

ABSTRACT OF THE BLOEMFONTEIN BROCHURE

The Bloemfontein map covers an area of approximately 75 000 km² within the RSA boundaries. Mixed farming is the main agricultural activity, although the cultivation of wheat, maize and potatoes, under irrigation from groundwater sources, is practiced on about 2 000 ha in the Petrusburg district and on a much smaller scale in the Koffiefontein, Luckhoff and De Aar districts.

The greater portion of the map area has a semi-arid climate of hot summers and mild to cold winters. The Orange River basin is by far the largest river basin in south Africa with a total catchment area in the order of 1 000 000 km² of which almost 600 000 km² is inside South Africa. The two largest storage reservoirs in South Africa, namely the Gariep Dam and the Vanderkloof Dam are located on the Orange River and both of them feature on the map.

The area is mainly underlain by sedimentary rocks of the Karoo Supergroup which have been intruded by numerous dolerite bodies. Pre-Karoo rocks cover only small areas along the northwestern boundaries of the map area.

Two aquifer types occur in the map area, namely the **fractured and intergranular**, and **fractured** regimes.

- **Fractured aquifer types:** Here, groundwater is contained mainly in fractures, joints, fissures including the important jointed transitional zone between the decomposed and solid rock components and on bedding planes.

The fractured regime is represented by the Dwyka Group, Ecca Group and portions of the Tarkastad Subgroup of the Beaufort Group south of the Orange River.

No meaningful intergranular (alluvial) aquifers have been reported within the map area. However, isolated two-layered aquifers, constituting intergranular (alluvial) aquifers overlying intergranular and fractured aquifers have been described. It can readily be accepted that alluvium can also act as a groundwater recharge medium.

- **The intergranular and fractured** mode of groundwater occurrence is represented by an obscured granite occurrence, the pre-Karoo Allanridge Formation, the Adelaide and Tarkastad Subgroups of the Beaufort Group, the Molteno, Elliot and Clarens Formations, the widespread dolerites and the Drakensberg Group.

A large ring-like dolerite structure, about 15km in diameter, occurs south-east of Reddersburg. The ring-complex has intruded shale of the Adelaide Subgroup of the Beaufort Group, and the structure has in turn been intruded by a number of marginally younger dolerite dykes. A strong spring emerges on the north-western edge of the ring-structure on the farm Mostertshoek. The strong spring Yields between 20 l/s during dry periods and up to 40 l/s during wet periods. The dolerite in the vicinity of the spring is well-decomposed, has high permeability, and a recharge value of about 8% of annual precipitation has been calculated for this feature.

Due to the largely rural nature of the area and the lack of heavy industry and mining, groundwater in the map area is generally unpolluted. Limited saltwater intrusions occur at localities situated within the sphere of influence of salt pans.

Groundwater, in contrast with surface water, has a major disadvantage when it comes to management: it is largely concealed. The depletion of a groundwater source would thus often come as a surprise if the groundwater-level is not monitored. Groundwater monitoring, whether it be water-level, abstraction, or quality monitoring is an essential element of groundwater management. Periodic groundwater monitoring should be practiced as a matter of routine, especially in cases of large scale abstraction. It is also important to keep records of measurements in order to render the evaluation and interpretation of the data ore meaningful.

Being located in Bloemfontein, the Institute for Groundwater Studies (IGS) warrants mentioning. The IGS at the University of the Free State was founded in 1974. To date more than 200 postgraduate students from South Africa and 14 other African countries have qualified in Geohydrology at this institution.