

E. KARST LANDFORMS

Field Note E3a. Dolines – DHV northwest province

The DHV (De Hoop Vlei) northwest doline province is situated west of the Salt River Gorge (Figure 1). Two major types of karst plateaus can be distinguished on the basis of the spatial distribution of dolines: one which is characterised by isolated dolines (the classical karst type) and another, which is characterised by honeycomb pattern of dolines. In many karst plateaus, intermediate situations can be observed. Rows of dolines commonly follow fault lines. In karst plateaus where a net of dry valleys can be distinguished, dolines are aligned along the valley bottoms.

Dolines commonly occur in populations with variable numbers of individual dolines and with different densities, ranging from a few to dozens per square kilometre. Within a population, the density depends on the surface slope. On sub-horizontal or gentle slopes, the density of dolines is higher than on steep slopes. Dolines on steep slopes are rare.

This Field Note is about the dolines on the karst plateaus, on either side of Langkloof, west of De Hoop Vlei, where several types of doline populations can be distinguished, as follows (Figures 1 to 4): A1. On a nearly horizontal surface – low density (Figure 5), A2. On a nearly horizontal surface – high density, or ‘honeycomb’ (Figures 6 and 7), B. On a gently sloping surface (Figure 8), C. Along a fault line (Figures 9), and D. Along a valley floor (Figure 10).

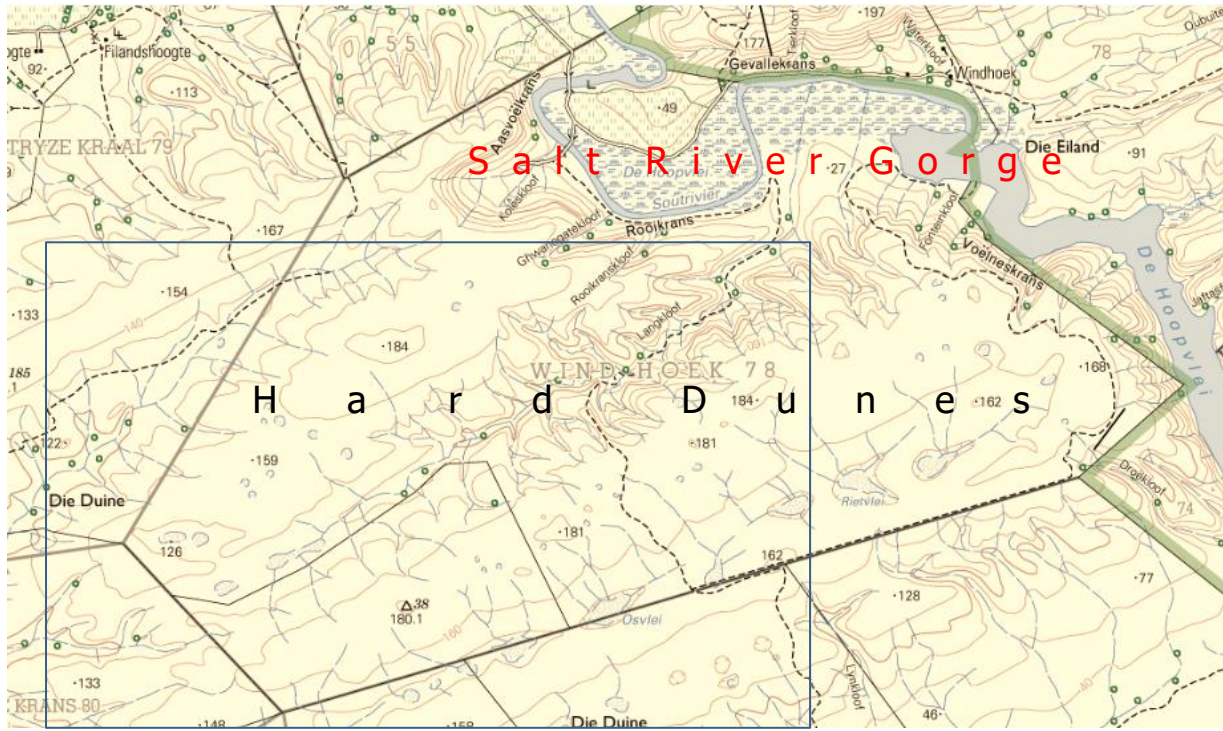


Figure 1. Topography map showing the main part of the DHV northwest doline province (the name Salt River Gorge was suggested by the author). The blue box indicates the area enlarged in Figure 2.

