C. GEOLOGY

Field Note C6a. Enon Formation - Soutpansvlakte Basin

The Enon Formation (of the Uitenhage Group) was deposited along the southern section of South Africa during the break up of Gondwana when there was widespread erosion of the rocks comprising the Cape Fold Belt. It is considered to be Late Jurassic to Early Cretaceous in age, some 145 ma ago (Figure 1).

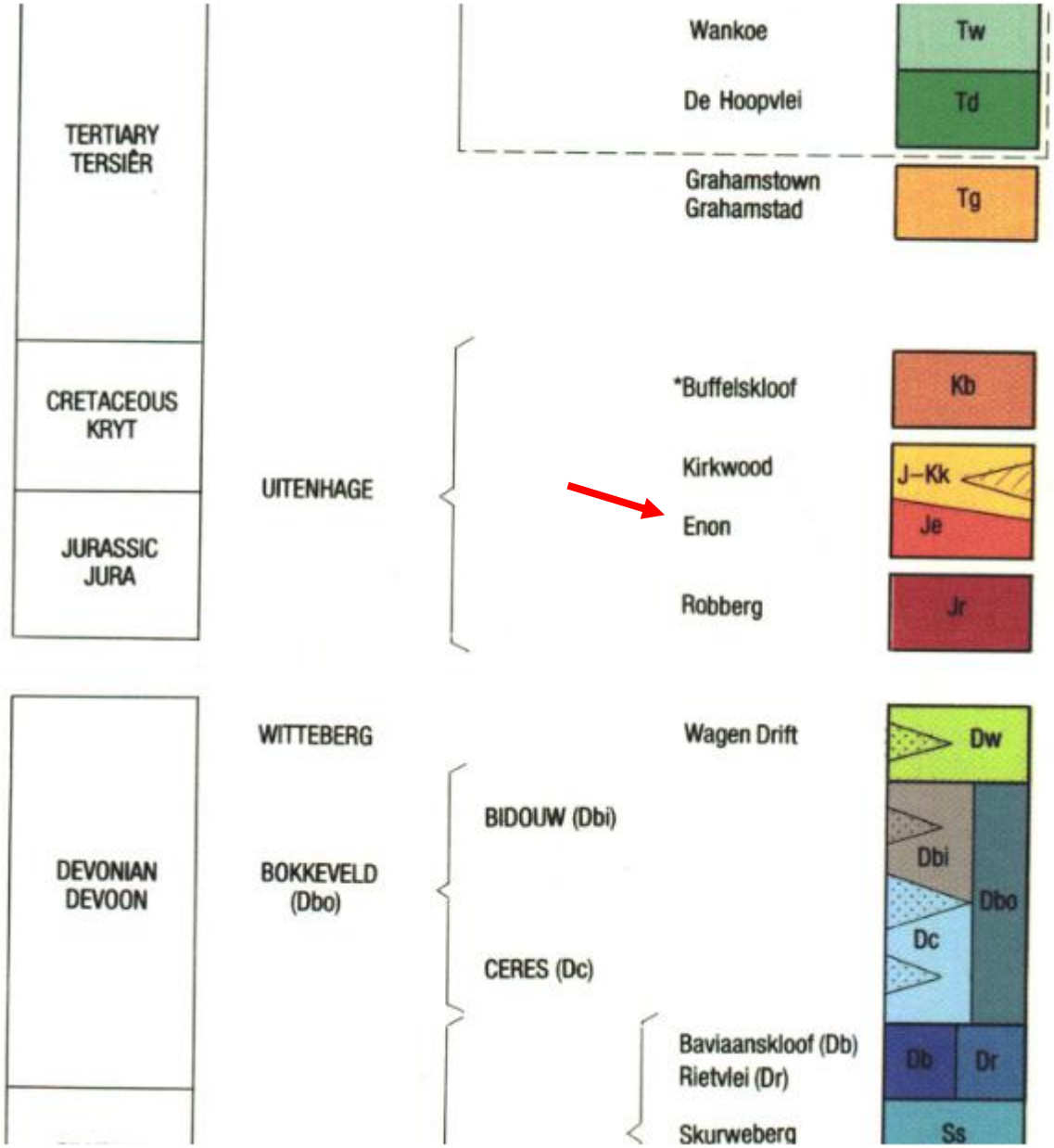

Figure 1. The location of the Enon Formation (arrow) in the geological column.

