Climate perception and reaction in urbanized areas

a case study during the heavy rain episodes

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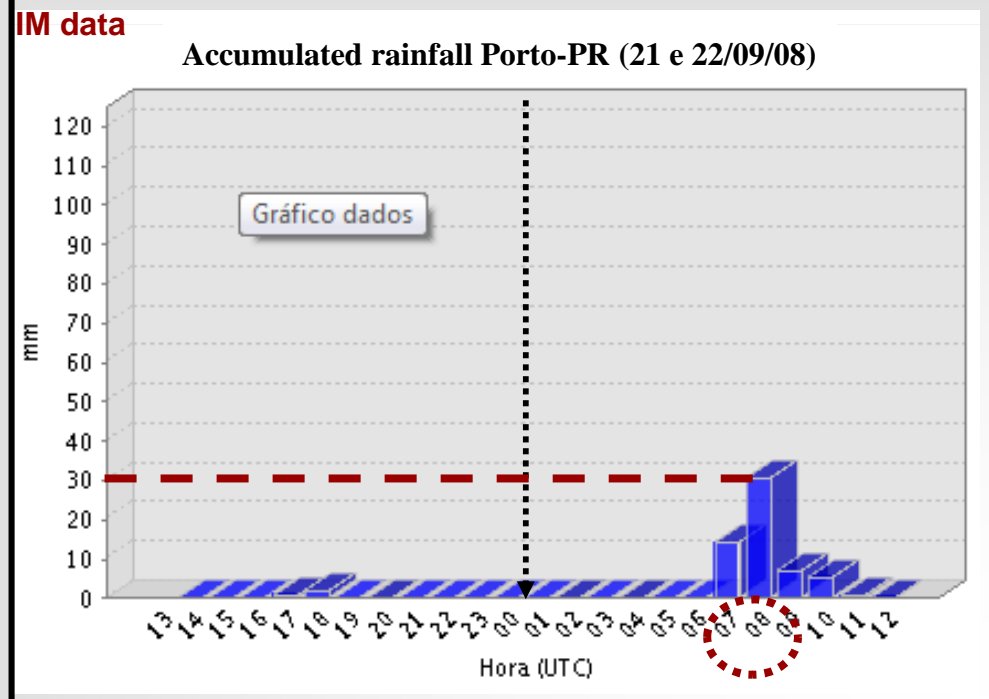Department of Geography – Porto- Portugal
PTDC/SAU-ESA/73016/2006

Rain at Porto (22 September 2008)

JN, 23/09/2008
"Porto under a deluge"

30mm → 7am – 9am

Extreme episode?

Urban planning (dry environments)?

IM data

Accumulated rainfall Porto-PR (21 e 22/09/08)

Gráfico dados

mm

Hora (UTC)
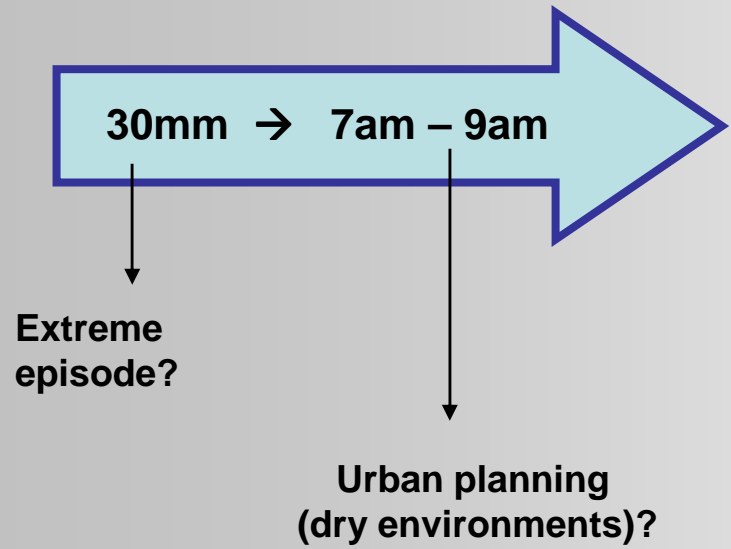
How do we perceive the rainfall?

