D. DURICRUSTS

Field Note D4c1. Pedogenic silcretes - Hilltop silcretes spatial distribution

Silcrete-capped hills.

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Silcretes along the costal 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 silicretised 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.

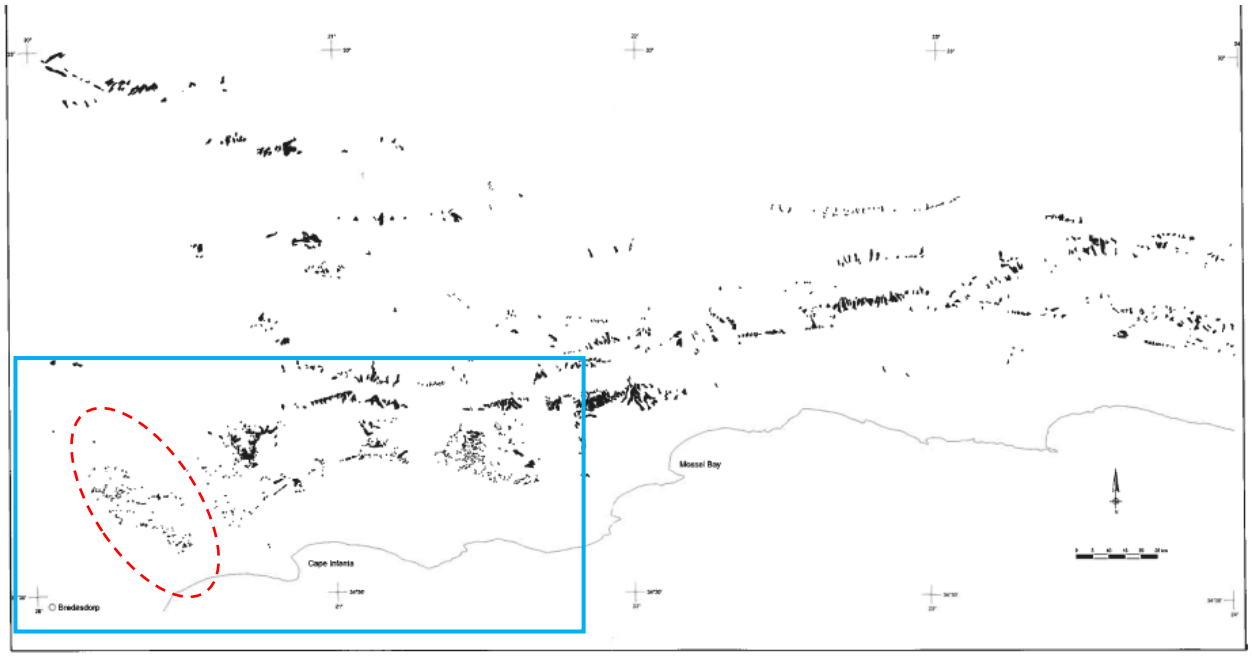
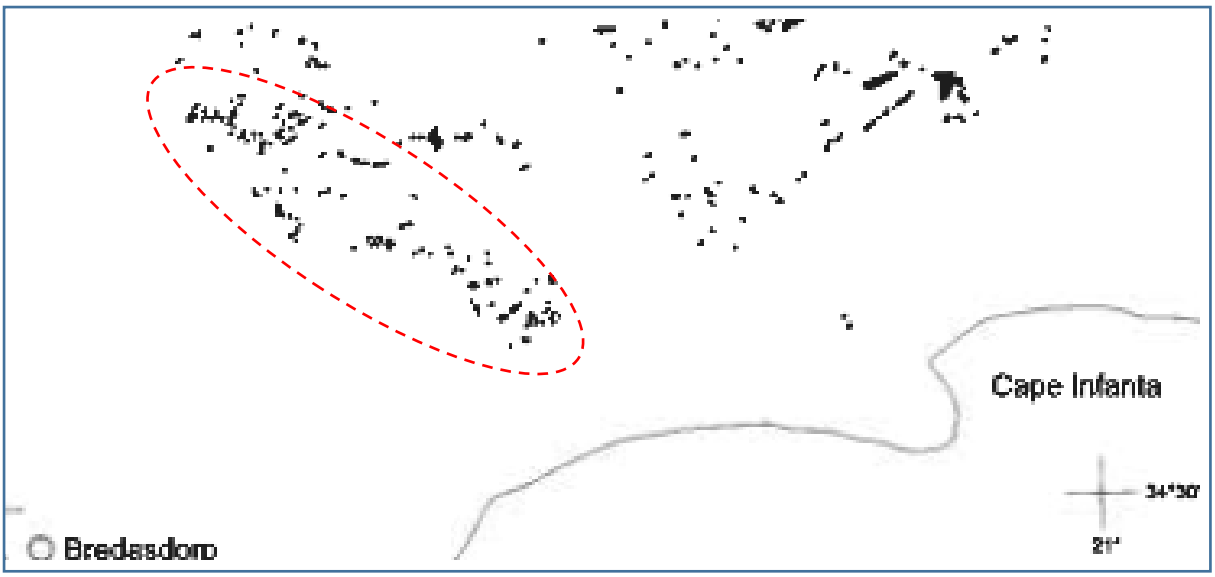


Figure 1. Distribution of partly silcretised and ferruginised surfaces along the coastal belt. The locations were taken from published geology maps. Box indicates the limits of the Riversdale 1:250,000 geology map. Ellipsoid indicates the hilltop silcretes within the Study Area (enlarged in Figure 2).
Source: DL Roberts, 2003. Age, genesis and significance of South African coastal belt silcretes.

