

International Symposium „DRAVA RIVER VISION”

23-25 September 2008

Maribor, Slovenia

Environmental effects of industrial dredging on alluvial riverbeds

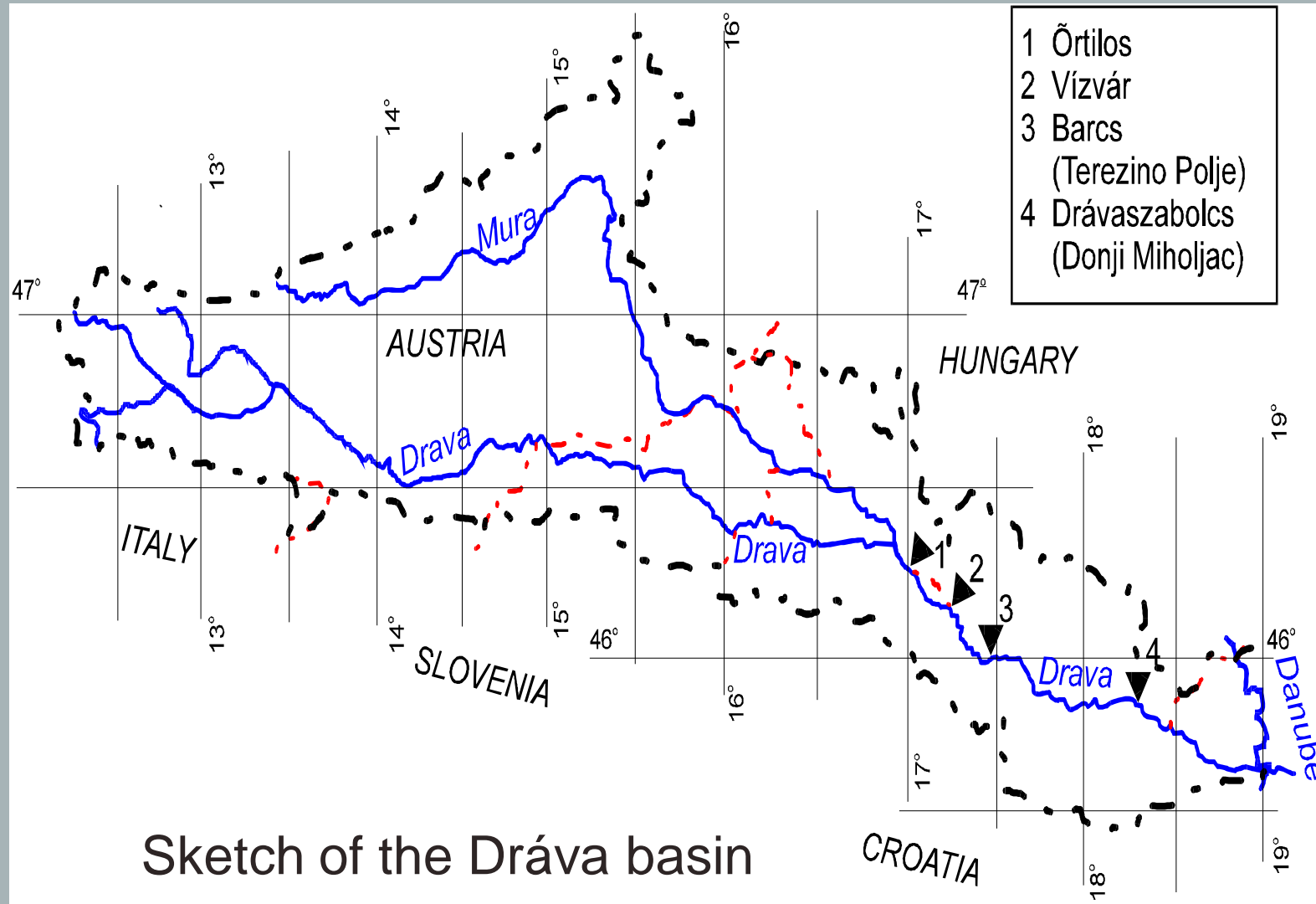
László RÁKÓCZI

János SZEKERES

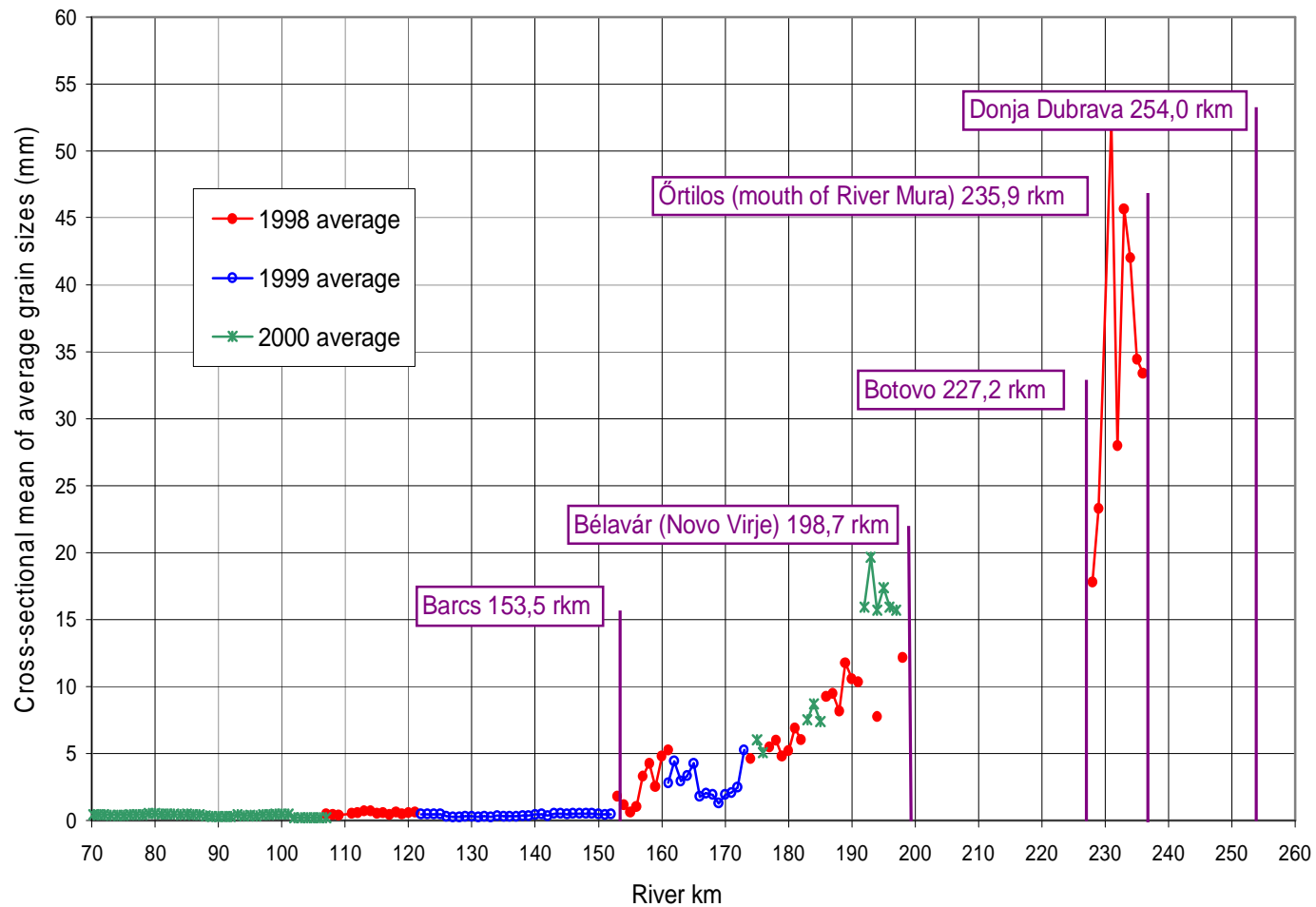
VITUKI Plc. Budapest, 2008



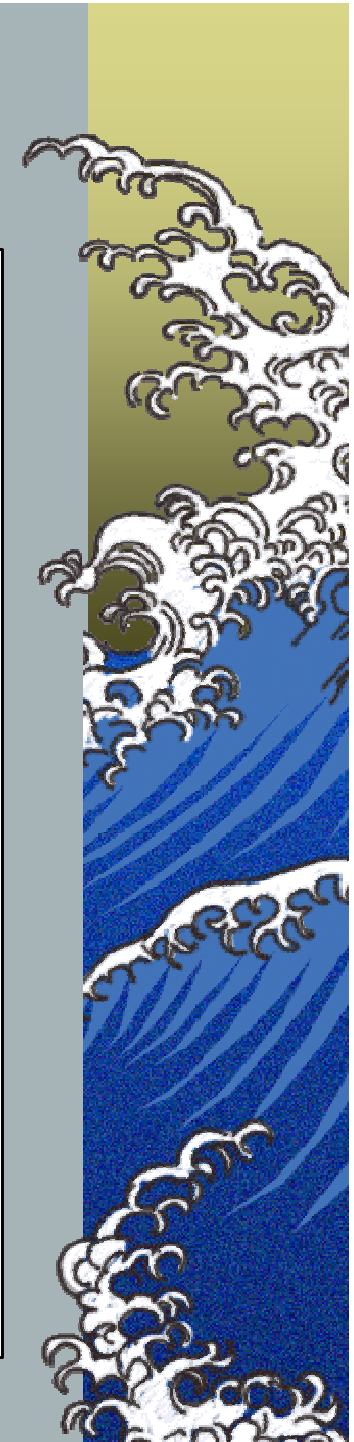
Environmental effects of industrial dredging on alluvial riverbeds



