

THEMATIC MAPPING AND THREE-DIMENSIONAL MODELLING OF THE REGOLITH FOR MINERAL AND ENVIRONMENTAL ASSESSMENT.

WILFORD JOHN

In highly weathered and buried landscapes mapping and understanding the origin of regolith materials is important in exploration. The surface expression of buried mineral deposits is determined by the regolith characteristics and the physical/chemical dispersion processes that have occurred or are still operating. From an environmental perspective, the regolith is becoming increasingly important in soil fertility, salinity and groundwater studies. Specialised thematic regolith maps and modelled raster datasets, using geographic information system tools, are now being generated to assist in mineral exploration and land capability assessment. Geochemical sampling strategy maps, reclassify regolith-landform units into major geochemical-regolith domains. These domains require different geochemical sampling and interpretative approaches. Integrated thematic maps tailored for specific applications are generated by combining and modelling regolith information with other datasets. These two-dimensional regolith and thematic maps are being complemented by three-dimensional regolith and geochemical models, using computer graphic visualisation techniques. Three-dimensional models are being constructed from a variety of subsurface datasets, including airborne magnetics, airborne electromagnetics, water bores, seismic profiles and exploration drillholes. Geochemical plumes generated from drillholes are being combined with the three-dimensional regolith models to assist in understanding metal dispersion trends from the mineralised host rock through the weathering profile to the surface. Combining airborne electromagnetic measurements with hydrogeochemistry into a three-dimensional regolith framework is helping to visualise and better understand the controls on salt distribution and movement in the landscape. Several case-studies in different Australian environments are used to demonstrate this research.