

D. DURICRUSTS

Field Note D7b. Silcretised landscape – a field guide



Hilltop silcrete.

D. DURICRUSTS

Field Note D7b. Silcretised landscape – a field guide

The author thanks Dr F Netterberg for his comments on the initial draft.

The purpose of this field guide is to summarise the morphological features of the silcretes in the Study Area (see satellite image, Page 4), which were described in many Field Notes in this chapter, and to help distinguish between the various types, habits (appearances) and textures of silcretes. Some silicified rocks outside the Study Area are also described.

A few points are noteworthy:

The current geology maps do not distinguish between pedogenic and non-pedogenic silcretes and assign all silcretes to the Grahamstown Formation.

Contrary to 'common knowledge', that silcrete was formed as a *crust* (other terms in use are *armour* and *cuirass*) on a peneplain (or a vast plateau, known as the 'African Surface'), silcrete outcrops in the Study Area are located on hilltops and hillslopes on a multitude of elevations (not necessarily of an "African" character, as crust remnants, individual nodules and boulders as well as isolated 'castles').

Contrary to 'common knowledge', that hilltop silcrete outcrops on South Africa coastal region slope southwards towards the sea, all but a few of more than two hundred hills and ridges in the Study Area slope to the north and northeast.

Contrary to 'common knowledge', that silcrete outcrops (together with ferricrete) occur at high levels, many outcrops occur on hillslopes, low mounds, gullies and flat fields (used for grain crops), and not always in association with ferricrete.

Silicified shales and sandstones are also present in the Study Area and outside it.

The summary is presented here in thirty-six plates (which are, essentially, excerpts of the Field Notes in this chapter) as follows:

1. Silcrete outcrops identification by lichen
2. Pedogenic silcrete - basic occurrences (a) - crust – 1. capped elevations
3. Pedogenic silcrete - basic occurrences (a) - crust – 2. capped elevation types
4. Pedogenic silcrete – basic occurrences (a) - crust – 3. wholly capped elevations
5. Pedogenic silcrete – basic occurrences (a) - crust – 4. partly capped elevations
6. Pedogenic silcrete - basic occurrences (b) - boulders
7. Pedogenic silcrete - basic occurrences (c) – protrusions
8. Pedogenic silcrete – hilltop habits (a) - irregular (shapeless) and bulky
9. Pedogenic silcrete – hilltop habits (b) - columnar (1)
10. Pedogenic silcrete – hilltop habits (c) - columnar (2)

11. Pedogenic silcrete – hilltop habits (d) – flat and rounded
12. Pedogenic silcrete – hilltop habits (e) – other
13. Pedogenic silcrete – hilltop surface habits
14. Pedogenic silcrete – hilltop and mound top boulder shapes (a) – various
15. Pedogenic silcrete – hilltop and mound top boulder shapes (b) – polyhedrons (1)
16. Pedogenic silcrete – hilltop and mound top boulder shapes (c) – polyhedrons (2)
17. Pedogenic silcrete – hilltop and mound top boulder occurrence (a) - spaced
18. Pedogenic silcrete – hilltop and mound top boulder occurrence (b) - clustered
19. Pedogenic silcrete – hilltop and mound top boulder occurrence (c) - heaped
20. Pedogenic silcrete – hillslope boulders
21. Pedogenic silcrete – protrusions (a) ‘castles’
22. Pedogenic silcrete – protrusions (b) bulges and pinnacles
23. Pedogenic silcrete – protrusions (c) silicified shale ‘castles’ and other features
24. Pedogenic silcrete – textures (a) – common textures
25. Pedogenic silcrete – textures (b) - textures of certain habits
26. Pedogenic silcrete – hilltop crust (cap) disintegration
27. Pedogenic silcrete – weathering of some hilltop silcretes
28. Pedogenic silcrete – some inherent properties
29. Silicified limestone habits
30. Silicified sandstone habits (a)
31. Silicified sandstone habits (b)
32. Silicified sandstone habits (c)
33. Silicified sandstone habits (d)
34. Non-pedogenic silcrete (a) - groundwater – 1. gentle slope habits
35. Non-pedogenic silcrete (a) - groundwater – 2. moderate slope habits
36. Non-pedogenic silcrete (b) - drainage line, ravine and river habits
37. Non-pedogenic silcrete (c) - lake and pan habits

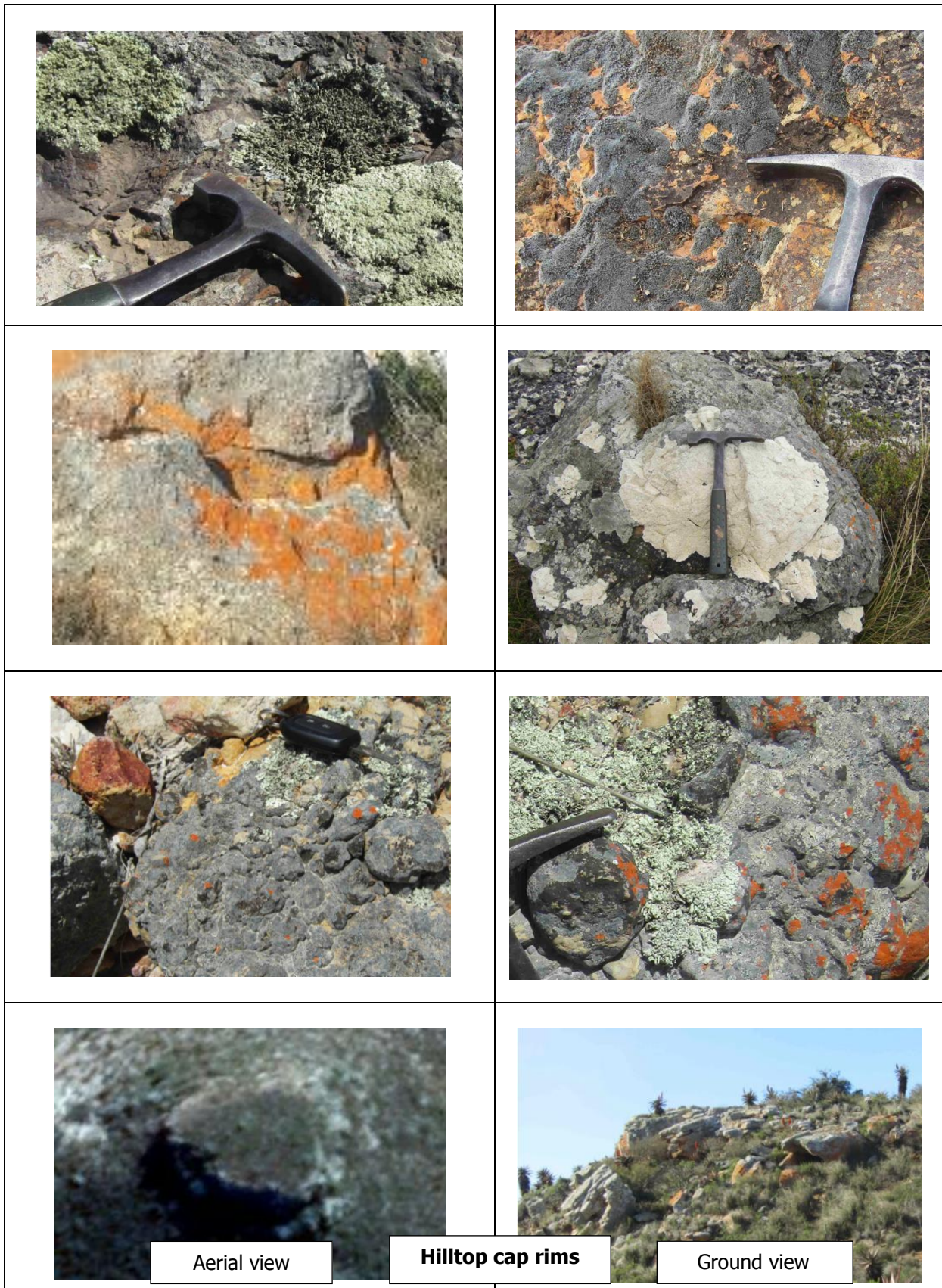
Readers are reminded that this Field Guide (as all the notes in this Website) is about the morphology of silcrete rock outcrops. The chemical compositions and the formation of the various silcrete types (as well as other duricrusts) are outside the scope of this study.

SoDHaE Chapter D Nov 2022 This document contains information which is the exclusive property of Yoav Eytam



Satellite image of the north part of the Study Area. The ellipse indicates the extent of the silcrete outcrops, between Potberg in the southeast and Luiperdsberg in the northwest, west of the Breede River, which are described and discussed in this chapter.

1. Silcrete outcrops identification by lichen



Aerial view

Hilltop cap rims

Ground view

Plate 1. Common lichen on silcretes.



2. Pedogenic silcrete - basic occurrences (a) - crust – 1. capped elevations

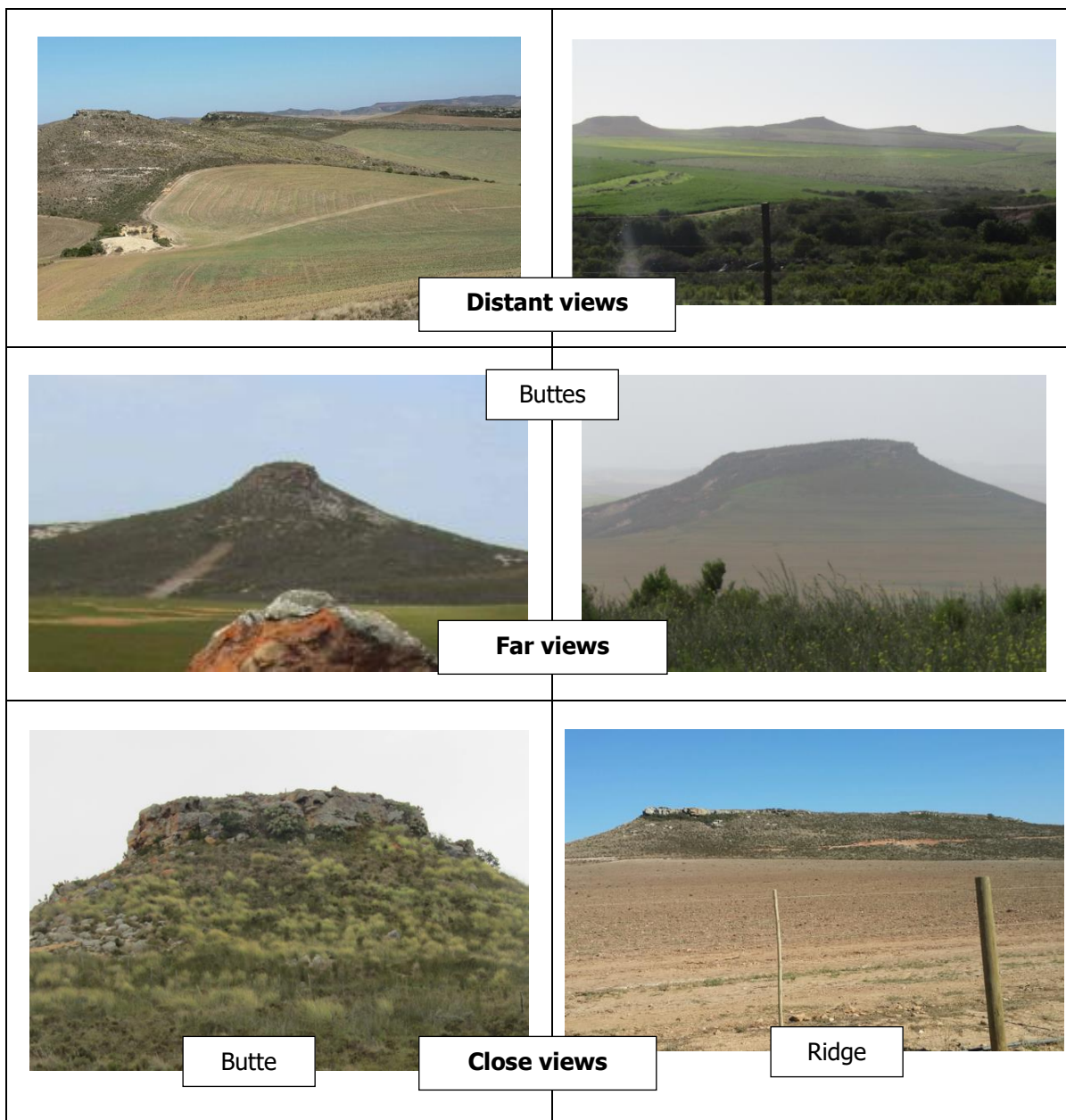


Plate 2. Identification of silcrete-capped elevations (crust remnants).

3. Pedogenic silcrete - basic occurrences (a) - crust – 2. capped elevation types

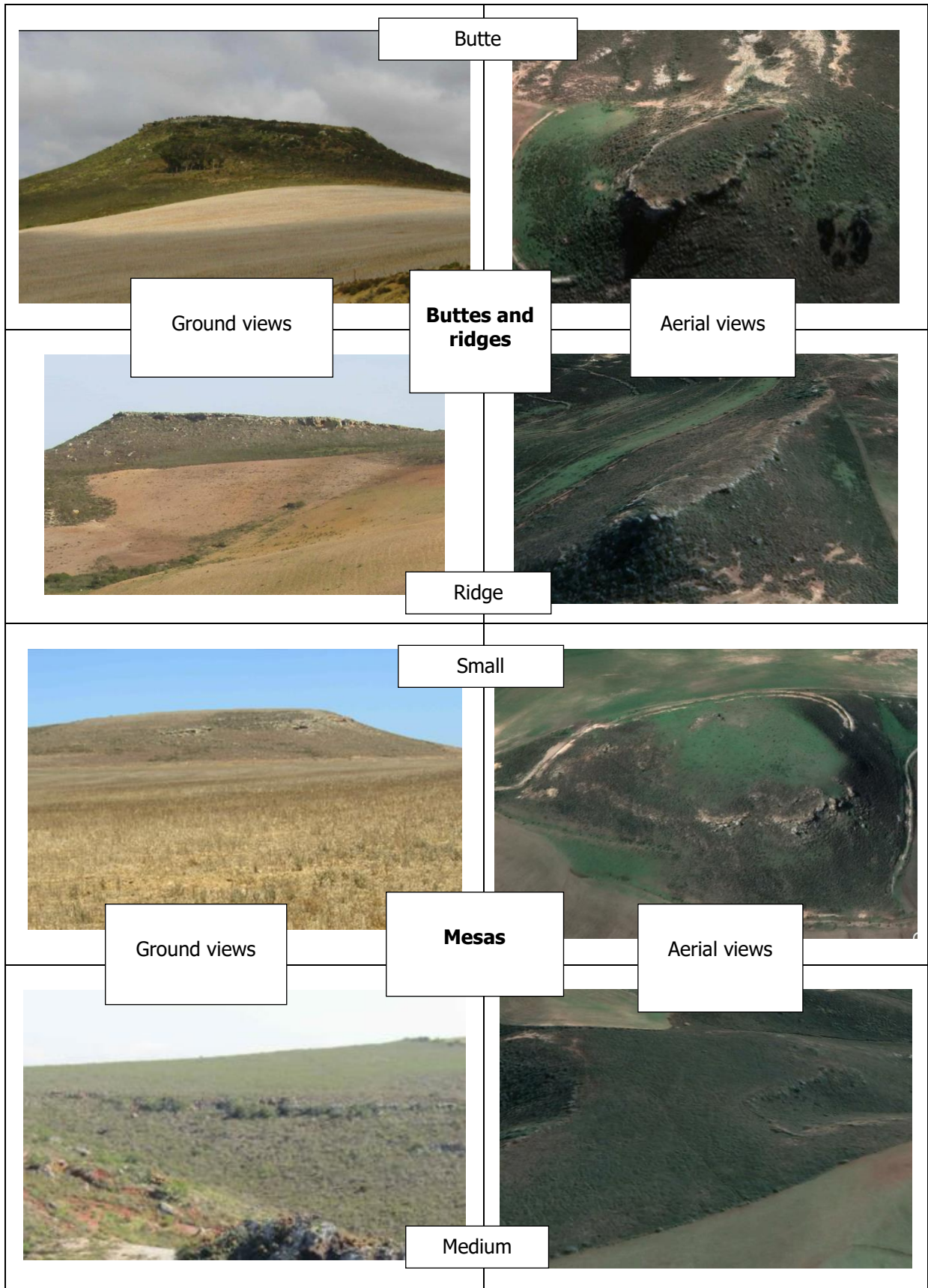


Plate 3. Silcrete crust remnants.

