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[2] Meiklejohn, K., Officer in Charge, Gaint's Castle Game Reserve, 1968-1974, 80 Globe Road, Petermaritzburg, 3201.

[3] Van Der Waals, J., Lecturer at the Department of Soil Science and Plant Production, Faculty of Natural and Agricultural Sciences, University of Pretoria, Pretoria, 0002.

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Appendix 1: Potential evapotranspiration (PET)

Table 1: PET value ranges in the KwaZulu-Natal Drakensberg expressed as a percentage of the rainfall per month (after Tyson *et al.*, 1976).

Season	Months	PET (% of rainfall)	PET monthly difference
Summer	December	53%	9%
	January	62%	9%
	February	53%	8%
Autumn	March	45%	8%
	April	36%	9%
	May	27%	9%
Winter	June	19%	8%
	July	10%	9%
	August	19%	9%
Spring	September	27%	8%
	October	36%	9%
	November	45%	8%
		Average	8.6%

Appendix 2: Landslide inventory

Table 1: Details of the landslide inventory on a study area in the Injisuthi Valley, KZN Drakensberg.

#	Position	Type	Coordinate (°)		Vegetation recovery
			South	East	
1	land	translational	29.10989	29.47567	10 - 30 %
2	land	translational	29.10997	29.47572	10 - 30 %
3	land	rotational	29.10974	29.47606	10 - 30 %
4	land	rotational	29.10975	29.47636	10 - 30 %
5	land	rotational	29.10976	29.47640	10 - 30 %
6	land	rotational	29.10941	29.47641	10 - 30 %
7	river	translational	29.10954	29.47661	10 - 30 %
8	river	translational	29.11069	29.47641	30 - 60 %
9	river	translational	29.11069	29.47654	30 - 60 %
10	river	translational	29.11095	29.47625	30 - 60 %
11	river	translational	29.11124	29.47631	30 - 60 %
12	river	translational	29.11134	29.47608	30 - 60 %
13	river	translational	29.11186	29.47604	60 - 90 %
14	river	translational	29.11187	29.47601	60 - 90 %
15	river	translational	29.11194	29.47616	30 - 60 %
16	river	rotational	29.11219	29.47620	10 - 30 %
17	river	translational	29.11201	29.47608	60 - 90 %
18	river	translational	29.11209	29.47609	60 - 90 %
19	river	translational	29.11219	29.47609	30 - 60 %
20	river	translational	29.11245	29.47626	60 - 90 %
21	river	translational	29.11253	29.47613	60 - 90 %
22	river	translational	29.11296	29.47627	60 - 90 %
23	river	translational	29.11301	29.47628	30 - 60 %
24	river	translational	29.11292	29.47624	60 - 90 %
25	river	translational	29.11345	29.47653	60 - 90 %
26	river	translational	29.11342	29.47659	60 - 90 %
27	river	translational	29.11413	29.47758	60 - 90 %
28	river	translational	29.11543	29.47875	10 - 30 %
29	land	translational	29.11555	29.47884	60 - 90 %
30	land	rotational	29.11553	29.47889	30 - 60 %
31	land	rotational	29.11556	29.47895	60 - 90 %
32	land	translational	29.11548	29.47909	30 - 60 %
33	land	translational	29.11547	29.47917	60 - 90 %
34	land	translational	29.11539	29.47932	10 - 30 %
35	land	rotational	29.11548	29.47944	10 - 30 %
36	land	translational	29.11542	29.47958	30 - 60 %
37	land	translational	29.11535	29.47954	30 - 60 %
38	land	translational	29.11531	29.47984	30 - 60 %
39	land	translational	29.11528	29.48003	10 - 30 %
40	land	translational	29.11548	29.48017	60 - 90 %
41	land	translational	29.11559	29.48036	10 - 30 %
42	land	translational	29.11571	29.48049	60 - 90 %
43	land	translational	29.11582	29.48051	30 - 60 %
44	land	translational	29.11588	29.48071	60 - 90 %
45	land	translational	29.11626	29.48119	60 - 90 %
46	river	translational	29.11624	29.48152	60 - 90 %
47	river	translational	29.11619	29.48151	60 - 90 %
48	river	translational	29.11613	29.48141	60 - 90 %
49	river	rotational	29.11602	29.48138	60 - 90 %
50	river	rotational	29.11602	29.48133	60 - 90 %

