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## Structural Development of the Potchefstroom Thrust and Fault System, Witwatersrand Basin, South Africa

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Although the Witwatersrand Basin (Wits) has been researched for well over 100 years, very little is known about the subsurface structures within the basin outside of the mining areas [1]. This project examines a set of 2D reflection seismic data acquired by Anglo Gold Ashanti Ltd. as part of the exploration of the Wits from 1986 to 1993. This project focuses on the area around the city of Potchefstroom known as the Potchefstroom Gap. Within this area the gold bearing reefs of the Witwatersrand and Ventersdorp supergroups are poorly developed or inconsistently present along strike. Truter (1936) proposed a westerly verging thrust/fault based on stratigraphic relationships to account for the loss of ground [2]. However, after 80 years of exploration no cohesive model has been developed for the sporadic presence of well mineralized reefs encountered during drilling.

We herein present the first full structural and developmental model for this region that integrates surface, subsurface and drilling data. This new model revises previous structural interpretations by demonstrating that the Potchefstroom thrust/fault does not exist and illustrates the gap is the result of the complex interaction between three major Neoproterozoic to Paleoproterozoic structures (Fig 1), consisting of 2 south-easterly verging thrusts, and a normal fault downthrown to the south-east. This has resulted in the complete removal of the Central Rand Group west of the normal fault and only partial deposition of the Ventersdorp Supergroup between the thrusts. Also, structures exposed at surface within the Transvaal lithologies may represent a structurally separate system with only sympathetic relationships to the underlying Witwatersrand and Ventersdorp aged structures.

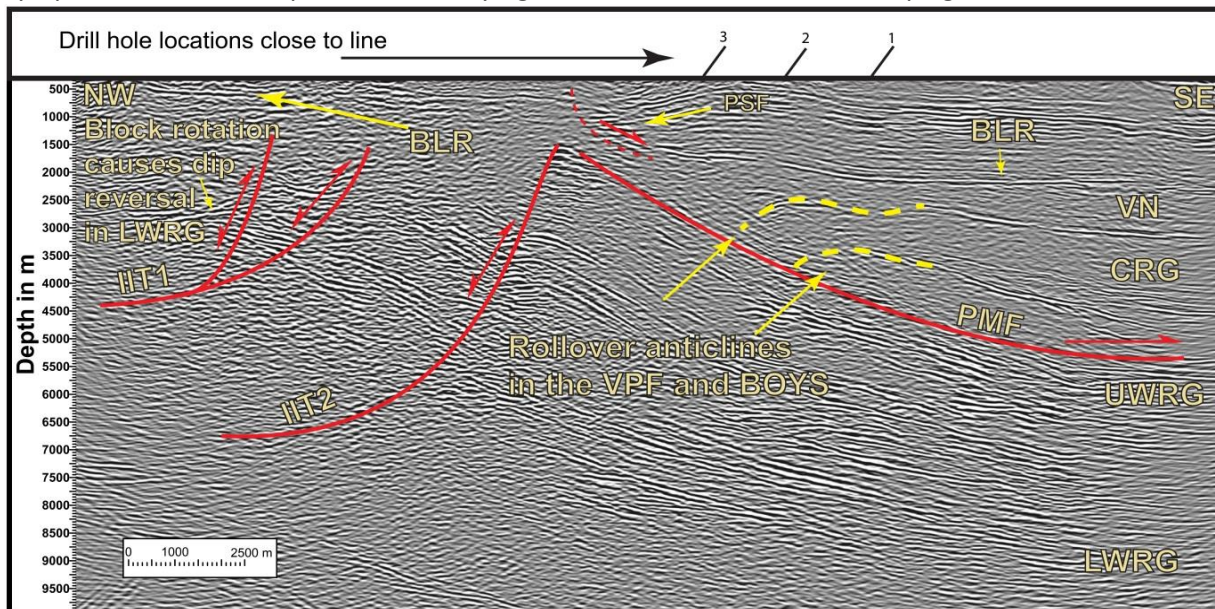


Figure 1: Seismic section across the Potchefstroom study area illustrating 3 major structures. The Potchefstroom Master Fault (PFM) and 2 thrusts IIT1 and IIT2 as well as rollover anticlines within the

*Wits and Ventersdorp Supergroups. BLR= Black reef Formation, VN= Ventersdorp, CRG= Central Rand Group, U/L WRG= upper/lower West Rand Group, PSF=Potchefstroom sympathetic fault.*

*References:*

[1] ] Dankert, B.T., & Hein, K.A.A. (2010). Evaluating the structural character and tectonic history of the Witwatersrand Basin. *Precambrian Research*, 177, 1-22.

[2] Truter, F.C. (1936). Observations on the Geology and Tectonics of a Portion of the Potchefstroom District. *Transactions of the Geological Society of South Africa*, 39, 441-456.