4. Pedogenic silcrete – basic occurrences (a) - crust – 3. wholly capped elevations



Plate 4. Wholly capped elevations ('silcrete caps').

5. Pedogenic silcrete – basic occurrences (a) - crust – 4. partly capped elevations

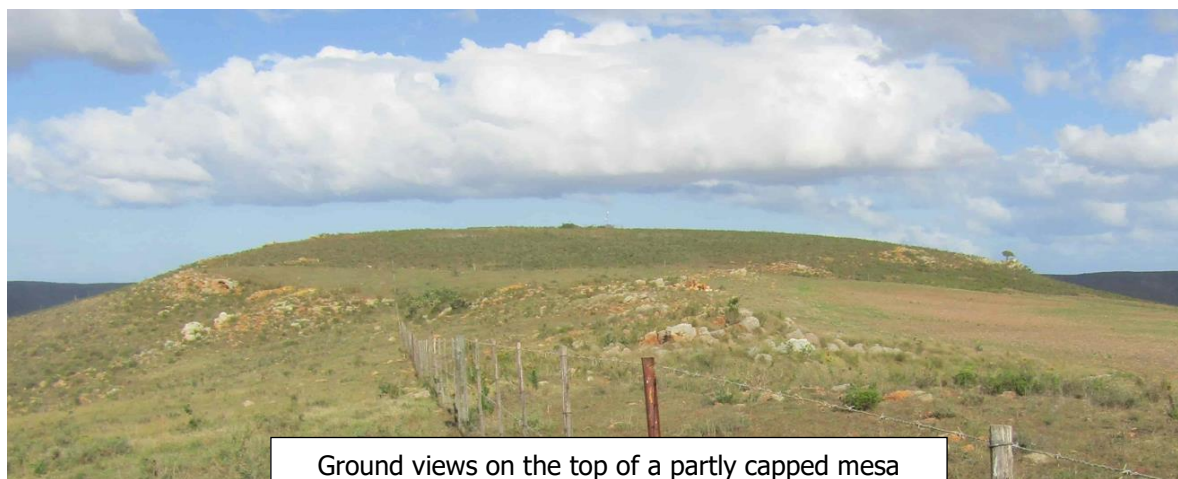


Plate 5. Partly capped mesa.

6. Pedogenic silcrete - basic occurrences (b) - boulders

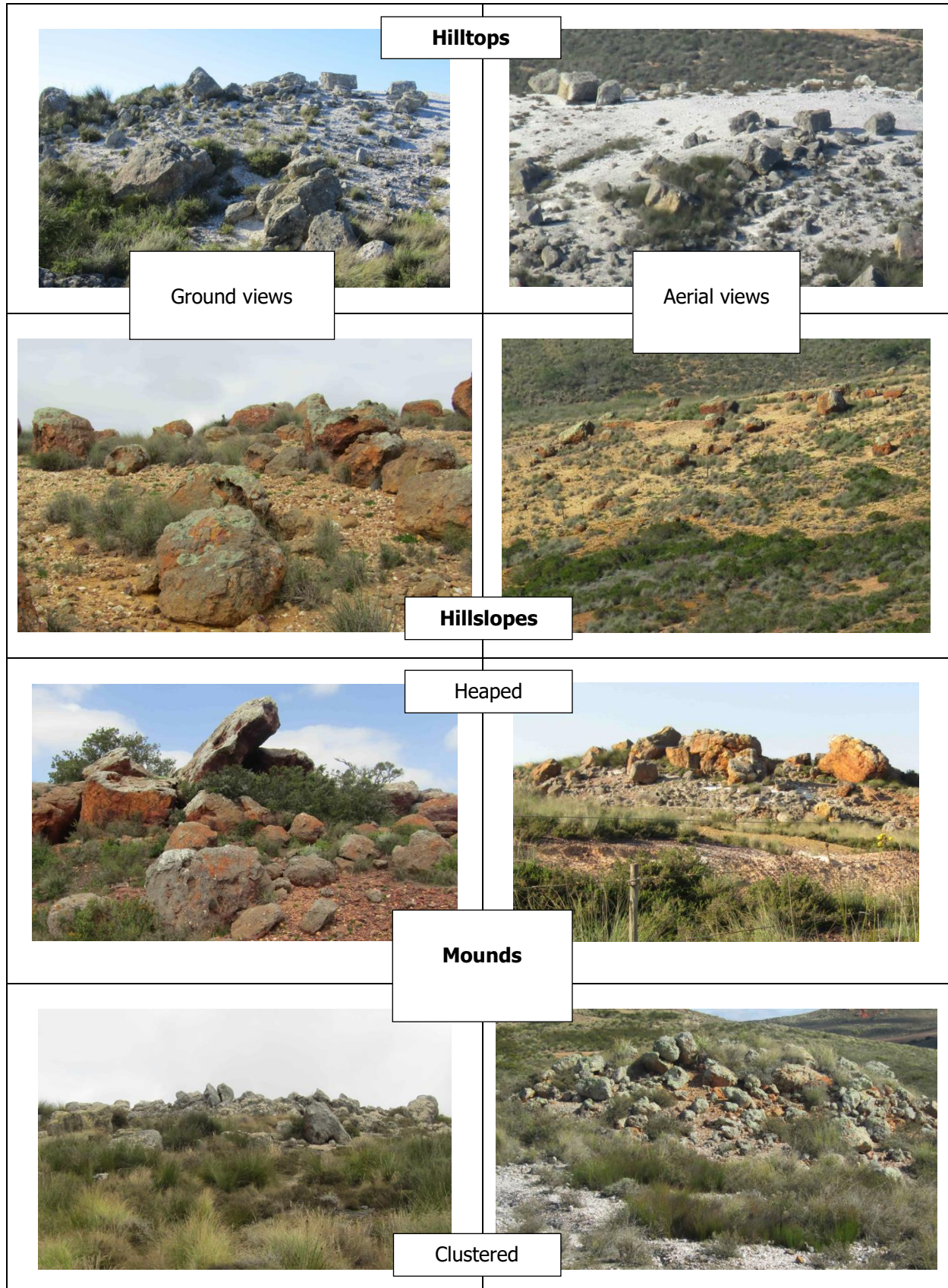


Plate 6. Silcrete boulders.

7. Pedogenic silcrete - basic occurrences (c) – protrusions

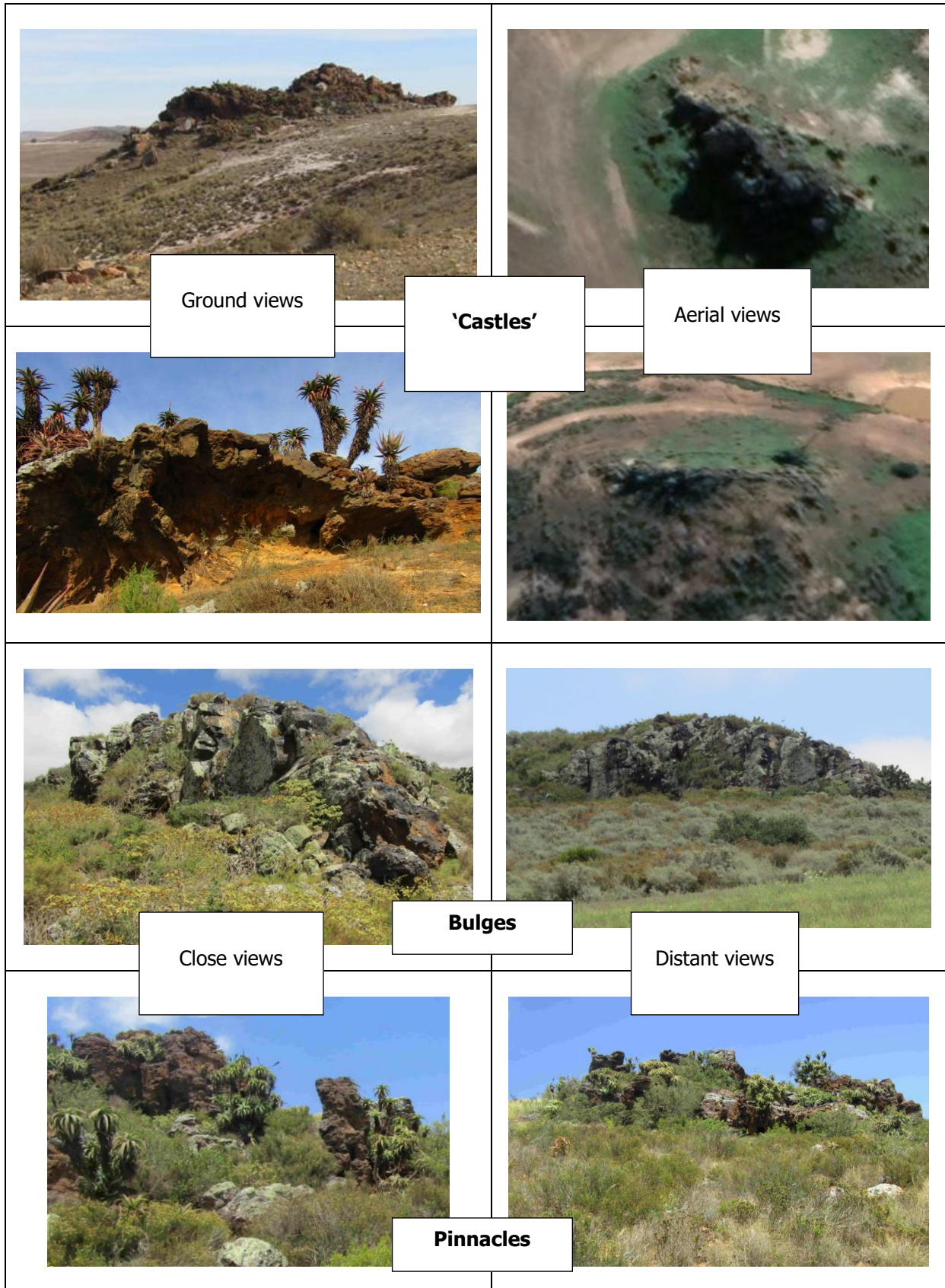


Plate 7. Silcrete protrusions - 'castles', bulges and pinnacles.

8. Pedogenic silcrete – hilltop habits (a) - irregular (shapeless) and bulky

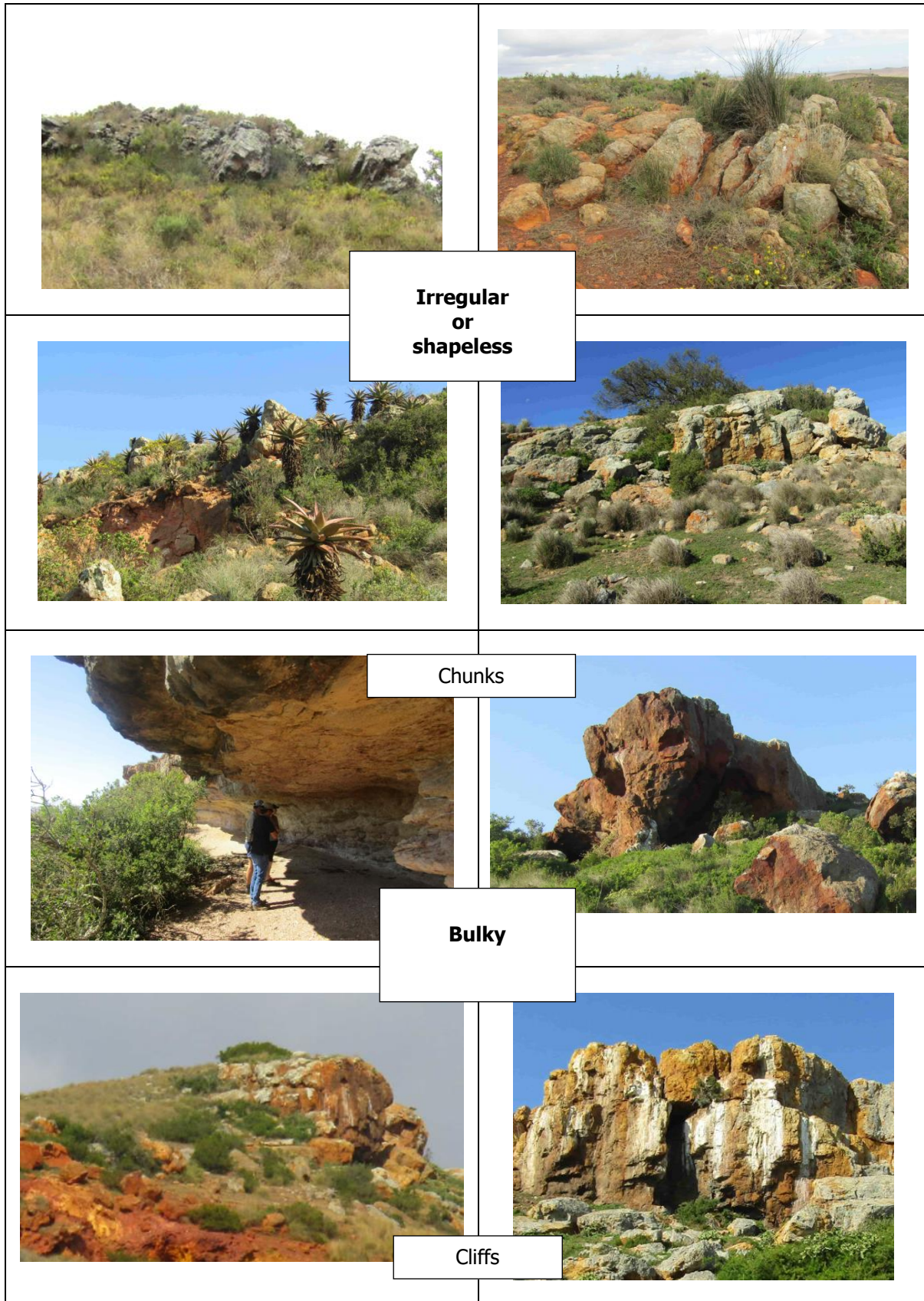


Plate 8. Common hilltop habits (a).

