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The tectonic evolution of the main gold-producing region of the Barberton greenstone belt, South Africa

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The Sheba and Jamestown Hills region of the Barberton greenstone belt has produced around 12 million ounces of gold since 1884 and accounts for about 85 per cent of all gold recovered in the Barberton Mountain Land, including Swaziland. The gold has mostly been recovered from sedimentary rocks that have behaved in a brittle state in the complexly folded and faulted area hosting three main mines north of the town of Barberton (viz., Sheba, New Consort, Fairview) [1].

Various views have been extended to explain the tectonic evolution of the main gold-producing region of the Barberton greenstone belt. Most of these suggest that horizontal thrusting played a major role firstly in producing a succession of subparallel overturned synclines separated by strike-parallel fault zones, interpreted to be mostly fold and thrust belts. The influence of the Kaap Valley Tonalite Pluton in the deformation of the Sheba and Jamestown Hills areas, has also been variously interpreted. Some views suggest the pluton acted as a resistant mass or buttress against which the stratified formations seen in the Eureka and Ulundi synclines were compressed, buckled and folded [2]. This paper provides an account of the regional structural evolution of the region shown in Fig. 1. Following the deposition of volcanic and sedimentary rocks of the Barberton Supergroup (ca. 3550-3200 Ma, [3]) early NNW-directed compression led to the initiation of regional NE-SW orientated fold and thrust belts [4, 5]. This was followed by the vertical (diapiric) emplacement of granitoid plutons (Kaap Valley and Stentor plutons) that refolded the Sheba Hills area resulting in a domino effect of progressive deformation, including the eastern Jamestown Schist Belt. The Kaap Valley Pluton, in particular, caused synchronous vertical and horizontal tectonism [6]. Southeast-directed horizontal forces led to reactivation and right-lateral displacement along the Barbrook Fault, which acted as a detachment zone and caused complex ductile refolding and brittle fracturing of rocks to the north.

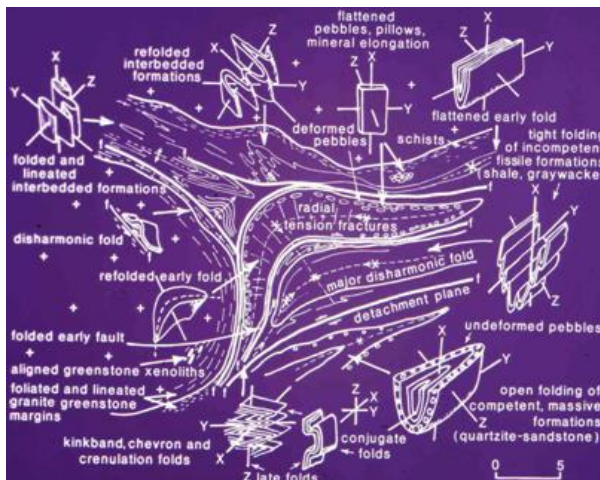


Figure 1: Schematic diagram illustrating the main tectonic elements and strain indicators of the Sheba and Jamestown Hills area of the Barberton greenstone belt [4].

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