Jber.Biol.Stn Lunz 14: 41 - 47 (1993)

Gauge data and water temperatures in the RITRODAT area 1991 and 1992 and long year averages of climatic data.

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Keywords: Discharge, water-temperature, climatic data

Water level is registrated with a GANSER water-stage recorder. Staff gauge and recorder are positioned on the right bank below the RITRODAT-bridge.
The hydrological year 1991 was dominated by an extreme flood (30-50 years recurrence) with discharge maxima on the 28th of July and 2nd of August. The highest gauge mark was 120 cm. The actual water level was somewhat higher than that but it surpassed the measuring capacity of the equipment. Waterlevel as means of dacades and extremes are set out in Tab. 1.

		Mean	Extremes Max	Min			Mean	Extremes Max	Min
1		32.2	56.0	21.5	1		25.4	48.5	17.5
2	J	23.3	34.0	16.0	2	J	32.8	81.0	14.5
3		12.9	16.0	10.0	3		49.9	120.0	19.0
1		6.5	10.0	1.5	1				
2	F	6.1	8.5	2.0	2	A			
3		9.8	15.0	2.5	3				
1		21.3	42.0	10.0	1		89.2	91.5	88.0
2	M	28.7	45.5	21.5	2	S	88.4	89.0	88.0
3		28.6	43.0	16.0	3		88.4	89.0	87.0
1		24.5	30.0	16.0	1		94.0	100.5	88.0
2	A	22.8	28.5	18.0	2	O	86.8	90.0	86.0
		22.8	39.5	15.5	3		87.2	88.0	86.5
1		32.0	41.0	25.0	1		93.9	104.5	87.5
2	M	38.0	50.0	31.0	2	N	101.3	106.0	99.0
3		43.1	69.0	30.5	3		100.0	102.0	97.5
1		45.3	73.0	33.5	1		93.0	97.5	89.5
2	J	31.4	49.0	22.0	2	D	89.7	101.5	87.5
3		24.6	49.5	17.0	3		122.5	191.5	101.5

ANNUAL	MEAN	MAX	MIN
-	(21.8)	(120)	2
MONTH/DATE	-	VII/3	II/1

Table 1: Water level means of decades and extremes, 1991. Gauge station RITRODAT-bridge. August data are missing because of extreme flood. Values in brackets: approximations only.

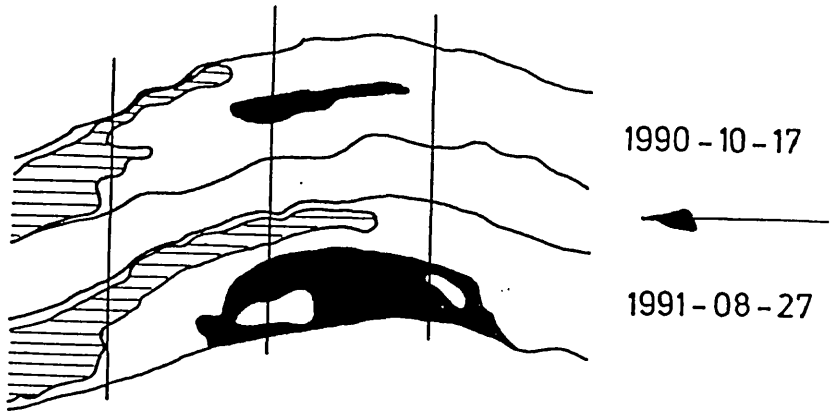

Figure 1: RITRODAT study area. Shore line is bankfull line (gauge RITRODAT-bridge: 70 cm). Hatched areas: deeper than 25 cm Black areas: higher than 25 cm relative to gauge station.

The summer flood changed greatly the topography of the channel (Fig. 1). Severe erosions happened on the right bank between profile 7 and 14. In the absence of the fortified dam, the brook would have changed its entire course towards north, migrating into the valey. Aggregations occured on the right bank between profils 0 and 4 and in the left part of the channel between profils 0 and 15 (Fig. 2). The effects of these flood inducted aggregation/erosion processes are very obvious in the development of the mean longitudinal profile (Fig. 3).

