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Fracture strength of tourmaline and epidote by three-point bending test: application to microboudin method for estimating absolute magnitude of palaeodifferential stress

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Three-point bending tests are conducted on millimetre-scale tourmaline and epidote samples at room temperature and pressure to determine fracture strengths suitable for use with the microboudin method of palaeostress analysis. The fracture strength of the samples is obtained from the Weibull scale and shape parameters using a size-effect model. Three different size-effect models are evaluated, and it is found that the effective-length model is the most appropriate for describing the fracture strength of tourmaline and epidote based on geological constraints. The palaeodifferential stresses determined by this method for samples from Wadi Tayin (Sultanate of Oman), Greenbushes (Australia) and four high-pressure metamorphic belts in Japan are in the range of 12–300 MPa.