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Apparent partial loss age spectra of Neoproterozoic hornblende (Kola Peninsula, Russia): the role of included biotite shown by Ar/Ar laserprobe analysis

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Metamorphic hornblende frequently yields spectra with progressively increasing Ar/Ar age steps, often interpreted as caused by partial resetting due to thermally activated radiogenic argon loss by solid-state diffusion. Yet, in many cases rising Ca/K ratio spectra for such samples imply the presence of minor inclusions of K-contaminant minerals. In order to avoid parts of grains with mineral inclusions or compositional zoning we drilled tiny discs from thin sections under a petrographic microscope. Laser step-heating of such micro-sampled biotite-free hornblende discs yielded flat age, Ca/K and Cl/K ratio spectra. In contrast, furnace step-heated hornblende separates from the same samples produced spectra with progressively increasing apparent ages and Ca/K ratios. Biotite-free samples yielded flat age and ratio spectra by both laser and furnace analysis. So, apparent loss spectra result from degassing of included much younger biotite before its hornblende host during laboratory step-heating.

