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Geoheritage of the Cape Fold Mountains

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The Atlas Mountains in North Africa, and the Cape Fold Mountains in the southernmost part of Africa, represent the only relatively recent well exposed and preserved orogenic fold mountains on the continent. Cape Supergroup rocks which give rise to the mountains, formed in the Agulhas Sea about 550 Ma. The sandy (now quartzitic) rocks of the Peninsula formation form the lowermost unit and are overlain by the deeper water, shale -dominated Bokkeveld Group. The uppermost unit is the quartzitic Witteberg Group, which is overlain by the younger Karoo Supergroup. At 250 Ma, the rocks were compressed, folded and faulted as part of a foreland complex related to a subduction zone of the Gondwana orogeny.

At about 170 Ma, the processes of ocean floor spreading and continental drift resulted in the breakup of the Gondwana continent. Second order fault splays related to the major Falkland Agulhas shear zone developed within and sub-parallel to the Cape Fold Belt as the proto-Indian and proto-Atlantic oceans formed. They formed half-graben structures which filled with clastic sediments derived from the erosion of the Cape Mountains to form the Enon conglomerate formation within Cretaceous and younger sub-basins on the southern flanks of major faults. Examples include the Oudtshoorn Basin flanking the Swartberg Fault, and the Algoa Basin on the southern flanks of the Coega Fault. Subsequent erosion etched out the present landscape with the harder quarzitic rocks forming mountain ranges such as the Cedarberg, Outeniqua and Swartberg ranges. The valleys are largely underlain by the more easily eroded Bokkeveld Group and Enon Formation.

During a long period of stability and deep weathering, an ancient land surface formed on the valley- fill material below the protruding uppermost parts of the resistant quarzitic ranges. Remnants of the largely eroded surface now form mesas capped by hard resistant silcrete which also abuts the quarzitic mountains in many places. The silcrete cap often overlies deeply weathered, mainly Bokkeveld shale altered to an often kaolinitic saprolite.

The spectacular mountain scenery is best appreciated in passes and gorges traversing the mountain ranges. In the latter in particular, the classical structural features of folding and faulting characteristic of the Cape Fold Belt are best seen (Fig. 1). Along the southernmost Garden Route sector of the Cape Fold Belt, an ancient, high-standing (±240m) wave cut platform is developed. This was subsequently incised by coastal rivers along north-south structural zones to form spectacular narrow, steep-sided gorges in the hard quarzitic rocks. The unique Cape Floral Kingdom biome is developed largely on Cape Supergroup and older rock formations, where rock type (and subsequent soil types) together with landscape

and aspect play an important part in determining the type of fynbos that develops.

Figure 1: Folding in Peninsula formation quartzite Seweweekspoort.