

C. GEOLOGY

Field Note C8c. Hilltop silcretes spatial distribution



Silcrete-topped hills.

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Silcretes along the coastal belt are parts of deep-weathering profiles of residual surfaces, commonly overlying kaolinised shales. They are considered the preserving layer of the African Surfaces (also named peneplains, pediplains or alluvial plateaus; see Chapter W). There is yet a controversy around the number, elevations and ages of these surfaces.

The 'common geological wisdom' is that the elevations of the silcrete capping of the hills of the coastal belt preserve a. the elevations of the African Surface on which they were formed, and b. the southward (seawards) inclination of this ancient surface.

These assertions by many geologists relates to the hilltop pedogenic silcretes. Other silcrete types were formed much later (the hillslope silcretes were formed on already-eroded surfaces (Post-African Erosion Surface; see Chapter W) or on well-established landscapes and features.

This Field Note is about the geographical distribution of these hilltops in the Study Area. It will show that some observations in the Study Area do not corroborate the above assertions.

The distribution of silcretised surfaces was summarised by DL Roberts (2003) and presented on one map (Figure 1). It is clear that from this presentation that the silcrete outcrops in the Study Area consist a very small part the entire outcrops along the coastal belt.



Figure 1. Distribution of partially silcretised and ferruginised surfaces along the coastal belt. The locations were taken from published geology maps. Box indicates the limits of the Riversdale 1:250,000 geology map. Ellipsoid indicates the hilltop silcretes within the Study Area (enlarged below). The green line indicates the limits of the Study Area in this region.

Source: DL Roberts, 2003. Age, genesis and significance of South African coastal belt silcretes.

The silcrete and ferricrete outcrops in the study area is shown in Figure 2.

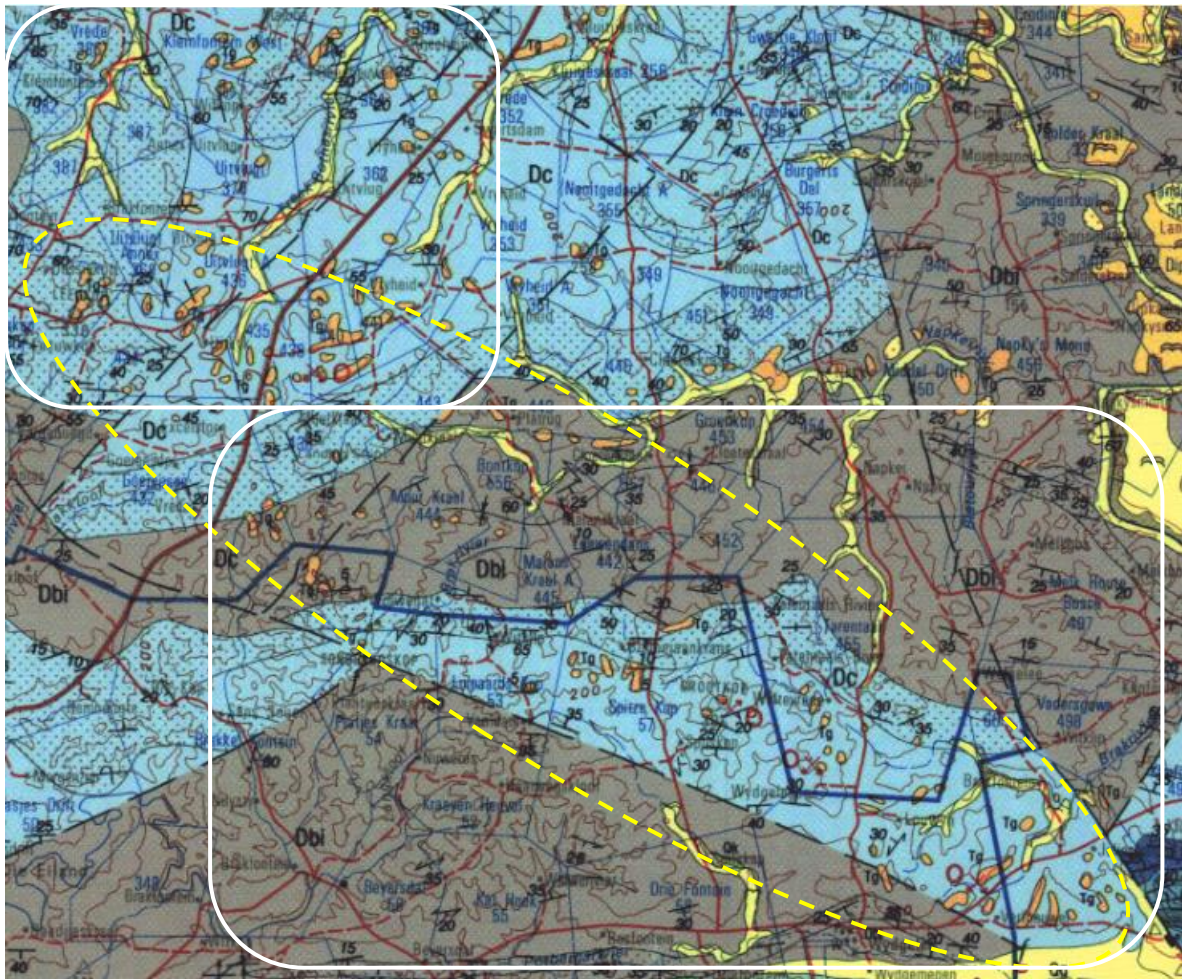
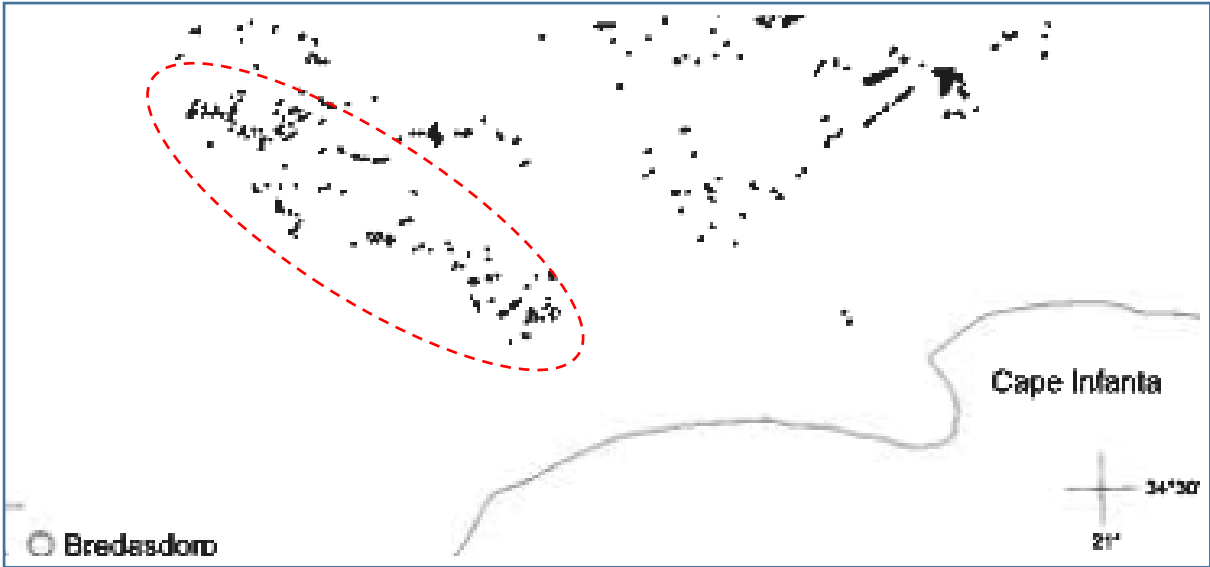


Figure 2. Top (from DL Roberts 2003) and bottom (Riversdale geology map 1993): distribution of partially silcretised and ferruginised surfaces in the area northwest of Potberg, which served as a base for Robert’s presentation. Ellipsoids indicate the hilltop silcretites within the Study Area which were investigated, herein named the ‘Silcrete Hilltop Strip’. White boxes show the confines of the maps in Figure 3.