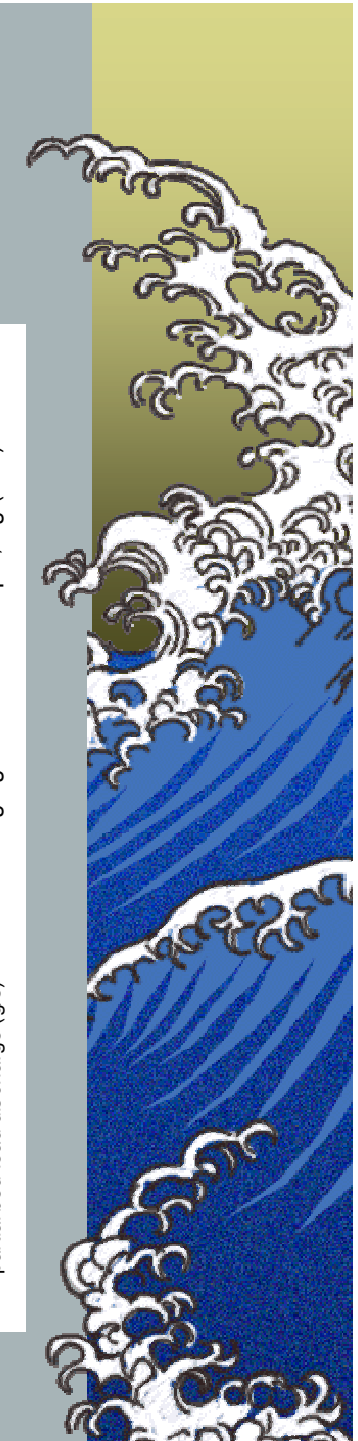
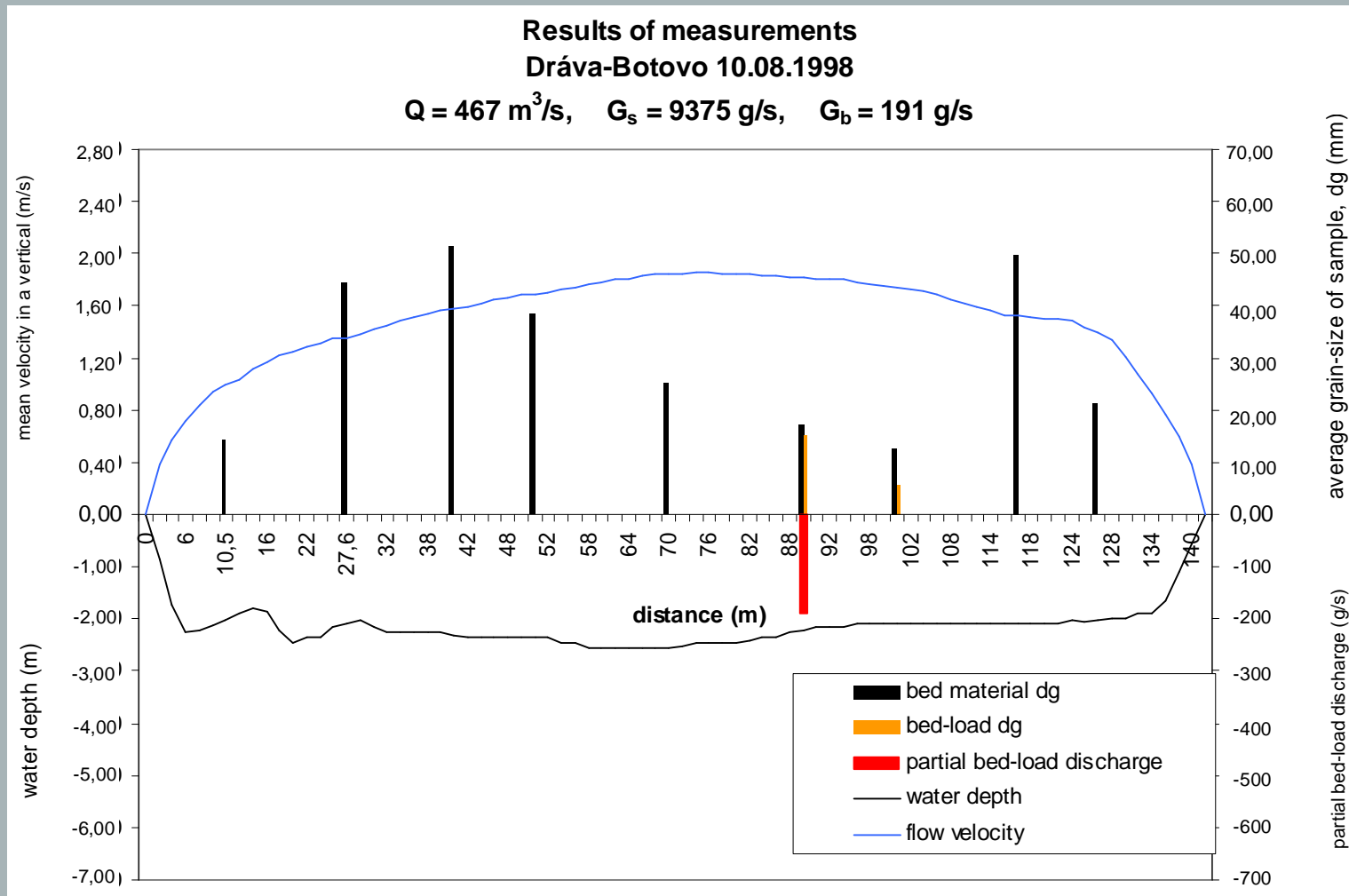
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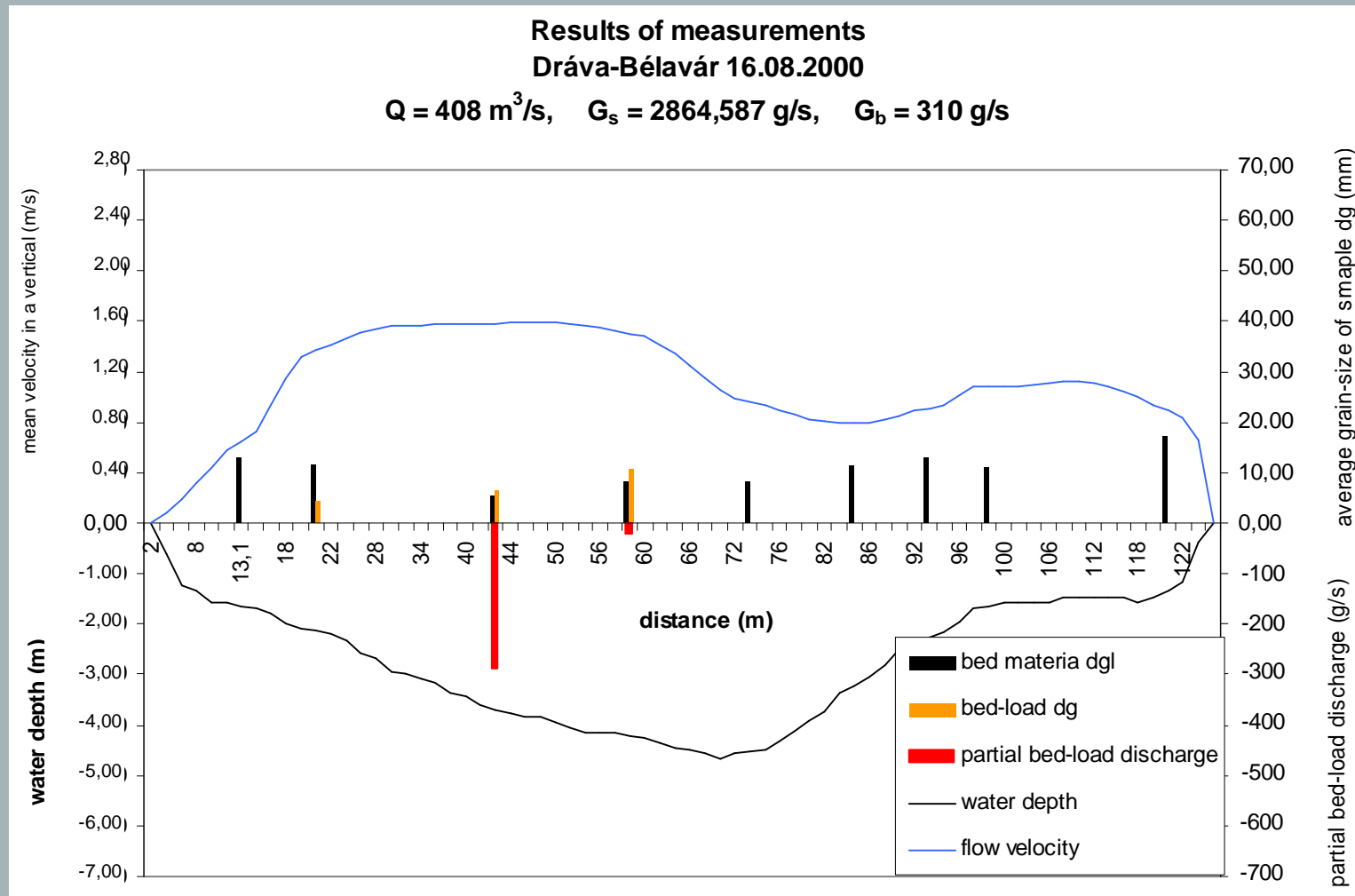
Variation of cross-sectional means of average grain sizes in bed material samples along the study reach of River Dráva 1998-2000.



