Supplementary files1

Sample	Texture	Packing	Quartz grain features							Type
			Clastic quartz grain	Undulatory extinction quartz grain	Syntaxial overgrowth quartz grain	Concavo-convex limits quartz grain	Suturated/Microstylithic limits quartz grain	Böhm lamellae	Recrystallisd quartz grains	
ES-263	Clastic grained	Tangential	XXX	-	XX	XXX	-	-	-	CA
ES-245	Clastic grained	Complete	-	-	XXX	XXX	X	-	-	OO
ES-255	Clastic grained	Complete	-	-	XXX	XXX	X	-	-	OO
ES-283	Clastic grained	Tangential	-	XXX	XXX	XXX	-	-	-	OO
ES-293	Clastic grained	Complete	-	-	XXX	XXX	X	-	-	OO
ES-246	Clastic grained	Suturated	-	XX	XX	XXX	XXX	-	-	SO
ES-314	Clastic grained	Suturated	-	XX	XXX	XXX	XX	-	-	SO
ES-328	Clastic grained	Suturated	-	XX	XX	XXX	XXX	-	X	SO
ES-265	Clastic grained	Suturated	-	XX	XX	XXX	XXX	X	-	SO

Supplementary Files Table 1: Thin section description of selected samples

Sample	Mineral identified								Matrix		Cement	
	Zircon	Rutile	Mica	Chlorite	Clay	Feldspar	Pyrite	Fe-oxides	Type	%	Type	%
ES-263	X	-	X	-	X	-	-	X	Siliceaus	X	Carbonated	X
ES-245	X	-	-	X	X	-	-	X	Clayey	X	-	-
ES-255	X	-	X	-	X	X	-	X	Clayey	XX	-	-
ES-283	X	X	-	-	X	-	-	X	Clayey	X	-	-
ES-293	-	X	-	-	X	-	-	X	Clayey	X	-	-
ES-246	X	X	-	-	-	-	X	X	-	-	-	-
ES-314	-	X	-	X	X	-	X	X	Clayey	X	-	-
ES-328	X	-	X	X	X	-	X	X	Clayey	X	-	-
ES-265	X	-	X	-	X	-	-	-	Clayey	X	-	-

Supplementary Files Table 2: Non-quartz mineral identified on thin section description of selected samples

Supplementary Files grain size, morphology and orientation: The following 36 pages described grain size, morphology and orientation of the selected samples through: a) their descriptive statistics, b) Rayleigh's index, c) frequency chart of the secondary axis of each particle chart (on milimetres), d) frequency chart of grains classified by Udden Wentworth scale, e) frequency chart of expressing the Round Index of each particle, f) frequency chart expressing the Circularity Index of each particle, g) Scateroplot displaying Circularity and Roundness indexes of each particle and classified as green crosses when they are primary quartz grain framework and on blue cyrcles when they are secondary quartz grain framework, h) Orientation chart. For more details: Prieto *et al.* 2020

Supplementary Files 1 from the article: Alejandro Prieto, Javier Baena Preysler, Maite García-Rojas, Álvaro Arrizabalaga and Iñaki Yusta: Quartzite procurement, not only in fluvial deposits: raw material characterisation of the lithic assemblage from Level XXII-R at El Esquilleu, Cantabrian Region, Spain. Journal of Lithic Studies

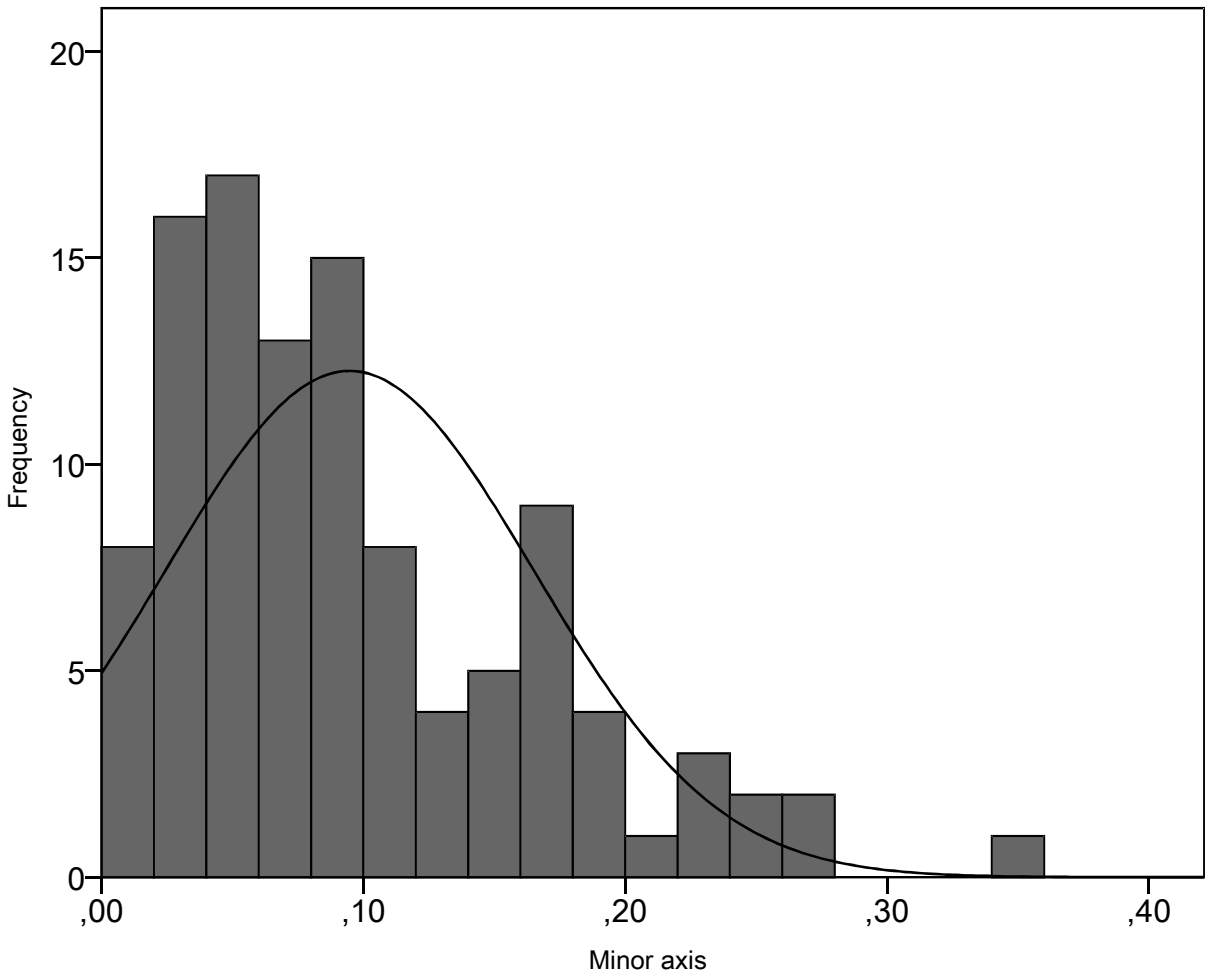
ES-263 (Nvl-XXII)

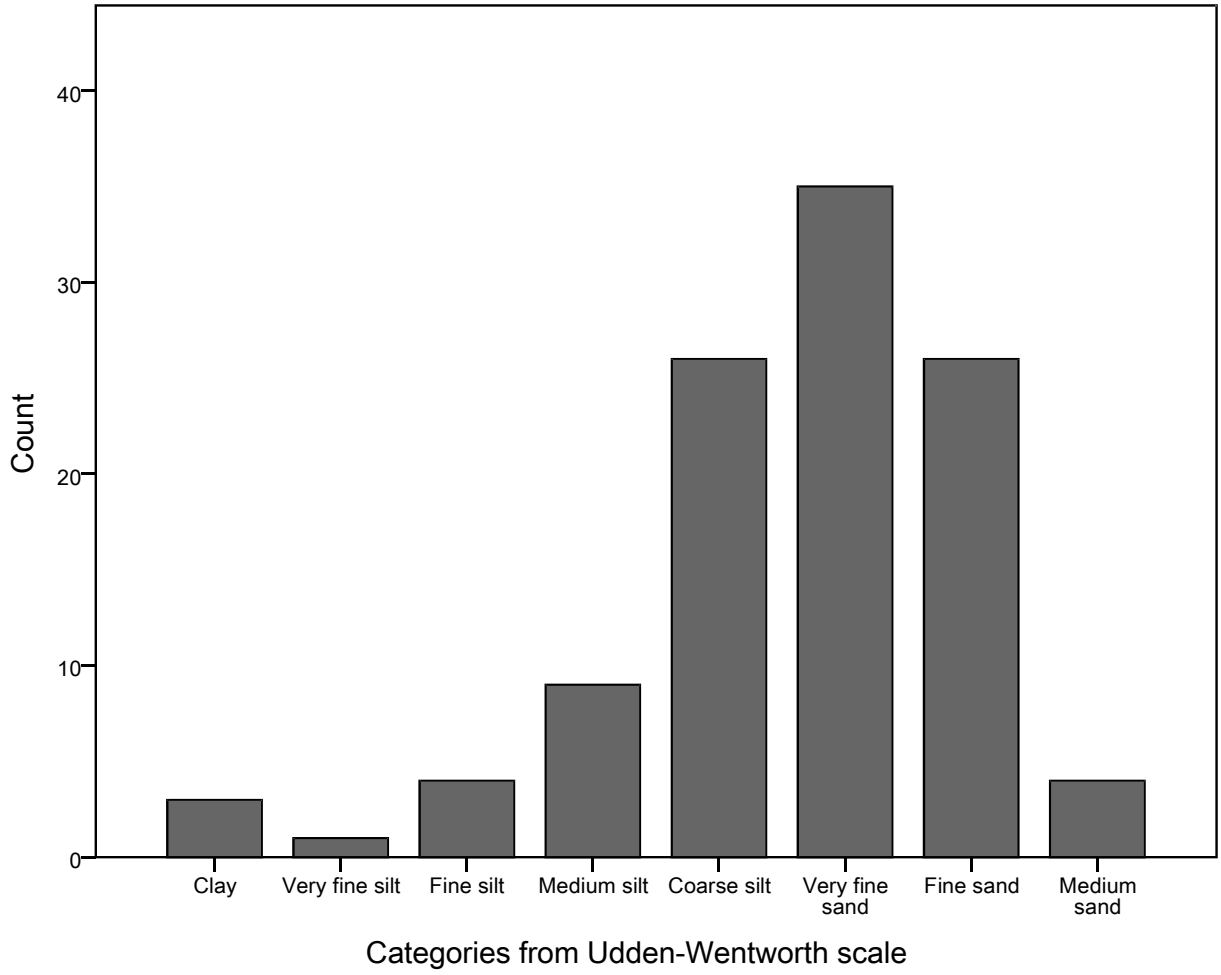
Statistics

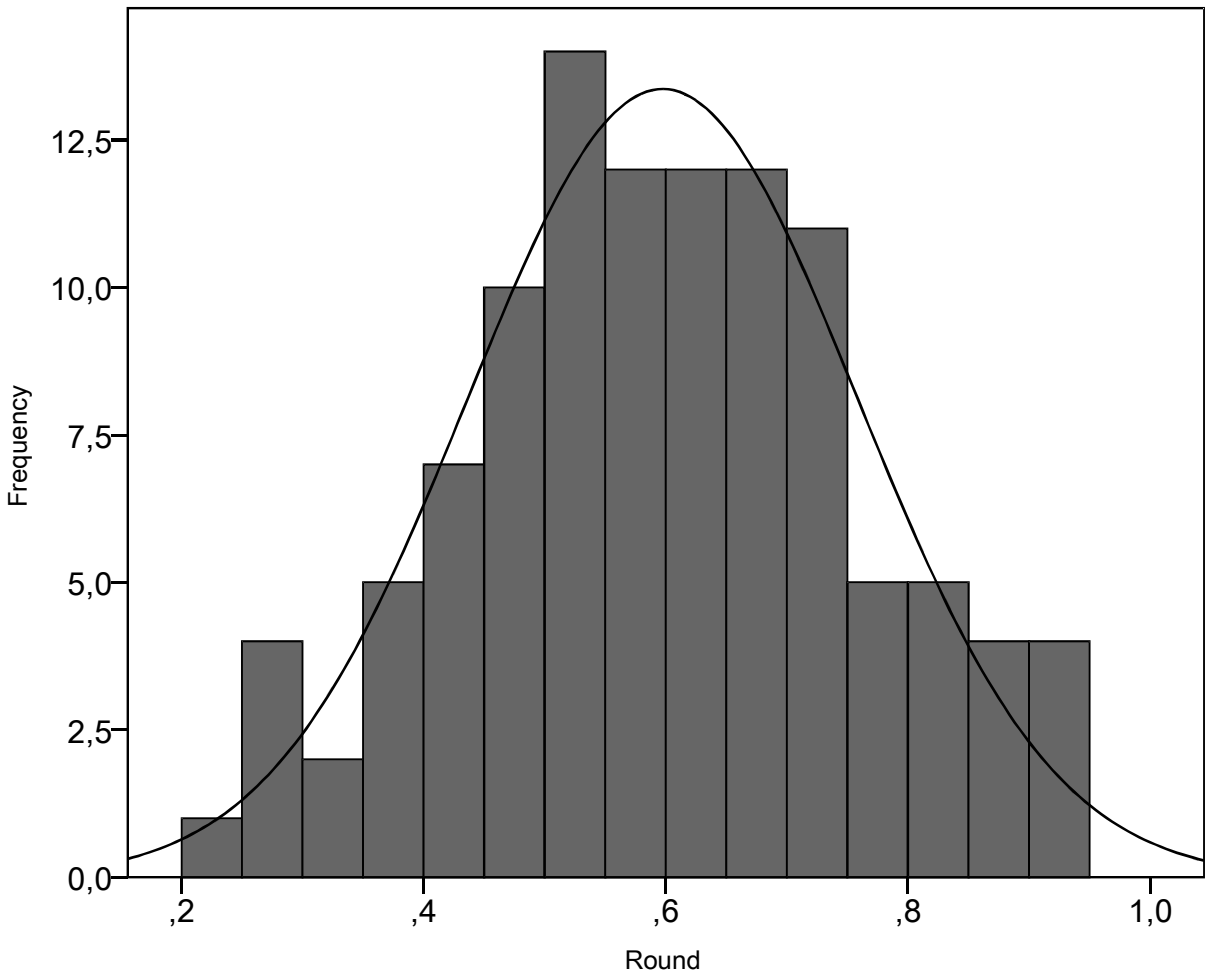
		Minor	Circ	Round
N	Valid	108	108	108
	Missing	0	0	0
Mean		,09469	,41945	,59741
Std. Error of Mean		,006761	,009860	,015511
Median		,07950	,42550	,59750
Mode		,042	,468	,375[a]
Std. Deviation		,070268	,102473	,161190
Variance		,005	,011	,026
Skewness		1,092	,172	,009
Std. Error of Skewness		,233	,233	,233
Kurtosis		,947	,201	-,489
Std. Error of Kurtosis		,461	,461	,461
Range		,349	,527	,724
Minimum		,002	,179	,213
Maximum		,351	,706	,937
Sum		10,227	45,301	64,520
Percentiles	25	,04200	,35025	,49175
	50	,07950	,42550	,59750
	75	,13900	,46750	,71900

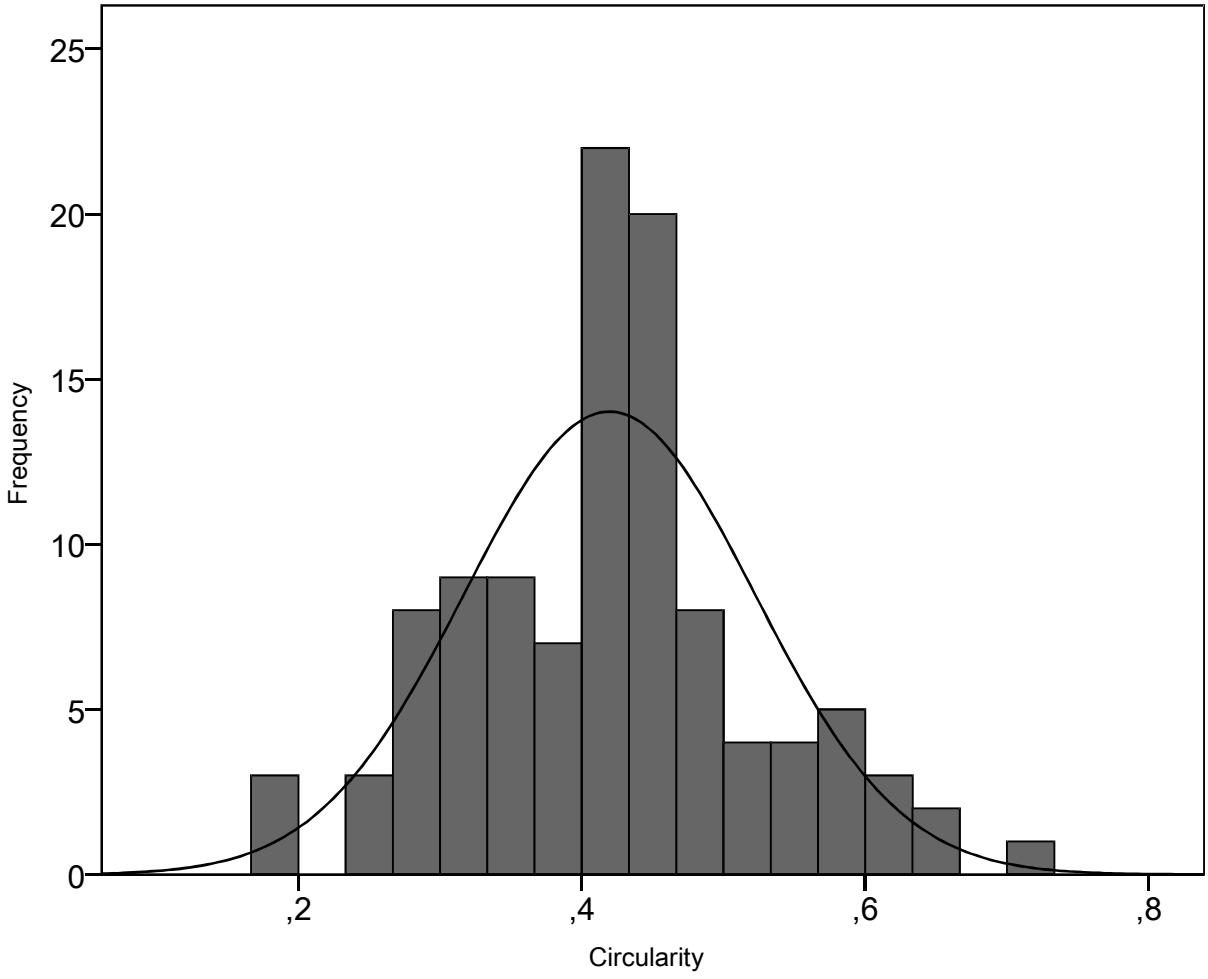
a. Multiple modes exist. The smallest value is shown

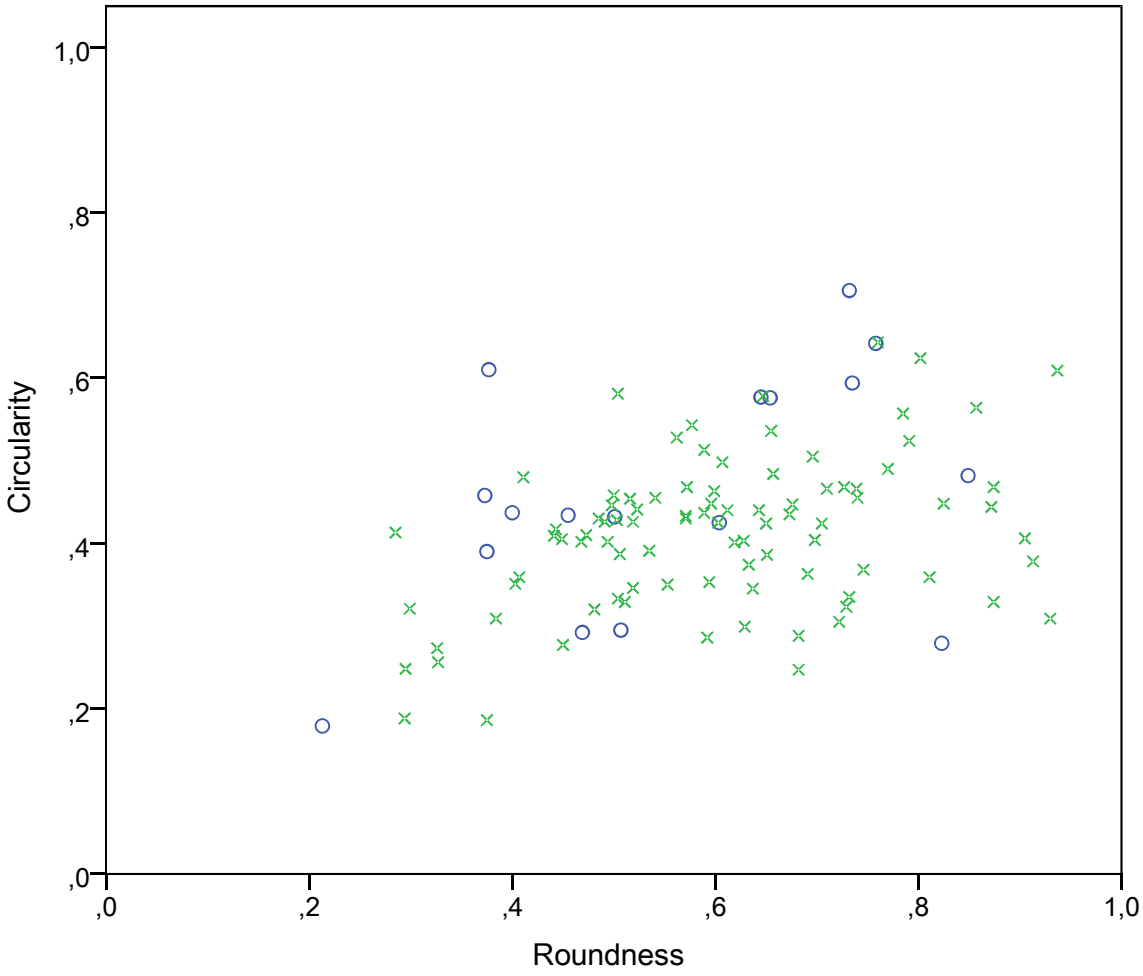
Circular mean:	135,62		ES-263
95% conf dence:	(90,62, 180,6)		
Rayleigh´s R:	0,08768	p (uniform):	0,50188


20
15
10
5
0
Frequency
,00
,10
,20
,30
,40
Minor axis

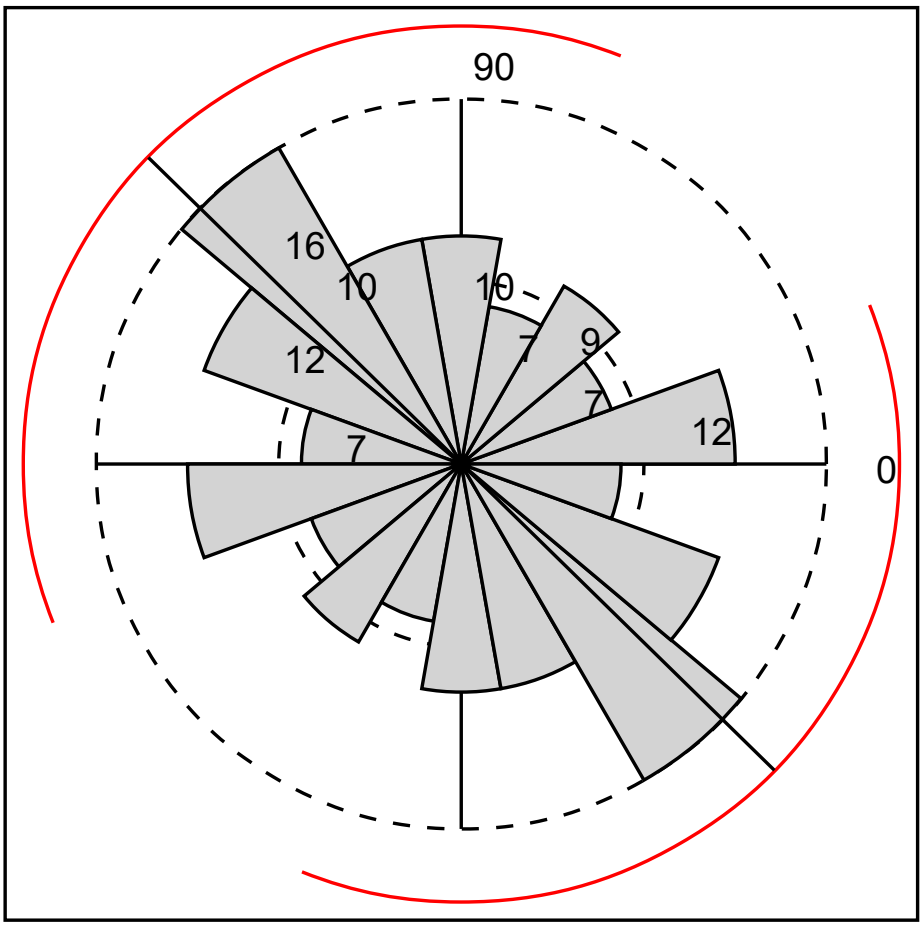

40
30
20
10
0
Count
Clay
Very fine silt
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Medium sand
Categories from Udden-Wentworth scale


12,5
10,0
7,5
5,0
2,5
0,0
Frequency
,2
,4
,6
,8
1,0
Round


25
20
15
10
5
0
Frequency
,2
,4
,6
,8
Circularity


1,0
,8
,6
,4
,2
,0
Circularity
,0
,2
,4
,6
,8
1,0
Roundness

Angle


90
16
10
10
7
9
12
7
7
12
0

ES-245 (NvI-XXII)

