

C. GEOLOGY

Desk Note C2a. Table Mountain Group - Overview

The Table Mountain Group (TMG) Formations were deposited during the Ordovician, Silurian and Lower Devonian (~500 to ~400 million years ago). Rocks of all the Table Mountain Group Formations are present in the Study Area. The purpose of this Desk Note is to give the reader a short introduction about the stratigraphy (Figures 1 and 2), the lithology and the outcrops of the TMG rocks in the Study Area.

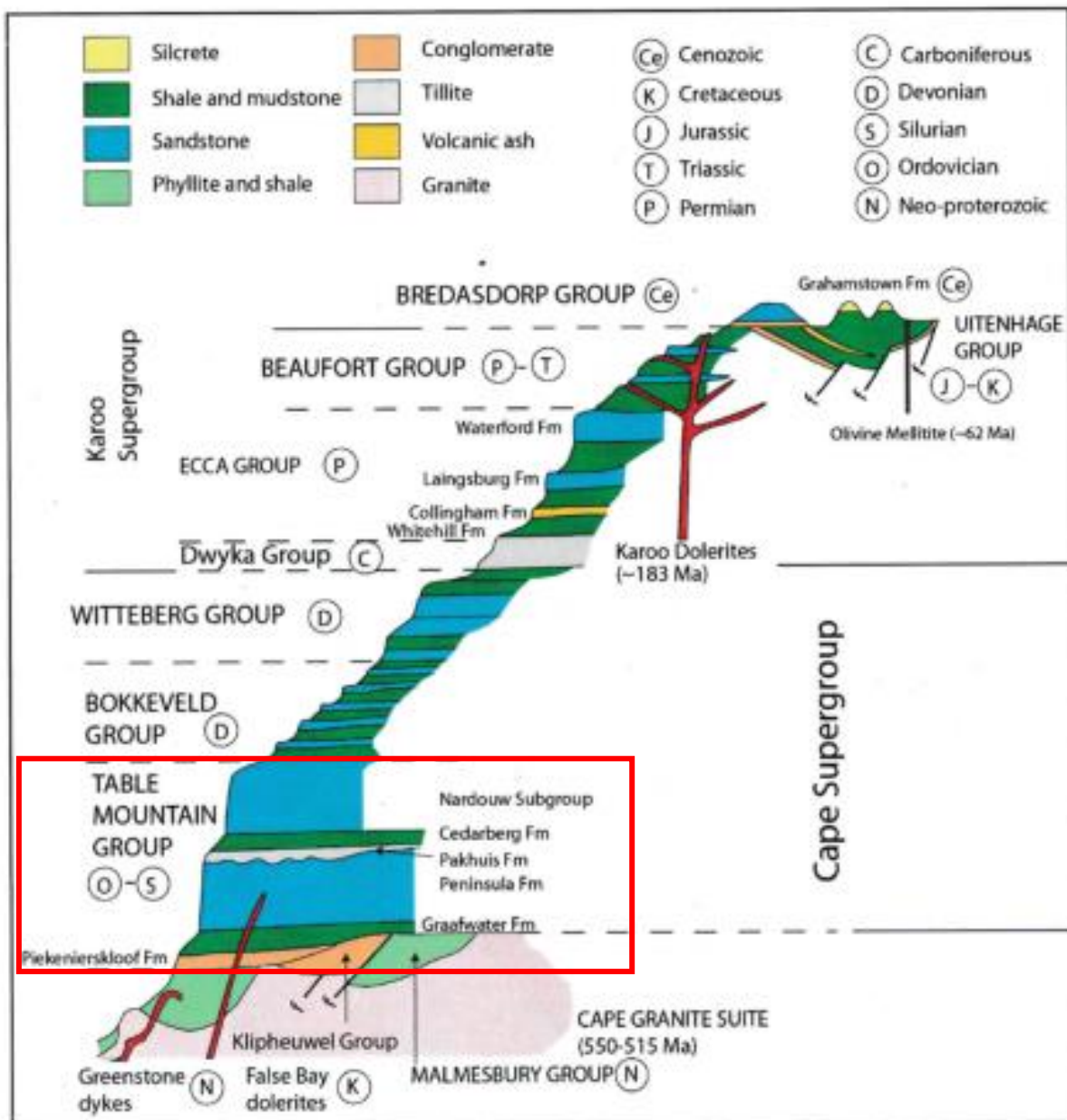


Figure 1. Schematic stratigraphic profile of the Western Cape. The Table Mountain Group Formations are contained in the box.

Source: J Malan and J Viljoen – Field trip guide, 2016.