51	river	rotational	29.11597	29.48126	60 - 90 %
52	river	rotational	29.11590	29.48126	60 - 90 %
53	river	translational	29.11591	29.48135	60 - 90 %
54	river	translational	29.11580	29.48139	60 - 90 %
55	river	translational	29.11557	29.48137	30 - 60 %
56	river	translational	29.11568	29.48126	60 - 90 %
57	river	translational	29.11553	29.48129	60 - 90 %
58	river	translational	29.11550	29.48125	60 - 90 %
59	river	translational	29.11524	29.48124	60 - 90 %
60	river	translational	29.11515	29.48109	60 - 90 %
61	river	translational	29.11488	29.48110	30 - 60 %
62	river	rotational	29.11481	29.48115	60 - 90 %
63	river	translational	29.11364	29.48002	60 - 90 %
64	river	translational	29.11320	29.47989	60 - 90 %
65	river	translational	29.11329	29.47955	60 - 90 %
66	river	translational	29.11302	29.47881	60 - 90 %
67	river	translational	29.11295	29.47865	60 - 90 %
68	river	translational	29.11302	29.47851	60 - 90 %
69	river	translational	29.11313	29.47849	60 - 90 %
70	river	translational	29.11315	29.47857	30 - 60 %
71	river	translational	29.11325	29.47851	30 - 60 %
72	river	translational	29.11325	29.47850	60 - 90 %
73	river	translational	29.11331	29.47850	60 - 90 %
74	river	translational	29.11338	29.47852	10 - 30 %
75	river	translational	29.11346	29.47845	60 - 90 %
76	river	translational	29.11292	29.47802	60 - 90 %
77	river	translational	29.11260	29.47766	60 - 90 %
78	river	translational	29.11216	29.47742	60 - 90 %
79	river	translational	29.11149	29.47694	60 - 90 %
80	river	translational	29.11104	29.47674	60 - 90 %
81	river	translational	29.11059	29.47669	60 - 90 %
82	river	translational	29.11038	29.47669	60 - 90 %
83	land	translational	29.11853	29.48150	0 - 10 %
84	land	translational	29.11861	29.48147	30 - 60 %
85	land	translational	29.11873	29.48158	60 - 90 %
86	land	translational	29.11879	29.48185	10 - 30 %
87	land	translational	29.11879	29.48214	30 - 60 %
88	land	translational	29.11879	29.48235	10 - 30 %
89	land	translational	29.11884	29.48245	10 - 30 %
90	land	translational	29.11870	29.48257	10 - 30 %
91	land	translational	29.11880	29.48266	60 - 90 %
92	land	translational	29.11878	29.48290	30 - 60 %
93	land	translational	29.11871	29.48302	60 - 90 %
94	land	translational	29.12201	29.48404	60 - 90 %
95	land	translational	29.12119	29.48555	30 - 60 %
96	land	translational	29.12088	29.48535	30 - 60 %
97	river	translational	29.11990	29.48424	60 - 90 %
98	river	translational	29.11875	29.48090	60 - 90 %

Appendix 3: Landslide morphometry

Table 1: Morphometric measures for landslides in steep slope colluvium and riverbanks on a study area in the Injisuthi Valley, KZN Drakensberg.