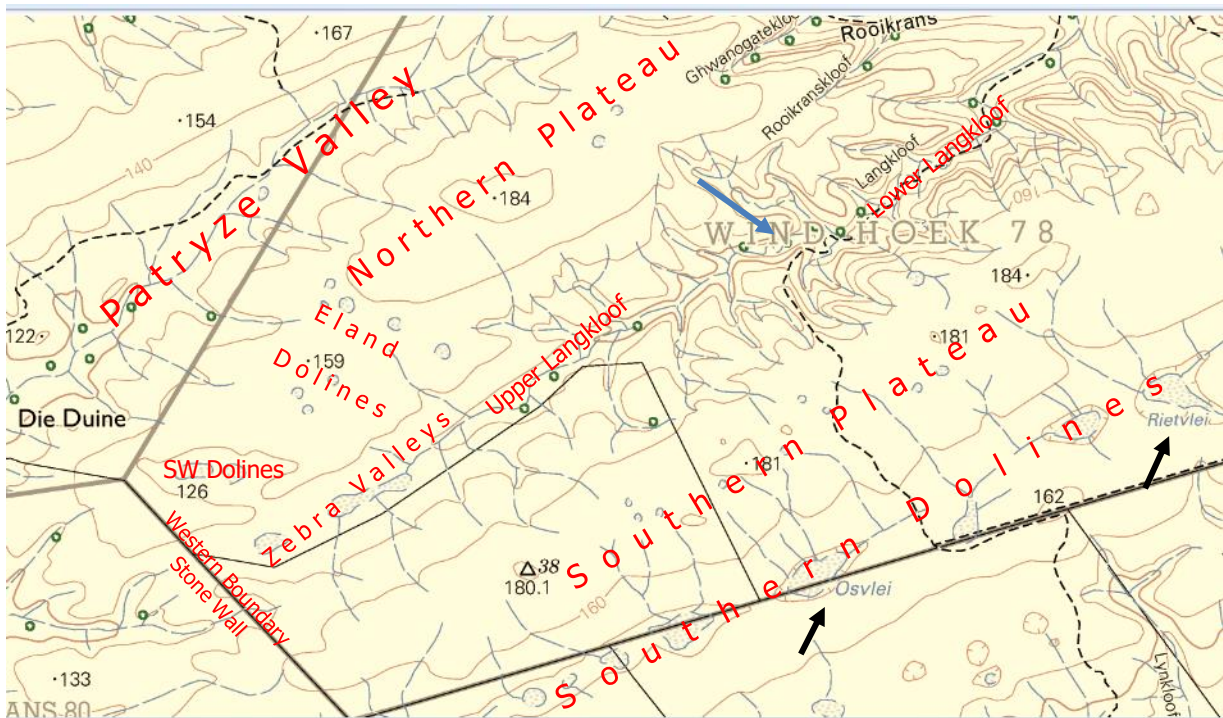


Figure 2. Topography map showing the plateaus either side of Langkloof (blue arrow). All the names in red have been suggested by the author. The Patryze Valley is named after the (old name of the) farm on which it is located; the Eland Dolines and the Zebra Valleys are named after the animals which were spotted in them. Two dolines along the southern slopes of the Southern Plateau have names on the maps (Rietvlei and Osvlei, black arrows).



Figure 3. Topography map of the area shown in Figure 2.

