

Palaeostress analysis of the 5 metre-outcrop in intraoceanic thrusting zone by the microboudin method

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The microboudin method for palaeostress analysis has been successfully applied to microboudinage of columnar minerals such as piemontite and tourmaline embedded within a quartz matrix in metamorphic tectonites. The analysed samples were collected from the metamorphic sole beneath the Semail ophiolite in the Mahlah area along Wadi Tayin, the Sultanate of Oman. Deformation/metamorphism is inferred to have been caused by emplacement of hot mantle peridotites during the initial stage of closure of Tethys during the late Cretaceous intraoceanic thrusting event. A total of 44 metachert samples were collected from the 5 metre-scale outcrop in the metamorphic sole, and the orientation of mineral lineation, the degree of preferred dimensional orientation of grains evaluated by the concentration parameter κ , the grain size of quartz matrix, and the far-field differential stress determined by the microboudin method were analysed. The orientation of mineral lineation is revealed to be stable (NE-SW) and the grain size of quartz matrix are also stable (0.04 mm) through the whole 5 m outcrop. On the contrary, the value of κ and the far-field differential stress varied widely, from 1 to 6 and 60 to 110 MPa, respectively. These results indicate that variation in differential stress even in a 5 m-scale outcrop should be a target of future studies.