

Abstract

This study has served to expand the geological map of surroundings of the Venetia Mine (Limpopo Province, South Africa) incorporating the area lying south of the kimberlite deposit and bounded in the south by the Dowe-Tokwe fault. The most significant structural conclusion stemming from this mapping project is that the Venetia Synform seems to be tectonically separate from the surrounding area and actually forms a klippe (shallowly dipping thrust) against the Krone Metamorphic terrane and the Gotha Complex. Petrographic descriptions of quartzofeldspathic lithologies found in the Krone Metamorphic Terrane to the west of the Venetia klippe (Mellonig, 2004) are identical suggesting that they belong to the Gotha igneous complex.

There are no differences in geochemical compositions of monzogranite to granodiorite, tonalite and quartz diorite from Farms Gotha and Venetia. The rocks are I-type granitoids that generally form in continental magmatic arcs. The amount of U and Th in the igneous rocks of the Farms Gotha and Venetia (contained in minerals found within quartz, plagioclase, amphibole and K-feldspar crystal boundaries and the magmatic zircons of the Farm Gotha samples) and the pattern produced by heat producing elements (Council for Geoscience Radiogenic Map), indicate that that the unexpectedly high concentration of these elements are not the result of regional metamorphism, but is the remnant of the final crystallisation phase of the magma of the area. REE plots of the Venetia Mine samples show negative Eu anomalies, indicating the presence of plagioclase and K-feldspar in the magma source of the Venetia mine samples. The assumption is, that most samples retained their original chemical compositions having experienced only weak deuteric alteration and no dynamic metamorphism.