The hilltops which are located within the confines of two main blocks, shown in Figure 3. The areas to the south, west and northwest of these blocks are devoid of silcrete-capped hills.

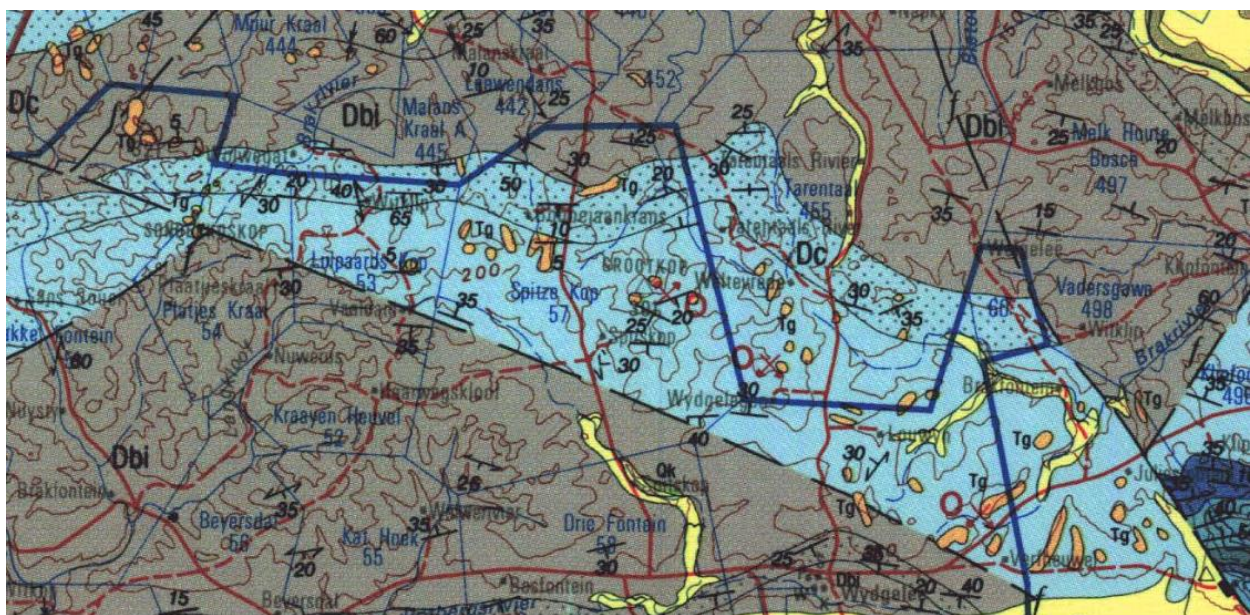
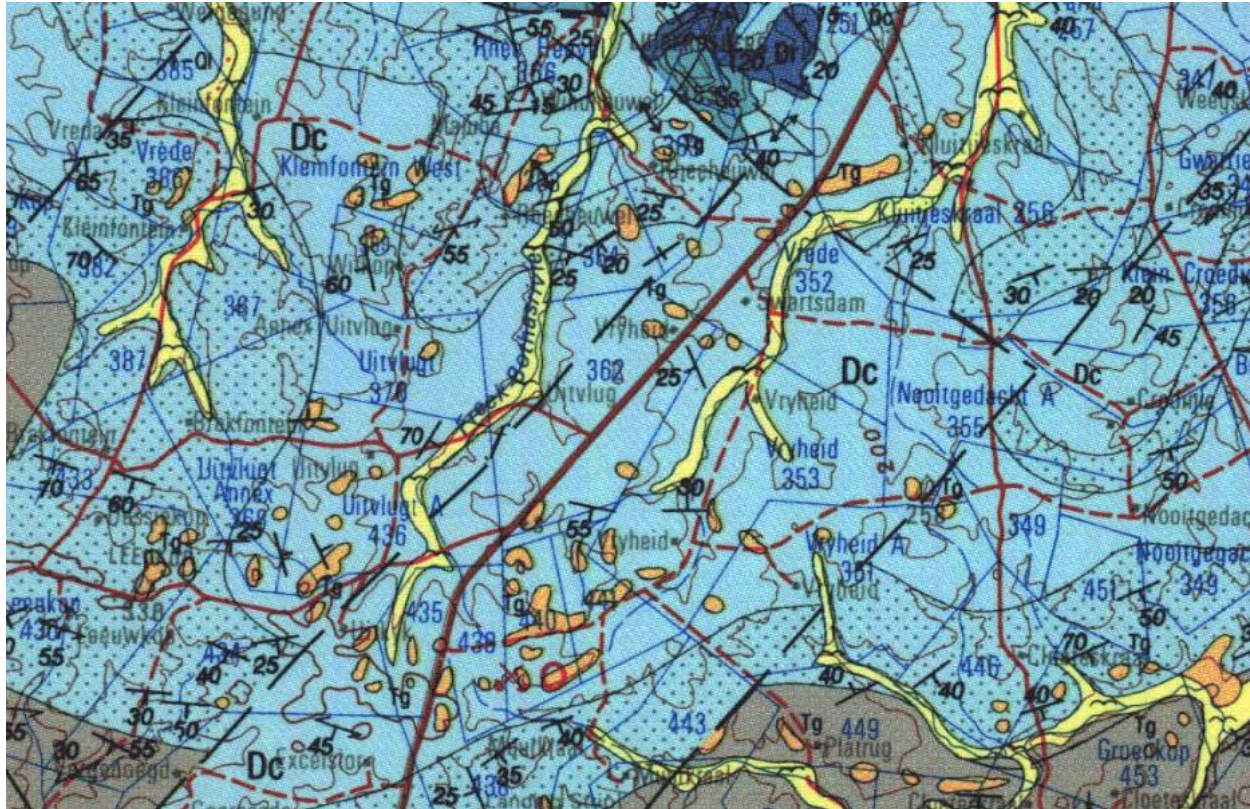


Figure 3. Top and bottom (Riversdale geology map, 1993): distribution of partially silcretised and ferruginised surfaces in the northwest of Potberg, where two main blocks (the NW block at top, and the SE block at bottom) may be recognised (white boxes in Figure 2).

In the Study Area the silcrete-capped hills are located along the ‘Silcrete Hilltop Strip’ (Figure 4). The strip, nearly 40 km long, could be divided morphologically into six sections, from NW to SE (Figures 5 to 10). All geology maps are field sheets by JA Malan, 1984. Names of high hills are also given.

