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Geochemical mapping of the Tugela Terrane, KwaZulu-Natal, South Africa: semi-regional soil survey

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The Council for Geoscience carried out a semi-regional geochemical survey in the KwaZulu Natal Province. The aim of the survey was to accomplish a systematic study of the northern part of the Natal Belt known as the Tugela Terrane.

A total of 11321 soil samples, each weighing 5 kilograms, were collected from a depth of 20 cm on a 500m x 500m grid. These samples were prepared and analysed.

The results for all elements as well as relevant multi-element groups were plotted on distribution maps using ArcGIS. From the maps, target areas for Au, Cr, Ni, Co, Cu, Zn, Pb, As and REEs were identified, evaluated and listed as potential targets for future follow up work.

The Au targets were subdivided into primary source type and secondary placer type target areas. The most prospective auriferous placer target areas are down-stream from the Ngubevu- Phoenix- and Mfongosi goldfields along the Tugela River valley. Target areas at Central Nsuzi and Melmoth were also identified.

Target areas for Cr and Ni that may warrant further investigation include the group of anomalies surrounding the Sithilo Ultramafic Complex within the Tugela Terrane. These anomalies are all considered to be Cr targets only since Cr mineralisation was reported in the Sithilo Complex whilst the lack of anomalous Cu support reduces the chance for Ni and Cu sulphides in these rocks

The Cu-Pb-Zn anomalies deserving further investigation include the Mfongosi Cu-Pb-Zn anomaly which corresponds with an important Au trend in the area and represents a truly multi-elemental anomaly.

The alkali-element and REE target areas which deserve further investigation include those in the leucocratic biotite granite as possible REE sources. The Halambu Gneiss and the Bulls Run Complex of the Tugela Terrane should also be explored as possible sources for alkali elements and REEs in general.

The study therefore successfully delineates several new target areas for follow up studies as well as a few anomalies proximal to known occurrences which therefore warrant re-examination.