	Position of landslide	Length (L)	Width (W)	Depth (D)	D/L ratio	Area m^2 (L*W)	Volume m^3
1	land	16.00	16.50	0.60	3.75	264.00	158.40
2	land	4.00	9.50	0.50	12.50	38.00	19.00
3	land	4.00	13.80	0.40	10.00	55.20	22.08
4	land	10.00	14.50	0.40	4.00	145.00	58.00
5	land	7.00	9.50	0.70	10.00	66.50	46.55
6	land	5.00	8.40	0.60	12.00	42.00	25.20
7	land	9.00	17.00	0.40	4.44	153.00	61.20
8	land	11.00	13.90	0.70	6.36	152.90	107.03
9	land	8.85	16.60	0.80	9.04	146.91	117.53
10	land	3.70	5.50	0.70	18.92	20.35	14.25
11	land	10.00	6.40	0.35	3.50	64.00	22.40
12	land	5.50	11.80	0.60	10.91	64.90	38.94
13	land	9.70	23.00	0.50	5.15	223.10	111.55
14	land	11.20	6.50	0.80	7.14	72.80	58.24
15	land	28.40	9.60	0.80	2.82	272.64	218.11
16	land	27.00	13.50	1.00	3.70	364.50	364.50
17	land	4.50	10.60	1.80	40.00	47.70	85.86
18	land	5.40	10.80	0.46	8.52	58.32	26.83
19	land	2.85	14.40	0.38	13.33	41.04	15.60
20	land	3.00	11.10	0.28	9.33	33.30	9.32
21	land	14.00	10.95	0.30	2.14	153.30	45.99
22	land	20.35	14.00	0.50	2.46	284.90	142.45
23	land	10.40	5.50	0.80	7.69	57.20	45.76
24	land	10.30	5.20	0.70	6.80	53.56	37.49
25	land	8.00	8.80	0.30	3.75	70.40	21.12
26	land	11.00	6.60	0.28	2.55	72.60	20.33
27	land	8.30	6.30	0.58	6.99	52.29	30.33
28	land	11.20	4.90	0.70	6.25	54.88	38.42
29	land	8.87	7.59	0.60	6.76	67.32	40.39
30	land	9.20	17.60	0.78	8.48	161.92	126.30
31	river	14.00	8.50	0.70	5.00	119.00	83.30
32	river	9.30	8.90	0.70	7.53	82.77	57.94
33	river	15.00	14.10	1.10	7.33	211.50	232.65
34	river	11.90	2.50	1.02	8.57	29.75	30.35
35	river	3.20	18.90	0.31	9.69	60.48	18.75
36	river	1.20	2.70	0.10	8.33	3.24	0.32
37	river	4.90	12.40	0.46	9.39	60.76	27.95
38	river	5.10	17.90	0.50	9.80	91.29	45.65
39	river	3.30	3.20	0.24	7.27	10.56	2.53
40	river	4.00	4.65	0.34	8.50	18.60	6.32
41	river	3.60	7.10	0.40	11.11	25.56	10.22
42	river	3.30	9.20	0.29	8.79	30.36	8.80
43	river	4.10	7.80	0.42	10.24	31.98	13.43
44	river	4.00	5.90	0.38	9.50	23.60	8.97
45	river	17.20	4.60	1.80	10.47	79.12	142.42
46	river	10.10	7.10	0.81	8.02	71.71	58.09
47	river	6.30	6.85	0.57	9.05	43.16	24.60
48	river	3.20	3.00	0.32	10.00	9.60	3.07
49	river	2.00	1.50	0.20	10.00	3.00	0.60
50	river	5.50	7.90	0.45	8.18	43.45	19.55
51	river	5.30	4.90	0.57	10.75	25.97	14.80
52	river	5.50	4.60	0.42	7.64	25.30	10.63
53	river	5.10	6.80	0.45	8.82	34.68	15.61
54	river	6.90	8.30	0.36	5.22	57.27	20.62
55	river	4.80	10.20	0.50	10.42	48.96	24.48
56	river	17.50	22.40	0.58	3.31	392.00	227.36
57	river	18.90	14.00	0.78	4.13	264.60	206.39
58	river	10.00	18.60	0.38	3.80	186.00	70.68
59	river	13.10	4.90	0.76	5.80	64.19	48.78
60	river	20.00	9.20	0.80	4.00	184.00	147.20
	Average						
	land	9.92	11.01	0.61	8.31	111.82	70.97
	river	7.94	8.62	0.56	8.02	77.75	52.74

Table 2: Interquartile range for landslides occurring in slope colluvium, .

Interquartile range		
Quartile	1	3
Length	4.40	11.05
Width	6.20	13.83
Depth	0.38	0.70

Figure 1: Correlation between length and depth of landslides.

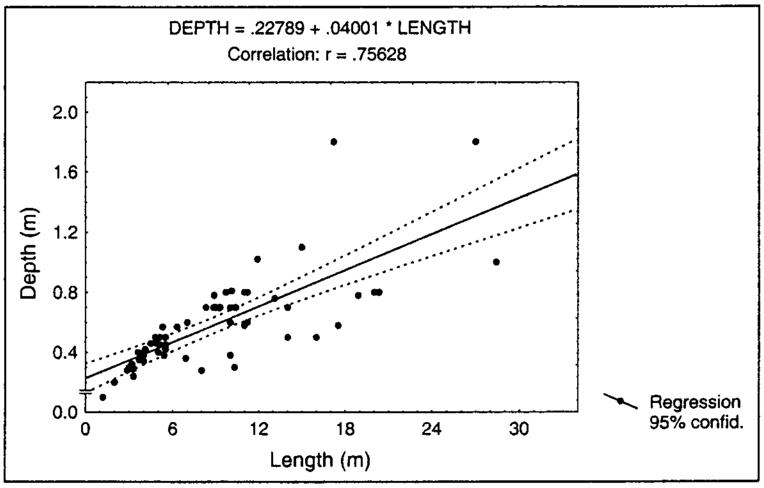

Table 2: Results of the T-test for dependent samples (P<0.05 is significant difference).

