS127B

Grain type	Grain wt. (µg)	Pb_c (pg)	U (ppm)	Isotope ratios $^{206}Pb_m/^{204}Pb$	$^{206}Pb_c/^{208}Pb$	$^{206}Pb^*/^{238}U$	$^{207}Pb^*/^{235}U$	$^{206}Pb^*/^{238}U$	$^{207}Pb^*/^{235}U$	$^{207}Pb^*/^{206}Pb^*$
127B										
u	26	50	427	1557	5.4	0.113916 ± 0.72	1.46500 ± 0.97	695	916	1494 ± 12
u	34	46	408	1819	8.3	0.098661 ± 0.40	1.24451 ± 0.72	607	821	1457 ± 11
u	41	18	166	2788	11.7	0.120318 ± 0.49	1.55615 ± 0.62	732	953	1504 ± 7
u	37	8	67	2862	9.0	0.153135 ± 0.96	2.04375 ± 1.02	919	1130	1563 ± 6
a	41	26	237	2378	8.9	0.109291 ± 0.47	1.39942 ± 0.68	669	889	1485 ± 9
a	38	11	124	4372	11.9	0.164200 ± 0.43	2.21503 ± 0.60	980	1186	1583 ± 7
a	35	7	69	4440	13.0	0.194509 ± 1.17	2.69676 ± 1.24	1146	1328	1634 ± 7
a	45	24	144	1360	6.7	0.084608 ± 0.59	1.03363 ± 0.81	524	721	1396 ± 10
a	40	29	169	1659	8.5	0.118016 ± 0.74	1.51549 ± 0.84	719	937	1491 ± 7

Grain types: u = unabraded, a = abraded to 70% of original size.

All grains were analyzed as single crystals.

$^{206}Pb/^{204}Pb$ is measured ratio, uncorrected for blank, spike, or fractionation.

$^{206}Pb/^{208}Pb$ is corrected for blank, spike, and fractionation.

All uncertainties are at the 95% confidence level.

Uncertainties in isotope ratios are in percent. Uncertainties in ages are in millions of years.

Most concentrations have an uncertainty of 25% due to uncertainty in weight of grain. Constants used:

$^{238}U/^{235}U = 137.88$. Decay constant for $^{235}U = 9.8485 \times 10^{-10}$. Decay constant for $^{238}U = 1.55125 \times 10^{-10}$.

Isotope ratios are adjusted as folllows:

(1) Mass dependent corrections factors of: 0.14 ±0.06 %/amu for Pb and 0.04 ±0.04 %/amu for UO_2.

(2) Pb ratios corrected for 0.005 ± 0.003 ng blank with $^{206}Pb/^{204}Pb = 18.6 \pm 0.3$, $^{207}Pb/^{204}Pb = 15.5 \pm 0.3$,and $^{208}Pb/^{204}Pb = 38.0 \pm 0.8$.

(3) U has been adjusted for 0.001 ± 0.001 ng blank.

(4) Initial Pb from Stacey and Kramers (1975), with uncertainties of 1.0 for $^{206}Pb/^{204}Pb$, 0.3 for $^{207}Pb/^{204}Pb$, and 2.0 for $^{208}Pb/^{204}Pb$.

All analyses conducted using conventional isotope dilution and thermal ionization mass spectrometry, as described by Gehrels (2000).

Gehrels, G.E., 2000, Introduction to detrital zircon studies of Paleozoic and Triassic strata in western Nevada and northern California, in Soreghan, M.J., and Gehrels, G.E., eds., Paleozoic and Triassic paleogeography and tectonics of western nevada and northern California: Geological Society of America Special Paper 347, p. 1-17.

Stacey, J.S., and Kramers, J.D., 1975, Approximation of terrestrial lead isotope evolution by a two-stage model: Earth and Planetary Science Letters, v. 26, p. 207-221.