The Enon Formation was deposited about 250 million years after the deposition of the Bokkeveld Formations, when the latter have already been very well eroded. In the South Western Cape, it is thus found on the Bokkeveld shale hills and in channels and valleys, which were cut into them.

Two basins in the study area are recognised as Enon Basins. The southern is the 'Jubilee Hill Basin' (Figures 2 and 3) and the northern is the 'Soutpansvlakte Basin' (Figures 4 and .

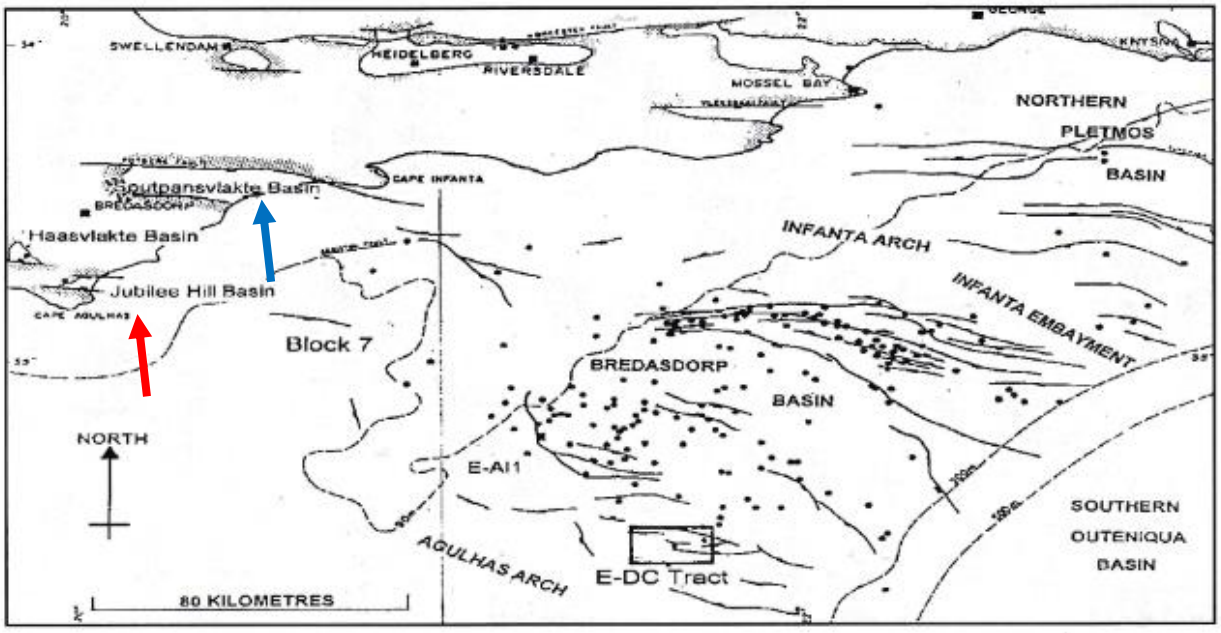

Figure 2. Study Area offshore paleogeography. Red arrow points to the Jubilee Hill Basin; blue arrow points to the Soutpansvlakte Basin, named so by J Malan and J Theron in 1987.
Source: J Malan and J Viljoen, Field Trip Guide, 2016.