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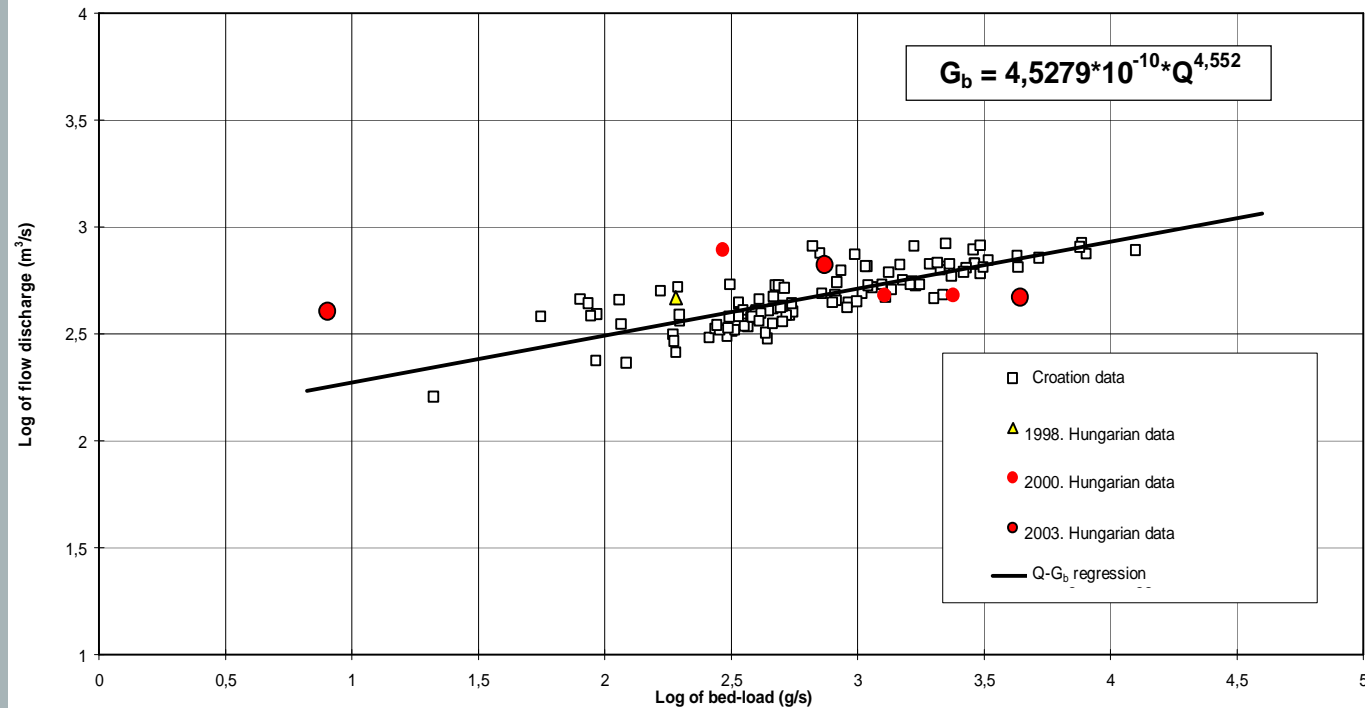


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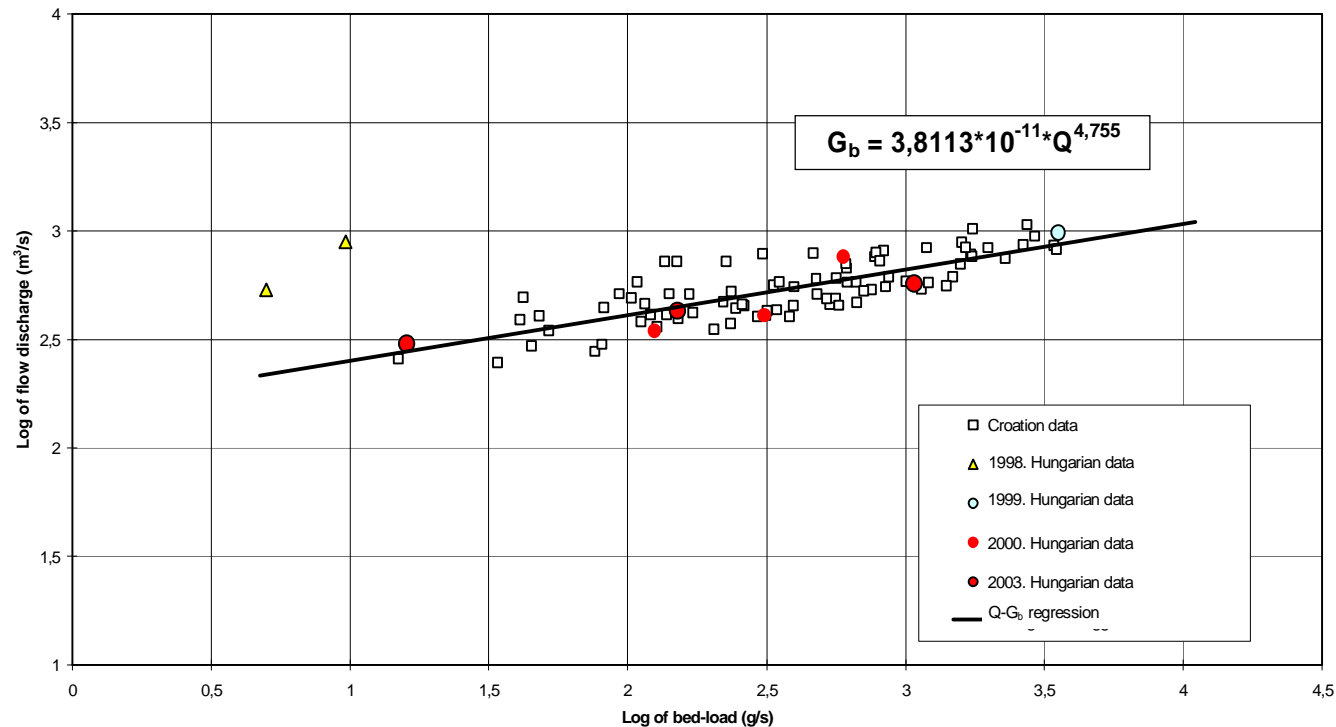
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Flow discharge vs. bed-load discharge
Dráva - Botovo