Table 4. Hornblende isotopic data and ages

step	Power [W]	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar \times 10^{-3}$	$^{39}Ar_K \times 10\text{-}15$ mol
99HS-127B Hornblende, wt. = 2.95 mg, J = 0.0163200, NM-128, Lab# = 51534-01					
1	3	44.04	2.737	57076	7.13
2	5	82.42	5.111	9.626	9.77
3	6	84.74	5.288	6.148	14.7
4	7	87.85	5.43	4.562	25.5
5	8	88.71	5.344	3.966	22.8
6	9	89.76	5.531	3.162	30
7	10	89.53	5.44	3.102	28.4
8	11	89.91	5.888	2.835	24.5
9	12	89.26	5.741	2.775	18.2
10	13	89.57	5.877	2.916	12.9
11	14	87.81	5.691	3.507	6.83
12	15	89.35	5.738	2.431	25.1
13	20	86.51	6.718	3.009	16.5
14	30	87.15	6.072	3.924	5.04
total gas age [n=14]					247.4
plateau age [MSWD=6.7**; n=7, steps 6-12]					145.8
99HS-132 Hornblende, wt. = 2.745 mg, J = 0.0164197, NM-128, Lab# = 51526-01					
1	3	158.8	6.977	104.5	0.618
2	5	88.6	7.094	5.447	11.1
3	6	91.12	7.239	2.966	14.5
4	7	91.65	7.228	2.757	31.5
5	8	91.84	7.07	2.611	35.5
6	9	91.42	7.093	2.726	23.4
7	10	91.33	7.238	3.087	9.22
8	11	92.18	7.25	3.198	5.06
9	12	91.47	7.207	2.831	8.47
10	13	91.45	7.11	4.044	2.65
11	14	91.48	7.357	4.576	1.93
12	15	90.71	7.492	4.533	0.49
13	20	92.95	7.483	6.041	0.922
14	30	91.46	7.585	3.125	7.49
total gas age [n=14]					152.8
plateau age [MSWD=0.82; n=12, steps 3-14]					141.1

Notes:

1) $^{40}Ar/^{39}Ar$ data were measured at New Mexico Tech with a Mass Analyzer Products 2

2) Hornblende was incrementally heated with a 50 W Synrad CO2 laser.

3) Neutron fluence was monitored with Fish Canyon Tuff sanidine with an assigned age

4) Isotopic ratios corrected for blank, radioactive decay, and mass discrimination, not c

5) Individual analyses show analytical error only; total gas and plateau ages error inclu

6) n = number of heating steps

7) K/Ca = molar ratio calculated from $^{39}Ar_K$ and $^{37}Ar_{Ca}$

*2σ error

**MSWD outside of 95% confidence interval, error multiplied by square root of MSWD

K/Ca	$^{40}Ar^{*}$ [%]	^{39}Ar [%]	Age [Ma]	± 1σ [Ma]*
0.19	61.7	2.9	663.2	5.7
0.1	97	6.8	1510.3	3.3
0.096	98.3	12.8	1552.9	2.7
0.094	98.9	23.1	1597.3	2.5
0.095	99.1	32.3	1609.8	2.8
0.092	99.4	44.4	1625.6	2.6
0.094	99.4	55.9	1622.9	3.3
0.087	99.6	65.8	1629.1	2.4
0.089	99.6	73.2	1621.3	2.6
0.087	99.5	78.4	1624.8	2.7
0.09	99.3	81.1	1601	3.9
0.089	99.7	91.3	1623.7	2.2
0.076	99.6	98	1588.8	2.8
0.084	99.2	100	1592.2	4.7
0.093			***1580.3***	***5.2****
0.09		59	***1623.4***	***5.2****
0.073	80.9	0.4	2052	45
0.072	98.8	7.7	1612.7	3.2
0.07	99.7	17.1	1652.1	2.9
0.071	99.7	37.8	1659.1	2.7
0.072	99.8	61	1661.6	3.2
0.072	99.7	76.3	1656.3	2.7
0.07	99.6	82.3	1654.2	3.6
0.07	99.6	85.6	1663.9	5
0.071	99.7	91.2	1656.7	3.6
0.072	99.3	92.9	1652.1	8.6
0.069	99.2	94.2	1651	12
0.068	99.2	94.5	1642	43
0.068	98.7	95.1	1663	24
0.067	99.6	100	1656.2	3.8
0.071			***1656.1***	***7.0****
0.071		92.3	***1656.9***	***2.2****

:15-50 mass spectrometer.

e of 27.84 Ma (Deino and Potts, 1990).
:orrected for interfering reactions.
des uncertainty in J and irradiation parameters.