Monday, July 13th, 2009

Summary of Geological Observations in Travels of 50km Along Birdsville Track East of Marree

The underlying basement rocks are Cretaceous (~100 million years) interbedded sandstone, claystones and thin porcellanite. Sandstones are lithic (rock fragments) with variable and low quartz content, and are probably partly volcanogenic and tuffaceous (volcanic ash). Some claystones are silicified into porcellanite: colours vary from pale cream to yellow, buff, brown, purple and red.

Weathering and erosion of these Cretaceous sediments created the Early Tertiary (~60 million years ago) sequence of sands, quartz gravels and silts. Deep weathering of these has created the local development of hard silcretes at their surfaces. These consist of microcrystelline silica

(quartz), yellowish grey to pale brown, with bulbous and mammilary surfaces and open channels and reentrants representing former roots, stems, termite burrows etc.

Close to the surface are gypsum crystals, in places forming pavements or gypcrete. Such gypsum would have first formed by evaporation of salts in dry lakes. Strong westerly winds would carry gypsum sands into gypsum dunes and dust spread over the landscape in the downwind direction. Occasional rains would dissolve some gypsum and precipitate it into large crystals (up to 10-15cm diameter). These deposits are of Quaternary age (less than 2.8 million years old).

(Images) Desert landscape with gypsum crystals and crust.

The present landscape consists of very flat stony desert with some escarpments and small mesas (buttes, table tops). These were seen to be capped by gypcrete or calcareous silts (calcretes).

The stony desert consists of silts with a gibber (stone) capping of fragmented silcrete, gypsum, jasper, porcellanite, ironstone, quartz pebbles etc.

In places quartz sand dunes and thin sand sheets cover the stony desert.

Some of the elevated areas were once the base of river channels where consolidation (by silica, iron oxides or calcite) would occur. Widespread erosion would then lower the landscape, leaving the hardened portions standing high above their surrounds. Such inverted relief has been observed on the Martian surface, and the Marree area offers several analogues to observed features on Mars.

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