9. Pedogenic silcrete – hilltop habits (b) – columnar (1)

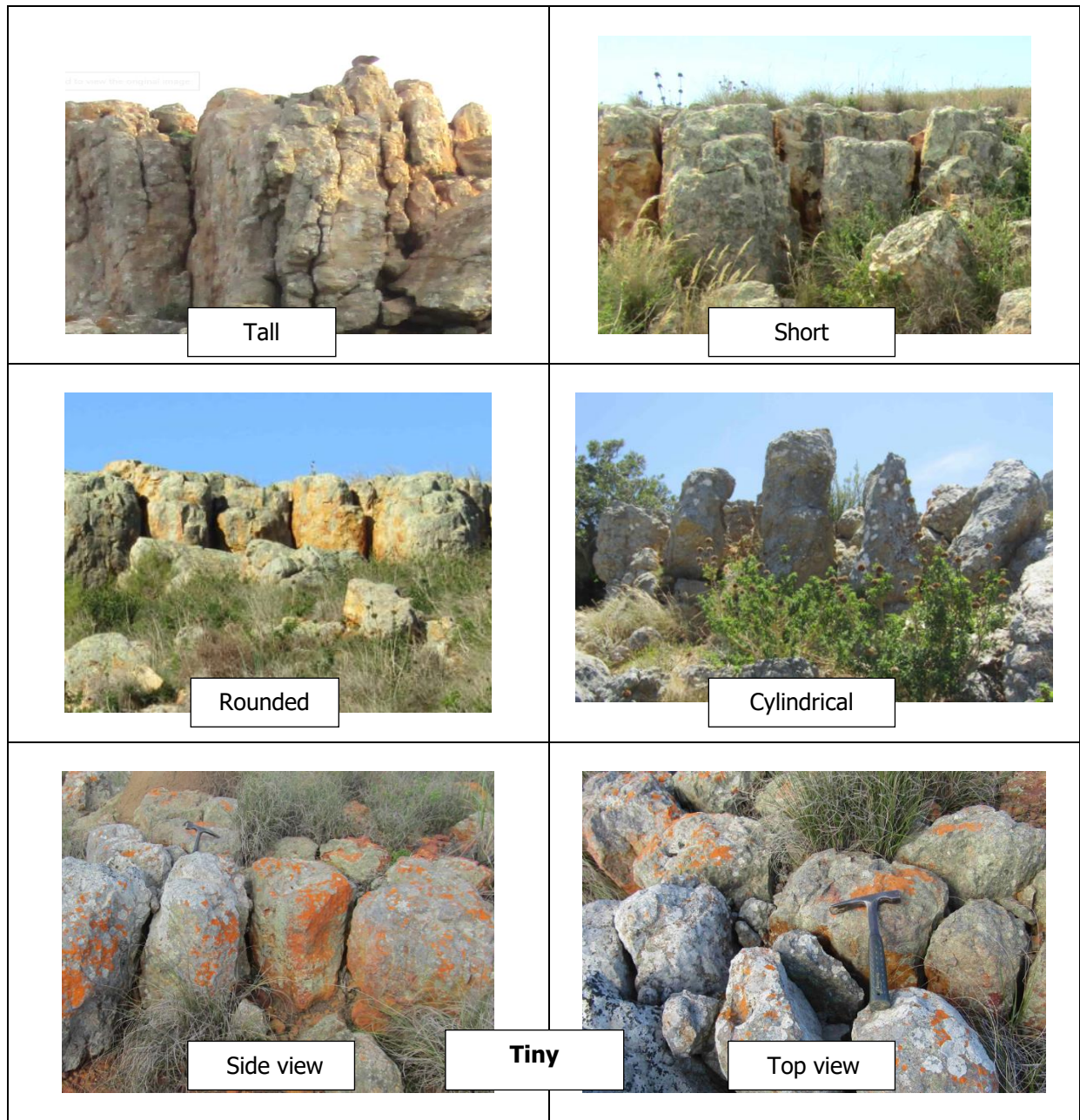


Plate 9. Common hilltop habits (b) – columnar habit variations (1).

10. Pedogenic silcrete – hilltop habits (c) – columnar (2)

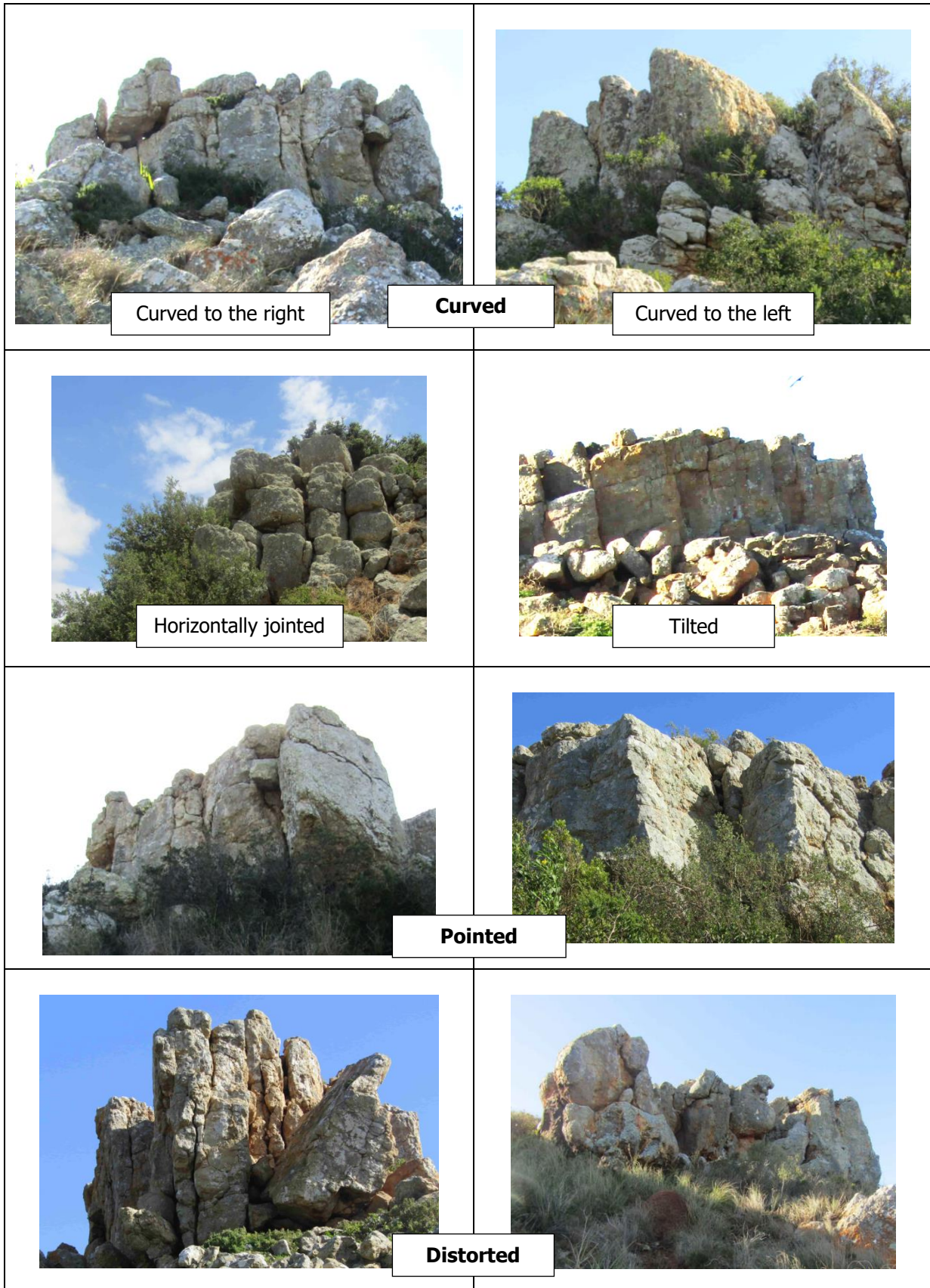


Plate 10. Common hilltop habits (c) – columnar habit variations (2).

11. Pedogenic silcrete – hilltop habits (d) - flat and rounded

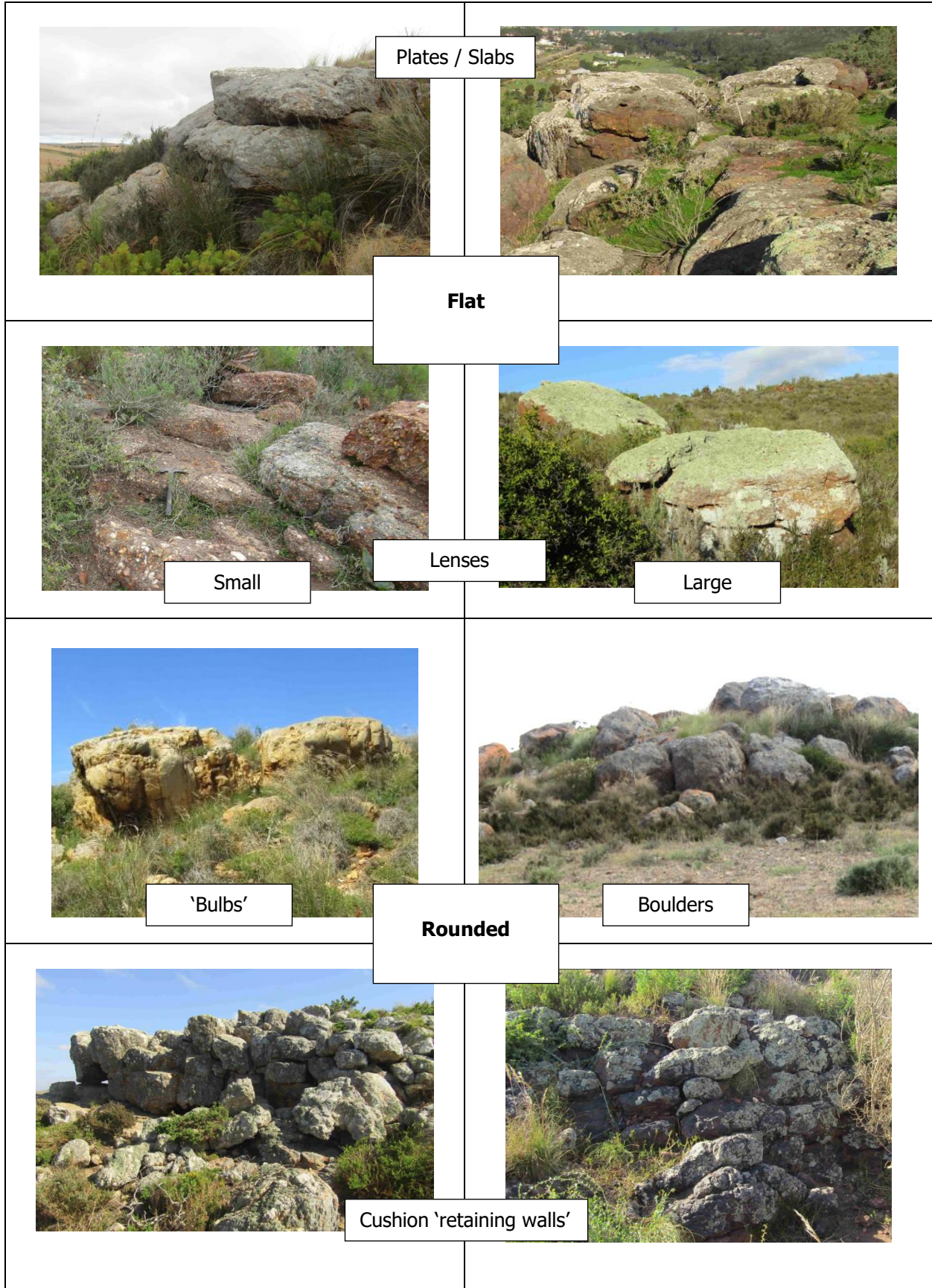


Plate 11. Common hilltop habits (d).

12. Pedogenic silcrete – hilltop habits (e) – other

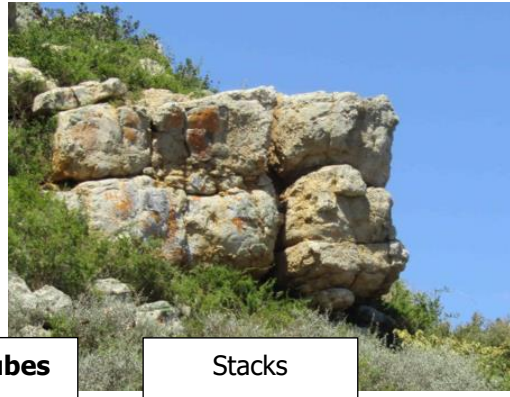


Plate 12. Common hilltop habits (e).

13. Pedogenic silcrete – hilltop surface habits



Cushions (high relief)



Pillows (low relief)

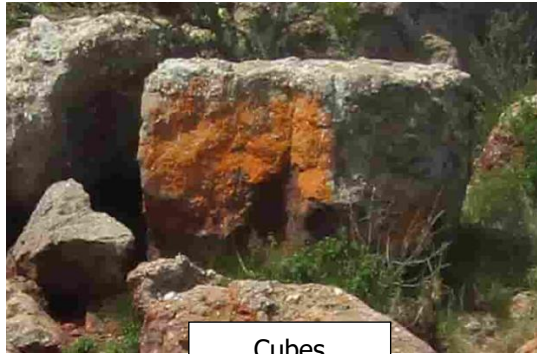


Platy



Plate 13. Common hilltop surface habits.

