High-precision 40Ar/39Ar dating of a 10 ka to 492 ka sequence of englacial tephra layers at Mt. Moulton, Antarctica

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$^{40}Ar/^{39}Ar$ dating of a sequence of englacial tephra layers at Mt. Moulton, Antarctica, yields ages ranging from 10 to 492 ka, with analytical uncertainties as small as ±0.7 ka (Table). A total of more than 42 tephra layers, ranging from <1 to 10 cm in thickness and dipping 45° to the north, are exposed within an area of actively ablating blue ice near the summit of Mt. Moulton. The thickest and coarsest layers contain pumice to 2 cm and sanidine crystals to 1 cm. Geochemical data indicate that nearly all tephra layers were erupted from Mt. Berlin, a thermally active volcano 30 km to the west. Dating of sanidine from Mt. Moulton is complicated by older contaminant crystals, and by modest amounts of excess ^{40}Ar in melt inclusions. For six of the tephra layers, these difficulties were overcome by a combination of sample preparation, single-crystal dating, and CO_2 laser step heating of large (200-300 mg) sanidine aliquots. Precision was improved by averaging multiple step-heating analyses. Age determinations from these tephra layers are sufficiently precise and accurate to provide useful constraints for climate records from Mt. Moulton ice, and for existing and future ice cores containing geochemically correlative tephra layers.

Sample	Age (ka)
WCM-313	10.5 ± 2.5
BIT-152	24.7 ± 1.5
BIT-157	92.2 ± 0.9
BIT-158	105.0 ± 0.7
BIT-160	118.2 ± 1.4
BIT-162	135.8 ± 1.1
BIT-166	492.4 ± 9.6