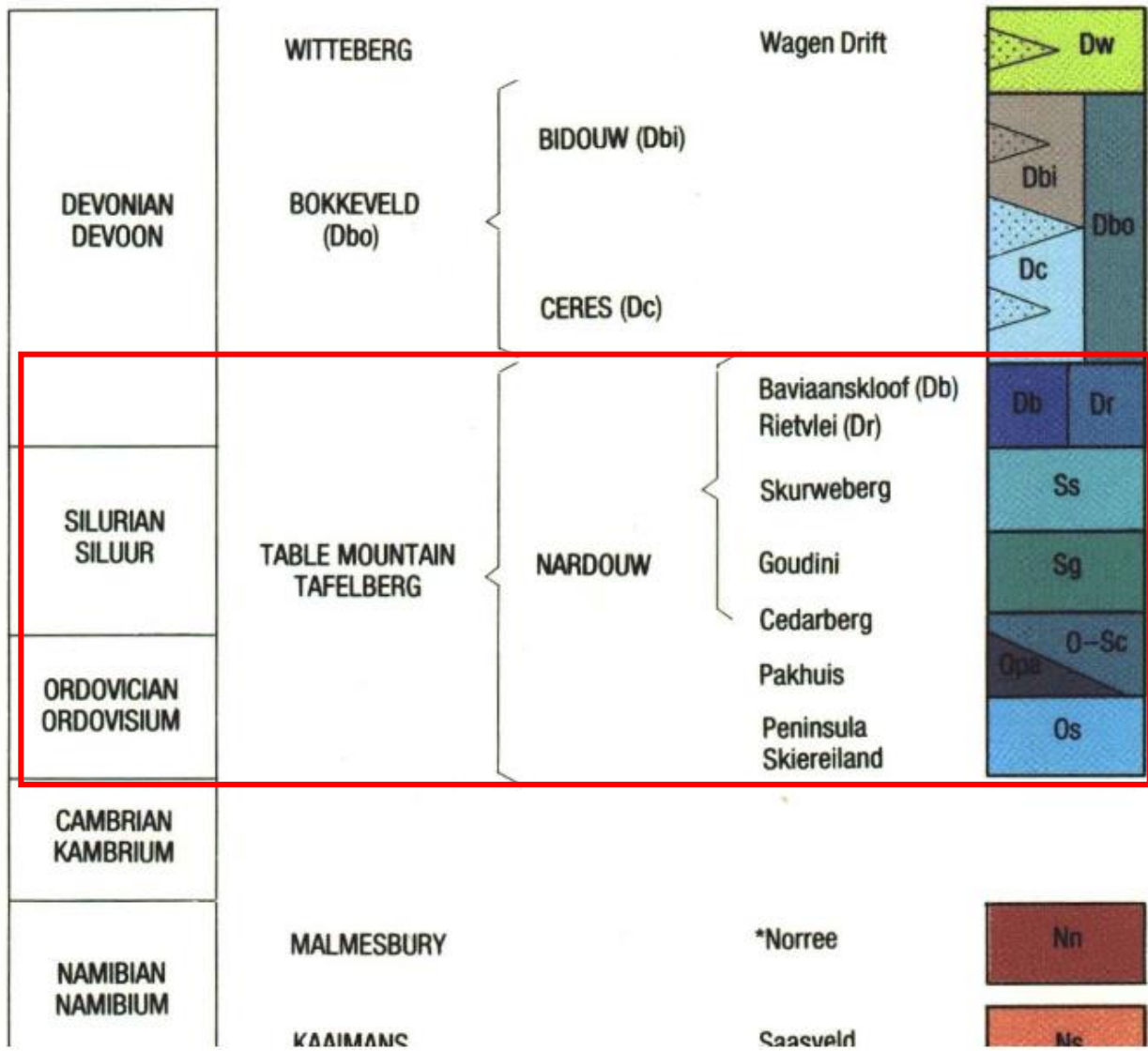


Figure 2. Part of the geological column in the Study Area. The formations of the Table Mountain Group are contained in the box.

Source: Legend of the Riversdale geology map at 1:250,000, 1993.

The lithology of the TMG Formation is briefly described below:

(Modified from various sources, mainly from Whittle-Herbert, MSc Thesis 1990: Deformation Structures in the Table Mountain Group centred on Vogelgat Nature Reserve, Hermanus).

Table Mountain Group (TMG) of the Southern Cape is deposited unconformably on Precambrian-Cambrian metamorphic sediments. The TMG in the Study Area consists of six formations: Peninsula, Pakhuis, Cedarberg, Goudini, Skurwegberg and Rietvlei (the latter four formations comprise the Nardouw sub-group).

The Peninsula Formation, of the Early Ordovician, is a quartz arenite complex. The mature, cross bedded sediment is attributed to high energy current and strong winnowing processes on a stable but slowly subsiding shelf.

The Late Ordovician is characterised by a glacial event in the Cape Basin. Diamictites (rocks that consists of unsorted to poorly sorted terrigenous sediments (derived from the erosion of rocks on land) containing particles that range in size from clay to boulders) and tillites (rocks made up of sediments that were carried or deposited by glaciers and later cemented) of the Pakhuis Formation are products of the glaciation. Sediments of the Pakhuis Formation are regionally associated with soft sediment deformation and erosion of the underlying Peninsula Formation.