How important are the newspaper
for our mental construction
about rainfall amount, intensity, duration?

Did the press react in the same way during the 20th century?

Perception → is a form of guessing what will happen next…

it means **working out** and **judging** what could happen

Whilst perception skills can only be acquired through experience you can speed up the learning process by having a better understanding of the factors that should be considered when **building up a mental picture** of what's likely to happen next.

You may **perceive risks that aren't really there** or indeed ignore risks that are!

**Awareness-Understanding-Persuasion process
contribute to
informed, logic-based judgement**

Newspaper Stories ?

Overexploitation risks

"…Ninety percent of what we do is based on perception. It doesn't matter if that perception is right or wrong or real…"

Making Book on the Buck, Wall Street Journal, Sept. 23, 1988, p. 17.

Rainfall → **"Pseudo-fact" ? Myth?**

Are *perceptions* true?

Is rainfall an undesirable enemy?

The several media items and newspapers stories about the occurrence of rainfall

do contribute to climatologically awareness ?

Is there work in progress throughout our society to improve climatologically knowledge?

or

**Is still a great gap between the perception of weather as science
and
of weather as common sense?**

We face a rainy day as we do in any stochastic process…

Rational Behavior Facing Stochastic Processes: The Case of Weather

Problem: How to dress appropriately?

Strategies: Shorts, T-Shirt, Rain Coat, Pullover, Umbrella, Combinations thereof.

Utility: How we feel when wet, cold, sweaty…

Expectations: Weather Forcast!

Rational Reasoning:

   If Sun then Shorts and T-shirt

   If Rain **(and no wind)** then Umbrella

   etc.

In Thorsten Hens, *Advanced Portfolio Theory* IEW,
Universität Zürich, September, 2003

If we apply to rainfall…

The Perceptual Cycle
(U.Neisser, Cognition and Reality, 1976)

positive, negative
detailed, generic

DIRECT OBSERVATION
METEO INFORMATION
PRESS
PRESS
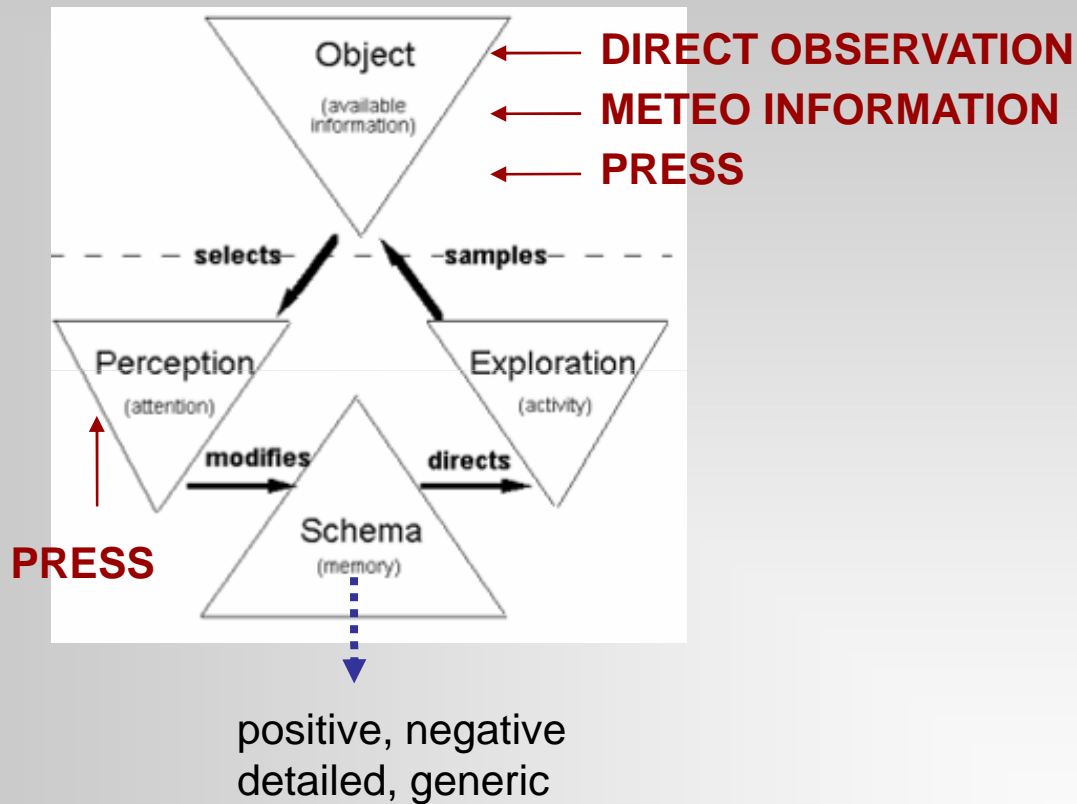
Rainfall
episode

