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Behavior of isotopic systematics during deformation and metamorphism: a Hf, Nd and Sr isotopic study of mylonitized granite

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We have discovered that many of our Rb concentrations were in error, and this note amends our paper presenting corrected Rb-Sr isotopic results. Table 1 and Fig. 1 give the principal changes.

Sr concentrations reproduce to within 2%, in the worst case to 3%. $^{87}\text{Sr}/^{86}\text{Sr}$ reproduced in most cases to within 3σ overlap with the old results. Our original Rb concentrations were confirmed to within 2% in 5 cases out of 12; others are shown to have been in error by up to a factor of 3.5 downwards. We are sure the new analyses are correct because of duplication in both Arizona and Wisconsin laboratories, and because the determinations were performed by "total spiking." This means addition of ^{87}Rb - ^{84}Sr tracer solution to the sample prior to closed-vessel dissolution. This procedure more adequately ensures equilibration between tracer and sample Rb and Sr. The old analyses, by contrast, were performed by adding ^{87}Rb - ^{84}Sr tracer to weighed aliquots of a larger-

Table 1 Corrected Rb-Sr isotopic results

Sample	Rb ^a (ppm)	Sr ^b (ppm)	$^{87}\text{Rb}/^{86}\text{Sr}^a$	$^{87}\text{Sr}/^{86}\text{Sr}^c$
Undeformed				
KB89-11	155.2	309.8	1.453	0.73709 ± 1
KB89-10	144.7	375.5	1.117	0.72855 ± 1
Protomylonite				
KB89-5	215.5	175.5	3.576	0.77695 ± 1
KB89-1	144.3	203.3	2.060	0.74002 ± 1
KB89-9	148.7	419.0	1.028	0.72745 ± 1
Mylonite				
KB89-7	179.0	215.8	2.404	0.73102 ± 1
KB89-6B	153.2	293.4	1.514	0.73352 ± 1
KB89-6	142.4	245.5	1.682	0.73061 ± 2
KB89-3	159.8	250.2	1.853	0.73672 ± 1
KB89-2A	97.3	232.9	1.211	0.72691 ± 1
Ultramylonite				
KB89-6A	185.1	399.0	1.345	0.72874 ± 3
KB89-2	123.8	528.4	0.679	0.72235 ± 1

^a Error < 1.0%^b Error < 0.5%^c In-run 2σ measurement error shown

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Fig. 1 Corrected Rb-Sr isotopic data for the mylonite zone in 1.4 Ga Harquahala Granite, western Arizona. *Filled circles*, undeformed samples; *open circles*, protomylonite and mylonite samples; *crosses*, ultramylonite samples. Points that deviate from the 1.4 Ga reference line shown all lie *below* the line in the corrected data

volume 6M HCl solution of the sample. We hypothesize that 7 of the 12 "solutions" in fact contained alkali perchlorate solids, resulting from use of HClO_4 to drive off fluorine from dissolution steps. The existence of problematic alkali perchlorates is a well-known, if not formally published, problem in Rb-Sr isotopic studies.

Figure 1 shows that the conclusions of the paper are essentially unchanged, that the Rb-Sr systematics of the mylonitized granites are disturbed compared to Sm-Nd and Lu-Hf systems. What is now apparent is that deviant samples all lie *below* the 1.4 Ga reference line through the undeformed granites. This makes sense in terms of loss of radiogenic ^{87}Sr , perhaps from original Rb cation sites, during Mesozoic shearing of the 1.4 Ga granites. Simple loss of ^{87}Sr to a fluid phase, and its removal from the rocks to an unknown site, is a more plausible result of shearing than the element mobilities discussed in our original paper. Rb and Sr are now somewhat better anticorrelated than in our original Fig. 4, and Rb is more coherent in behavior vs. SiO_2 and K_2O .

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