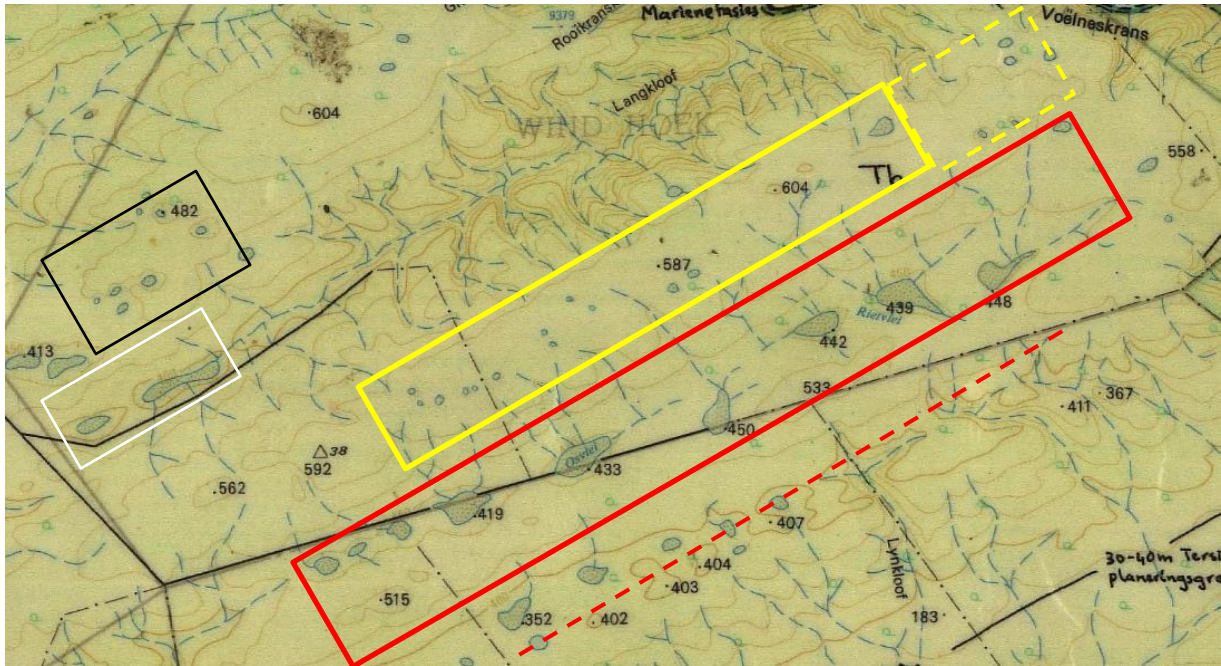


Figure 4. Geological map (elevations in feet) of the plateau south of Langkloof, showing several types of doline populations, within boxes: A – on a sub-horizontal surface, low density (yellow box); B – on a sub-horizontal surface, high density or ‘honeycomb’ (dashed yellow box, also in Figure 5); C- on a gently sloping surface (black box); D - along a fault line (red box); E- along valley bottom (white box). See details in the figures below. (Another row of dolines along a fault line (dashed red line) is located to the south (Figure 9).



Figure 5. Topographic map of the Southern Plateau showing type A1 doline population – low density, isolated dolines on a sub-horizontal surface (within the yellow box, which is the yellow box in Figure 4). No doline can be seen on the slopes.