		Mean	Std.Dv.	N	Diff.	Std.Dv. Diff.	df	P	Difference
D/L	slope	0.070994	0.022879						
	riverbank	0.080222	0.022675	30	-0.00923	0.03075	29	0.111	Not significant
Area	slope	111.8178	89.37769						
	riverbank	77.7485	87.94353	30	34.06928	128.179	29	0.156	Not significant
Volume	slope	87.55465	126.0892						
	riverbank	52.73521	68.28022	30	34.81944	139.426	29	0.182	Not significant

Appendix 4: Soil survey

Table 1: Details of the soil survey for two soil profiles in study area S in the Injisuthi Valley.

PROFILE		1			2		
PLACE		Injisuthi Valley, near pipe and gully			Injisuthi Valley, near pipe and gully		
VEGETATION		Themeda – Trachypogon grassland, 90% basal cover			Themeda – Trachypogon grassland, 90% basal cover		
% SLOPE		7°			5°		
LANDFORM TOPOGRAPHY		Riverbed			Riverbed, foothills		
SOIL USE		Conservation area			Conservation area		
HORIZON		Orthic A	E	Soft plinthic B	Orthic A	E	Soft plinthic B
TRANSITION		Gradual	Gradual	Gradual	Gradual	Gradual	Gradual
DEPTH		120mm	500mm	1.4m	120mm	510mm	>510mm
MOISTURE		Dry	Dry	Moist	Dry	Dry	Moist
COLOUR		Dark brown	Light brown	Light brown	Dark brown	Light brown	Light brown
MOTTLING	CONTRAST	X	X	Distinct	X	Distinct	Distinct
	INTENSITY	X	X	Strong	X	Weak	Strong
TEXTURE		Sand	Sand	Clay	Sand	Sand	Clay
CONSISTENCY		Slightly hard	Slightly hard	Hard	Slightly hard	Slightly hard	Hard
CEMENTATION		Strongly cemented	Strongly cemented	Hard	Strongly cemented	Strongly cemented	Hard
STRUC-TURE	GRADE						
	TYPE						
	CLASS						
CON-CRETIONS	TYPE	X	X	Orange	X	Orange	Orange
	AMOUNT	X	X	40%	X	10%	40%
ROCKS	AMOUNT	X	X	<10%	X	X	20%
	FORM	X	X	Round	X	X	Flat-round
	SIZE	X	X	± 9cm	X	X	± 20 cm
ROOTS		Frequent	Frequent	Seldom	Frequent	Frequent	Seldom
PERMEABILITY		Fast	Fast	Medium	Fast	Fast	Fast
UNDERLYING MATERIAL		Sandstone	Sandstone	Sandstone	Sandstone	Sandstone	Sandstone
GENERAL		X	X	X	X	X	X

Appendix 5: Soil depth and slope angle

Table 1: Field measured soil depth variability with slope angle in the Injisuthi Valley, KZN Drakensberg.

	Soil depth (m)	Slope angle (°)
Profile 1	2.00	2.00
	0.35	25.00
	0.42	28.00
	0.42	28.00
	0.50	40.00
	0.50	40.00
	0.55	37.00
	1.60	9.00
Profile 2	0.65	36.00
	0.66	21.00
	0.66	21.00
	0.69	24.00
	0.71	42.00
	0.73	32.00
	0.86	35.00
Profile 3	2.00	2.00
	2.00	5.00
	0.60	9.00
	2.00	10.00
	2.00	15.00
	2.00	19.00
	2.00	19.00
	2.00	21.00
	2.00	21.00
	2.00	24.00
	0.35	25.00
	2.00	32.00
	0.65	36.00
	0.55	37.00
	0.71	39.00
	0.71	45.00

Table 2: Soil depth ranges.