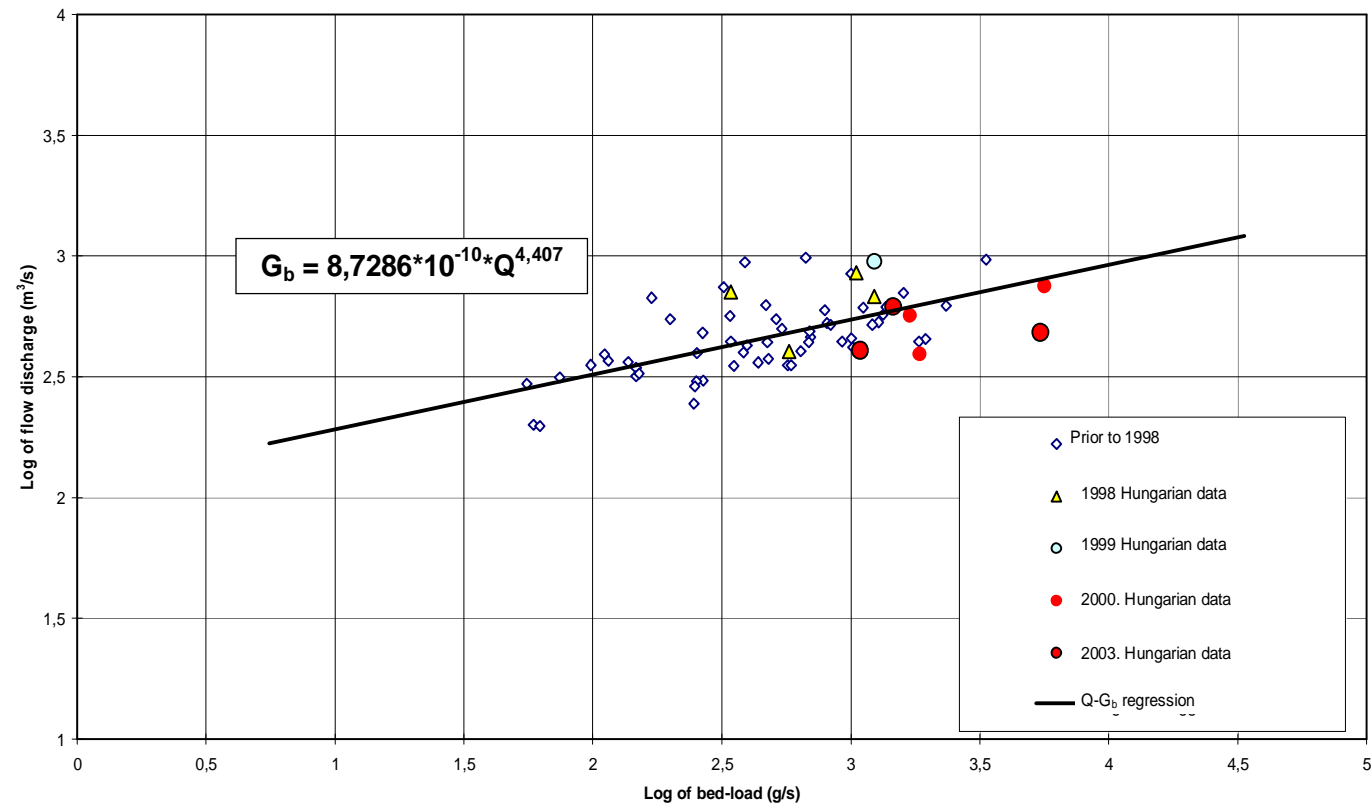
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Flow discharge vs. bed-load discharge
Dráva - Bélavár (Novo Virje)

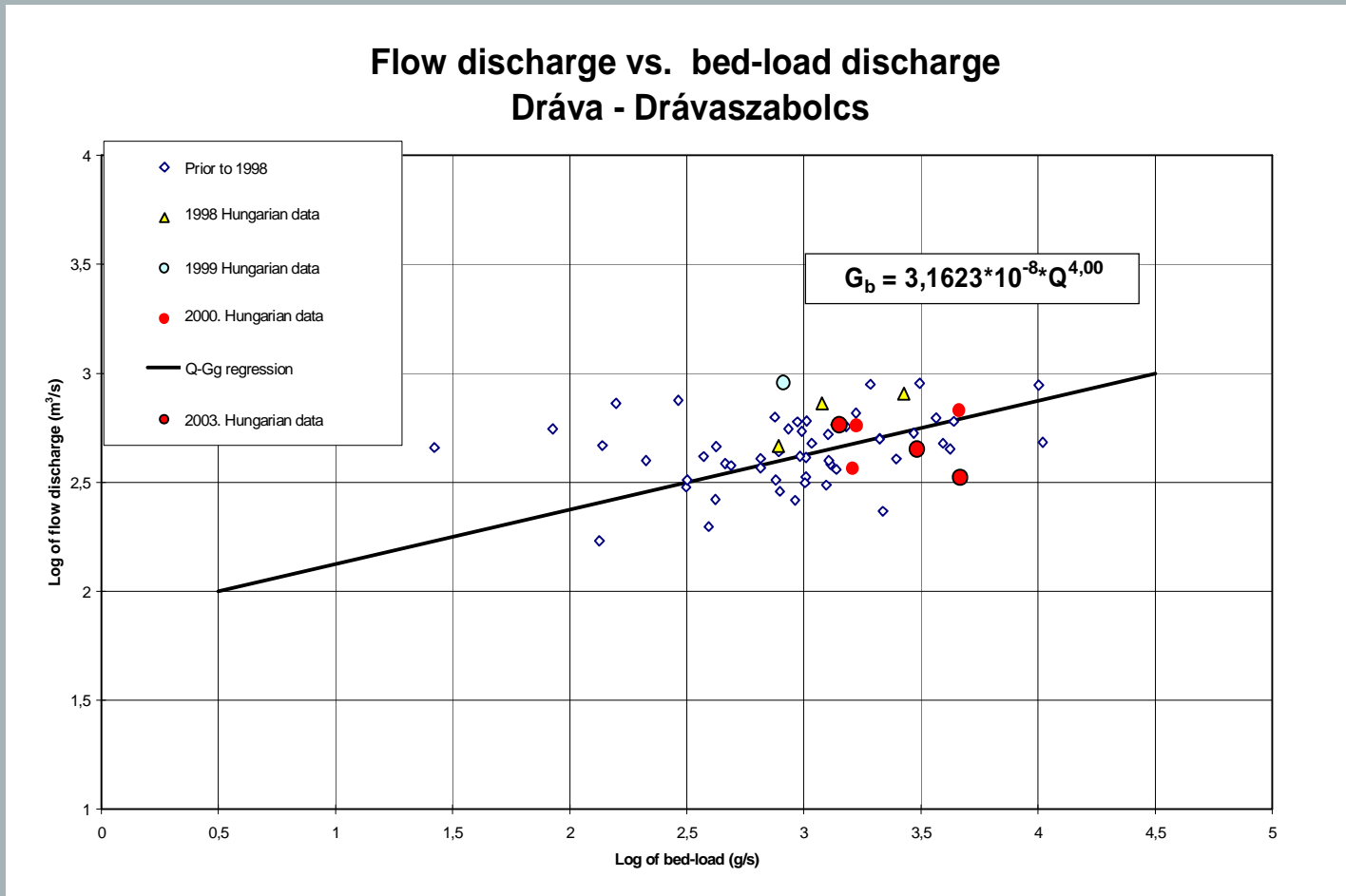


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Flow discharge vs. bed-load discharge Dráva - Barcs