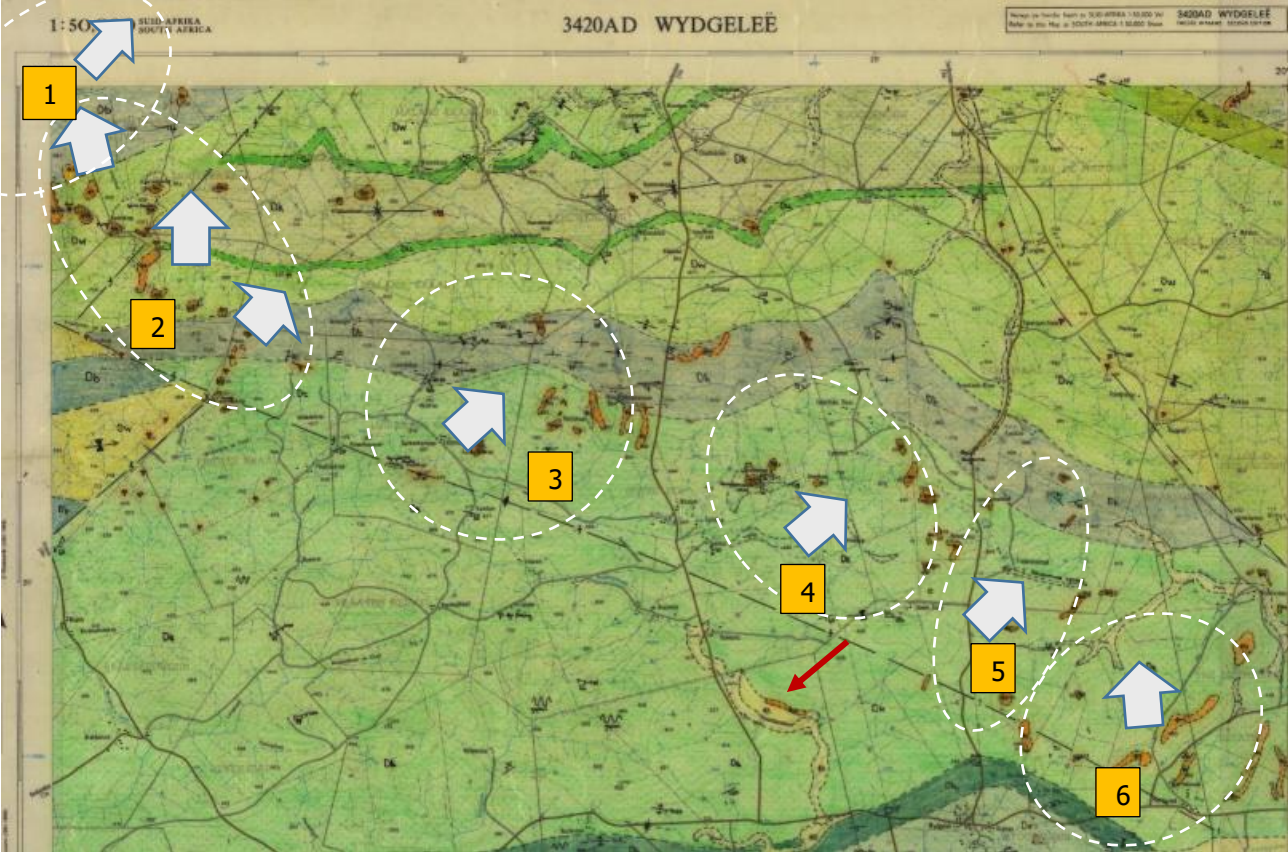


Figure 4. Geology map of the Silcrete Hilltop Belt in the study area, subdivided into six sections. (Red arrow indicates to a non-pedogenic silcrete, which does not form a hilltop).

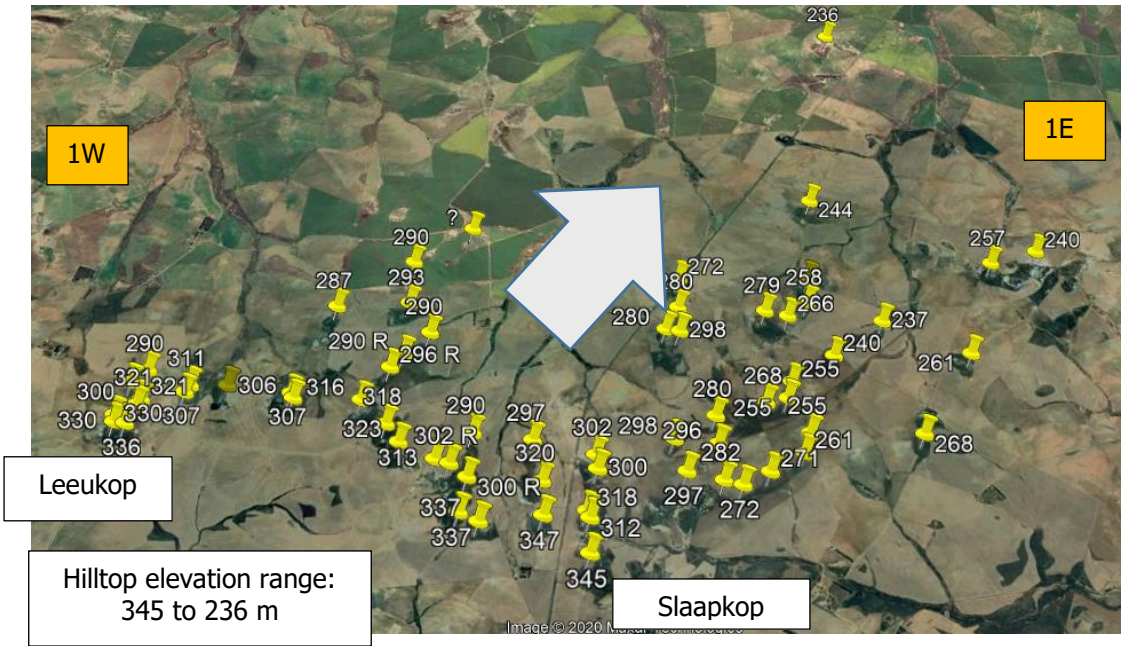


Figure 5. Satellite image of Section 1 of the Silcrete Hilltop Strip. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations.

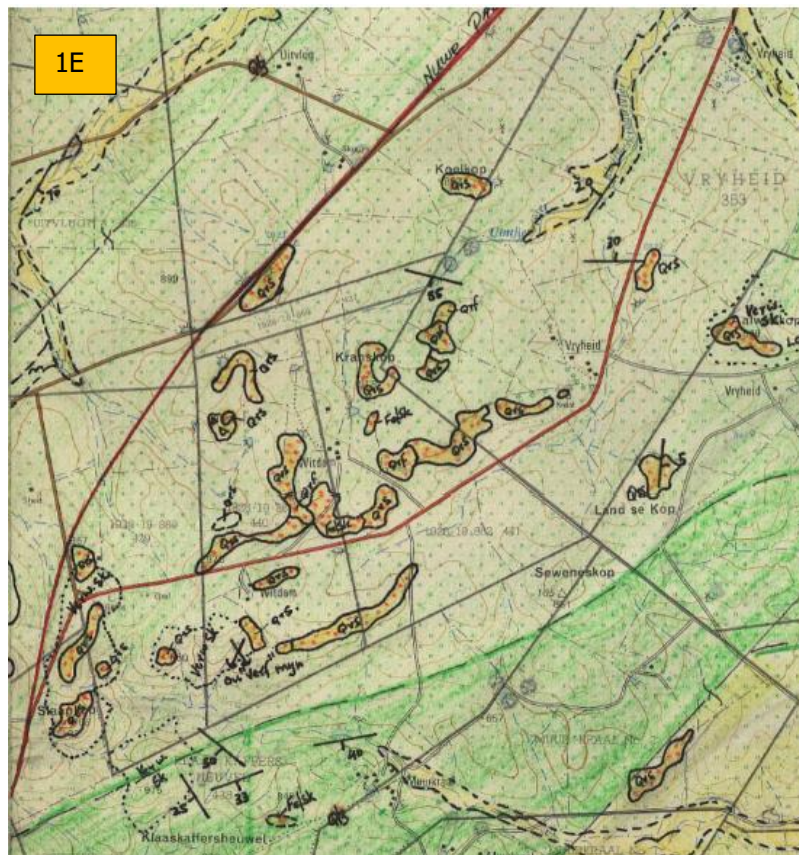
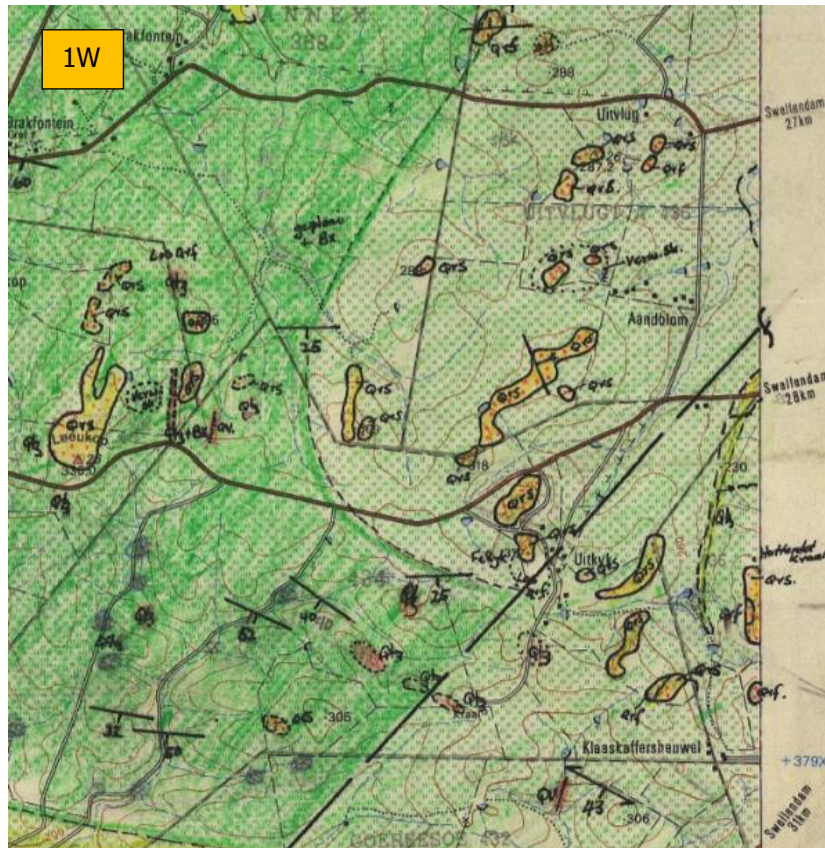