?...

If we apply to rainfall…

General Information Processing Model (perceptual motor)

Sensory input

Perceptual processing

Output

Rainfall episode

Stimuli

Receptors

CNS data processing

Motor Response

?...

light
sound
touch
smell
taste

visual
auditory
kinesthetic
tactile
olfactory
gustatory

Integration with memory bank

(U.Neisser, Cognition and Reality, 1976)
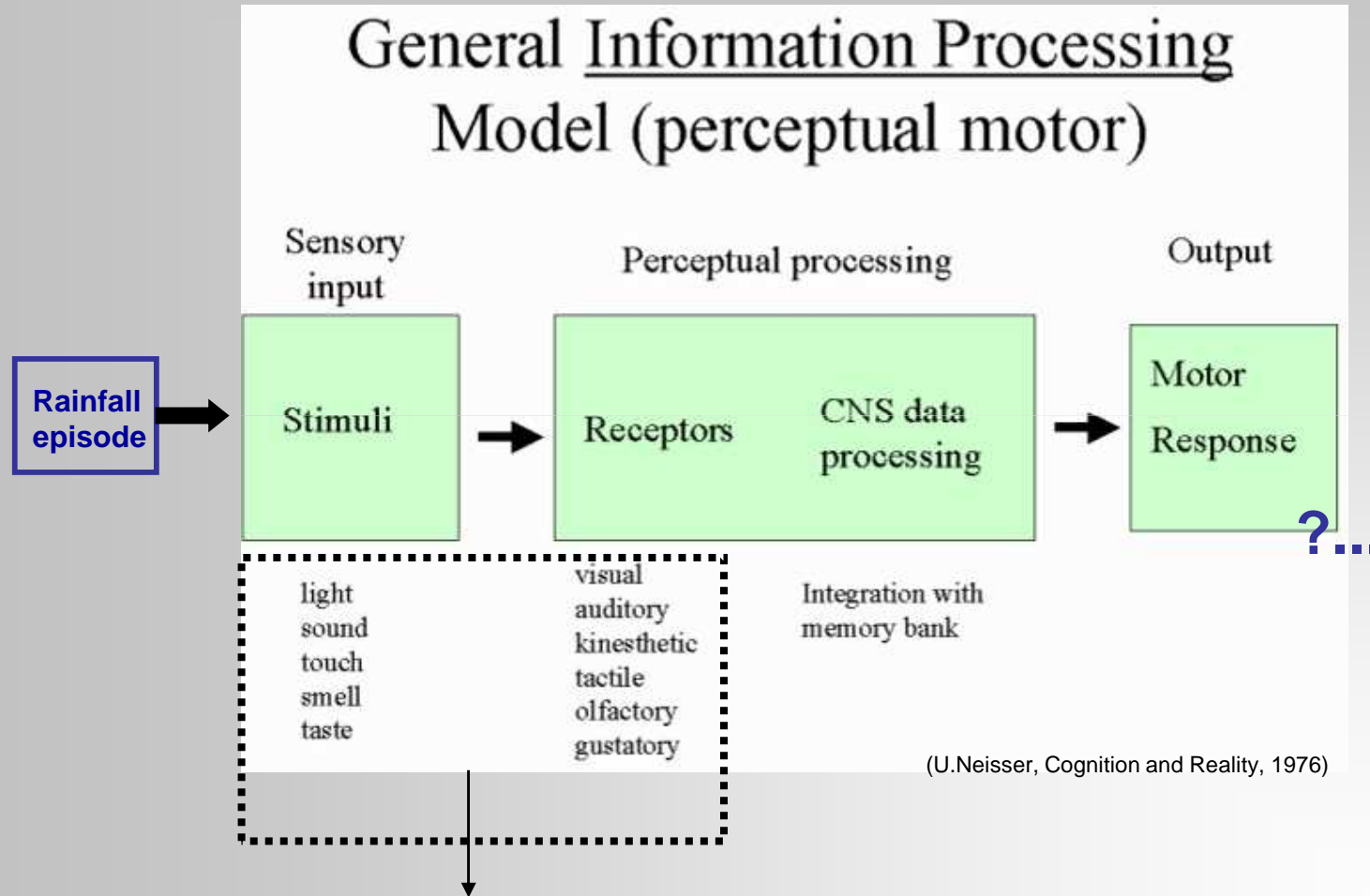
negative for urban citizens….surprise!
positive/negative for farmers