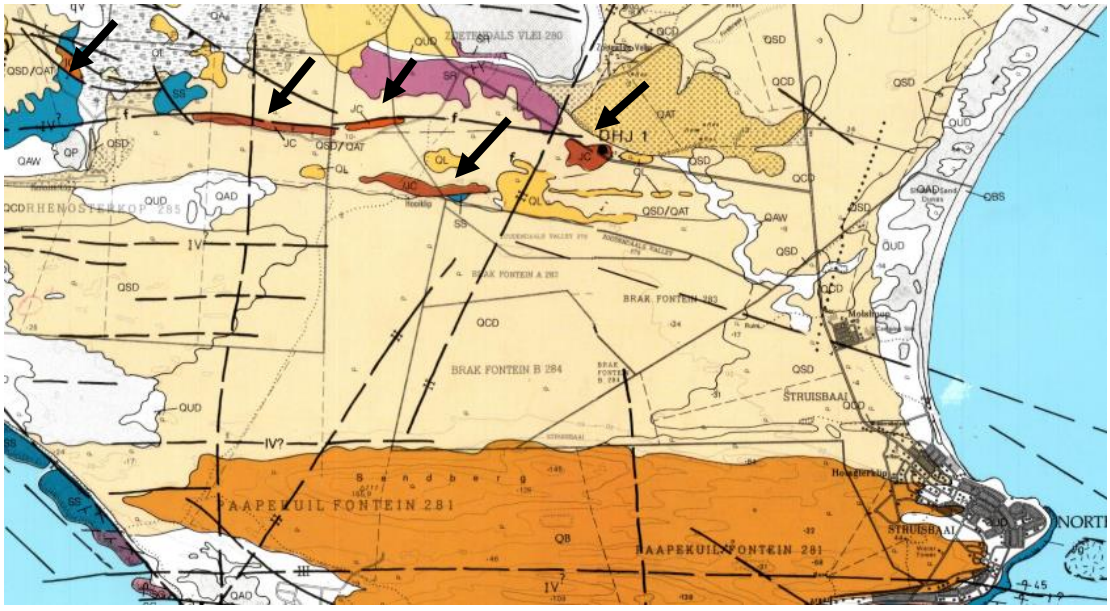

Figure 3. Geology map (MAG Andreoli, 1989) of the area north of Struis Bay. Arrows point to the Enon Formation outcrops, within the Jubilee Hill Basin.

