Determination of the ^{87}Rb decay constant by ^{87}Sr accumulation

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We are currently re-determining the decay constant of ^{87}Rb (λ_{87}) with improved accuracy by measuring ^{87}Sr accumulated in $RbClO_4$ prepared by Davis in 1976 from a high purity salt with a known initial Sr isotopic composition. Results from 14 aliquots give a preliminary value of 1.421 ± 0.001 (MSWD=0.88), and are shown in Figure 1. ^{87}Sr* accounts for between 82-97% of all ^{87}Sr.

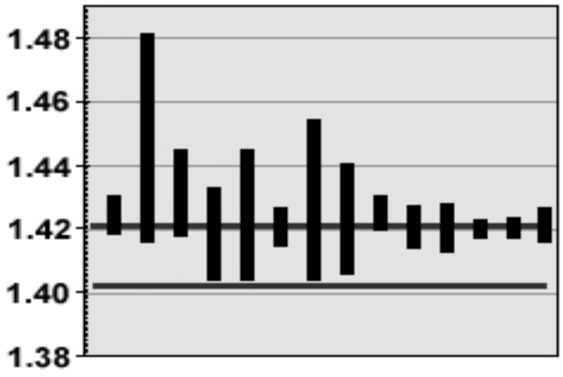

Figure 1 shows results of the Sr accumulation experiment and includes a reference line at 1.402. First eight measurements were taken on VG354, last six on Triton. (Error bars are 2σ).

This value agrees with that of Davis et al. (1977): 1.419 ± 0.012. However, it is higher than the age-comparison values suggested by Minster et al. (1982), Shih et al. (1985), and Amelin and Zaitsev (2002) of 1.402, Kossert's (2003) counting experiment value of 1.395 ± 0.009 and the value recommended by Begemann et al. (2001). Six additional aliquots await isotopic analysis and we are undertaking duplicate spike calibrations on pure samples of $SrCO_3$ (SRM-987) and $SrCl_2$.

References

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New ID-TIMS U-Pb zircon ages for the Carboniferous-Permian boundary sections of the southern Urals – Russia, Kazaskhstan

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Abundant interstratified volcanic tuffs within a detailed multi-taxa biostratigraphic framework for Late Pennsylvanian-Cisuralian (Early Permian) stratotypic marine sections of the southern Urals provide the opportunity to calibrate the absolute ages and durations of the global stages and biozonal subdivisions of this geological transition, which holds one of the Phanerozoic's major climate regime changes.

New ID-TIMS U-Pb zircon ages (weighted mean ^{206}Pb/^{238}U dates of equivalent annealed and chemically abraded single zircons with no rejected outliers) have been obtained for ash beds above and below the Pennsylvanian-Permian boundary at the Usolka and Dal'ny Tulkas sections, spanning the Upper Moscovian to Upper Sakmarian stages. Two ash beds separated by 2.3 meters in the Upper Moscovian at Dal'ny Tulkas yield ages of 307.3 ± 0.2 Ma and 305.4 ± 0.2 Ma, in stratigraphic order. At Usolka, an ash bed in the Lower Sakmarian yields an age of 290.0 ± 0.4 Ma. In concert with refined bracketing ages for the Pennsylvanian-Permian boundary at Usolka, these data anticipate the fine scale to which an accurately correlated, composite reference section for the Pennsylvanian-Cisuralian can be constructed and calibrated.

With this high-resolution framework we can anticipate unprecedented temporal constraints on: the rates of sedimentation and sea-level change in various locations around the world; accurate reconstructions of the full range of variability of the Late Paleozoic climate systems; the relations between marine and terrestrial geologic records; spatial and temporal patterns of extinction events and the rates of ecological recovery and biodiversification following such events; and the timing, duration, and synchroneity of tectonic activity associated with the final assembly and early modification of Pangaea.