



High spatial resolution $^{40}\text{Ar}/^{39}\text{Ar}$ dating of pseudotachylite: geochronological evidence for paleo-seismic faulting in the Taiwan Mountain Belt

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In-situ $^{40}\text{Ar}/^{39}\text{Ar}$ laser microprobe dating was carried out on the Hoping pseudotachylite from a mylonite-fault zone in the metamorphosed basement complex of the active Taiwan Mountain Belt to determine the timing of the responsible earthquake(s). The dating results, distributed between 3.2 to 1.6 Ma with errors ranging 0.2~1.1 Ma, were derived from a combination of two Ar isotopic system end-members with inverse isochron ages of 1.55 ± 0.05 and 2.87 ± 0.07 Ma, respectively. Fault melt was found mixed with ultracataclasis in petrographical observations, therefore the older inverse isochron end-member may be attributed to relic wall rock Ar isotopic system contained in micro-breccia as published $^{40}\text{Ar}/^{39}\text{Ar}$ mylonitization ages from 4.1 to 3.0 Ma. Without significant Ar loss expected, the young ~1.6 Ma end-member represents the Ar isotopic system and age of the exact pseudotachylite. Seismic faulting therefore occurred during basement rock exhumation in the Taiwanese hinterland.