Do we understand the water cycle?

Precipitation data at Porto *vs* Newspaper stories

In the 11 rainiest years of the century
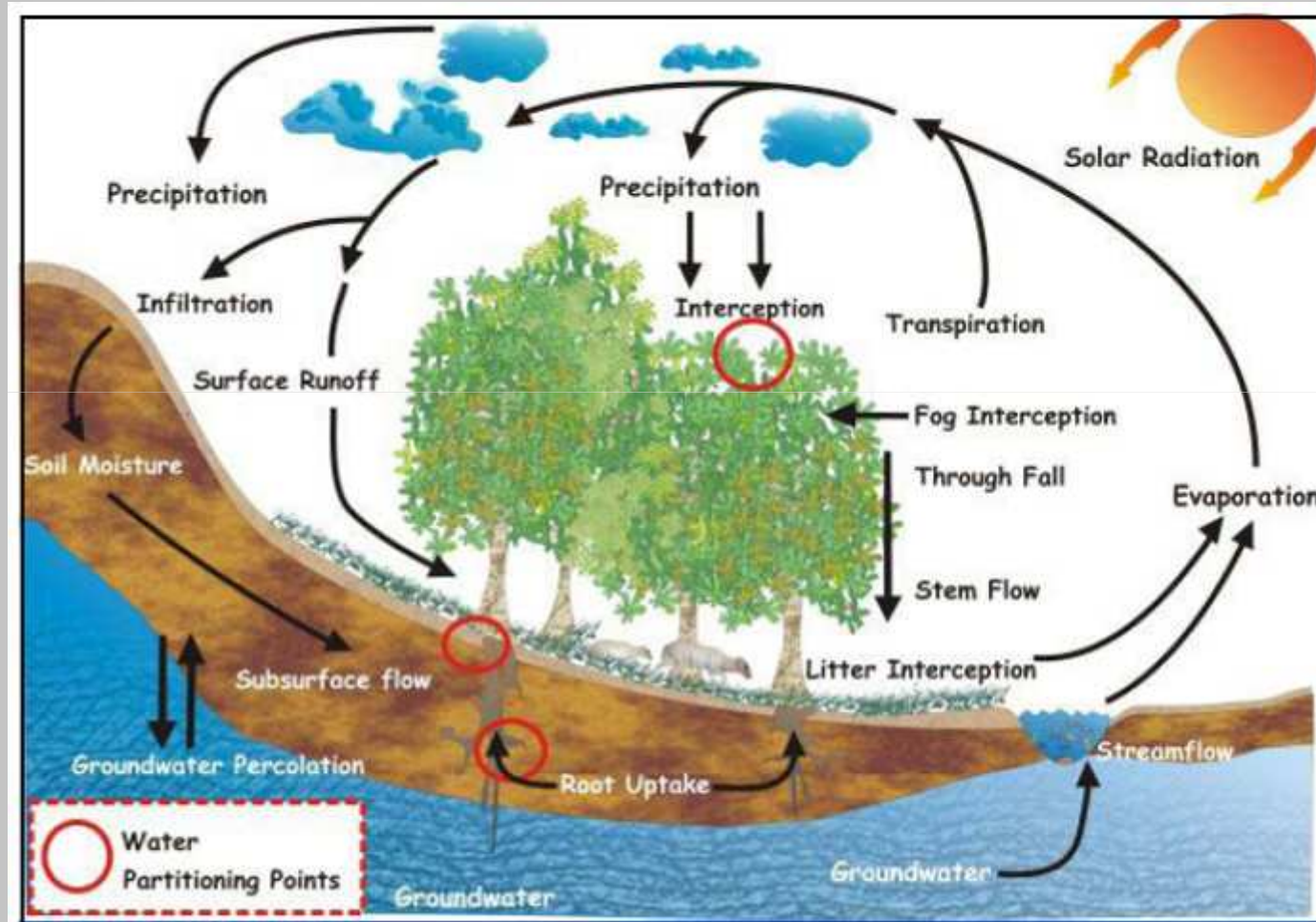