Figure 6. Geology map of Section 1 of the Silcrete Hilltop Strip in the study area. Top – the western part. Bottom – the eastern part.

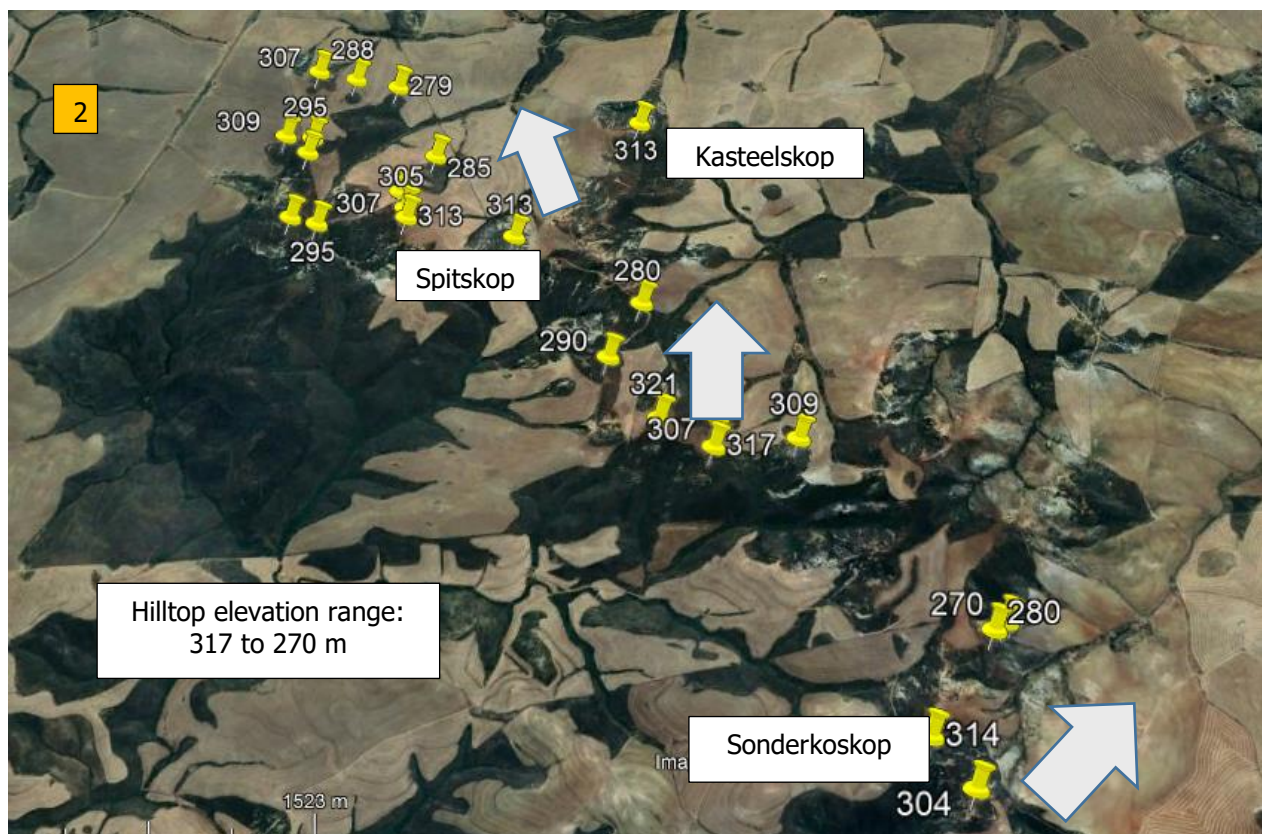
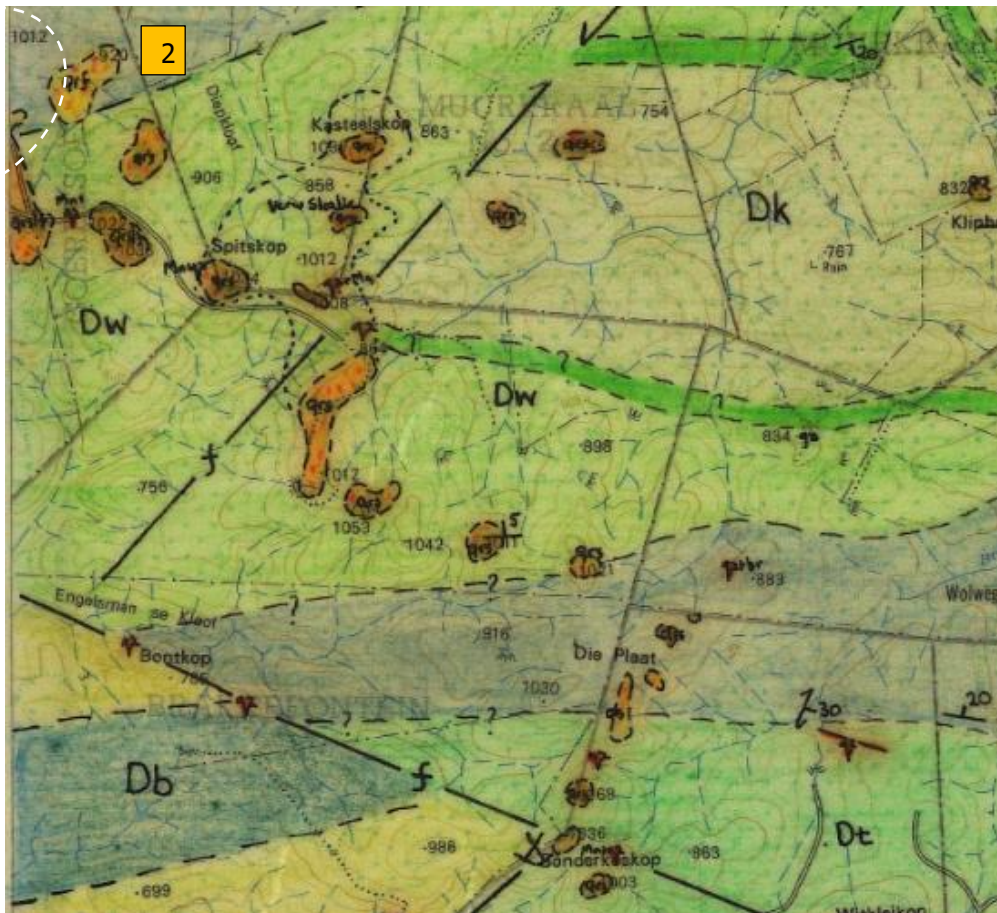


Figure 7. Section 2 of the Silcrete Hilltop Strip. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrows indicate the directions of decreasing elevations.

