Appendix A Impact of depth and length criteria in scour hole identification

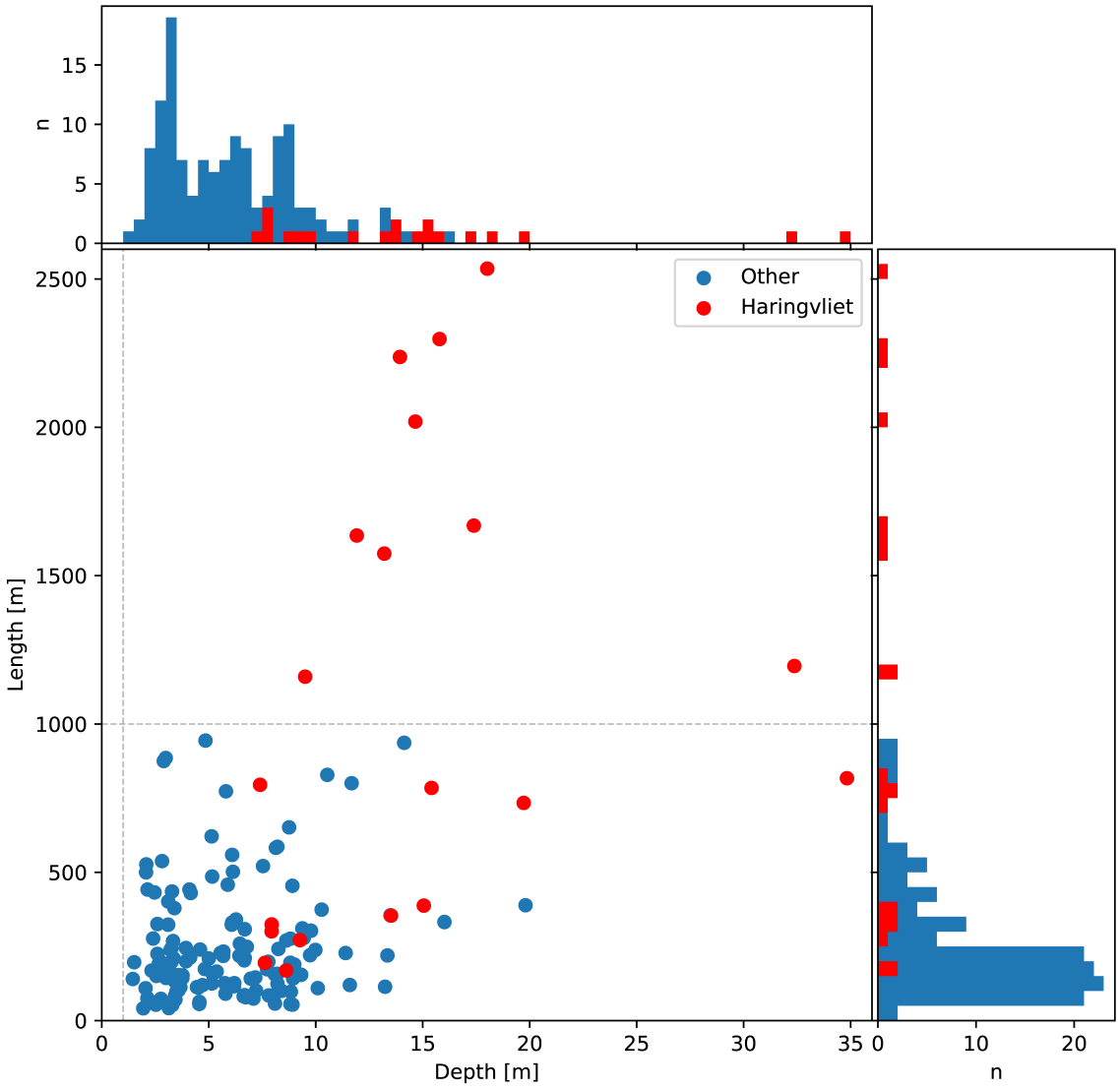

Figure 14: Depth of all scour holes in the study area plotted against their length along with histograms showing the distributions. The horizontal and vertical dashed lines indicate the depth and length criteria respectively that were used for the scour hole identification (section 3.1.1). A larger depth criterion of up to 2 m has small effects on the results as only 3 scour holes would have to be excluded. Scour holes in the Haringvliet are indicated by a different color to highlight the necessity for using different cutoff values in this branch.

Appendix B Median width and number of scour holes per river branch in the Rhine-Meuse delta

Table 4: Median width, ranges of 50 and 90 percentile flow velocities and number of scour holes for the river branches in the Rhine-Meuse delta. The ranges of the flow velocities are derived from modelling output. The median width is used for normalizing the radius of curvature.