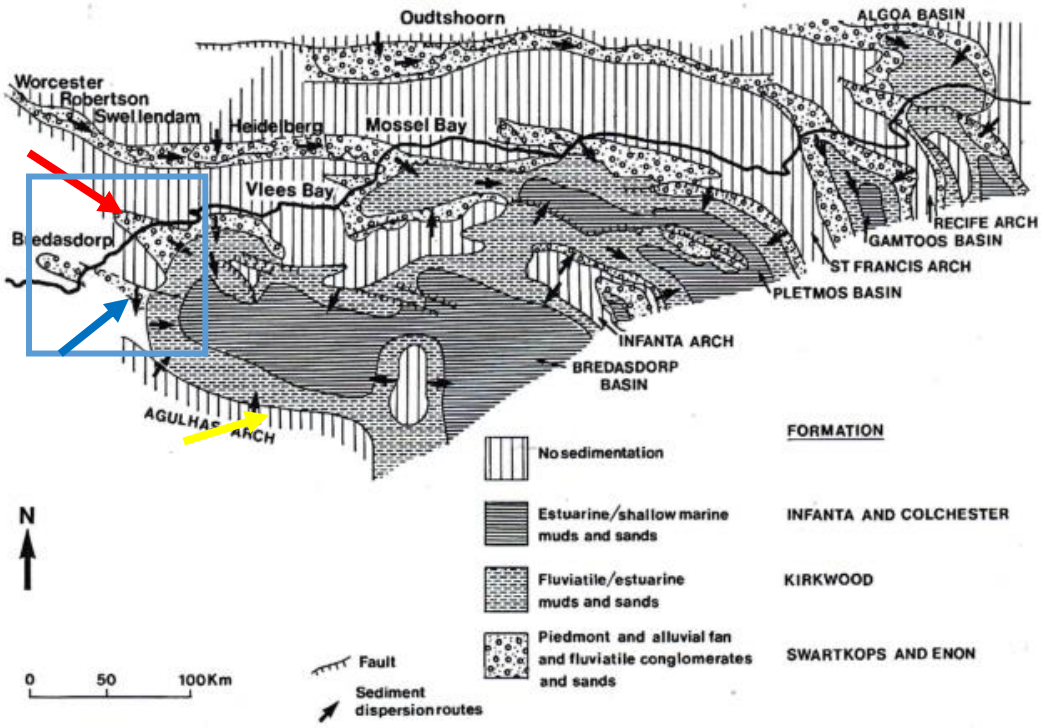

Figure 4. Palaeogeography map of the basins off the south coast of SA for the late Jurassic / early Cretaceous times. The blue box indicates the section enlarged in Figure 5. The red arrow points to the Soutpansvlakte Basina and the blue arrow points to the Jubilee Hill Basin, both at the north-western tip of the Bredasdorp Basin (yellow arrow).
Source: Dingle et al, 1983. Mesozoic and Tertiary geology of Southern Africa.

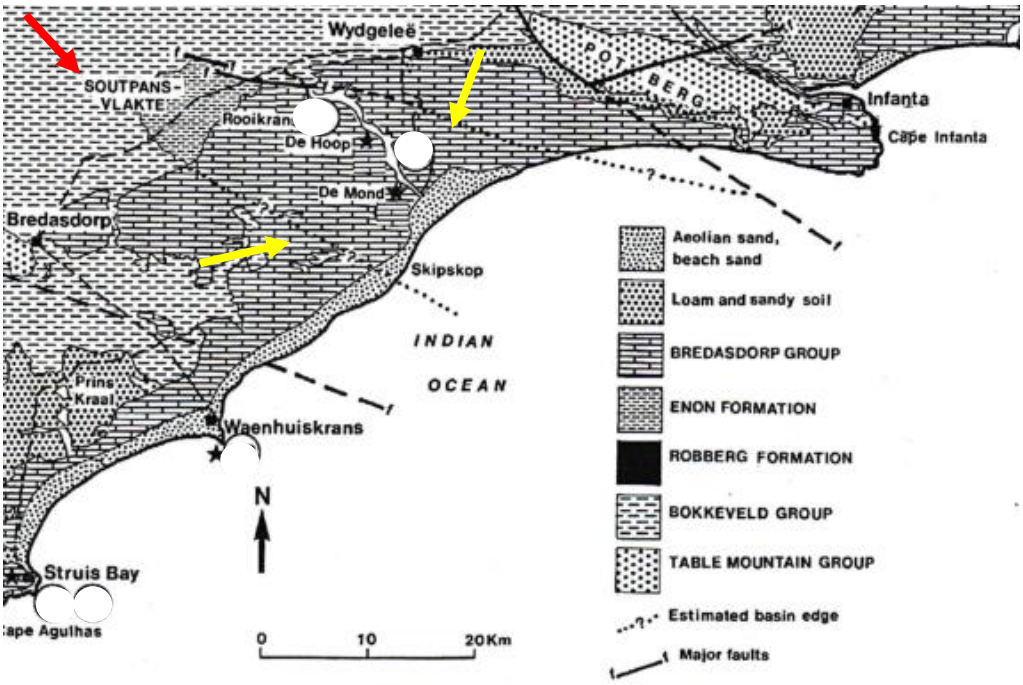

Figure 5. The Enon Basin, underlying the Hard Dunes, is defined by two inferred NW-SE trending faults (yellow arrows). The northwestern tip of the basin, NW of the Hard Dunes, and where Enon sediments are exposed, is the Soutpansvlakte Basin (red arrow).
(Source: J Malan and J Viljoen, 2016: Southern Cape Geology: Evolution of a Rifted Margin. 35th International Geological Congress, Cape Town. Field trip guide.

The Soutpansvlakte Basin is flanked on the southeast by the Hard Dunes, and on all other sides by the Shale Hills (name given by the author, Chapter S) of the Bokkeveld Formations. The Enon Formation deposits are exposed in the Soutpansvlakte Basin and in areas east of the basin and along the Salt River Gorge (Figures 6 to 8).

