

THE MECHANISM OF POST-METAMORPHIC METASOMATISM OF ORTHOGNEISSES FROM AMBAGASPITIYA, SRI LANKA

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(Dedicated to the late Professor P.W. Vitanage)

ABSTRACT

This paper deals with the mechanism of post-metamorphic metasomatism of orthogneisses from Ambagaspitiya, NE of Colombo, Sri Lanka. The granite-looking, more or less isotropic, microcline-bearing rocks exposed around Ambagaspitiya have never undergone deformation and metamorphism. It is shown that they are products of a post-metamorphic metasomatism of once highly deformed and metamorphosed orthogneisses. This metasomatism has been caused by some externally derived K-rich fluids, which contained K, P, halogens (Cl and/or F), H₂O, CO₂ and some other unknown components. It is inferred that these potassium-bearing metasomatic fluids may have been derived from a deep-seated K-rich source, the nature of which has yet to be understood. These fluids have migrated along post-D₅ shear zones, nucleating the metasomatism. The fluids which entered the shear zones have pervaded the parent orthogneisses through foliation planes (S₂) and along grain boundaries and microcracks in minerals, transforming them into metasomatic rocks. A model is presented here to explain the metasomatism associated with shear zones. The formation of in-situ charnockite and of some retrogressed rocks can also be explained by this model, although the composition of the fluids involved may be different. This is an excellent example of post-metamorphic and large-scale metasomatism of high-grade orthogneisses, caused by the introduction of channelled K-bearing fluids. This paper emphasizes the need for understanding the nature and the source of late-stage fluids in the earth's crust.