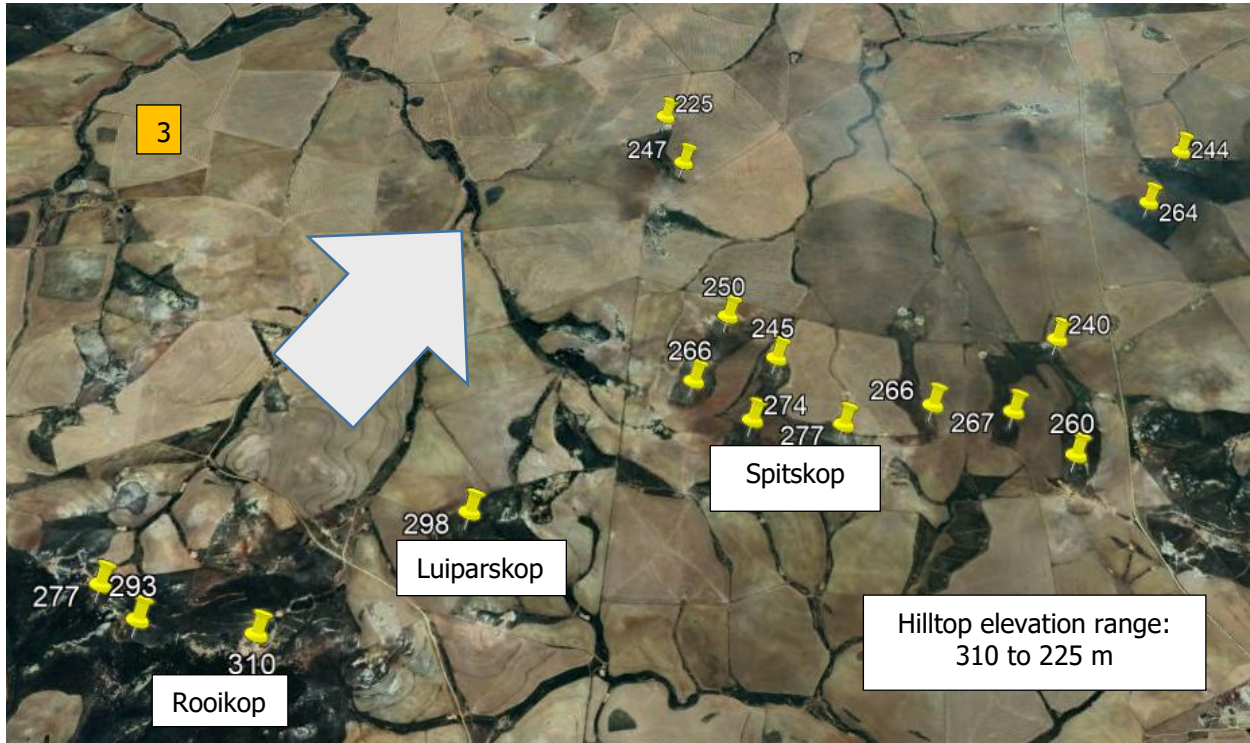
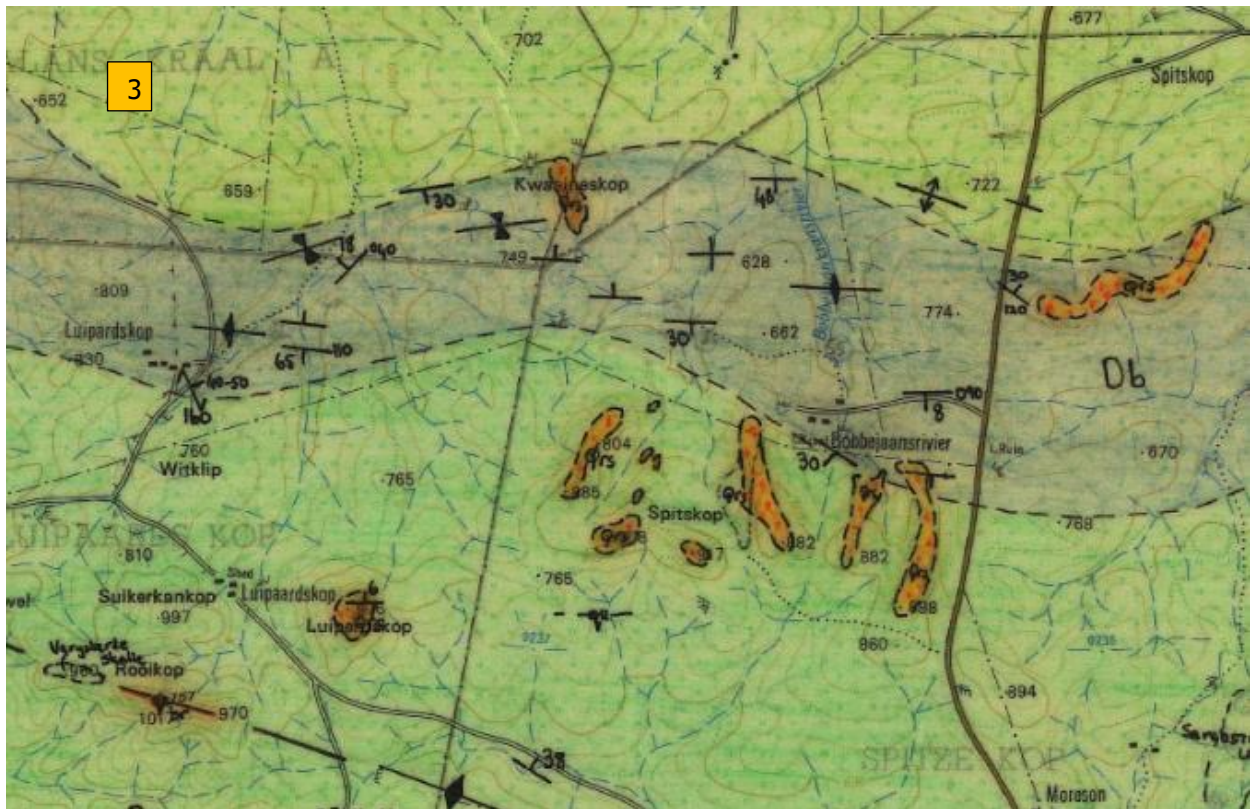


Figure 8. Section 3 of the Silcrete Hilltop Strip. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations. (Note: in the study Area there are about ten hills with the name Spitskop)