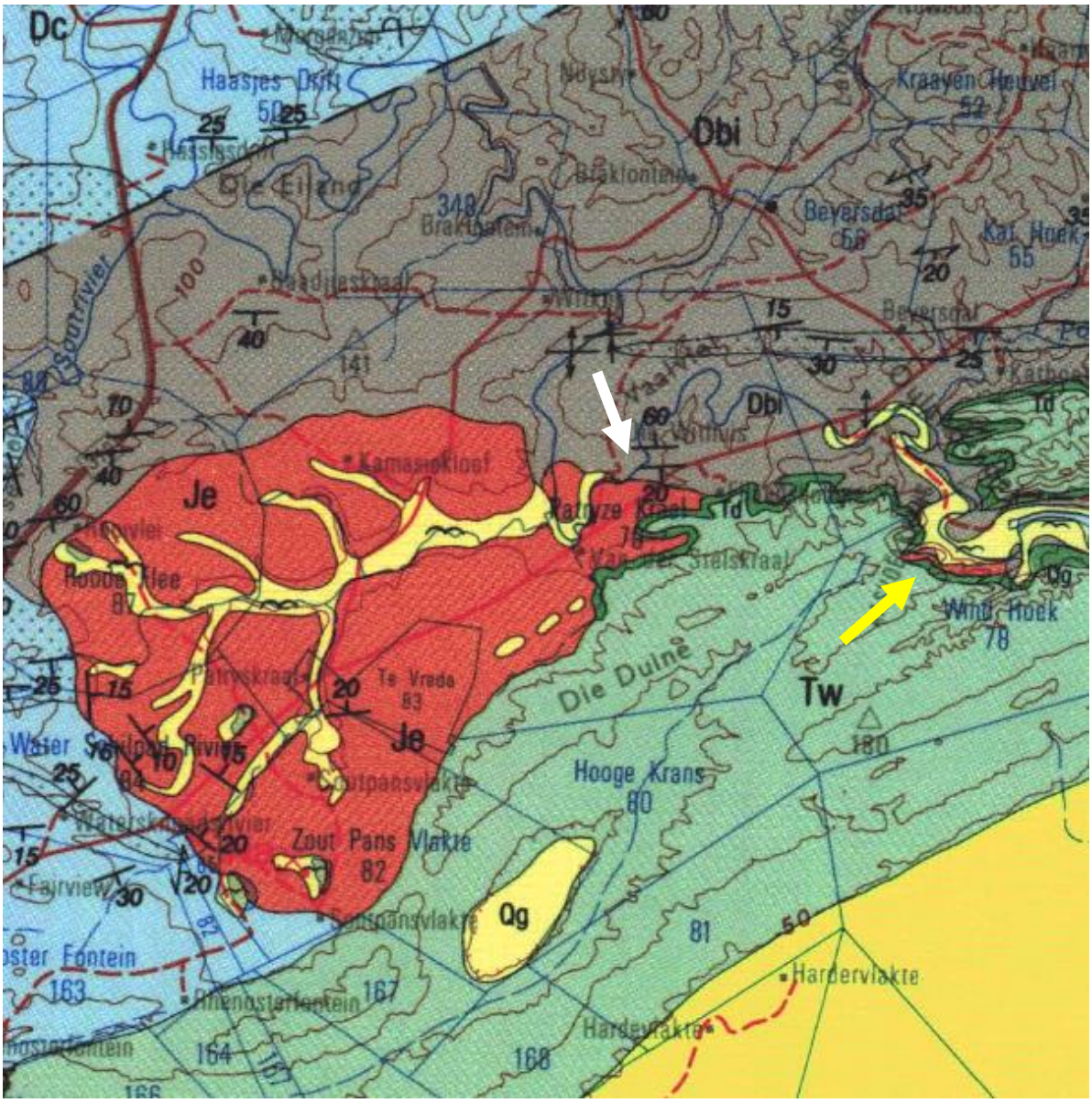

Figure 6. Geology map (Riversdale sheet, 1:250,000, 1993) showing the locations where the Enon Formation sediments are exposed in the Soutpansvlakte Basin (red), drained by the Waterskilspads River (yellow within the red), which flows to the Salt Rver (white arrow), and along the Salt River Gorge (yellow arrow). Small Enon Formation outcrops are located within the De Hoop Vlei Gorge, farther to the south east.

