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Microstructures and kinematic vorticity analysis from the mylonites along the Karakoram Shear Zone, Pangong Mountains, Karakoram

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The Karakoram Shear Zone is a northwest-southeast trending dextral ductile shear zone, which has affected the granitic and granodioritic bodies of the southern Asian Plate margin in three distinct episodes. The ductile shearing of the granitic bodies at Tangste and Darbuk has resulted in the development of mylonites with mylonitic foliation and stretching lineation. More intense deformation is noted in the Tangste granite grading upto orthomylonite, as compared to the Darbuk granite. Kinematic indicators include S-C foliation, synthetic C' and C'' antithetic shear bands, Type A σ-mantled porphyroclasts, oblique quartz foliation, micro-shears with bookshelf gliding, mineral fishes including Group 2 mica fishes, and Type 1 and 2a pull-apart microstructures, and exhibit strong dextral sense of ductile shearing towards southeast. The textural features of the minerals especially that of quartz and feldspar, indicate temperature of mylonitisation ranging between 300° C and 500° C in the upper greenschist facies. The mylonitic rocks of the KSZ provide an opportunity for the possible utilization of the deformational structures namely that of quartz and feldspar porphyroclast as well as, well developed shear bands for kinematic vorticity studies. Well developed quartz and feldspar porphyroclasts and synthetic and antithetic shear bands from six different mylonitic samples of the mylonitic Tangste granite has been used to estimate the bulk kinematic vorticity (Wk) involved in the overall deformation of the KSZ using the Porphyroclast Hyperbolic Distribution (PHD) method and Shear band (SB) analysis. The PHD method yields Wk values that range from Wk = 0.29 to Wk =0.43, where as the Shear bands yields values ranging from Wk = 0.45 to Wk =0.93, thus indicating distinct pure and simple shear regimes at different stages of the evolution of the KSZ.