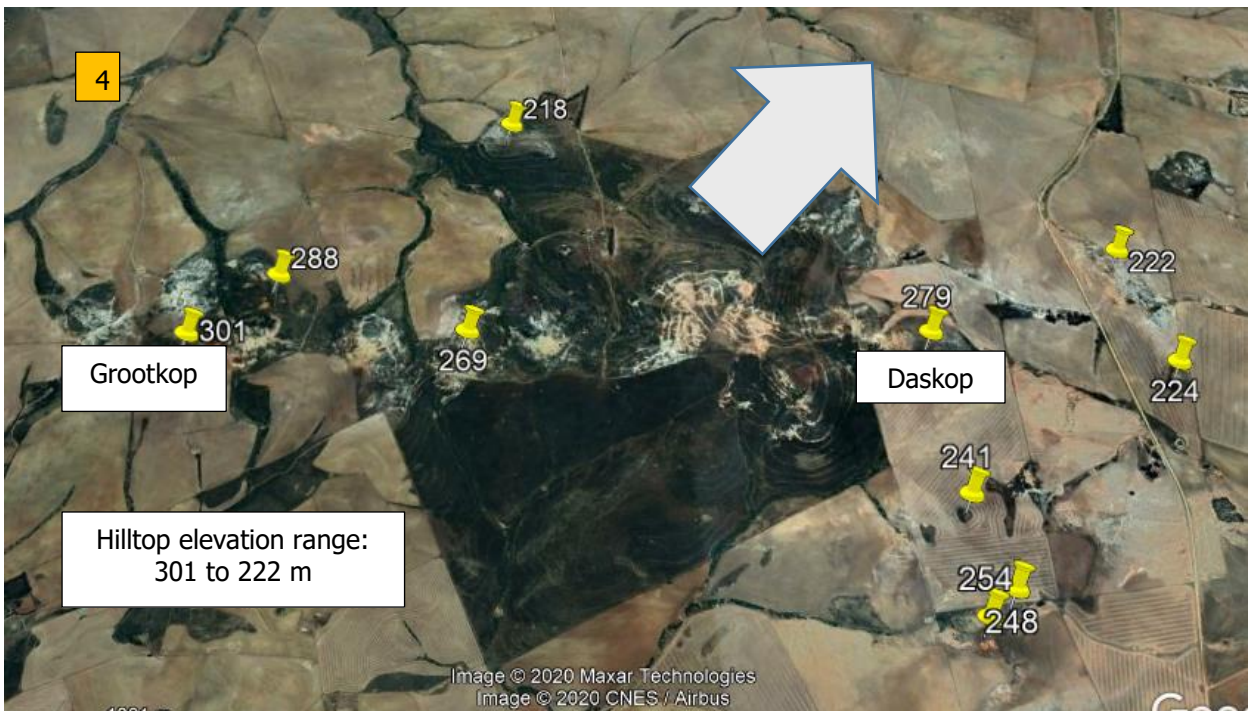
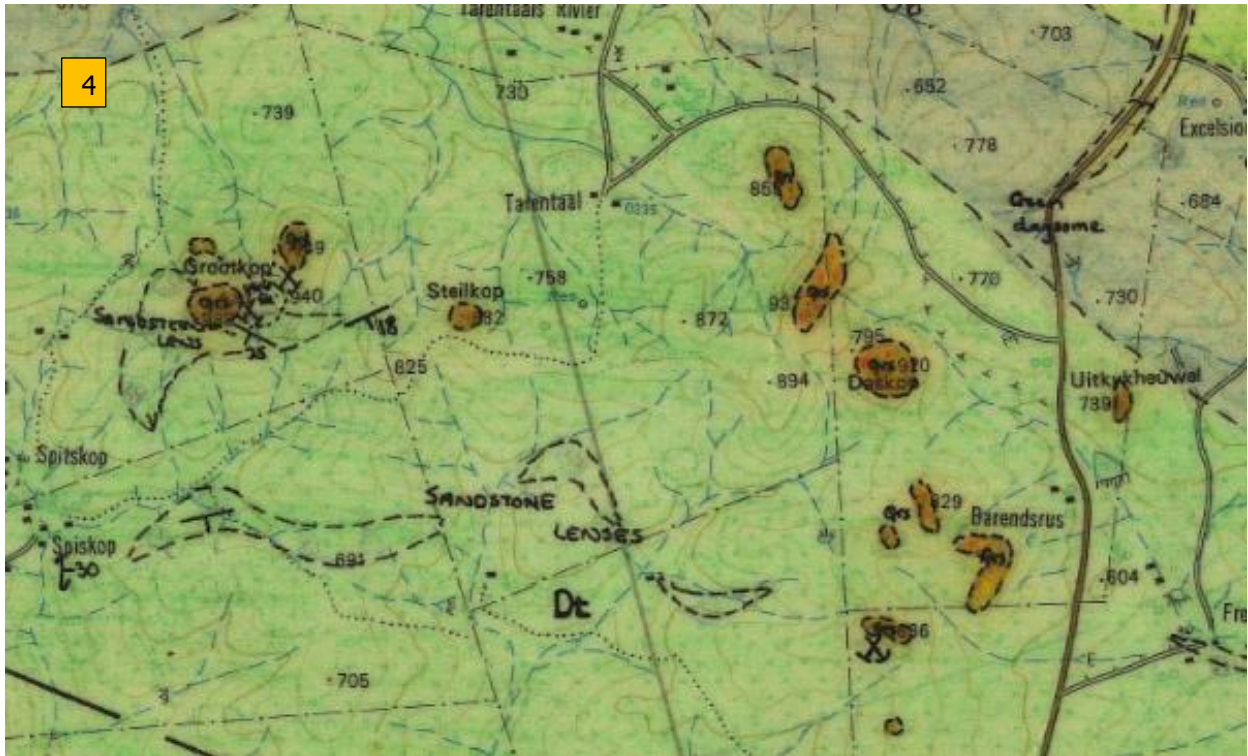


Figure 9. Section 4 of the Silcrete Hilltop Strip. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations.

