D-57: Mechanism of metasomatism of high-grade orthogneisses around Ambagaspitiya

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Recent work on granite-looking, microline-bearing rocks of Ambagaspitiya, N.E of Colombo has shown that they have a metasomatic origin. Further, it has been shown that these more or less isotropic rocks are, in fact formed from the metasomatism of once metamorphosed and highly deformed orthogneisses. Previous field and petrofabric studies reveal that these rocks are neither intrusive nor metamorphosed and that they exhibit no signs of recrystallization and deformation. The main purpose of this study is to investigate the mechanism(s) of metasomatism of deformed and metamorphosed rocks exposed around Ambagaspitiya.

Modal analysis shows that the majority of these rocks fall in the fields of syenite, quartz syenite, monozonite and quartz monzonite of QAP triangle, and a very few in the quartz monzodiorite field. As the names in QAP diagram cannot be given to any non-intrusive rock, the metasomatic rocks

of Ambagaspitiya are named as pseudo-syenite, pseudo-quartz syenite, pseudo-monzonite, pseudo-quartz monzonite and pseudo-quartz monzodiorite. Pseudo-syenite and pseudo-quartz syenite are found to be intensely metasomatized and pseudo-monzonite and pseudo-quartz monzonite are moderately affected. Slightly to moderately metasomatized metatonalite may have produced pseudo-quartz monzodiorite.

All the original metamorphic rocks of the area had acquired a well-developed gneissic foliation (S_2) and had suffered at least two intense folding events (F_3 and F_5) before the metasomatism occurred. Subsequently, some of the original rocks namely metagranodiorite, metatonalite, metamonzodiorite and metaquartz monzodiorite - have been intensely metasomatized into younger pink-coloured, medium - to coarse-grained, microcline-bearing rocks. The metasomatism has nucleated along small shear zones, which post-date F_5 folds. Some shear zones make a conjugate set, which indicates a nearly NW-SE compression, and some others form a single set with a strike ranging from NE-SW to ENE-WSW. Most of the shear zones make an interconnected network. Potassium-bearing metasomatic, aqueous fluids, derived from an external source, have migrated along these shear zones, nucleating the metasomatism. These chanelled K-bearing fluids which entered the shear zones, have pervaded the rocks through foliation planes (S_2) and along grain boundaries and microcracks in minerals, transforming some orthogneisses into metasomatic rocks. It was found that metasomatic microcline has formed through the direct replacement of metamorphic plagioclase and plagioclase-quartz in the presence of externally derived K^+ ions.