14. Pedogenic silcrete – hilltop and mound top boulder shapes (a) - various



Cubes



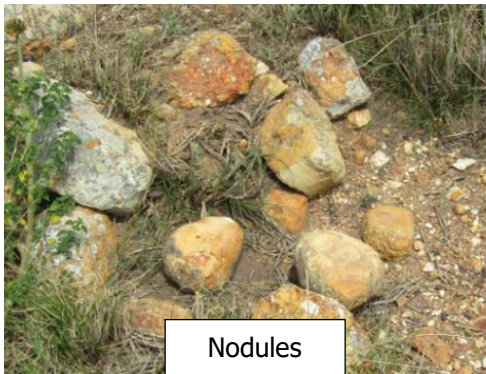
Slabs



Spheres



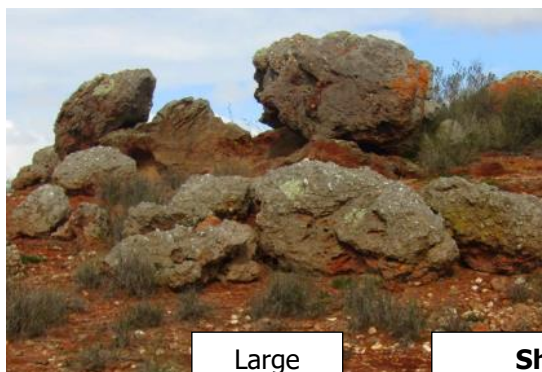
'Pears'



Nodules

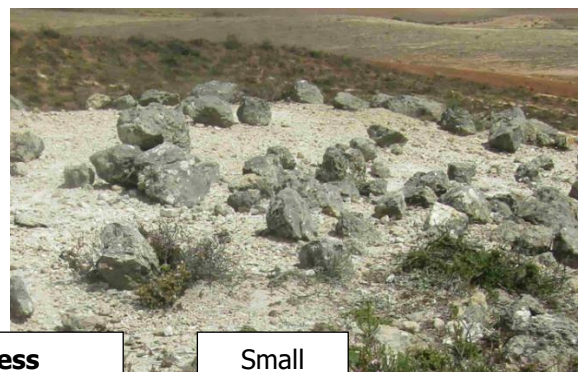


Prisms



Large

Shapeless



Small

Plate 14. Common hilltop and mound top boulder shapes.

15. Pedogenic silcrete – hilltop and mound top boulder shapes (b) – polyhedrons (1)

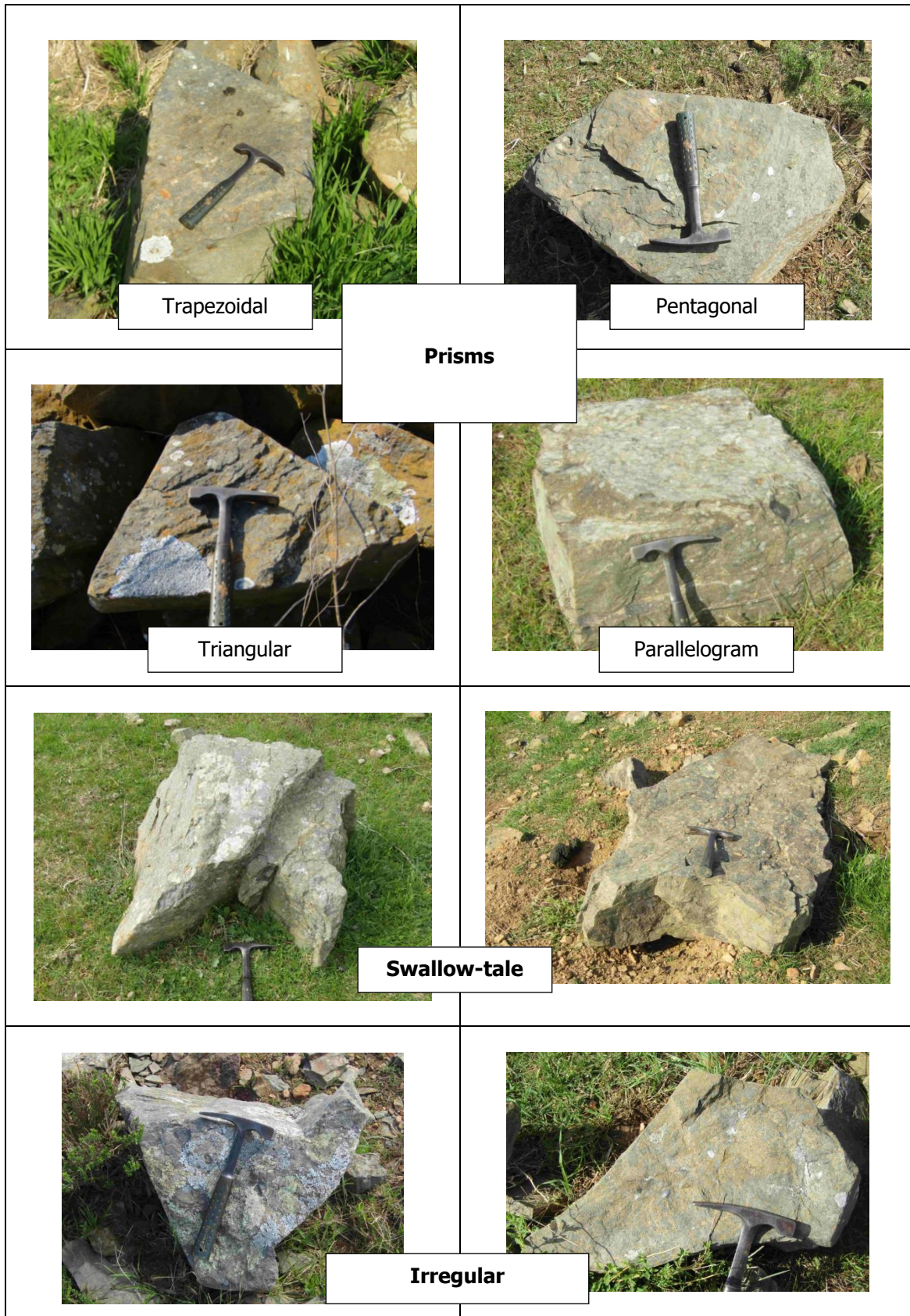


Plate 15. Polyhedral habits (1).

(All polyhedrons in Plates 15 and 16 occur on one hill, 10 km north of Bredasdorp).

16. Pedogenic silcrete – hilltop and mound top boulder shapes (b) – polyhedrons (2)

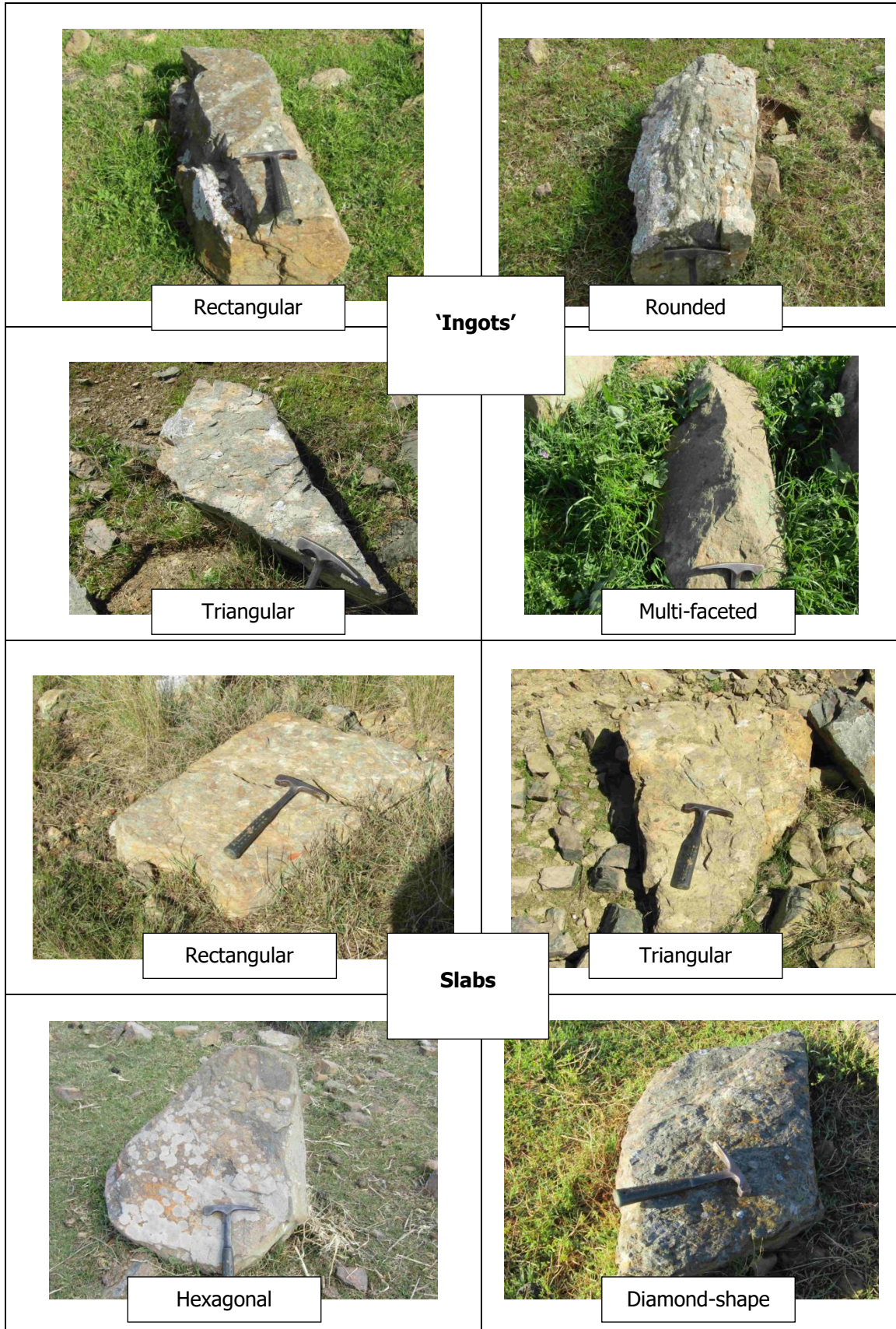


Plate 16. Polyhedral habits (2).

(All polyhedrons in Plates 15 and 16 occur on one hill, 10 km north of Bredasdorp).

17. Pedogenic silcrete – hilltop and mound top boulder occurrence (a) - spaced

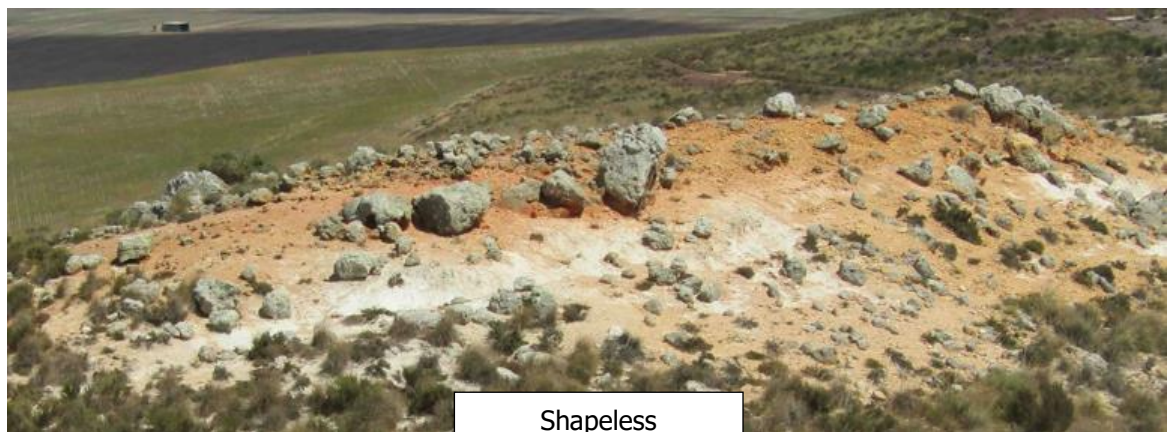


Plate 17. Common hilltop and mound top spaced boulders.

18. Pedogenic silcrete – hilltop and mound top boulder occurrence (b) - clustered

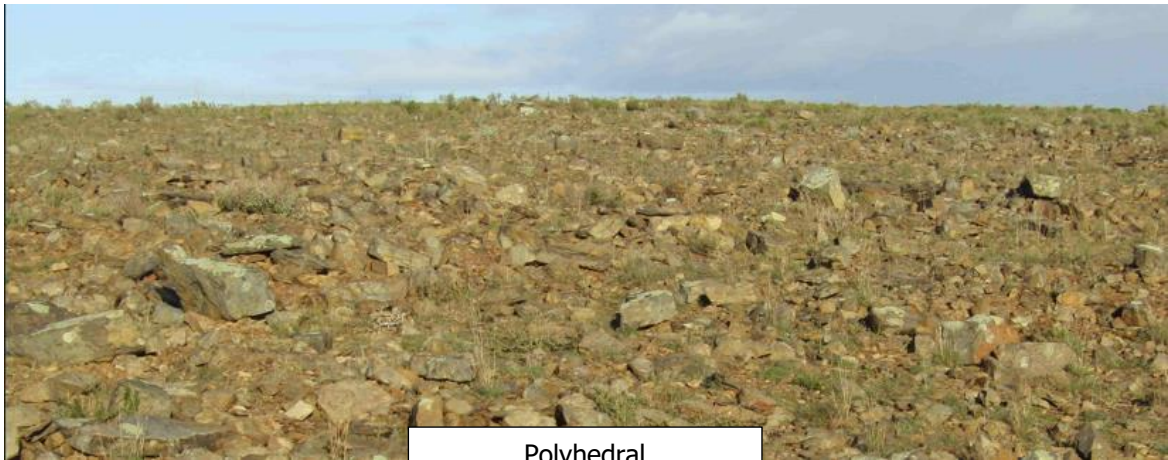


Plate 18. Common hilltop and mound top clustered boulders.

19. Pedogenic silcrete – hilltop and mound top boulder occurrence (c) – heaped

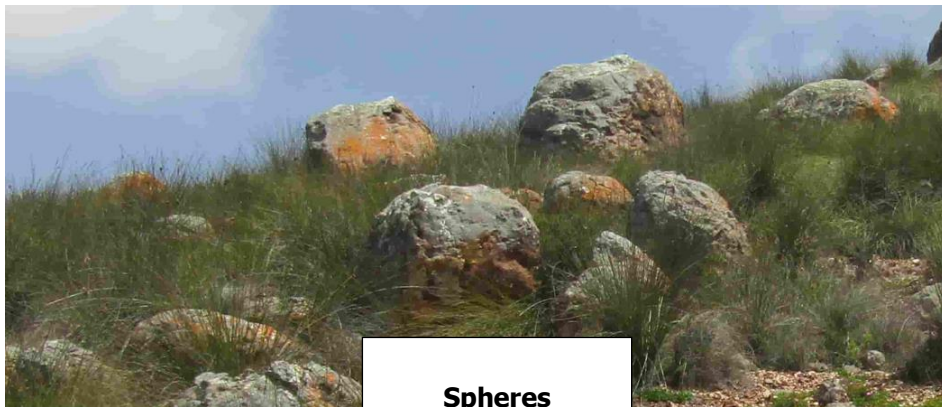


Plate 19. Common hilltop and mound top heaped boulders.