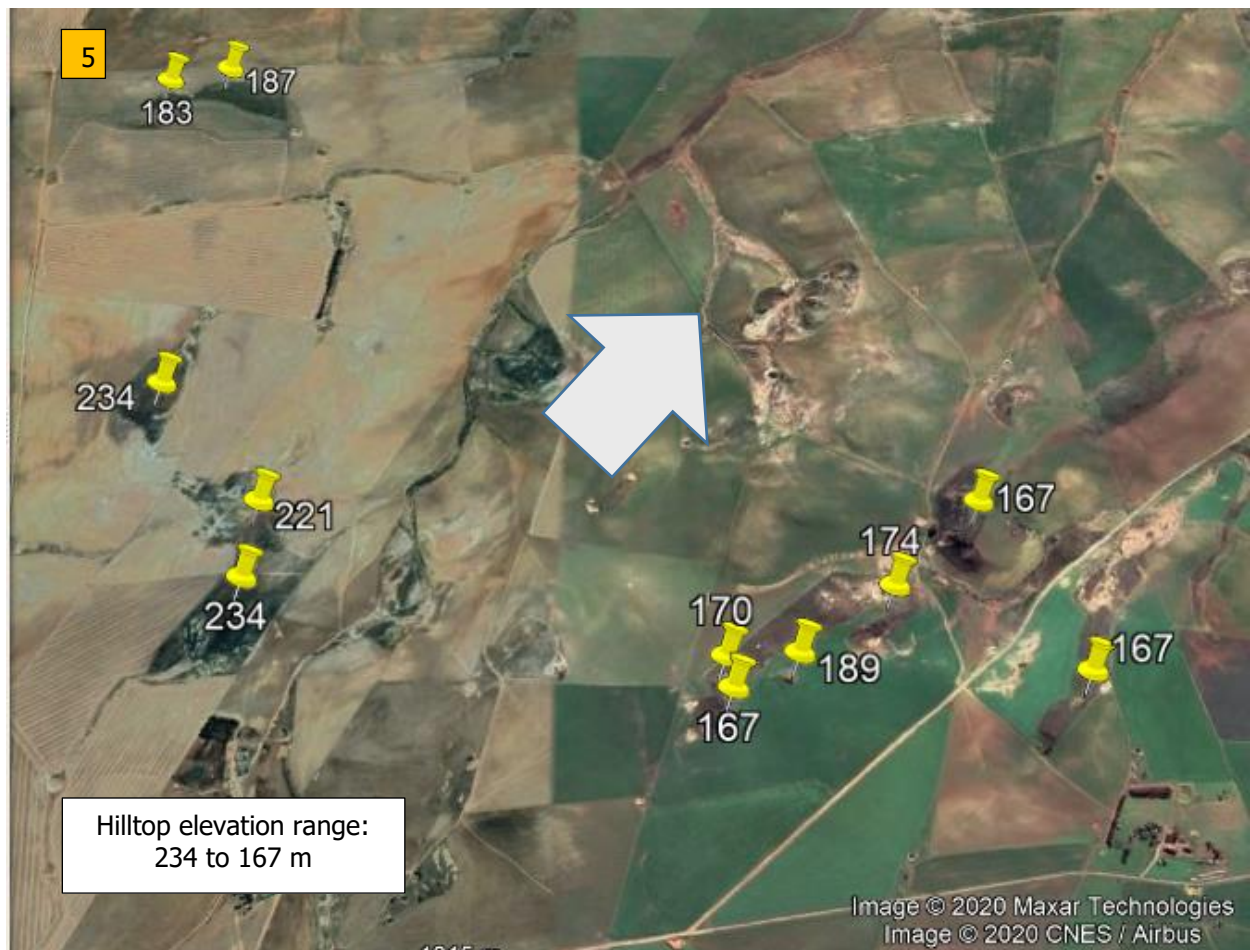
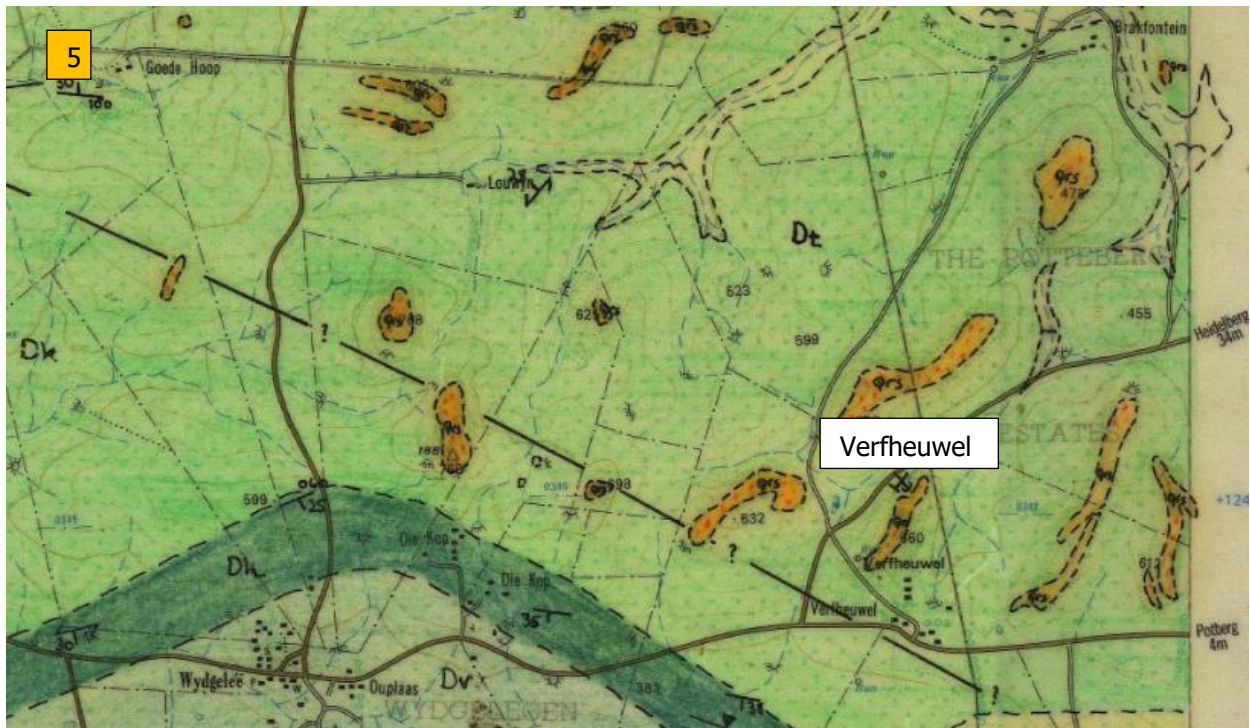


Figure 10. Section 5 of the Silcrete Hilltop Strip. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations.

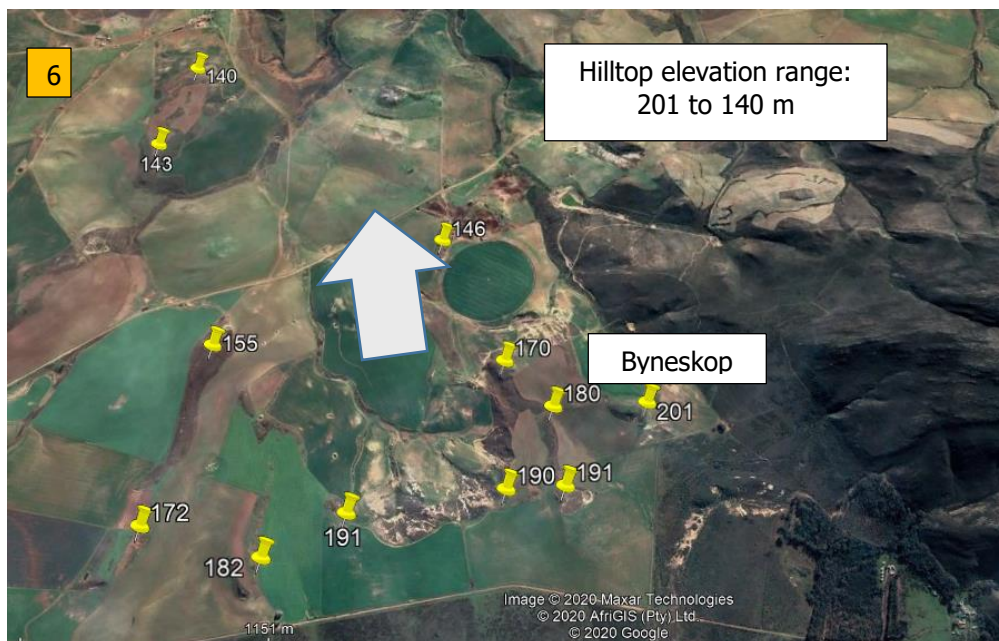
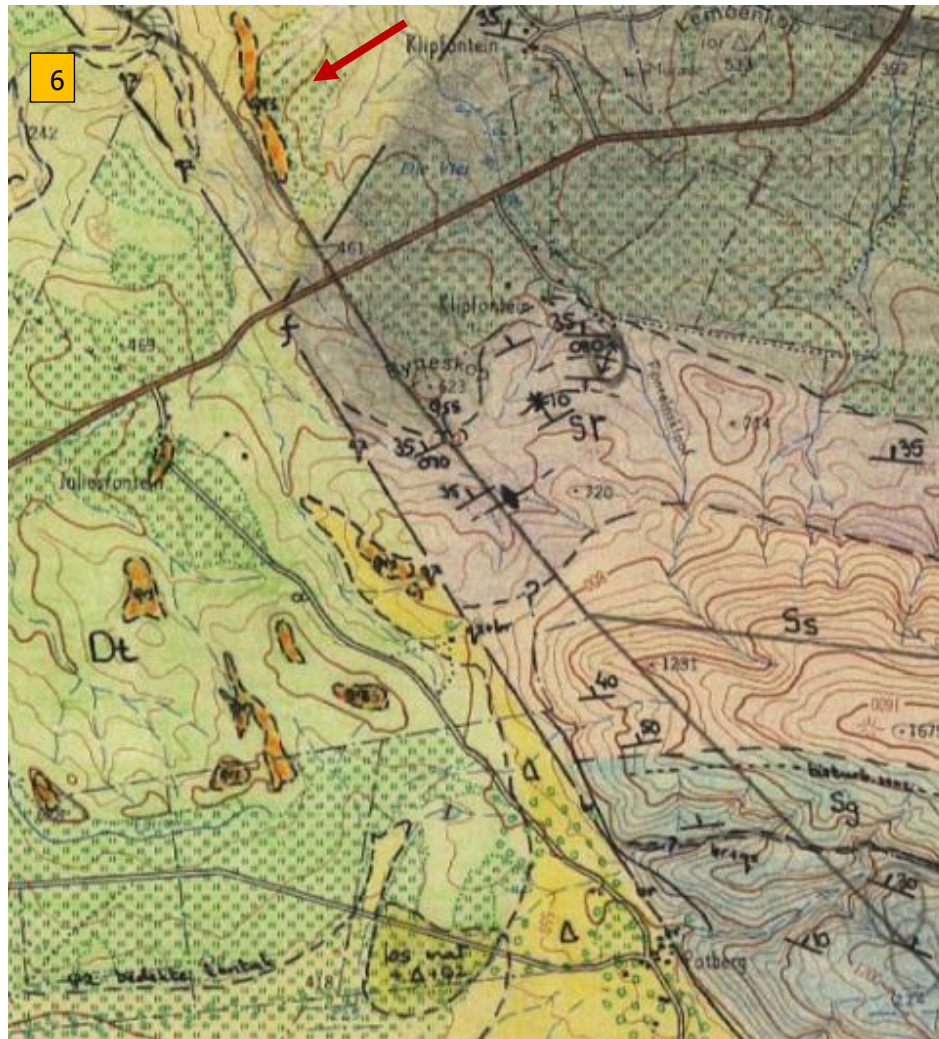


