D. DURICRUSTS

Field Note D4f. Non-pedogenic silcretes: B. Drainage-lines and rivers

Riverine silcrete.

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Introduction

There are *three* varieties of *non-pedogenic silcretes:*

A. *Groundwater silcretes* are formed under phreatic conditions (in the zone of saturated groundwater; YE) through silicification at or close to a water table, or at zones of groundwater outflow.

B. *Drainage-line silcretes* develop as a result of the silicification of alluvial fills in contemporary or former fluvial systems.

C. *Pan / lacustrine silcrete,* forms as a result of the silicification of sediments at the margins of lakes and pans.

Non-pedogenic silcrete development may be more localised and is often controlled by the position of the local water table; while this would imply an overlying palaeosurface, the silcrete itself does not mark the position of the former land surface.

The formation of the above three types of non-pedogenic silcretes is illustrated in the diagram below:

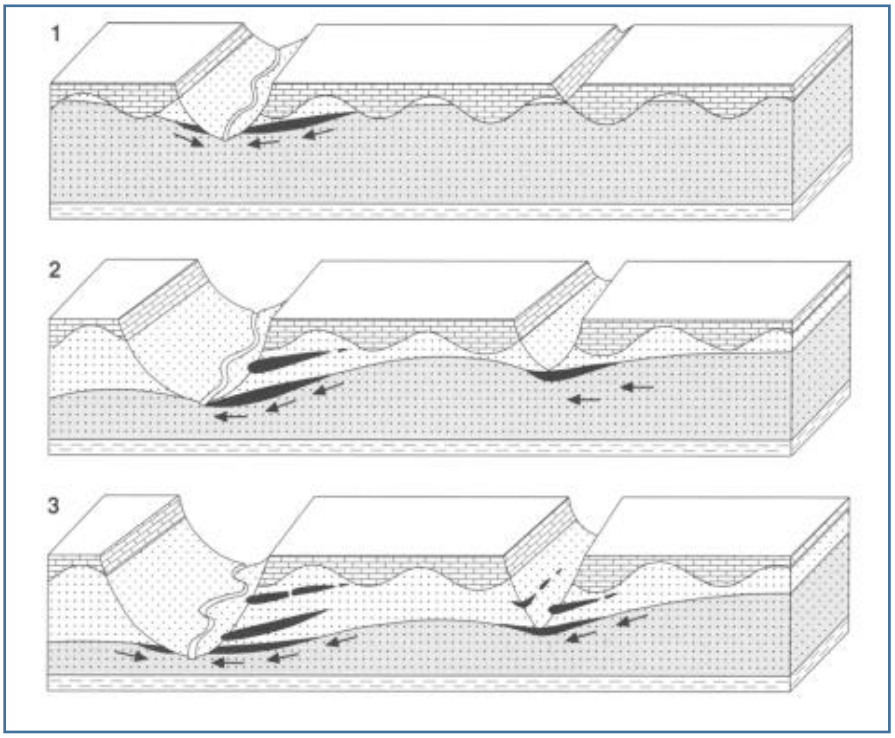

Figure 1. Block diagram illustrating the formation of groundwater silcretes (in France). Silcrete lenses form close to the water table in zones of groundwater outflow (1) and superposed lenses develop (2) with valley deepening due to progressive landscape evolution (3).
Source: Ullyot at al, 1999, in turn adopted from Thiry et all, 1988.

The non-pedogenic silcretes in the Study Area can be grouped into the three types mentioned above. This Filed Note describes Group B silcretes (Drainage-lines and rivers).

1. Alluvial drainage-lines

Silcretes in alluvial drainage-lines are usually bulbous (Figures 1 and 2).

Figure 2. Bulbous silcrete protrude the soft alluvium. Top – lower section of the Spitskopkloof Valley. Bottom – upper Potberg River Valley.

Figure 2. Silcrete lumps protrude the soft alluvium, at the outlet of Langkloof (arrow), on the south shore of the Salt River Marsh. Top - View to the west. Bottom – a lump of silcrete.

2. Streams

Silcrete along stream has a platy (tabular) appearance (Figures 3 and 4) as well as blocky appearance (Figure 5).

Figure 3. Tabular Silcrete. Top – along the Brakrivier. Bottom – along Spitskopkloof.

Figure 4. Tabular silcrete. Top and bottom – along an east tributary to Spitskopkloof.

Figure 5. Blocky silcrete. Top and bottom – along a west tributary to the Waterschilpad River.

3. *Ravines*

Silcretes along deep ravines have a blocky appearance (Figure 6).

Figure 6. Blocky silcretes. Top and bottom – along a west tributary to the Waterschilpad River near Middeldam Farm.

4. Salt River

Platy silcrete is typical of the shores of the Salt River in the Salt River Gorge and in the De Hoop Vlei (Figures 7 and 8).