20. Pedogenic silcrete – hillslope boulders



Mixed habits



Spheres



Plate 20. Common hillslope boulders.

21. Pedogenic silcrete – protrusions (a) - ‘castles’

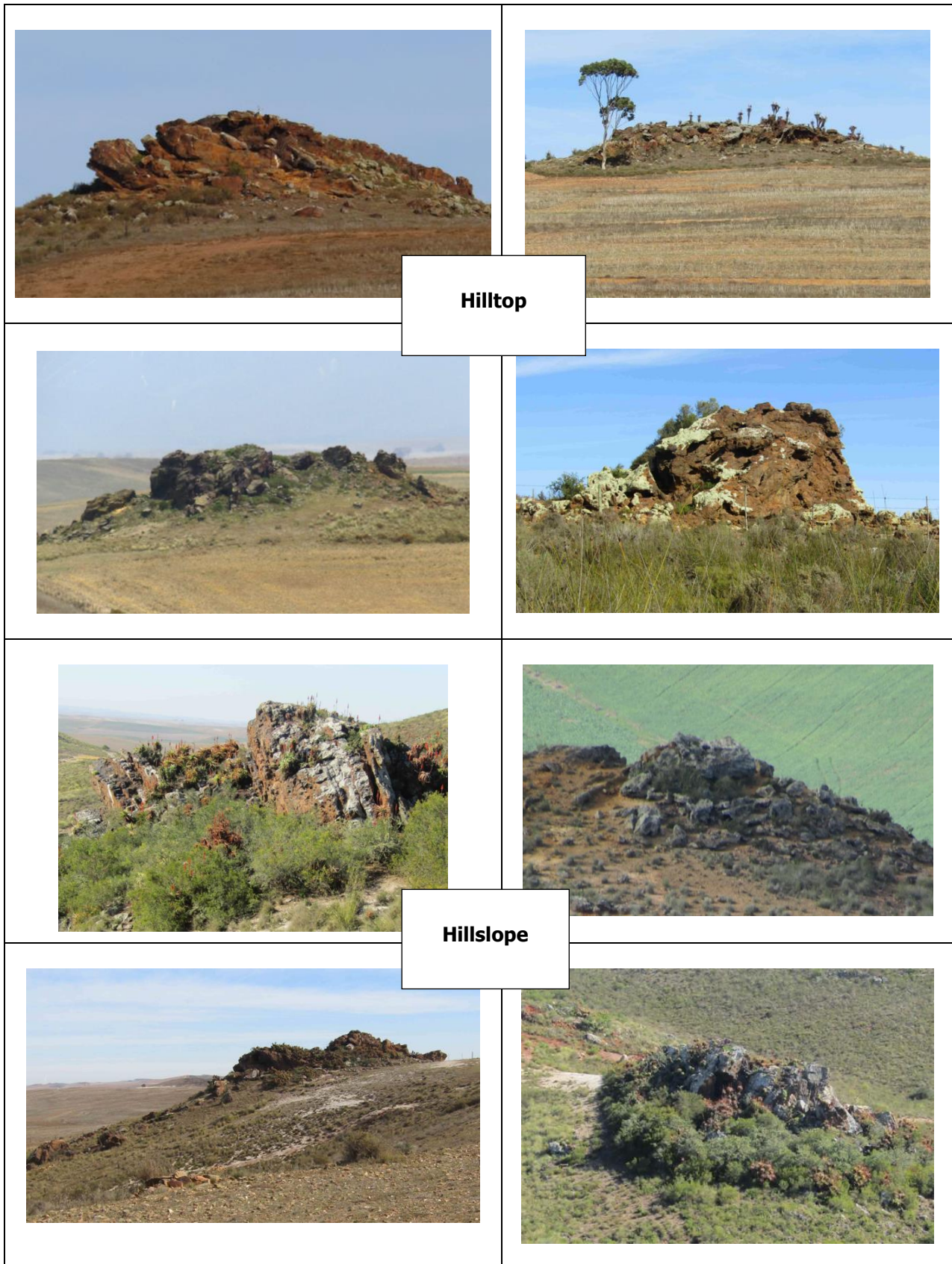


Plate 21. Hilltop and hillslope ‘castles’.

22. Pedogenic silcrete – protrusions (b) - bulges and pinnacles

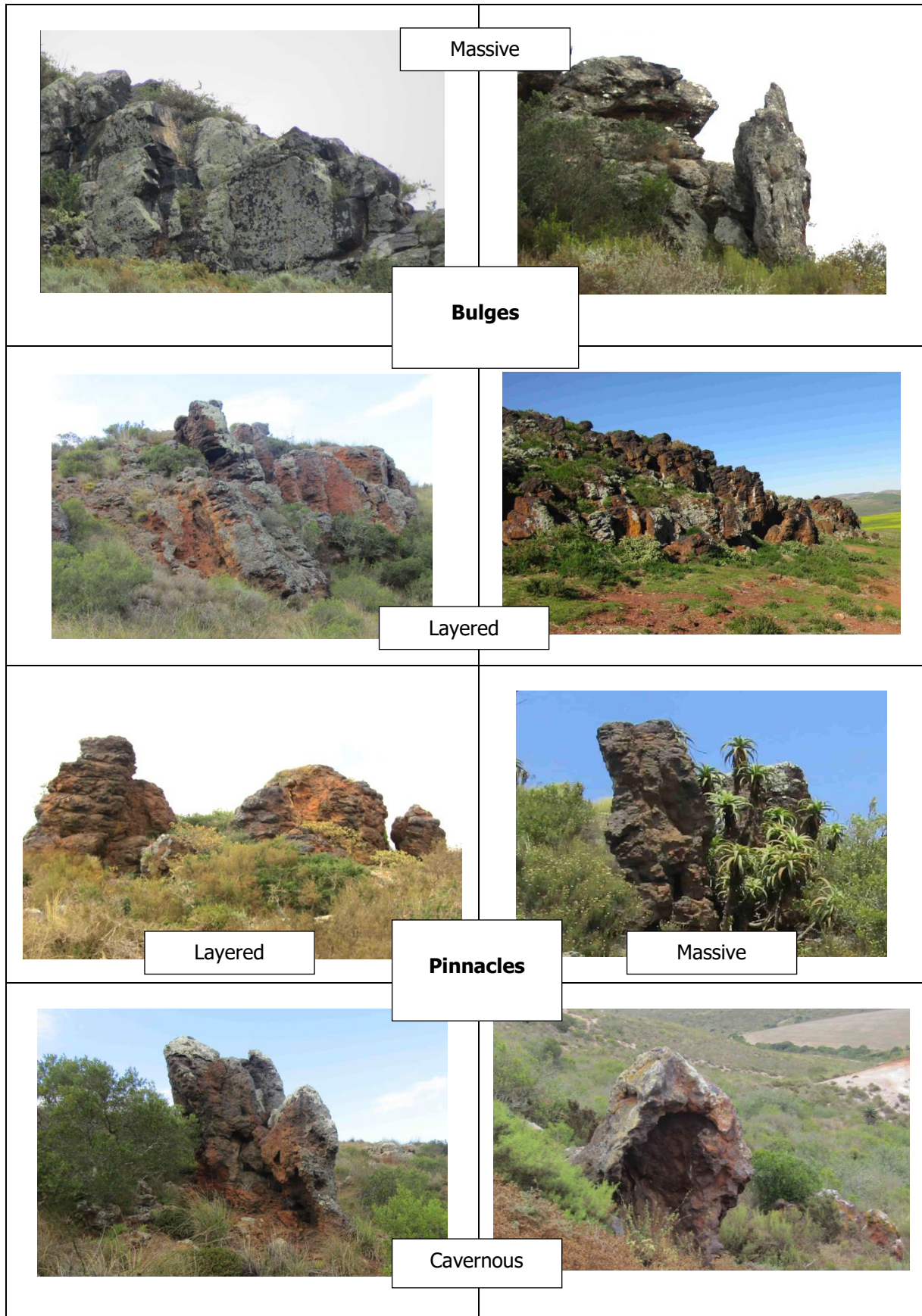


Plate 22. Common bulges and pinnacles.

23. Pedogenic silcrete – protrusions (c) – silicified shale ‘castles’ and other features

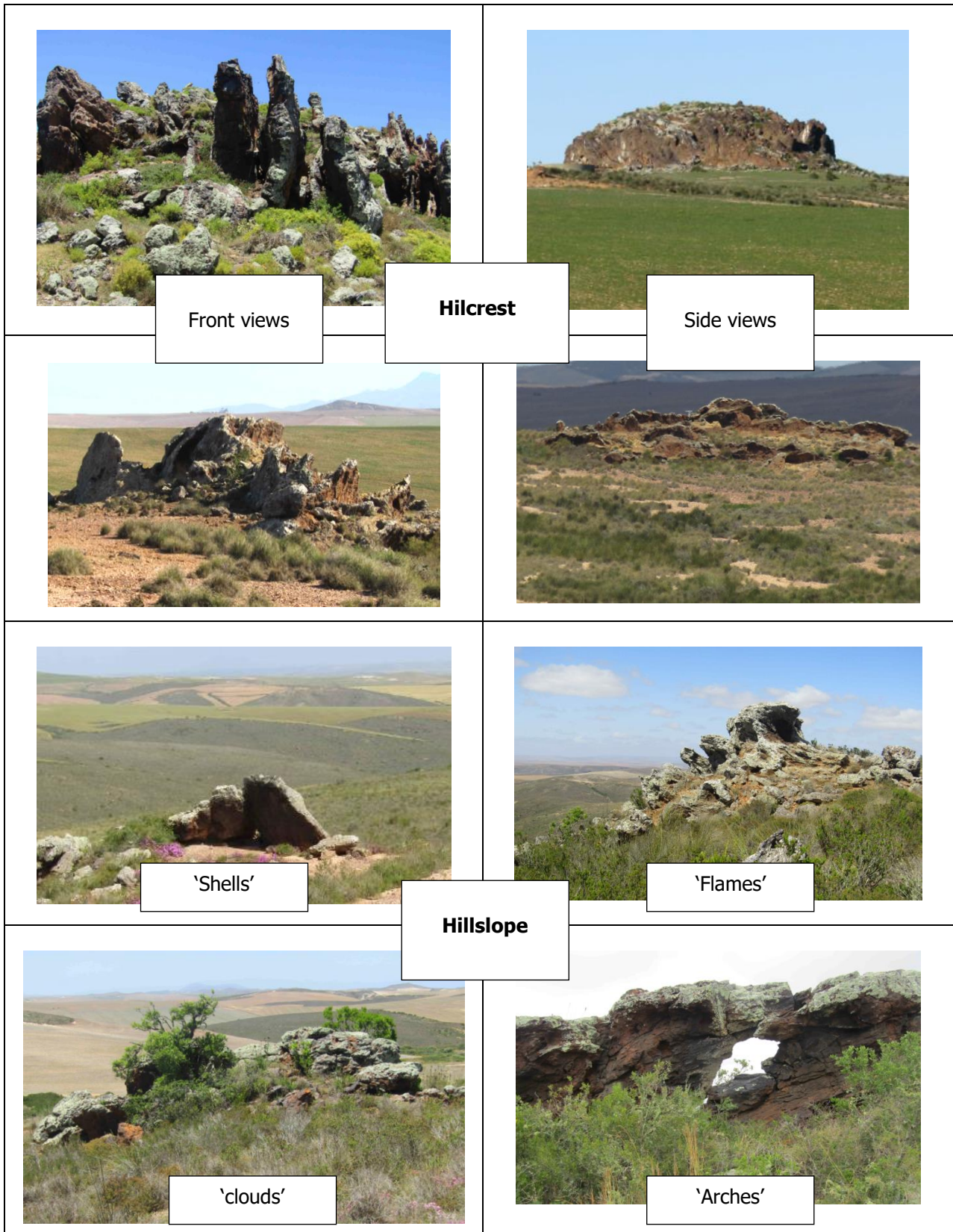


Plate 23. Common silicified shale ‘castles’ and other features.

24. Pedogenic silcrete – textures (a) – common textures

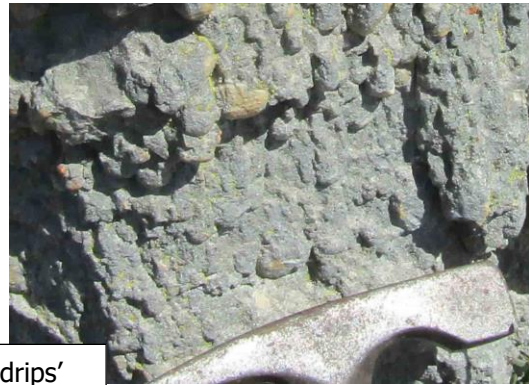
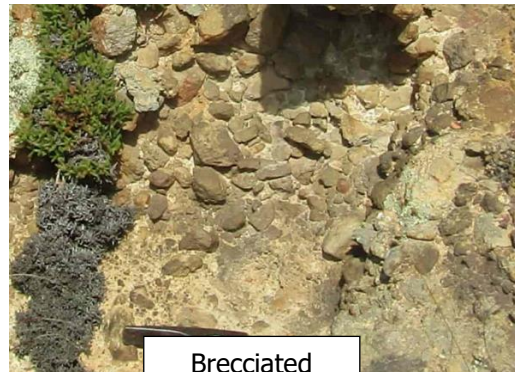
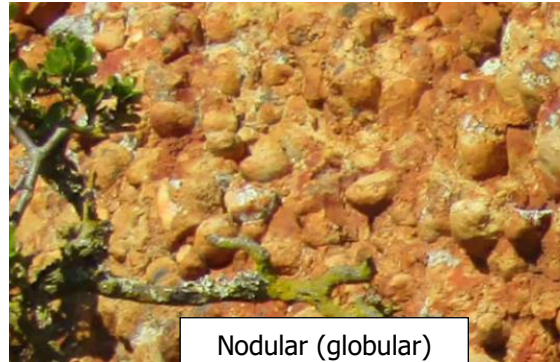


Plate 24. Common silcrete textures.

