

**Deformation of the Stellarton Basin, Nova Scotia**

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The Stellarton Basin of northern Nova Scotia comprises the Late Carboniferous clastic sedimentary and coal-bearing sequences of the Stellarton Group and is bounded by the eastern Cobequid and Hollow fault zones. Four equivalent deformation generations are recognized within the boundary fault zones.  $D_1$  produced penetrative  $S_1$  cleavage and both asymmetrical and en echelon folds,  $F_1$ . Localized  $S_2$  axial planar fracture and crenulation cleavages were produced during  $D_2$ .  $D_3$  formed pervasive Riedel shears, while  $D_4$  generated tensional normal faults and fractures. All deformation generations record a transcurrent, dextral sense of fault movement. Within the basin, the geometry of secondary faults, right-step en echelon NE-SW trending folds and calculated principal stress orientations are also consistent with a dextral wrench faulting regime.

Mineralogical changes during cleavage development involve a progression from chlorite porphyroblasts to chlorite-muscovite stacks and finally muscovite grains. Both  $S_1$  and  $S_2$

cleavages are defined by the preferred orientation of muscovite grains. Intragranular deformation of the porphyroblasts and stacks significantly influences the initiation of cleavage, while pressure solution effects dissolution and precipitation of material along the incipient cleavage zones.

The quartz-chlorite-muscovite-biotite-calcite mineral assemblages indicate low-grade metamorphism within the boundary fault zones. A metamorphic maximum of approximately 400°C is achieved locally within the eastern Cobequid Fault, based on the first appearance of biotite. The boundary fault metamorphism is of distinctly higher grade than that within the basin, where vitrinite reflectivity of coals indicates basin temperatures between 200°C and 250°C.

\*This presentation is abstracted from the M.Sc. thesis of R.X. Gao.