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



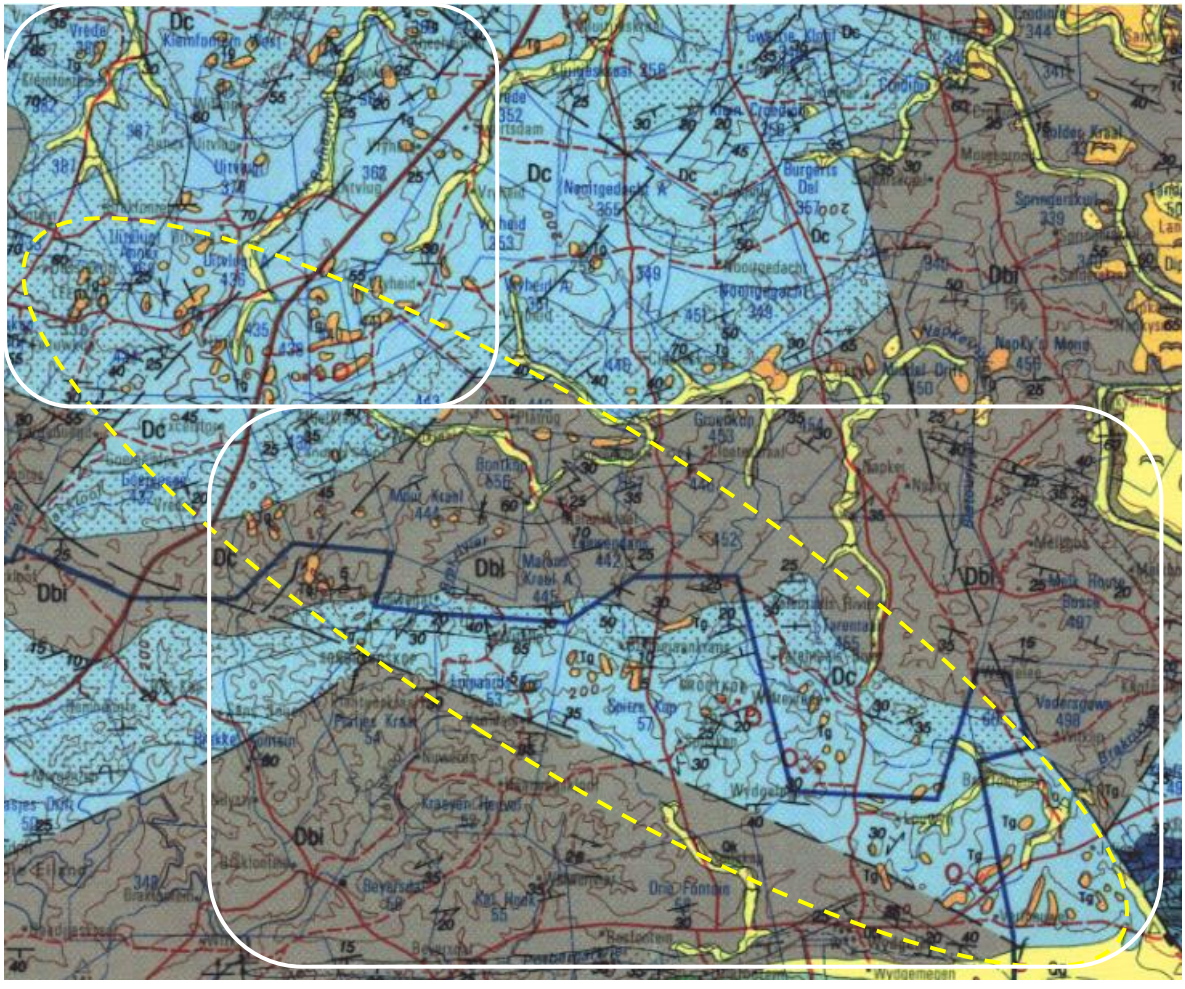


Figure 2. Top (from DL Roberts, 2003) and bottom (Riversdale geology map, 1993): distribution of partly silcretised and ferruginised surfaces in the area northwest of Potberg, which served as a base for Roberts' presentation (note: there are many inaccuracies in this presentation). Ellipsoid indicates the locations of hilltop silcretes within the Study Area which were investigated, herein named the 'Hilltop Silcrete Belt'. White boxes show the confines of the maps in Figure 3.

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

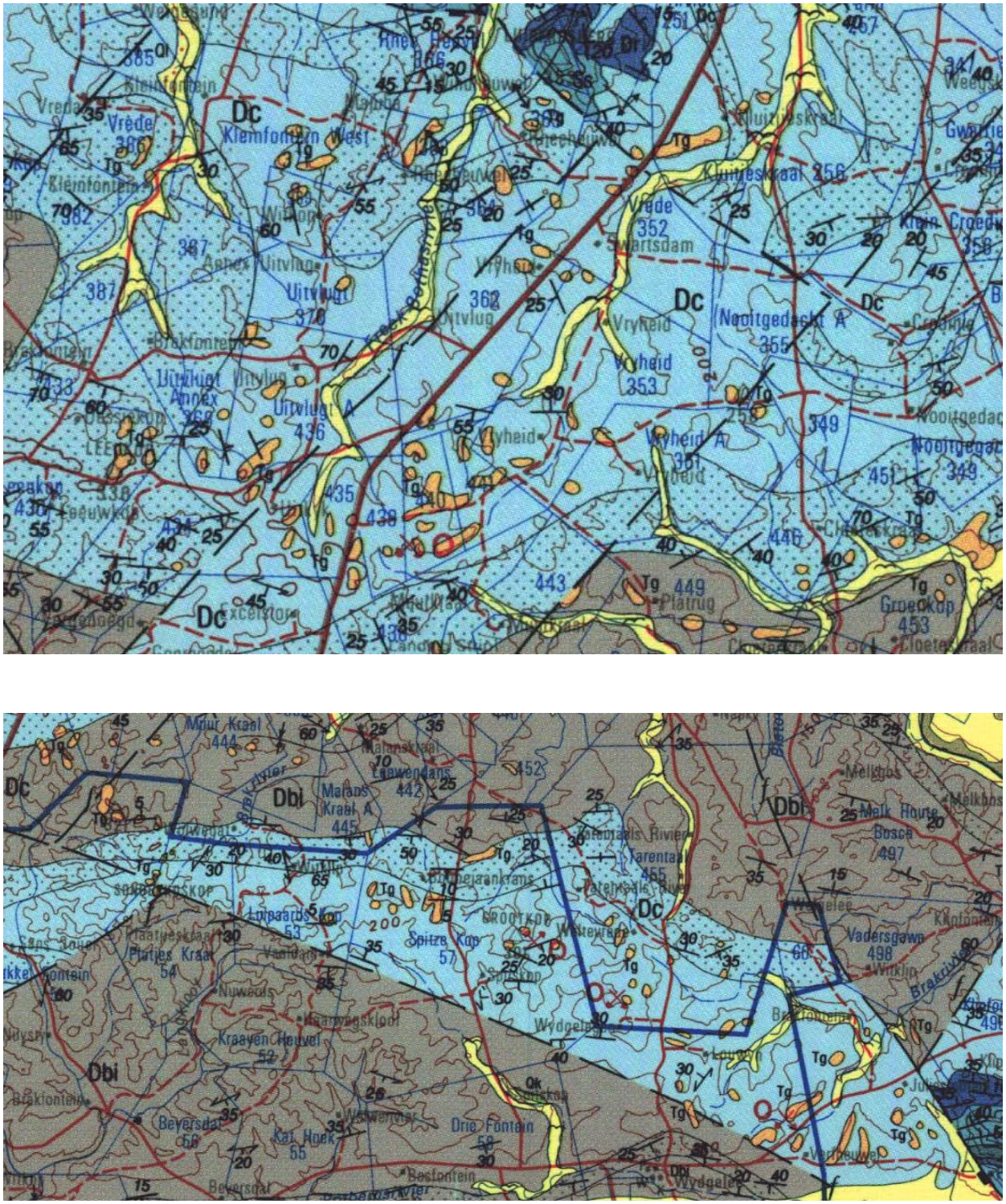


Figure 3. Top and bottom (Riversdale geology map, 1993): distribution of partly silcretised and ferruginised surfaces northwest of Potberg Mountains, where two main blocks (the NW block at top, and the SE block at bottom) may be recognised (white boxes in Figure 2).