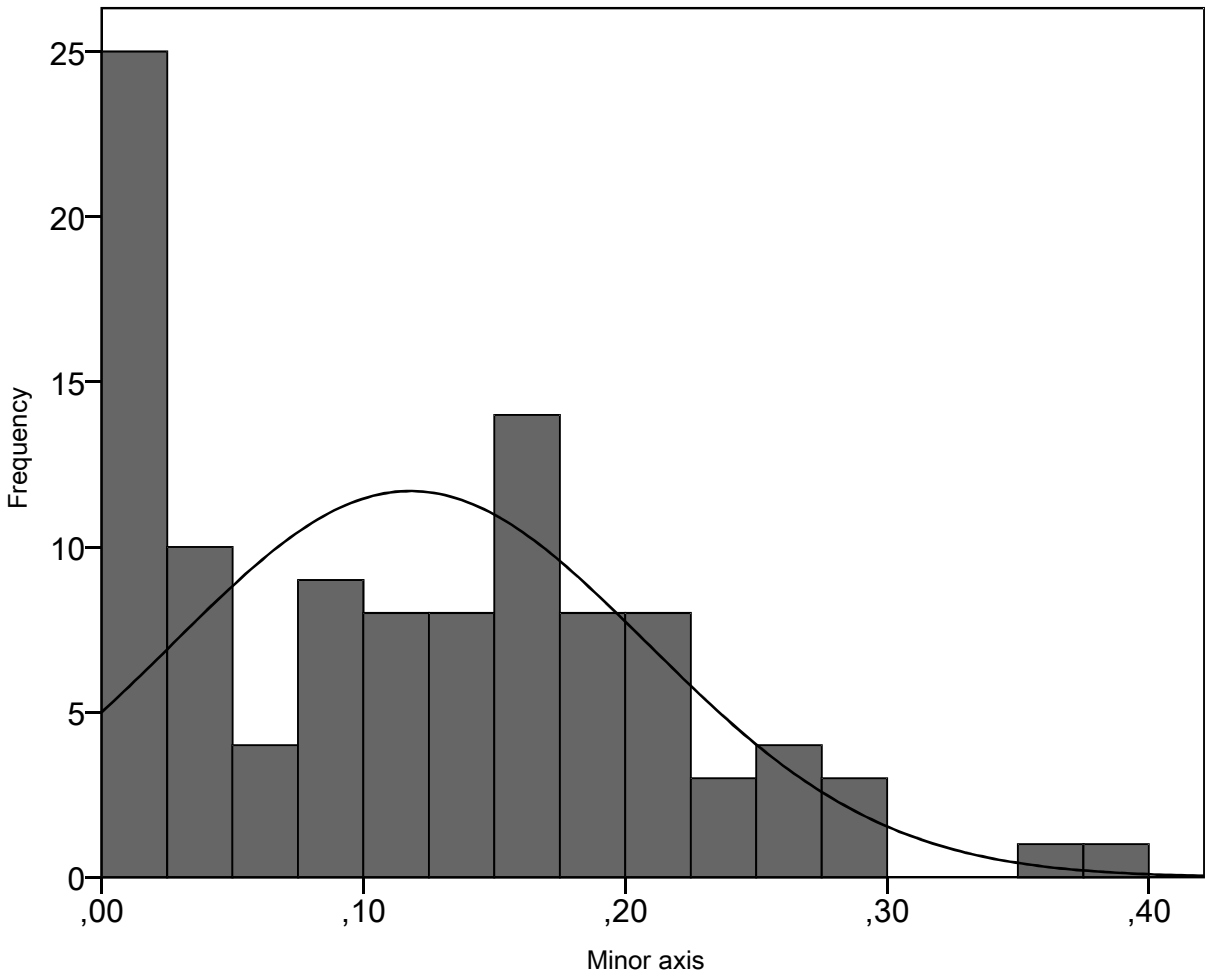
Statistics

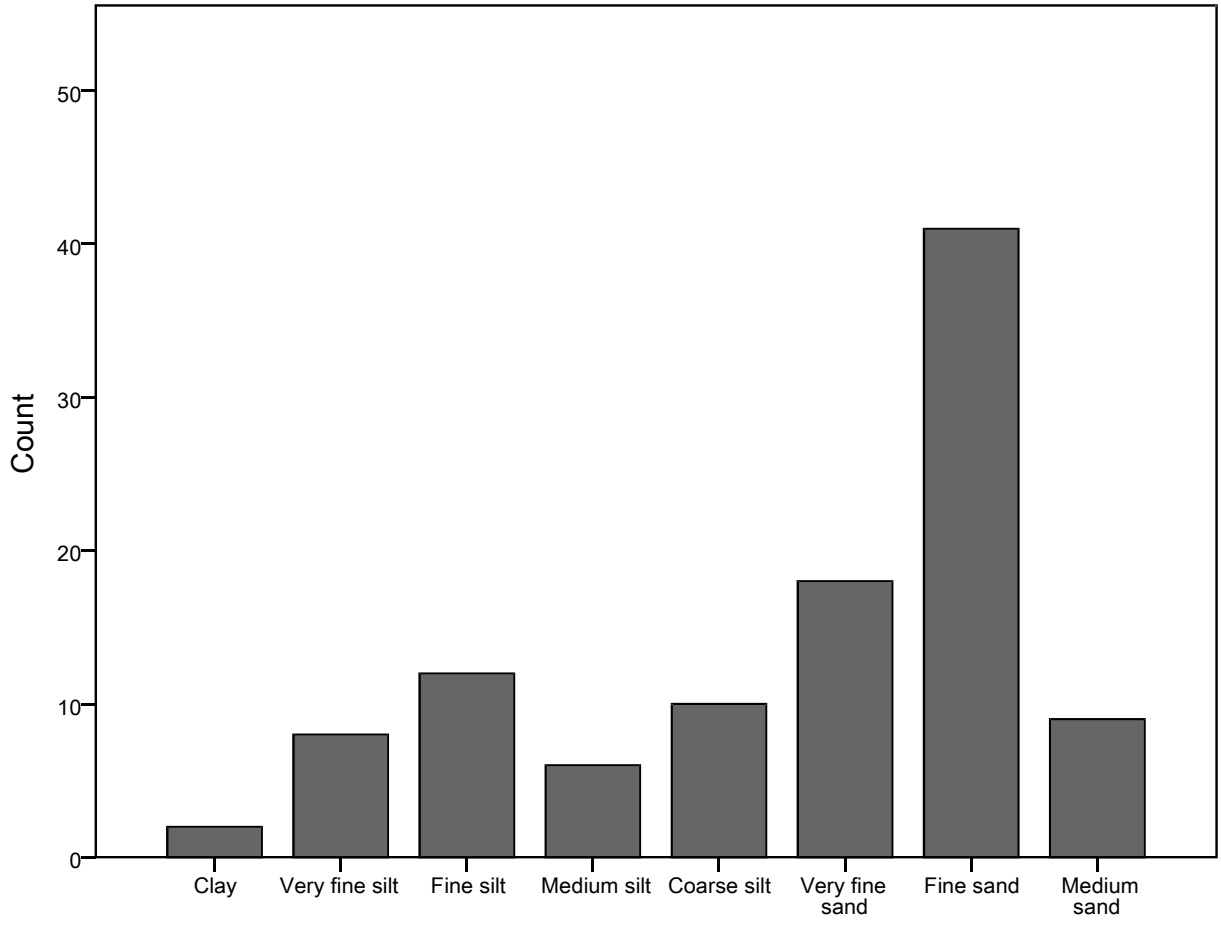
		Minor	Circ	Round
N	Valid	106	106	106
	Missing	0	0	0
Mean		,11789	,49925	,58741
Std. Error of Mean		,008783	,017017	,016039
Median		,11200	,48700	,58450
Mode		,011	,201[a]	,394[a]
Std. Deviation		,090422	,175196	,165135
Variance		,008	,031	,027
Skewness		,508	,526	,134
Std. Error of Skewness		,235	,235	,235
Kurtosis		-,387	,205	-,705
Std. Error of Kurtosis		,465	,465	,465
Range		,377	,878	,711
Minimum		,003	,122	,236
Maximum		,380	1,000	,947
Sum		12,496	52,921	62,265
Percentiles	25	,02500	,38200	,44950
	50	,11200	,48700	,58450
	75	,17975	,58500	,69975

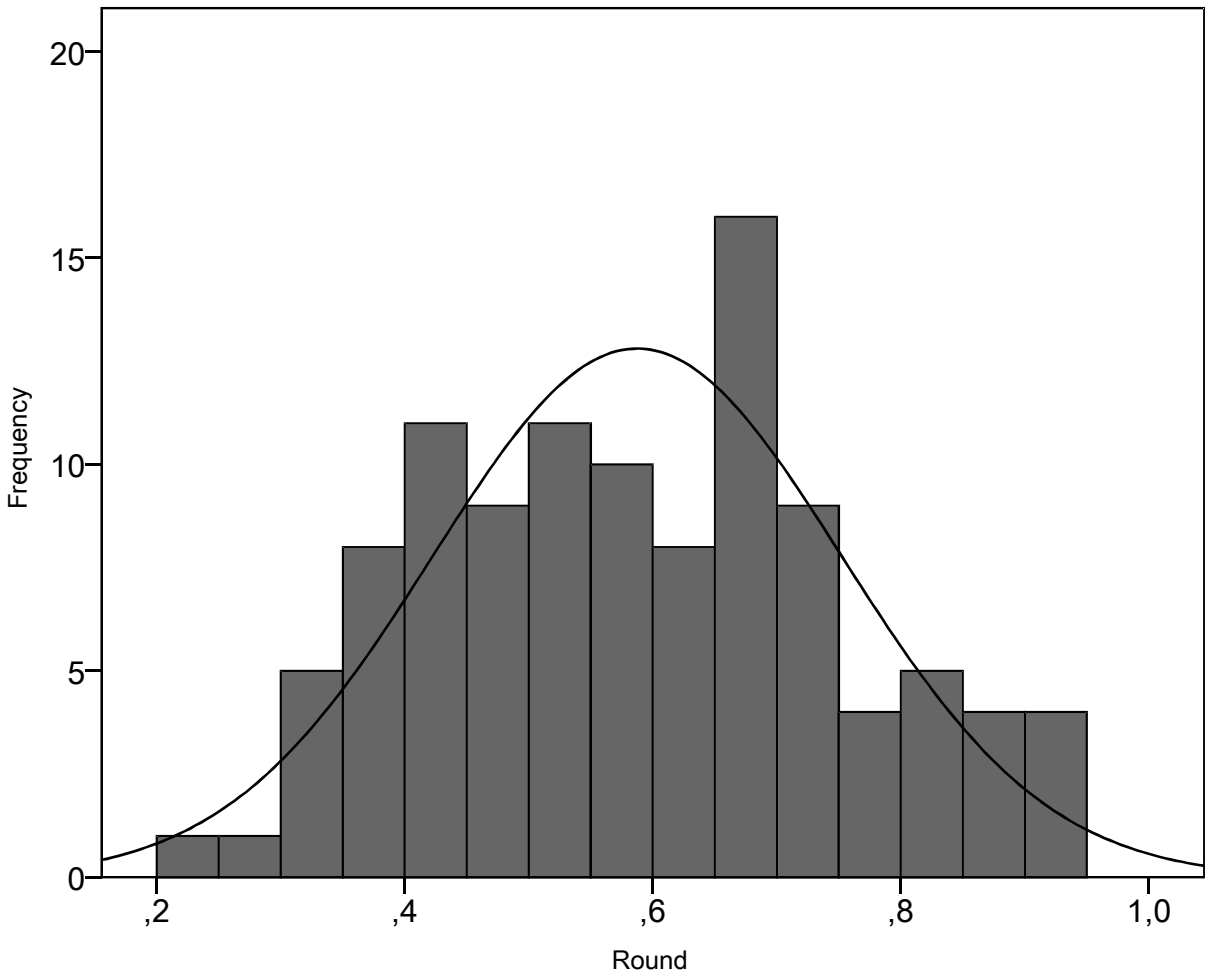
a. Multiple modes exist. The smallest value is shown

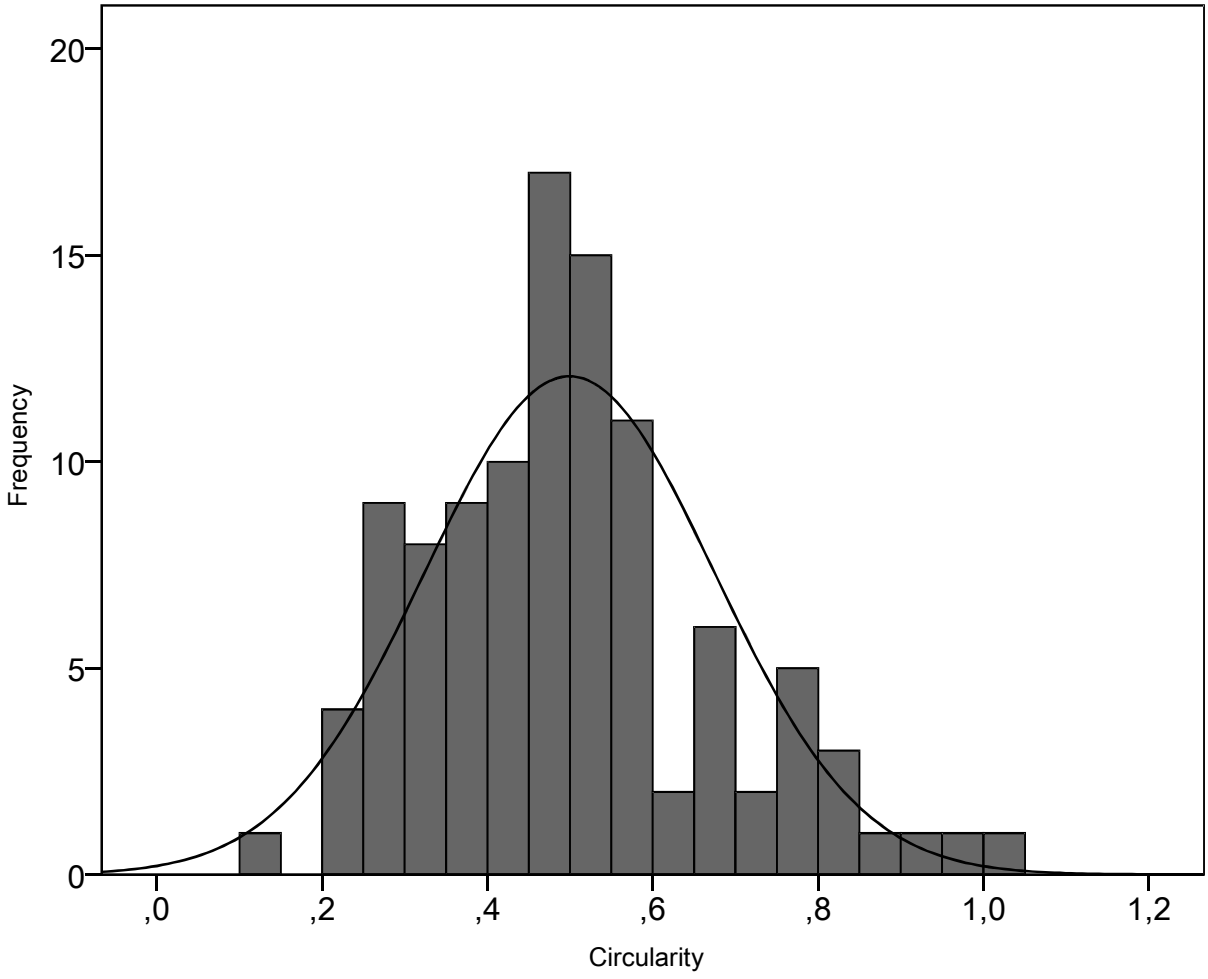
Statistics

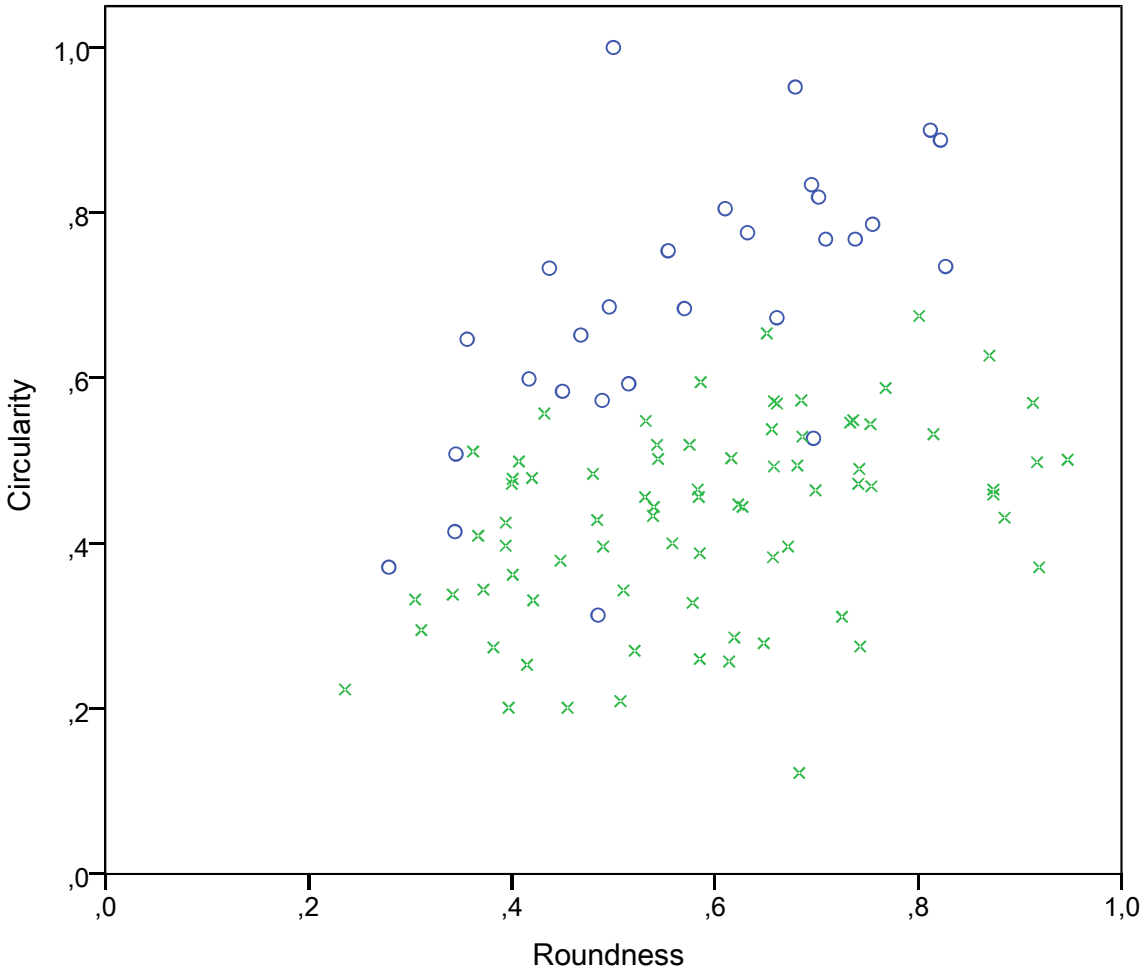
Circular mean:	174,34		ES-245
95% conf dence:	(164,4, 184,3)		
Rayleigh´s R:	0,3951	p (uniform):	5,60E-07


25
20
15
10
5
0
Frequency
,00
,10
,20
,30
,40
Minor axis

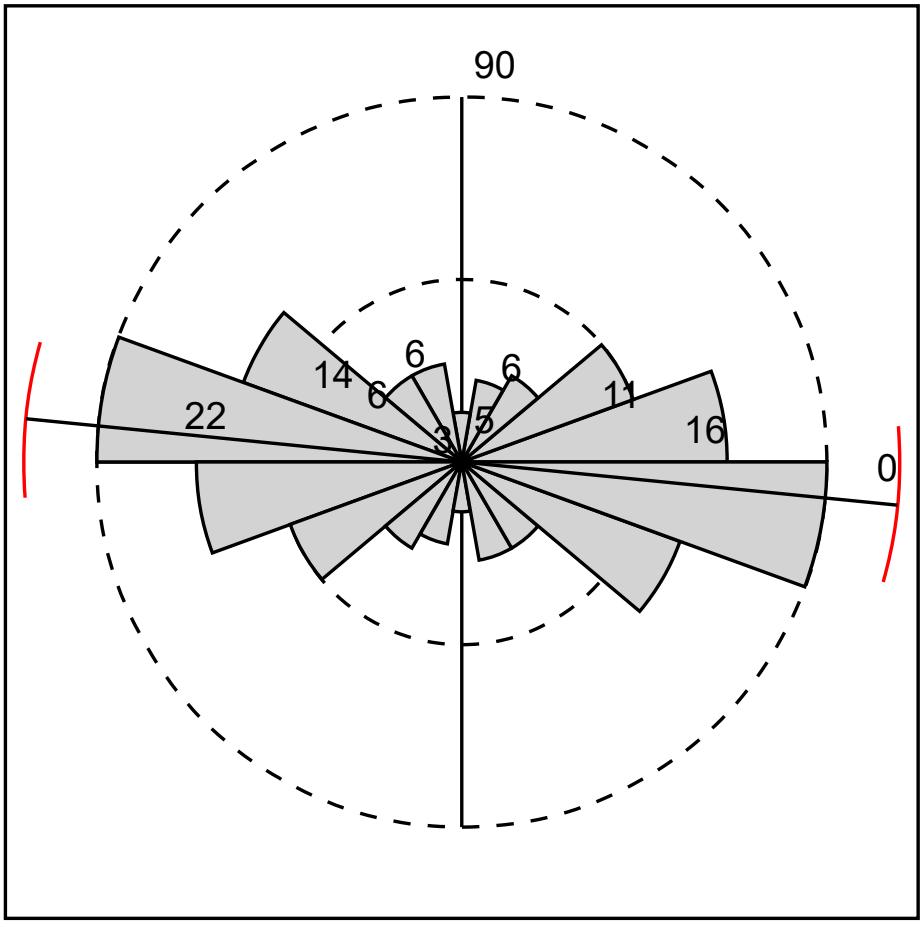

50
40
30
20
10
0
Count
Clay
Very fine silt
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Medium sand
Categories from Udden-Wentworth scale


20
15
10
5
0
Frequency
,2
,4
,6
,8
1,0
Round


20
15
10
5
0
Frequency
,0
,2
,4
,6
,8
1,0
1,2
Circularity


1,0
,8
,6
,4
,2
,0
Circularity
,0
,2
,4
,6
,8
1,0
Roundness

Angle


90
22
14
6
6
6
5
3
11
16
0

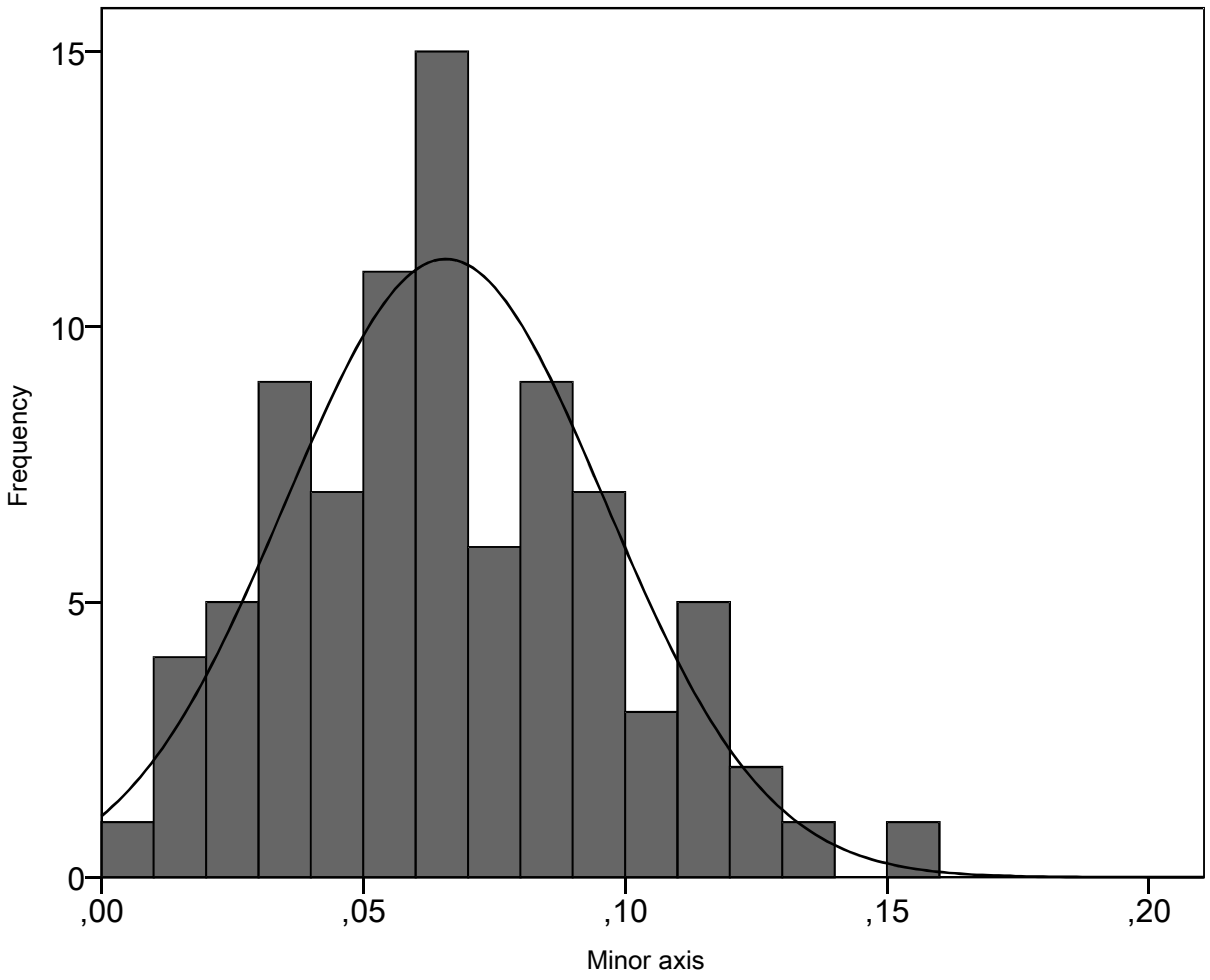
ES-255 (NvI-XXII)

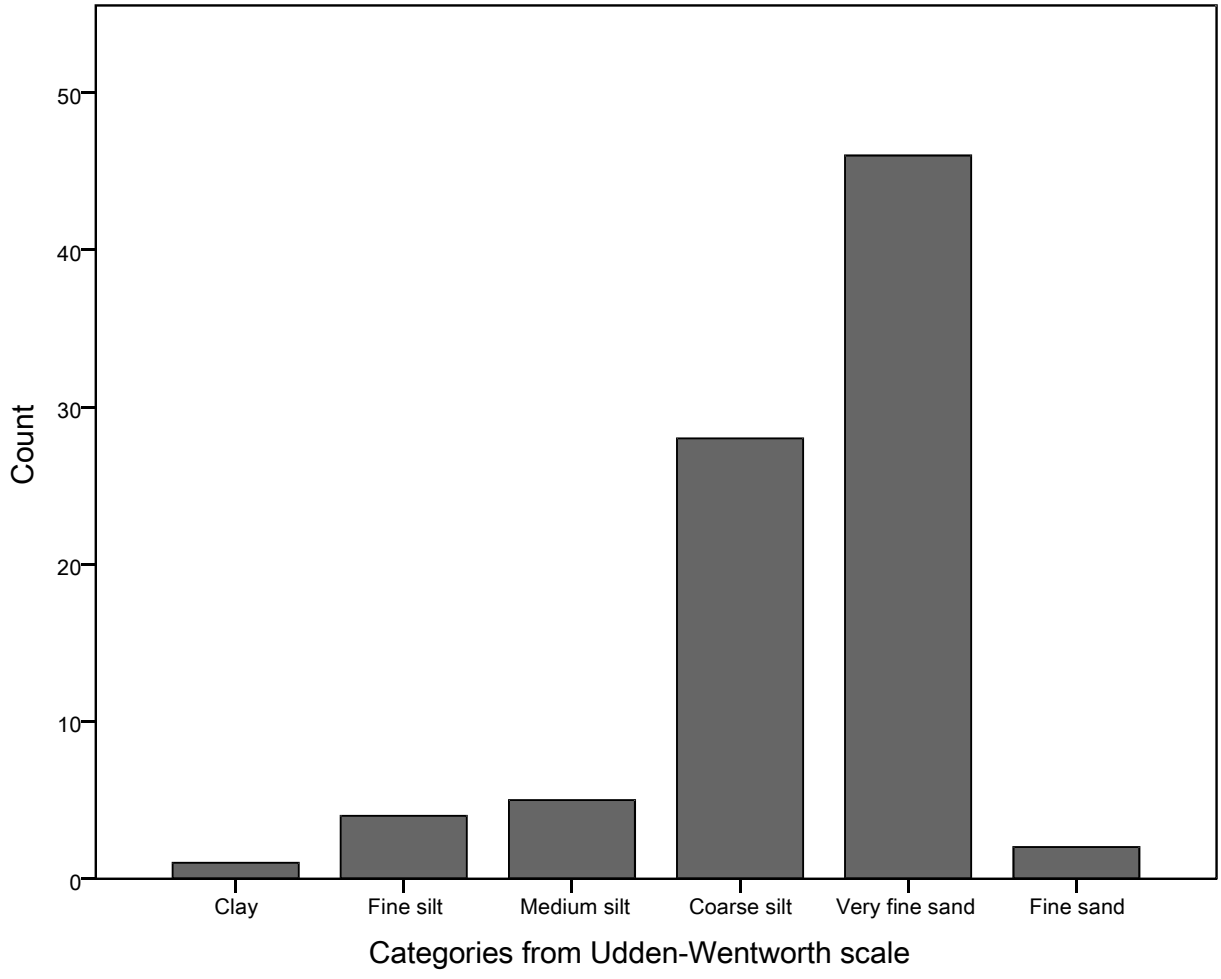
Statistics

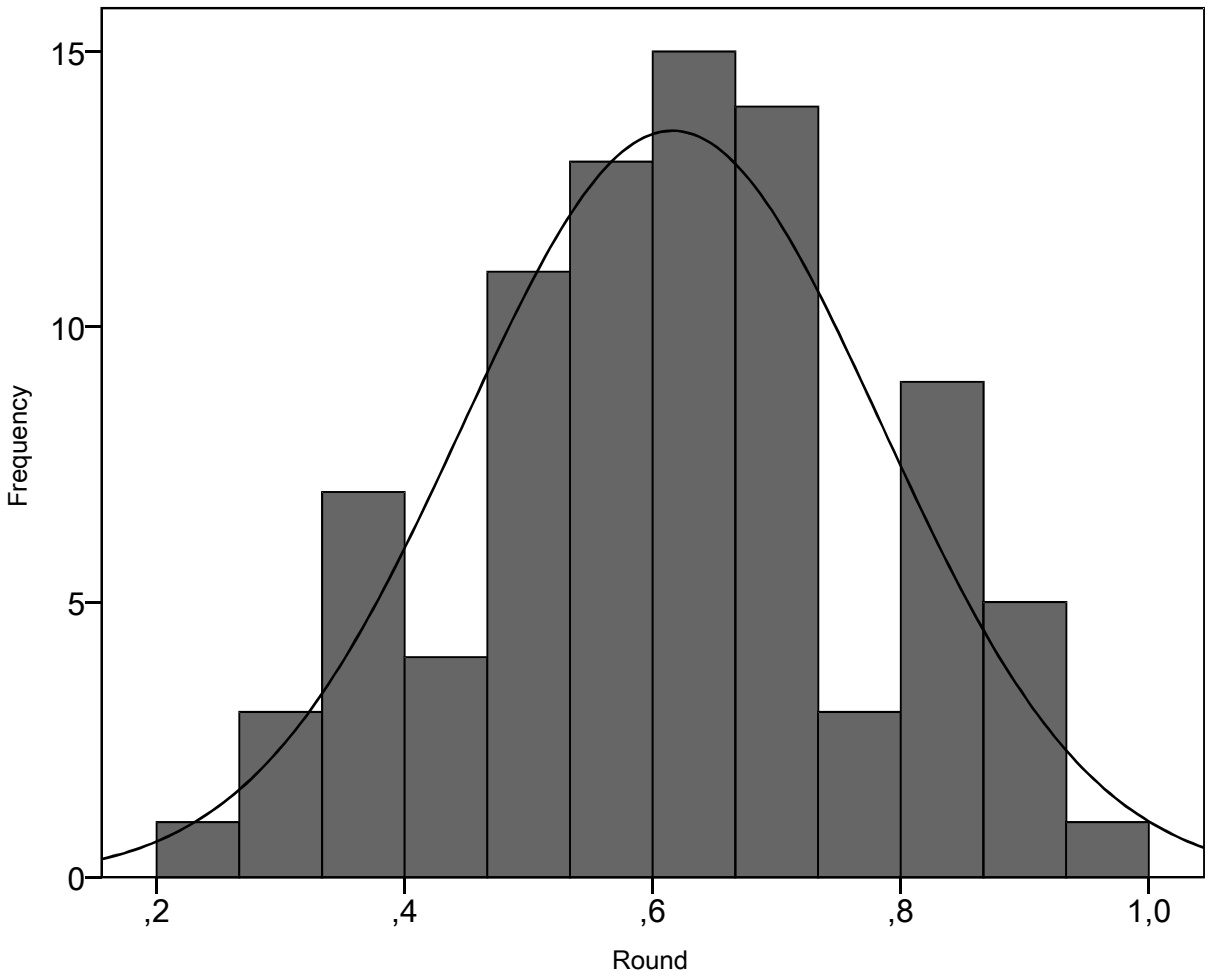
		Minor	Circ	Round
N	Valid	86	86	86
	Missing	0	0	0
Mean		,06571	,42240	,61580
Std. Error of Mean		,003294	,010674	,018187
Median		,06600	,42750	,61050
Mode		,052[a]	,240[a]	,345[a]
Std. Deviation		,030549	,098988	,168656
Variance		,001	,010	,028
Skewness		,326	,087	-,006
Std. Error of Skewness		,260	,260	,260
Kurtosis		-,168	-,216	-,583
Std. Error of Kurtosis		,514	,514	,514
Range		,149	,476	,719
Minimum		,003	,209	,257
Maximum		,152	,685	,976
Sum		5,651	36,326	52,959
Percentiles	25	,04100	,34750	,48850
	50	,06600	,42750	,61050
	75	,08700	,49050	,71800