	Soil depth range (m)	Average slope angle (°)
Average (n=31)	0-0.5	6.17
	0.5-1.0	22.38
	1-1.5	none
	1.5-2	37.58

Table 3: PCRaster model input of the soil depth map.

Tangent of slope angle range		Soil depth (cm)
[0.001745 ,	0.017455 >	370
[0.017455 ,	0.03492 >	360
[0.03492 ,	0.052407 >	350
[0.052407 ,	0.069926 >	340
[0.069926 ,	0.087487 >	330
[0.087487 ,	0.105102 >	320
[0.105102 ,	0.122782 >	310
[0.122782 ,	0.140538 >	300
[0.140538 ,	0.158382 >	290
[0.158382 ,	0.176324 >	280
[0.176324 ,	0.194377 >	270
[0.194377 ,	0.212553 >	260
[0.212553 ,	0.230864 >	250
[0.230864 ,	0.249324 >	240
[0.249324 ,	0.267944 >	230
[0.267944 ,	0.28674 >	220
[0.28674 ,	0.305725 >	210
[0.305725 ,	0.324914 >	200
[0.324914 ,	0.344321 >	190
[0.344321 ,	0.363964 >	180
[0.363964 ,	0.383857 >	170
[0.383857 ,	0.404019 >	160
[0.404019 ,	0.424467 >	150
[0.424467 ,	0.44522 >	140
[0.44522 ,	0.466299 >	130
[0.466299 ,	0.487723 >	120
[0.487723 ,	0.509516 >	110
[0.509516 ,	0.531699 >	100
[0.531699 ,	0.554298 >	90
[0.554298 ,	0.577339 >	80
[0.577339 ,	1 >	70
[1 ,	1.02733 >	60
[1.02733 ,	1.05466 >	50
[1.05466 ,	1.08199 >	40
[1.08199 ,	1.10932 >	30
[1.10932 ,	1.19175 >	20
[1.19175 ,	4.704 >	0.1

Appendix 7: Bulk density

Table 1: Bulk density values (g/cm^3) for sites S at the surface and at a depth (D) of 1m and the control site C in the Injisuthi Valley.

	Test (S)	Depth (D)	Control (C)
1	0.5	0.4	1.4
2	0.6	0.6	1.5
3	0.6	1.0	1.3
4	0.6	1.9	1.3
5	0.6	1.4	1.4
6	0.6	1.7	1.2
7	0.7	0.9	1.4
8	0.7	1.3	1.1
9	0.7	1.2	1.5
10	0.8	0.5	1.2
11	0.8	1.3	1.3
12	0.9	0.7	1.2
Average	0.7	1.1	1.3
Minimum	0.5	0.4	1.1
Maximum	0.9	1.9	1.5
Std. Dev.	0.1	0.5	0.1

Table 2: Results of the students-T test.

Sample areas	Type of t-test	n	P value	Difference
S and D	Equal variance n=n, two tailed	12	0.00000004	significant
S and C	Equal variance n=n, two tailed	12	0.02658453	significant
D and C	Equal variance n=n, two tailed	12	0.40959849	not significant

Appendix 8: Soil moisture

Table 1: Soil moisture values (%) for sites S at the surface and at a depth (D) of 1m and the control site C in the Injisuthi Valley.

	Test (S)	Control (C)	Depth (D)
1	11.5	9.5	7.7
2	14.2	8.2	7.4
3	19.7	13.9	6.6
4	25.7	10.7	12.5
5	23.6	10.0	12.3
6	43.2	9.4	14.4
7	5.5	4.8	12.5
8	5.0	8.0	10.4
9	7.3	6.1	13.7
10	6.2	6.0	9.7
11	13.0	11.1	9.0
12	18.2	13.8	5.3
Average	16.1	9.3	10.1
Minimum	5.0	4.8	5.3
Maximum	43.2	13.9	14.4
Std. Dev.	11.1	2.9	3.0

Appendix 9: Shear strength

Table 1: Shear strength values (kPa) for 4 sites in study area S in the Injisuthi Valley.