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

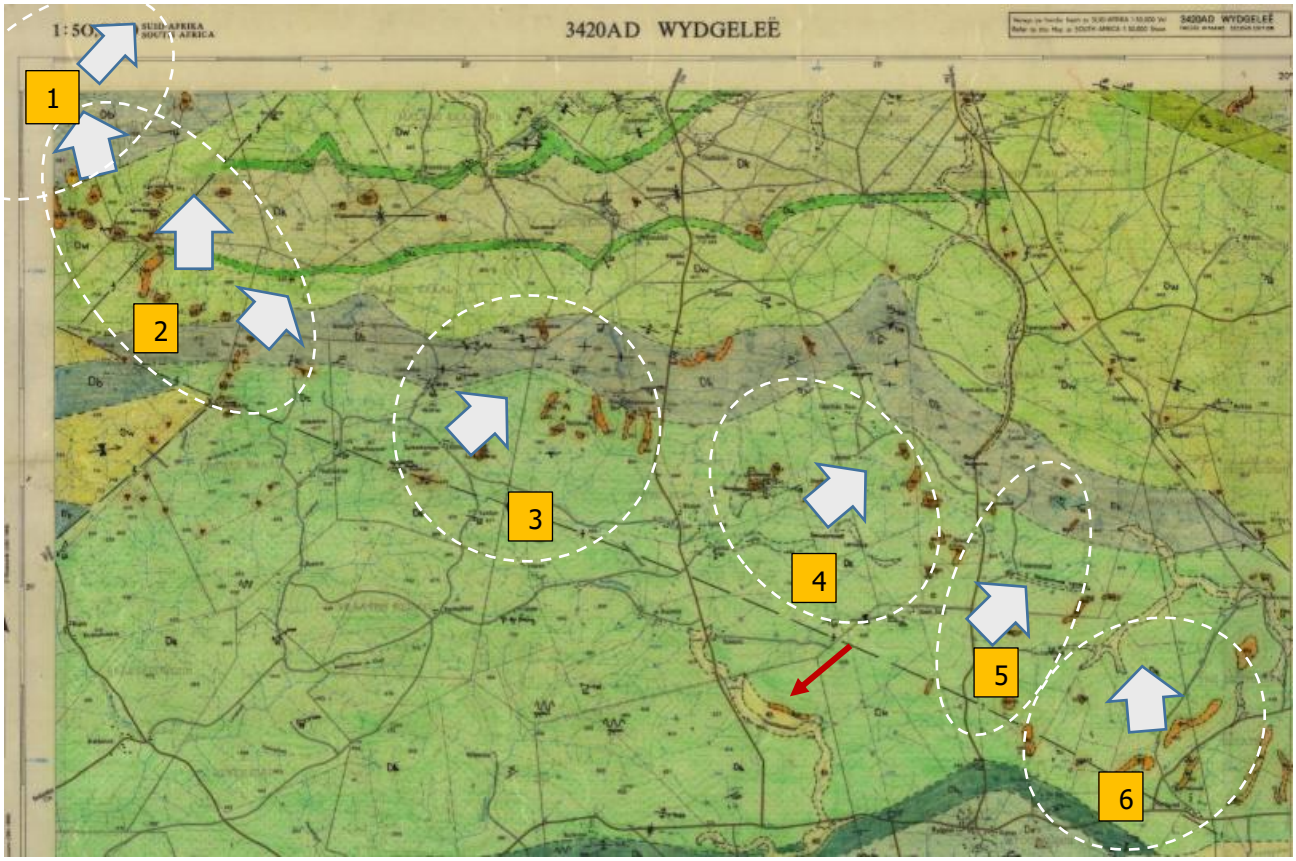


Figure 4. Geology map of the Hilltop Silcrete Belt in the Study Area, subdivided into six sections. White arrows indicate the direction of decreasing elevations. {Red arrow points to a non-pedogenic silcrete, which does not form a hilltop cap).

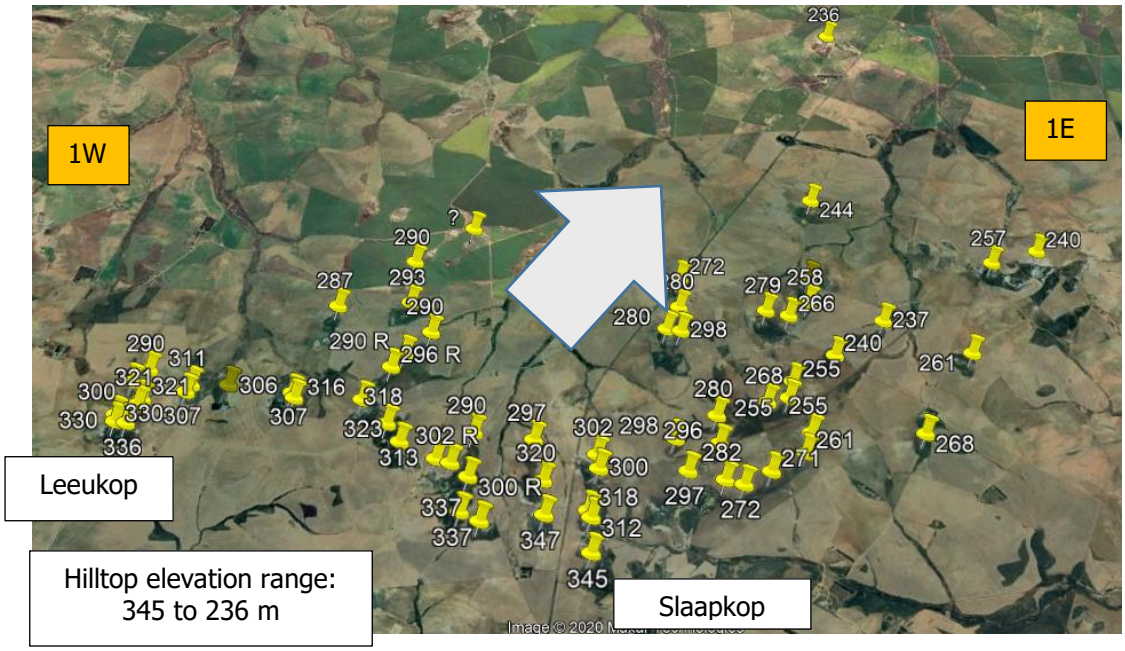


Figure 5. Satellite image of Section 1 of the Hilltop Silcrete Belt. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations.

