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# Orogen-Parallel Constrictional Strain from Multiple Markers: Insights from preliminary AMS and conventional Strain analyses

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In Sikkim Himalayan fold thrust belt (FTB), the Pelling-Munsiari thrust (PT) is characterized by SL mylonitic fabric that locally transforms to a linear (L) fabric, and then back to an SL fabric along its transport direction. The L-fabric is restricted to linear, N-S trending, discontinuous PT klippen developed within PaleoProterozoic orthogneiss that lie surrounded by the footwall Daling rocks. The klippen are synformally folded sub-parallel to the regional transport direction (N-S). The strongest L-fabric is localized in the hinge zone, and is spatially associated with LS and SL fabrics. The primary objective of this study is to compare the magnetic fabric with the field fabric and strain ellipsoids from the L-tectonite klippen to examine the relationships between these two fabrics. Additionally, we examine the effect of folding on the linear fabric formation.
We conducted Anisotropy of Magnetic Susceptibility (AMS) analysis on each of the deformation fabrics (L, LS, SL) from the mylonite zones. The mean magnetic susceptibility (Km) for all the samples varies between 26.3 x 10-6 SI units and 411 x 10-6 SI units. This suggests that the paramagnetic minerals are the primary magnetic carriers. The degree of anisotropy (Pj) varies between 1.075 and 1.941 and shape parameter (T) varies between -0.552 and 0.947. Most of the samples have positive T values indicating a dominance of oblate shape of the AMS ellipsoids. In contrast, the quantified strain ellipsoids from the quartz grains indicate prolate geometry from these rocks (Bhattacharyya et al., 2015). At a first-order, this variation could be due to the control of mineralogy on the deformation fabric. The paramagnetic minerals, for example, biotite and muscovite are the major contributors to bulk susceptibility, while quartz grains are the strain markers for the strain ellipsoids. Interestingly, the orientations of magnetic and the mylonitic fabrics from the PT protolith have a strong correlation. However, within the klippen they show a variation. Although the plunge of the magnetic lineation (K1), which defines the maximum principal axis of the AMS ellipsoid, and X of the strain ellipsoid are comparable, the azimuths of these two lineations are different. Additionally, preliminary results from constructive unfolding of the synformal klippen indicate that the magnetic fabric developed prior to the orogen-parallel fold. Thus, at a first-order, the progressive deformation is being recorded differently by the magnetic fabric and the finite strain fabric, as estimated by plastically deformed quartz grains.