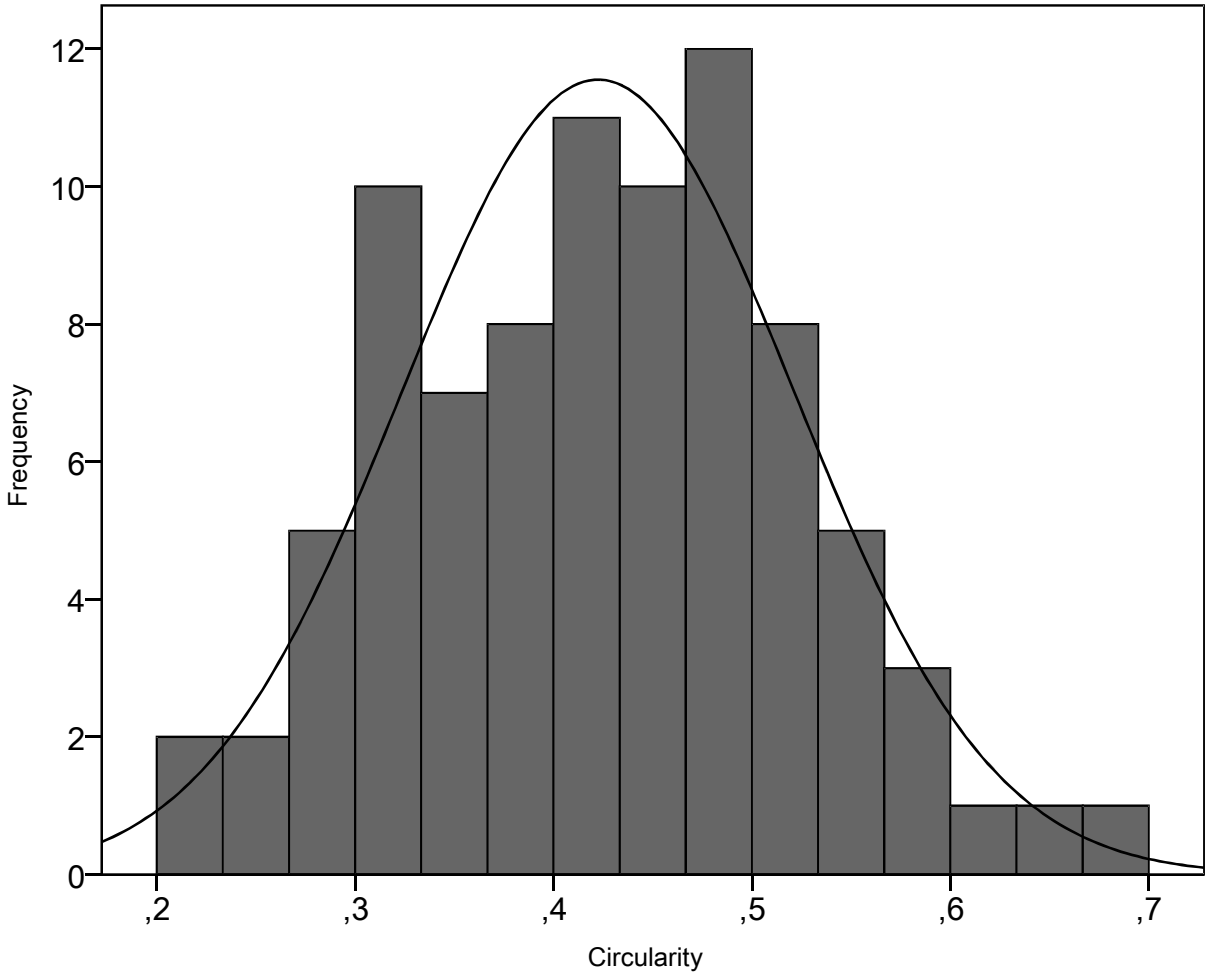
a. Multiple modes exist. The smallest value is shown

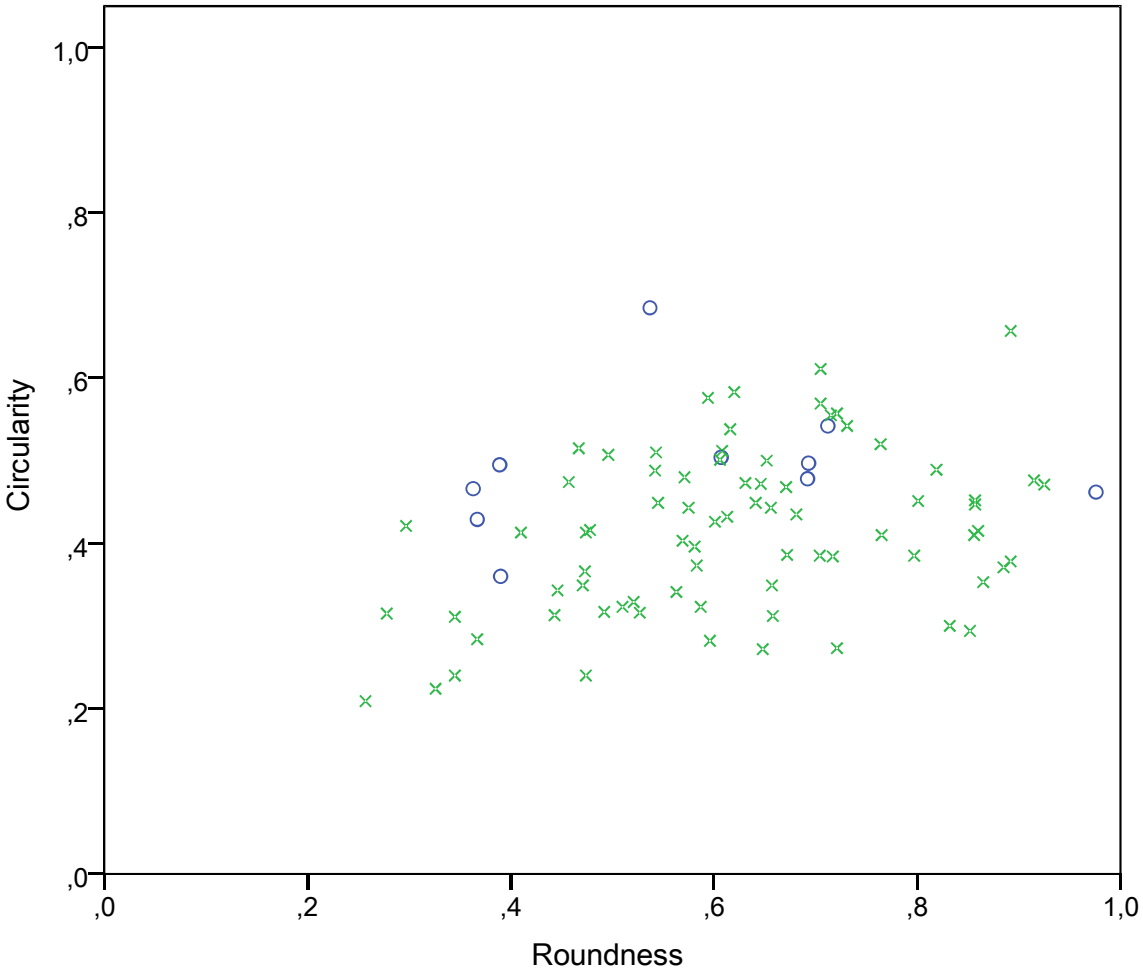
Circular mean:	167,26		ES-255
95% conf dence:	(153,8, 180,7)		
Rayleigh´s R:	0,3611	p (uniform):	0,00011093


15
10
5
0
Frequency
,00
,05
,10
,15
,20
Minor axis

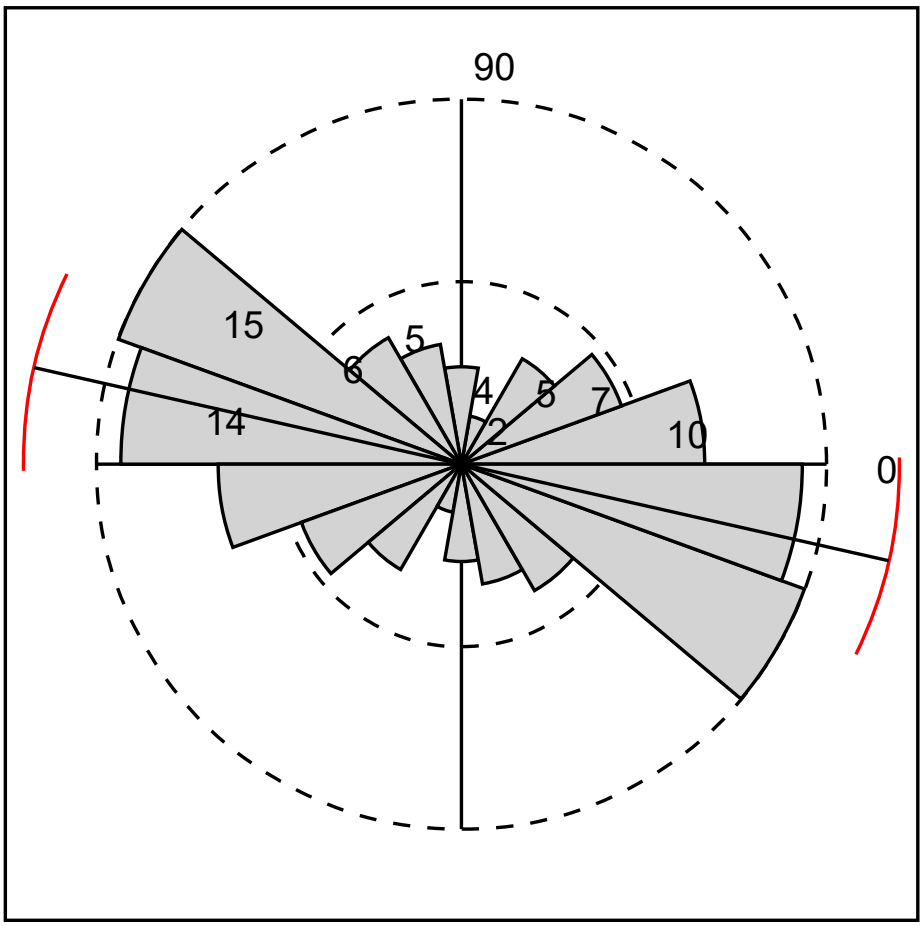

50
40
30
20
10
0
Count
Clay
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Categories from Udden-Wentworth scale


15
10
5
0
Frequency
,2
,4
,6
,8
1,0
Round


12
10
8
6
4
2
0
Frequency
,2
,3
,4
,5
,6
,7
Circularity



Angle



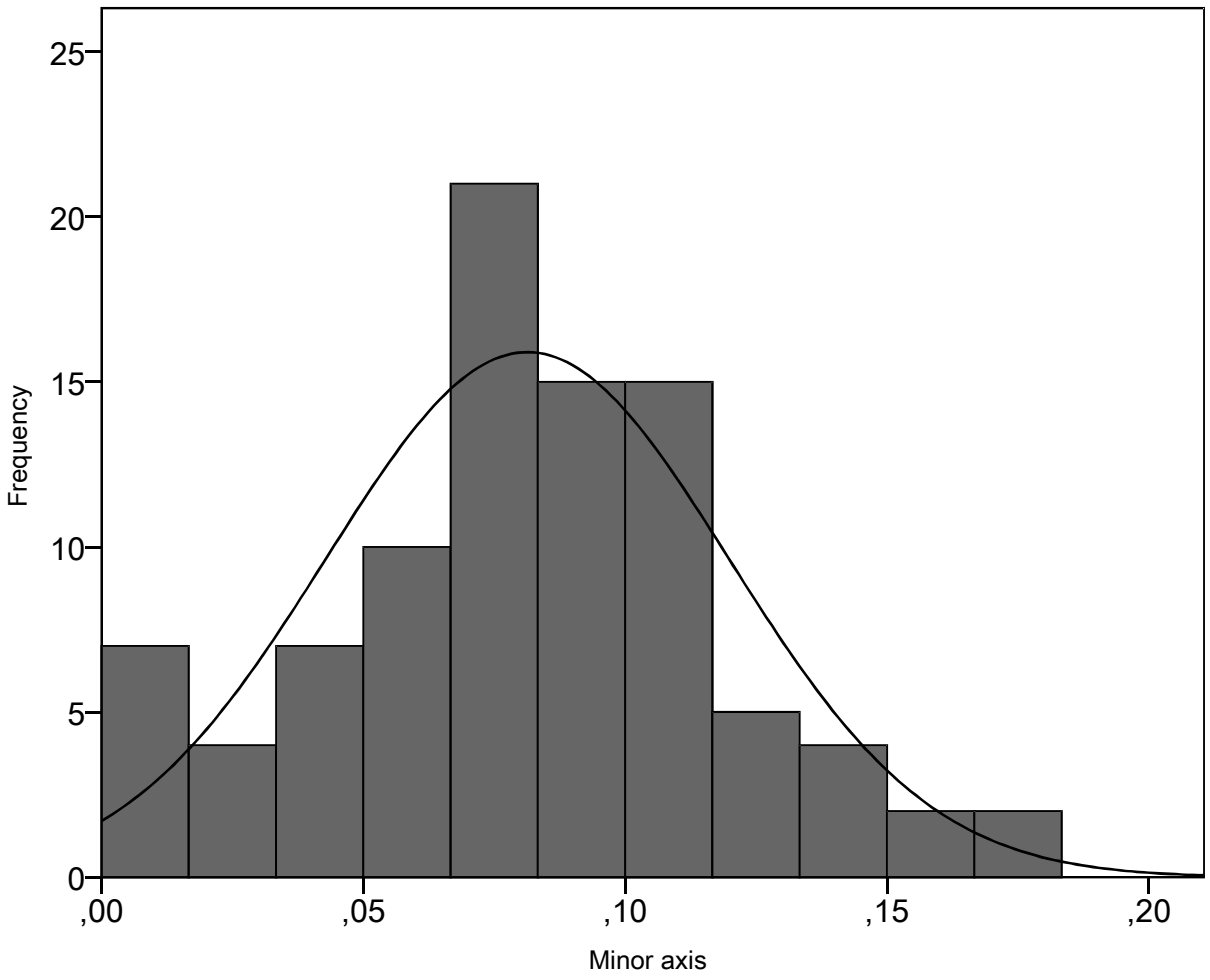
ES-283 (NvI-XXII)

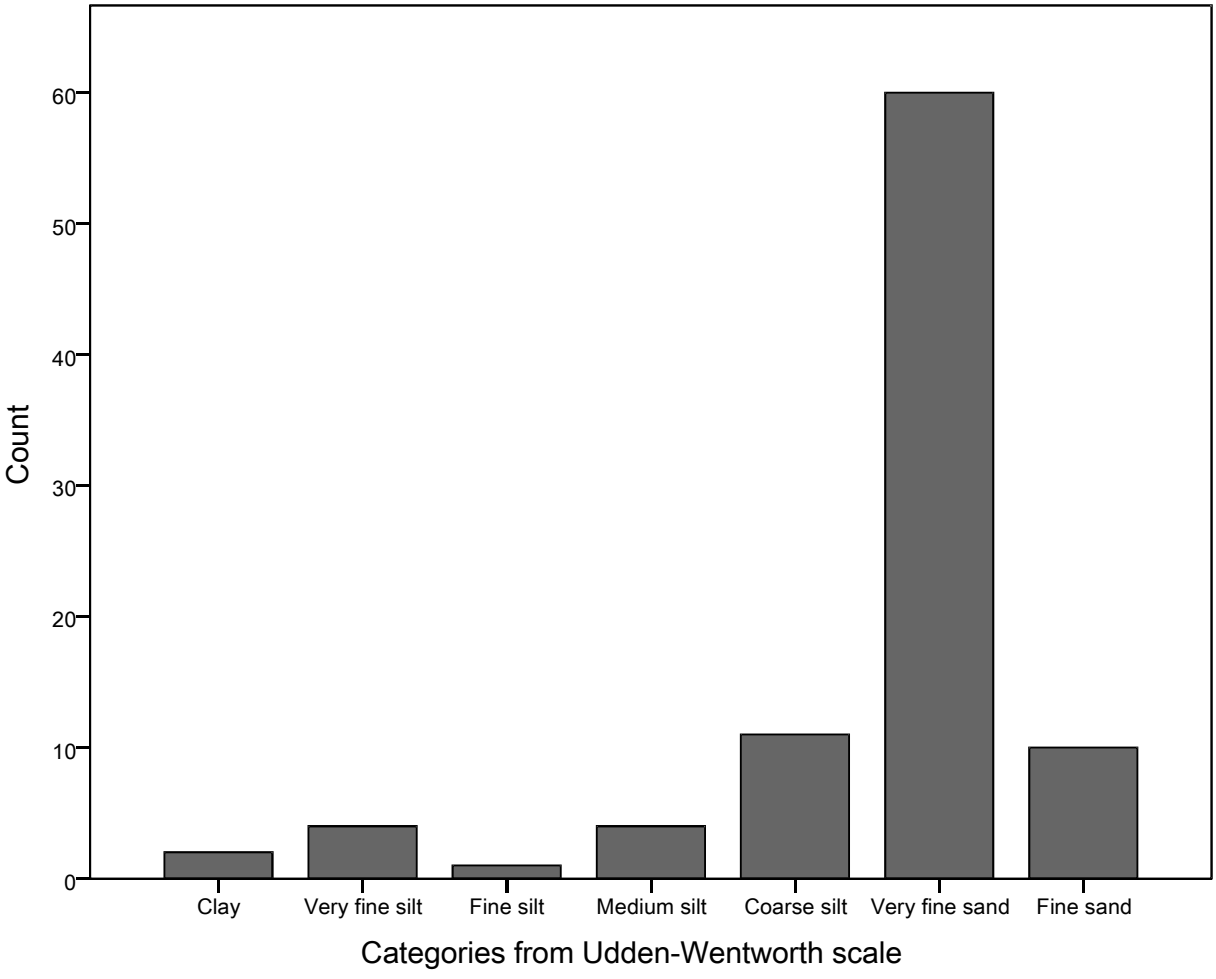
Statistics

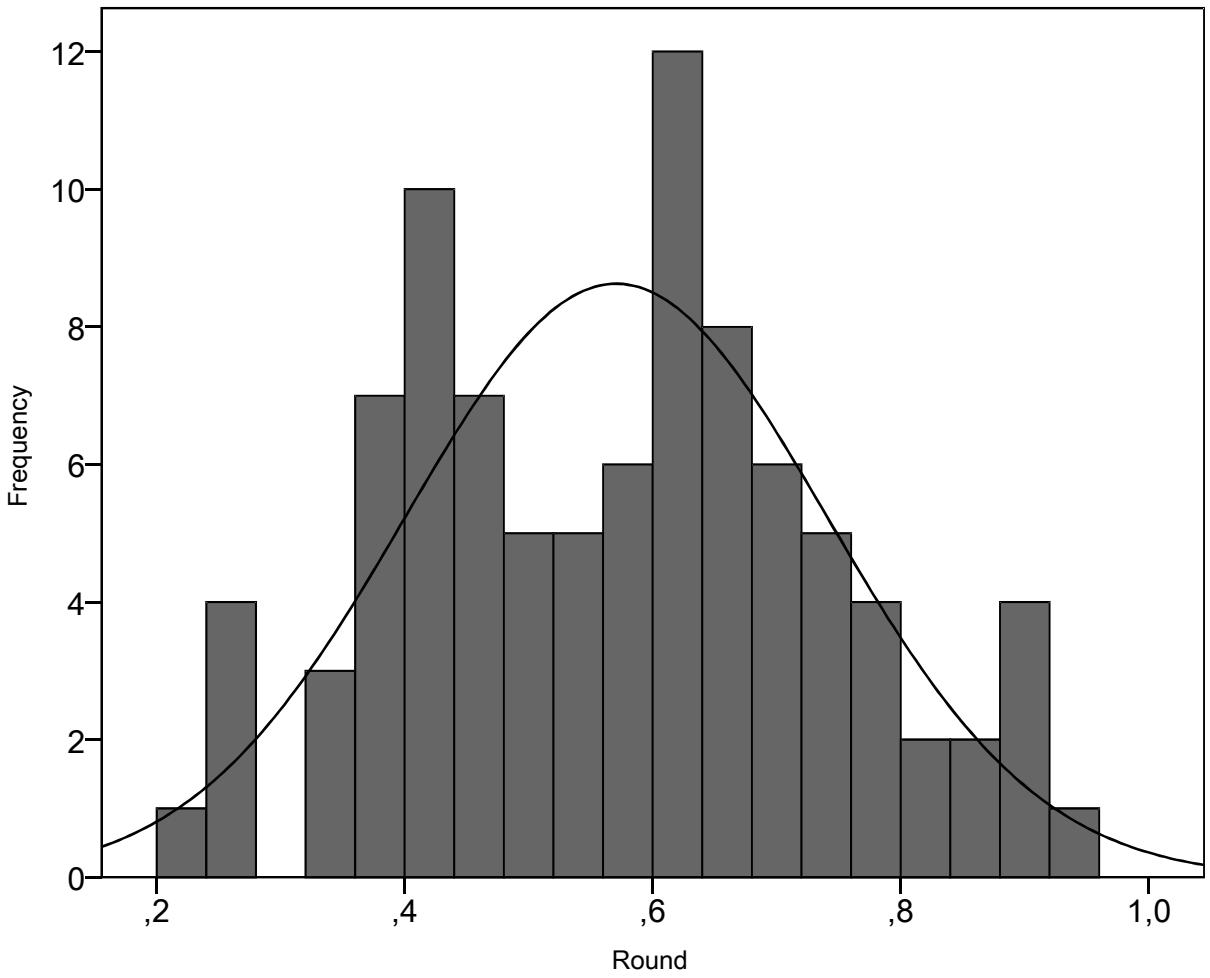
		Minor	Circ	Round
N	Valid	92	92	92
	Missing	0	0	0
Mean		,08133	,50884	,57050
Std. Error of Mean		,004012	,015489	,017746
Median		,08000	,50200	,58750
Mode		,070[a]	,516	,373[a]
Std. Deviation		,038479	,148564	,170212
Variance		,001	,022	,029
Skewness		,019	,301	,108
Std. Error of Skewness		,251	,251	,251
Kurtosis		,190	,234	-,637
Std. Error of Kurtosis		,498	,498	,498
Range		,181	,752	,688
Minimum		,002	,187	,238
Maximum		,183	,939	,926
Sum		7,482	46,813	52,486
Percentiles	25	,06300	,42000	,42775
	50	,08000	,50200	,58750
	75	,10700	,60875	,68650

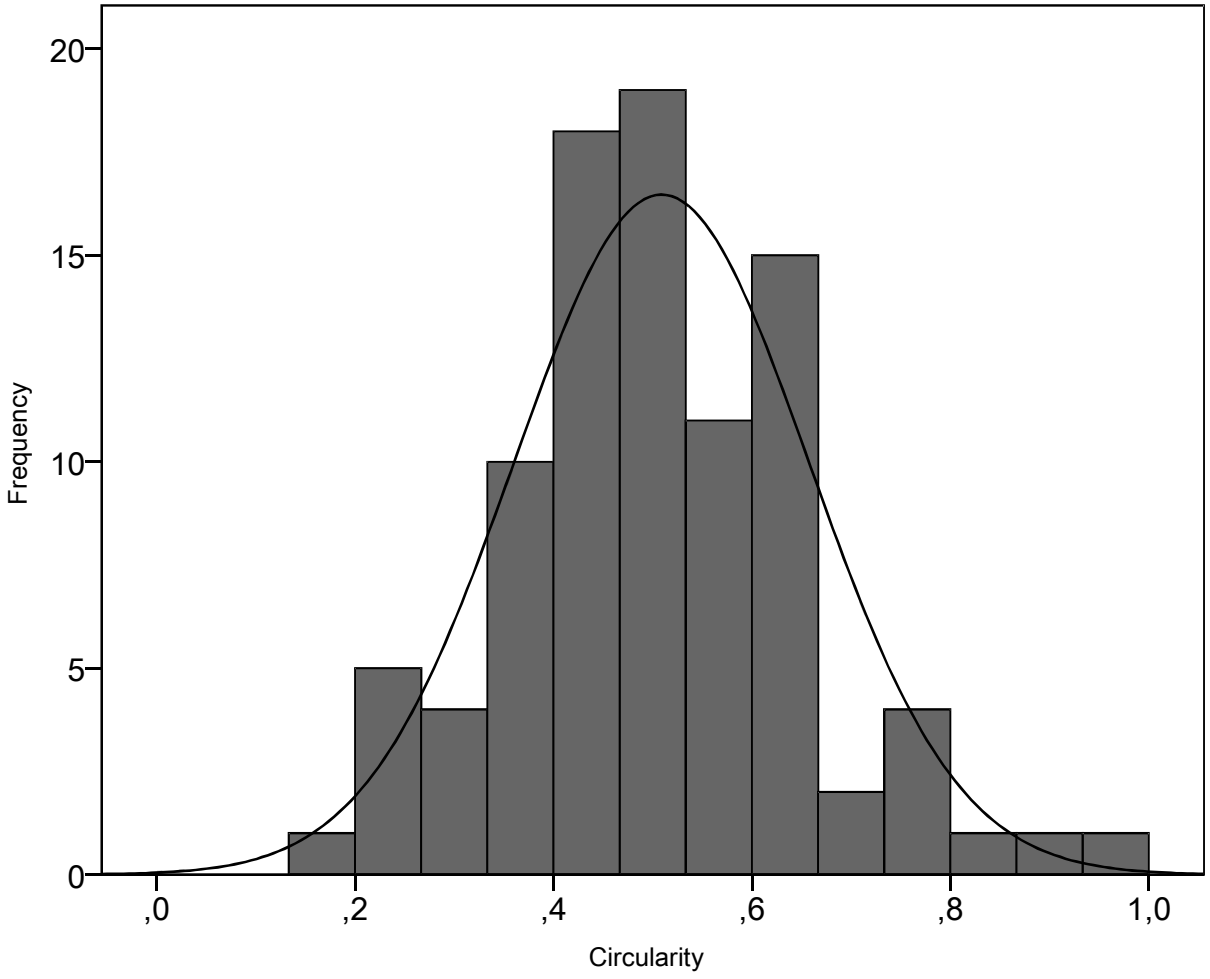
a. Multiple modes exist. The smallest value is shown