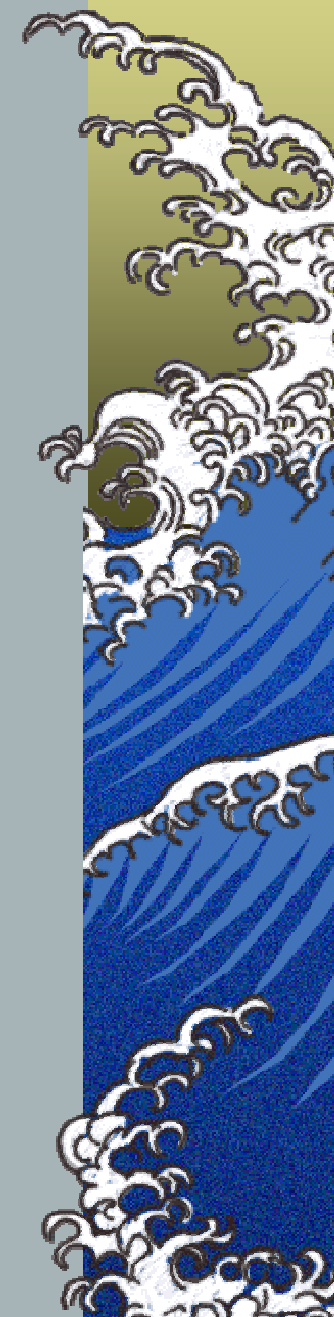
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Annual bed-load transport of Dráva and Mura Rivers (t/yr)

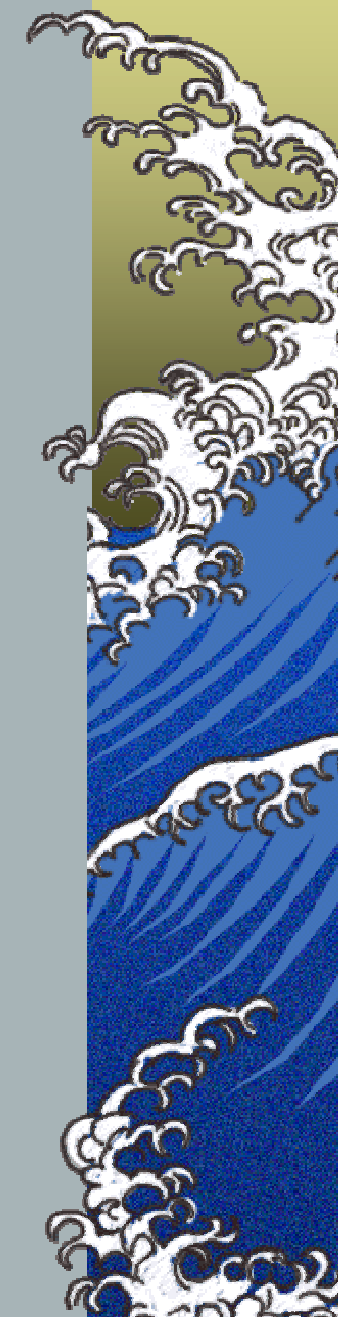
Year	Botovo	Bélavár	Barcs	Dráva szabolcs	Letenye
1986	165 587	56 887	117 776	283 545	52 611
1987	126 122	42 059	91 638	228 289	51 937
1988	46 849	14 960	35 117	107 287	13 512
1989	184 710	65 619	128 513	306 357	176 374
1990	52 595	17 389	38 497	96 144	19 727
1991	160 236	54 937	114 182	298 318	63 756
1992	84 295	27 879	61 607	169 380	38 098
1993	144 226	51 819	99 605	231 717	60 910
1994	45 052	14 374	33 798	106 131	11 938
1995	67 872	22 309	49 867	141 590	23 150
1996	178 755	61 605	126 979	322 580	102 050
1997	40 936	13 031	30 757	83 811	11 879
1998	186 499	66 332	129 645	248 529	23 112
1999	121 850	40 571	88 633	241 491	52 042
2000	142 105	49 017	100 896	238 799	19 044
2001	43 353	13 721	32 684	86 067	2 873
2002	62 599	20 927	45 456	108 366	23 962
2003	10 358	3 110	8 119	27 448	607
average	109 038	37 261	77 979	194 024	43 940



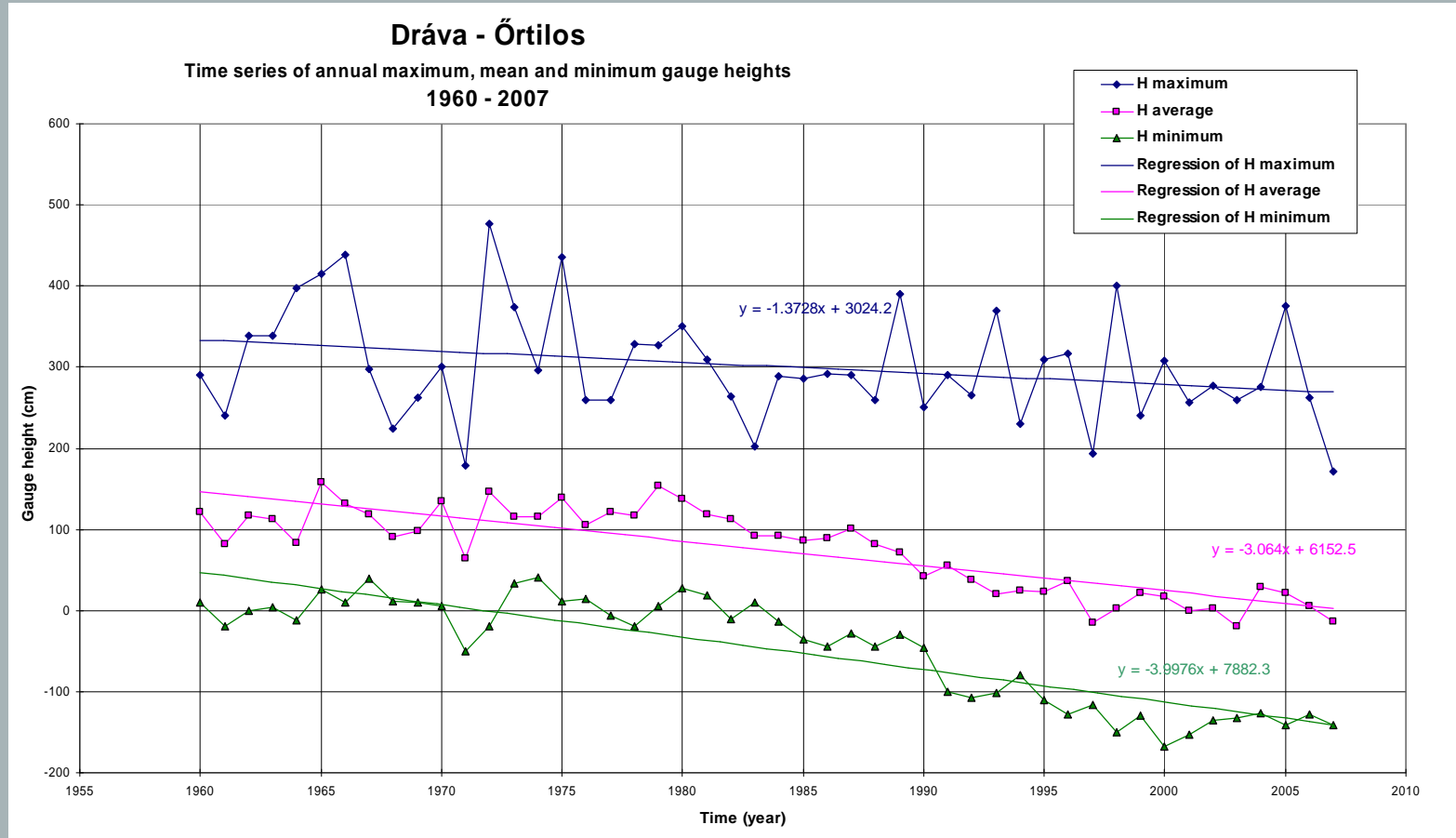
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Annually dredged bed material masses in River Dráva (t/yr)

