



**Structural geological controls on the flow and occurrence of  
groundwater in the basement lithologies of the Limpopo Province,  
South Africa**

**By**

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## **Structural geological controls on the flow and occurrence of groundwater in the basement lithologies of the Limpopo Province, South Africa**

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### **ABSTRACT**

The work for this thesis was conducted on the basement lithologies of the Limpopo Province in South Africa. An investigation into the correlation between structural geology and the flow/occurrence of groundwater was conducted on these lithologies. Field measurements of geological structures were recorded and compared graphically and statistically to existing groundwater borehole data. Data analysis revealed that the structural geology in the basement lithologies of the Limpopo Province of South-Africa does not have a clearly identifiable influence in terms of spatial patterns in groundwater flow and occurrence at a regional scale. Groundwater targets created through weathering rather than tectonics were evidently more easily recognized. Structural controls on groundwater in the granitic aquifers from this specific area are not totally negligible, although it is believed that such influences will be better identified through intensive local scale investigations. As drilling for groundwater is an expensive practice, the knowledge gained through this study and the possibility of a correlation between groundwater flow/occurrence compared to structural geology might improve the odds of finding groundwater for the communities and farmers in the area.

## **Die struktuurgeologiese kontrole op die vloei en voorkoms van grondwater in die vloergesteentes van die Limpopo Provinsie, Suid-Afrika**

Deur Konstant Johannes Petzer

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### **OPSOMMING**

Hierdie tesis se veldwerk was uitgevoer op die vloergesteentes van die Limpopo Provinsie in Suid-Afrika. 'n Ondersoek rakende die verwantskap tussen struktuurgeologie en die vloei/voorkoms van grondwater was geloods op die bogenoemde litologieë. Veldopnames en meetings van geologiese strukture was grafies en statisties vergelyk met grondwaterdata van bestaande boorgate. Data-analise het bewys dat die struktuurgeologie van die vloergesteentes in die Limpopo Provinsie van Suid-Afrika nie 'n duidelik-identifiseerbare invloed i.t.v. geografiese verspreidingspatrone van grondwater op 'n streekskaal het nie. Potensiële grondwaterteikens wat deur verwerking veroorsaak is was makliker identifiseerbaar uit die ingesamelde data. Nietemin kan die invloed van geologiese strukture op die grondwater in die granitiese waterdraers van die area nie geïgnoreer word nie, alhoewel daar geglo word dat sulke verwantskappe beter geïdentifiseer kan word deur intensiewe kleinskaalse ondersoeke. Aangesien boorkostes vir grondwatereksplorasië uiters hoog is, kan die kennis wat uit hierdie studie opgedoen is, asook die moontlike korrelasie tussen die vloei/voorkoms van grondwater en struktuurgeologie die kans op suksesvolle boorgate in die toekoms verbeter vir die boere en gemeenskappe van die area om sodoende minder geld te vermors op die boor van droë gate.



I hereby declare that this thesis is my own unaided work except where referenced otherwise. It is being submitted for the degree M.Sc. Geology at the University of Pretoria, Pretoria. It has not been submitted before for any degree or examination in any other University.

\_\_\_\_\_ Signature of author

Date \_\_\_\_\_



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## TABLE OF CONTENTS

	Page
1. INTRODUCTION: .....	11
1.1 Study area background: .....	11
1.2 Problem statement: .....	14
1.3 Objectives: .....	14
1.4 Scope and limitations of the study: .....	14
1.5 Methodology: .....	15
2. LITERATURE REVIEW: .....	18
2.1. Regional Geology: .....	18
2.1.1. General: .....	18
2.1.2. Kaapvaal Craton: .....	23
2.1.3. Paleoproterozoic Intrusions (3600 – 3200 Ma) and the Pietersburg- and Giyani Greenstone Belts: .....	24
2.1.4. Mesoproterozoic Intrusions (3200 – 2800 Ma) and the Murchison Greenstone Belt (MGSB): .....	26
2.1.5. Neoproterozoic Intrusions (2800 – 2500 Ma): .....	27
2.1.6. The Limpopo Belt (LB): .....	30
2.1.7. Timing of the Limpopo Orogeny: .....	32
2.1.8. The Hout River Shear Zone (HRSZ): .....	33
2.1.9. Dolerite dykes: .....	34
2.1.10. Wolkberg Group: .....	35
2.1.11. Bushveld Igneous Complex: .....	36
2.1.12. Blouberg Formation: .....	36
2.1.13. Waterberg Group: .....	36
2.1.14. Soutpansberg Group: .....	37
2.1.15. Proposed Models for the formation of the Soutpansberg Group: .....	38
2.1.16. Drakensberg Group: .....	38
2.2. Fault and joint analysis: .....	38
2.3. Geological stress and strain regimes in Southern Africa: .....	45
2.4. Previous work pertaining to structural geology's influence on groundwater in the Limpopo Belt: .....	50
3. RESULTS: .....	52
3.1. General: .....	52
3.2. Joints: .....	52
3.3. Faults and shears: .....	66
3.4. Folds: .....	74
3.5. Foliation: .....	76
3.6. Dykes: .....	79
3.7. Summary of strikes/trends: .....	83
3.8. Lithological Contacts: .....	84
3.9. Groundwater flow/occurrence: .....	87
3.10. Surface Drainage Patterns: .....	95
4. CONCLUSION: .....	99



