Petrology of the talc-kyanite-yoderite-quartz schist and associated rocks of Mautia Hill, Mpwapwa District, Tanzania

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Abstract
Talc-kyanite-yoderite-quartz schist and associated rocks belonging to the Proterozoic Usagaran System occurring along the western edge of the Mozambique Orogenic Belt (450–600 Ma) were studied using petrographic, X-ray diffraction, electron-microprobe and fluid inclusion methods. The main rock types studied in the area include talc-kyanite-yoderite-quartz schist, piemontite quartzite, epidote-phogopite quartzite, kyanite-quartz-biotite schist and biotite gneiss.
Fluid inclusion studies on the selected rock types indicate the presence of usually two-phased H_2O-rich and CO_2-rich fluids with a range of filling from 0.6 to 0.95. Some CO_2-rich fluids may be one-phased (liquid) at room temperature with their degree of filling ranging from 0.4 to 1.0. Most of the CO_2-rich inclusions show negative crystal shapes.
Fluid inclusions trapped in kyanite in the talc-kyanite-yoderite-quartz schist with isolated negative crystal shapes are considered primary. The presence of CO_2-rich fluids indicates low water fugacity during the formation of the talc-kyanite assemblage, and so pressure was probably lower. Primary fluid inclusions could be trapped at pressures between 5.2 and 5.6 kb and temperatures ranging from 540 to 570°C; this gives the possible P-T range of the peak of the first phase of progressive metamorphism.