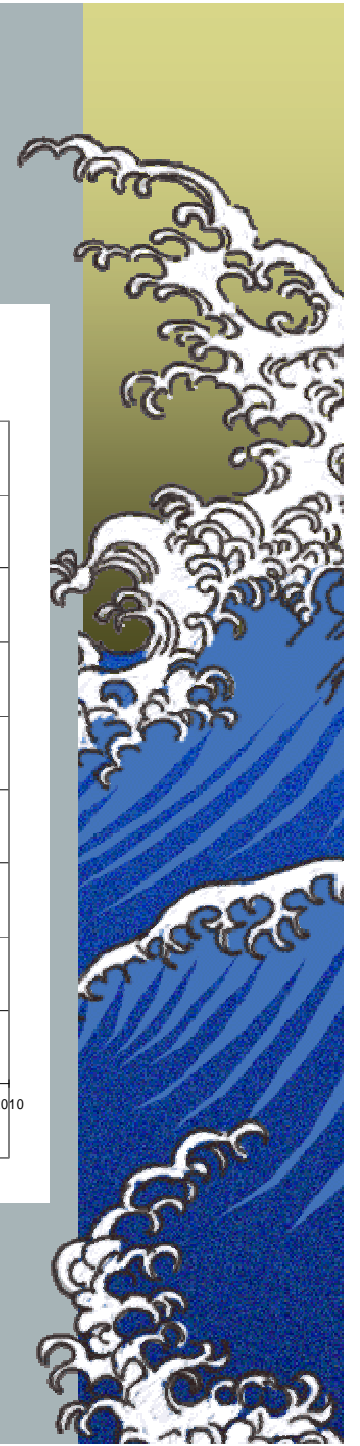
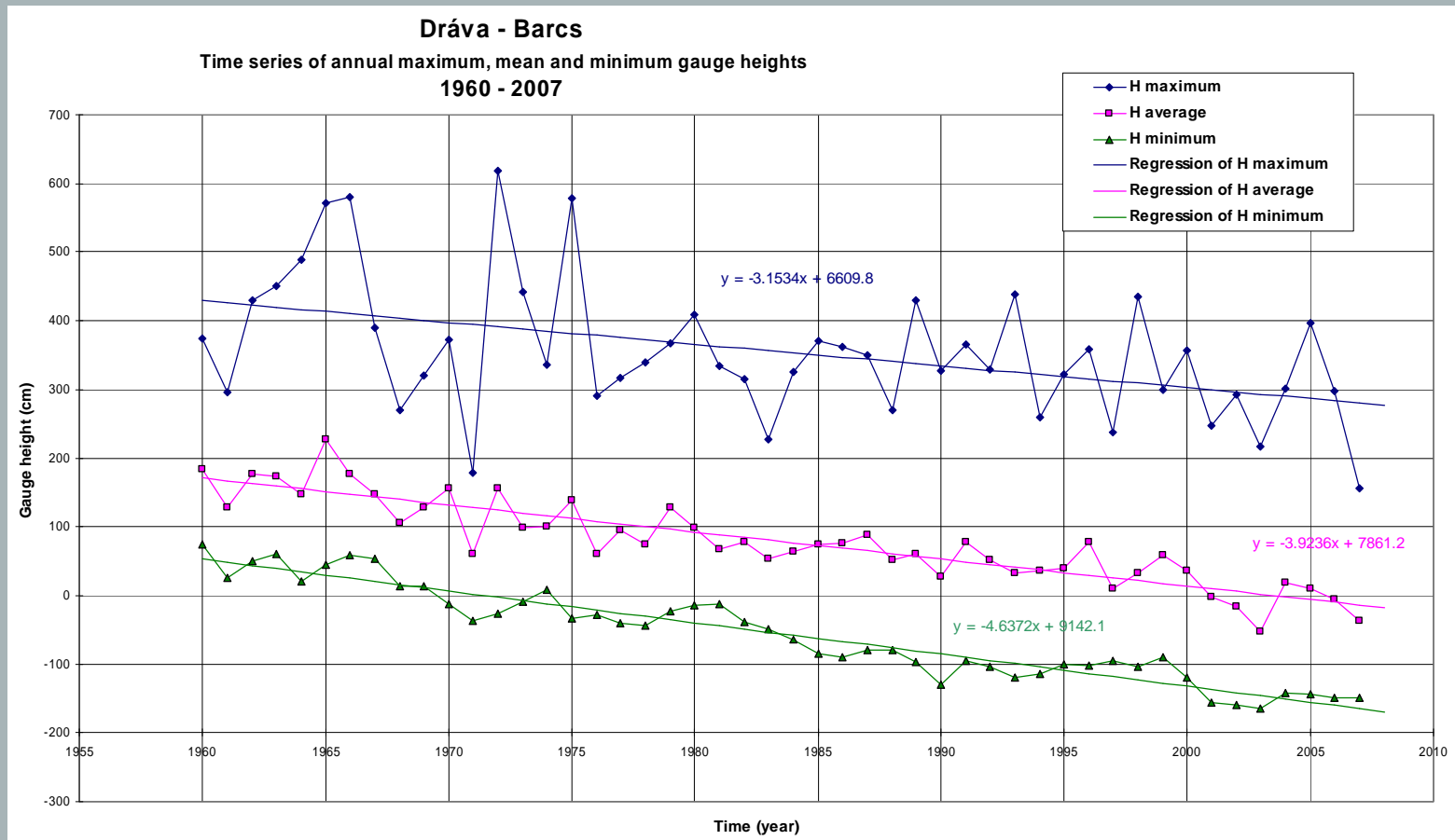
Year	Hungarian dredging			Croatian dredging			Total dredging
	sand+ gravel	gravel 184,2- 185,0 rkm	sand+ gravel 152,7- 157,1 rkm	sand+ gravel	gravel since 1993	since 1993 sand	
1982	171 000			472 680			643 680
1983	192 420			438 300			630 720
1984	238 277			396 000			634 277
1985	180 000			316 800			496 800
1986	160 200			244 534			404 734
1987	206 460			90 000			296 460
1988	190 800			180 000			370 800
1989	218 880			297 000			515 880
1990	116 460			177 059			293 519
1991	41 904			109 834			151 738
1992	51 696			255 861			307 557
1993	60 714			172 211	130 372	41 839	232 925
1994	54 000			458 860	375 957	82 903	512 860
1995	81 104			428 094	428 094	0	509 198
1996	67 000			279 724	228 352	51 372	346 723
1997	64 899	1 890	63 009	470 736	262 181	208 555	535 635
1998	115 967	63 844	52 123	558 356	361 800	196 556	674 323
1999	175 946	124 733	51 214	560 317	166 059	394 258	736 263
2000	201 568	147 254	54 313	238 973	238 435	538	440 541
2001	188 041	142 834	45 207	128 833	99 497	29 336	316 874
2002	230 771	169 956	60 815	21 775	14 364	7 411	252 545
Subtotal of marked values		1 899 729			3 659 398		6 898 576