5. SUGGESTIONS FOR FURTHER STUDY:.....	101
6. REFERENCES:.....	102
7. APPENDIX: .....	109



## LIST OF FIGURES

	<b>Page</b>
Figure 1: A Google Earth© image indicating the location of this project's study area.....	12
Figure 2: An average annual precipitation map of the study area, which falls within the Limpopo- (WMA1) and Levuvu/Letaba- (WMA2) water management areas.....	13
Figure 3: A map showing the locations of the district municipalities of the Limpopo Province and the corresponding population of each. Source: The South African Demarcation Board and Statistics South Africa, 2000.....	13
Figure 4: A Geological Map of the Study Area. ....	1
Figure 5: Map of the northern and northeastern sectors of the Kaapvaal Craton and their different granitoid occurrences (from Robb, et al., 2006).....	24
Figure 6: Regional geological map and cross section through the Limpopo Belt, showing the subdivisions, major shear zones and location of northern part of the study area (modified after Bumby & van der Merwe, 2004). ....	32
Figure 7: Aeromagnetic lineament map of the northern part of South Africa an interpreted lineament domains (After Stettler et al., 1989).....	35
Figure 8: A Mohr diagram illustrating the principles of the Coulomb Law of Failure. Modified after Davis and Reynolds, 1996.....	39
Figure 9: Illustrations of the three fault types described in Anderson's Theory, as well as a reverse fault.....	41
Figure 10: An illustration of the relationship between a Coulomb frictional envelope and a frictional sliding envelope on a Mohr diagram. Modified after Suppe, 1985.....	44
Figure 11: Two pairs of conjugate fault sets produced in a three-dimensional strain field.....	45
Figure 12: Vertical integrals, through the model lithosphere, of the tectonic stress tensor (symbols) and of the greatest shear stress (colours), for the preferred model AF-SO- 013 by Bird et al., 2006. ....	48
Figure 13: A map showing the most compressive horizontal principal stress directions ( $\sigma_{1H}$ ) from AF-SO-013, the preferred model from Bird et al., 2006. ....	48
Figure 14: Long-term average (anelastic) strain rates predicted by Bird's (2006) preferred model, AF-SO-013.....	49
Figure 15: A map showing the location of the boreholes that were analyzed in this study and the waypoints recorded in the field while gathering structural geological data. ....	52
Figure 16: Poles to all joint planes.....	53
Figure 17: Density distribution of all poles to joint planes.....	53
Figure 18: Rose diagram derived from the strikes of all joint.....	54
Figure 19: A map summarizing the major strike directions of joints in each 10' x 10' block that yielded field measurements.....	1
Figure 20: Rose diagram derived from the strikes of shallow-dipping ( $0^\circ - 45^\circ$ ) joints.....	59
Figure 21: A map showing the spatial distribution of shallow-dipping joints that were measured. Note that the distribution of shallow dipping joints is not confined to one specific measured area on the map.....	60
Figure 22: Rose diagram derived from the strikes of moderately dipping ( $46^\circ - 79^\circ$ ) joints.....	61
Figure 23: A map showing the spatial distribution of measured joints with moderate dip angles and strikes between W and NW. ....	62
Figure 24: Rose diagram derived from the strikes of steeply dipping ( $80^\circ - 90^\circ$ ) joints.....	63