The 11 rainiest years at Porto (1900-2006)
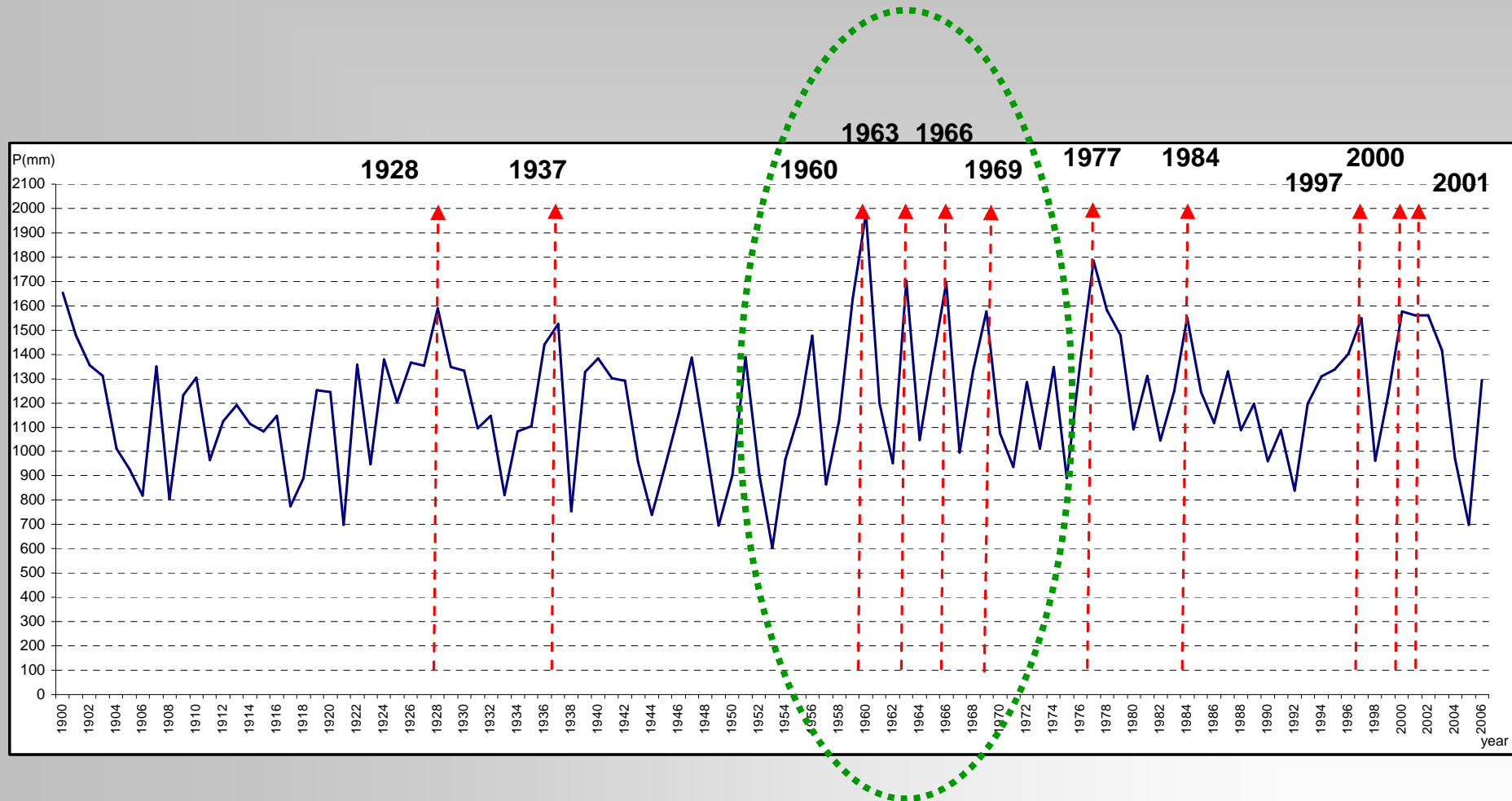
The importance given to extreme episodes of rainfall by press was always the same?