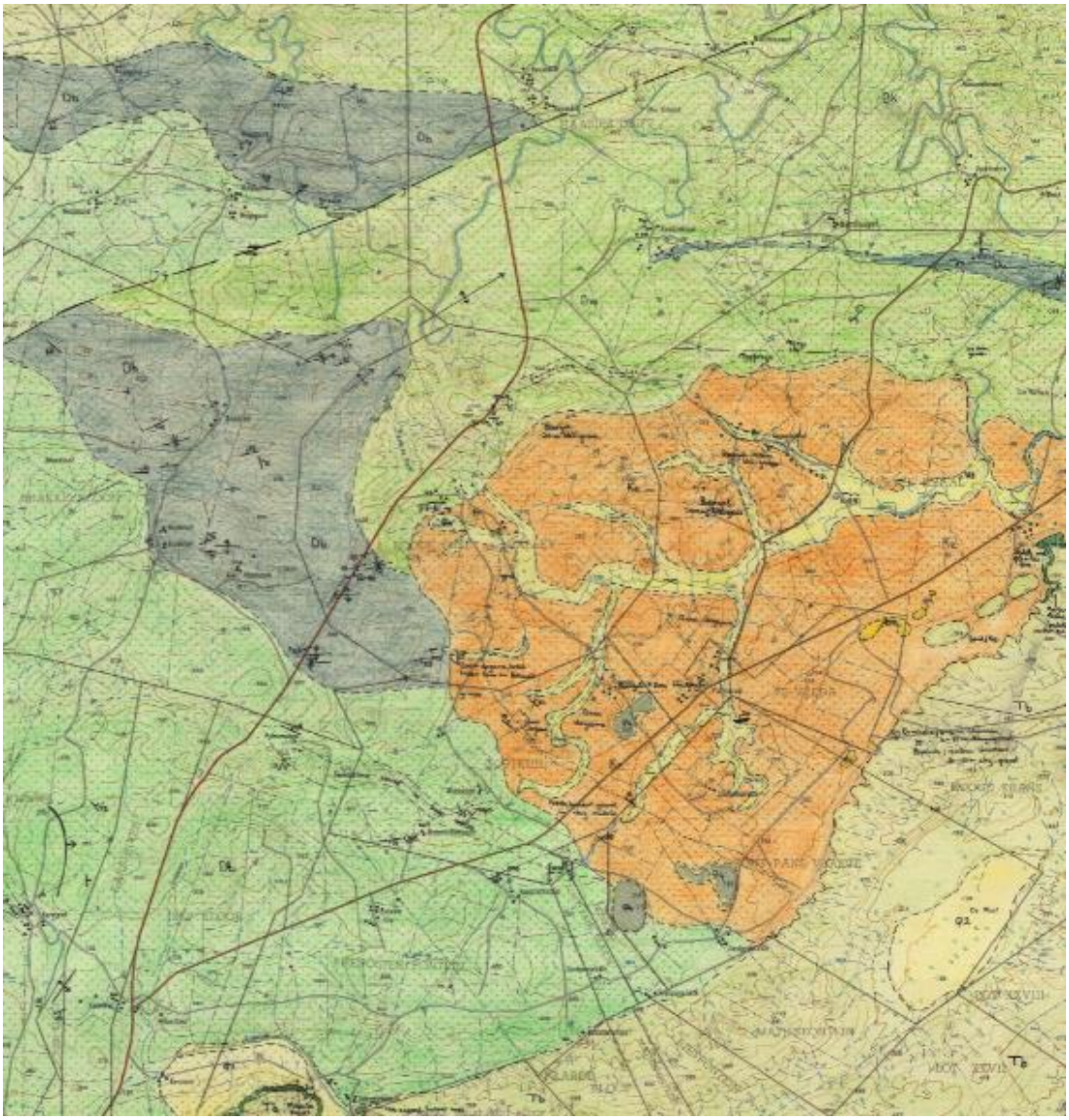

Figure 7. Geology map (field sheet 3420 AD 1:50,000, 1984) showing the Enon Formation deposits (orange) in the Soutpansvlakte Basin.