Figure 11. Section 6 of the Silcrete Hilltop Strip. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations. (Red arrow indicates to a non-pedogenic silcrete outcrop, which does not form a hilltop).

Of more than a hundred silcrete-capped hills in the Study Area, only a few are sloping to the south. All other hilltops slope to the northwest, north or northeast (Figures 12 and 13).



Figure 12. View of a line of buttes and ridges in the Study Area. View to the east.



Figure 13. View to the west on Hill 288 (next to Grootkop). Note the red clay, which was mined below the top; see Field Notes on mines.

Summary

The hilltop silcrete distribution in the Study Area can be summarised as follows (Figure 14):

- A. Silcrete-capped hills are confined to a certain area. There is not one hill outside this area.
- B. The hilltop elevations generally decrease to the northeast
- C. The elevation ranges decrease from Section 1 in the NW to Section 6 in the SE.

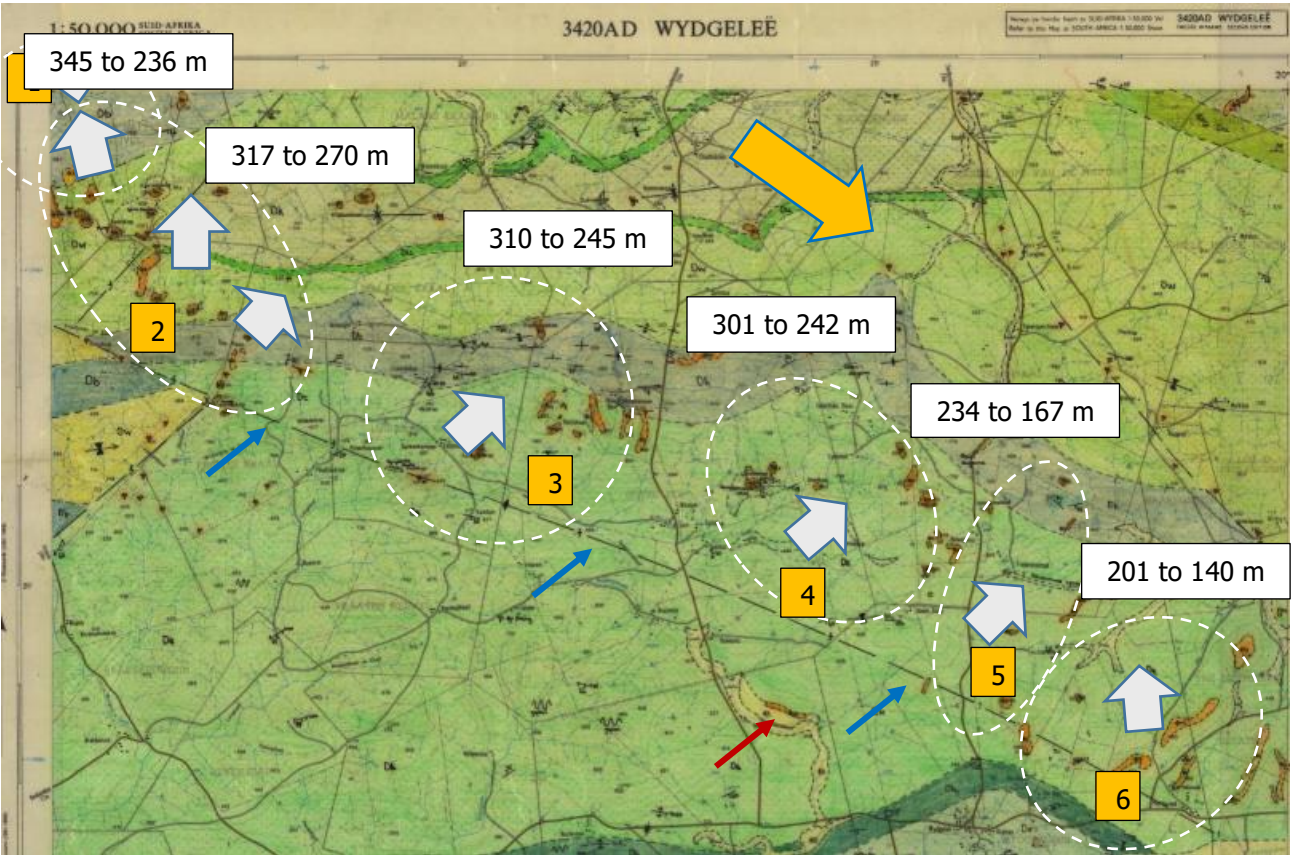
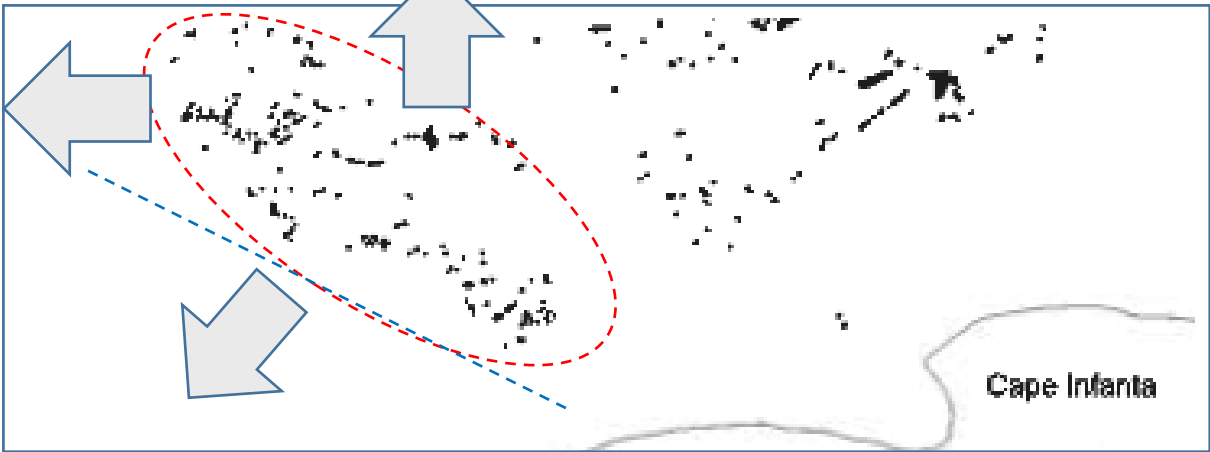


Figure14. Top and bottom - range of directions of decreasing elevations in the six sections, and the general NW to SE sloping of the Silcrete Hilltop Strip elevations (from 345 m in the NW to 140 m in the SE to the SE, indicated by the yellow arrow). Blue line and arrows indicate a regional fault line. (Red arrow points to a non-pedogenic silcrete outcrop, which does not form a hilltop).

More studies are required to assess the spatial distribution of the Silcrete Hilltops of the Study Area in the context of silcrete outcrops in the coastal belt.