Geology and geochemical investigations of the clastic sedimentary rocks of the Ikorongo group of North-wesrern Serengeti district, North-Eastern Tanzania

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The Neoproterozoic Ikoromgo Goup, which lies uncomfortably on the late Archakan Nyanzian Super group of the Tanzania Craton, is comprised of conglomerates quartzite's shales, siltstones, red sandstones with rare flagstone and gritstones. The Ikorongo group is unbiased into three stratigraphic formation namely the Kinenge, Sumuji and Masati Formation. Two new stratigraphic member of the Sumuji Formation are proposed. The oldest unit is the shale member which comprises of four alternating horizons of brown and green hales containing mud crack, rain drops and ripple marks and is there reported for the first time to tap on basement rocks. The hilly member is overlain by the siltstone member which consists of ferrugenised and cross-laminated micaceous siltstones. The presence of mud crack and ripple marks in the rock of the Sumuji Formation Signifies deposition in shallow water environments which had experienced intermittent sub-aerial exposure and decision desiccation. Major element data for the shales and siltstones of the Sumuji JM nation intake broad compositional similarity with both PAAS and NASC. The shales arc, however, relatively depleted m CaO and P205 compared to PAAS and NASC whereas the siltstones show relative depletion in Ti02, Ah03, CaO, K20 and P205 . Compared to both PAAS and NASC, the shales show relative depletion in the trace elements Sr, Zr, Hf, Mo, b and Cu whereas Cs, Ba, Ta and Cr are relatively enriched. On the other hand, the siltstones are depleted in the LILE as well as Nb, Mo, Cr, Ni, Sc and V relative to both PAAS and NASC. The chemical index of alteration (CIA: 52 - 82) and the Rb/Sr ratios (0.5-8.6) reveal a moderately weathered photolith . Based on Ni/Al and Mo/Al tem poral variation diagrams, oxic conditions predominated during the deposition of the brown shales, anoxicperiods prevailed during the deposition of the green shales whereas unstable anoxic-oxic states prevailed during the deposition of the siltstones. The consistent REE patterns, which are characteri sed by enrichments in the LREE over the HREE ((La/Yb)CN = 7.3-38.3) and negative Eu anomal ies (Eu/Eu* = 0.71 on average) whose characteristics are similar to those of PAAS and NASC, illustrate cratonic sources that formed by intra-crustal differentiation. Geochemical consideration and palaeocurrent studies suggest that the provenance of the lkorongo Group include high-Mg basaltic andesite's, decides, rhyolites and granitites from

the Neoarchean Musoma-Mara Greenstone Belt to the north of the lkorongo basin. Mass balance calculations suggest relative contributions of 50%, 36% and 14% from granitoids, high magnesium basaltic¬ andesite's and decides respectively to the detritus that formed the shales. Corresponding ng contributions to the siltstones detritus are 58%, 38% and 4% respectively. The geochemistry of the mudstones suggests that the. Neoproterozoic upper cst of the Tanzania Craton had an overall granodioritic composition. The abundances of Ti02, total fe o , MnO, Sc, Cr, Ga, Ge, Sb, Ba, LREE, and Bi are, however , higher than the crustal 2 abundances reported by Taylor and McLennan (1985) and McLennan (200 l). On the other hand, the abundances of CaO, Na20, P20s, Sr, and Sn are lower than the upper crustal vaJ ucs of Taylor and McLennan (1985) and McLnnan (2001). The Neoproterozoic ic upper crust of the Tanzania Craton had the following elemental rat Kill J 0862; K/Rb = 250; Zr/Nb = 1O; Zr/Hf = 35; Nb/Th = 1.1; Nb/Ta - 1 1 : Rb/ -30,and '[h/U - 3.8.