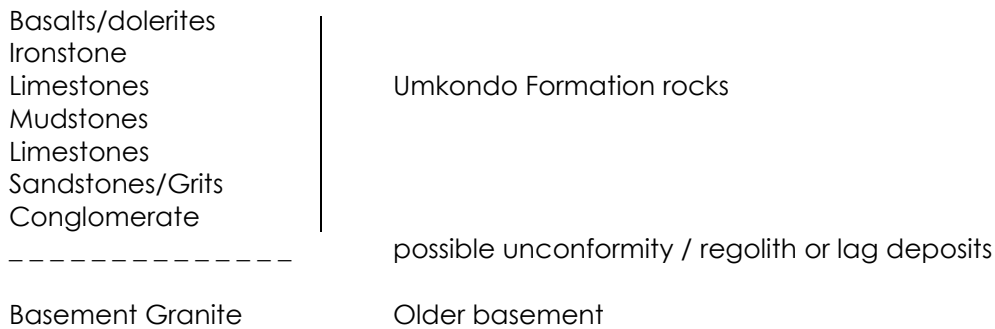


A Geological Summary of the Chiadzwa Diamond Fields

The oldest rocks in the area are the basement granites. They are in turn overlain by the younger Umkondo Formation sediments, which have undergone various degrees of deformation and metamorphism. The entire thicknesses of these sediments and the capping dolerites, is still unknown. The stratigraphic sequence of the rocks in the area can be summarized as follows (with the oldest rocks at the bottom);



The Umkondo sediments were deposited in a large basin over a period of time. The different sediments are a time capsule that depicts the nature of the environmental and climatic conditions prevailing at that period in time. The basal conglomerate and the overlying sandstones and grits, show a period of high energy activity, whereby the river systems brought in a lot of eroded materials into the basin, that was later deposited at the base. On the other hand, the ironstones and limestones, being precipitants, show a period where there was very little high energy and no depositional processes from river systems were occurring. Instead the climatic conditions and the basin chemical compositions allowed the precipitant formation of the ironstones and the limestones, albeit at different times,

Basalts/Dolerites

Dolerites and basalts result from volcanic extrusion processes. Most hills within the concession areas are comprised of the Umkondo sediments that are capped at the top by dolerites. The dolerites weather into rounded boulders or chunks of rocks. The roundness of the chunks or boulders is not in any way a result of water channel erosion effects, but primarily is a natural denudation characteristic called "onion skin peeling", where the outer crust of the rock continuously peels off by natural weathering processes.

Ironstone

Ironstones are precipitants formed within Fe rich basins. The ironstone formed within the Umkondo series is not banded but forms a solid mass. Although no known chemical analysis has been done, the ironstone shows a dark colour and solid massive characteristic, which may indicate that the Fe content may be very high.

Limestones

Like ironstones, limestones are also chemical precipitants, which formed within the basin during a period when there was a high content of calcium carbonates (CaCO_3). Chemical alteration of the limestones (addition of silica) can result in the rock turning into a dolomite.

Mudstones

These are fine to very fine grained rocks formed also during periods of river system deposition. However, unlike the conglomerates and sandstones/grits that show high energy, the mudstones were formed at the end of the high energy cycle of the river systems, where the materials forming the mudstones were carried mostly in suspension.

Basement granite

These are the oldest rocks in the area and are not part of the Umkondo series. They form the base of the basin, onto which the Umkondo sediments were deposited.

Diamonds and the different environments of occurrence

There must have been a period of erosion of the kimberlites/lamproites after they were emplaced and prior to the deposition of the Umkondo sediments. Some of the eroded diamonds from the kimberlites/lamproites were then deposited into the basal conglomerate of The Umkondo formation. It is believed that through processes of weathering and denudation, some of the diamonds within the conglomerate have now been released into the surrounding environments and now found in scree, rubble, lag material just above the basement granite and alluvial sediments confined to stream channels. The diagram below is a schematic depiction of the different environments in which the diamonds occur.