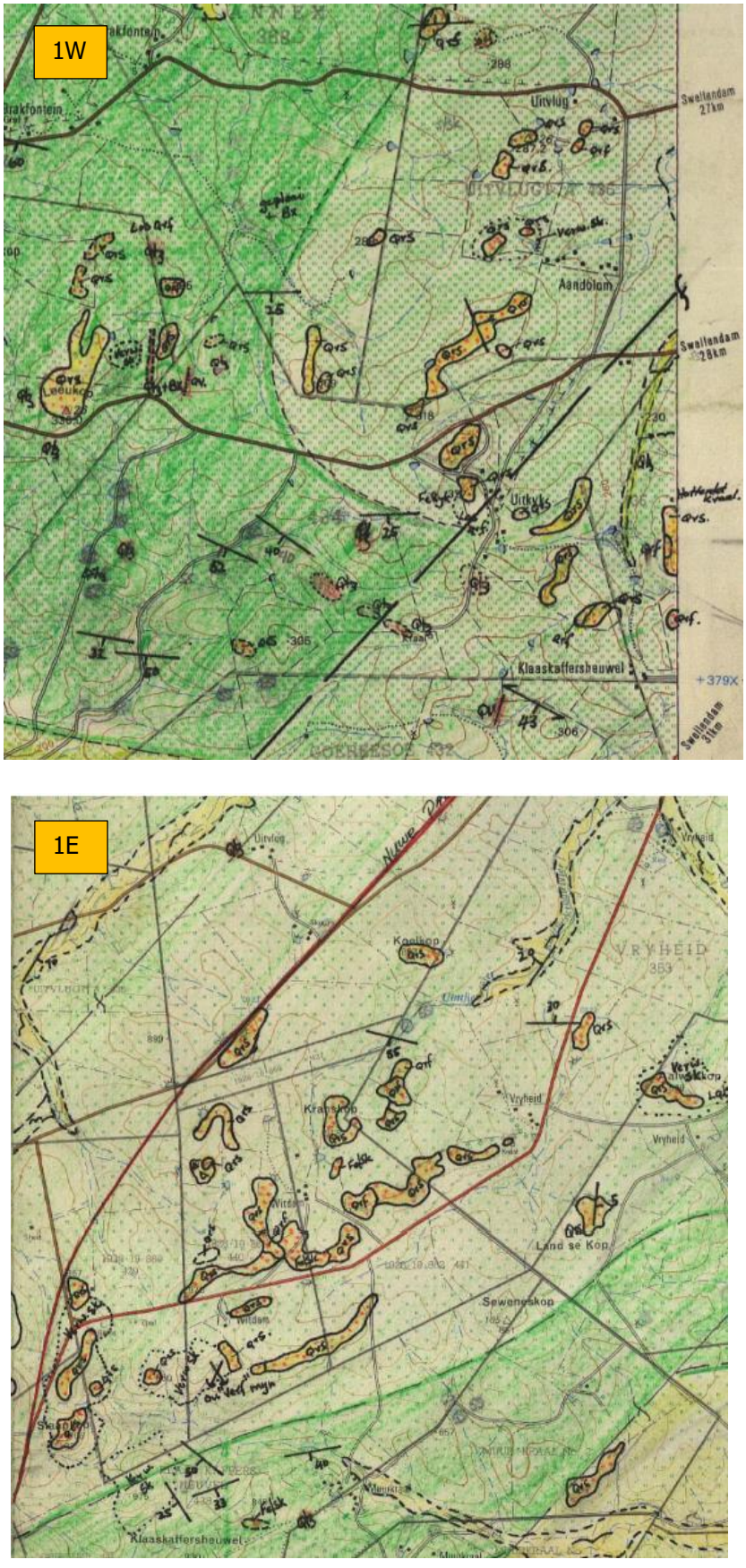


Figure 6. Geology map of Section 1 of the Hilltop Silcrete Belt in the study area. Top – the western part. Bottom – the eastern part.