Because of these topographic changes, a new rating curve had to be established for the gauge RITRODAT-bridge. In the praeflood situation (1989) one typical power function describes the regression between water level and discharge (Fig. 4):

$$y = 0.00018\, x^{2.584} \qquad r^2 = 0.988 \qquad n = 11$$

After the flood two power functions are necessary to describe the regression with the necessary accuracy (Fig. 4):

gauge reading lower than 135 cm:

$$y = 3.266^{-18}\, x^{8.474} \qquad r^2 = 0.946 \qquad n = 18$$

gauge reading higher than 135 cm:

$$y = 1.045^{-9}\, x^{4.440} \qquad r^2 = 0.992 \qquad n = 10$$

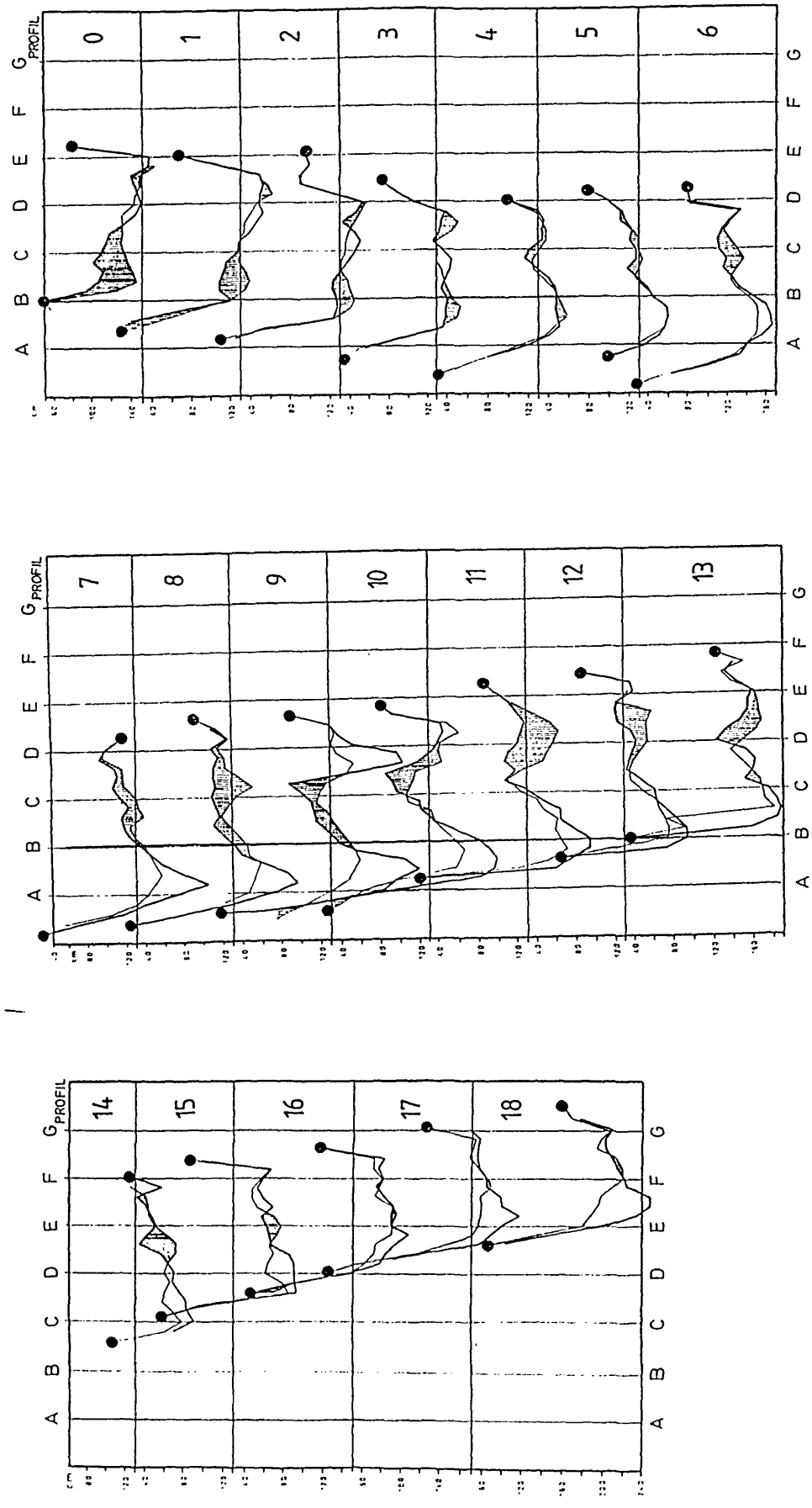

Figure 2: RITRODAT-study area. Cross-sectional profiles, 1991-08-27. Reference: Gauge RITRODAT-bridge, 150 cm. Open areas show erosions and hatched areas aggregations in comparison to the praeflood situation (1990-10-17, Fig. 1).

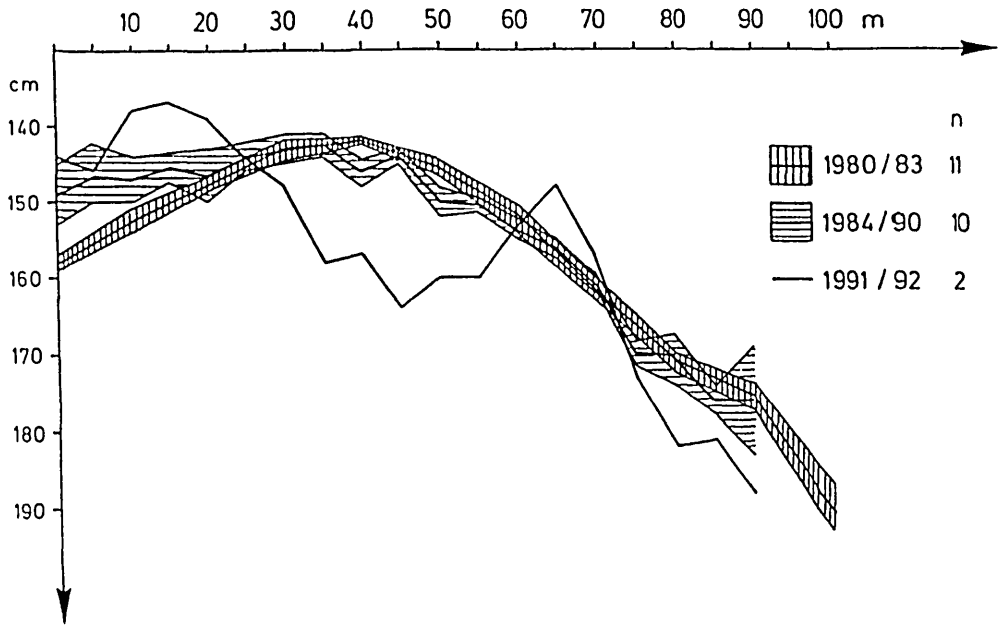

Figure 3: RITRODAT- study area. Mean level of crossectional profils at mean discharge. Reference: Gauge RITRODAT-bridge, 150 cm. Hatched areas: 95 % Confidence intervals (from BRETSCHKO, in press).