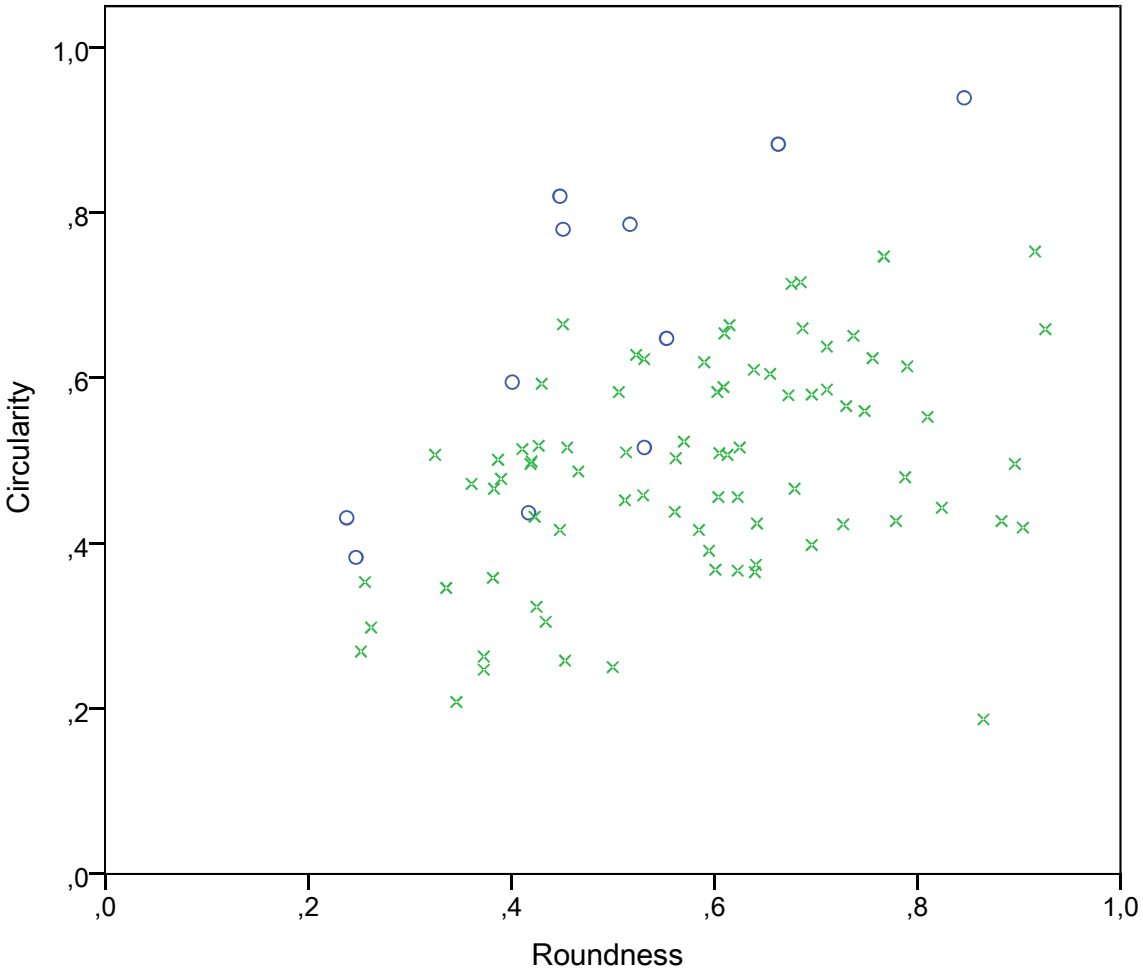
Circular mean:	7,1654	ES-283	
95% conf dence:	(-4,342, 18,67)		
Rayleigh´s R:	0,3694	p (uniform):	1,74E-05


25
20
15
10
5
0
Frequency
,00
,05
,10
,15
,20
Minor axis

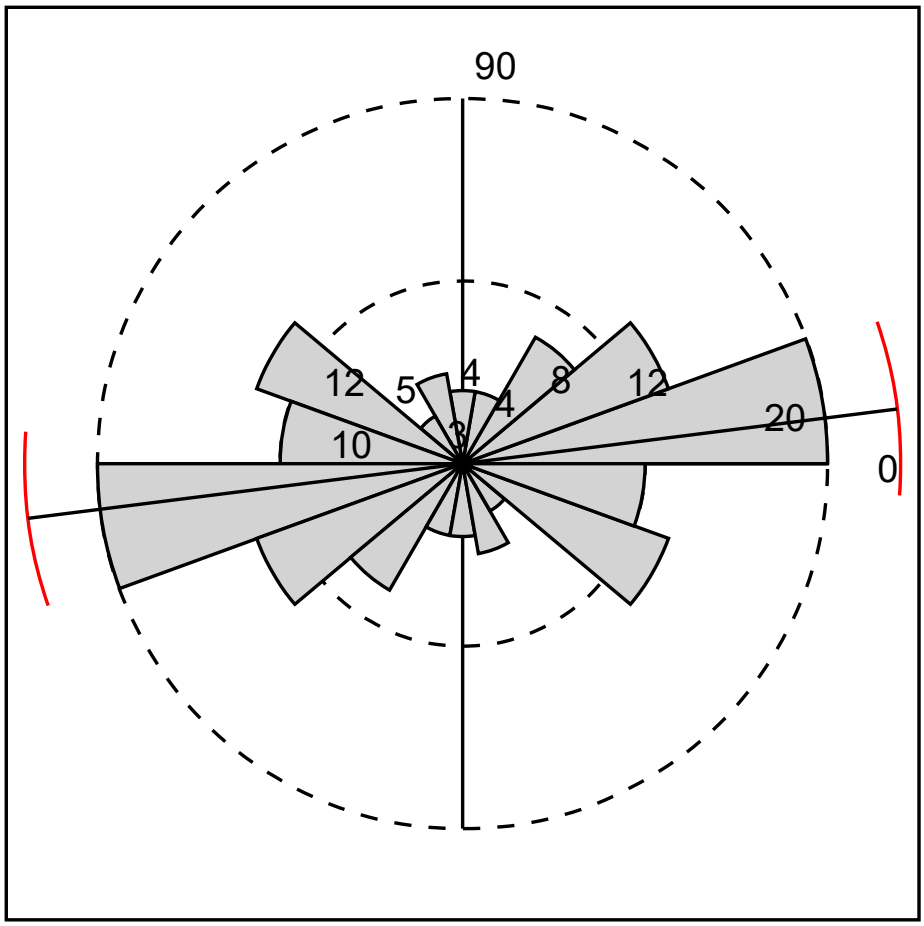

60
50
40
30
20
10
0
Count
Clay
Very fine silt
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Categories from Udden-Wentworth scale


12
10
8
6
4
2
0
Frequency
,2
,4
,6
,8
1,0
Round


20
15
10
5
0
Frequency
,0
,2
,4
,6
,8
1,0
Circularity


1,0
,8
,6
,4
,2
,0
Circularity
,0
,2
,4
,6
,8
1,0
Roundness

Angle


90
12
5
4
4
8
12
20
10
3
0

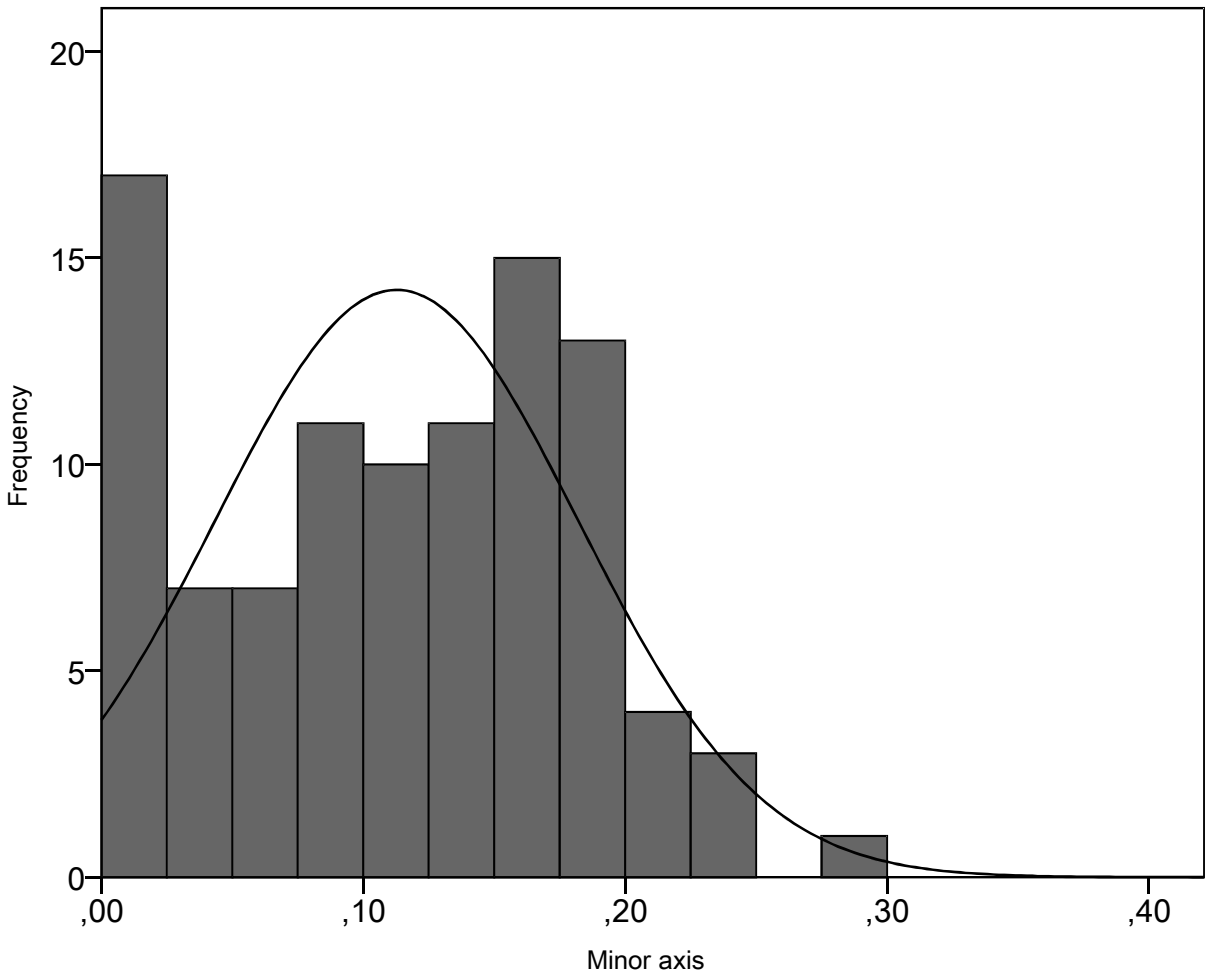
ES-293 (Nvl-XXII)

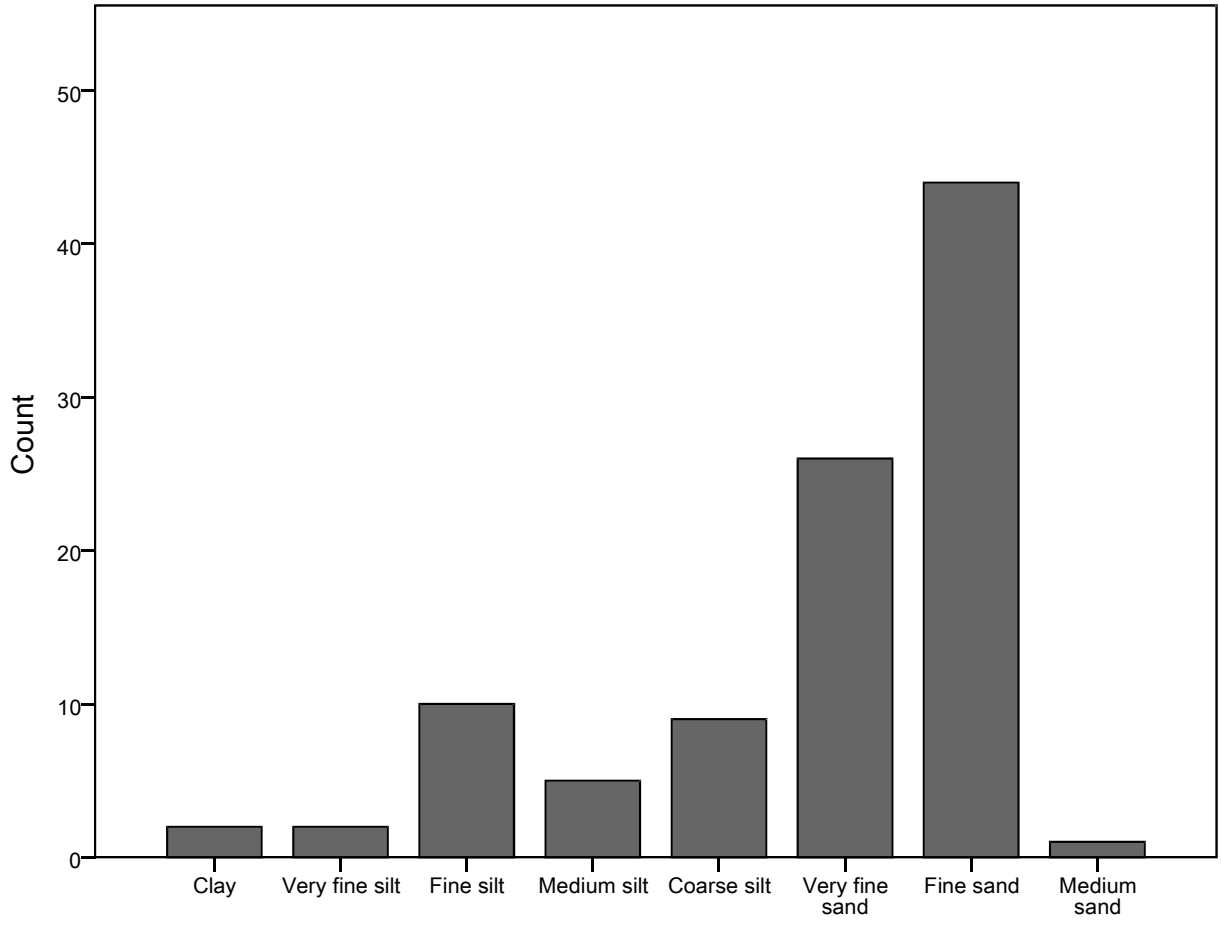
Statistics

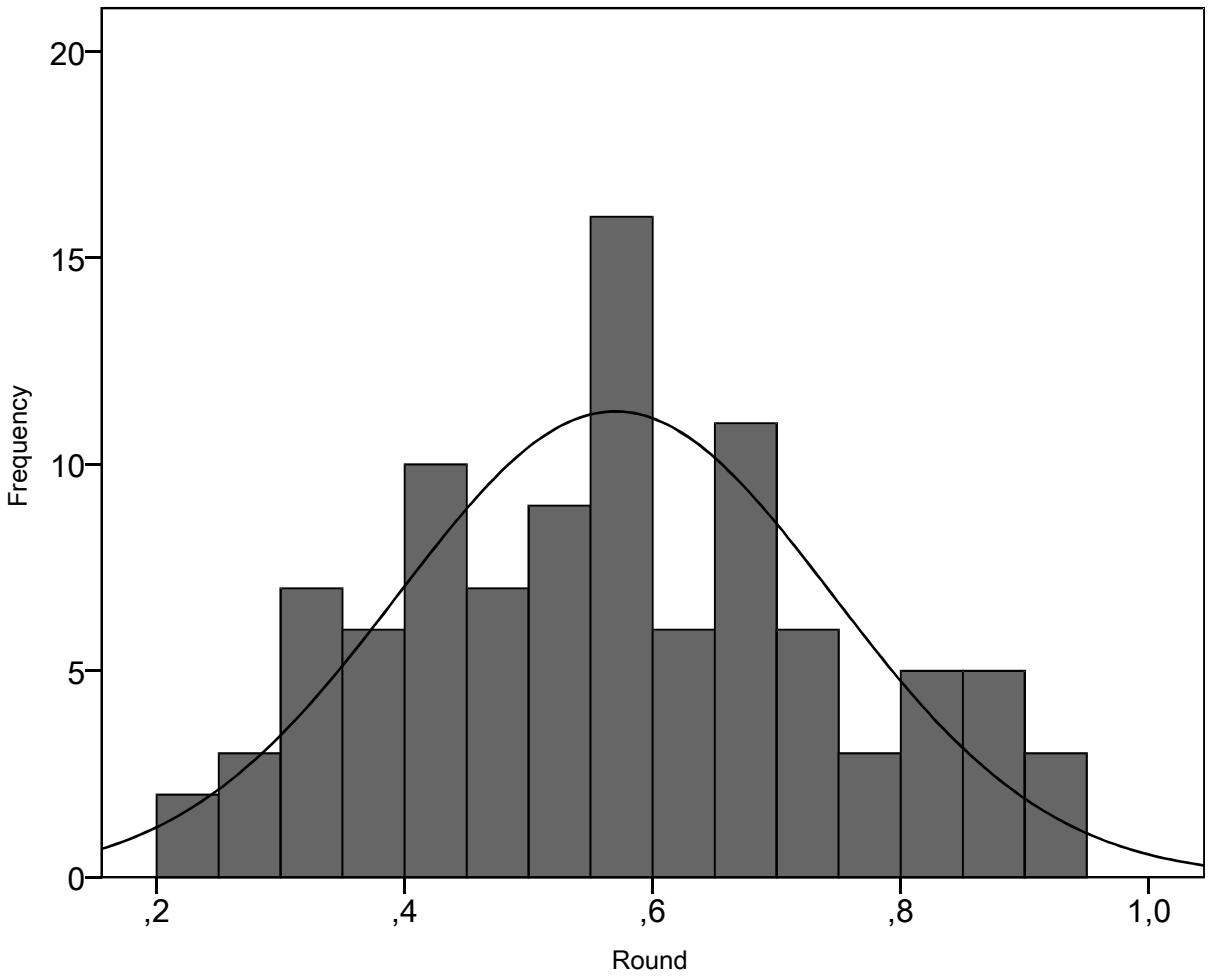
		Minor	Circ	Round
N	Valid	99	99	99
	Missing	0	0	0
Mean		,11273	,49591	,56977
Std. Error of Mean		,006975	,015432	,017590
Median		,12100	,47400	,56900
Mode		,040[a]	,361[a]	,531[a]
Std. Deviation		,069404	,153546	,175019
Variance		,005	,024	,031
Skewness		,006	,504	,161
Std. Error of Skewness		,243	,243	,243
Kurtosis		-,962	,122	-,690
Std. Error of Kurtosis		,481	,481	,481
Range		,275	,675	,704
Minimum		,003	,198	,223
Maximum		,278	,873	,927
Sum		11,160	49,095	56,407
Percentiles	25	,05500	,40200	,43500
	50	,12100	,47400	,56900
	75	,16500	,57900	,68800

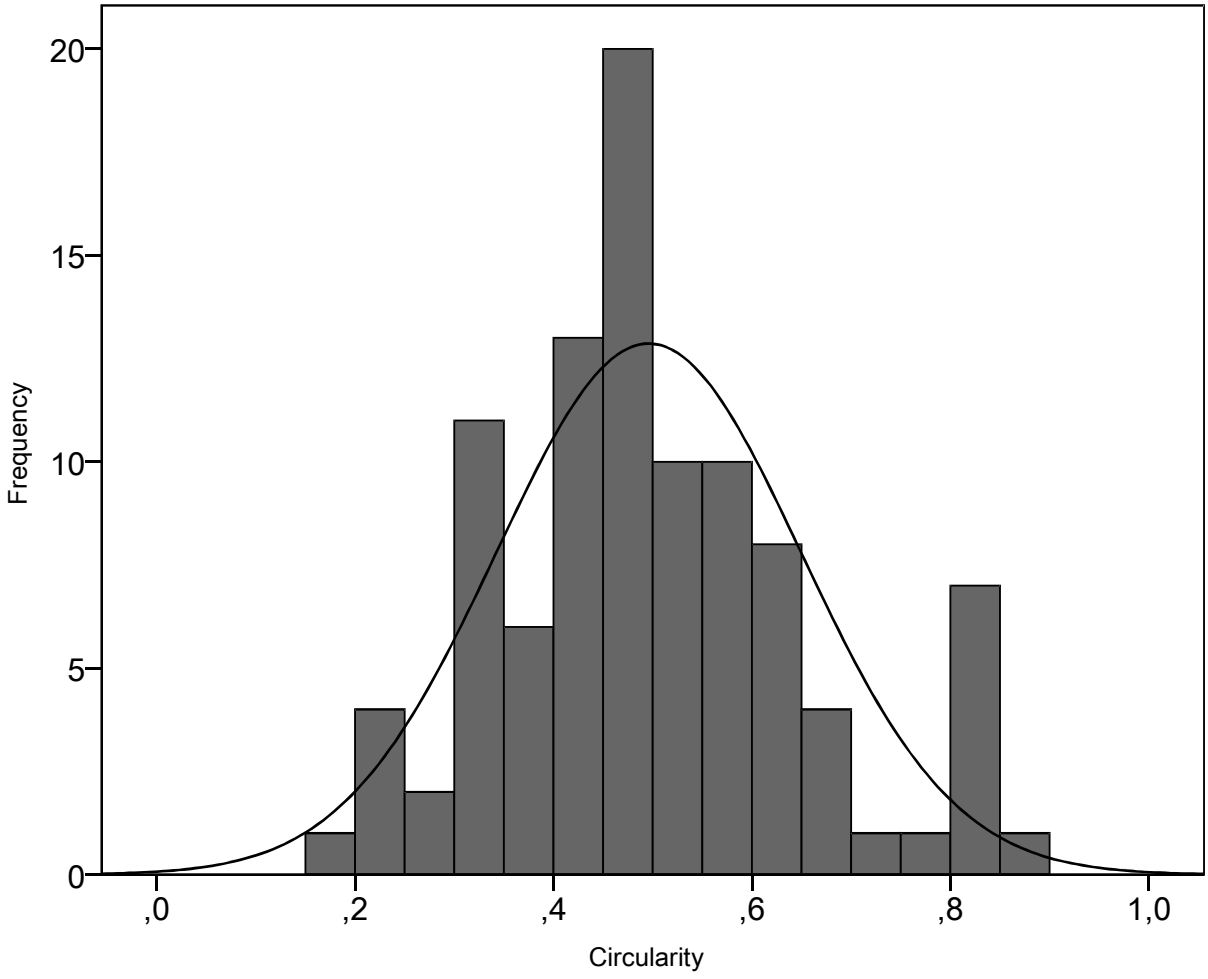
a. Multiple modes exist. The smallest value is shown

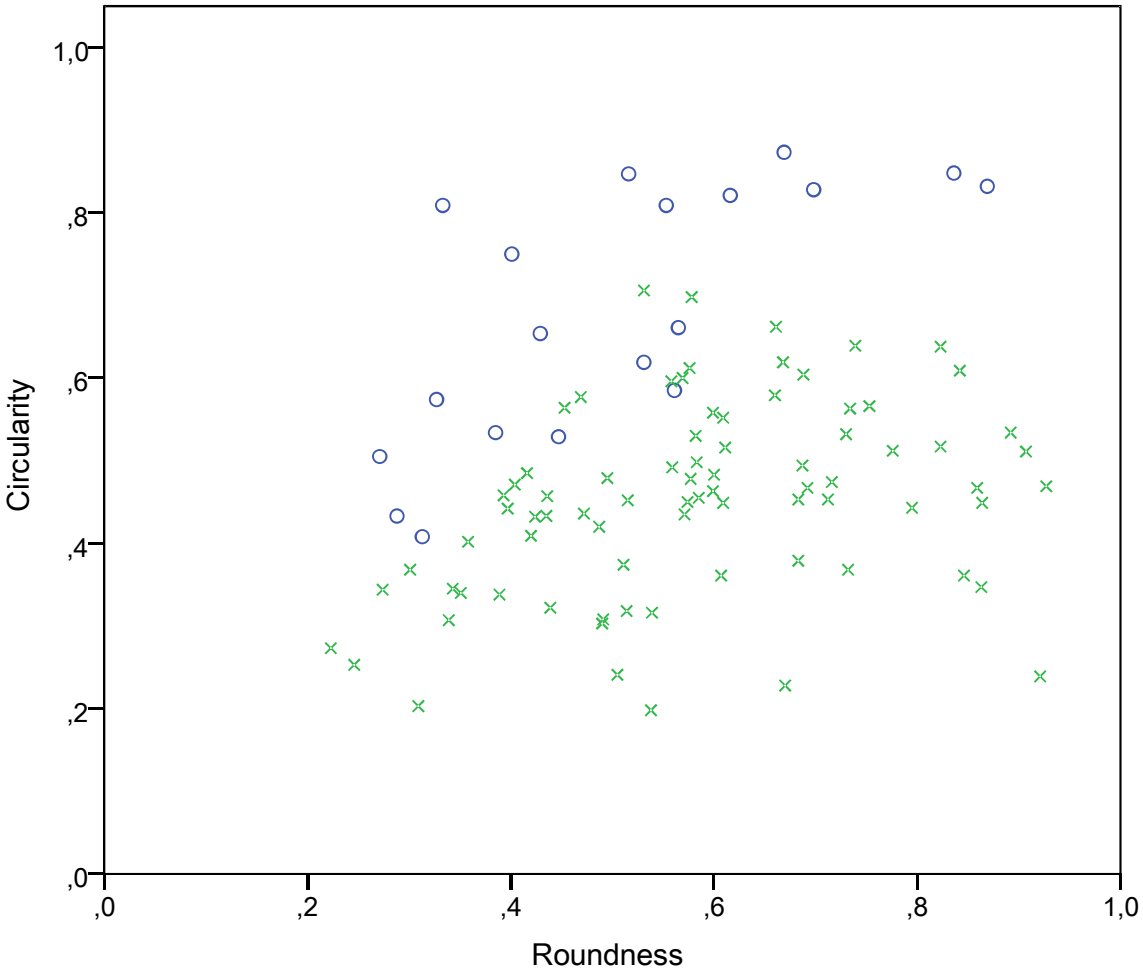
Circular mean:	2,6814		ES-293
95% conf dence:	(-6,896, 12,26)		
Rayleigh´s R:	0,4306	p (uniform):	1,06E-07


