

## Unit 2 Topography associated with inclined rock strata

### 1 What does topography in inclined (tilted) layers look like?

- Large areas of South Africa have tilted or inclined sedimentary rock. Inclined strata are layers of rock below the Earth's surface which tilt at an angle.
- The tilting was caused by tectonic forces, resulting in both hard and soft layers of rock being exposed at the surface. This is illustrated in Figure 50.

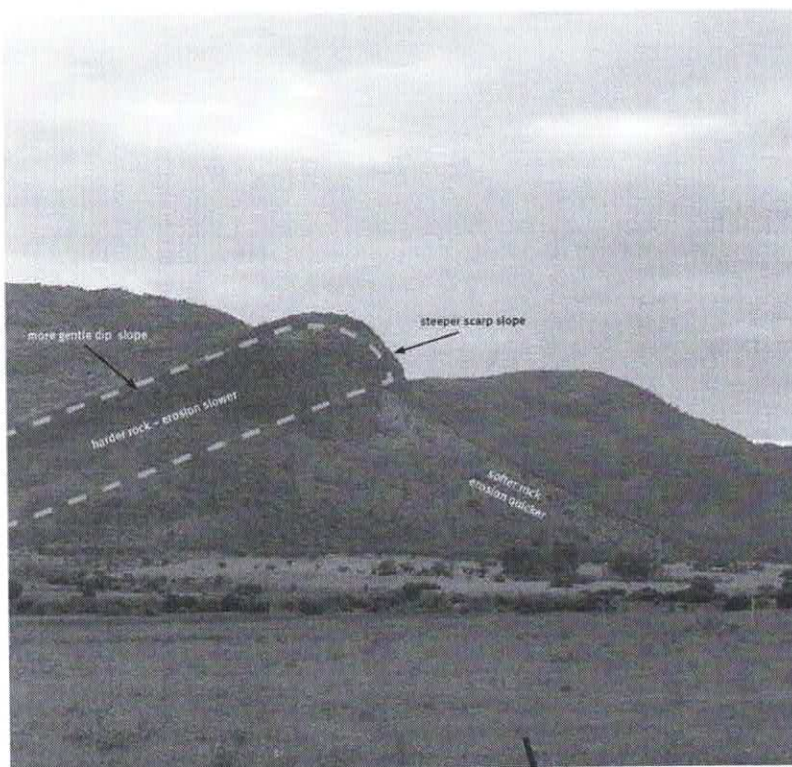


Figure 50 Inclined strata. Note the angle at which the harder layer dips, indicated in red.

As a result of the continued eroding action of running water, mass movements and weathering the difference in resistance of the different layers causes homoclinal ridges.

- The softer layers will be removed more easily than the harder layers. Figure 51 shows how the harder layers remain as parallel ridges.
- These ridges are known as collectively homoclinal ridges. The steeper slope is called the scarp slope and the more gentle slope is called the dip slope.

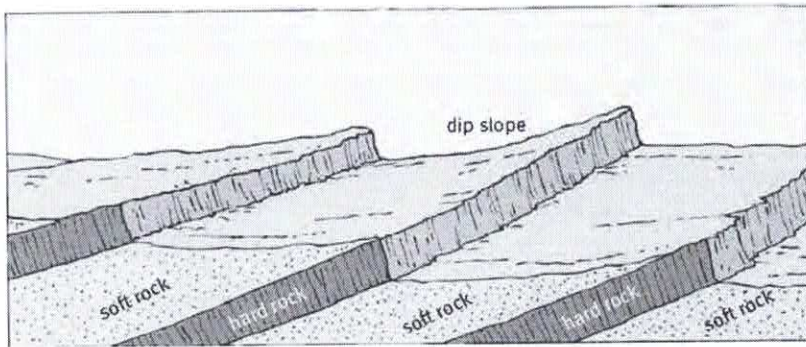


FIGURE 51 Valley and ridge topography in tilted strata

### 1.1 How are homoclinal ridges classified?

Homoclinal ridges are classified according to the angle of the dip slope. The type of homoclinal ridge depends on the gradient at which the layers dip.

- cuestas, where the layers dip very gradually at  $10^{\circ}$  to  $25^{\circ}$
- homoclinal ridges dip from  $25^{\circ}$  to  $45^{\circ}$ , for example the Magaliesberg
- hogsback ridges, where the dip slope is very steep, at an angle greater than  $45^{\circ}$ , for example the Hogsback, north of Alice in the Eastern Cape.