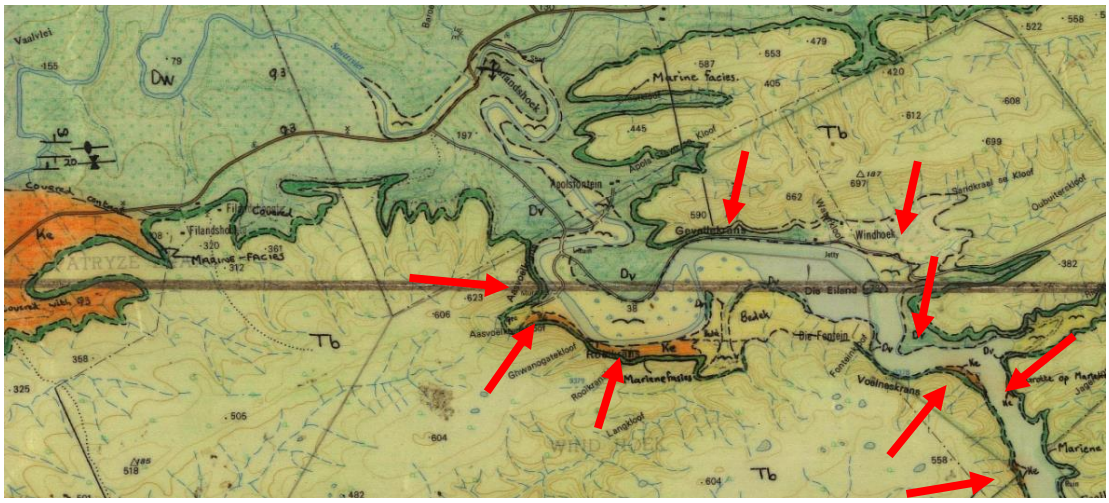

Figure 8. Geology map (Malan's field sheet 3420AD 1:50,000, 1984) showing the Enon Formation outcrops (orange) within the Salt River and De Hoop Vlei Gorges (arrows).

The Soutpansvlakte Basin is flanked by the Hard Dunes on the southeast and by the Bokkeveld shale hills on all other sides (Figures 9 and 10).

Figure 9. The southern part of the Soutpansvlakte Basin. View from the west. Shale hills are seen at a distance.

Figure 10. The southern part of the Soutpansvlakte Basin. View to the southeast on a tributary of the Waterskilpads River (dry in this photograph and during most days of the year), which drains the basin. The Hard Dunes are seen at a distance.

A clear contact between the Bokkeveld Formations and the Enon Formation is located in a tributary of the Waterschilpad River, on the west side of the basin (Figure 11).

Figure 11. Top and bottom. Enon Formation gravel on the western side of the Soutpansvlakte Basin. The dashed line demarcates the contact with the underlying Bokkeveld shales.

The author noticed that the Enon Formation deposits in the east end of the Soutpansvlakte Basin extend slightly differently to the extent, which was mapped in 1984 (Figure 12). For Enon Formation deposits cover east of the Soutpansvlakte Basin, see Field Note C6b.