Let's see how the press behave in each of these 11 rainiest years………..

Analysing more than 2000 daily newspapers of

O Comércio do Porto

(a portuguese newspaper created at Porto and published
from **2 June 1854** till **2005)**

Newspaper's dimension changed

1928/1977

64cm

46cm

1984/1997

46cm

31cm

2000/2001

39cm

28cm

Year 1977

Year 1997

Year 2000

Year 2001

Full page news with text about a rainfall episode
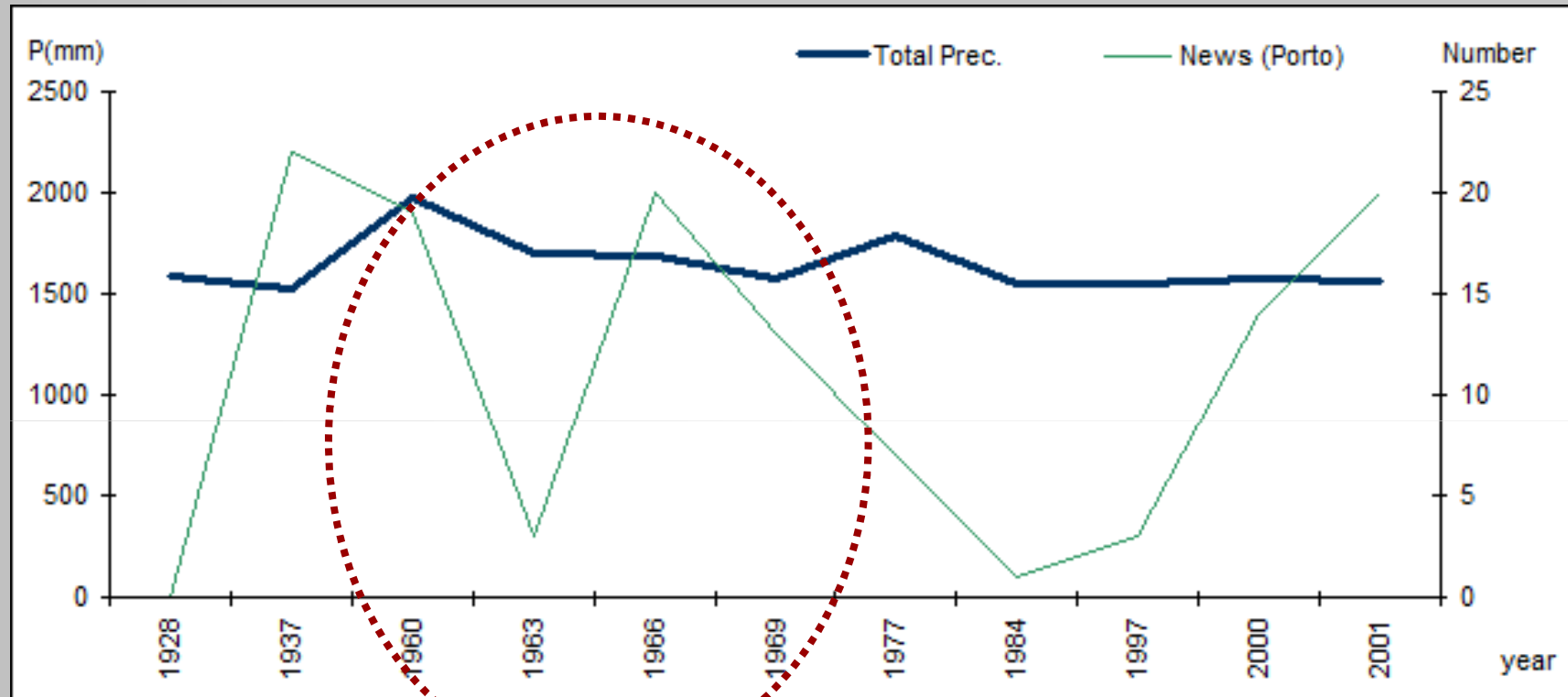
It seems that there is no relationship at all!.........

