Geochemistry of the Neoarchaean mafic volcanic rocks of the Geita area, NW Tanzania: Implications for stratigraphical relationships in the Sukumaland greenstone belt

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Abstract

Geochemical data are presented for a suite of mafic volcanic rocks from the Geita area in the Sukumaland greenstone belt (SGB) of northwestern Tanzania with the aim of constraining their petrogenesis, tectonic setting and to assess a possible genetic link with mafic volcanic rocks from the Rwamagaza area also from the SGB previously reported by [Manya, S., Maboko, M.A.H., 2003. Dating basaltic volcanism in the Neoarchaean Sukumaland greenstone belt of the Tanzania Craton using the Sm–Nd method: implications for the geological evolution of the Tanzania Craton. Precambrian Research 121, 35–45] and [Manya, S., 2004. Geochemistry and petrogenesis of volcanic rocks of the Neoarchaean Sukumaland greenstone belt, northwestern Tanzania. Journal of African Earth Sciences 40, 269–279]. Mafic volcanic rocks from the two locations in the SGB show similar geochemical and Nd-isotopic compositions. Trace element and Nd-isotope compositions are consistent with their generation from a depleted MORB mantle (DMM) source which had been metasomatised by a subduction component in a late Archaean back arc setting at ~2823 Ma.

These findings are at variance with the previously proposed lithostratigraphical framework in the SGB which postulated an inner arcuate belt dominated by lower Nyanzian mafic volcanic rocks and an outer belt dominated by upper Nyanzian chemical sedimentary rocks, rare felsic flows and shales. The presence of mafic volcanic rocks flanking the outer belt which are of similar composition and age as those of the inner belt suggests that mafic volcanics in the SGB form discontinuous patches of rock distributed throughout the belt and separated by intervening granites. Furthermore, they corroborate previous evidence that both the rocks of the inner and outer belt formed more or less coevally and the subdivision of the volcano-sedimentary package of the SGB (and other greenstone belts of the Tanzania Craton) into a lower mafic volcanic dominated unit and an upper felsic volcanic and BIF dominated unit is not stratigraphically valid.

Keywords

Tanzania Craton; Sukumaland greenstone belt; Metabasalts; Sm–Nd isotope; Stratigraphy