

Geology

The Greater Fish River Canyon Landscape stretches from the Orange River in the south (where it borders onto the Richtersveld National Park in South Africa) to the Naute Recreational Resort in the north. In the west it borders onto the Sperrgebiet National Park, thereby creating a vital corridor of land between the Ai-Ais and Sperrgebiet National Parks, and in the east it reaches the top of the Klein Karas Mountains.

The landscape encompasses a vast diversity of landscapes, topographic features and habitats. The geology of the area ranges from relatively young rock formations of the Karoo and Nama Groups (200 and 550 million years old respectively, to rocks of the Namaqua Metamorphic Landscape (about 1,200 million years), to some of the oldest rocks known, along the Orange River valley, which are over 2,000 million years old. The geology is highly visible and accessible. The key topographic features including the Fish River Canyon, the Konkiep valley, the Orange River valley, the Huns Mountains and the Klein Karas Mountains. Between these are an array of rocky and sandy plains, rocky hillsides, plateaus, drainage lines, incised valleys and ephemeral river courses.

In terms of landforms, the landscape falls on the transition of the “high mountains of the escarpment” and the “foothills and slopes of the plateau country”, having elements of both. The drainage is virtually all to the south, into the Fish and Orange River system.

Situated some 80 km west of Grünau, the Fish River Canyon starts about 30 km upstream of Ai-Ais Hot Springs and winds its way more than 50 kilometres to the main view point on Farm Hobas. Although a mere trickle during the dry season, the Fish River over millions of years has managed to cut a 160 to 550 m deep gorge through both the flat-lying Nama sediments of the Huns Plateau and the underlying deformed and metamorphosed gneisses of the Namaqua Complex, which can be easily distinguished in the canyon walls. Second in size and grandeur only to the Grand Canyon of the Colorado in Arizona (USA), it is a [National Monument](#), as well as one of the most popular tourist attractions in southern Namibia.

Geological History

The Namaqua Complex originated as layers of sediments and volcanic rocks deposited more than 1800 million years ago in a shallow sea. After deposition they were buried to a depth exceeding 20 km by the slow accumulation of more sediment. During this process they were intruded by granitic magma and transformed under high pressures and temperatures to gneiss, amphibolite, schist

and granulite (ca. 1200 m. y. ago). Some 770 m. y. ago these metamorphic rocks were invaded by doleritic magma which formed prominent dark dykes that can be seen in the canyon walls. Another 300 m. y. later the Namaqua rocks once more became exposed on the Earth's surface through erosion of the overlying strata to form the floor of another shallow sea in which the sandstone, shale and limestone of the Nama Group were laid down. As no major phase of deformation or metamorphism followed their deposition, these rocks today are still nearly horizontal and have preserved their original sedimentary structures - thus forming a sharp contrast to the underlying massive Namaqua metamorphic rocks.

Ca. 350 m.y. before present erosion had removed most of the Nama rocks and the initial river valley had formed as a wide depression. During the Dwyka glaciation it was deepened by south flowing glaciers, and eventually filled up by glacial sediments, sandstone and shale of the Karoo Sequence. Today's canyon began to form during post-Karoo uplift of the new-formed African continent. During this period the glacial deposits were nearly completely eroded; the rocks exposed today in and around the Fish River Canyon belong to the Namaqua Metamorphic Complex, with only the lower portion of the Nama Group (sandstone and black limestone) preserved in the vicinity of the Canyon.

Story of a River

The Fish River rises between Rehoboth and Maltahöhe. For the first 450 km of its course (overall length approximately 650 km) its gradient is comparatively low and it flows within a broad valley. Only ca. 50 km south of Seeheim, downstream of the confluence with the Löwen River, the gradient increases, causing the Fish River to incise more strongly into the underlying rocks. Initially it must have flown slowly over a flat land surface where it could meander freely as shown by its numerous bends, but continental uplift after the break-up of Gondwanaland ca. 130 m.y. ago resulted in the deep incision of the river into this surface to its present day level. At first, it cut through the horizontal layers of the Nama sediments, but later reached the underlying gneisses, amphibolites and migmatites of the Namaqua Complex. The same uplift created disturbances in the earth's crust as evidenced by the bordering faults in the northern upper canyon along which the valley subsided.

While the upper canyon (8 km wide, 160 to 190 m deep) thus is a tectonic trough, the southern lower canyon (5 km wide, 460 to 550 m deep) was simply incised into the Nama and Namaqua rocks. From the first waterfall north of the northernmost viewpoint, to a point opposite the Chudaub trigonometrical beacon, the canyon is 56 km long; the Fish River hiking trail follows the river course for 85km from the main view point near Hobas to Ai-Ais Hot Springs.

Located at the southern end of the Fish River Canyon the recently refurbished Ai-Ais Hot Springs Spa is a veritable oasis in the middle of a grandiose mountain scenery teeming with wildlife and birdlife, which is part of the Ai-Ais/Richtersveld Transfrontier Park. The sulphate and fluoride-rich hot spring, which is supposed to have natural curative properties, was discovered in 1850 by a Nama shepherd searching for his lost sheep (Ai-Ais meaning “burning water” in the local Nama language).

Hot Springs

Along the fault zones forming the canyon sides groundwater rises to the surface to create a number of hot springs. The two best known are Ai-Ais (60°C) and, a little upstream, Sulphur Spring (56°C).

Source: [Ministry of Mines and Energy](#)