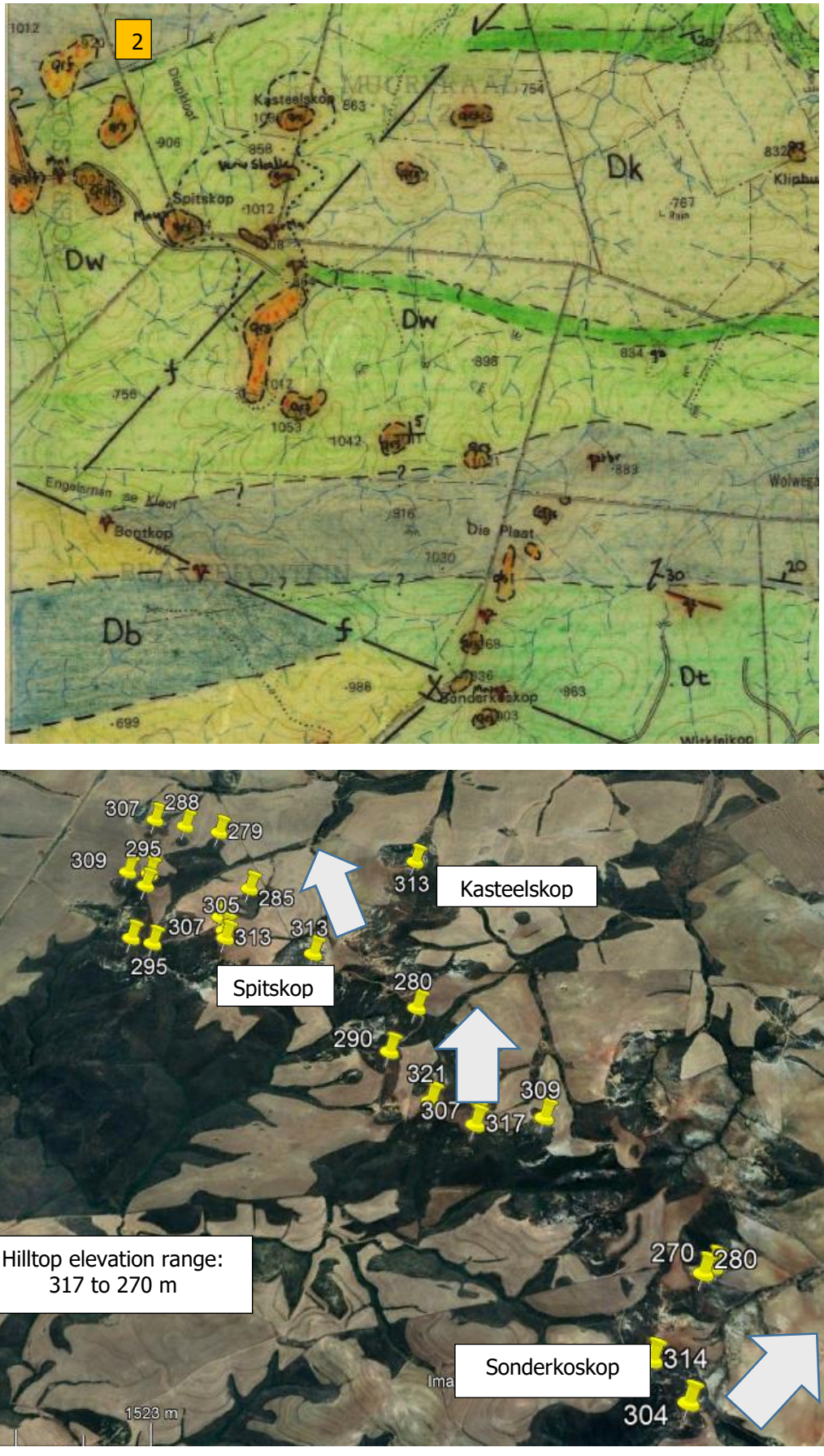


Figure 7. Section 2 of the Hilltop Silcrete Belt. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrows indicate the directions of decreasing elevations.

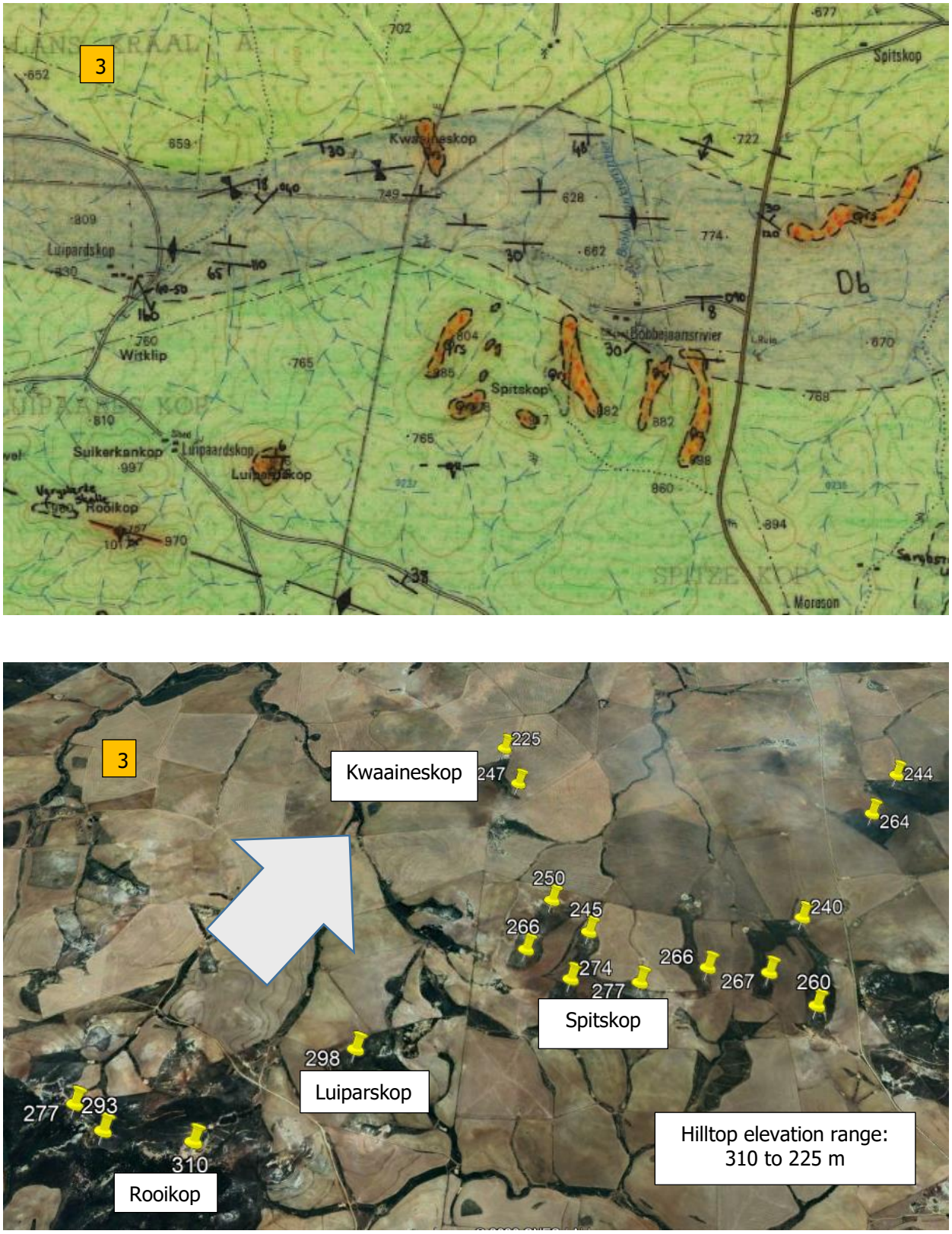
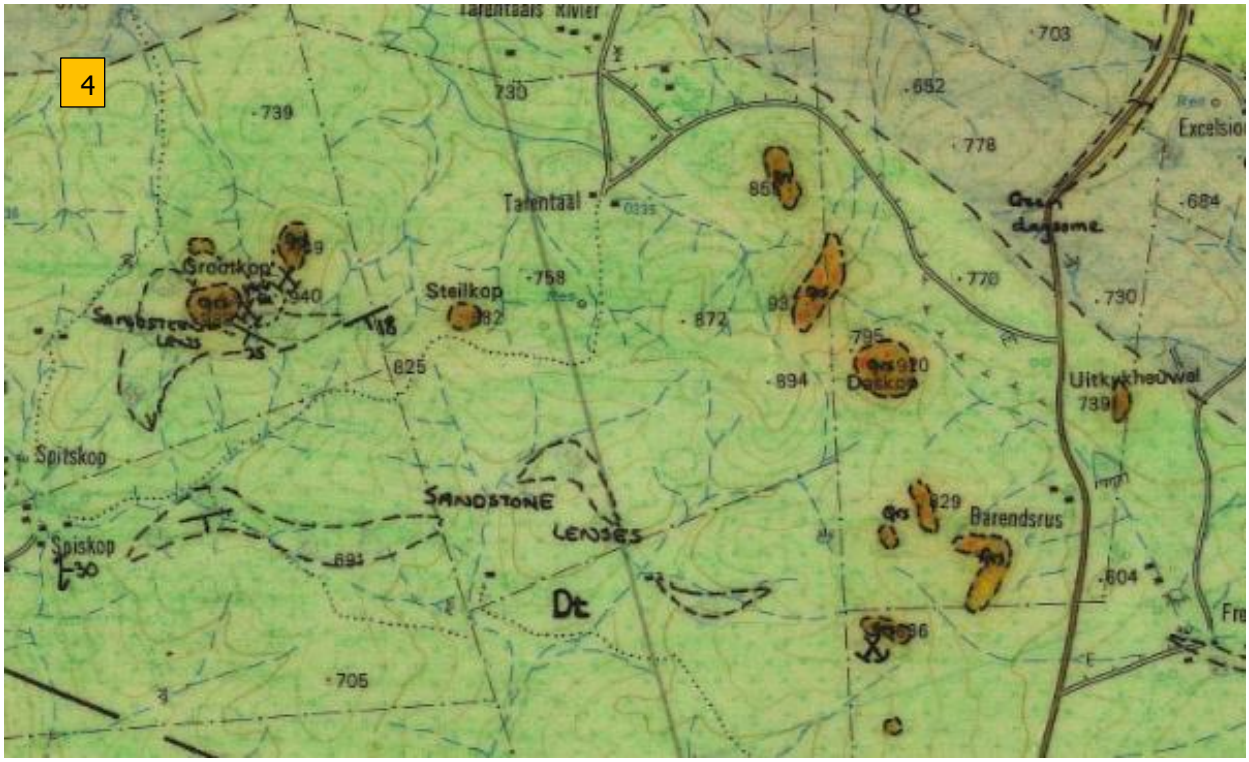