20
15
10
5
0
Frequency
,00
,10
,20
,30
,40
Minor axis

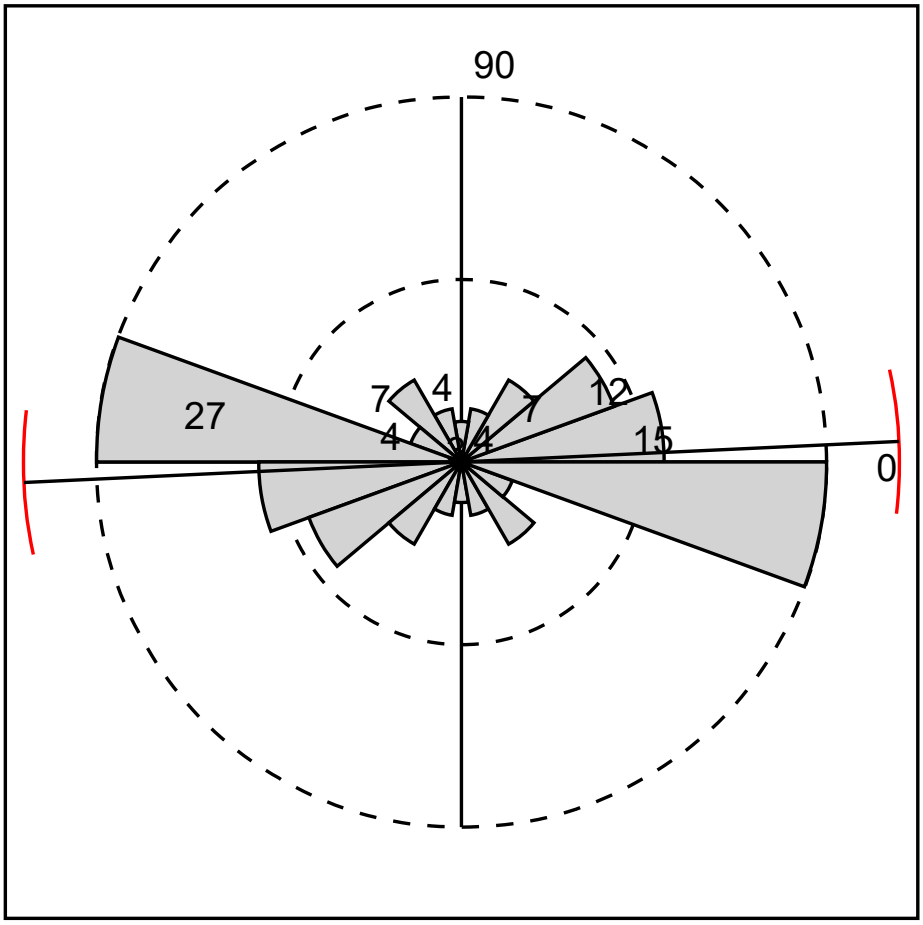

50
40
30
20
10
0
Count
Clay
Very fine silt
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Medium sand
Categories from Udden-Wentworth scale


20
15
10
5
0
Frequency
,2
,4
,6
,8
1,0
Round


20
15
10
5
0
Frequency
,0
,2
,4
,6
,8
1,0
Circularity



Angle



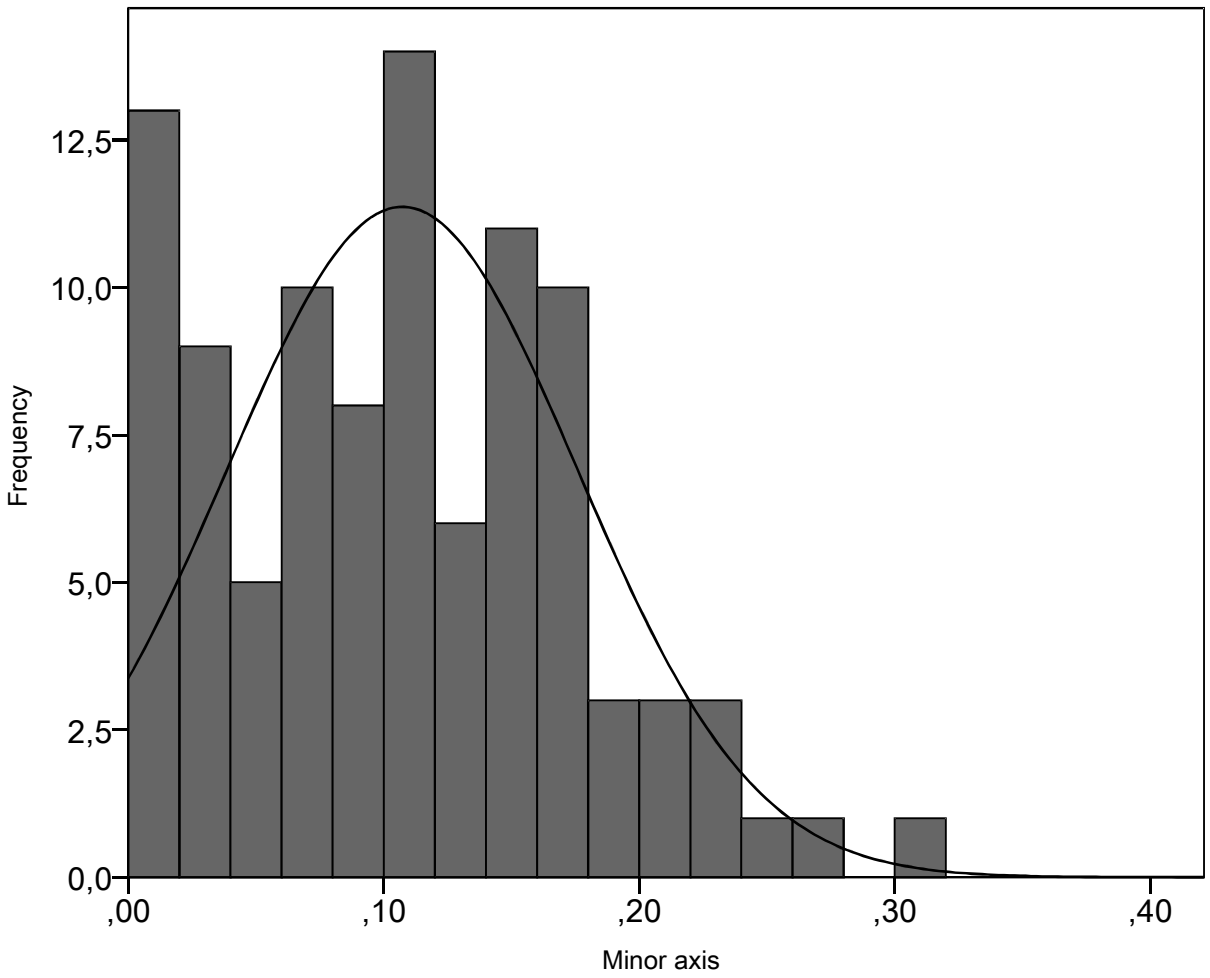
ES-246 (Nvl-XXII)

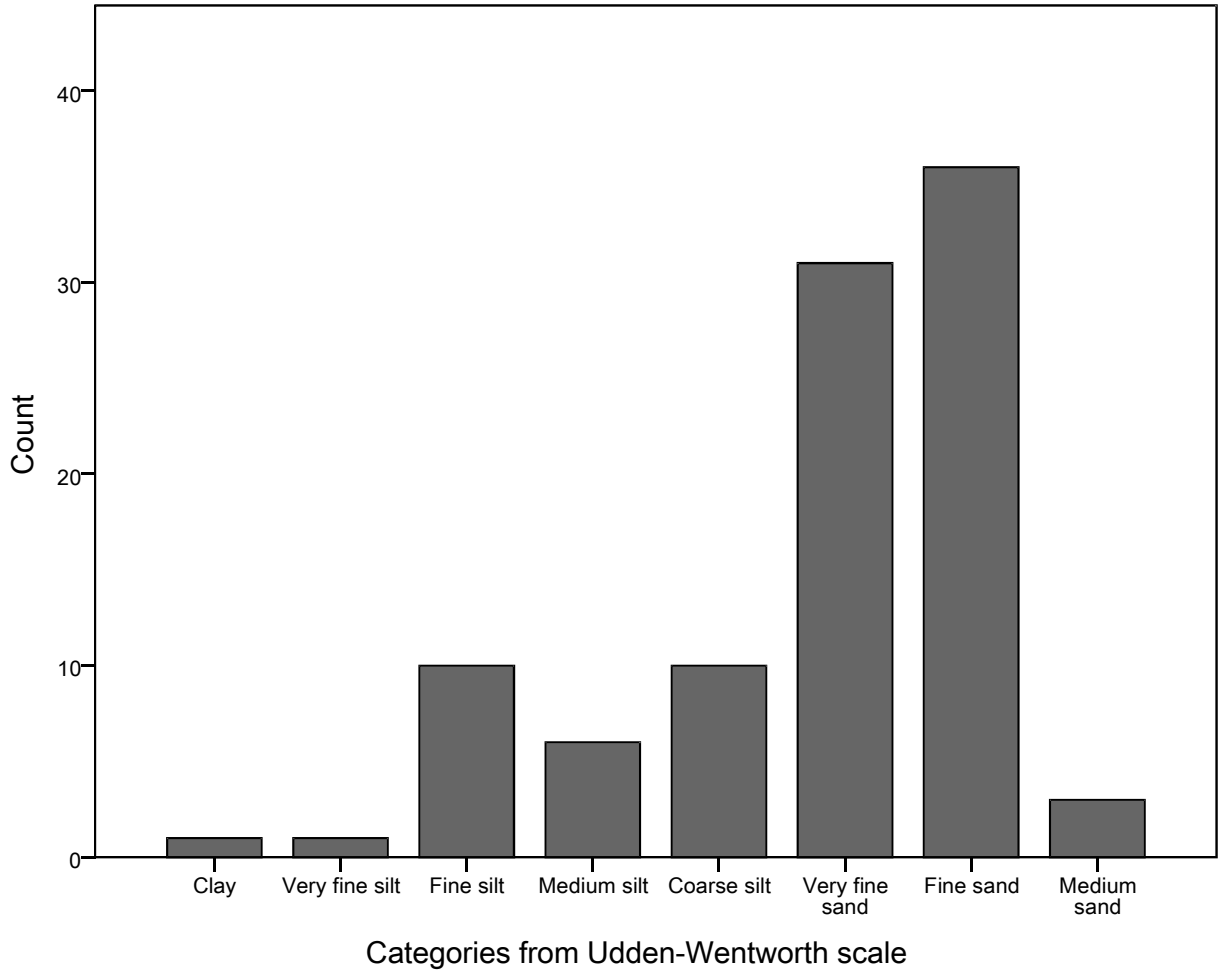
Statistics

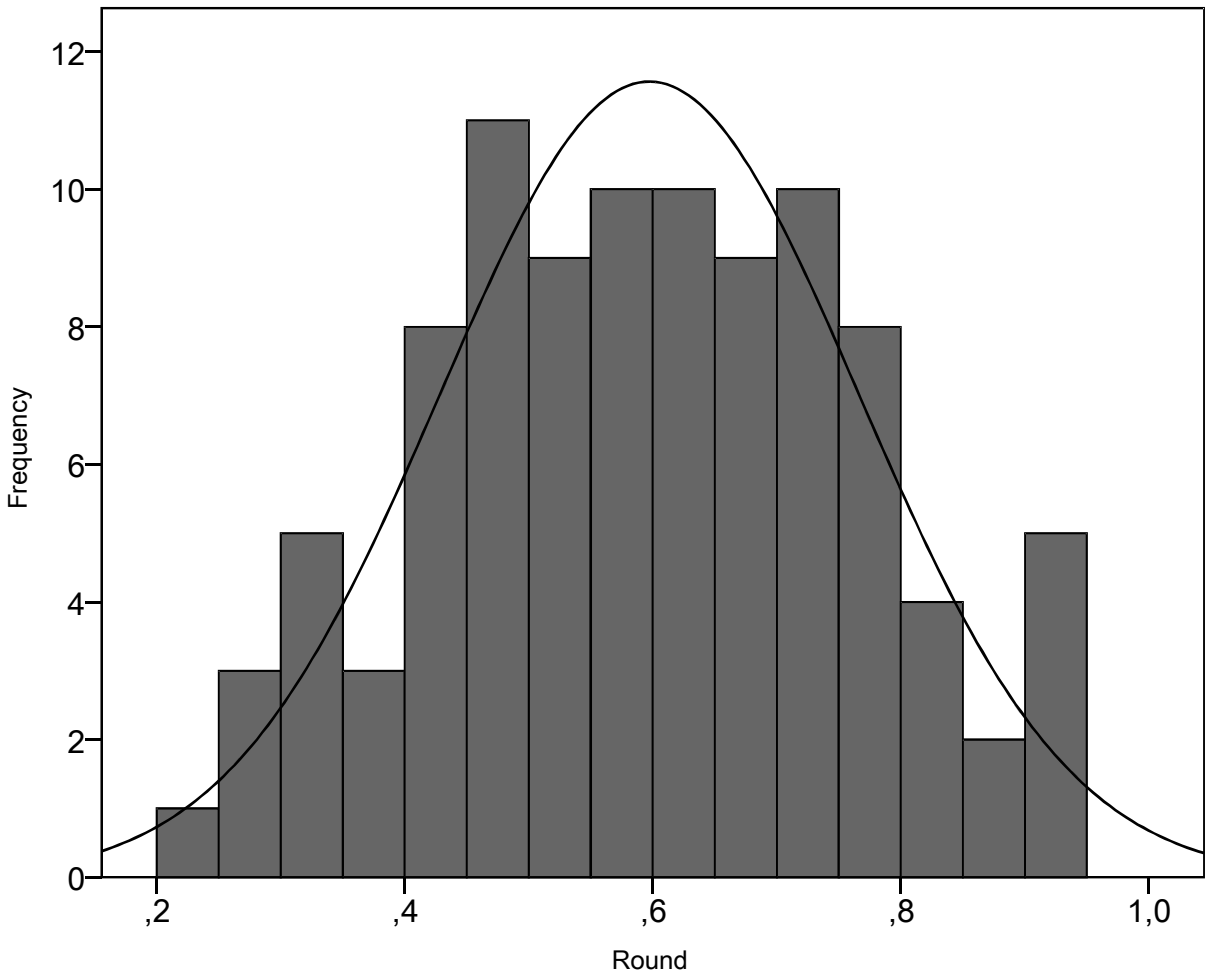
		Minor	Circ	Round
N	Valid	98	98	98
	Missing	0	0	0
Mean		,10722	,47728	,59726
Std. Error of Mean		,006949	,014375	,017076
Median		,10800	,48200	,59750
Mode		,013[a]	,405[a]	,446[a]
Std. Deviation		,068791	,142310	,169045
Variance		,005	,020	,029
Skewness		,420	,157	-,001
Std. Error of Skewness		,244	,244	,244
Kurtosis		-,205	-,290	-,655
Std. Error of Kurtosis		,483	,483	,483
Range		,313	,652	,710
Minimum		,004	,180	,236
Maximum		,317	,832	,946
Sum		10,508	46,773	58,531
Percentiles	25	,05100	,36975	,46650
	50	,10800	,48200	,59750
	75	,15650	,56900	,72475

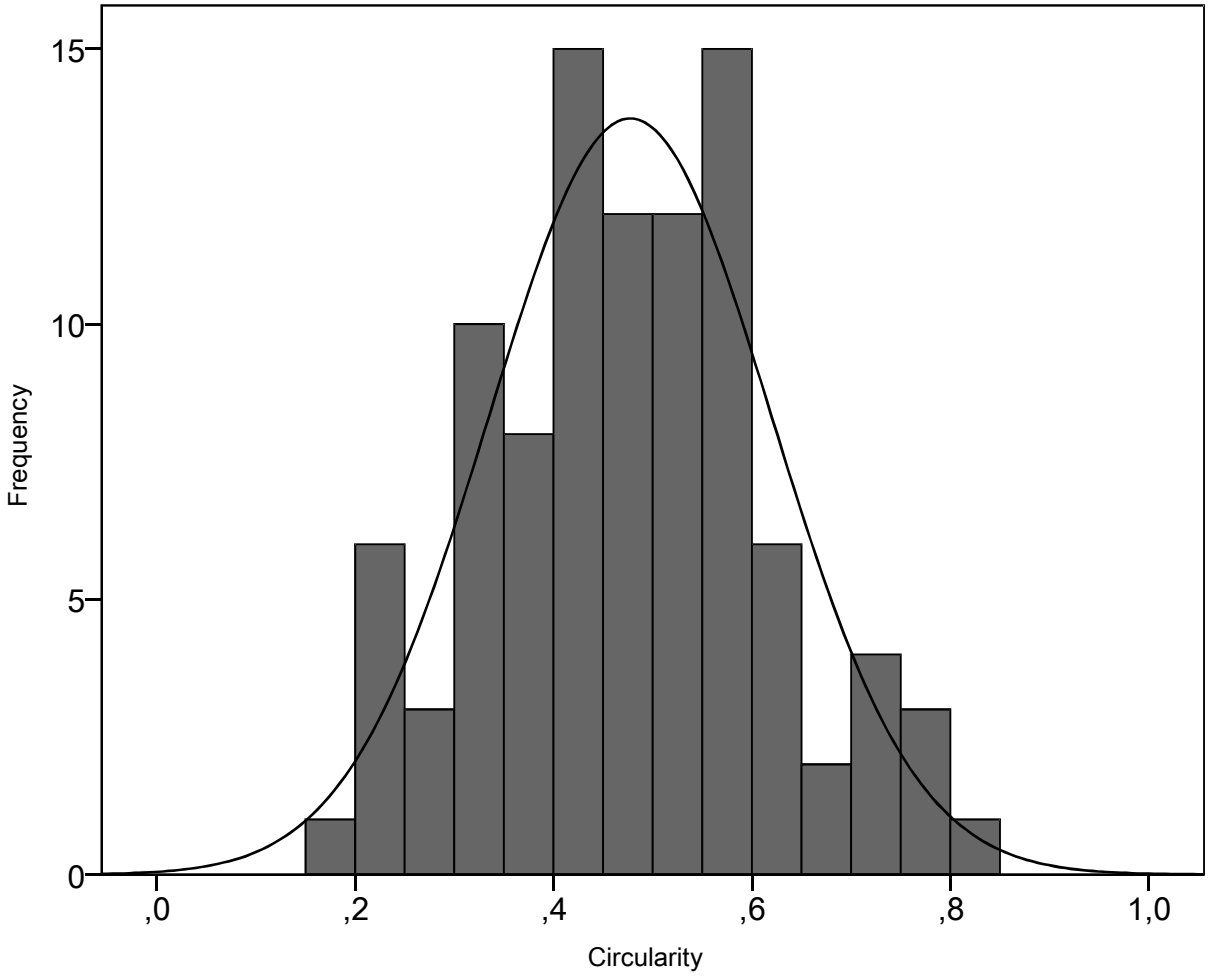
a. Multiple modes exist. The smallest value is shown

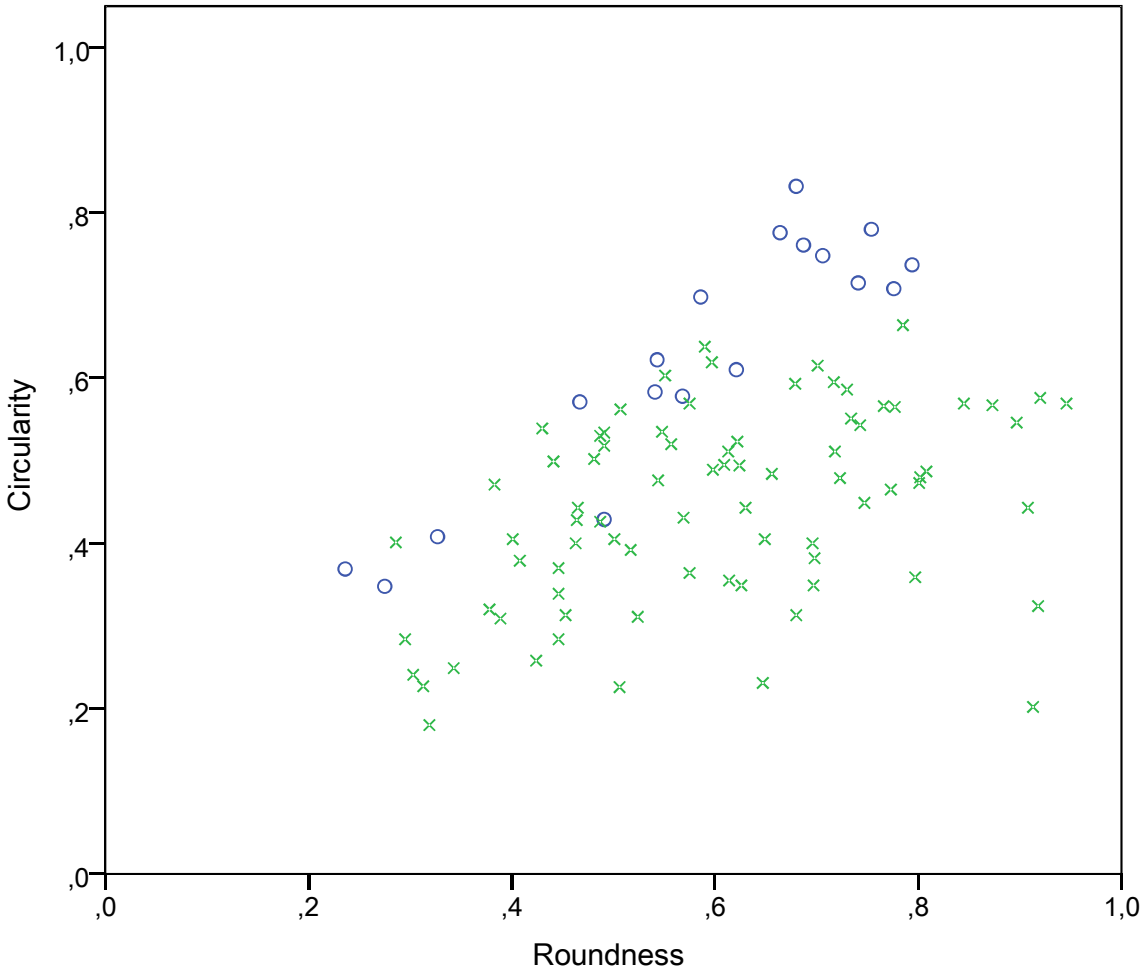
Circular mean:	62,527		ES-246
95% conf dence:	(46,98, 78,07)		
Rayleigh´s R:	0,2923	p (uniform):	0,0010537


12,5
10,0
7,5
5,0
2,5
0,0
Frequency
,00
,10
,20
,30
,40
Minor axis

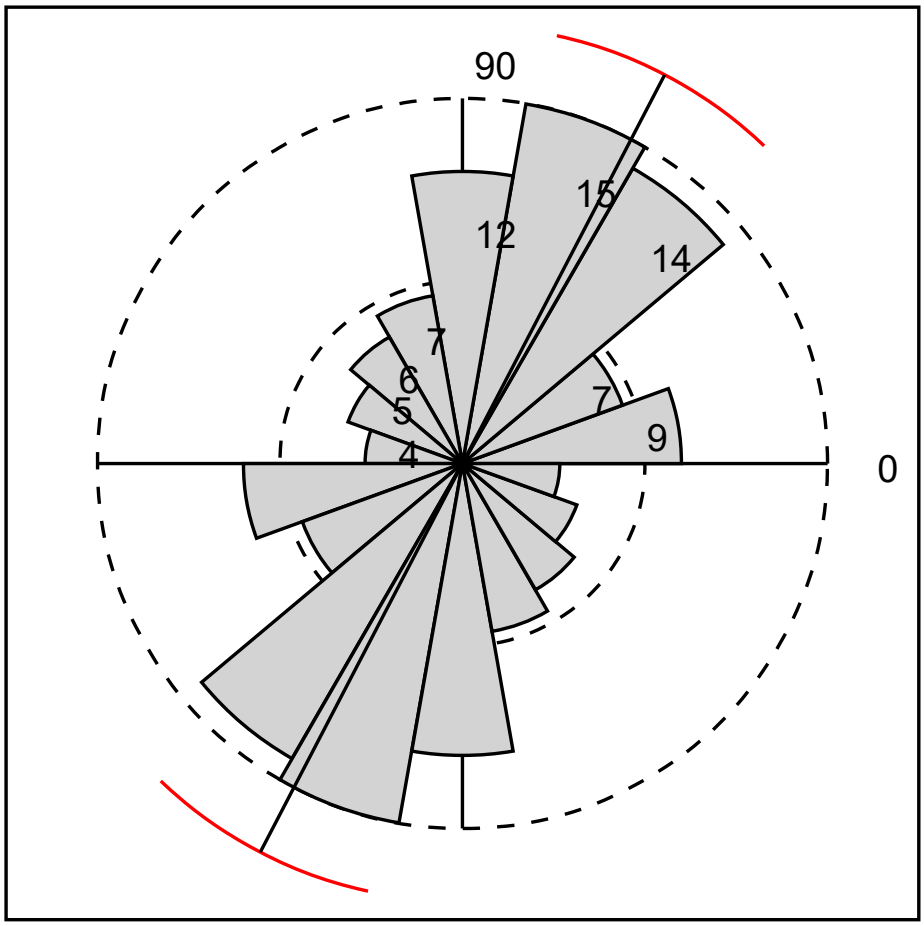

40
30
20
10
0
Count
Clay
Very fine silt
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Medium sand
Categories from Udden-Wentworth scale


12
10
8
6
4
2
0
Frequency
,2
,4
,6
,8
1,0
Round


15
10
5
0
Frequency
,0
,2
,4
,6
,8
1,0
Circularity



Angle



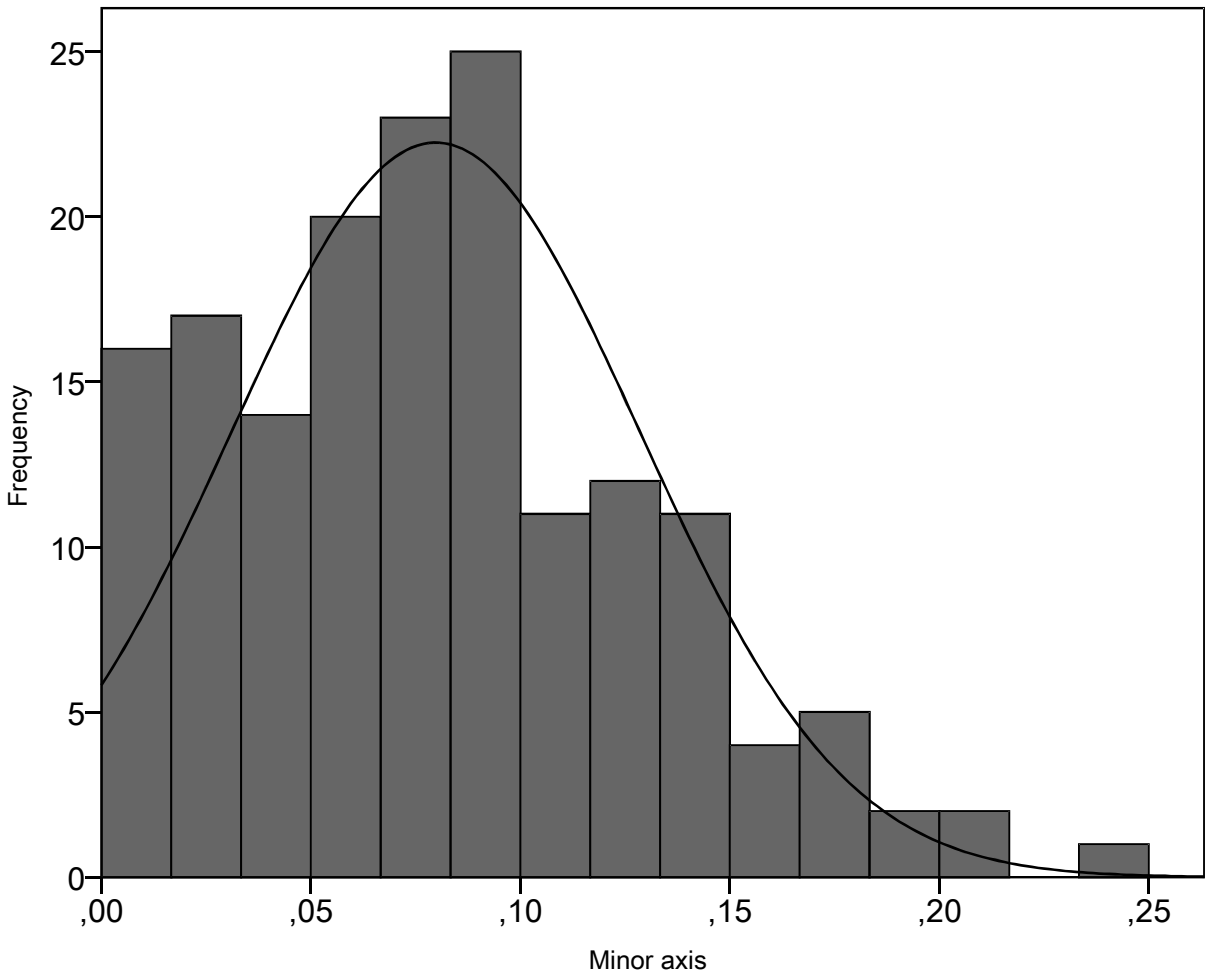
ES-265 (Nvl-XXII)

