

Noncoaxial strain of bedded khondalite near Gampola, Sri Lanka highlands

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Large upright to inclined folds in gneissosity (foliation, schistosity and relict bedding) dominate the geologic map pattern in central Sri Lanka. Yet most of the large strain of the Highland Series rocks seem to predate the open to close folds, and were accumulated either by coaxial flattening of subhorizontal strata or by noncoaxial deformation along subhorizontal glide planes. We performed a coaxiality test in two specimens of foliated khondalite from outcrop No.1 situated in the central highlands, approximately 8 km southeast of Gampola and near the village of Paradeka (Figure 1). Both specimens failed the coaxiality test, and furnished evidence for post-605 Ma, subhorizontal shear. The displacement sense inferred from the discordant shape fabric of garnet porphyroclasts supports the hypothesis that the Highland Series rocks were thrust southeasterly on to the Vijayan gneisses (Vitanage 1985, Kröner 1986).

Garnet-rich khondalites of the Pussellawa antiform (Figure 1) have a strong planar shape fabric of inequant quartz grains and exhibit a conspicuous sillimanite lineation on discrete foliation surfaces. The angle between the foliation trace and the apparent long diameter of more than 50 garnet porphyroclasts (Figure 2) was measured systematically on two serial sections per specimen, one oriented NW-SE and parallel to lineation (Figure 3a), the other oriented normal to lineation (Figure 3b). The angle measurements in the first specimen were repeated by a different analyst, but the results were nearly identical. The second specimen was large enough to allow measurement of about 100 diameters per serial section, but the same obliquity was obtained between the garnet diameters and the foliation trace. This demonstrates that the deformation was noncoaxial and possibly akin to subsimple shear (De Paor 1983). Most porphyroclasts show no evidence of large rotation (Figure 2), which suggests that the garnet crystals fractured oblique to foliation at an

advanced stage of ductile deformation (Figure 4). The preferred plunge of the porphyroclasts is southeasterly (Figure 3a) and, therefore, unrelated to late-stage folding but supportive of the ductile thrust hypothesis (Vitanage 1985, Kröner 1986). The garnet fabric of khondalites needs to be analyzed at many localities, however, before the thrust emplacement of the Highland Series complex can be confirmed.

REFERENCES

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 Kröner, A., 1986. *American Geophysical Union, Geodynamics Series* 14,107-119.
 Vitanage, P.W., 1985. *Bulletin of the Geological Society, Finland* 57,157-168.

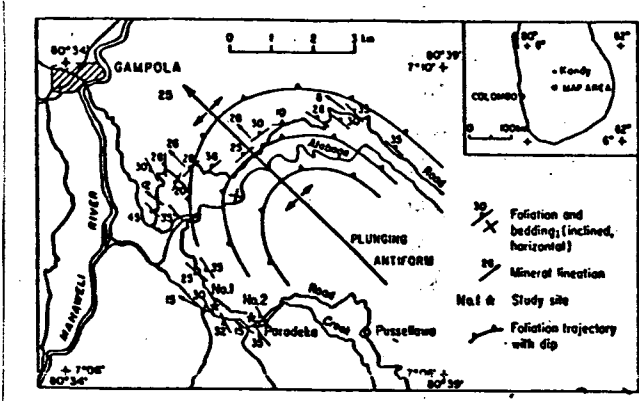


Figure 1.

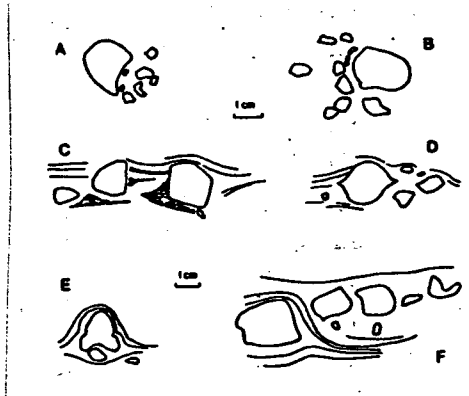


Figure 2.

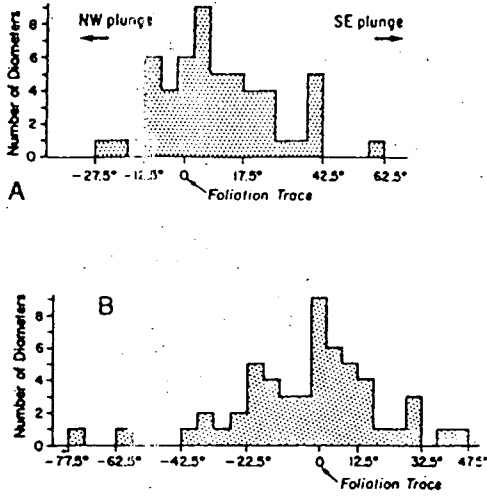


Figure 3.

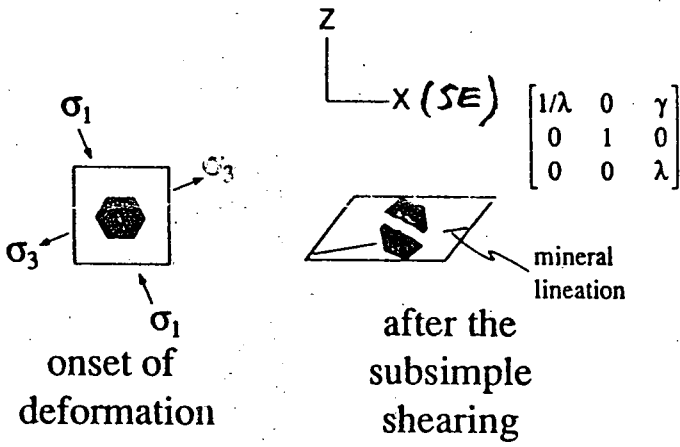


Figure 4.