Supplementary material 1. Slopes, R2, and AIC values per distribution type of the cumulative frequency vs length plots of all fracture transects. R2 value highlighted in orange is the highest value, based on three significant figures; whilst the AIC in green is the lowest value for each dataset.

Scale		Transect Code	Normal			Log-normal			Exponential			Power		
			linear-linear			linear-log			log-linear			log-log		
			Slope	R2	AIC	Slope	R2	AIC	Slope	R2	AIC	Slope	R2	AIC
Regional		500K-NS	-3.00E-09	0.82	-3555	-7.00E-05	0.98	-393	-3.00E-05	0.94	-22	-0.77	0.97	-36
		500K-EW	-4.00E-09	0.61	-152	-8.00E-05	0.84	-160	-5.00E-05	0.86	7	-0.97	0.97	-9
		500K-NESW	-7.00E-09	0.97	-121	-6.00E-05	0.98	-123	-8.00E-05	0.99	-13	-0.71	0.92	-3
		500K-NWSE	-5.00E-09	0.97	-480	-1.00E-04	0.96	-469	-4.00E-05	0.96	-28	-0.94	0.82	8
		250K-NS	-3.00E-09	0.64	-391	-6.00E-05	0.9	-417	-9.00E-05	0.91	6	-1.55	0.99	-36
		250K-EW	-3.00E-08	0.65	-112	-3.00E-04	0.75	-115	-2.00E-04	0.86	6	-2.11	0.93	1
		250K-NESW	-1.00E-08	0.87	-91	-9.00E-05	0.92	-93	-9.00E-05	0.95	-4	-1.2	0.97	-7
		250K-NWSE	-1.00E-08	0.95	-352	-1.00E-04	0.98	-371	-9.00E-05	0.99	-54	-0.88	0.94	-20
		100K-NS	-4.00E-07	0.94	-338	-1.00E-03	0.98	-361	-4.00E-04	0.97	-41	-1.24	0.93	-24
		100K-EW	-2.00E-07	0.92	-222	-6.00E-04	0.98	-240	-5.00E-04	0.98	-32	-1.06	0.96	-20
		100K-NESW	-4.00E-07	0.94	-503	-9.00E-04	0.97	-529	-5.00E-04	0.97	-53	-1.14	0.88	-4
		100K-NWSE	-3.00E-07	0.92	-340	-8.00E-04	0.94	-344	-5.00E-04	0.92	-17	-1.17	0.85	-2
Sub-regional		50K-NS	-4.00E-07	0.88	-398	-1.00E-03	0.97	-440	-6.00E-04	0.97	-35	-1.71	0.93	-9
		50K-EW	-3.00E-07	0.94	-181	-6.00E-04	0.97	-188	-8.00E-04	0.97	-20	-1.37	0.94	-12
		50K-NESW	-4.00E-07	0.96	-342	-8.00E-04	0.99	-369	-6.00E-04	0.98	-47	-1.44	0.94	-23
		50K-NWSE	-6.00E-07	0.98	-344	-1.00E-03	0.98	-343	-9.00E-04	0.95	-29	-1.53	0.91	-17
		20K-NS	-6.00E-07	0.91	-356	-1.00E-03	0.97	-382	-9.00E-04	0.96	-22	-1.68	0.89	3
		20K-EW	-5.00E-07	0.93	-161	-1.00E-03	0.97	-170	-5.00E-04	0.96	-10	-1.37	0.93	-5
		20K-NESW	-6.00E-07	0.89	-317	-1.00E-03	0.96	-340	-7.00E-04	0.96	-34	-1.28	0.93	-19
		20K-NWSE	-6.00E-07	0.93	-336	-1.00E-03	0.98	-368	-7.00E-04	0.98	-39	-1.2	0.92	-10
Mascroscale	Outside SNGF	OC-15	-0.74	0.79	28	-1.02	0.97	-78	-0.62	0.9	-36	-0.79	0.93	-61
		OC-17	-0.71	0.17	328	-4.47	0.85	234	-0.22	0.54	105	-0.81	0.97	-35
		OC-18	-1.18	0.79	66	-1.26	0.98	-28	-0.55	0.93	-49	-0.54	0.96	-75
	Inside SNGF	OC-74	-3.59	0.78	175	-2.42	0.99	10	-1.28	0.95	-53	-0.76	0.95	-43
		OC-81	-1.31	0.76	99	-1.19	0.99	-89	-0.75	0.91	-45	-0.61	0.95	-87

