The numerical simulation of rigid ellipsoids rotation within Newtonian viscous matrix for the comparison with the arrangement of columnar tourmaline grains within quartz matrix in metacherts

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We performed the numerical simulation for the rigid ellipsoids rotation within the Newtonian viscous matrix. The simulation provided the variation of the shape preferred orientation of the ellipsoids with respect to variables between the degree of non-coaxiality (Θ = 0˚–90˚) and Flinn parameter (K = 0–∞). We used the width and length data collected from 3621 of tourmaline grains as the shape factor of the ellipsoids, and the initial distribution pattern of the ellipsoids is assumed to be random in their orientation. Calculation results are obtained on the plane parallel to the foliation (XY-plane) and the plane vertical to the foliation in parallel with the mineral lineation (XZ-plane), because this facilitates the comparison with nature. Using the calculation result, we compared these results with the natural shape preferred orientation of tourmaline grains embedded within quartz matrix of metacherts. The comparison suggests that natural shape preferred orientation of the tourmaline grains from three metacherts correspond to a pure shear (Θ = 90˚) and plane to constrictional strain (K = 1–10) with about 1–2 of finite strain.

Keywords: shape preferred orientation, numerical simulation, rigid ellipsoid, tourmaline, degree of non-coaxiality