Figure 8. Section 3 of the Hilltop Silcrete Belt. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations. (Note: in the Study Area alone there are about ten hills with the name Spitskop)



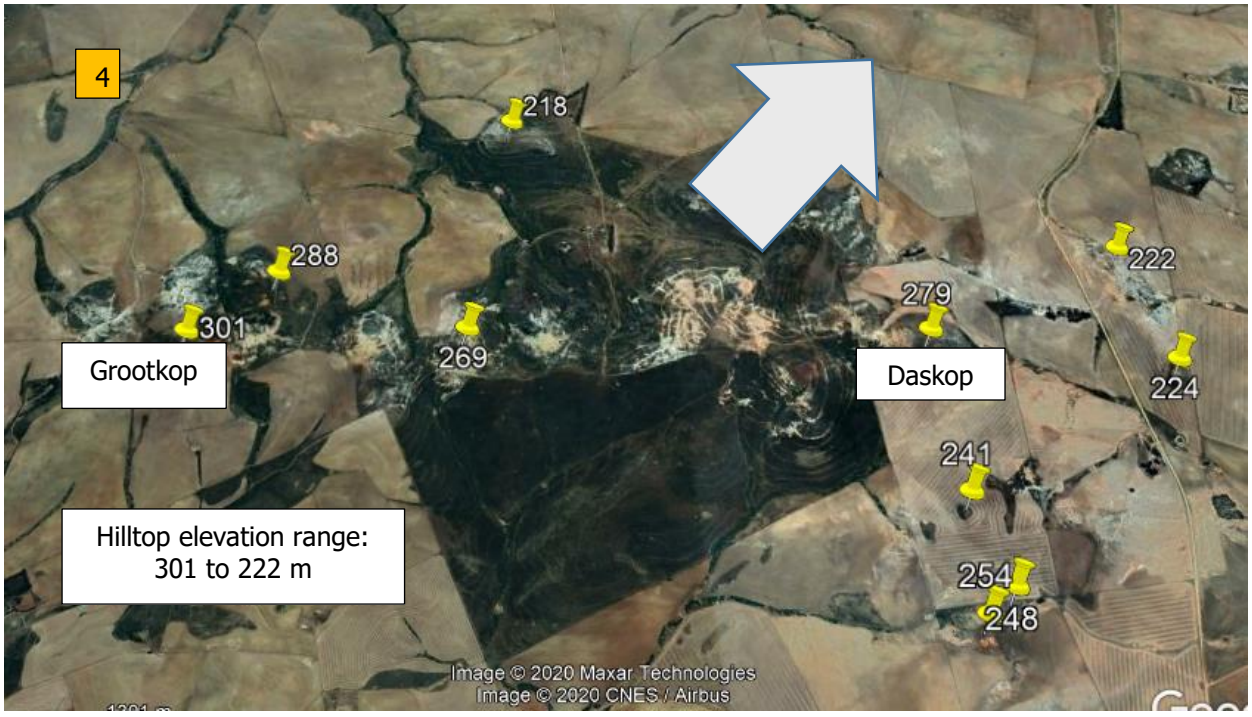


Figure 9. Section 4 of the Hilltop Silcrete Belt. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations.