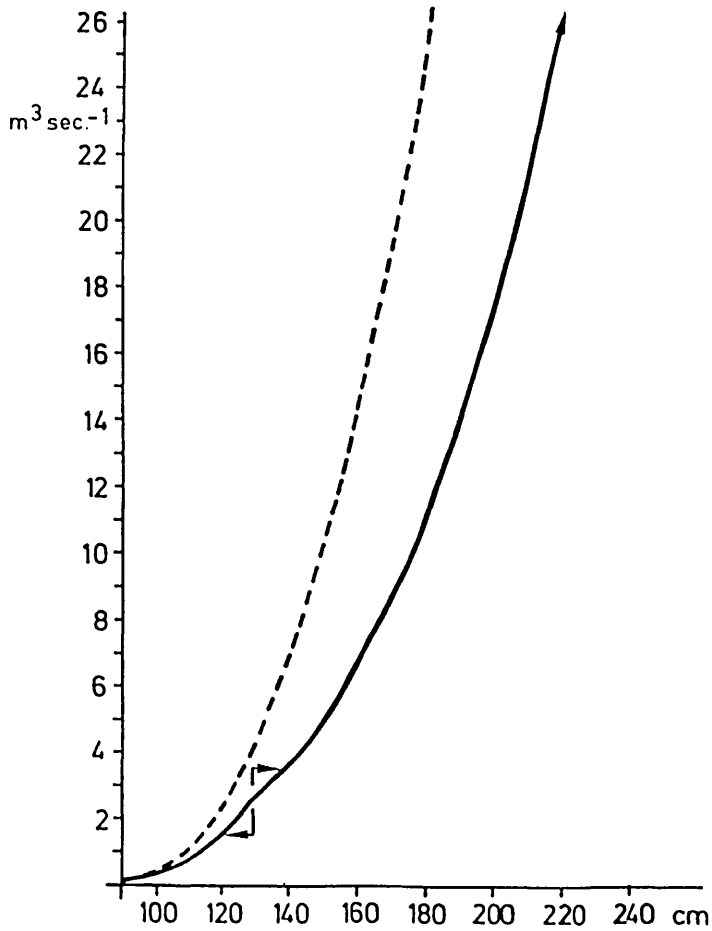

Figure 4: Gauge RITRODAT-bridge, rating curves. Broken line: praeflood condition (1989). Full curve: afterflood condition (1992).

The deep erosion in the area of the gauge station made it necessary to elongate the rod gage by 100 cm downwards. Based on equal discharges a regression has been established between the prae- and afterflood gauge readings (Fig. 5):

$$y = -47.726 + 0.662\,x \qquad r^2 = 0.999 \qquad n = 17$$

Because of the linearity of the regression, the difference between the two gauge readings is constant and amounts

81.5 cm

The water level data for 1992 are shown in Table 2.

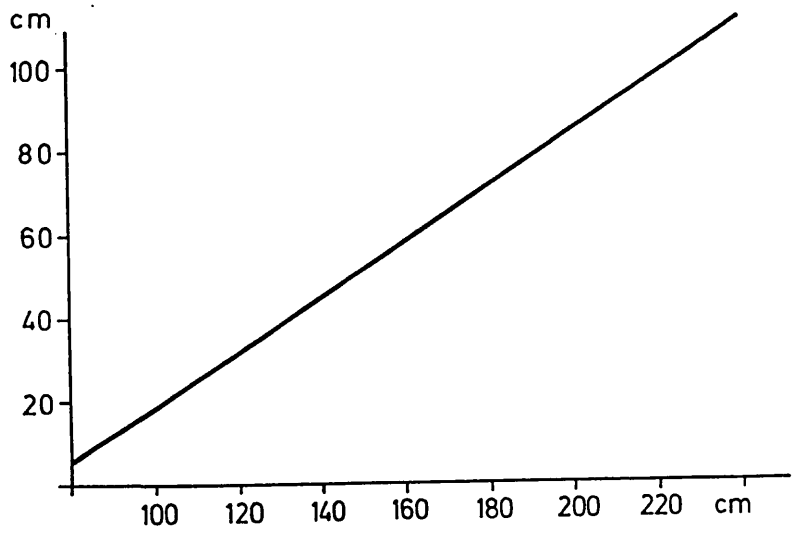

Figure 5: Gauge RITRODAT-bridge. Regression between prae- (ordinate) and afterflood (abscissa) gauge readings. Based on equal discharges.

The temperature of the surface water is measured with a Pt-100-probe at the upstream end of the RITRODAT-study area (0C1↑1) and continuously registrated with a SCHENK analog recorder. The data (means of decades and extremes) are set out in table 3.
Since the establishment of the Biological Station Lunz (1906) various climatic data have been collected continously. So far, a 32-years average (1927-1959) is used to characterize the climatic conditions in Lunz. A more recent 30-years average (1960-1989) is set out in table 4.

For the compilation of the annual data I have to thank Mr. A. AIGNER.