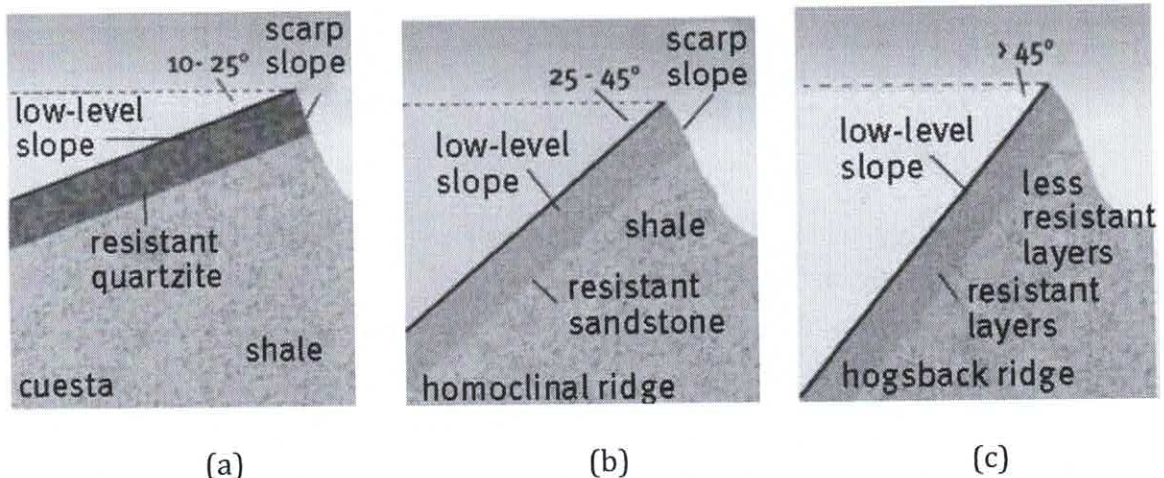


FIGURE 52 Cuesta (a), homoclinal ridge (b) and hogsback (c)

### 1.2 What are cuesta basins and cuesta domes?

Cuestas can form basin-shaped or dome-shaped structures.

- In a basin, the scarp slope of a cuesta will face the outside and the dip slope will be face the inside (Figure 53a).
- In a dome, the scarp slope faces the inside and the dip slope faces the outside (Figure 53b).

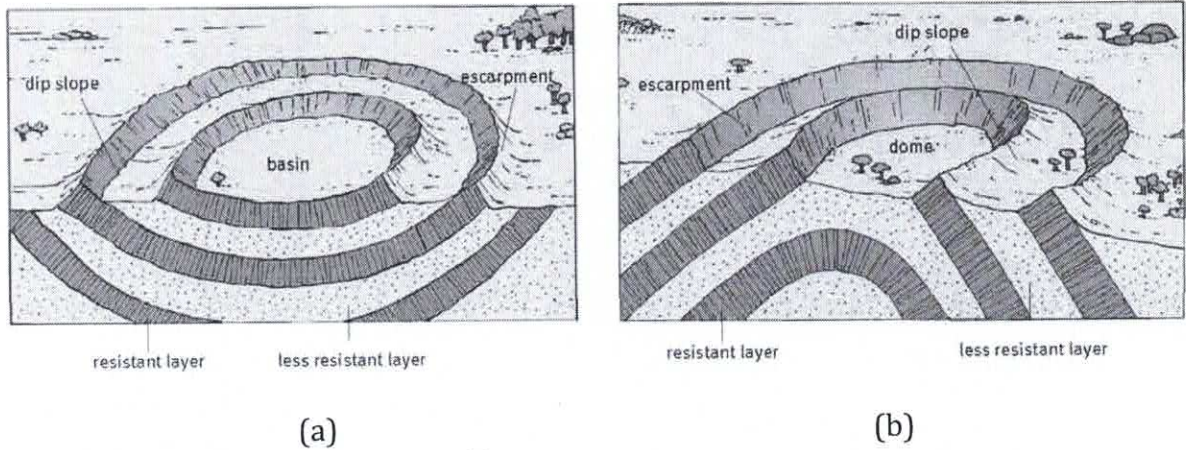


FIGURE 53 Cuesta basin (a) and cuesta dome (b)

### 1.3 Of what significance are cuesta landscapes to humans?

- When dipping layers erode, the harder layers provide less fertile soil. The slopes may then be suitable for forestry.
- Cuestas are usually low, so they do not cause traffic obstacles.
- Underground water and oil can be trapped in and extracted from cuestas.