25. Pedogenic silcrete – textures (b) – textures of certain habits

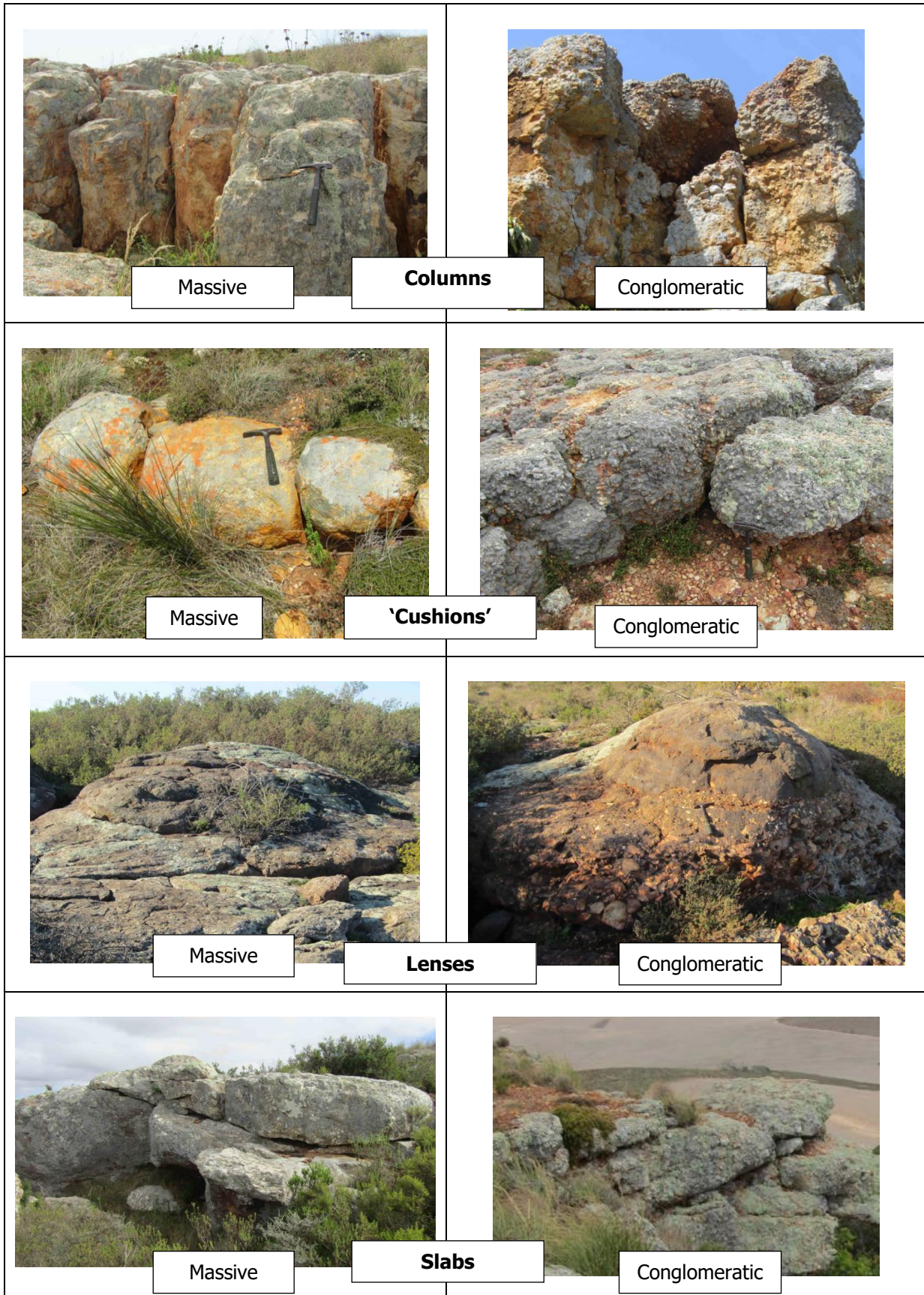


Plate 25. Massive and conglomeratic textures of some silcrete habits.

26. Pedogenic silcrete – some inherent properties



Plate 26. Inherent 90° vertices and smooth planes in silcretes and silicified sandstone boulders.

27. Pedogenic silcrete – hilltop crust (cap) disintegration

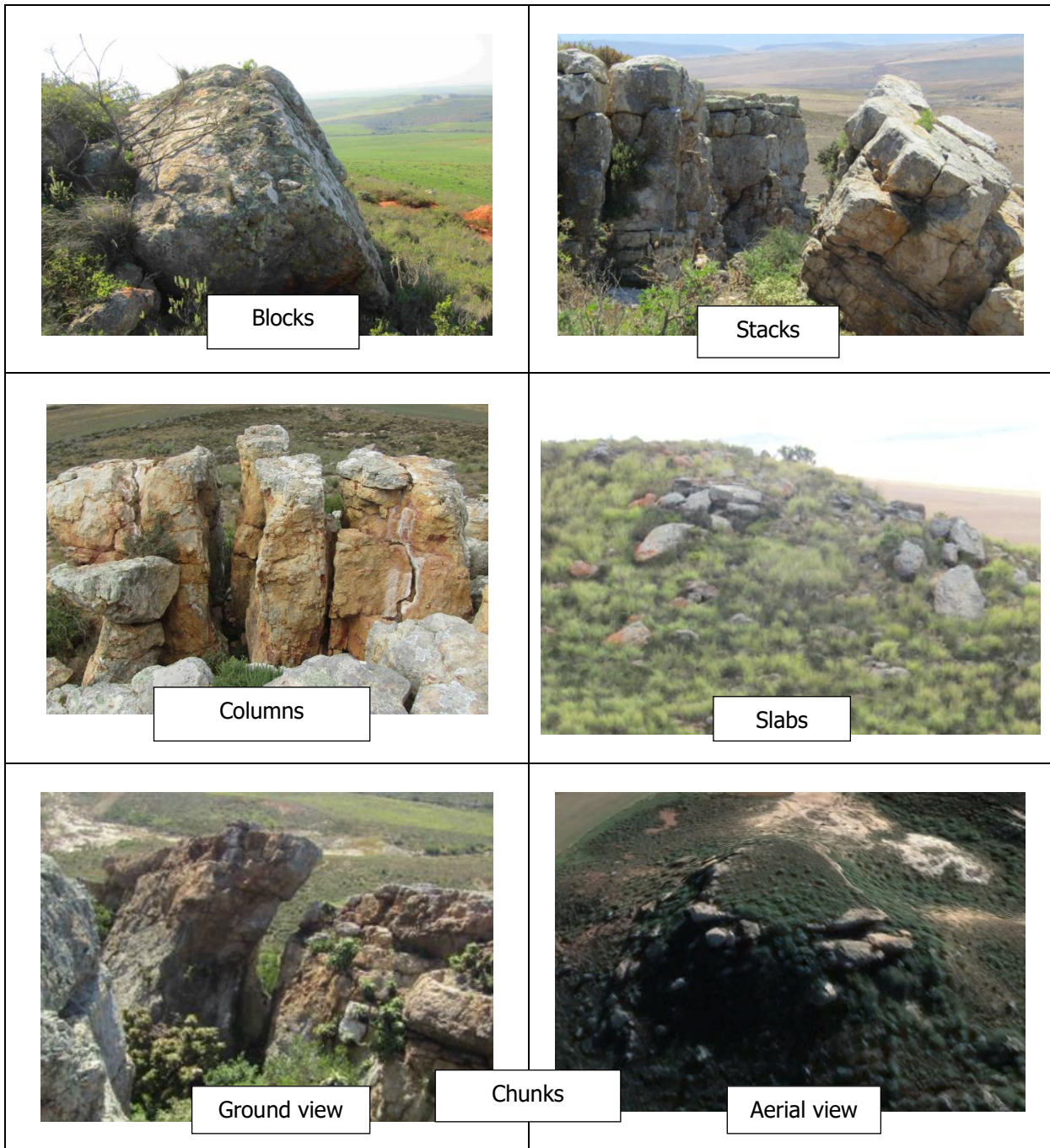


Plate 27. Common hilltop crust (cap) disintegration patterns.

28. Pedogenic silcrete – weathering of some hilltop silcretes

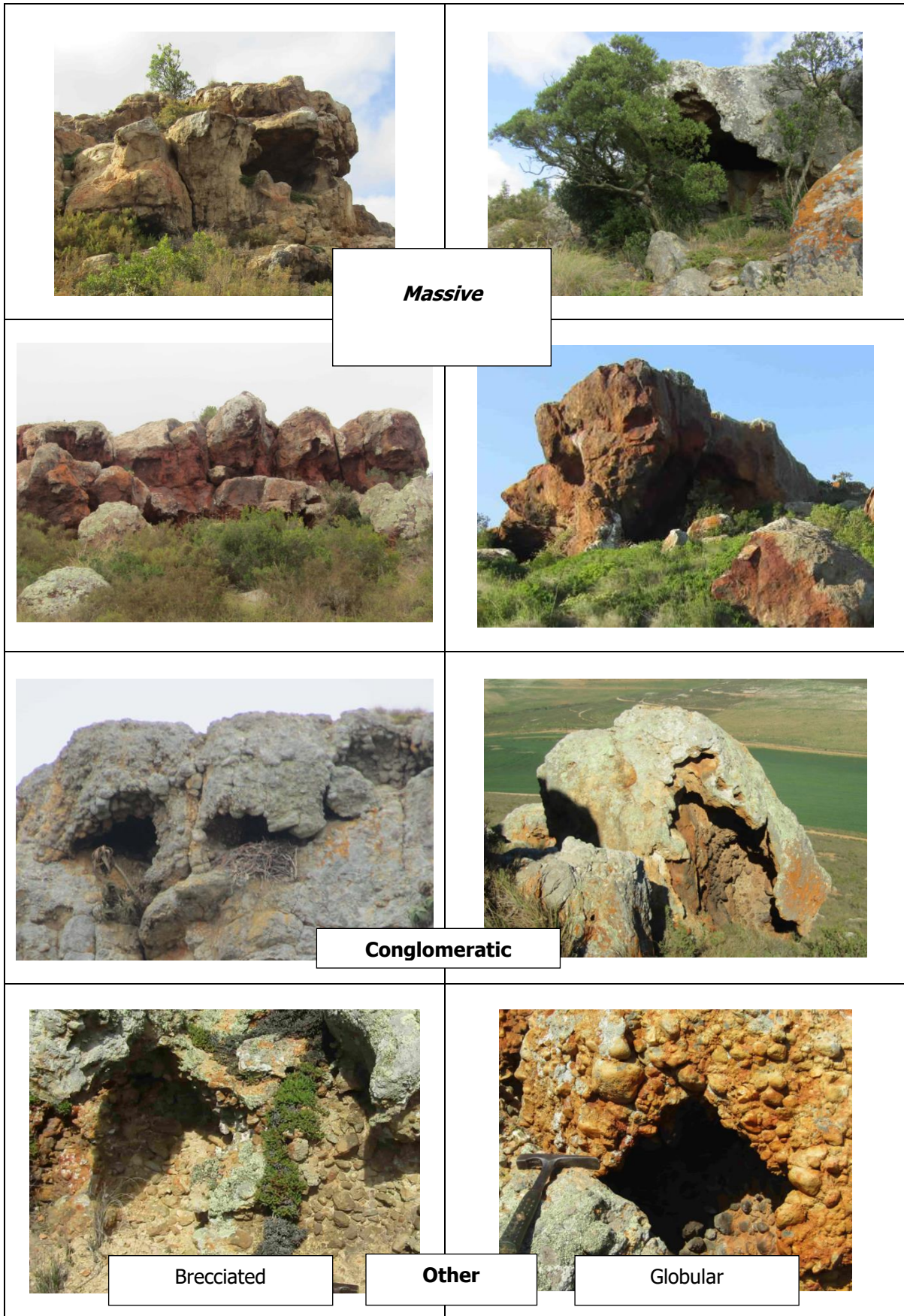


Plate 28. Hilltop weathered silcretes.

29. Silicified limestone habits

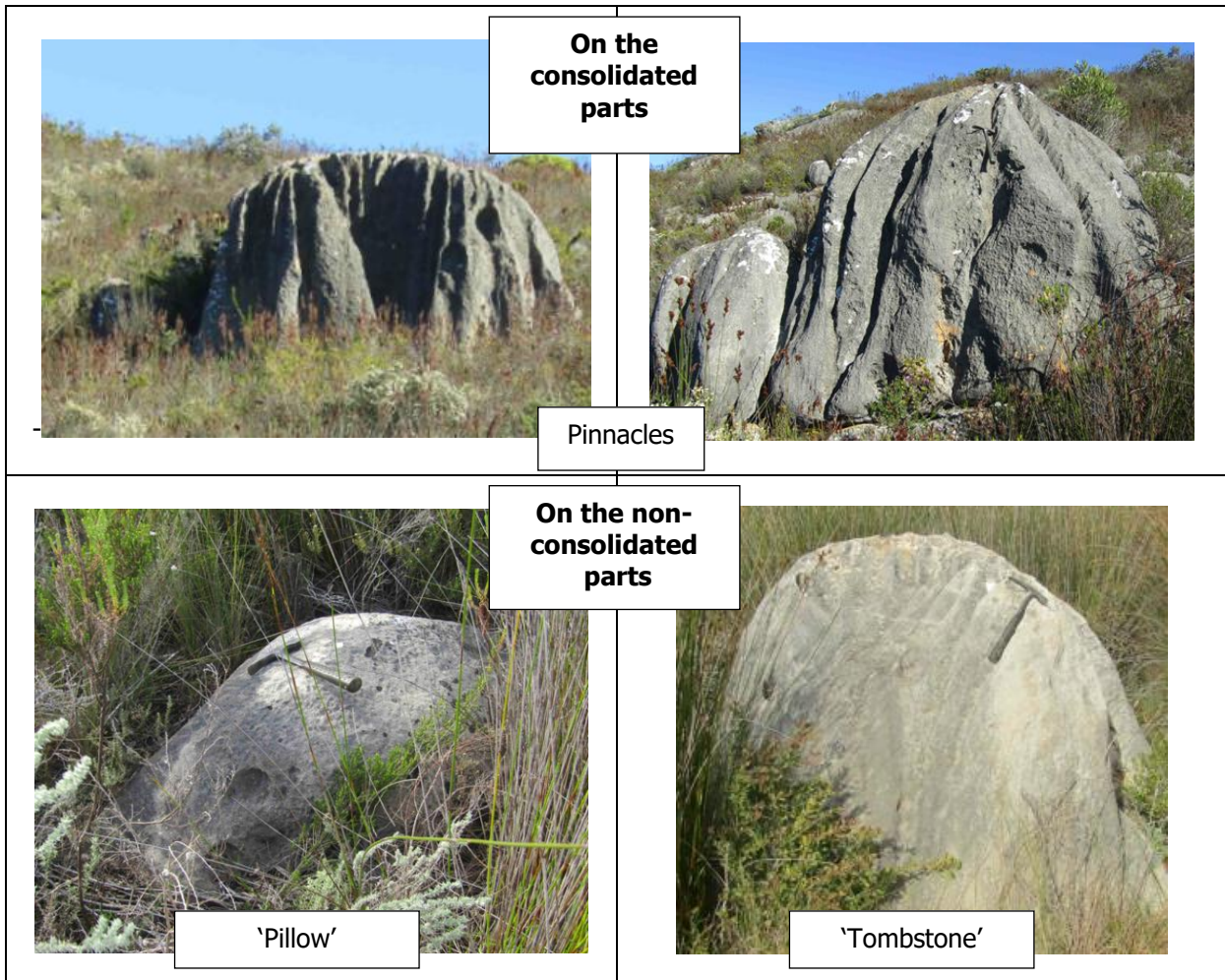


Plate 29. Common silicified limestone habits (on the Bredasdorp Group Wankoe Formation).