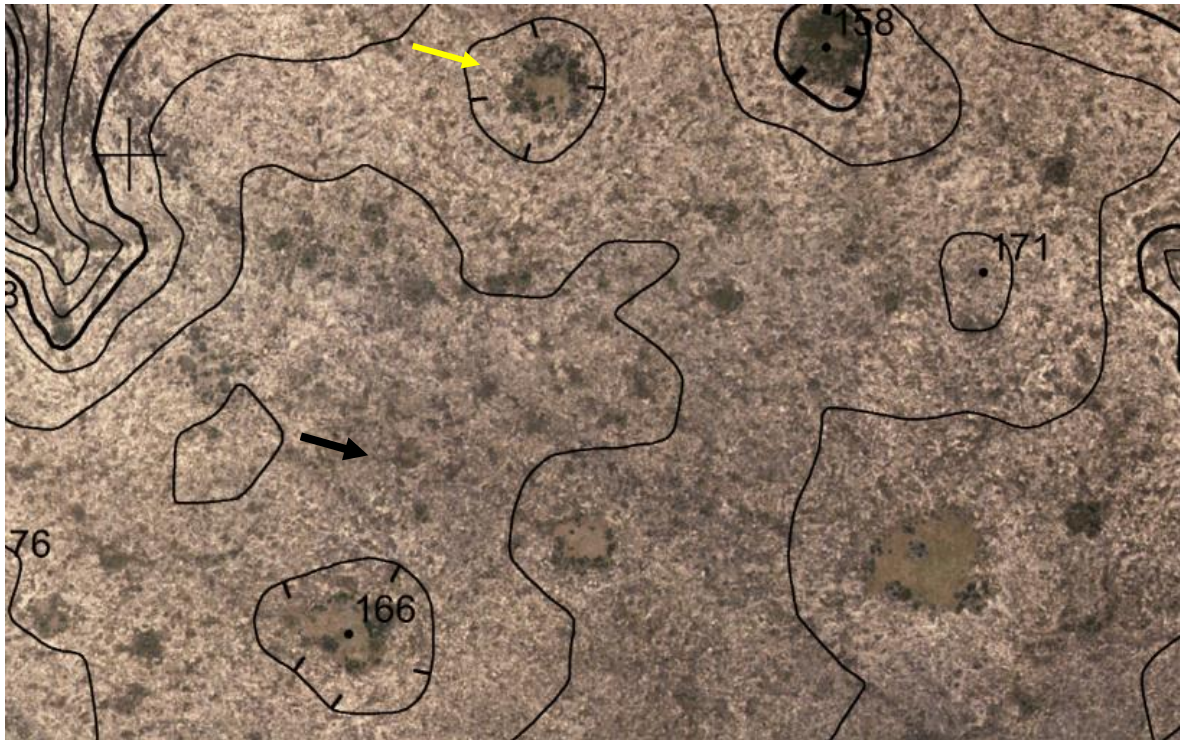


Figure 6. Topographic map (1:10,000) of a section of the Southern Plateau showing Type A2 doline population - high density or honeycomb, on a sub-horizontal surface. The doline indicated by the yellow arrow is ~40 in diameter; the doline indicated by the black arrow is ~12 in diameter. This map was produced upon aerial photographs taken after a fire, and thus many tiny dolines can also be discerned.



Figure 7. Satellite image of the same section of the Southern Plateau shown in Figure 6. This image was taken before the fire, thus many small dolines are obscured by the vegetation. A honeycomb pattern could not be discerned from such images.