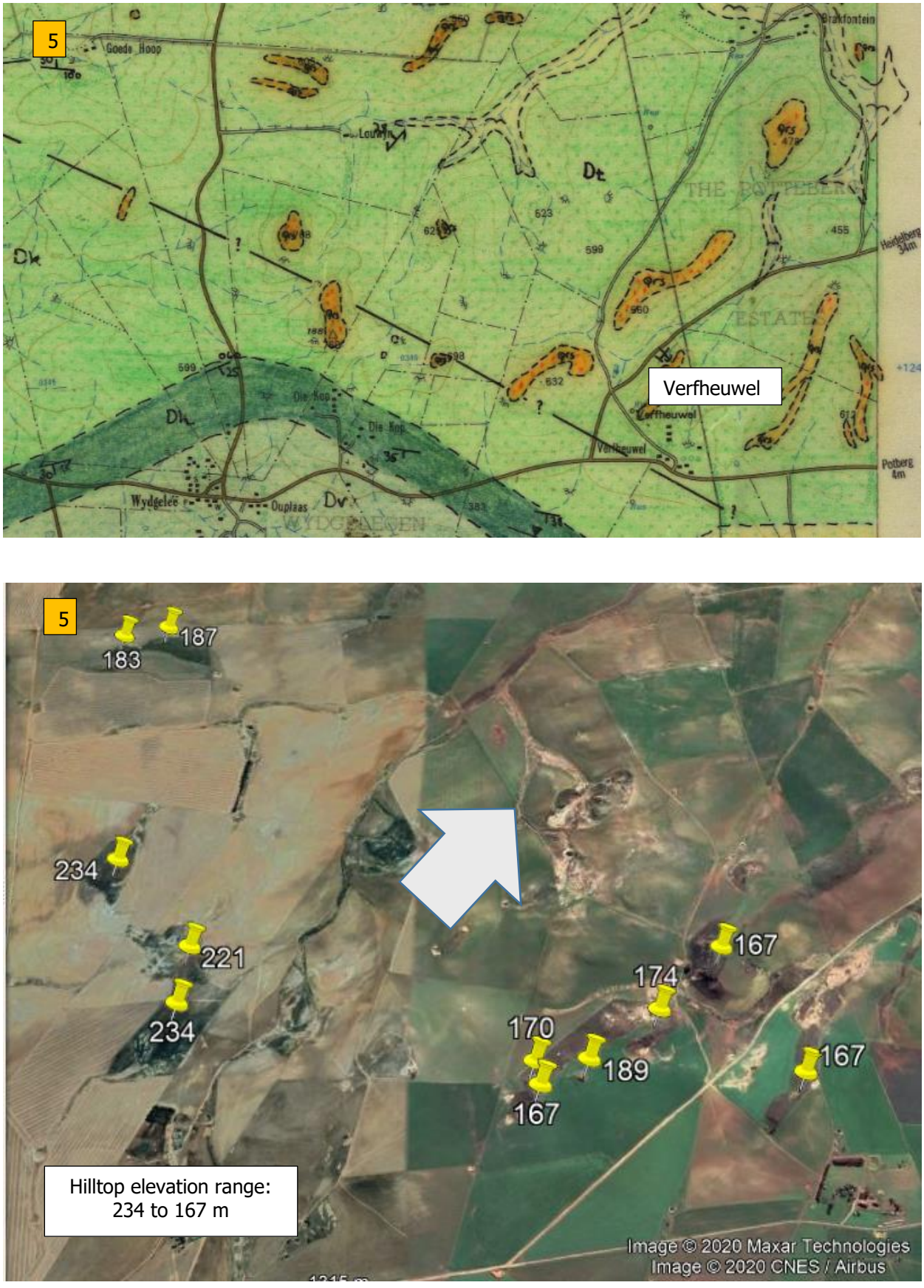


Figure 10. Section 5 of the Hilltop Silcrete Belt. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations.

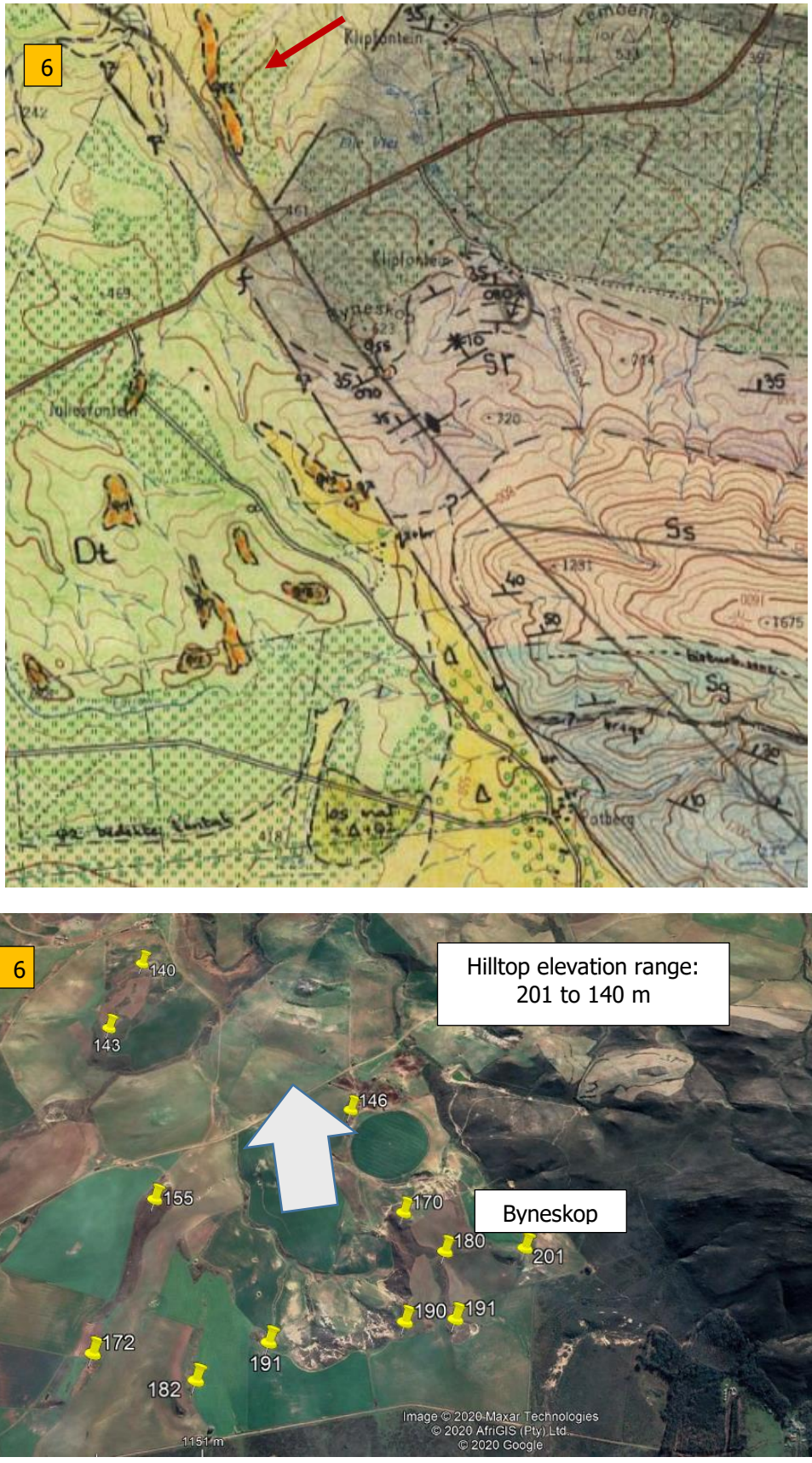


Figure 11. Section 6 of the Hilltop Silcrete Belt. Top - geology map. Bottom – satellite image. Elevations in metres above sea level. Arrow indicates the direction of decreasing elevations. (Red arrow indicates to a non-pedogenic silcrete outcrop, which does not form a hilltop).