		OC-98	-10.4	0.76	163	-2.52	0.97	48	-3.11	0.94	-49	-0.68	0.98	-109
		OC-105	-0.14	0.81	-17	-0.54	0.97	-64	-0.25	0.95	-26	-0.89	0.98	-52
		OC-107	-10.57	0.71	282	-4.75	0.97	144	-1.68	0.89	-23	-0.68	0.97	-105
	Mesoscale	W1-2	-1968.1	0.75	181	-54.08	0.96	150	-36.4	0.94	-12	-0.89	0.97	-29
		W1-3	-443.74	0.62	64	-31.58	0.75	61	-34.82	0.83	8	-2.35	0.9	3
		W2-2	-257.23	0.48	96	-14.63	0.86	80	-14.14	0.7	16	-0.7	0.94	-3
		W3-1	-742.38	0.86	189	-46.48	0.99	131	-9.92	0.97	-37	-0.56	0.92	-19
		W4-3	-211.58	0.88	81	-24.12	0.98	-16	-6.79	0.97	62	-0.72	0.94	-14
		W4-4	-284.1	0.87	58	-31.29	0.96	49	-6.92	0.96	-12	-0.73	0.98	-16
		W5-1	-2410.4	0.51	195	-90.59	0.86	174	-27.2	0.81	18	-0.87	0.99	-27
		W6-5	-2458.5	0.78	58	-39.12	0.93	49	-73.86	0.9	2	-1.11	0.97	-6
		W7-1	-638.42	0.7	117	-55.58	0.93	1	-8.74	0.88	99	-0.69	0.97	-15
		W7-3	-661.41	0.56	90	-18.57	0.87	76	-35.82	0.81	12	-0.84	0.88	7
		W8-5	-490.73	0.91	70	-22.81	0.98	54	-8.16	0.97	-23	-0.36	0.95	-17
		W9-3	-1593.9	0.55	195	-58.54	0.86	175	-2301	0.83	18	-0.73	0.96	-8

Supplementary material 2. Slopes, R2, and AIC values per distribution type of the cumulative frequency vs aperture plots of outcrop and well core fracture transects. R2 value highlighted in orange is the highest value, based on three significant figures; whilst the AIC in green is the lowest value for each dataset. Note that for OC-15, there is no clear trendline generated under a power law distribution (two trends with distinct slopes), hence, it was not included in the analysis.

Scale		Transect Code	Linear			Log-normal			Exponential			Power		
			linear-linear			linear-log			log-linear			log-log		
			Slope	R2	AIC	Slope	R2	AIC	Slope	R2	AIC	Slope	R2	AIC
Macroscale	Outside SNGF	OC-15	-0.01	0.22	-32.21	-0.22	0.91	-38.78	-0.02	0.56	-22.99	-0.13/ -1.41	0.96/ 0.93	0.32/ -37.7
		OC-17	-3.54	0.65	138.23	-3.52	0.98	48.86	-0.41	0.8	-8.02	-0.37	0.99	-85.1
		OC-18	-0.05	0.59	62.18	-0.56	0.94	6.72	-0.03	0.8	4.21	-0.29	0.97	-50.67
	Inside SNGF	OC-74	-0.7	0.61	106.14	-1.6	0.93	44.77	-0.41	0.88	7.91	-0.8	0.99	-65.43
		OC-81	-0.27	0.43	69.23	-0.54	0.9	8.15	-0.26	0.68	31.01	-0.43	0.99	-84.81
		OC-98	-1.07	0.52	78.23	-1.25	0.93	51.41	-0.58	0.8	25.68	-0.56	0.98	-16.11
		OC-105	-0.02	0.61	-2.3	-0.2	0.98	-71.29	-0.02	0.75	-2.24	-0.25	0.96	-44.22
		OC-107	-0.12	0.16	187.88	-2.2	0.78	141.67	-0.08	0.47	87.88	-0.71	0.97	-10.16
Mescoscale		W1-2	-8.66	0.3	187.82	-29.43	0.87	156.31	-0.28	0.59	34.22	-0.72	0.97	-18.5
		W1-3	-187.91	0.96	35.26	-12.68	0.89	42.76	-9.45	0.92	-0.86	-0.6	0.75	6.89
		W2-2	-3.04	0.89	13.15	-2.84	0.99	5.46	-0.57	0.97	-0.44	-0.53	1	-7.21
		W3-1	-18.8	0.23	144.26	-26.85	0.81	124.56	-0.63	0.56	30.3	-0.66	0.98	-12.59
		W4-3	-1.7	0.44	92.02	-8.25	0.75	83.21	-0.11	0.7	18.57	-0.44	0.91	5.41
		W4-4	-284.1	0.87	62.03	-31.29	0.96	59.2	-6.92	0.96	-8.76	-0.5	0.83	3.15
		W5-1	-27.13	0.68	94.28	-40.99	0.96	74.34	-0.41	0.83	2.36	-0.57	0.96	-12.3
		W6-5	-1111.4	0.76	89.22	-24.33	0.97	67.25	-3.11	0.92	-4.06	-0.62	0.97	-16.1
		W7-1	-638.42	0.7	89.57	-55.58	0.93	81.11	-8.74	0.88	18.53	-0.68	0.94	3.67
		W7-3	-66.61	0.72	76.88	-13.49	0.97	53.07	-2.65	0.87	2.2	-0.48	0.94	-5.33
		W8-5	-193.33	0.93	62.2	-24.99	0.97	53.33	-3.21	0.97	-20.94	-0.4	0.93	-12.29
		W9-3	-89.84	0.24	201.77	-60.35	0.76	181.5	-1.99	0.58	38.37	-0.97	0.96	-2.55