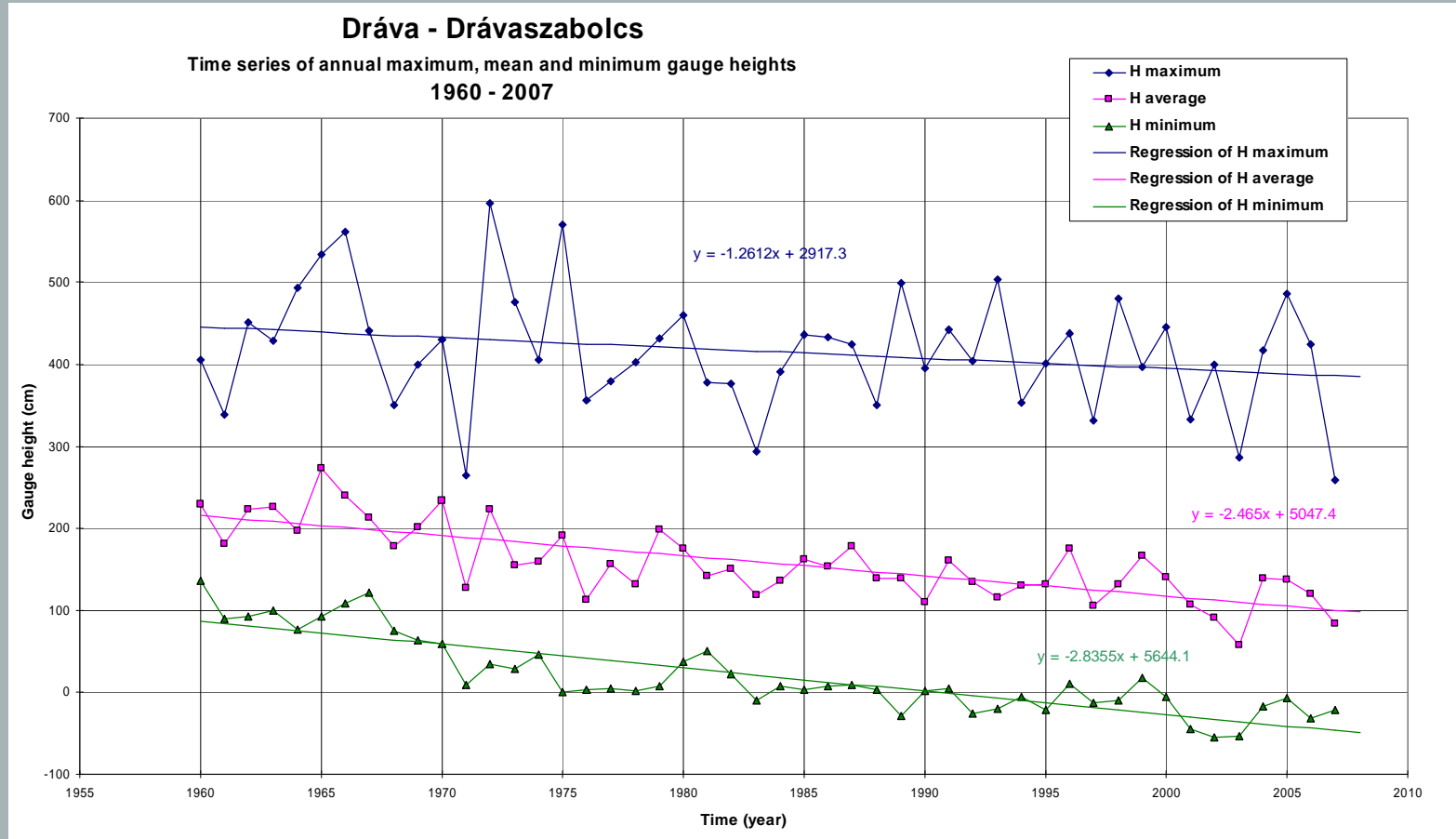
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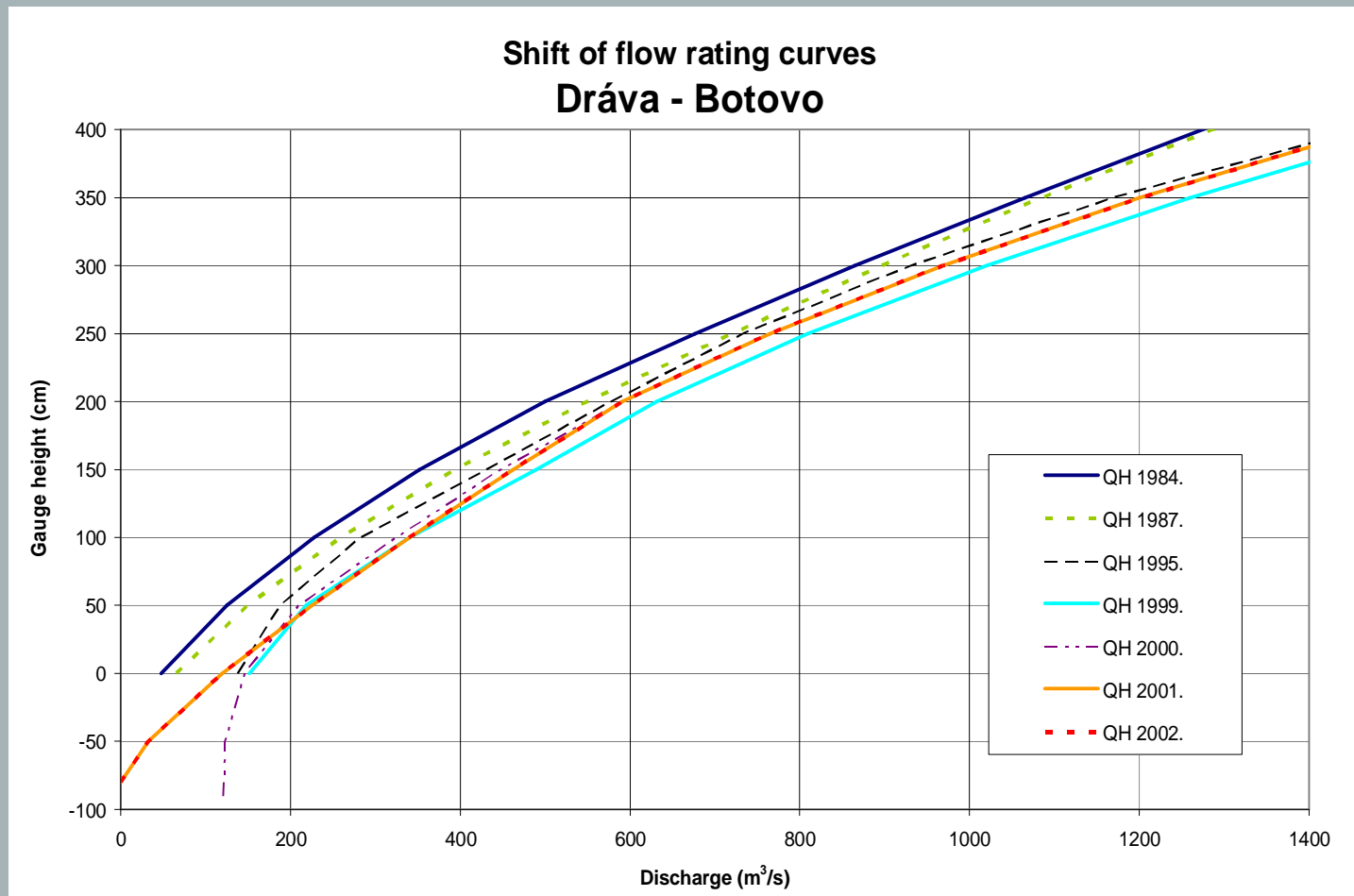
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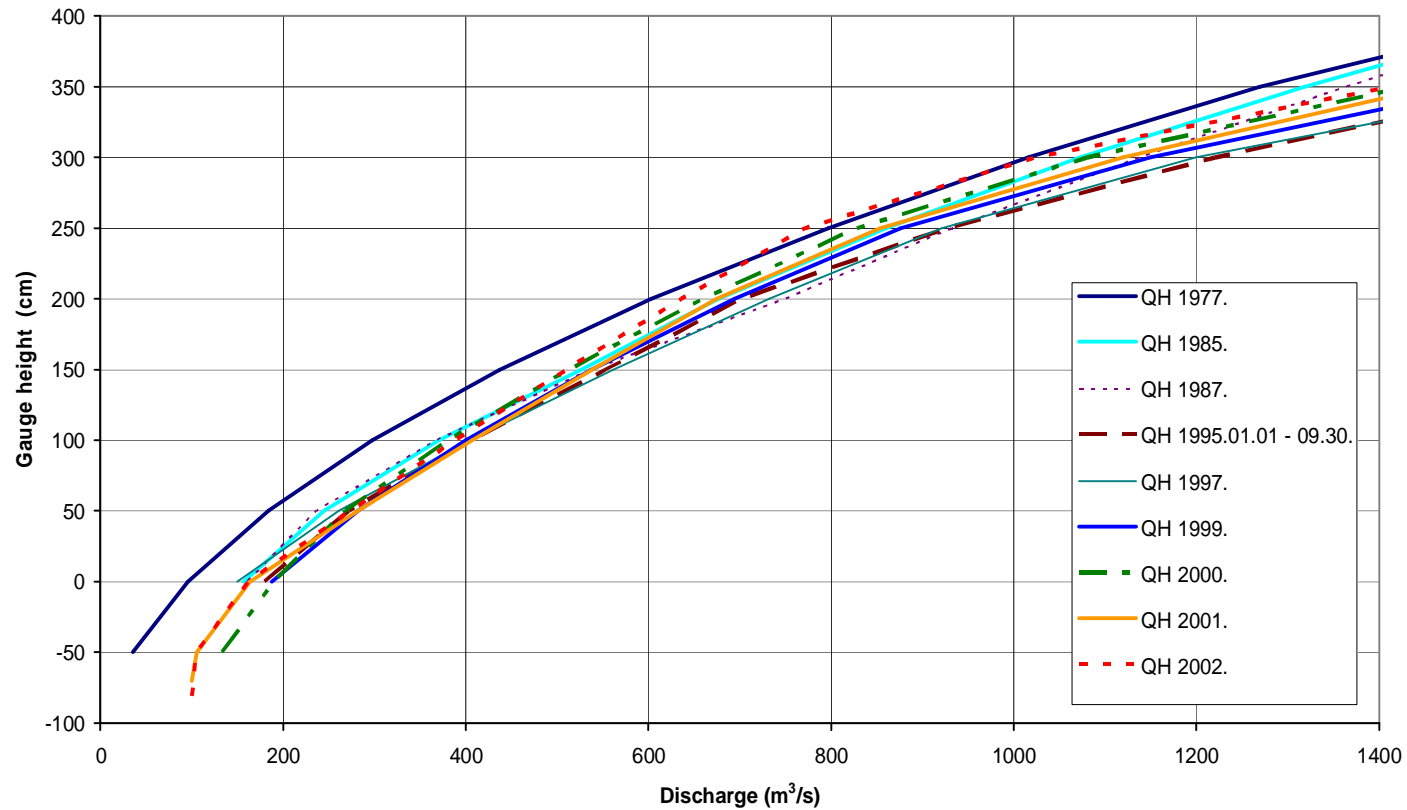


