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The elusive Rayton Formation in the Khayakhulu area; western Transvaal basin of the North West Province, South Africa

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The far western lobe of the Bushveld Complex is underlain by the Rayton, Magaliesberg and Silverton Formations of the Pretoria Group (in descending stratigraphic order). In the Khayakhulu area west of the Pilanesberg Complex, the Magaliesberg Formation quartzite forms high relief areas relative to the adjacent usually low lying and poorly exposed Rayton and Silverton Formation hornfels. Total count radiometric maps can be used to identify the different formations in this area. Naturally, the Silverton Formation has high radiometric counts because of its elevated uranium and potassium concentrations. Samples from outcrops previously mapped as "Rayton" Formation within the zone of high radiometric count have lower Na₂O + K₂O than the typical Rayton Formation [1], suggesting that they are Silverton Formation.

In the published 2526 Rustenburg 1:250 000 scale geological map, the Rayton Formation appears to directly overlie the Silverton Formation in the eastern portion of the Khayakhulu area. This implies that the Magaliesberg Formation is 'missing' here. Outside the study area, the Magaliesberg Formation is continuous indicating that localised non-deposition was unlikely. The missing Magaliesberg Formation can be explained by structural means. Bushveld related intrusions riddled the Silverton Formation, causing it to rise diapirically. The overlying Magaliesberg Formation quartzite, being substantially more brittle than the Silverton Formation, faulted along a north-south anticlinal joint, bringing the Silverton Formation into direct contact with the Rayton Formation.

References:

[1] Reczko BFF (1994) Ph.D. thesis, University of Pretoria.

