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WHOLE-ROCK GEOCHEMICAL SIGNATURES OF DOLERITE DYKES IN SRI LANKA

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So far, dolerite dykes have solely been reported from the Vijayan Complex (VC) of Sri Lanka. Samples of two localities have been geochemically analyzed for whole-rock major and trace element concentrations. Here, we present the whole-rock major and trace element geochemistry of seven Sri Lankan dolerite samples collected from five localities (two samples each at Wahawa, Rukkamputur, and one sample from Gallodai in the Vijayan Complex; one each in the Highland Complex - close to Badulla, and Wanni Complex - close to Kurunegala) to unravel the tectonic setting, nature of source magma and crustal contamination of dolerite magmatism. In the SiO_2 *vs* $Na_2O + K_2O$ diagram, the composition of dolerite magma varies from basalt to basaltic andesite and was plotted within the region of the sub-alkaline magma series. Major and trace element geochemical discrimination diagrams (AFM, Jensen cation plot, and Nb/Y vs Rb/Y diagram) of different magma series indicate tholeiite affinity and are differentiated through fractional crystallization. The wide ranges in MgO (3.03-7.47wt %), and patterns of other major trace elements (such as Fe_2O_3, TiO_2, and SiO_2) and compatible trace elements (such as Ni and Cr) with MgO indicate the typical trends of fractional crystallization. Chondrite normalized rare earth element (REE) patterns indicate enrichment of LREE relative to MREE and HREE. Chondrite normalized REE patterns and Primitive Mantle (PM) normalized incompatible trace element patterns of dolerites are mainly comparable with those of continental basalts. The pronounced negative Nb, Ti, and positive Pb anomalies in the PM normalized diagram and Nb/La ratios of <1 represent the signals of crustal contamination of parent magma. In tectonic discrimination diagrams (Y vs Cr, Zr/4-2*Nb-Y), dolerites fall in the within-plate basalt (WPB) field and continental basalt region. Hence, the studied dolerites indicate their origin from a differentiated contaminated-tholeiitic magma in an intra-continental tectonic setting.

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Keywords: Continental basalt, Crustal contamination, Dolerites, Sri Lanka, Whole-rock geochemistry