Despite, being

a newspaper of Porto

it published

more news

of Portugal

than

of Porto

Oporto News/Portugal News
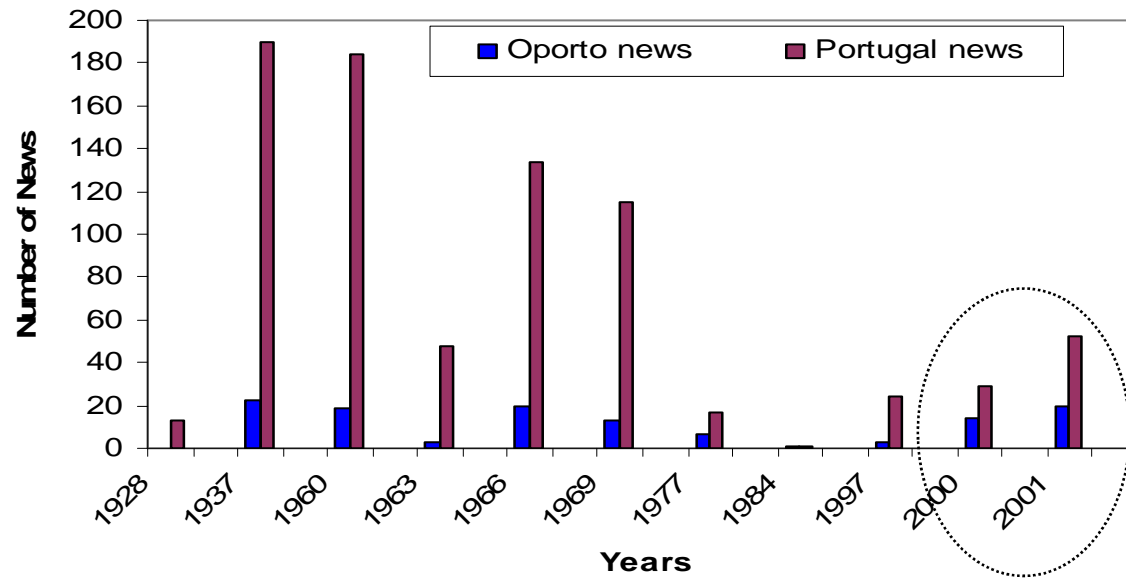
Year	Number of news				Graphical spot		
	Oporto news	Portugal news	Odd page	Even page	Min.	Max.	Media
1928	0	13	0	13	0,6%	10%	5%
1937	22	190	102	110	0,2%	50%	11%
1960	19	184	158	45	2%	62%	28%
1963	3	48	39	12	2%	44%	13%
1966	20	134	88	66	4%	100%	55%
1969	13	115	80	48	4%	100%	29%
1977	7	17	13	11	4%	100%	28%
1984	1	1	1	1	7%	21%	14%
1997	3	24	17	10	20%	100%	78%
2000	14	29	21	22	29%	100%	71%
2001	20	52	34	38	42%	100%	87%

Having in mind that

odd page
is
more
important….

