

The area investigated extends west to longitude 28°55' and south of latitude 29°00'. The major acid component of the Bushveld Complex, the Bashepo Granophyre Suite and the Lebowa Granite Suite and the volcanic rocks of the Rooiberg Felsite Group are exposed. Rocks of the Rustenburg Layered Suite occur in the south-eastern sector of the area.

**THE GEOCHEMISTRY AND PETROLOGY  
OF THE ROOFROCKS  
OF THE BUSHVELD COMPLEX  
EAST OF GROBLERSDAL**

Stavoren Granophyre and Rooiberg Felsite occupy the western part of the study area. A detailed petrographical description of the granophyres was undertaken and several granophyric intergrowth forms were distinguished. The granophyres are fairly homogeneous in composition throughout the 200 metre thick sheet, while the felsites display a differentiative trend. It seems that the two rocktypes are related. Either the granophyres represent a partial melt extracted from the felsites on metamorphism by the Rustenburg Layered Suite or the felsites and granophyres represent one co-magmatic suite.

BY

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is observable from bottom to top in the Nebo Granite sheet. The Klipklouf Granite occurs in the stratigraphically higher portions of the Nebo Granite sheet, where it forms undulating flat-lying sills and dykes, which are intrusive into the Nebo Granite.

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The Nebo Granite is characterized by a well defined differentiation trend, whereas the Klipklouf Granite is highly differentiated, plots randomly at the end of the Nebo Granite trends. The majority of the geochemical data presented suggest that the Klipklouf Granite is a late-stage

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Abstract

The area investigated extends west of longitude  $29^{\circ}55'$  and south of latitude  $25^{\circ}00'$ . The major acid components of the Bushveld Complex, the Raseop Granophyre Suite and the Lebowa Granite Suite and the volcanic rocks of the Rooiberg Felsite Group are exposed. Rocks of the Rustenburg Layered Suite occur in the south-eastern sector of the area.

Stavoren Granophyre and Rooiberg Felsite occupy the western part of the study area. A detailed petrographical description of the granophyres was undertaken and several granophyric intergrowth forms were distinguished. The granophyres are fairly homogenous in composition throughout the 2000 metre thick sheet, while the felsites display a differentiation trend. It seems that the two rocktypes are related. Either the granophyres represent a partial melt extracted from the felsites on metamorphism by the Rustenburg Layered Suite or the felsites and granophyres represent one co-magmatic suite.

The Lebowa Granite Suite occurs in the western half of the study area and consists of the Nebo Granite and several Klipkloof Granite types. A mineral gradation, differences in grain size and colour, and geochemical fractionation is observable from bottom to top in the Nebo Granite sheet. The Klipkloof Granite occurs in the stratigraphically higher portions of the Nebo Granite sheet, where it forms undulating, flat-lying sills and dykes, which are intrusive into the Nebo Granite.

The Nebo Granite is characterized by a well defined differentiation trend, whereas the Klipkloof Granite, being highly differentiated, plots randomly near the end of the Nebo Granite trends. The majority of the geochemical plots presented suggest that the Klipkloof Granite is a late-stage

evolved phase of the Nebo Granite. There is, however, a difference between the two with respect to their  $Al_2O_3$ ,  $TiO_2$  and Zr concentrations, which seems to reflect some late metasomatic alteration of the Klipkloof Granite.

The upper portions of the tin-specialized albitized Klipkloof Granite were probably lost by erosion. Therefore no significant tin concentrations could be found. The possibility for more molybdenum and copper mineralization exist, where the mineralizing fluids were trapped by Klipkloof Granite sills. The Stavoren Granophyre could also have served as a trap for mineralization.

The albitized Klipkloof Granite of the study area has the same fractionation pattern for Rb, Ba and Sr as was observed in the highly metasomatized tin-bearing granites of the Zaaiplaats area. The fractionation pattern in the unmineralized slightly altered Klipkloof Granite, however, appears to be the normal pattern for the Bushveld Granite. These differences could thus be useful in the identification of target areas for tin mineralization.