Of about 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).

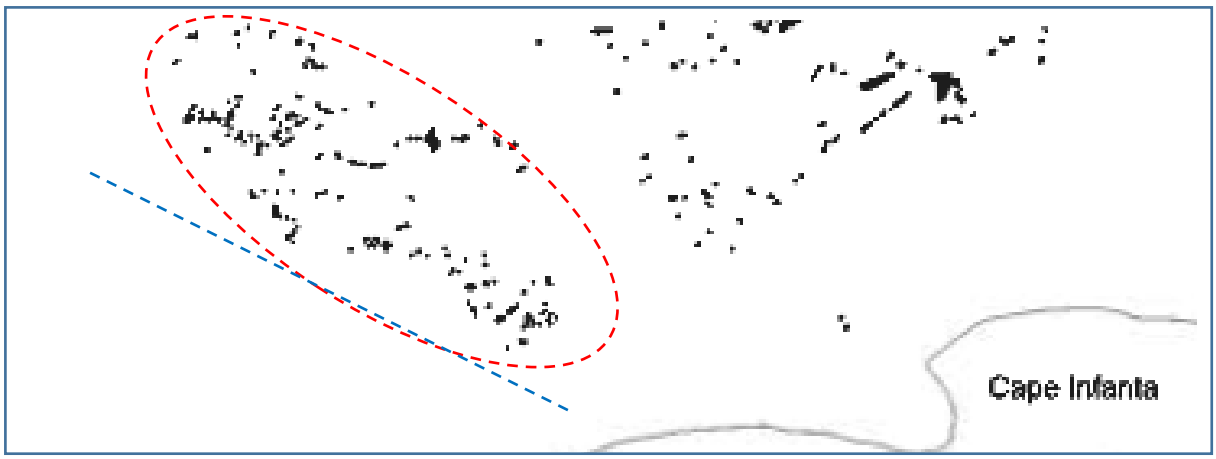
Figure 12. View of a line of buttes and ridges in the Study Area. View to the east.

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

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 belt elevations decrease from Section 1E in the NW to Section 6 in the SE.



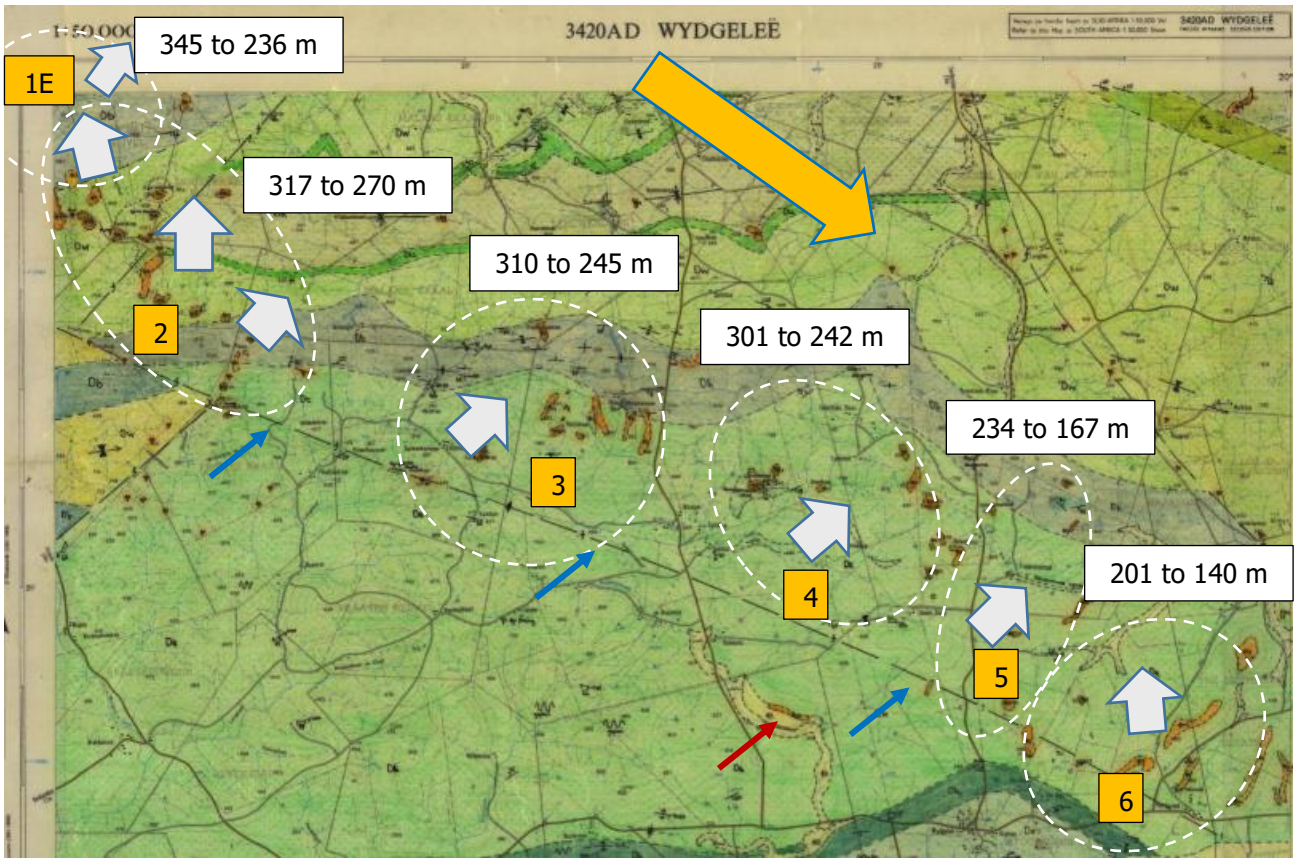


Figure14. Top and bottom - ranges and directions of decreasing elevations in the six sections, and the general NW to SE sloping of the Hilltop Silcrete Belt elevations (from 345 m in the NW to 140 m in the SE, indicated by the yellow arrow) over a 30 km ditance. The blue arrows point to a regional fault line. (The red arrow points to a non-pedogenic silcrete outcrop, which is a hilltop).

More studies are required to assess the spatial distribution of the Hilltop Silcretes of the Study Area in the context of silcrete outcrops in the entire coastal belt.