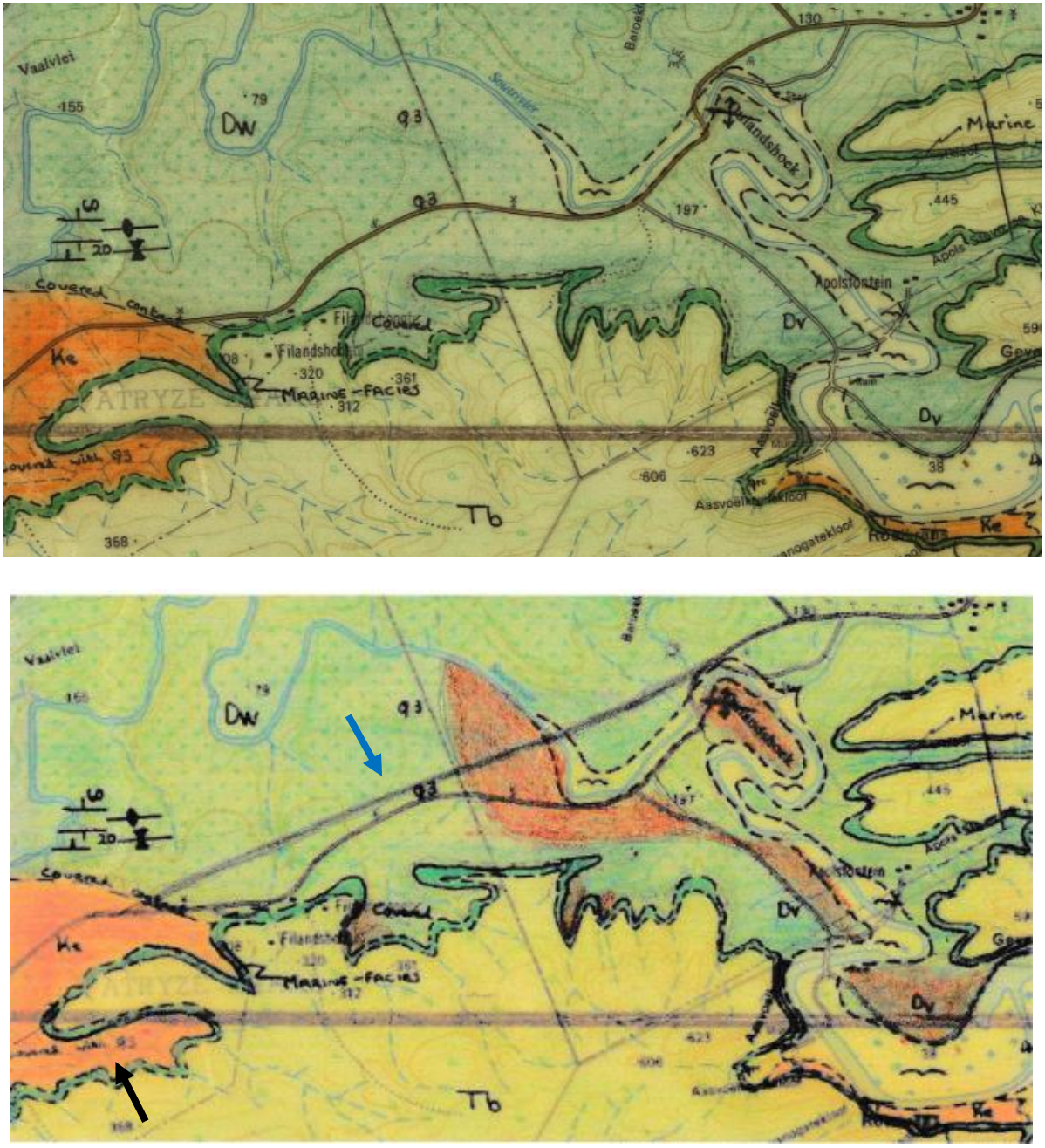

Figure 12. Geology maps of the east end of the Soutpansvlakte Basin. Top – mapped by J Malan, 1984. Bottom – Enon Formation deposits (orange), mapped by the author, 2020; black arrow points to a kloof, which is not covered with Enon deposits, but with the red, loose sand of the Wankoe Formation (see Field Note C9c and Chapter W); blue arrow points to a section of the road Bredasdorp - Malgas, which was constructed after the publication of Malan's map.

Some of the hills in the north of the basin (Bokkeveld shale hills) have no, or only little, Enon Formation deposits cover (Figure 11). Further studies are required to exactly map the distribution on the Enon Formation in and around the basin (see Chapter W).