Die Lebograniet jagsoos in die wustelike gedeeltes van die studiegebied en bestaan uit die Nebograniet en verskeie Klipkloofgraniet tipes. In Minerale gradasie, veral in korrelgrootte en kleur, en geochemiese fraksionering is waarneembaar van onder na bo in die Nebograniet laag. Die Klipkloofgraniet is in die stratigrafiese hoër gedeeltes van die Nebograniet en selfs tot in die Stavorengranofier ontwikkel en vorm 'n aantal opeenvolgende goikende, plat-liggende plate en gange.

Die Nebograniet word gekarakteriseer deur 'n goed-gedefinieerde differensiasie neiging, terwyl die Klipkloofgraniet, wat hoogs gedifferensieerd is, ooralestig aan die wande van die Nebograniet differensiasiepatroon stig.

Samevatting

Die studiegebied strek wes van lengtegraad  $29^{\circ}55'$  en suid van breedtegraad  $25^{\circ}00'$ . Die belangrikste suurgesteentes van die Bosveldkompleks, die Suite Rashoopgranofier Suite Lebowagraniet en die vulkaniese gesteentes van die Groep Rooiberg is in die gebied ontwikkel. Gesteentes van die Gelaagde Suite Rustenburg dagsoom in die suid-oostelike deel van die gebied.

Stavorengranofier en Rooibergfelsiet beslaan die westelike gedeelte van die studiegebied. 'n Breedvoerige petrografiese beskrywing van die granofiere is gedoen en verskeie granofiriese vergroeiings is onderskei. Die granofiere is taamlik homogeen in samestelling in die 2000 meter dik opeenvolging, terwyl die felsiete 'n differensiasie neiging vertoon. Dit wil voorkom asof die twee gesteentetipes verwant aanmekaar is. Die granofiere verteenwoordig of 'n gedeeltelike smeltsel geekstraheer uit die felsiete tydens metamorfose tydens indringing van die Gelaagde Suite Rustenburg of die felsiete en granofiere verteenwoordig een ko-magmatiese suite.

Die Lebowagraniet dagsoom in die westelike gedeelte van die studiegebied en bestaan uit die Nebograniet en verskeie Klipkloofgraniet tipes. 'n Mineraal gradasie, verskille in korrelgrootte en kleur, en geochemiese fraksionasie is waarneembaar van onder na bo in die Nebograniet laag. Die Klipkloofgraniet is in die stratigrafies hoër gedeeltes van die Nebograniet en selfs tot in die Stavorengranofier ontwikkel en vorm 'n aantal opeenvolgende golwende, plat-lêende plate en gange.

Die Nebograniet word gekarakteriseer deur 'n goed-gedefinieerde differensiasie neiging, terwyl die Klipkloofgraniet, wat hoogs gedifferensieerd is, onreëlmatig aan die einde van die Nebograniet differensiasiepatroon stip.

Die meerderheid van die geochemiese diagramme dui daarop dat die Klipkloofgraniet 'n laaifase van die Nebograniet is. Daar is egter 'n verskil in  $Al_2O_3$ ,  $TiO_2$  and Zr konsentrasie tussen die twee graniete, wat op moontlike laat metasomatiese verandering van die Klipkloofgraniet dui.

Die boonste gedeeltes van die tin gespesialiseerde ge-albitiseerde Klipkloofgraniet het heelwaarskynlik as gevolg van erosie velore gegaan aangesien geen belangrike tin konsentrasies daarin gevind word nie. Die moontlikheid vir meer molibdeen en koper mineralisasie bestaan waar mineraliserende vloeistowwe vasgevang is deur Klipkloofgraniet plate. Die Stavorengranofier kan ook dien as 'n ondeurdringbare laag waaronder mineralisasie kan plaasvind.

Die ge-albitiseerde Klipkloofgraniet van die studiegebied toon dieselfde fraksionasieneiging vir Rb, Ba en Sr as die in hoogs gemetasomatiseerde tin-draende graniete van die Zaaiplaatsgebied. Die fraksionasieneiging van die ongeminaliseerde, minder metasomaties veranderde Klipkloofgraniet, blyk die normale neiging vir die Bosveldgraniete te wees. Hierdie verskille kan gebruik word in die identifikasie van teikengebiede vir tinmineralisasie.

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