Deposition of the Cedarberg Formation followed the retreat of the ice sheets. The Cedarberg Formation consists of thinly laminated shales and rare lenses of siltstones.

Quartz arenites of the Nardouw Subgroup transgressively (resulting of the sea flooding the coastal areas) overly the Cedarberg Formation. Fine-grained sandstones interbedded with purple shales of tidal origin, make up the Goudini Formation.

The Goudini Formation conformably overlies the Cedarberg shales. The sandstone beds are generally thinner than Peninsula sandstone beds (<1.0 mm thick) and are planar and trough cross-bedded in places. The sandstone is medium to coarse grained, white to dark grey and frequently interbedded with lenticular units of up to 40cm of purple shale.

The Skurweberg Formation is composed of mainly braided fluvial pebbly sandstones with thin subordinate mudrocks, especially in shallow marine – lacustrine (characterised by lakes) environments.

The TMG Formations crop out in the south, middle and north of the Study Area, in four areas, namely From SW to NE (Figures 3 to 6):

1. Agulhas (Field Note C2b)
2. Bredasdorp (Field Notes C2c1, C2c2 and C2c3)
3. Arniston (Field Notes C2d1 and C2d2)
4. Potberg (Field Notes C2e1, C2e2 and C2e3)

The Formation names and symbols used in this Desk Note and in the following Field Notes are taken from the available geological maps by J Malan (3420CA&CC field sheet, 1:50,000,1984), MAG Andreoli et al (PIN 1133 – GEA 845, 1:50,000, 1988) and J Malan et al (3420 Riversdale, 1:250,000,1993).



Figure 3. Satellite image showing the locations of the TMG outcrops in the Study Area:
1 – Agulhas; 2- Bredasdorp; 3 – Arniston; 4 – Potberg.



Figure 4. Geology map (3420 Riversdale) showing the locations of the Agulhas outcrops (blue).



Figure 5. Geology map (3420 Riversdale) showing the locations of the Bredasdorp outcrops (black arrows) and the Arniston outcrops (red arrows). The dark blue colour represents TMG Formations. (The light blue represents Bokkeveld Formations).

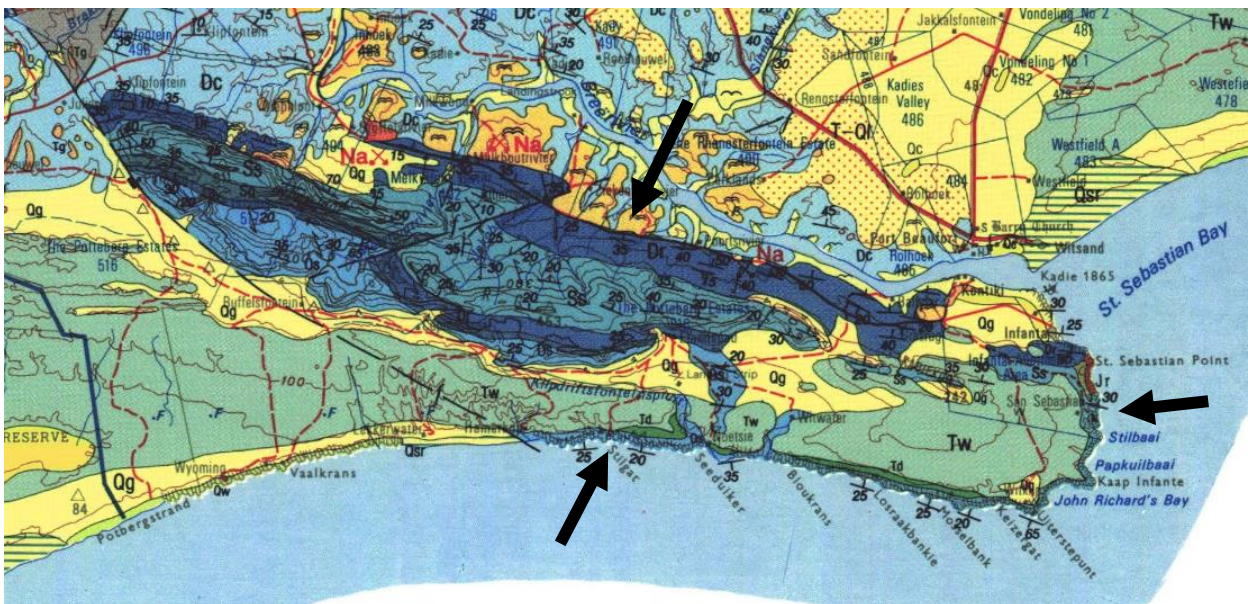


Figure 6. Geology map (3420 Riversdale) showing the locations of the Potberg outcrops (arrows). The dark blue represents TMG Formations. (The light blue represents Bokkeveld Formations).