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Linking streamwater quality of the upper Vaal River catchment area to acid deposition

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2018

https://hdl.handle.net/10539/24020

Mbewe, Isabel (2018) Linking streamwater quality of the upper Vaal River catchment area to acid deposition, University of the Witwatersrand, Johannesburg, <http://hdl.handle.net/10539/24020>

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APPENDIX

Table I Location of study catchments

SITE ID	LATITUDE AND LONGITUDE	DISTANCE FROM MAJUBA POWER STATION (m)	ELEVATION (m)	DATE	TIME	TEMP (˚C)	DESCRIPTION OF SITE
IS3955	-28.59233 28.93689	185 701.22	1868	23/11/16	11H00	19.2	Small channel flowing into Motohimelo reservoir. Moderate flow. Very clear water. Catchment consists of natural grassland with scattered trees and shrubs.
IS3939	-28.50388 28.93076	177 144.20	-	23/11/16	12H15	19.7	Small channel and almost dry. Almost stagnant and quite turbid. Catchment vegetation is mostly grassland, possibly improved and mainly used for grazing.
IS3945	-29.51544 28.97968	176 910.16	1715	23/11/16	12H55	22.3	Large clear fast flowing stream with pools at the bridge where sample was taken. Located in the proximity of the Sterkfontein Dam. Catchment vegetation is grassland with dispersed trees and shrubs
IS3937	-28.51633 28.99340	175 932.65	1739	23/11/16		20.2	Medium sized stream with good flow and quite clear. Close to the Sterkfontein Dam. Catchment vegetation mostly grassland.
IS3941	-28.52241 29.10435	172 189.84	1666	23/11/16	14H20	22.6	Tributary medium sized stream sampled because the main river could not be accessed. Stream very slow and turbid. Catchment mostly natural grassland with about 1% cultivation.
IS3941B	-28.53261 29.10215	172 479.16	-	23/11/16			Sampled less than 100m from 3941 from the main channel. Sample site located just above the confluence with crop field just below. Channel with moderate flow and clearer than 3941.
IS3863	-28.40791 29.29431	154 037.86	-	23/11/16	16H15	18.6	Headwater stream, very small, channel almost dry with very little flow. Very turbid. Catchment vegetation mostly grassland used mainly for grazing. Large trees along the channel.

IS3760	-28.28224 29.44151	135.963.44	1684	5/01/17	10H00	17.3	Medium sized wetland stream with moderate flow. Water quite clear. Vegetation mostly grasses and reeds. Catchment used mostly for grazing.
IS3715	-28.21310 29.47125	128 308.42	1724	5/01/17	10H45	19.4	Original site located 1 km off the main public road on a private farm and could not be accessed. Therefore sampled at a bridge on the public road. Channel was almost dry consisting of a series of small pools with no flow. Very turbid water. Catchment vegetation is grassland used for grazing.
IS3639	-28.14001 29.46488	120 009.65	1719	5/01/17	-	18.8	Small flowing stream sampled at village fork. Very turbid. Stream banks greatly incised. Grassland dominant vegetation.
IS3693	-28.20294 29.51084	126 257.40	1705	5/01/17	13H00	17.8	No stream at marked sited. Sample taken from stream about 200m from original site at canalised section above road bridge. Stream very turbid with little flow. Mostly grassland catchment.
IS3582	-28.13852 29.59396	117 387.33	1713	5/01/17	14H00	25.6	Very small stream with no flow. Very turbid. Sampled at site where it crosses dirt road. Grassland catchment.
IS3549	-28.13421 29.59345	118 019.44	-	5/01/17	14H10	30.1	Very small stream. Little flow. Quite turbid. Channel consists of series of pools.
IS2973	-27.60006 29.72254	-	-	5/01/17	-	-	Site not sampled because the catchment is mostly cultivated and situated on private land.
IS2976	-27.600827 29.245505	-	-	5/01/17	-	-	Site not sampled because the catchment is mostly cultivated and situated on private land
IS3627	-28.15714 29.59643	119 787.59	1701	25/01/17	10H25	19.1	Wetland stream. Good flow with clear water. Vegetation is mostly grassland with reeds within the stream channel. Catchment natural and used mainly for grazing.
IS3577	-28.11669 29.60797	115 055.12	1714	25/01/17	11H00	20.5	Medium sized stream. Good flow. Very clear waters with crabs and fish. Catchment vegetation mostly grassland with trees and shrubs.
IS3523	-28.04006 29.54009	108 844.19	1730	25/01/17	-	22.6	Large stream sampled just above mealie farm. Channel deeply incised. Good flow. Very turbid. Grassland vegetation possibly improved.
IS3480	-28.04585 29.53959	108 723.25	1728	25/01/17	12H20	24.3	Large clear stream with good flow. Sampled at a road bridge above a maize field. Vegetation mainly grassland