30. Silicified sandstone habits (a)

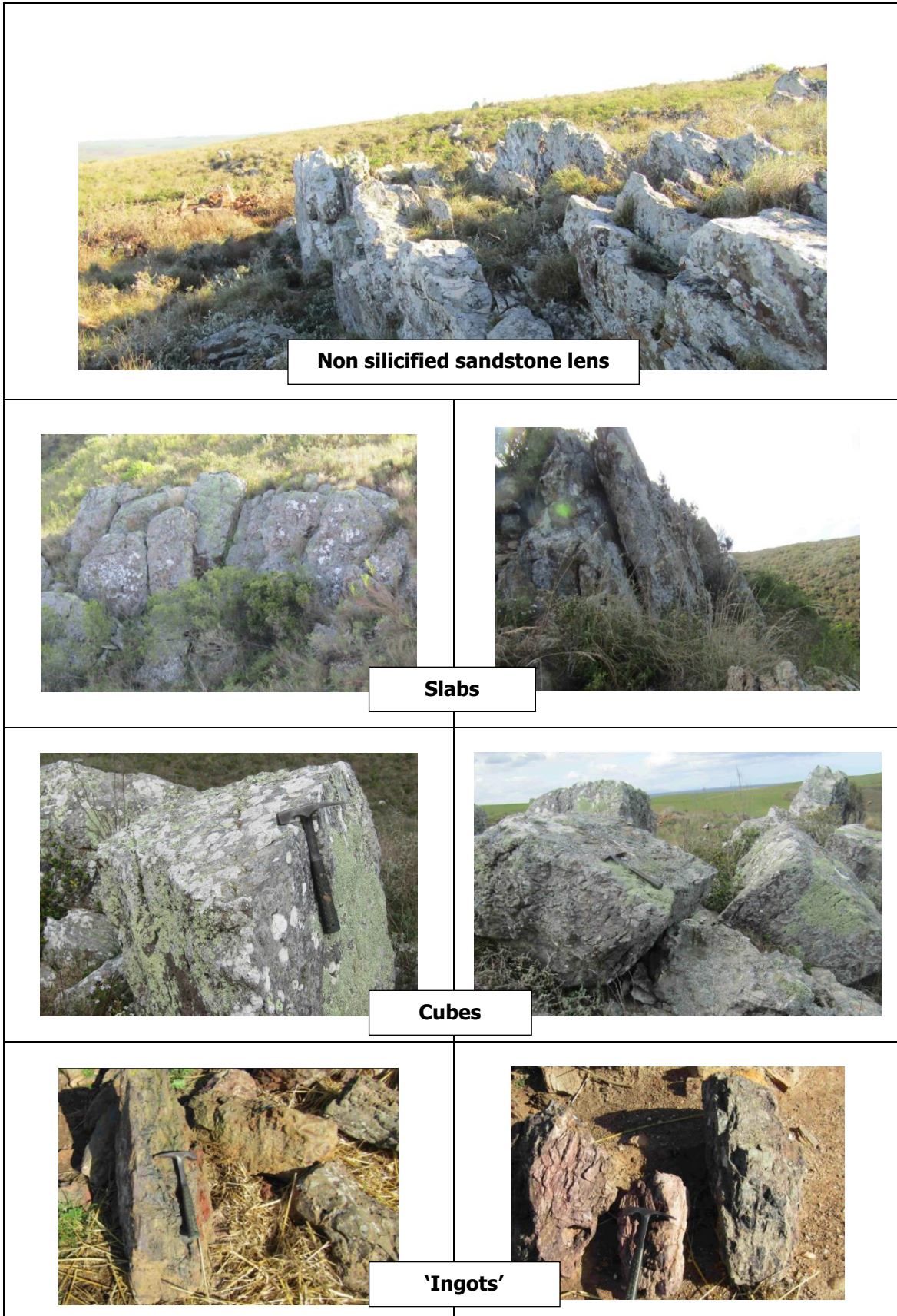


Plate 30. Common silicified sandstone habits (a) (in sandstone lenses within the Bokkeveld shale formations).

31. Silicified sandstone habits (b)

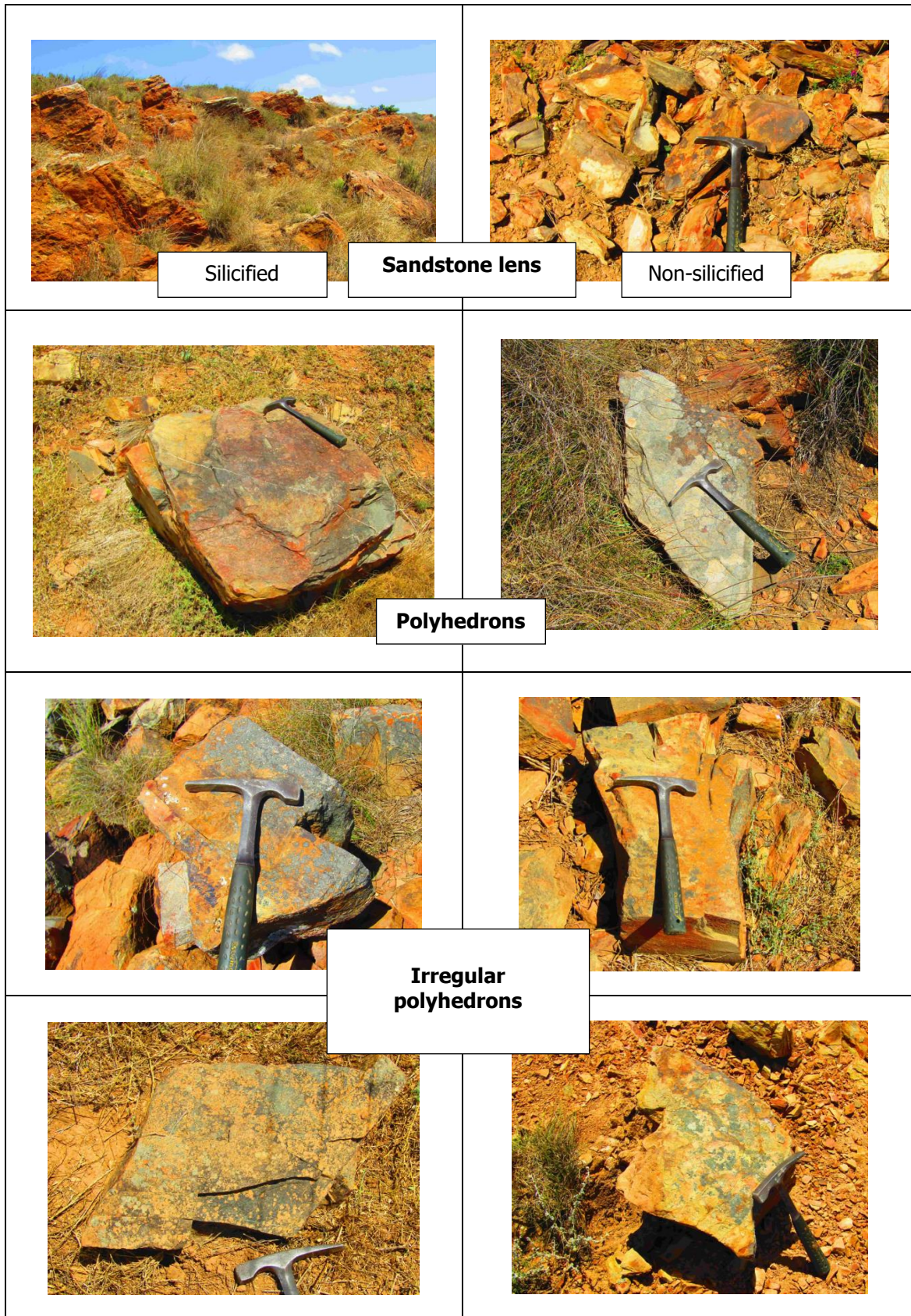


Plate 31. Common silicified sandstone habits (b) (in sandstone lenses within the Bokkeveld shale formations).

32. Silicified sandstone habits (c)

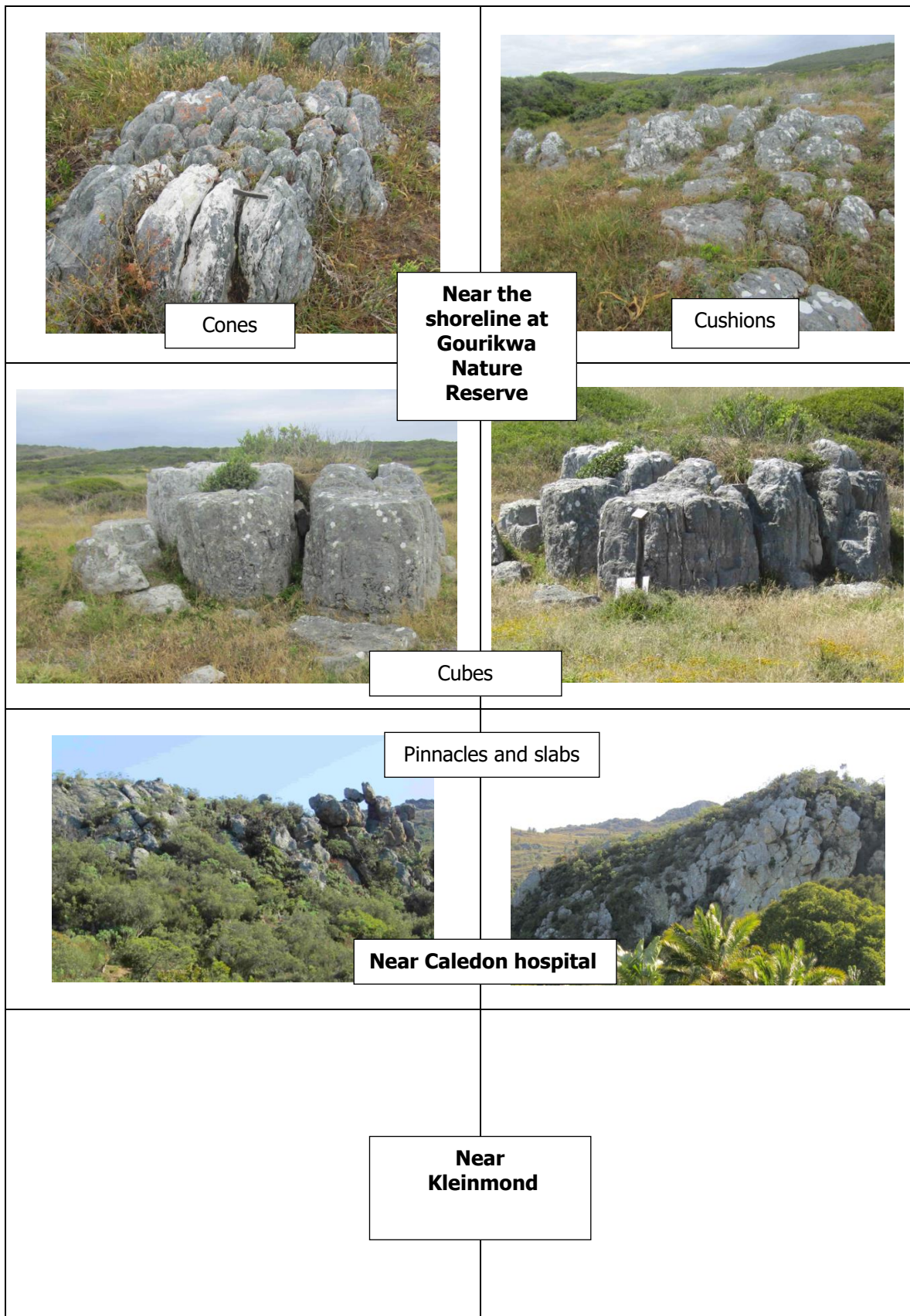


Plate 32. Silicified sandstone common habits (c) (on the TMG Formations, outside the Study Area).

