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On the occurrence of anomalous fission tracks in apatite and titanite

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ABSTRACT

In annealing experiments on natural crystals of apatite and titanite, two types of fission track were observed that had not been identified previously: (1) “stable” tracks, and (2) tracks through fluid inclusions. Stable tracks do not shorten significantly even when heated to temperatures well above those normally sufficient for complete annealing of fission tracks. Tracks through fluid inclusions owe their excessive length to the fact that one fission fragment traveled through a fluid inclusion without appreciable energy loss. If they go undetected, both types of track can distort the temperature-time paths constructed on the basis of confined fission-track-length measurements. Simple measures are proposed to avoid these pitfalls.