	1	2	3	4
1	38	40	32	29
2	29	39	32	37
3	40	41	45	29
4	34	46	41	36
5	35	45	22	42
6	24	38	48	35
7	34	54	40	31
8	48	46	40	30
9	37	44	37	29
10	42	46	35	28
11	36	44	36	30
12	37	52	32	30
13	27	52	31	27
14	35	48	52	35
15	24	54	48	40
16	21	40	38	36
17	35	52	48	36
18	34	46	33	42
19	34	46	35	32
20	22	45	40	33
21	22	45	38	33
22	38	36	39	38
23	22	34	34	44
24	33	28	34	36
25	31	40	38	39
26	38	40	33	31
27	30	40	35	37
28	34	52	43	45
29	39	34	38	39
30	32	42	33	42
31	36	39	41	35
32	34	41	46	26
33	28	46	36	39
34	36	45	36	31
35	34	38	34	39
36	31	54	35	32
37	29	46	28	25
38	45	44	39	32
39	36	46	52	29
40	25	44	40	32
41	38	52	32	26
42	37	52	32	38
43	39	48	51	32
44	34	54	35	29
45	43	40	24	37
46	40	52	32	29
47	38	46	33	31
48	48	46	30	34
49	38	45	48	31
50	31	45	34	39
51	46	36	34	32
52	44	34	32	32
53	32	28	42	36
54	50	40	46	38
55	40	40	55	43
56	32	40	54	37
57	42	52	44	35
58	42	34	56	30
Average	35	44	38	34
Std dev	7	6	8	5
Min	21	28	22	25
Max	50	54	56	45

Appendix 10: Contour lengths

Table 1: Contour lengths derived in ArcView® 3.1 for study area S used in critical rainfall (Rc) calculations.