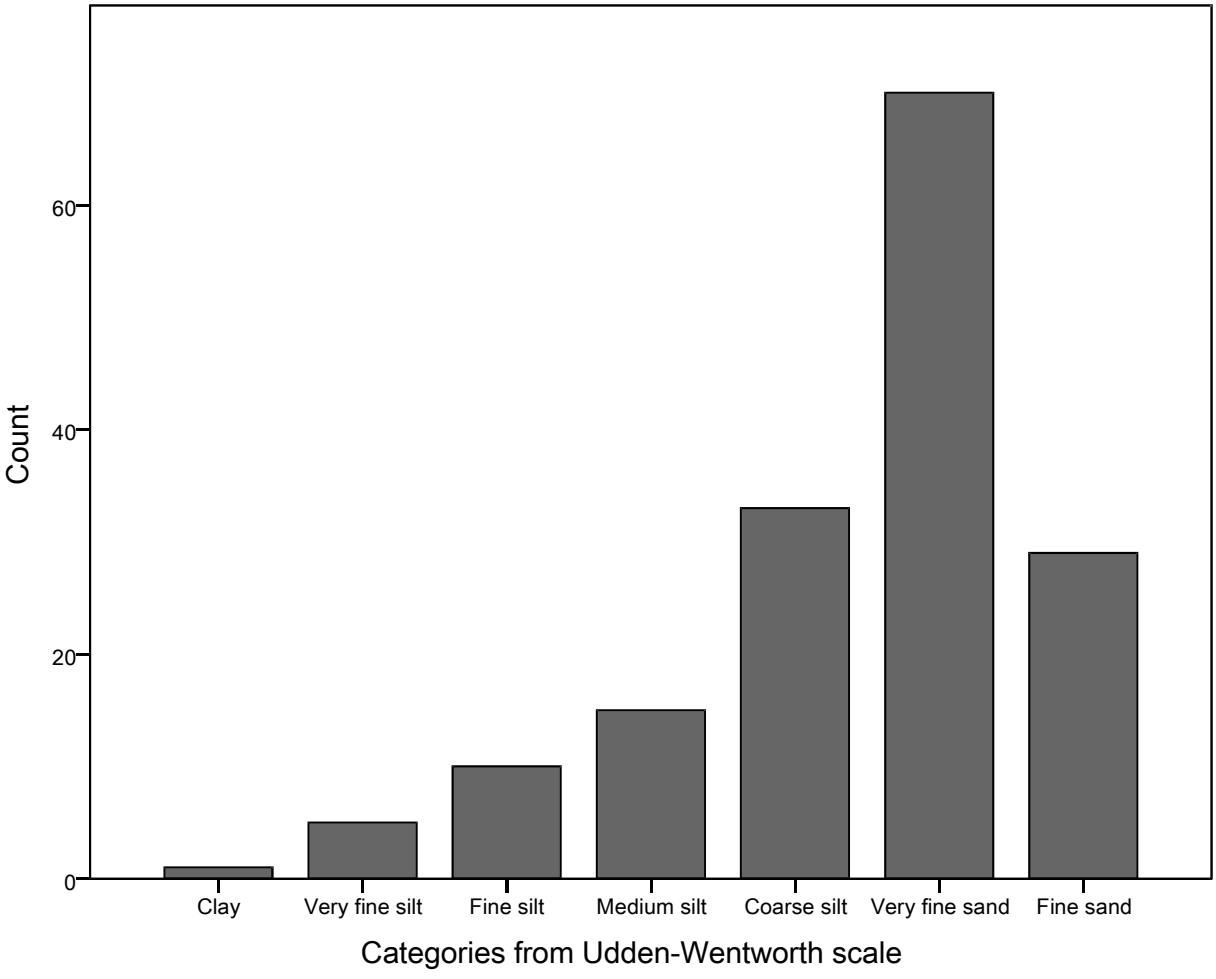
Statistics

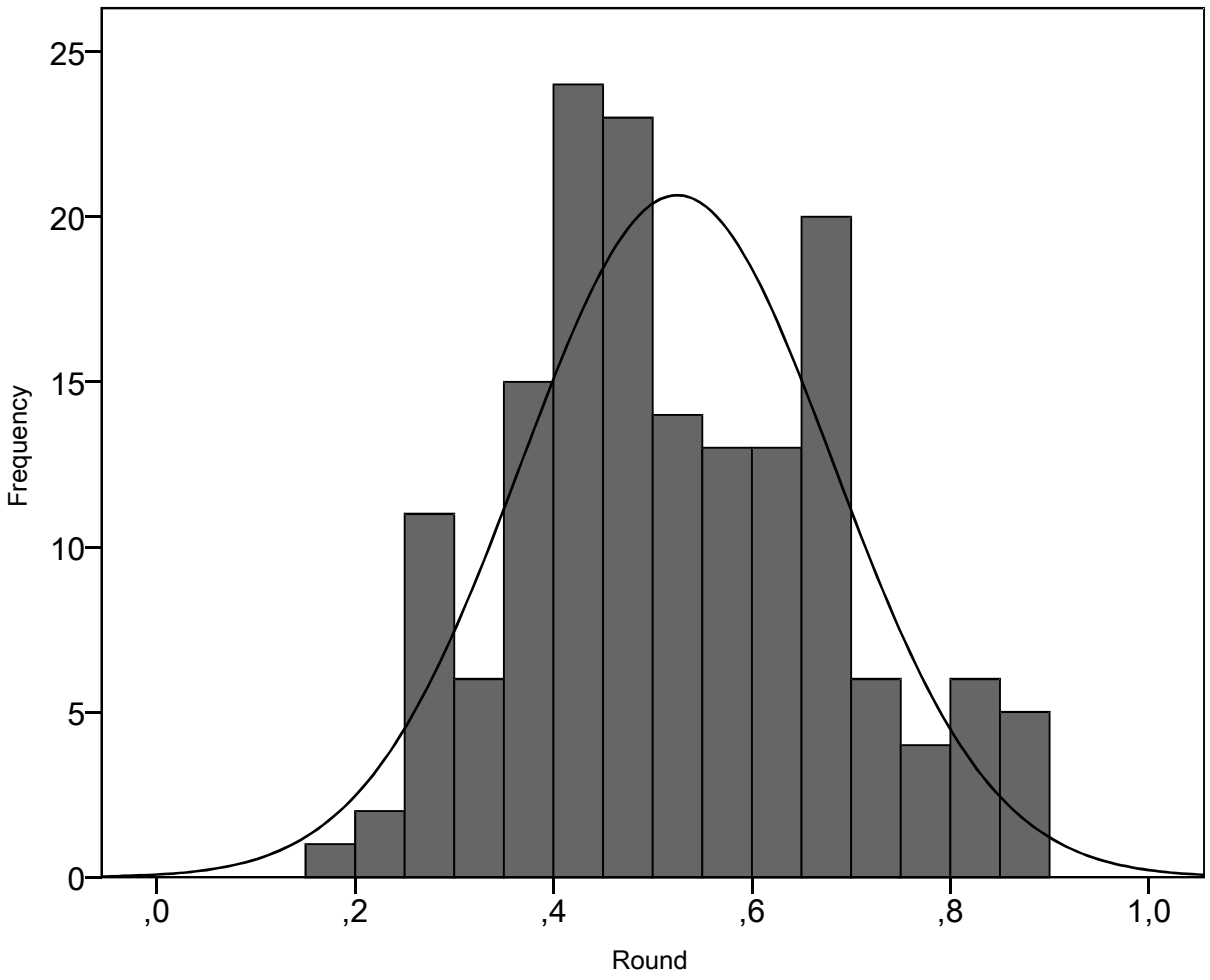
		Minor	Circ	Round
N	Valid	163	163	163
	Missing	0	0	0
Mean		,07979	,34226	,52461
Std. Error of Mean		,003816	,008209	,012331
Median		,07600	,33900	,49400
Mode		,010[a]	,270	,413
Std. Deviation		,048721	,104801	,157436
Variance		,002	,011	,025
Skewness		,562	1,118	,247
Std. Error of Skewness		,190	,190	,190
Kurtosis		-,045	3,495	-,582
Std. Error of Kurtosis		,378	,378	,378
Range		,233	,733	,704
Minimum		,004	,123	,176
Maximum		,237	,856	,880
Sum		13,005	55,788	85,511
Percentiles	25	,04000	,27100	,41300
	50	,07600	,33900	,49400
	75	,11100	,39300	,65100

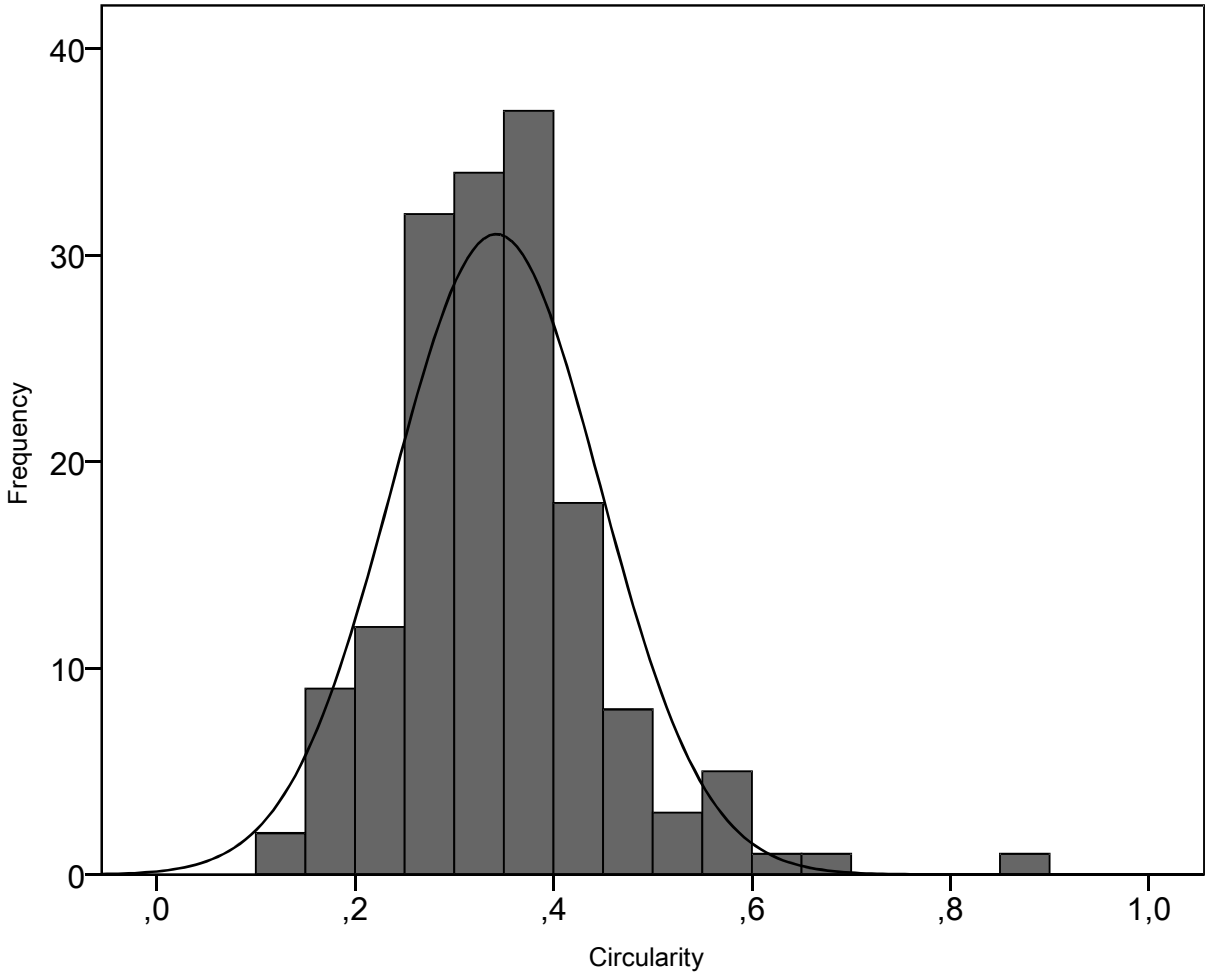
a. Multiple modes exist. The smallest value is shown

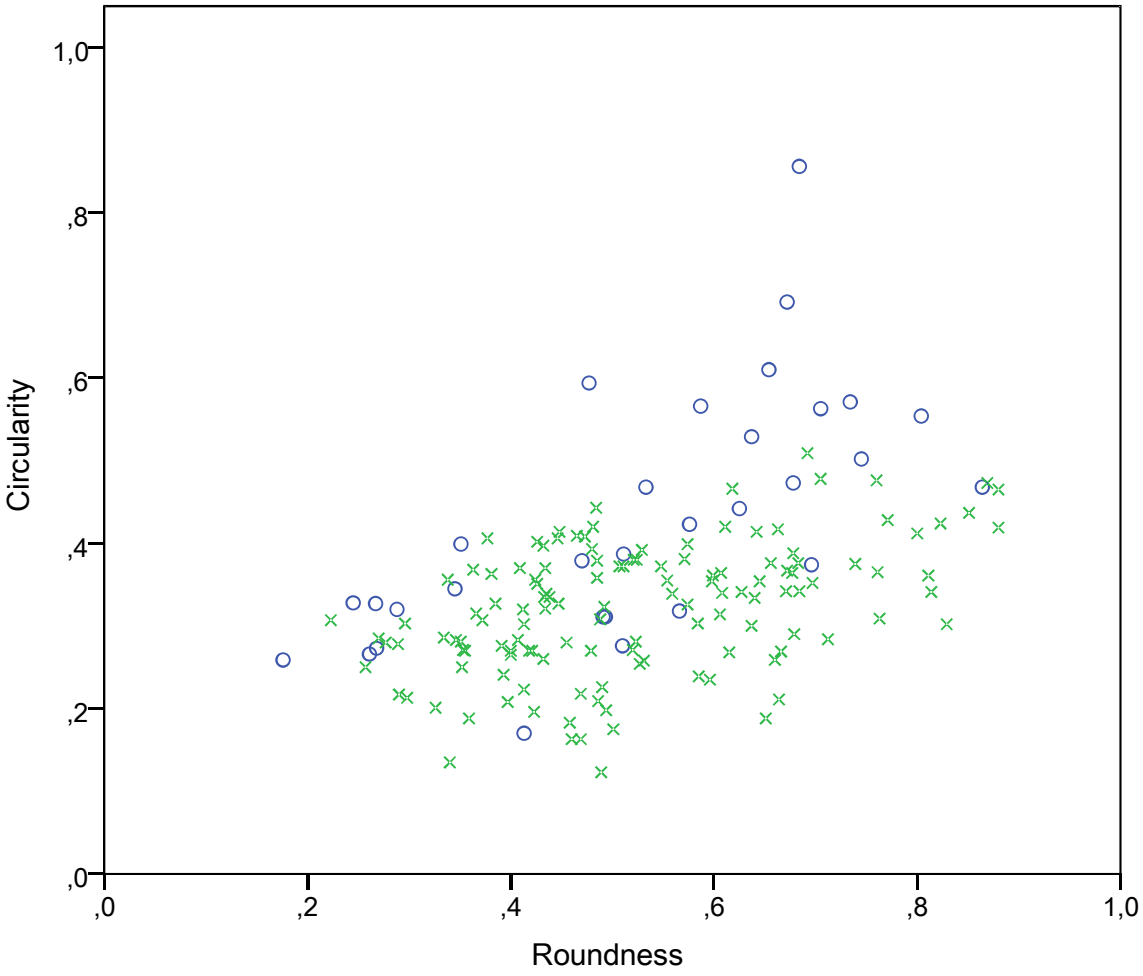
Circular mean:	10,632		ES-265
95% conf dence:	(6,658, 14,61)		
Rayleigh´s R:	0,6782	p (uniform):	5,52E-29


25
20
15
10
5
0
Frequency
,00
,05
,10
,15
,20
,25
Minor axis

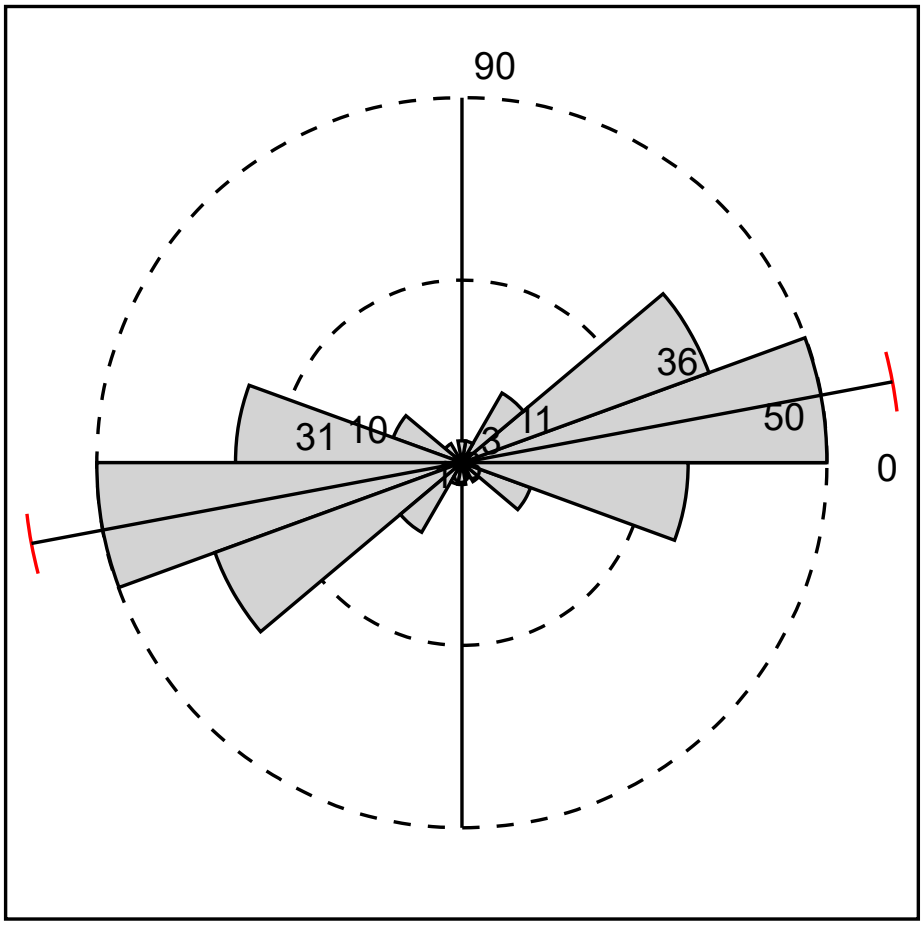

60
40
20
0
Count
Clay
Very fine silt
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Categories from Udden-Wentworth scale


25
20
15
10
5
0
Frequency
,0
,2
,4
,6
,8
1,0
Round


40
30
20
10
0
Frequency
,0
,2
,4
,6
,8
1,0
Circularity



Angle



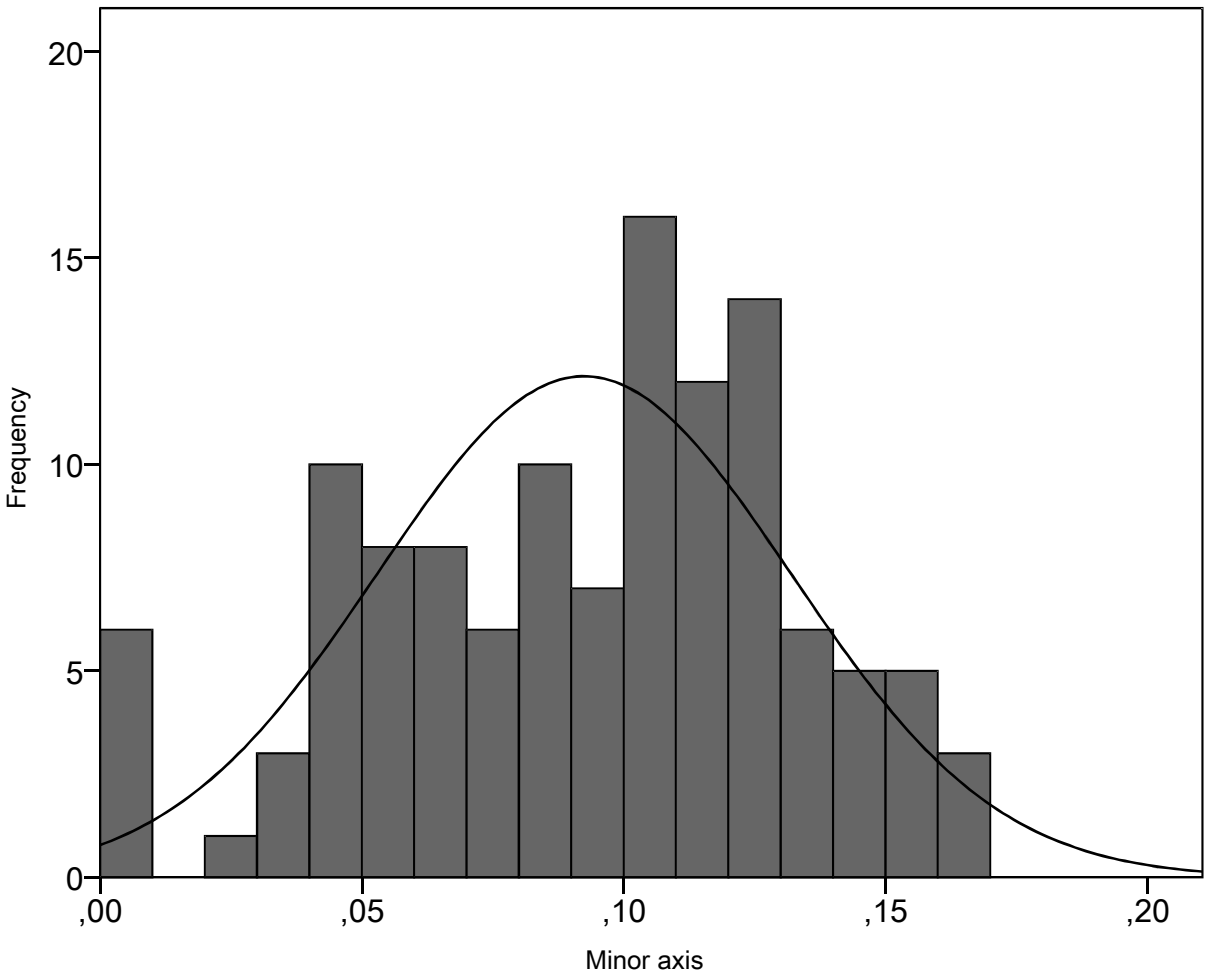
ES-314 (NvI-XXII)

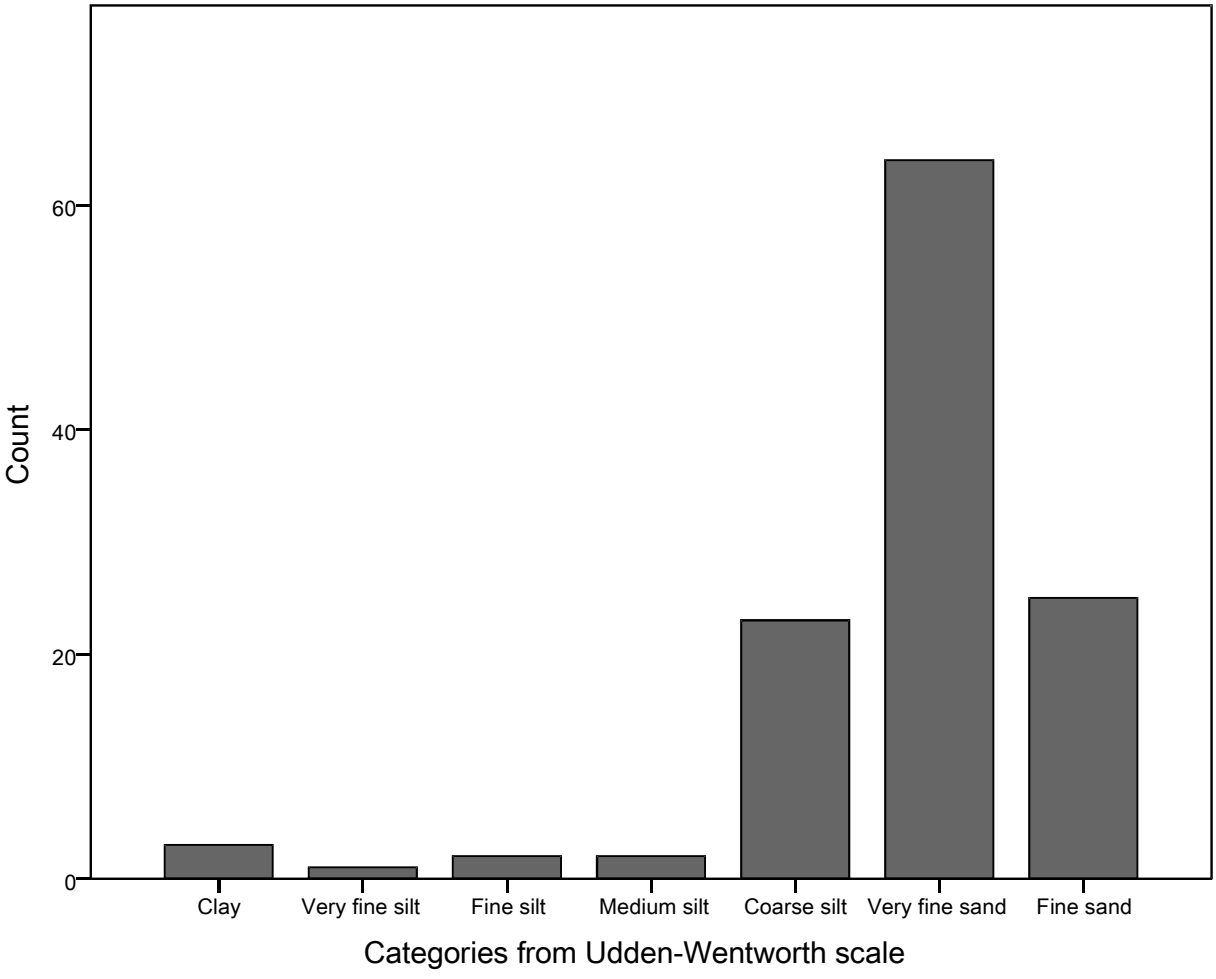
Statistics

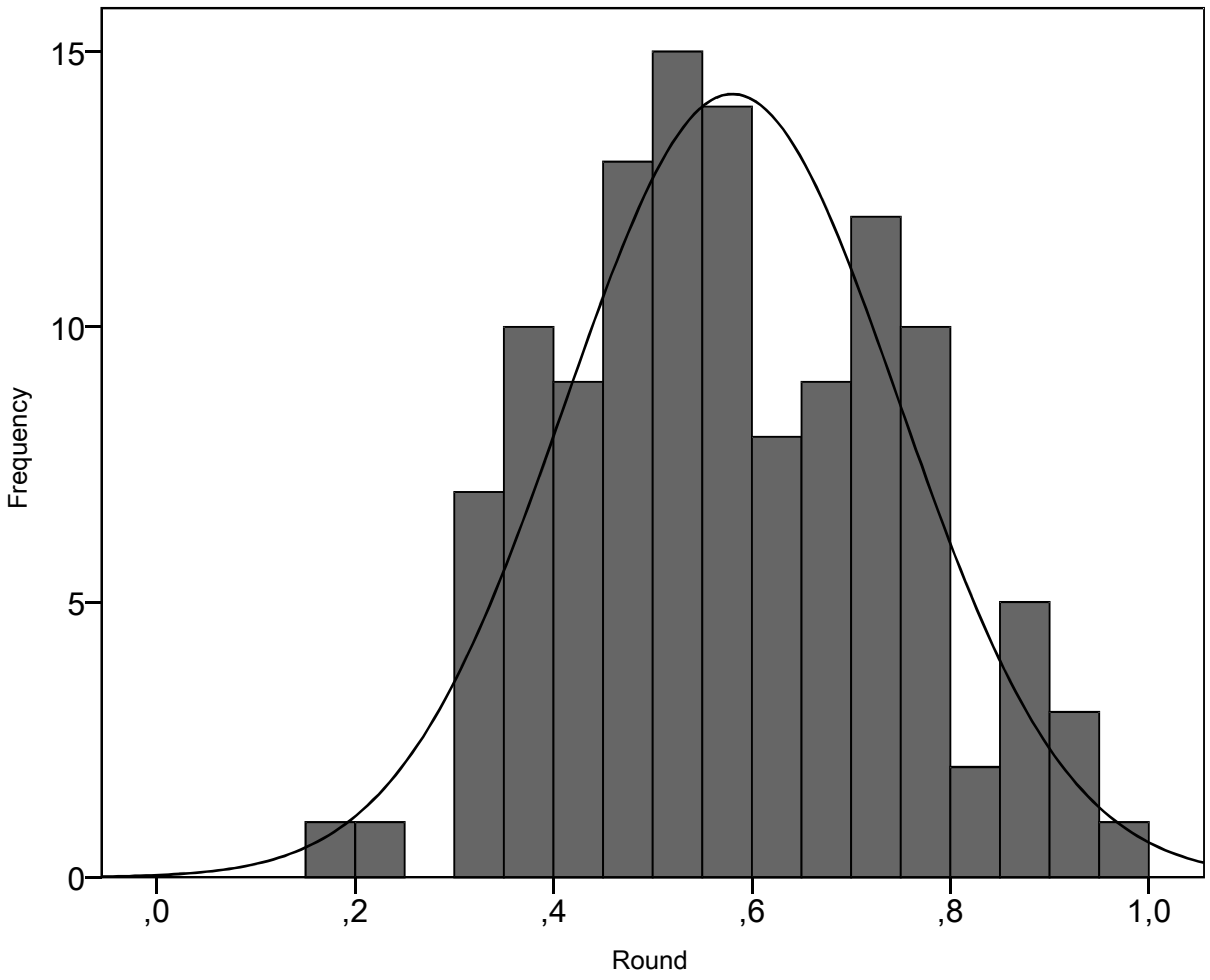
		Minor	Circ	Round
N	Valid	120	120	120
	Missing	0	0	0
Mean		,09244	,50178	,58018
Std. Error of Mean		,003602	,013056	,015356
Median		,10000	,48050	,56750
Mode		,100	,423[a]	,522
Std. Deviation		,039453	,143025	,168215
Variance		,002	,020	,028
Skewness		-,370	1,046	,143
Std. Error of Skewness		,221	,221	,221
Kurtosis		-,477	2,578	-,571
Std. Error of Kurtosis		,438	,438	,438
Range		,165	,843	,793
Minimum		,003	,157	,177
Maximum		,168	1,000	,970
Sum		11,093	60,213	69,622
Percentiles	25	,06025	,41400	,45750
	50	,10000	,48050	,56750
	75	,12375	,57700	,71100

