

**KINEMATIC EVOLUTION OF THE EARLY CAMBRIAN AMBAR FORMATION,
KHYBER PAKHTUNKHWA USING FINITE STRAIN**

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Abstract

Penetrative strain analyses in the Early Cambrian Ambar Formation were conducted by microscopic measuring the state of strain to establish the tectonic setup of the study area in regional tectonic context. The state of finite strain was calculated for the Ambar Formation, using elliptical ooids and quartz grains. Strain ellipses were generated for four oriented samples, having abundant strain markers on the photomicrographs, obtained from the oriented thin sections using the Fabric 8 software. These strain ellipses were obtained using the normalized Fry method. Analyses of elliptical ooids, strongly oriented quartz grains, elongated clasts, tectonic stylolites and differentiated cleavages in the oolitic limestone/dolomite and calcareous quartzite of the Ambar Formation display a systematic regional arrangement. Overall, they accommodated NE-SW shortening. The opening of veins perpendicular to these structures accommodated extension in the SE-NW direction. Analyses of elliptical ooids and quartz grains show an overall 14.59 % shortening in the region. The SE-NW trending Swabi Synclinorium and Shewa Anticlinorium correspond with the NE-SW shortening in the region. Being a part of the SW limb of the Swabi Synclinorium, the Ambar Formation would have been deformed in the SE-NW direction during the evolution of the Swabi Synclinorium and Shewa Anticlinorium. Analyses of microscopic structures and penetrative finite strain direction in the oolitic limestone of the Ambar Formation accommodated shortening parallel to the trend of the Swabi Synclinorium and Shewa Anticlinorium.