Figure 25: A map showing the spatial distribution of measured joints with steep dip angles. Steep-dipping joints are the most uniformly distributed spatially throughout the study area. ....	64
Figure 26: A Google Earth satellite image of the eastern margin of the Waterberg Group .....	65
Figure 27: Slightly weathered gneiss with well-preserved joint sets.....	66
Figure 28: Rose diagram derived from strikes of faults observed in the field.....	67
Figure 29: A map indicating some of the faults in the study area that were observed through an aeromagnetic survey by the Council for Geosciences of South Africa. ....	68
Figure 30: An interesting outcrop of migmatite near the township of Middelwater .....	69
Figure 31: Dextral shear in a banded granitoid.....	70
Figure 32: A small sinistral fault shown by the displacement of a pegmatite vein in.....	70
Figure 33: A map showing a 2.5km buffer around the Hout River Shear Zone (i.e. 5km wide) and the boreholes that fall within that buffer.....	72
Figure 34: An outcrop showing a small part of the HRSZ between the Matok Granite and the Goudplaats Gneiss. ....	73
Figure 35: Density distribution of hinge lineations. ....	74
Figure 36: Rose diagram derived from trends of fold hinges found throughout the study area. ..	75
Figure 37: An example of some small, open, symmetric folds in the Goudplaats Gneiss. ....	75
Figure 38: An example of small folds which formed adjacent to the Matok Granite in .....	76
Figure 39: Density distribution of the poles to foliation planes.....	77
Figure 40: Rose diagram derived from the trends of foliation.....	77
Figure 41: A picture showing strong foliation in gneisses near the Middelwater township.....	78
Figure 42: Rose diagram derived from strikes of dolerite dykes in the study area. ....	80
Figure 43: A map indicating the dolerite dykes and other lineaments that were observed through an aeromagnetic survey of the study area done by the Council for Geosciences. ....	81
Figure 44: A 60cm wide, dolerite dyke with sharp edges (256°, 84° NW).....	82
Figure 45: (A) A dolerite sill with outcrop dimensions of about 60m x 40m (long axis trending 152°). ....	82
Figure 46: A summary of the strikes/trends of structures observed in the field. ....	83
Figure 47: A map indicating the location of the Neoarchean granitoids in the study area and a 1000m buffer (500m inside & 500m outside) around their contacts. ....	84
Figure 48: Groundwater accumulation related to the lithological contacts between Neoarchean granitoids and older basement rocks in the study area. ....	85
Figure 49: (A) An example of a Neoarchean Granite, which only shows a dilatational pressure-release surface, but not any tectonically induced joints. (B) A close-up look at the same granite still doesn't indicate any joints. (C) Some animals use the dilatational cracks in the granite as a shelter.....	86
Figure 50: A map of the interpolated (inverse distance weighted) Logan transmissivity values of the western part of the study area. ....	88
Figure 51: A map of the interpolated (inverse distance weighted) sustainable yield values of the western part of the study area. ....	89
Figure 52: A map of the interpolated (inverse distance weighted) Logan transmissivity values of the eastern part of the study area.....	90
Figure 53: A map of the interpolated (inverse distance weighted) sustainable yield values of the eastern part of the study area. ....	91
Figure 54: A map of the interpolated (inverse distance weighted) Logan transmissivity values of the central part of the study area. ....	92

Figure 55: A map of the interpolated (inverse distance weighted) sustainable yield values of the central part of the study area. ....	93
Figure 56: A Three-dimensional model of the Logan Transmissivities from a part of the study area with a good spatial distribution of boreholes, superimposed onto a corresponding geological map of the area. ....	94
Figure 57: A map indicating the surface drainage patterns of the study area. ....	96
Figure 58: A Google Earth satellite image taken near the Giyani Greenstone Belt showing NNE, NE and lesser NW trending joint sets. ....	97
Figure 59: A three-dimensional illustration and an associated stereographic projection of fault patterns produced in rock subjected to three-dimensional strain. From Reches and Dieterich, 1983. ....	98
Figure 60: The traces of faults correlating to the fault patterns seen in Figure 59. ....	98
Figures 61 to 87: A summary of the poles to joint planes found in different 10' x 10' blocks..	113
Figures 88 to 114: A summary of the joints' strike directions found in different 10' x 10' blocks. (Ten degree intervals centred around 0°).....	120
Figures 115 to 139: Density distribution of the lineations created by the intercepts of joints in different 10' x 10' blocks.....	127

## LIST OF TABLES

	<b>Page</b>
Table 1: Geological timeline of igneous/metamorphic lithological emplacements/events (Modified after Robb et al., 2006) .....	22
Table 2: Most Compressive Horizontal Principal Stress Azimuths and Stress Regimes in Southern Africa*. After Bird et al., 2006.....	47
Table 3: Measured joint quantities.....	58
Table 4: The mean average T and Q values from inside and outside of the 2.5km buffer around the Houtriver Shear Zone.....	73
Table 5: A table showing the average T and Q values for different groups of boreholes in relation to their spatial distribution relative to Neoproterozoic Granitoids. ....	85
Table 6: A table containing the coordinates for all the waypoints recorded in the field in decimal degrees. ....	109