Branch	Code	Median width [km]	v 50-th [m/s] (SOBEK)	v 90-th [m/s] (SOBEK)	(WAQUA)	number of scour holes
Amer	amr	0.46	0.13-0.2	0.24-0.42		3
Beneden Merwede	bem	0.30	0.42-0.68	0.59-0.9		2
Bergse Maas	bms	0.21	0.19-0.28	0.42-0.61		3
Boven Merwede	bom	0.47	0.5-0.71	0.78-1.05	0.49-1.0	1
Bovenrijn	bor	0.44			1.16-1.43	2
Dordtsche Kil	dkl	0.27	0.72-0.82	0.91-1.05		6
Hollands diep	hdp	1.59	0-0.2	0.01-0.39		7
Haringvliet	hvl	0.60	0-0.11	0.06-0.21		10
Haringvliet (zuid)	hvl	0.60	0.01-0.07	0.06-0.18		10
Hollandse IJssel	hys	0.12	0.03-0.33	0.06-0.72		21
Lek	lek	0.24	0.18-0.52	0.49-0.96	0.26-0.97	14
Nieuwe Merwede	nme	0.54	0.32-0.52	0.5-0.81		3
Nieuwe Maas	nms	0.41	0.32-0.87	0.6-1.29		9
Noord	nor	0.23	0.57-0.74	0.73-1.03		8
Oude Maas	oms	0.31	0.15-0.8	0.37-1.12		20
Spui	spu	0.18	0.07-0.75	0.13-0.96		13
Waal	waa	0.38	0.71-1.26	1.0-1.49	0.9-1.38	7

Figure 15: Location of the main river branches in the Rhine-Meuse delta. See Table 4 for the meaning of the abbreviations.

Appendix C ANOVA results scour hole characteristics by region

Table 5: One way ANOVA test results of scour hole characteristics per region.

	DoF	F	p value	F critical	significant
Area	(3, 150)	37.421	0.000	2.665	yes
Aspect ratio	(3, 150)	0.253	0.859	2.665	no
Solidity	(3, 150)	1.195	0.314	2.665	no
Average slope	(3, 150)	6.711	0.000	2.665	yes
Maximum slope	(3, 150)	14.558	0.000	2.665	yes
Depth	(3, 150)	18.531	0.000	2.665	yes

Table 6: Post-hoc Tukey test results indicating which scour hole characteristics differ significantly between regions.

	group A	group B	meandiff	lower	upper	p
Area	CD	SW	152899.003	113511.523	192286.482	0.001
Area	LD	SW	145623.182	99286.579	191959.784	0.001
Area	SW	UD	-158363.905	-208383.602	-108344.208	0.001
Average slope	CD	LD	2.254	0.926	3.582	0.001
Average slope	LD	UD	-1.985	-3.717	-0.253	0.018
Maximum slope	CD	LD	8.778	4.768	12.789	0.001
Maximum slope	CD	SW	5.945	1.656	10.234	0.002
Maximum slope	LD	UD	-9.883	-15.113	-4.653	0.001
Maximum slope	SW	UD	-7.049	-12.496	-1.602	0.005
Depth	CD	SW	0.876	0.570	1.182	0.001
Depth	LD	SW	0.620	0.260	0.980	0.001
Depth	SW	UD	-0.665	-1.054	-0.277	0.001

Appendix D ANOVA results scour hole characteristics by substrate type

Table 7: Two way ANOVA results of scour hole characteristics per architectural element (AE) and lithology along the scour holes edge. Only scour holes in the delta area (LD, CD and UD; Fig. 1a) are incorporated conform figure 8

		DoF	F	p value	F critical	significant
Area	AE	(3, 113)	0.567	0.569	2.685	no
	edge	(3, 113)	2.079	0.130	2.685	no
	AE - edge	(9, 113)	0.957	0.473	1.964	no
Aspect ratio	AE	(3, 113)	0.649	0.525	2.685	no
	edge	(3, 113)	0.132	0.877	2.685	no
	AE - edge	(9, 113)	0.672	0.715	1.964	no
Soliditiy	AE	(3, 113)	2.707	0.071	2.685	no
	edge	(3, 113)	1.270	0.285	2.685	no
	AE - edge	(9, 113)	1.412	0.199	1.964	no
Average slope	AE	(3, 113)	0.391	0.677	2.685	no
	edge	(3, 113)	2.405	0.095	2.685	no
	AE - edge	(9, 113)	0.591	0.783	1.964	no
Maximum slope	AE	(3, 113)	2.693	0.072	2.685	no
	edge	(3, 113)	3.162	0.046	2.685	yes
	AE - edge	(9, 113)	0.664	0.722	1.964	no
Depth	AE	(3, 113)	4.755	0.010	2.685	yes
	edge	(3, 113)	1.384	0.255	2.685	no
	AE - edge	(9, 113)	1.862	0.073	1.964	no

Table 8: Post-hoc Tukey test results indicating which scour hole characteristics differ significantly between architectural elements (AE) and lithology along the scour hole edges.

		group A	group B	meandiff	lower	upper	p
Maximum slope	edge	clay	peat	-8.392	-15.853	-0.931	0.021
	edge	clay	sand	-6.689	-11.773	-1.606	0.005
	edge	mixed	sand	-4.516	-8.692	-0.339	0.029
Depth	AE	AEc	Wy	0.377	0.064	0.690	0.011
	AE	AEo	Wy	0.495	0.102	0.887	0.007