Stratigraphy and palaeodepositional environment of the Palaeoproterozoic volcano-sedimentary Konse Group in Tanzania

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Abstract

The Konse Group is a volcano-sedimentary assemblage of Palaeoproterozoic age located in central Tanzania between the Tanzanian Archaean Craton (to the west) and the high-grade Palaeoproterozoic Isimani Suite (to the east). The Konse Group is unconformably deposited on the high-grade Isimani Suite and it is only mildly metamorphosed to greenschist facies.

Although the Konse Group is quite old, its deformational pattern is not complex and the order of superposition of its constituant lithologies can be outlined. There are also abundant primary sedimentary and volcanic structures which are still preserved in it. The Konse Group is therefore one amongst the very few oldest (if not the oldest) sedimentary basins in eastern Africa with preserved stratigraphy and primary structures, hence the basin serves as an important site for palaeodepositional environment, palaeoclimatology, and palaeotectonic studies in Africa and Gondwanaland as a whole.

The Konse Group is made up of six lithologically distinct, conformable units. Its basal unit is a well-sorted orthoquartzite (the Mkulula Formation), which is shallow sea or epicontinental sands deposited on the sea shore. The basal orthoquartzite is overlain by a matrix-supported polymictic conglomerate (the Ruaha River Formation), which is either a lag gravel, point bar or channel bar deposit. The conglomerate is, in turn, overlain by thinly laminated silts and muds (the Kilimbe Formation) representing off-shore or shelf zone (distal) facies. The Kilimbe Formation is overlain by the Kikuyu Formation, which is made up of subaqueous volcanics of basic pillow lavas and basic tuffs with lapilli pockets which show low angle, cross-stratification. The subaqueous volcanics are overlain by dolomitic marble (the Ihumbirisa Formation) of the shallow water carbonate shelves fades and they are in turn overlain by the Mhwana Formation, which constitute the top-most unit of the Konse Group. The Mhwana is dominated by fine arenites intercalated with a banded quartz-Fe formation and a Mn-rich quartz formation.

The Konse basing is interpreted as a peripheral foreland basin formed at the margin of the Tanzanian Archaean Craton during the :main phase of the Usagaran deformation.