1991

		EXTREMES MEAN	MAX	MIN			EXTREME MEAN	MAX	MIN
1		5.1	5.5	4.7	1		8.1	9.7	6.8
2	J	4.4	5.4	3.3	2	J	8.1	10.4	6.7
3		3.8	5.6	2.9	3		7.4	9.3	6.6
1		2.4	4.5	0.6	1		7.6	9.0	6.8
2	F	2.2	4.1	0.4	2	A	9.0	10.7	7.9
3		3.9	5.2	2.6	3		10.0	12.1	7.7
1		4.9	5.8	3.6	1		9.3	12.7	8.0
2	M	5.5	6.1	4.8	2	S	9.0		8.2
3		5.8	6.9	4.6	3		9.2	12.7	8.2
								9.7	
1		6.0	7.0	5.1	1		8.5	10.8	7.3
2	A	5.8	7.2	3.9	2	O	8.5		7.0
3		5.8	7.1	3.5	3		5.8	9.6	3.7
								9.6	
1		6.5	7.5	5.7	1		6.0	7.4	3.4
2	M	6.2	7.2	4.9	2	N	6.1		5.2
3		6.3	7.2	5.6	3		6.0	7.0	5.4
								6.6	
1		6.7	8.0	6.1	1		3.8		1.5
2	J	7.5	9.1	6.4	2	D	2.8		1.6
3		7.9	9.4	6.8	3		4.6		3.2

ANNUAL:	MEAN	MAX	MIN
-	6.3	12.7	0.4
MONTH/DECADE:	-	IX/1	II/2

1992

		EXTREMES MEAN	MAX	MIN			EXTREME MEAN	MAX	MIN
1		4.6	5.6	3.4	1		9.2	10.4	8.4
2	J	4.9	5.4	3.8	2	J	8.8	10.4	7.9
3		4.4	5.4	3.2	3		9.7	11.2	8.4
1		4.7	5.6	3.7	1		10.0	11.4	9.2
2	F	4.7	5.6	3.7	2	A	10.0	11.3	8.8
3		4.6	5.7	3.3	3		10.0	11.2	9.1
1		5.2	6.2	4.3	1		8.5	10.0	7.3
2	M	4.9	6.2	3.9	2	S	9.0	9.7	8.3
3		5.5	6.6	4.5	3		9.0	9.7	7.3
1		6.2	7.1	5.0	1		7.8	8.2	7.2
2	A	6.3	7.3	5.2	2	O	7.4	8.3	6.5
3		6.7	7.7	5.6	3		6.8	7.8	6.2
1		6.7	7.9	6.2	1		6.6	7.1	6.1
2	M	6.8	7.8	6.0	2	N	6.0	7.0	5.1
3		7.3	8.7	5.9	3		6.3	6.9	5.1
1		7.4	9.0	6.5	1		5.9	6.5	5.3
2	J	7.5	9.4	6.5	2	D	5.3	5.9	4.4
3		8.5	10.3	7.6	3		4.3	5.7	2.7

ANNUAL:	MEAN	MAX	MIN
-	6.9	11.4	2.7
MONTH/DECADE:	-	VIII/1	XII/3

Table 3: Temperatures of surface water (means of decades and extremes): measured at the upstream end of tje RITRODAT-study area (0C1↑1).

TEMPERATURE				
	1927/59		1960/89	
Annual mean	6.36.6 ± 0.4			
Mean Maximum	33.232.8 ± 1.6			
Mean Minimum	- 25.1- 23.0 ± 5.0			
	1927/59		1960/89	
	First	Last	First	Last
hoar-frost	7.X.	3.V.	27.IX.	24.V.
Frost	13.X.	4.V.	27.IX.	29.V.
Snow cover	9.XI.	9.IV.	19.X.	5.V.
Snow fall	1.XI.	-	8.X.	11.V.
Max. snow cover (cm)			150 (1988-03-13)	

PRECIPITATION		
	1927/59	1960/89
Annual mean total (mm)	1629.01514.8 ± 65.9	
Mean highest daily total	72.062.4	

Table 4: 30-years averages of climatic data (1927/59 and 1960/89). Biological Station Lunz (615 m asl; 47°51' N; 15°04' E).

References:

BRETSCHKO, G., in press: Niederschlagsereignisse, Hochwässer und Fließgewässerökologie.- Wiener Mitteilungen.