NEW INSIGHTS INTO THE NORTHERN TERRITORY REGOLITH

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The Atlas of Regolith Materials for the Northern Territory was prepared as a companion to the 1:2 500 000 regolith map the Northern Territory. Specimens of regolith (329), including weathered rocks, sands and soils and their secondary cemented products (silcrete, ferricrete, calcrete) were collected along some 20 000 km of traversing. These have been combined with specimens collected by CRC LEME in 1998-1999 from the Amadeus Basin.

The regolith materials have been grouped and described according to large-scale regolith terrains and have been split according to their regolith classification. The atlas is illustrated with 508 annotated photographs of landscape, outcrop appearance, hand-specimen and micrographic details. Most of the specimens have been chemically and mineralogically analysed, to contrast their compositions, including some ‘stable’ elements such as Zr and Ti. Particle size distributions are available for some of the soils and sands.

Regolith materials varied from the apparently unweathered quartzites of the Amadeus Basin to complete lateritic profiles protected from erosion by the Austral Downs chert. Study of the Amadeus Basin quartzites showed that many were actually saprock or even saprolite. Carbonates weather abruptly by solution, leaving little weathered mantle, although cemented scree and calcrete-cemented alluvium are common. The granitoids degrade to grus, where erosion is active, and to saprolite and ferruginous saprolite, where erosion is much less active. The fabric collapses progressively to a mass of shard-like quartz grains in clay that readily erodes to supply outcrop-proximal sands, alluvium, sandplain sand and aeolian sand.

Mafic rocks, siltstones and argillites degrade readily to saprolite, where some primary structures are preserved and then to plasmic and mottled materials where primary fabrics are largely absent. The Brewer Conglomerate is rather unique in that its carbonate-rich matrix dissolves, leaving a loose mass of quartzite clasts that shatter to insoliths on the surface.

There are a variety of silcretes, some clearly formed from Palaeogene-Neogene fluvial, silty, sandy, gritty and conglomeratic sediments; others formed in soils between outcrops of quartzite. Some quartzites adjacent to these silcretes have also been silicified in the process. Although the silcretes formed low in the landscape, probably on the floors and edges of valleys, relief inversion has formed small mesas.

Ferricretes are very variable. Some are cemented scree on the edges of modern drainages. Many consist of ferruginous granules, some containing fossil wood. The granules have been coated with goethite to form an open mesh. Some of these have formed on the margins of karstic depressions in Cretaceous rocks in the north of the territory. Calcrete has developed on the flanks of hills of Brewer Conglomerate, as sheets and joint fillings in saprolite, as layers of rhizomorphs in alluvium, or as nodules within sand dunes.

Soils and sands have been subdivided into coarse outcrop-proximal deposits, alluvium, sandplain deposits, aeolian deposits, calcareous sands and black soils. They each have characteristic particle size distributions and mineralogies. The outcrop-proximal, sandplain and alluvial deposits probably form a continuum. Small amounts of aeolian material are found in all these. Termites have been important soil turbating agents and termitaria are important features of sand plains throughout the territory.