

Ecological study of gas fields in the northern Adriatic

6. Tides

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The results of the statistical analysis of the gauge registrations for Rovinj and Koper have been shown. The return periods of extreme levels of high and low waters have been calculated.

6.1. INTRODUCTION

The survey of sea currents presented in the previous paper (4) shows that tidal currents have a significant share in the total current energy. In the deeper layers the tidal currents are predominant. Because of that, the statistical analysis of tide gauge registrations in Rovinj and Koper (Fig. 1.1. in Preface) - locations on the eastern coast closest to the fields IVANA and IKA - have been presented. The statistical analysis gives quantitative information of the sea level oscillations.

6.2. THE CHARACTERISTICS OF THE TIDES IN ROVINJ AND KOPAR

The tides in the Adriatic are of mixed type, and their amplitudes have linear increase from the Strait of Otranto to the line connecting cape Kamenjak - Ravenna. To the north of the line the amplitudes of the tides rapidly

increase. Tab. 6.1. and 6.2. show the statistical analysis of the tide gauge registrations for Rovinj and Koper.

The tables show that the mean height difference between mean high waters (MHW) and mean low waters (MLW) in Rovinj is 48.6 cm, while in Koper it is 66.0 cm. According to BULJAN and ZORE-ARMANDA (1976) the same difference in Bakar is 33 cm. From the south Adriatic (Bar) to Bakar this difference increase for 10 cm, and from Bakar to Koper for 33 cm.

From the continuous tide gauge registrations in Rovinj (1956-1983) the return periods of extreme levels of high and low waters have been calculated (PRŠIĆ, 1983). The values are shown in Tab 6.3.

The values in the table show that for the return period of 100 years a maximum difference of level is expected to be up to 236 cm. This is for 14 cm higher than the maximum level difference measured in the course of 28 years.

Table 6.1. Mean monthly and annual values of High and Low waters in cm and its differences for Rovinj calculated from 20 years in the period 1956-1983 and related to Tide Gauge Datum.

	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
MHW	122,4	119,9	117,3	119,1	118,4	120,2	120,8	122,1	122,9	127,1	130,1	127,8	122,0
MLW	73,4	70,5	68,0	71,3	71,5	73,8	72,8	72,6	72,6	77,3	81,4	80,2	73,8
HD	49,0	49,4	49,3	47,8	46,4	46,4	48,0	49,5	50,3	49,8	138,3	47,6	48,6
MHHW	129,2	125,5	122,5	126,3	127,0	128,3	128,3	128,4	128,1	133,8	70,2	136,4	129,0
MLLW	58,6	59,9	60,1	62,3	58,7	57,8	57,7	61,3	66,4	70,7	64,8	64,8	62,4
HD	70,6	65,6	62,7	64,0	68,3	71,5	70,6	67,1	61,7	63,1	68,1	71,6	67,1

MHW =Mean high water height

MHHW =Mean higher high water height

MLW =Mean low water height

MLLW =Mean lower low water height

HD =Height difference

Mean HW annual extreme 193.0

Mean LW annual extreme 19.3

Height difference 173.7

Absolute HW extreme 230.0

Absolute LW extreme 8.0

Height difference 222.0

Mean sea level 98.1

Chart datum sea level 49.1

Table 6.2. Mean monthly and annual values of high and Low waters in cm for Koper calculated from 22 years (1962 - 1983) and related to the Tide Gauge Datum. The meaning of the abbreviations as in Tab. 6.1.

	Jan.	Feb.	March	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year
MHW	245,6	246,7	239,6	245,9	245,4	246,8	246,9	248,6	248,9	253,9	255,3	252,3	248,0
MLW	179,8	179,9	176,8	179,4	181,2	182,8	182,6	180,6	178,7	185,7	184,9	188,5	182,0
HD	65,8	66,8	62,8	66,5	64,2	64,0	64,3	64,3	70,2	68,2	70,4	63,8	66,0
MHHW	253,7	253,1	251,0	253,5	225,4	257,5	255,2	255,7	255,0	261,8	264,5	262,1	256,0
MLLW	161,5	165,0	166,6	164,5	164,5	163,2	162,5	164,3	168,3	175,0	174,6	170,0	166,0
HD	92,2	88,1	84,4	89,0	89,5	94,3	92,7	91,4	86,7	86,8	89,9	92,1	89,8

Mean HW annual extreme 332.3

Mean LW annual extreme 116.8

Height difference 215.5

Absolute HW extreme 273.0

Absolute LW extreme 102.2

Height difference 270.8

Mean sea level 215.3

Chart datum level 151.1

Table 6.3. The distribution of return periods for 10, 50 and 100 years referring to the extreme sea levels in Rovinj, shown in centimeters.

Disribution	Extreme HW			Extreme LW		
	Return period (years)			Return period (years)		
	10	50	100	10	50	100
GAUSS	217	288	232	10	5	3
GALTON	217	229	234	9	4	2
PEARSON	217	232	237	9	2	1
log PEARSON3	217	232	238	9	4	2
GUMBEL	217	236	243	11	8	7

6.3. REFERENCES

- BULJAN, M. and M. ZORE-ARMANDA. 1976, Oceanographic properties of the Adriatic Sea. *Oceanogr.Mar. Biol. Ann.Rev.*, 14: 11-98.
- PRŠIĆ, M. 1983, Metodologija prognoze ekstremnih amplituda morskih razina. Magistarski rad. Sveučilište u Zagrebu. 251 pp.

Ekološka studija plinskih polja u sjevernom Jadranu

Morske mijene

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KRATKI SADRŽAJ

Izneseni su rezultati statističke analize mareografskih zapisa za Rovinj i Koper. Izračunati su povratni periodi za ekstremne vrijednosti visokih i niskih voda.