IS3467	-27.98331 29.58907	101 105.43	1758	25/01/17	13H25	22.2	Medium sized stream with good flow. A little turbid. Sampled above confluence. Catchment vegetation mostly grassland used for grazing.
IS3467B	-27.98309 29.58542	101 548.84	1754	25/01/17	-	22.5	Medium sized stream. Left fork of the IS3467 channel. Much clearer stream in comparison to IS3467. Good flow. Catchment vegetation grassland with shrubs.
IS3416	-27.96892 29.58542	99 717.24	1768	25/01/17	-	23.0	Medium sized stream. Good flow and quite clear. Catchment vegetation grassland used mostly for grazing
IS3366	-29.63414 27.91174	93 597.84	1786	25/01/17	14H55	22.8	Medium sized fast flowing stream close to main river. Clear stream with crabs and frogs. Sampled at road a road bridge. Grassland with shrubs dominant catchment vegetation
IS3369	-27.91199 29.63526	94 902.48	1787	25/01/17	15H20		Large fast flowing river. Sampled at confluence 100m above IS3366. Grassland with shrubs dominant catchment vegetation.
IS3275	-27.82541 29.67392	82 263.03	1772	25/01/17	-	22.6	Medium sized stream. Extreme meandering. Fast flowing and very turbid waters. Catchment vegetation is grassland and used for grazing purposes.
IS3184	-27.78722 29.62184	79 359.83	1728	25/01/17	-	17.6	Small wetland stream with moderate flow. Waters quite clear. Sample taken at a road bridge before the stream flows into a maize field. Catchment is mostly grassland used for grazing with some cultivation.
IS3157	-27.74943 29.69510	72 920.28	1929	25/01/17	17H04	19.3	Small mountain stream that ford road. Good flow condition. Clear stream. Catchment vegetation is grassland with scattered trees and shrubs in the rocky ridges
IS3131	-27.74069 29.63136	72 882.00	1732	25/01/17	17H55	22.0	Large clear stream with very good flow conditions. Catchment vegetation is mostly grassland. Mostly natural with some cultivation extending 300m from the sample point.
IS3237	-27.85136 29.43734	93 155.00	1905	6/02/17	10H00	17.3	Large stream with moderate flow. Quite turbid. Sampled just below Mathys' farm. Catchment vegetation is grassland. A small portion of the catchment is cultivated
IS2976	-27.58927	-	-	6/02/17	-	-	Site situated on private property and could not be accessed