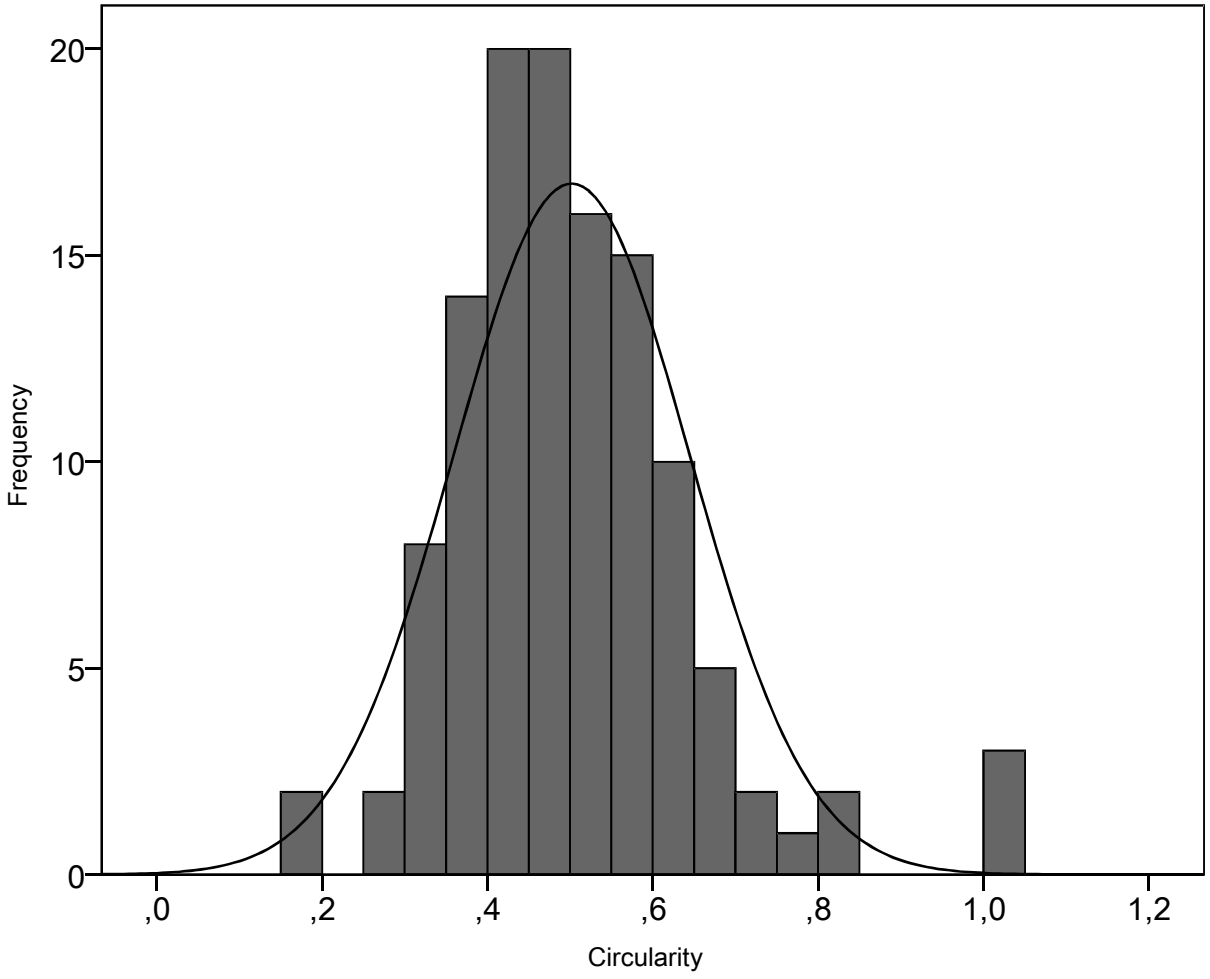
a. Multiple modes exist. The smallest value is shown

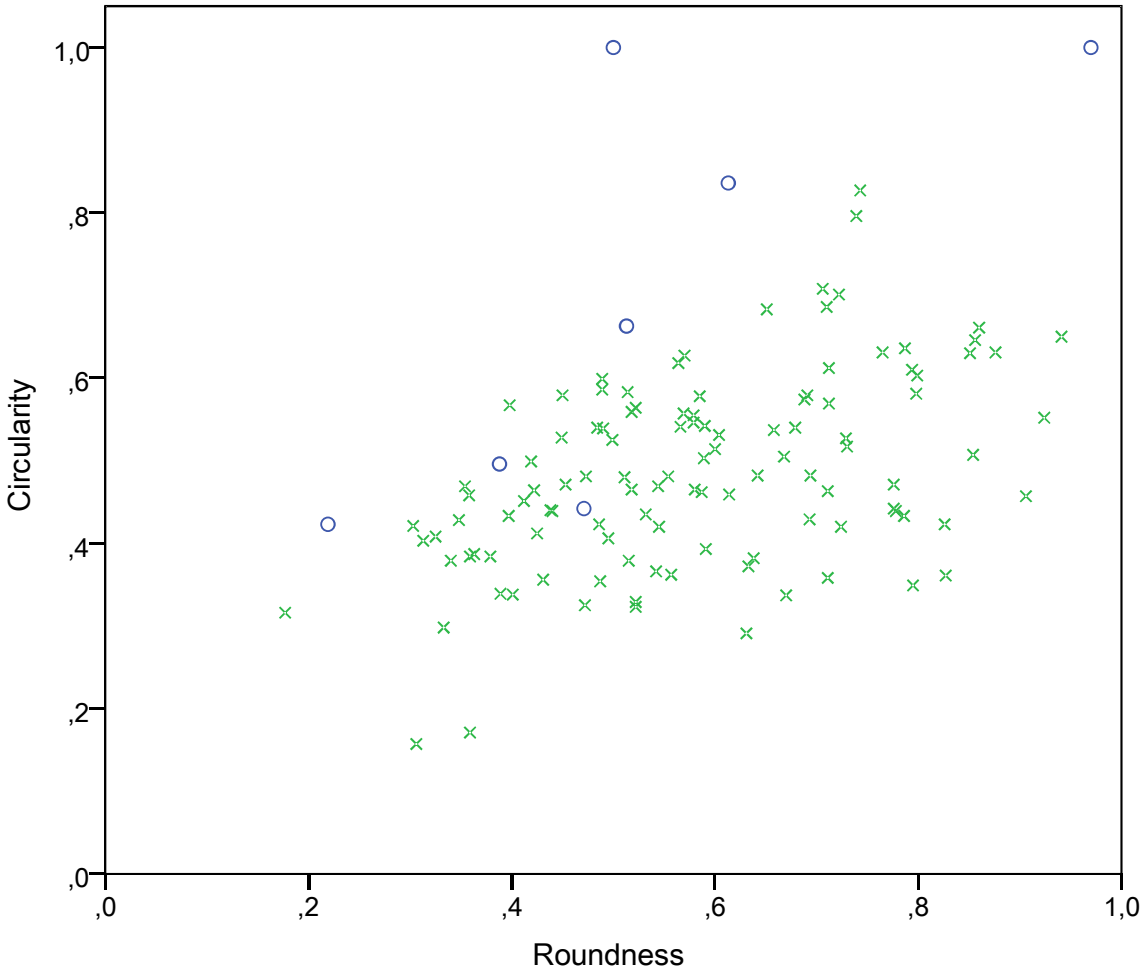
Circular mean:	22,258		ES-314
95% conf dence:	(14,42, 30,09)		
Rayleigh´s R:	0,4769	p (uniform):	6,17E-11


20
15
10
5
0
Frequency
,00
,05
,10
,15
,20
Minor axis

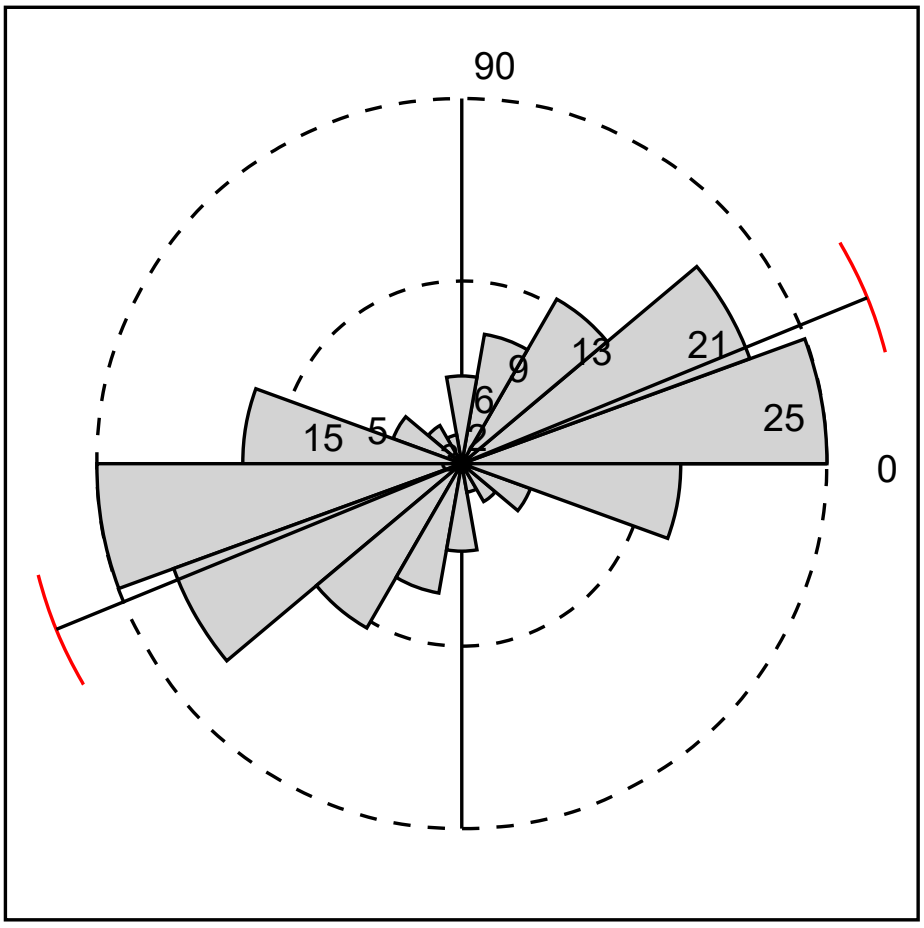

60
40
20
0
Count
Clay
Very fine silt
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Categories from Udden-Wentworth scale


15
10
5
0
Frequency
,0
,2
,4
,6
,8
1,0
Round


20
15
10
5
0
Frequency
,0
,2
,4
,6
,8
1,0
1,2
Circularity



Angle



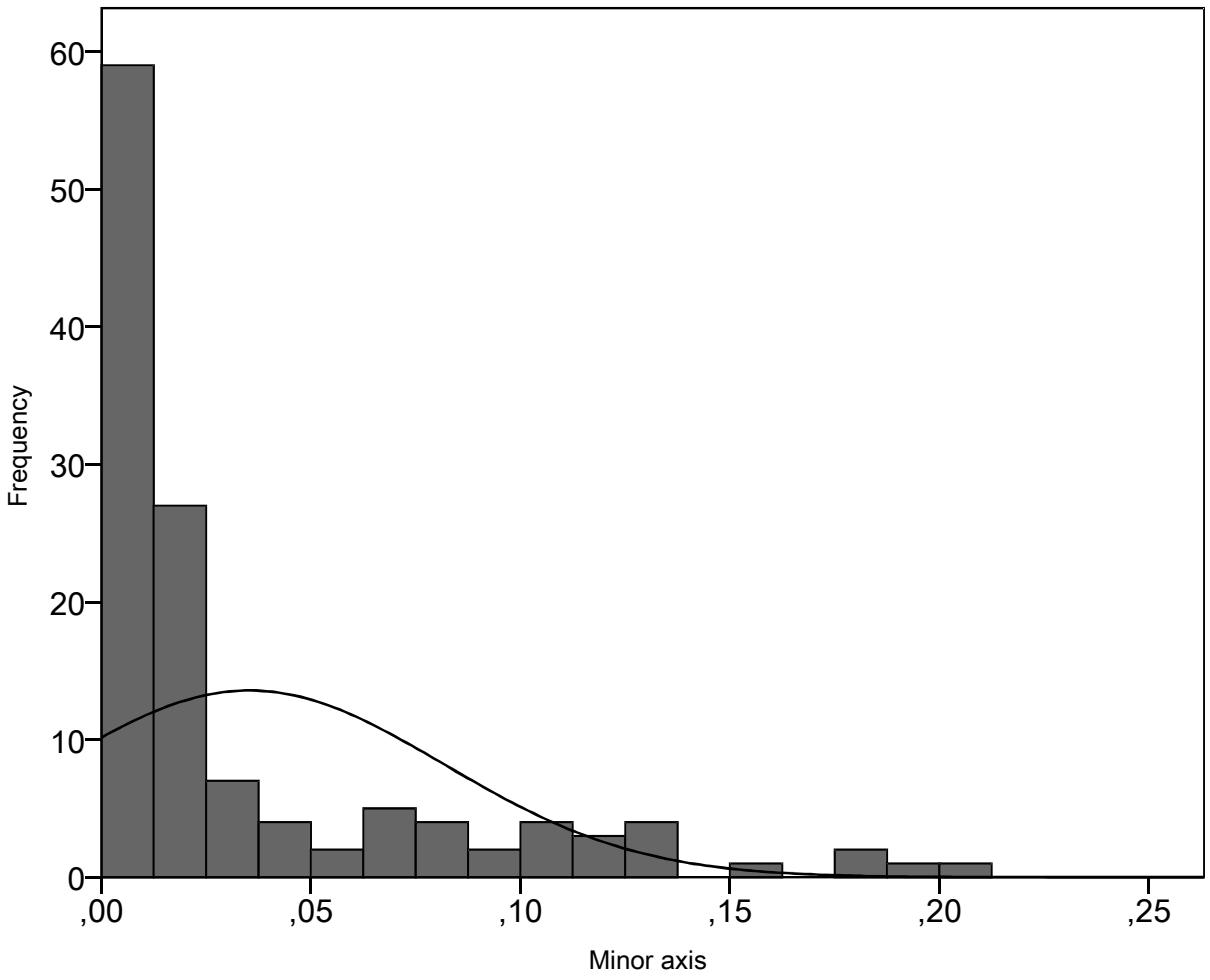
ES-328 (Nvl-XXII)

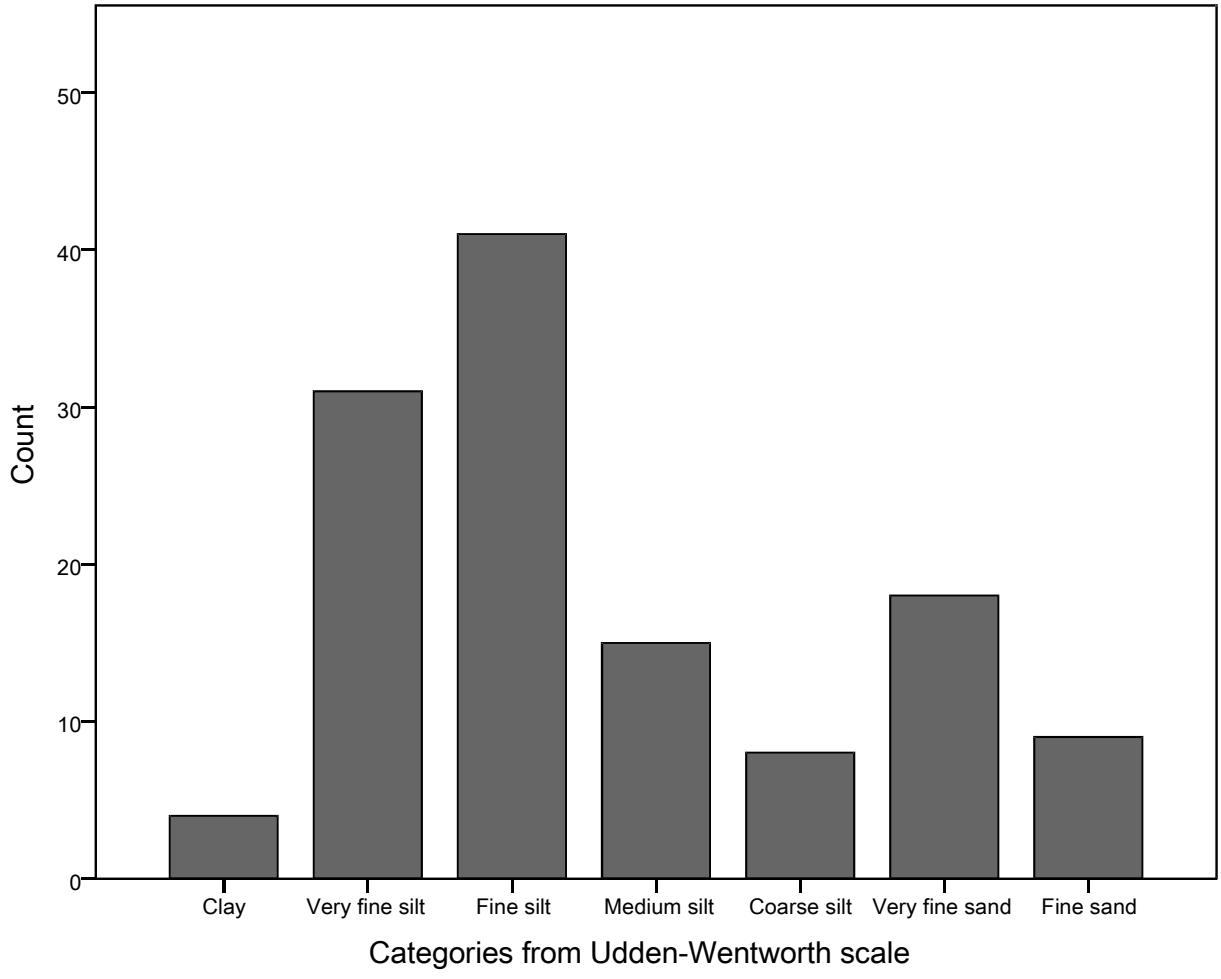
Statistics

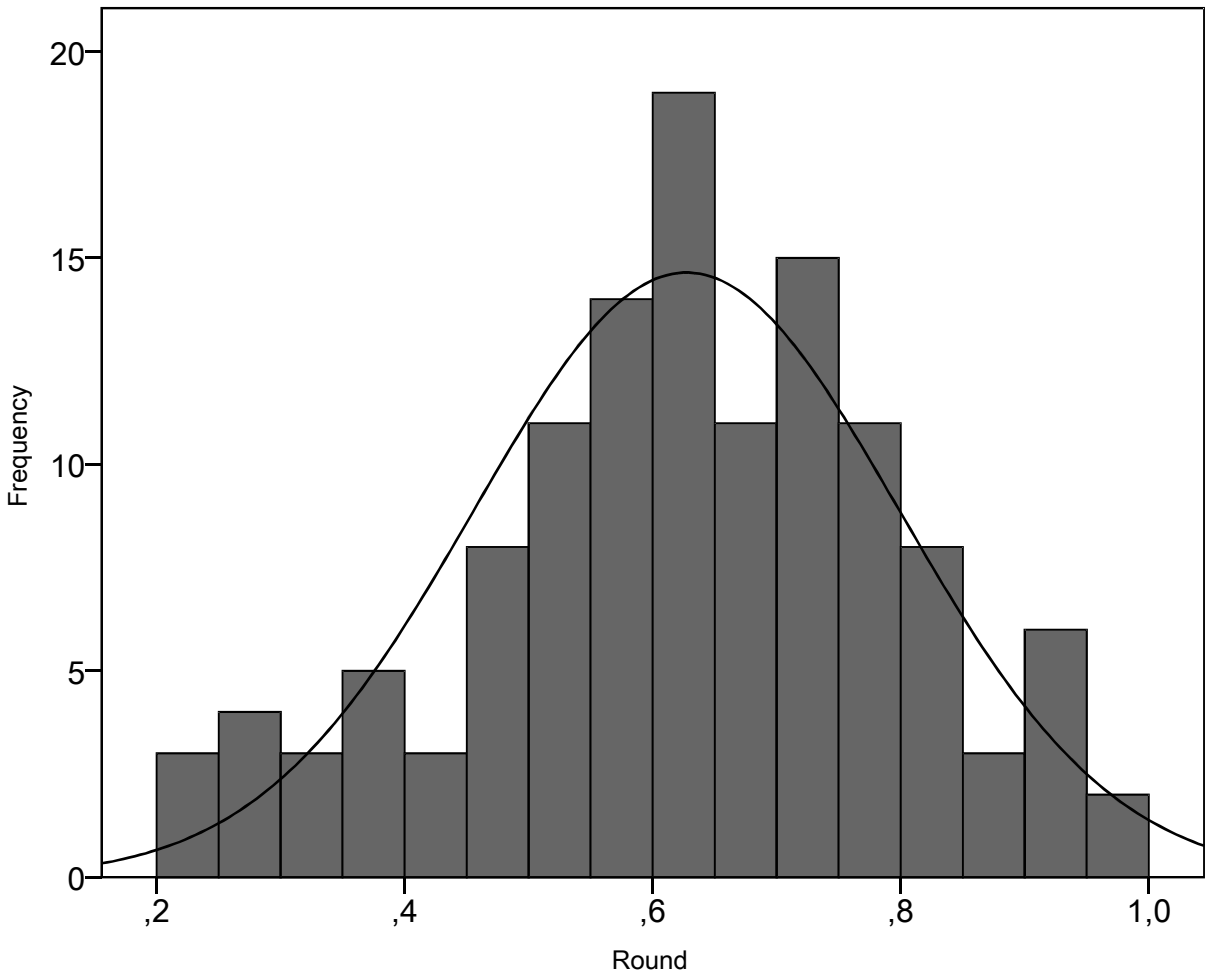
		Minor	Circ	Round
N	Valid	126	126	126
	Missing	0	0	0
Mean		,03528	,49348	,62724
Std. Error of Mean		,004125	,015485	,015286
Median		,01300	,51300	,62350
Mode		,005[a]	,428[a]	,738
Std. Deviation		,046308	,173815	,171582
Variance		,002	,030	,029
Skewness		1,939	-,316	-,307
Std. Error of Skewness		,216	,216	,216
Kurtosis		3,144	-,754	-,161
Std. Error of Kurtosis		,428	,428	,428
Range		,206	,728	,763
Minimum		,004	,096	,209
Maximum		,210	,824	,972
Sum		4,445	62,178	79,032
Percentiles	25	,00800	,37100	,52625
	50	,01300	,51300	,62350
	75	,03950	,62575	,73825

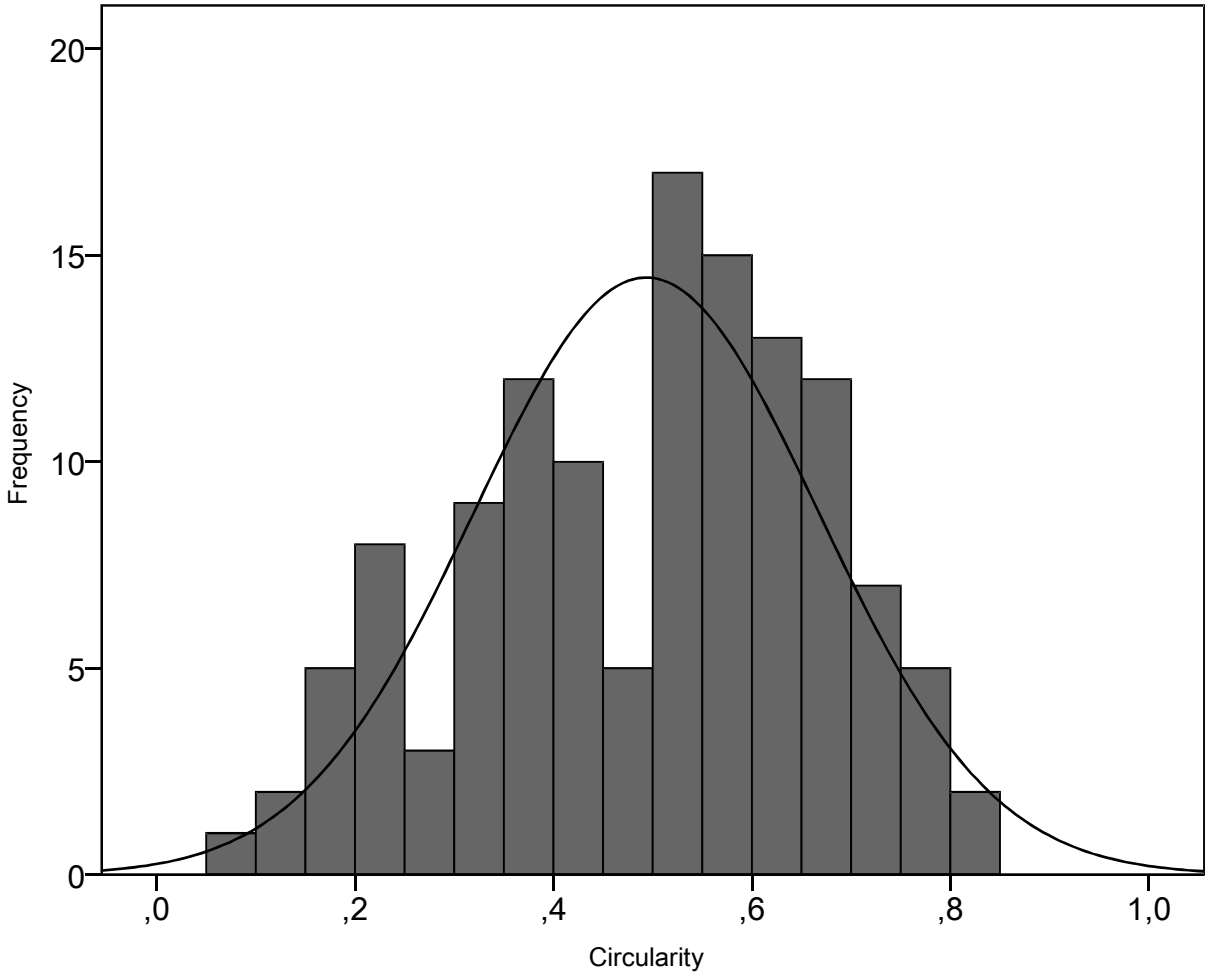
a. Multiple modes exist. The smallest value is shown