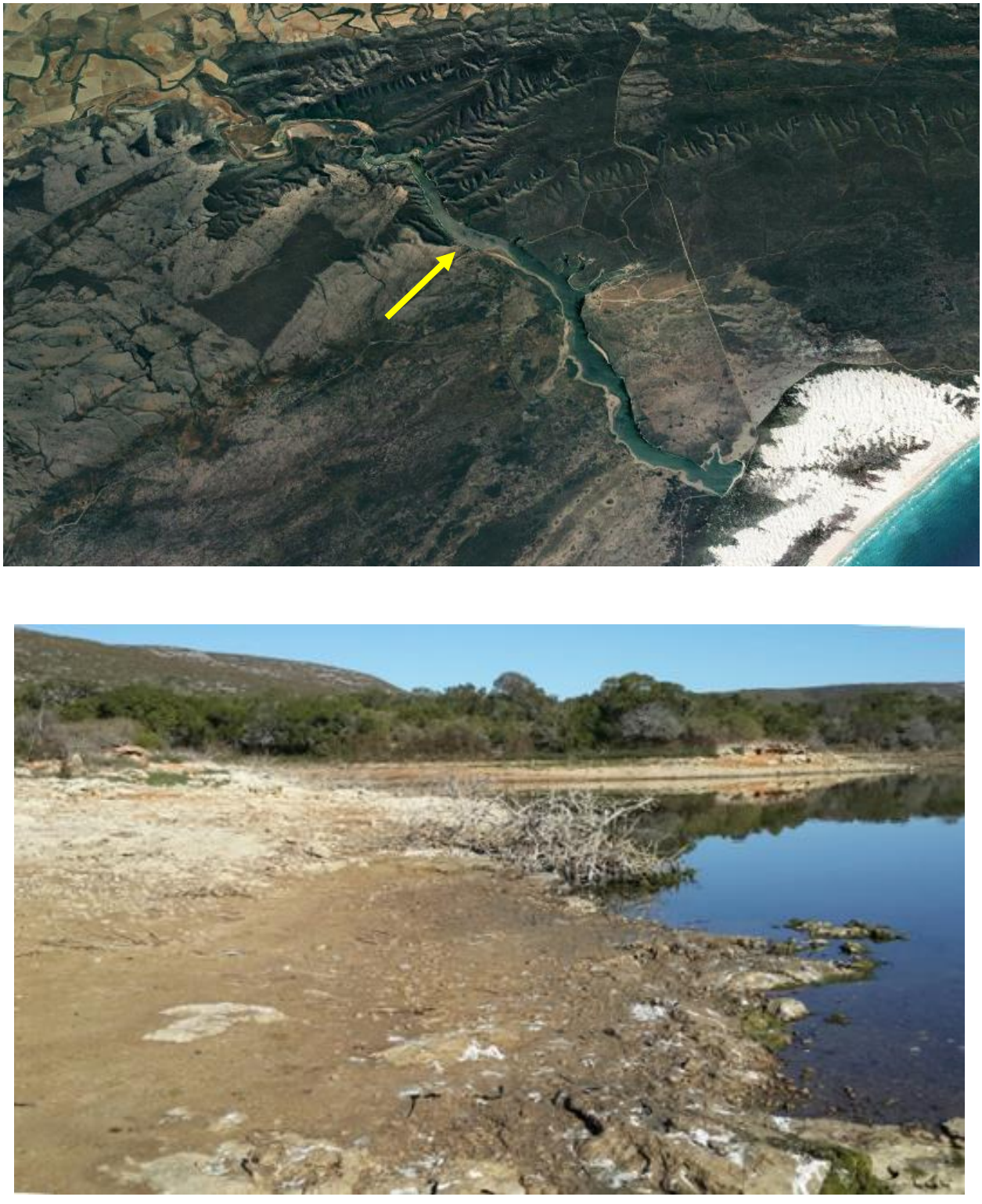

Figure 7. Tabular silcrete along the shores of the Salt River. Top - satellite image showing the location of the Salt River and the De Hoop Vlei (arrow). Bottom - tabular silcrete.

Figure 8. Tabular silcrete on the shores of the Salt River. Top – along the De Hoop Vlei. Bottom – at Die Mond. These silcrete could be intergrades with calcretes (also see Field Note on groundwater silcretes).

5. Heunings River

Silcrete was formed on the banks of the Huenings River and Estuary. The silcrete habits on the north shore are different from those on the south shore (Figures 9 to 17).

Figure 9. Satellite images of the Heunings River Estuary. Top – October 2018: the river meanders to the sea through a dry, sandy beach. Bottom – July 2020: sand brought onto the shore by waves and currents block the outlet, resulting in the water level rising and covering the shores of the river and the estuary.

Figure 10. Tabular silcrete on the north shore of the Heunings River Estuary. View to the west.

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Figure 11. Silcrete on the north shore of the Heunings River Estuary. Small pebbles have been cemented into the silcrete.

Figure 12. Shells of estuarine organisms can also be seen in the silcrete.

Figure 13. The content of fossils in the silcrete is decreasing with increasing distance from the sea.

Figure 14. Top and bottom – the silcrete on the north shore of the Heunings River Estuary.

Figure 15. Top and bottom – bulbous silcrete on the north shore of the Heunings River Estuary, at a greater distance from the sea are less resistant to weathering. Note spiky surface of the rocks.

Figure 16. Top and bottom: lumps of silcrete on the south shore of the Heunings River.

Figure 17. Top and bottom: lumps of silcrete on the south shore of the Heunings River. Arrows point to sharp spikes, facing up (top) and the thin 'fin', ~20 cm high (bottom).