Supplementary information

Bulk rock major and trace elements

Bulk rock samples from Megas Gialos locality were carefully cleaned by removing visible contamination. The samples were crushed in a steel mortar and then grinded using a tungsten mill. The rock powders were first heated to 950 °C to determine the loss on ignition and then melted using a lithium tetraborate metaborate fusion flux. The resulting glass beads were analyzed for major and trace elements determinations using a Panalytical Axios wavelength-dispersive X-ray fluorescence spectrometer (WD-XRF) at the institute of Geochemistry and Petrology (ETH Zürich). The trace element compositions of the bulk rocks were determined on fragments of these glass beads using an Excimer 193 m (ArF) GeoLas laser coupled to a Perkin Elmer Nexion 2000 DRC quadrupole ICP-MS. Unknowns (samples) and blanks were ablated with a beam diameter of 90 um for 60 s (10 Hz repetition rate), whereas the NIST-610 synthetic glass standard was ablated with a beam diameter of 40 um (10 Hz repetition rate). Data reduction was performed using the MATLAB-based SILLS program (Guillong et al., 2008). Only Sr and Rb concentrations used for initial Sr/Sr calculations is reported here (**Supplementary Table S4**).

Guillong, M., Meier, D. L., Allan, M. M., Heinrich, C. A., & Yardley, B. W. (2008). Appendix A6: SILLS: A MATLAB-based program for the reduction of laser ablation ICP-MS data of homogeneous materials and inclusions. Mineralogical Association of Canada Short Course, 40, 328-333.

Bulk rock isotopic compositions

Bulk-rock isotopic compositions were determined on powdered material from phengite-epidote veins, their metamafic host rocks, and peripheral metasediments. The samples were digested in a 3:1 mixture of HF and HNO_3 to ensure complete dissolution of silicate phases, then were re-equilibrated in HCl until clear solutions were obtained. Major elements were separated from bulk samples using AG50-X8 cation exchange resin, after which distinct minor element (including Sr) and rare earth element fractions were collected. These fractions were further purified using Eichrom Sr resin and Ln resin, respectively, to produce clean Sr and Nd fractions. The separation method was adapted for different matrix types (carbonate, silicate) to maximize procedural yields. The basaltic reference materials BHVO-2 and BCR-2 (United States Geological Survey) along with the carbonate reference material SRM-1d (National Institute of Standards and Technology) were processed identically to ensure data quality. For comparison of results obtained from this bulk digestion of SRM-1d (i.e., carbonate plus silicate fractions; bulk SiO_2 = 4.1 wt.%) compared to the carbonate fraction of SRM-1d alone, a second aliquot of SRM-1d was leached using 2M HCl, and the leachate was processed through the same separation chemistry. To our knowledge, the data described below represent the first published Sr and Nd isotopic compositions for SRM-1d.

Strontium isotopic compositions were measured using the Triton TIMS in the Planetary Geochemistry group at ETH Zürich. Measured $^{87}Sr/^{86}Sr$ isotopic compositions were corrected

to $^{88}Sr/^{86}Sr = 8.37521$ using the exponential fractionation law. This produced average $^{87}Sr/^{86}Sr$ ratios of 0.710268 ±0.000008 (2σ s.d., $n = 10$) and 0.710268 ±0.000010 (2σ s.d., $n = 10$) for the NBS987 standard; the sample data were then renormalized to the NBS recommended $^{87}Sr/^{86}Sr$ ratio of 0.710245 for NBS987 on a per-session basis. Average $^{87}Sr/^{86}Sr$ ratios for BHVO-2 and BCR-2 were 0.703471 ±0.000011 (2σ s.d., $n = 2$; GeoReM preferred value: 0.703478 ±0.000068) and 0.705008 ±0.000005 (2σ s.d., $n = 2$; GeoReM preferred value: 0.70492 ±0.00110), respectively, which are in agreement with average published values in the GeoReM database. The bulk SRM-1d aliquot digested with HF and HNO3 yielded a $^{87}Sr/^{86}Sr$ ratio of 0.708344 ±0.000012 (2σ s.d., $n = 2$) and the SRM-1d leachate yielded a $^{87}Sr/^{86}Sr$ ratio of 0.708102 ±0.000011 (2σ s.d., $n = 2$). This reflects unequilibrated Sr isotopic compositions between the carbonate and silicate fractions of SRM-1d, with the silicate fraction possessing a more radiogenic $^{87}Sr/^{86}Sr$ ratio than the carbonate fraction.