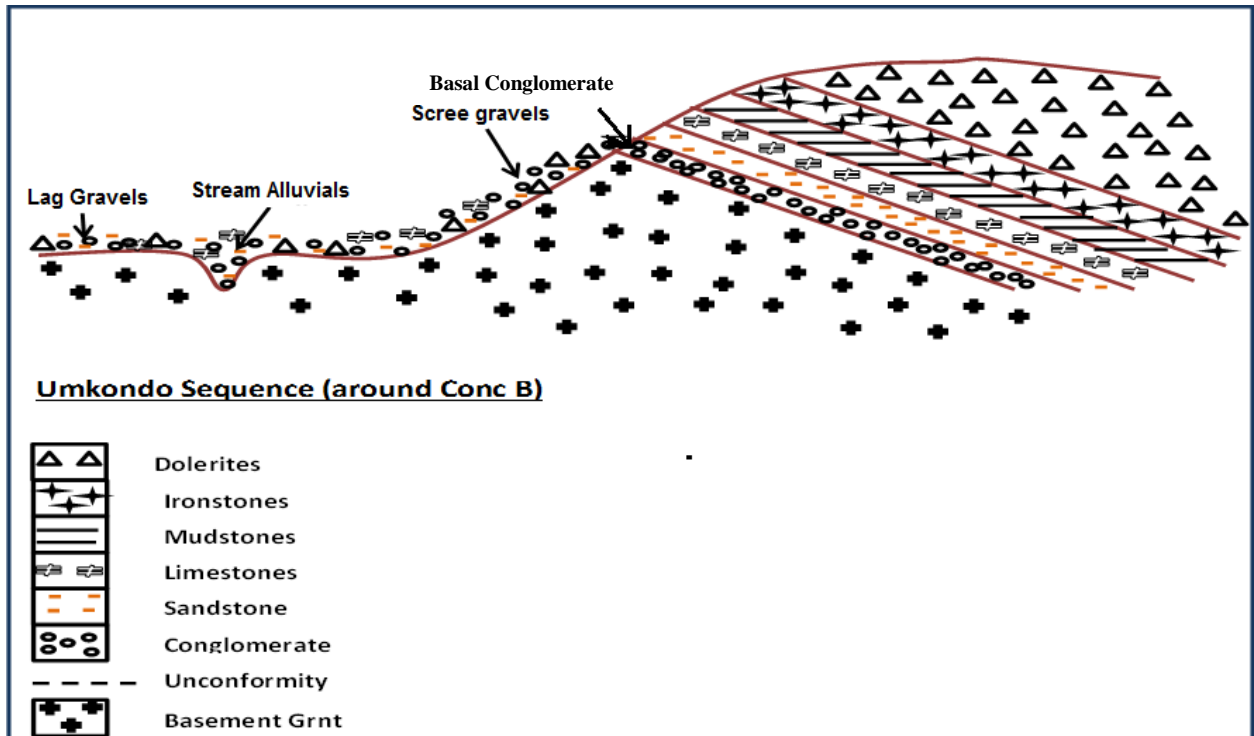


Figure 1: Schematic diagram showing the different environments in which the diamonds occur within the Chiadzwa concessions.

- Scree / rubble – this is normally found around some hills surrounding the area. These particular hills are mainly remnants of the weathering resistant portions of the Umkondo sediments. Diamonds are believed to have been released from the conglomeritic sediments of the hills into the hill slopes and low-lying areas.
- Lag material – this is a thin horizon of a regolith or remnant material comprised of various types of rock fragments, cobbles and some diamonds. It has been concentrated mostly on the current weathering surface by processes of winnowing from wind and flush flood running water. The remnant material will comprise of all the heavy cobbles and diamonds that the wind and running water cannot wash away.
- Alluvial material – the alluvial material is confined to current and palaeo stream channels. It is a result of deposition of heavy cobbles, rock clasts and some diamonds by river or stream water processes.
- Conglomerate – this is part of the Umkondo Formation sedimentary rock sequence. This is believed to have been the first depositional source of the diamonds immediately after erosion from the primary kimberlite sources.