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Geobotany of the Koedoesfontein Complex in the Vredefort Dome, South Africa.

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The Vredefort Dome in South Africa is accepted to be the result of a large meteorite impact that occurred around 2023 Ma, thus being the oldest preserved impact crater known. A unique feature of the dome is the presence of several exposed Neoproterozoic (2800 Ma) to Mesoproterozoic (1000 Ma) peralkaline to ultramafic intrusive bodies, which were emplaced into its core and collar. As a result of the broad difference in mineral composition between the intrusions, as well as the abundant quartz and shale country rocks, abrupt transitions in soil chemistry are produced which is believed to ultimately affect the floristic and physiognomic characteristics of the associated vegetation in the dome.

Despite various efforts to study the ultramafic-adapted vegetation (also known as “serpentine flora”) of southern Africa, little is known about the effect these particular intrusions have on the soil and floristical components of the dome. The aim of this study was to investigate the geobotany of one of the ultramafic-peralkaline complexes in the dome, namely the Koedoesfontein Complex. The complex hosts several different intrusions that collectively form a mineralogical gradient ranging from purely mafic- to felsic-dominant silicates. Three primary components (geology, soil and woody vegetation) were sampled along this gradient and analysed to determine the effect of these intrusions on the residual soil chemistry, and the floristics and physiognomy of the supported vegetation type.

Weathering of the peralkaline to ultramafic lithologies greatly affected the soil’s chemical properties and related species composition and physiognomy. Major chemical variation in the soil, including the total chromium and nickel content, is correlated with the difference in abundance of sodium-, calcium-, iron- and magnesium-rich silicate minerals. Significant variations in woody species composition (particularly across *Senegalia* and *Vachellia* genera) have been established between soils originating from ultramafic–mafic, intermediate and felsic rock types, and can be utilised as indicators for different geological substrates within the dome.