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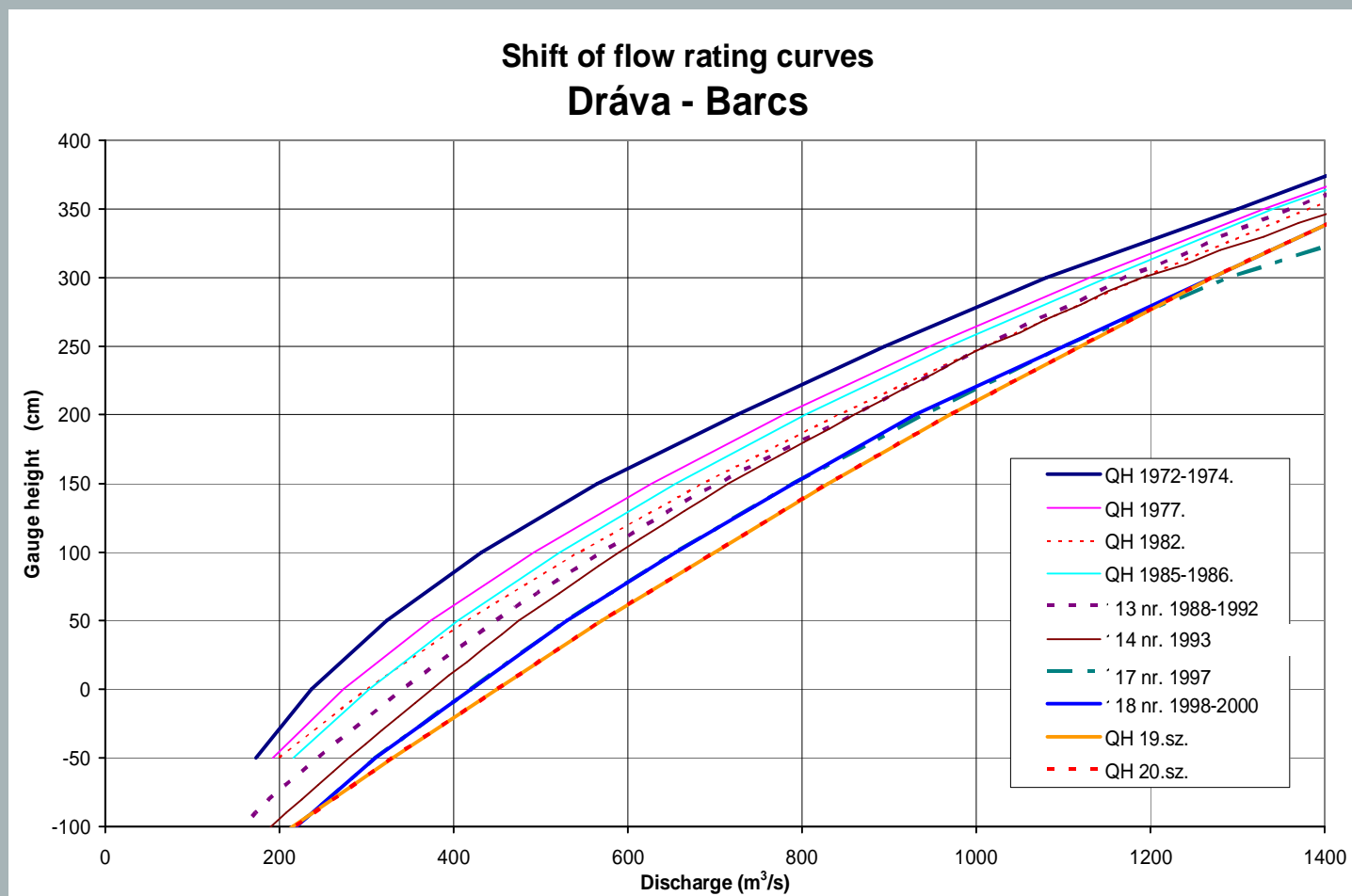


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Shift of flow rating curves
Dráva - Novo Virje (Bélavár)

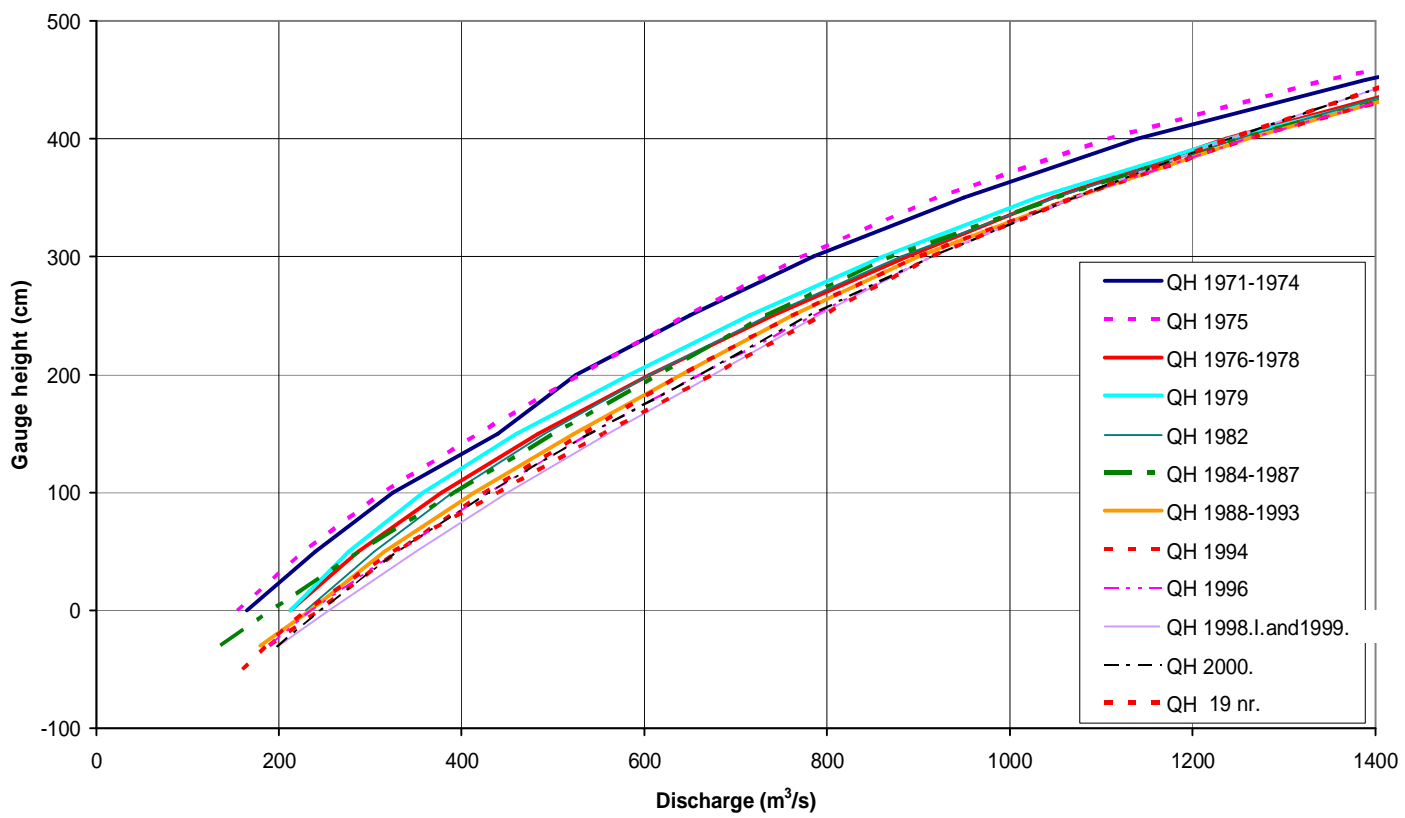


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Shift of flow rating curves
Dráva - Drávaszabolcs



Thank you for your attention!