Altitudinal range (m. a.s.l.)	Contour length (cm)
1340 - 1360	20000
1360 - 1380	20000
1380 - 1400	20000
1400 - 1420	50000
1420 - 1440	60000
1440 - 1460	40000
1460 - 1480	40000
1480 - 1500	40000
1500 - 1520	50000
1520 - 1540	80000
1540 - 1560	50000
1560 - 1580	50000
1580 - 1600	40000
1600 - 1620	40000
1620 - 1640	40000
1640 - 1660	30000
1660 - 1680	30000
1680 - 1700	30000
1700 - 1720	30000
1720 - 1740	30000
1740 - 1760	30000
1760 - 1780	40000
1780 - 1800	50000
1800 - 1820	50000
1820 - 1840	40000
1840 - 1860	30000
1860 - 1880	0

```
 Moisturecont1=scalar(0.1);
 Moisturecont2=scalar(0.1);
 Overlandflow=scalar(0.1);

dynamic

 #New depth (cm) of unsaturated layers
 H1=max(0.025*H,(H-Waterheight)*Frh1);
 H2=max(0.025*H,(H-Waterheight)*Frh2);


 ##SURFACE WATER (Fig 4.2)
 Precip=timeinputscalar(rain31.tss,clone.map);
 PET=timeinputscalar(pet31.tss,clone.map);
 AET=if(Moisturecont1>Tetafield,PET,PET-((Tetafield-Moisturecont1)/Tetafield)*PET);

 #Increase (and decrease) in moisture content due to rainfall and evaporation
 Deltamoist1=max(Precip-AET,0.01);
 report dmoist.tss=timeoutput(OutFlowPoint,Deltamoist1);

 #Vegetation interception (Equation 4.8)
 Grass=max(0.01,(1-((7.6*ln(7175.0*Deltamoist1))/100)));
 Intercept=(Deltamoist1*Grass);
 report intercep.tss=timeoutput(OutFlowPoint, Intercept);

 #SOIL WATER (Fig 4.2)
 Deltamoist=max((Deltamoist1-Intercept),0.01);

 #quantity of water entering top soil layer
 report atwater.tss=timeoutput(OutFlowPoint, Deltamoist);

 #Horton overland flow occuring in the upper soil layer
 Hortonianflow=accuthresholdflux(Ldd,Deltamoist,Ksat);
 report horton.tss=timeoutput(OutFlowPoint,Hortonianflow);

 #Percolation (Equation 4.4)
 Bi=(-2.655)/log10(Tetafield/Tetamax);

 #Calculating Kteta in cm/day for upper and lower soil layers.
 Kteta1=(Ksat*((Moisturecont1)/(Tetamax))**Bi);
 Kteta2=(Ksat2*((Moisturecont2)/(Tetamax))**Bi);

 Percolation1=if(Moisturecont1<Tetafield,0,Kteta1);
 Percolation2=if(Moisturecont2<Tetafield,0,Kteta2);
 report perco1.tss=timeoutput(OutFlowPoint,Percolation1);
 report perco2.tss=timeoutput(OutFlowPoint,Percolation2);


 #GROUNDWATER (Fig 4.2)
 #Decrease in moisture content due to percolation
 #upper soil layer
 Moisturecont1=max(min(Tetamax,Moisturecont1+(Deltamoist-Percolation1)/H1),Tetar);
 report moist1.tss=timeoutput(OutFlowPoint,Moisturecont1);

 #Percolating moisture contribution from top soil layer
 #Resulting moisture of lower soil layer (slip plane)
 Moisturecont2=max(min(Tetamax,Moisturecont2+(Percolation1-Percolation2)/H2),Tetar);
 report moist2.tss=timeoutput(OutFlowPoint,Moisturecont2);
```

```
#Water discharge of lower soil layer (Equation 4.6)
#Base flow (Figure 4.2)
Q=Ksat2*S*B*Waterheight;


##PORE WATER PRESSURE CHANGE
#Change in waterheight (pore pressure) of lower soil layer
#First, current water balance (Deltawaterheight)
#Second, inflow from upstream pixels, also lower soil layer
#Third, new water height as a result of inflow and outflow
#Fourth, pore water pressure changes with water height changes

Deltawaterheight=Q/(B*B*(Tetamax+0.01-Moisturecont2));

Inflowdeltawaterheight=upstream(Ldd,Deltawaterheight);

Totalwater=max(((Waterheight+Inflowdeltawaterheight-Deltawaterheight)
+((Percolation2-Loss)/(Tetamax+0.01-Moisturecont2))),0);
report water370.tss=timeoutput(OutFlowPoint, Totalwater);
report water260.tss=timeoutput(Out260, Totalwater);
report water140.tss=timeoutput(Out140, Totalwater);

 Waterheight=min(Totalwater,H1+H2);
report waterh.tss=timeoutput(OutFlowPoint,Waterheight);
report water=Waterheight;

Porepr=Waterheight*GammaWat*(cos(S)**2);

 #Water height exceeding soil depth is saturation excess overlandflow
#Overlandflow=accuthresholdflux(Ldd,Totalwater,H);

over370=max(if(Totalwater gt 370,Totalwater-370,0),0);
over260=max(if(Totalwater gt 260,Totalwater-260,0),0);
over140=max(if(Totalwater gt 140,Totalwater-140,0),0);

#Overlandflow=max(Totalwater-(H1+H2),0);
report Land370.tss=timeoutput(OutFlowPoint,over370);
report Land260.tss=timeoutput(Out260,over260);
report Land140.tss=timeoutput(Out140,over140);


##SAFETY FACTOR CHANGE (Equation 4.3)

report Safety=min(1.5,if(H==0.1,1.5,((Cohes+Cohesroots)+(H*Bulk*sqr(cos(atan(S)))-
Porepr)*TanPhi)/(H*Bulk*sin(atan(S))*cos(atan(S)))));

#number of days with safety factor F<1.
report CumSafety=scalar(if(Safety le 1,CumSafety+1,CumSafety));


#Critical rainfall (Equation 4.7)
Crain1=Ksat*sin(S)*(Contlength/Upslope)*(Bulk/GammaWat)*(1-(S/TanPhi));
Crain2=scalar(if(Crain1 gt 0, Crain+Crain1, Crain));
Crain3=scalar(if(Crain1 le -2,-2, Crain2));
#rainfall maximum of 20cm is reported.
report Crain=scalar(if(Crain3 ge 20,20,Crain3));
```

Appendix 12: Confusion matrix pixel counts

Table 1: Pixel counts for various measures used to determine the angle of internal friction.

Internal friction angle	Pixel counts				
	a	b	c	d	N
1°	37	6049	0	25	6111
14°	35	2759	2	3315	6111
16°	35	2377	2	3697	6111
18°	35	2038	2	4036	6111
20°	34	1802	3	4272	6111
22°	33	1597	4	4477	6111
24°	33	1399	4	4675	6111
26°	32	1213	5	4861	6111
27°	31	1133	6	4941	6111
28°	31	1063	6	5011	6111
29°	31	986	6	5088	6111
30°	30	1793	7	4281	6111
32°	25	619	12	5455	6111
34°	22	434	15	5640	6111
36°	13	287	24	5787	6111
38°	5	97	32	5977	6111
40°	0	-12	37	6086	6111
42°	0	-28	37	6102	6111
44°	0	-33	37	6107	6111