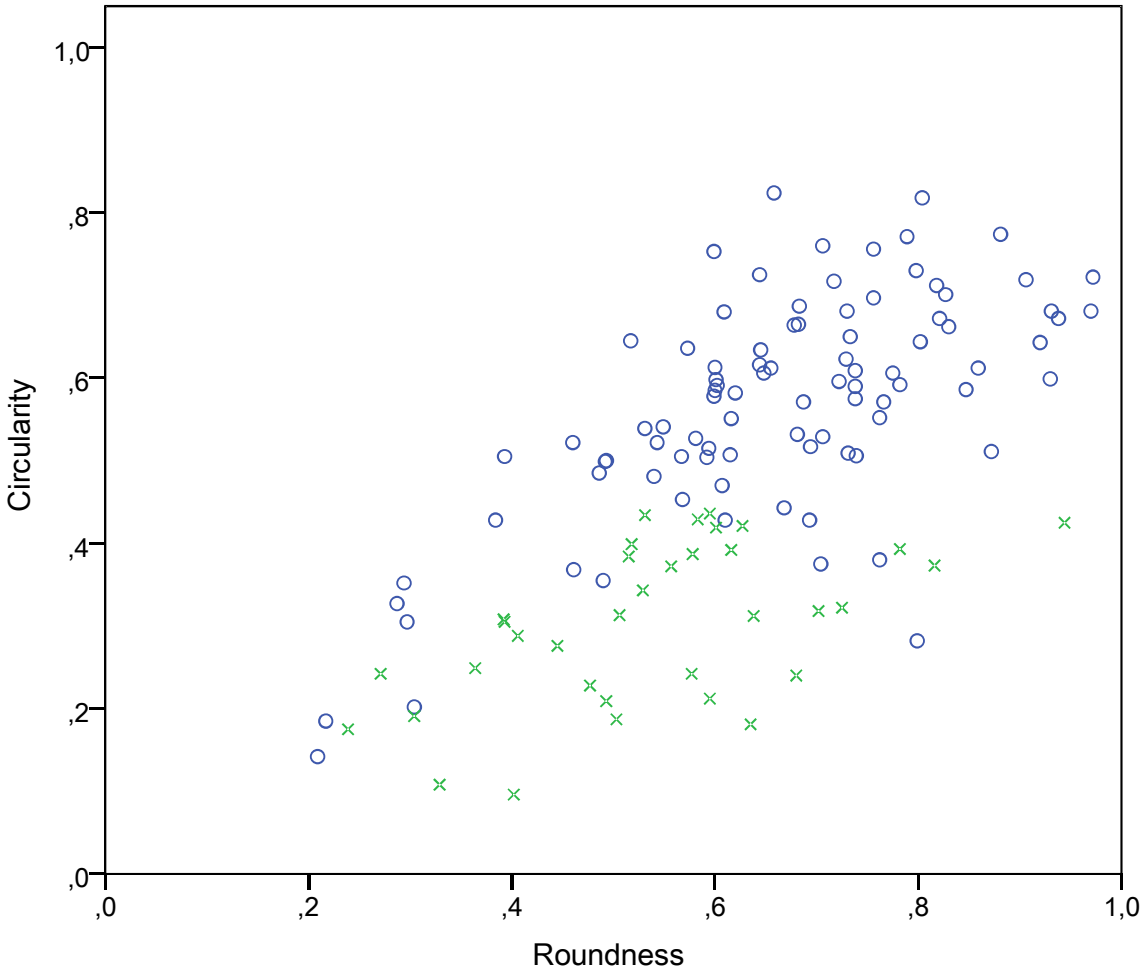
Circular mean:	13,344		ES-328
95% conf dence:	(3,645, 23,04)		
Rayleigh´s R:	0,3944	p (uniform):	1,90E-07


60
50
40
30
20
10
0
Frequency
,00
,05
,10
,15
,20
,25
Minor axis

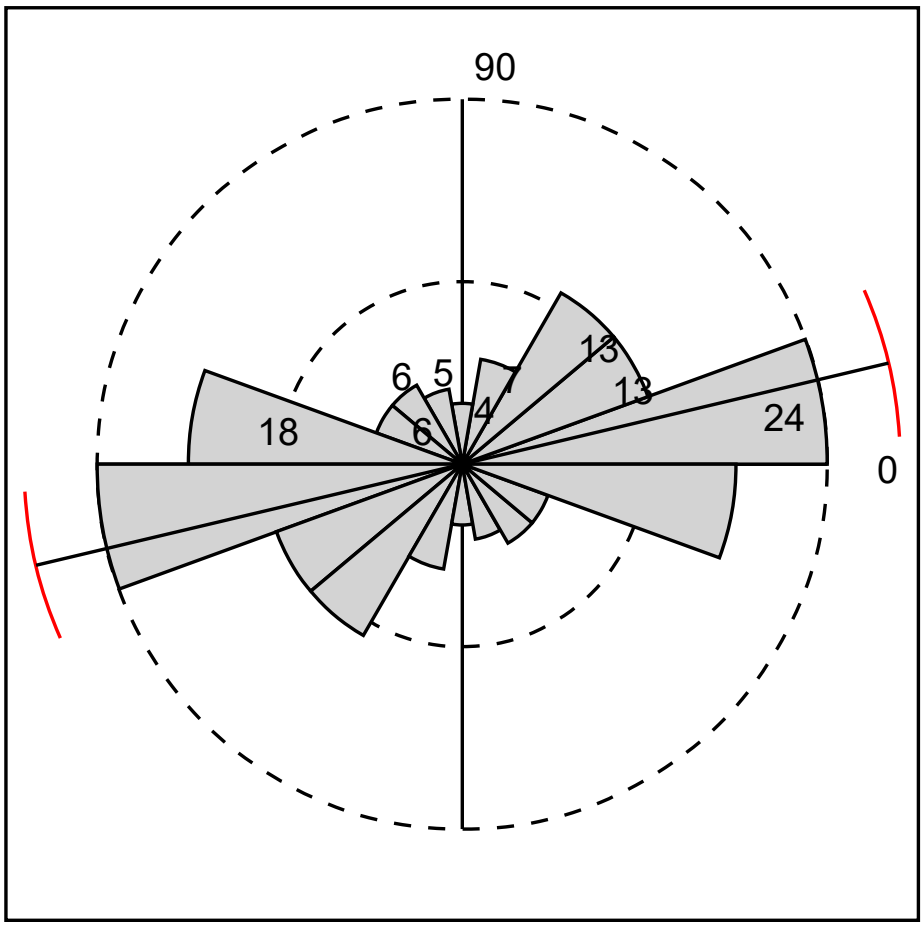

50
40
30
20
10
0
Count
Clay
Very fine silt
Fine silt
Medium silt
Coarse silt
Very fine sand
Fine sand
Categories from Udden-Wentworth scale

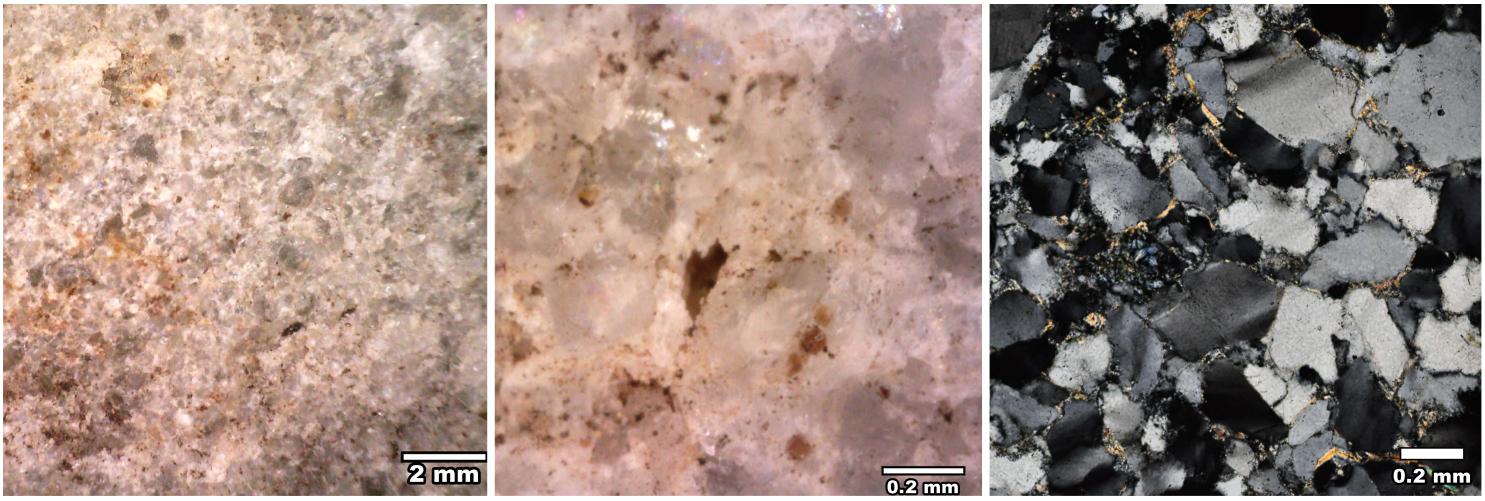

20
15
10
5
0
Frequency
,2
,4
,6
,8
1,0
Round


20
15
10
5
0
Frequency
,0
,2
,4
,6
,8
1,0
Circularity

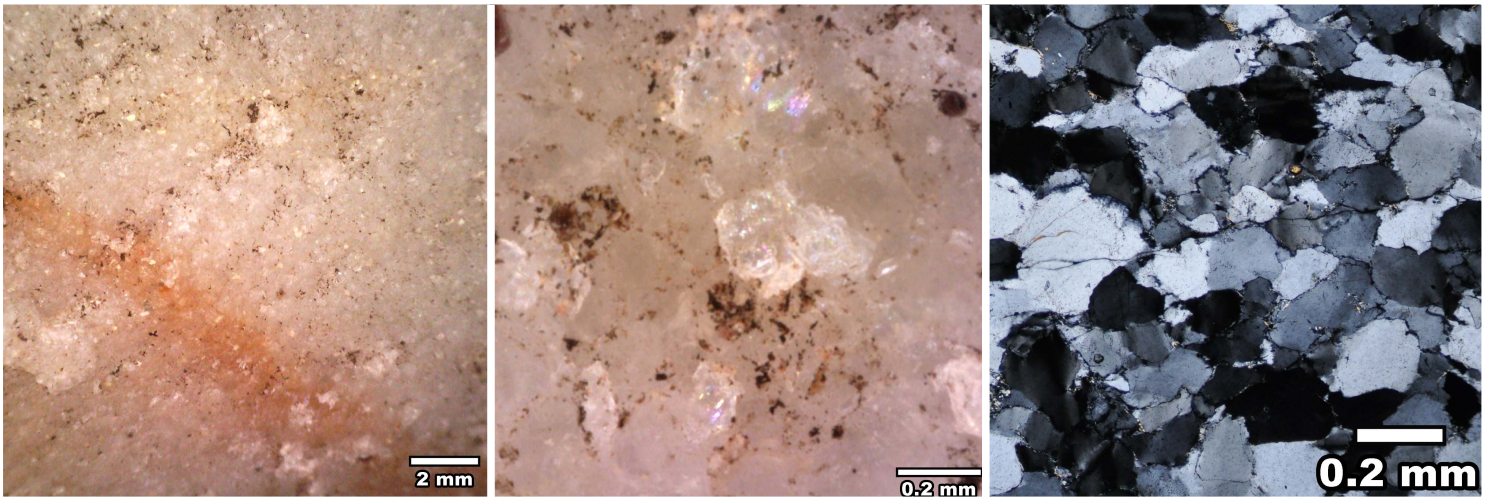


Angle

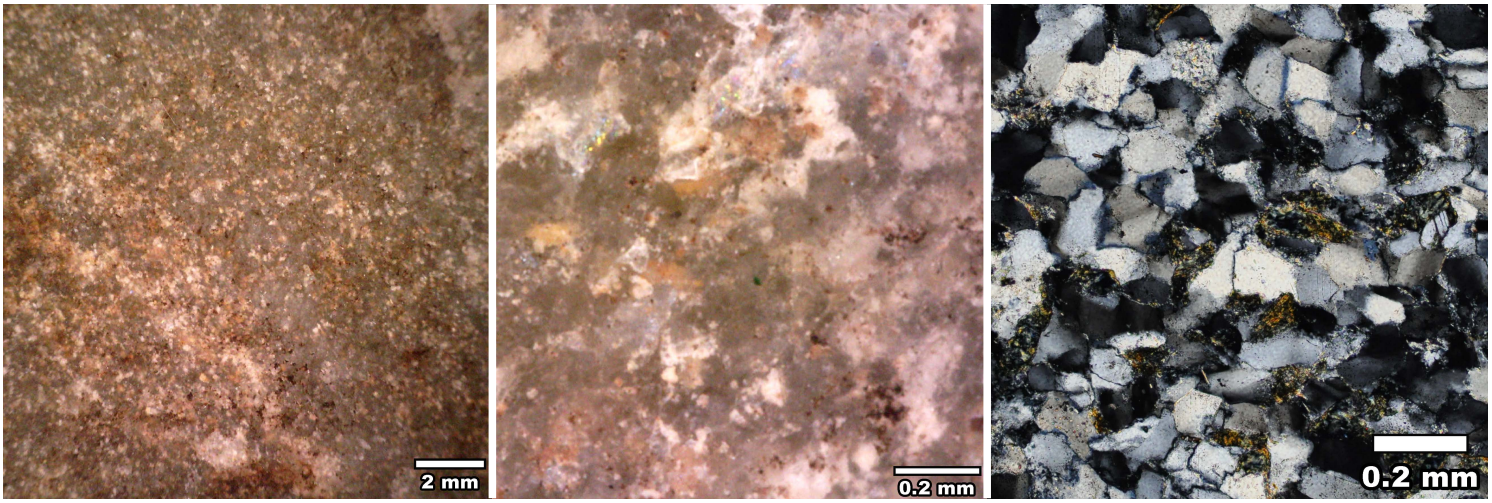




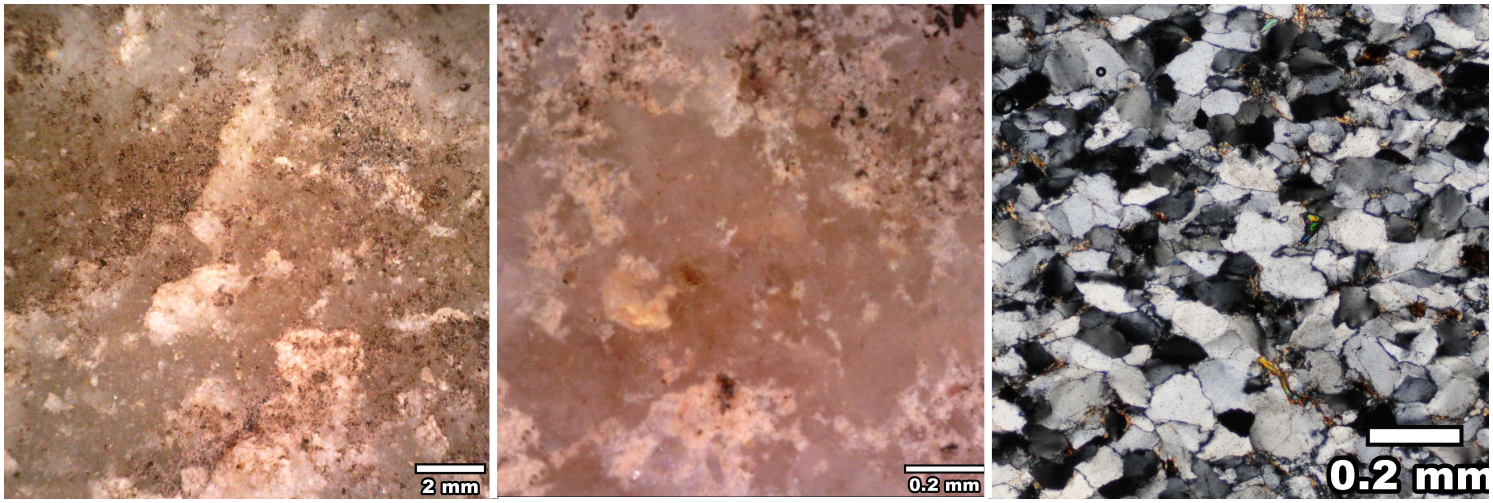
Supplementary Files Figure 1: Pictures of the CA type sample, ES-263. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.



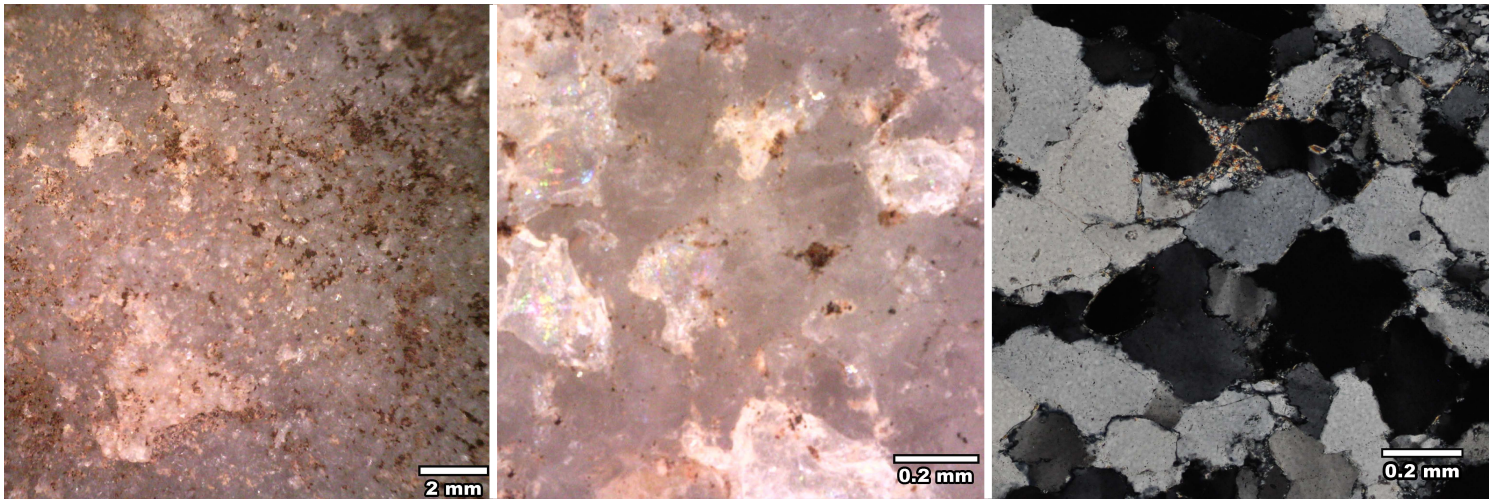
Supplementary Files Figure 4: Pictures of the OO type sample, ES-245. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.



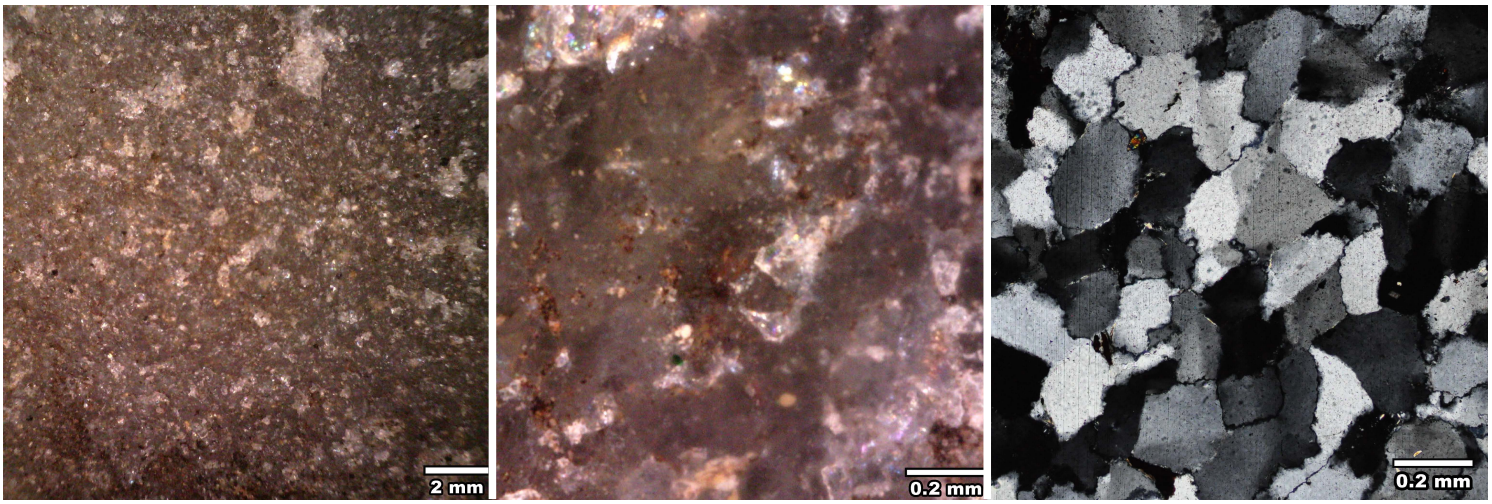
Supplementary Files Figure 3: Pictures of the OO type sample, ES-255. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.



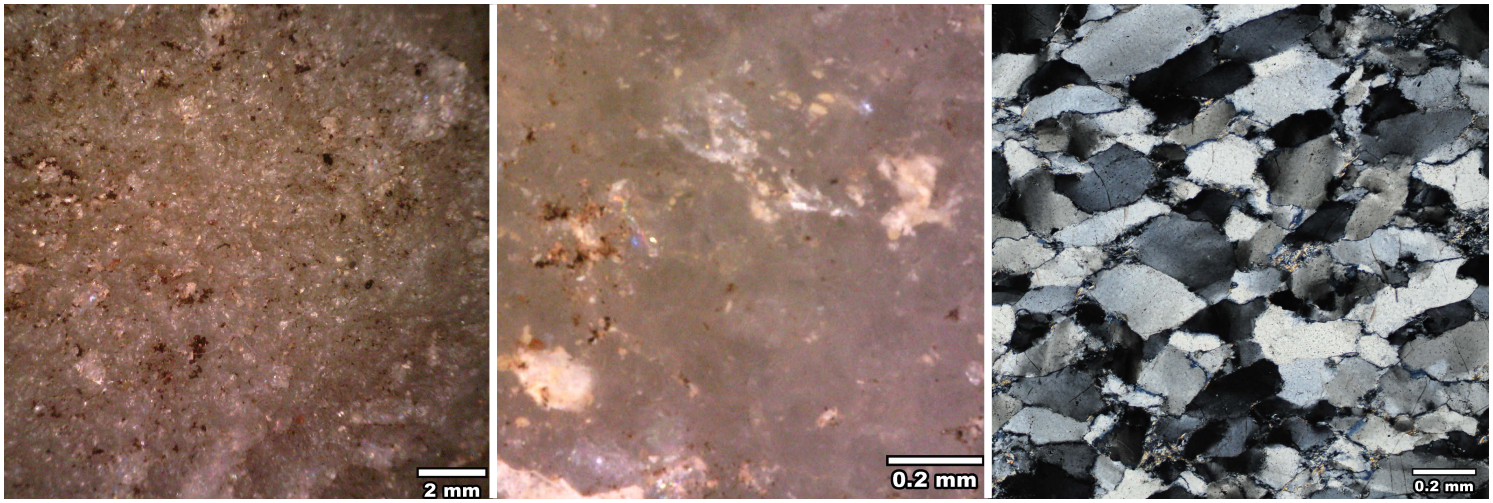
Supplementary Files Figure 2: Pictures of the OO type sample, ES-283. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.



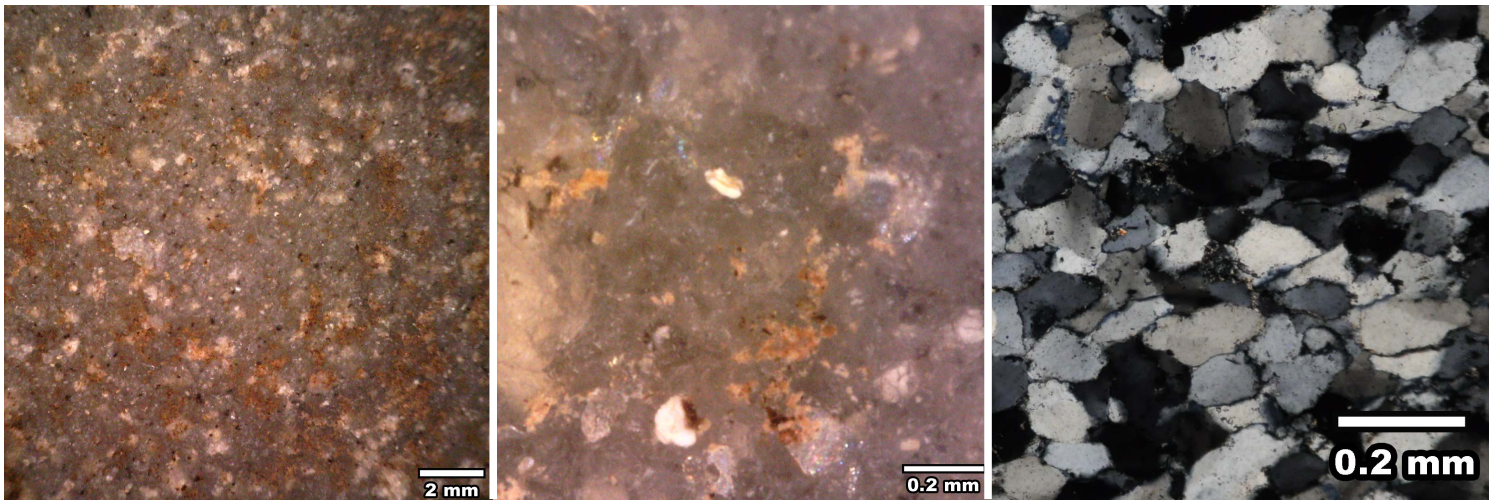
Supplementary Files Figure 5: Pictures of the OO type sample, ES-293. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.



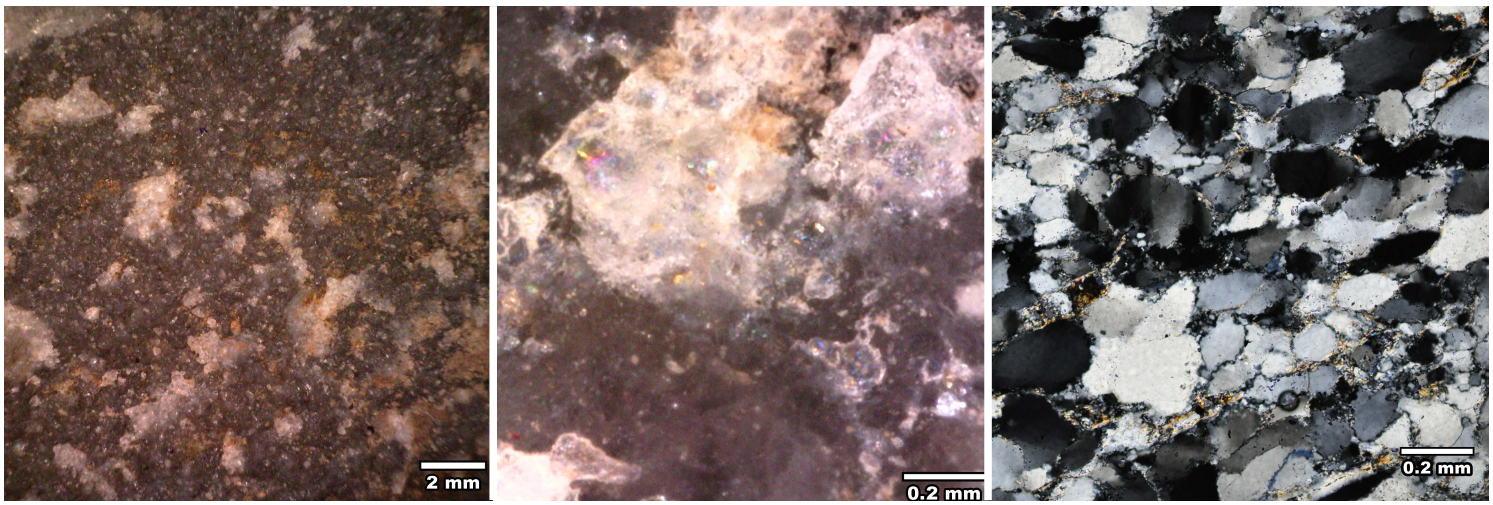
Supplementary Files Figure 6: Pictures of the SO type sample, ES-246. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.



Supplementary Files Figure 8: Pictures of the OO type sample, ES-265. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.



Supplementary Files Figure 7: Pictures of the SO type sample, ES-314. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.



Supplementary Files Figure 9: Pictures of the OO type sample, ES-328. From left to right, microscopy binocular picture at 20x, microscopy binocular picture at 250x, and thin section microscopy picture at different magnifications.