HIGH DENSITY REGIONAL GEOCHEMICAL MAPPING OF SOUTH AFRICA

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A total of 25 % of the surface area of South Africa has been systematically covered on a sample density of one sample per km2. Samples from first order streams are preferentially collected but representative soil samples are taken if these are not present within the designated square kilometre. The minus 75 micron fraction of samples is collected by dry sieving and analysed for 24 elements (TiO2, MnO, Fe2O3T, Sc, V, Cr, Co, Ni, Cu, Zn, As, Rb, Sr, Y, Zr, Nb, Mo, Sn, Sb, Ba, W, Pb, Th, U) by simultaneous X-ray fluorescence on pressed powder pellets. Samples from selected areas have also been analysed by other analytical techniques for additional elements such as Au by graphite furnace, major elements by sequential X-ray fluorescence and anions by ion chromatography. The semi-quantitative mineralogical content of in excess of 1000 samples soil samples were determined by X-ray diffraction on a trial basis and encouraging results were obtained. An excellent correlation has been found between soil chemistry and underlying geological formations. Geological units are clearly demarcated and the chemistry clearly reflects regional geological patterns. Apart from geological correlations the data set can also used for exploration purposes, the establishment of environmental baselines within geological units and agricultural applications. An advantage of the methodology followed by this program is that all sample material are stored and archived which allows for samples to be analysed by other and future advanced analytical techniques for additional elements as the need arise.