	29.23294						
IS3159	-27.74366 29.37442	-	-	6/02/17	-	-	Site situated on private property and could not be accessed
IS3225A	-27.77684 29.52830	80 459.88	1786	6/02/17	10H50	19.9	Small stream with a good flow. A tributary (road crossing) of the main stream. Catchment vegetation is grassland. Used mostly for grazing with some cultivation.
IS3225B	-27.78365 29.52174	80 210.42	1790	6/02/17	-	20.0	Small stream with good flow. Waters quite turbid. Natural grassland catchment with a little cultivation
IS3203	-27.78369 29.52177	83 775.46	1788	6/02/17	-	20.6	Small stream, good flow and clear waters. Natural grassland vegetation. Grazing is the dominant landuse
IS3155	-27.75523 29.54077	77 004.61	1761	6/02/17	11H40	21.0	Medium sized wetland stream. Fast flowing under the bridge. Original site on private property and could not be accessed. Catchment vegetation grassland with shrubs in places.
IS3082	-27.69000 29.52347	-	-	-	-	-	Site situated on private property and could not be accessed
IS2972	-27.57048 29.71428	53 175.62	1720	6/02/17	12H40	20.3	Small wetland stream. Slow flow with turbid waters. Grassland vegetation catchment used for grazing.
IS2972B	-27.57036 29.71389	53 232.10	1716	6/02/17	12H50	20.6	Larger stream in comparison to IS2972. Moderate flow, clear waters. Sampled above confluence.
IS2792	-27.43925 29.64584	40 715.31	1722	6/02/17	13H40	27.2	Hartbeesfontein farm. Medium sized stream in the valley. Good flow, water a little turbid. Sampled below maize field. Catchment mostly grassland used for grazing with some cultivation
SPRING	-27.45287 29.65526	41 394.56	1773	6/02/17	-	20.8	Hartbeesfontein farm. Ground water piped in to a trough. Very clear water. Catchment all natural. Grassland vegetation for grazing purposes.
IS2792A	-27.46132 29.66648	42 225.05	1791	6/02/17	14H50	22.1	Hartbeesfontein farm. Small stream, clear water with little flow above maize field at IS2792. Catchment vegetation grassland used for grazing.

IS2792B	-27.46018 29.66611	42 214.43	1791	6/02/17	14H55	22.0	Hartbeesfontein farm. Right fork of IS2792A Small stream, clear water with little flow above maize field at IS2792. Catchment vegetation grassland used for grazing.
IS2645	-27.36875 29.65788	-	-	6/02/17	-	-	Site was dry.
IS2360	-27.15966 29.99148	23 020.22	1696	6/02/17		25.4	Medium sized stream, clear waters with moderate flow draining communal grassland above Daggakraal.
IS2370	-27.15174 29.99080	22 740.95	1687	6/02/17	16H00	25.9	Very small stream. Little flow. Very turbid. Series of muddy pools along the channel. Catchment is communal grazing grassland
IS1946	-26.98451 29.74956	12 272.57	1625	6/02/17	16H25		Medium sized stream with clear waters. Good flow. Very rocky channel. Grassland vegetation. Mostly natural catchment with some vegetation.
IS1891	-26.95017 29.67438	18 736.36	1598	6/02/17	18H55	23.4	Medium sized stream with clear waters and a good flow. Catchment mostly natural grassland.
IS2303	-27.08851 30.09850	32 493.15	1676	6/02/17	17H30	20.8	Large deep stream with moderate flow. Clear waters. Sampled above arable land. Vegetation is grassland with some reeds close to the stream banks

Table II Component matrix

Component Matrix[a]			
	Component		
	1	2	3
FINEGRAINED	.896		
ALTERNATING	.876		
BASALTIC	.810		
WATER	.789		
REDGREENSUBORDSANDSTONE	.608		
NETWORK		.857	
MUDROCK		.582	
DARKSHALE		.512	
REDGREENFINETOMEDIUM	-.398	-.430	.692
MUDROCKSUNSANDSTONE	-.565	-.487	-.607
SANDSTONE			.504
Extraction Method: Principal Component Analysis.			
a. 3 components extracted.			

Table III Rotated Component matrix

Rotated Component Matrix[a]			
	Component		
	1	2	3
FINEGRAINED	.897		
ALTERNATING	.886		
BASALTIC	.828		
WATER	.783		
REDGREENSUBORDSANDSTONE	.564		-.344
NETWORK		.853	
MUDROCKSUNSANDSTONE	-.593	-.696	
MUDROCK		.520	
DARKSHALE		.517	
REDGREENFINETOMEDIUM			.858
SANDSTONE			.598
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 5 iterations.			