

Table S1. PhotoScan processing parameters and approximate times for UAV and Ground survey datasets.

	G1		G3		G6	
	UAV	Ground	UAV	Ground	UAV	Ground
Structure from motion						
Number of cameras (images)	938	1747	451	935	603	1228
Number of aligned cameras	938	1702	451	704	603	1228
Alignment parameters						
Accuracy	High	High	High	High	High	High
Pair preselection	Generic	Generic	Generic	Generic	Generic	Generic
Key point limit	40,000	40,000	40,000	40,000	40,000	40,000
Tie point limit	4,000	4,000	4,000	4,000	4,000	4,000
Constrain features by mask	No	No	No	No	No	No
Adaptive camera model fitting	Yes	Yes	Yes	Yes	Yes	Yes
Sparse point cloud number of points	468,222	1,320,348	376,855	405,866	326,912	896,687
RMS reprojection error	0.302 (0.997 pix)	0.106 (0.535 pix)	0.215 (1.00 pix)	0.188 (0.872 pix)	0.230 (0.782 pix)	0.0987 (0.426 pix)
Max reprojection error	1.251 (54.852 pix)	0.671 (27.301 pix)	1.1094 (40.3035 pix)	11.6492 (54.850 pix)	0.836 (46.595 pix)	1.250 (21.520 pix)
Matching time (h)	2.08	7.0 (1.17)*	0.61	2.60 (0.87)*	1.03	3.85 (0.64)*
Alignment time (h)	1.95	0.63 (0.11)*	0.88	0.36 (0.12)*	1.07	0.20 (0.03)*
Scaling, Georeferencing, Optimization						
Number of Ground Control Points	7	10	7	7	6	10
Camera accuracy (m)	10	10	10	10	10	10
Camera accuracy (deg)	2	2	2	2	2	2
Marker accuracy (m)	0.002	0.002	0.002	0.002	0.002	0.002
Marker accuracy (pix)	0.1	0.1	0.1	0.1	0.1	0.1
Tie point accuracy (pix)	1	1	1	1	1	1
Optimization parameters	f, b1, b2, cx, cy, k1-k4, p1, p2	f, b1, b2, cx, cy, k1-k4, p1, p2	f, b1, b2, cx, cy, k1-k4, p1, p2	f, b1, b2, cx, cy, k1-k3, p1, p2	f, b1, b2, cx, cy, k1- k4, p1, p2	f, b1, b2, cx, cy, k1- k4, p1, p2
Optimization time (h)	0.05	0.11 (0.02)*	0.02	0.08 (0.03)*	0.03	0.01 (0.00)*
Multi-View Stereo						
Reconstruction parameters						
Quality	High	High	High	High	High	High
Depth filtering	Aggressive	Aggressive	Aggressive	Aggressive	Aggressive	Aggressive
Dense point cloud number of points	189,299,097	112,896,341	119,656,063	44,145,187	143,440,438	
Depth maps generation time (h)	9.67	19.18 (3.2)*	2.67	5.70 (1.90)*	3.18	435 (72.5)*
Dense cloud generation time (h)	2.28	471.0 (78.5)*	0.87	55.0 (18.33)*	4.03	228 (38)*
Textured 3D model and Ortho-photo mosaic						
Model processing time (h)	0.68	5.30 (0.88)*	0.15	0.91 (0.30)*	3.17	2.43 (0.41)*
Texturing processing time (h)	4.06	7.10 (1.18)*	2.19	0.65 (0.22)*	2.16	2.29 (0.38)*
Ortho-photo mosaic generation processing time (h)	3.33	28.0 (4.67)*	3.78	12.97 (4.32)*	4.08	13.27 (2.21)
Total processing time (h)	24	90	11	26	19	114

*Values in brackets indicate estimated true processing time. As multiple gully systems were analysed simultaneously, processing times (reported by PhotoScan) for individual gully systems are significantly higher than what would be expected if gullies were processed individually. Time values should be treated as approximations only.