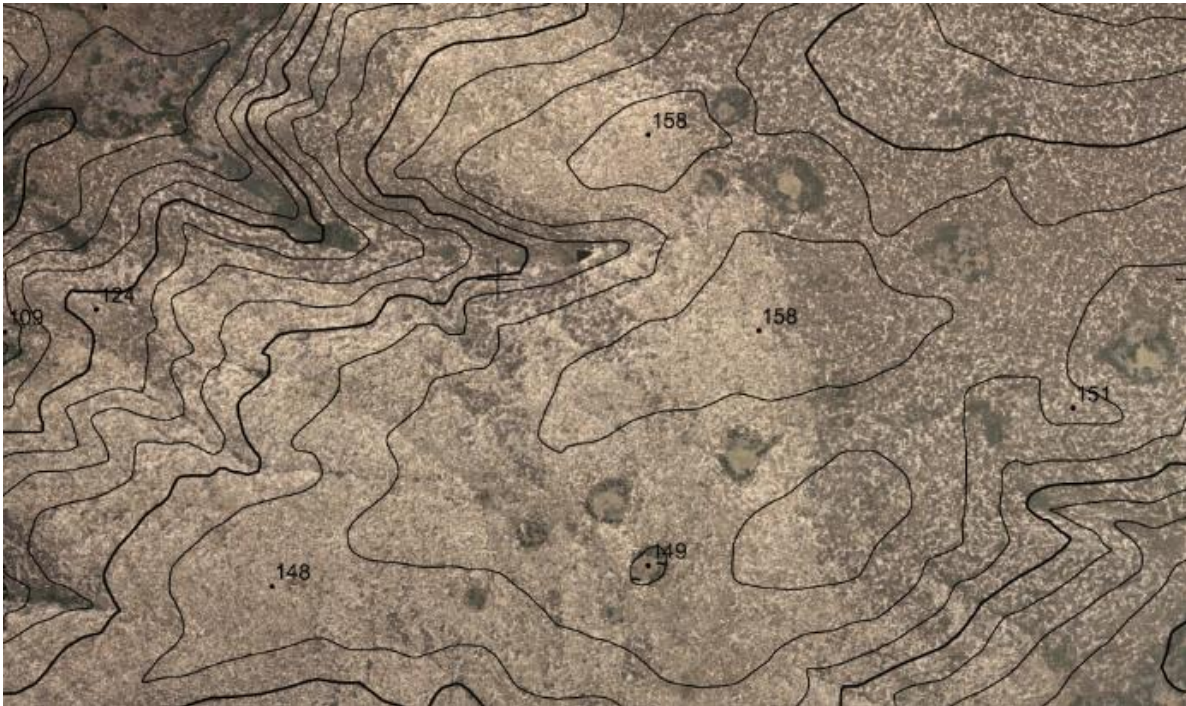


Figure 8. Topographic map of a section of the south west slope of the Northern Plateau, showing Type B doline population - on a sub-horizontal surface. These are the Eland Dolines.



Figure 9. Topographic map of a section of the Southern Plateau showing Type C of doline population - along a fault line (dashed yellow line). The dolines, of various shapes are situated at elevations of 135-140 m above sealevel. Note another, parallel line of dolines on a fault zone to the south (white dashed line), along lower elevations.



Figure 10. Topographic map of a section of the SW slope of the west reaches of the plateaus, showing Type D doline population (along a valley floor; these are the Zebra Valleys), if they are, indeed, dolines. Their formation may be associated with the Lankgkloof Fault. The depressions in the white box are the SW Dolines

There are less dolines on the Northern Plateau than on the Southern Plateau (Figure 11). Some of the round features, which look like close depressions, are not dolines. They are located at the highest elevations of the plateau (183 m above sealevel), they have no relief and they are not surrounded by high vegetation, as no water is retained in their rims. Their floor comprise red sand (Figures 12 to 15). (Read more on the red sand in Chapter W).



Figure 11. Satellite Image of the northeast section of the Northern Plateau. The area in the white box is enlarged in Figures 12 and 13.



Figure 12. Enlargement of the section in the white box in Figure 11. Red sand comprise these round features, which are surrounded by calcrete.



Figure 13. Topography map of the area in shown in Figure 12. The round features are situated on the highest point of the Northern Plateau.



Figure 14. Looking out from the centre of one of the circular features on top of the Northern Plateau (183 m above sealevel). These features are not depressions. Note the red sand.



Figure 15. Within one of the red sand round feature at the top of the Northern Plateau.

Two of the Southern Dolines on the Southern Plateau are historically named Osvlei and Rietvlei (Figures 16 and 17), indicating that the early settlers may have seen water contained in them. Neither the maps nor the available satellite images show these dolines – or any other dolines, for this matter - with water.