33. Silicified sandstone habits (d)

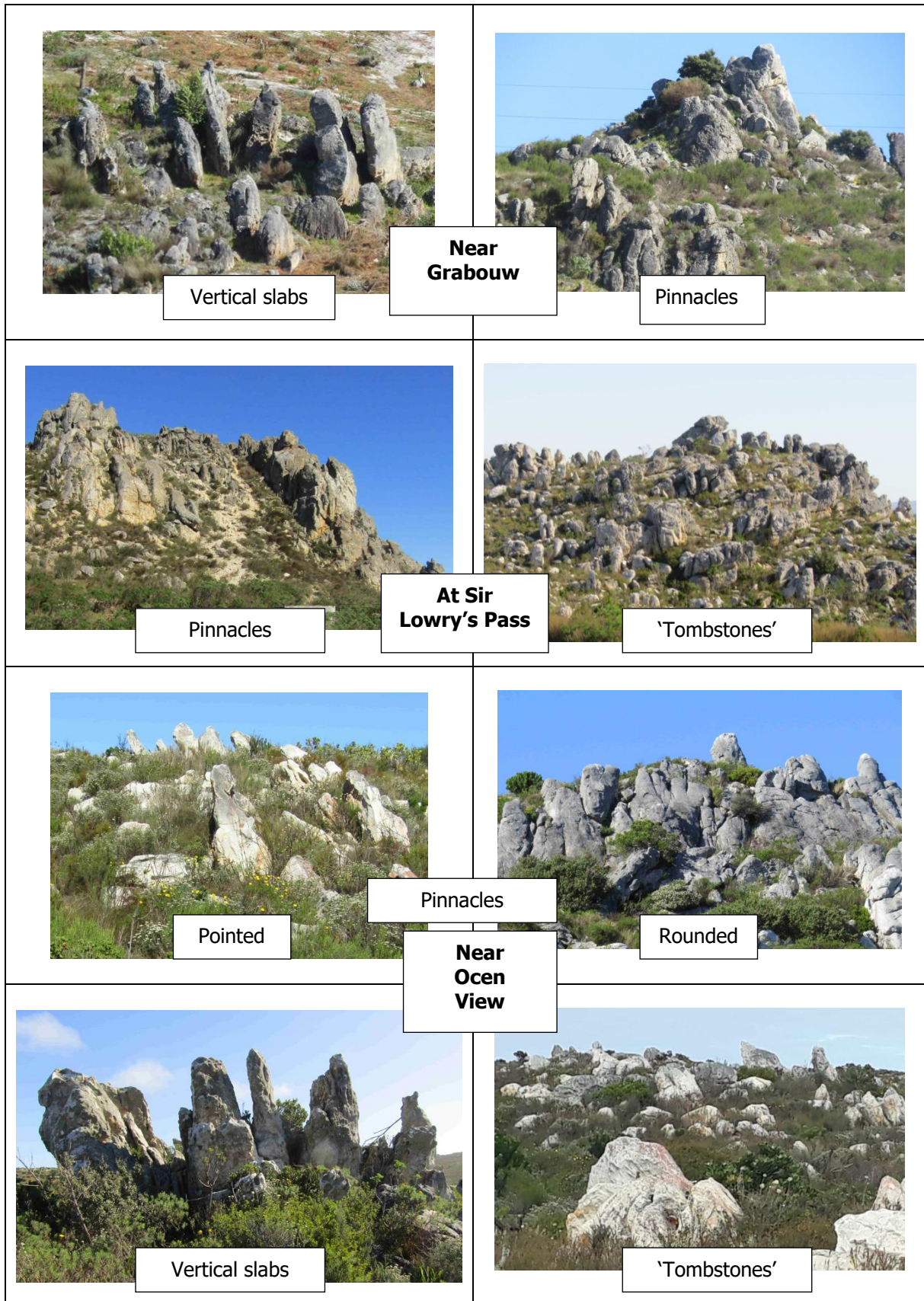


Plate 33. Silicified sandstones common habits (d) (on the TMG Formations, outside the Study Area).

34. Non-pedogenic silcrete (a) groundwater – 1. gentle slope habits



Nodules

Plate 34. Non-pedogenic silcrete– groundwater - gentle slope common habits.

35. Non-pedogenic silcrete (a) groundwater – 2. moderate slope habits

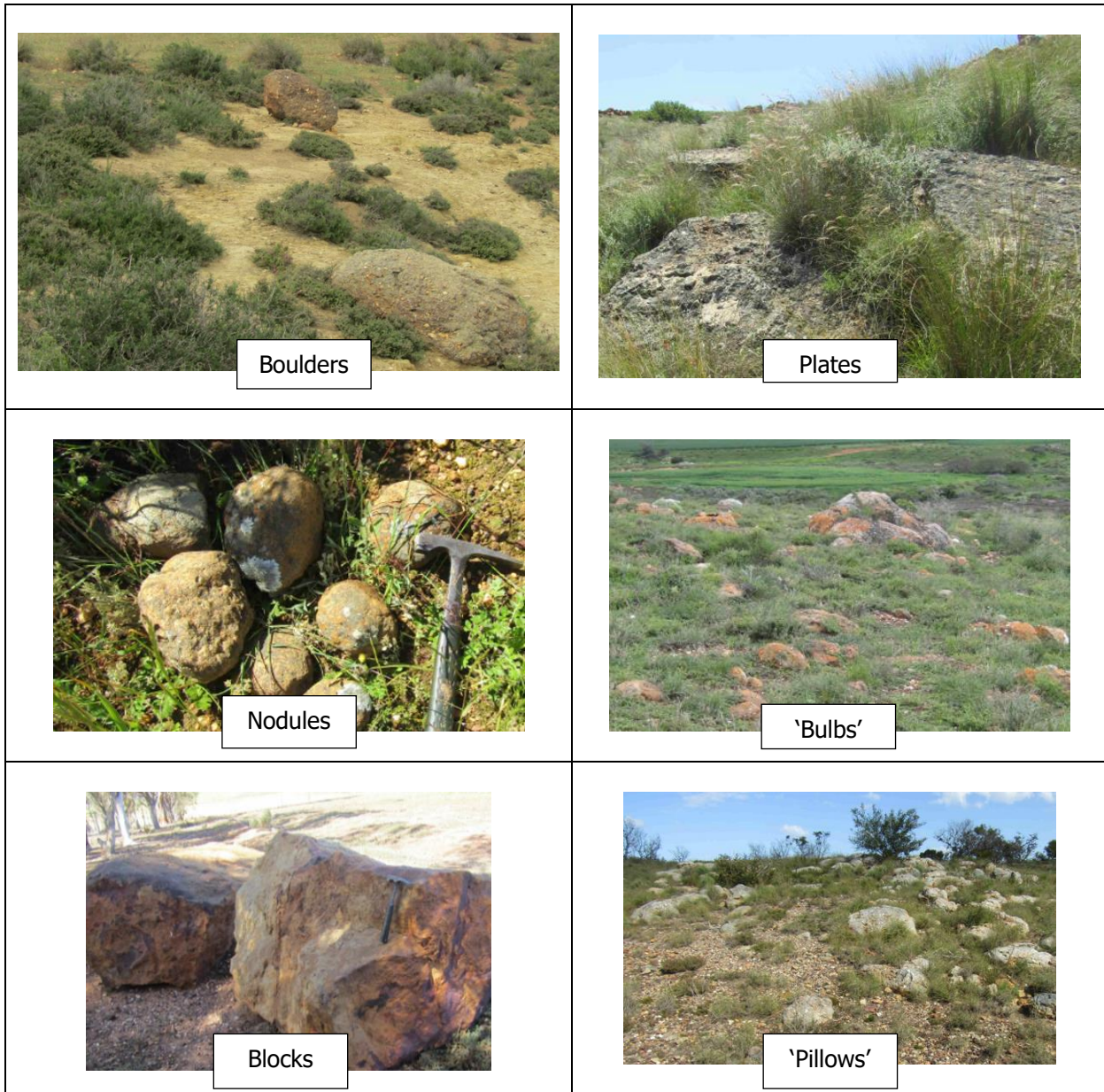


Plate 35. Non-pedogenic silcrete – groundwater – moderate slope common habits.

36. Non-pedogenic silcrete (b) – drainage line, ravine and river habits

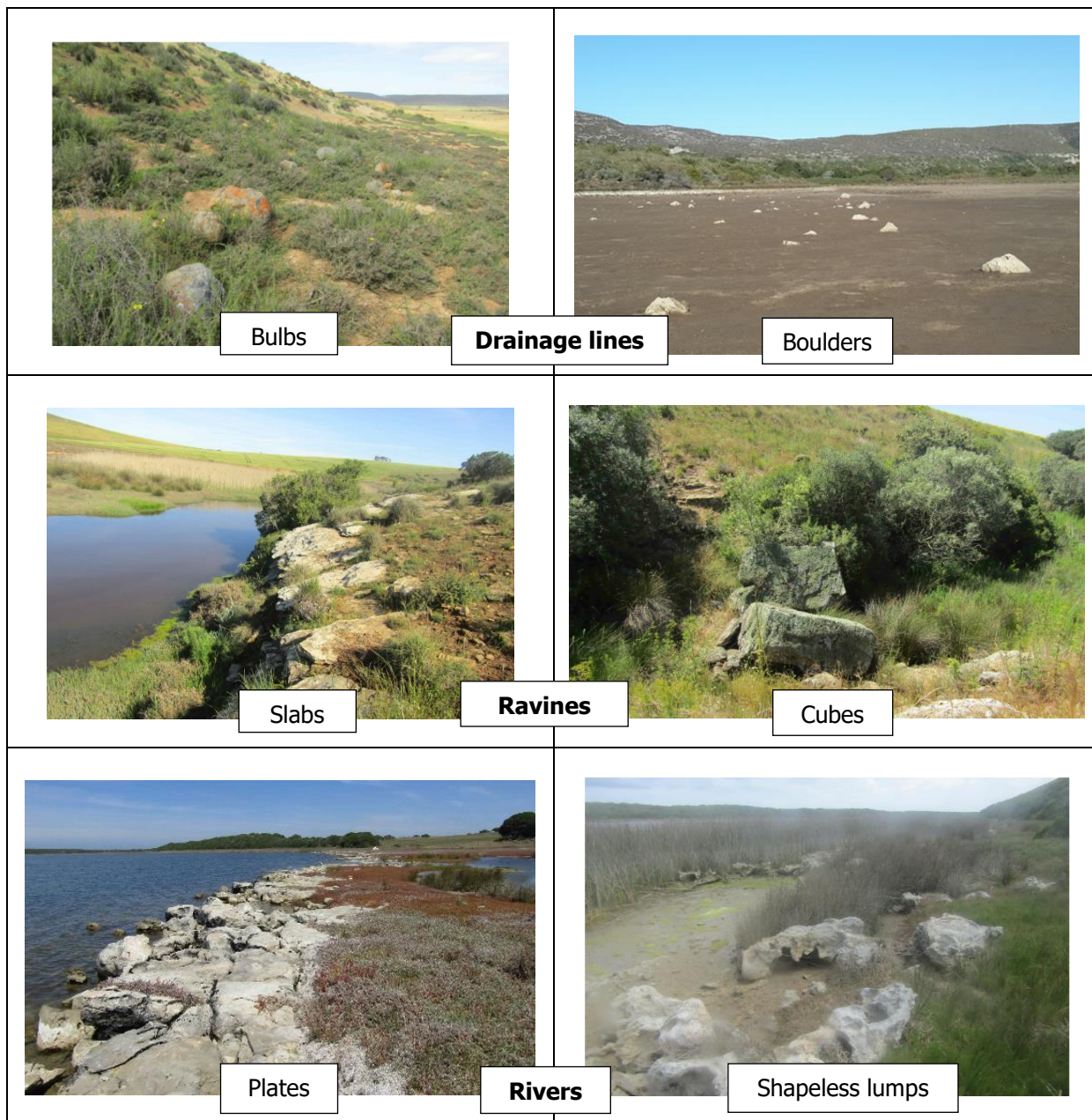


Plate 36. Non-pedogenic silcrete – drainage line, ravine and river common habits.

37. Non-pedogenic silcrete (c) – lake and pan habits

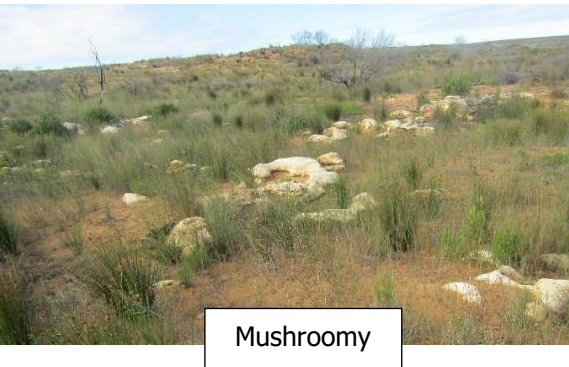
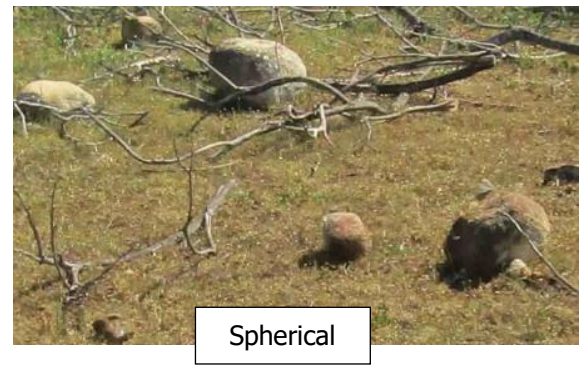
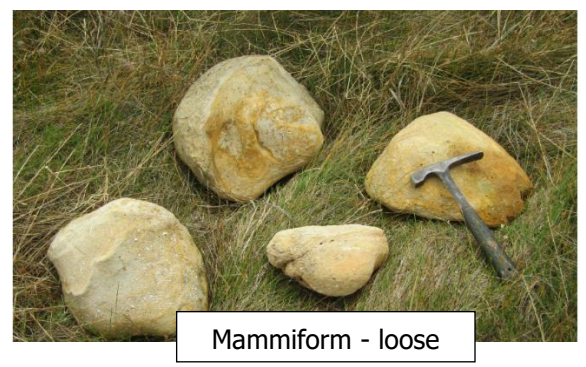
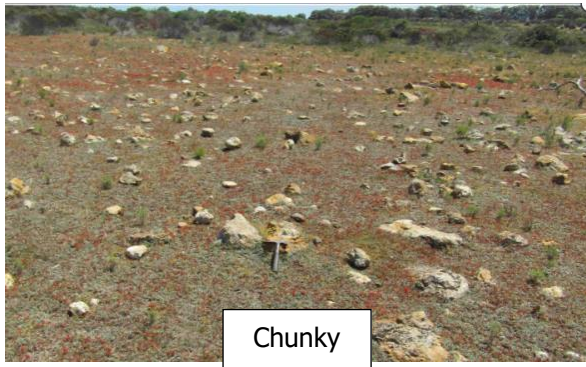
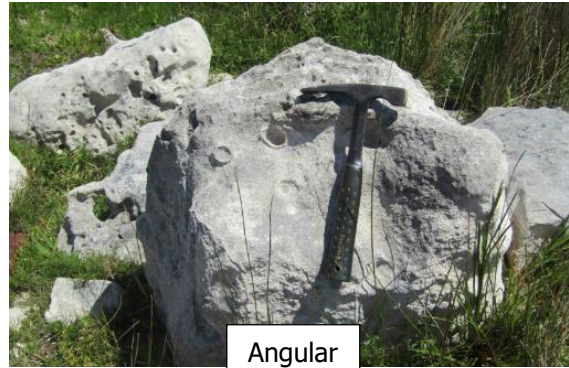
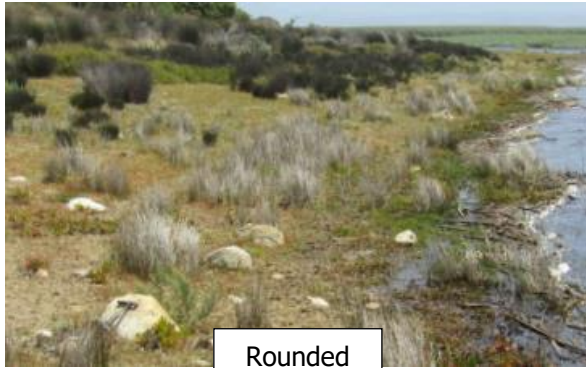


Plate 37. Non-pedogenic silcrete – lake and pan common habits.