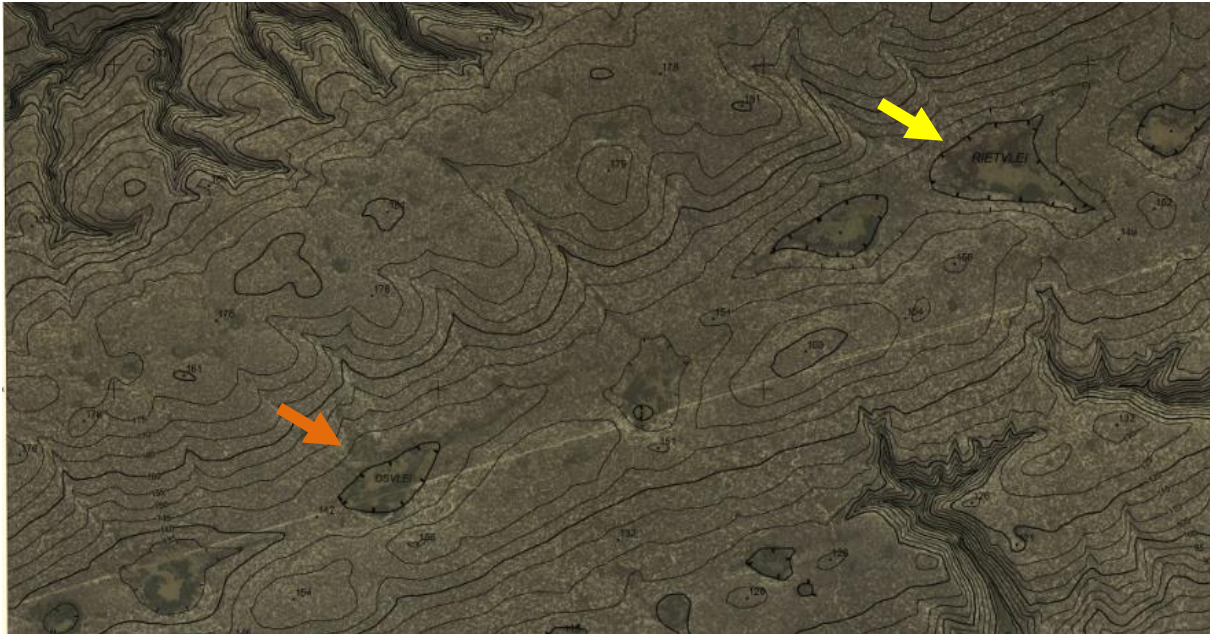


Figure 16. Topography map of the Southern Dolines, on the Southern Plateau. Yellow arrow points to Rietvlei, the red arrow to Osvlei.

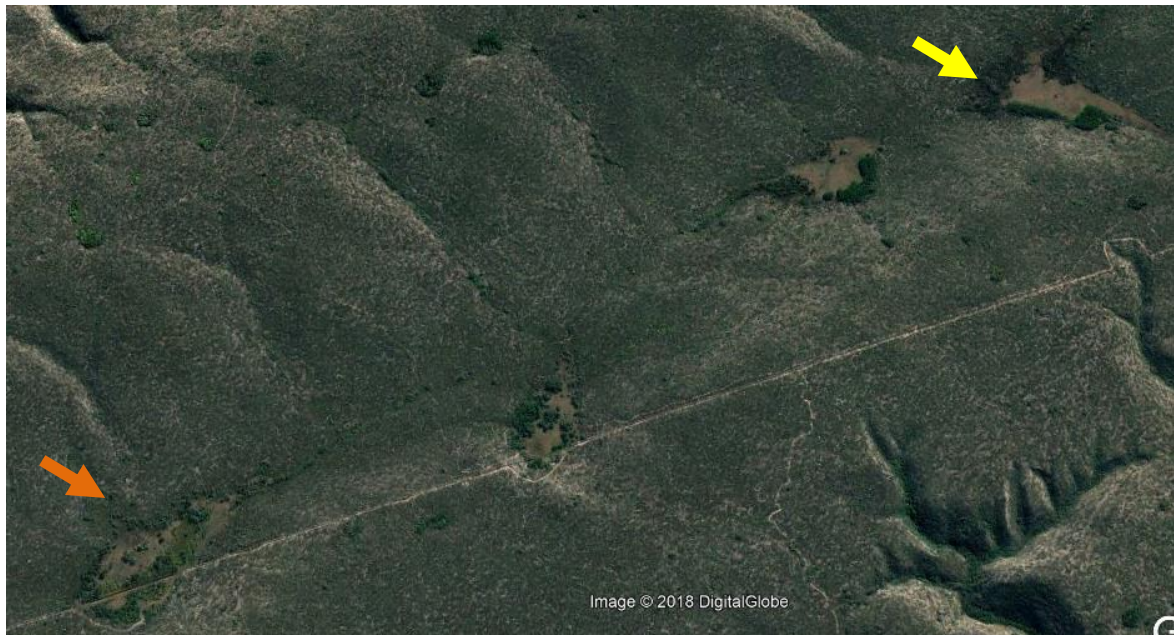


Figure 17. Satellite image of the Southern Dolines on the Southern Plateau. The yellow arrow points to Rietvlei, the red arrow to Osvlei.

Water is retained in the rim of any doline, from runoff, which flows from the higher ground above and around the doline, resulting in high vegetation and trees in the rim (Figure 18). On the plateaus, in periods of heavy rainfall, water may stay in a doline for a while, but not permanently, as one may be misled by their names or by some maps (Figure 19).



Figure 18. The high and dense vegetation around a doline.



Figure 19. 3-D map of the plateaus west of the Salt River Gorge, depicting large and small dolines as permanent bodies of water. This is a misleading map.