Oporto news in odd and even page
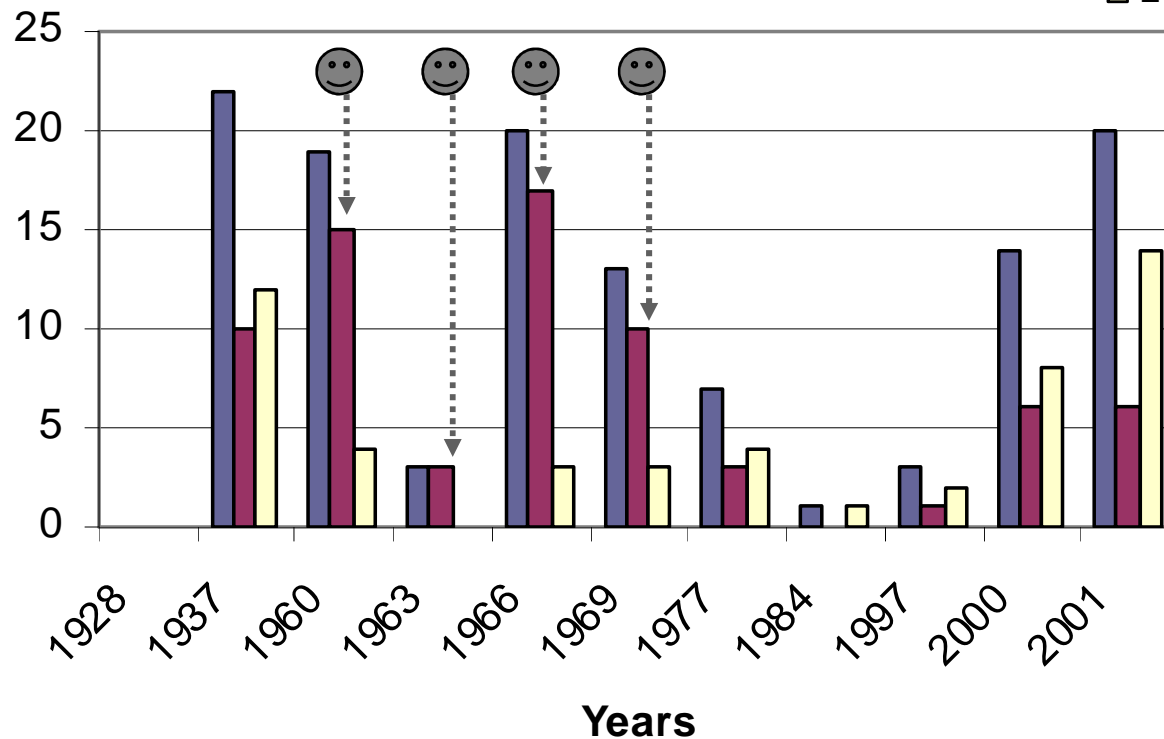
■ Oporto news
■ Odd page
□ Even page

news

Years

Years	Oporto news	Odd page	Even page	Portugal news	Odd page	Even page
1928	0	0	0	13	0	13
1937	22	10	12	190	92	98
1960	19	15	4	184	143	41
1963	3	3	0	48	36	12
1966	20	17	3	134	71	63
1969	13	10	3	115	70	45
1977	7	3	4	17	10	7
1984	1	0	1	1	1	0
1997	3	1	2	24	16	8
2000	14	6	8	29	15	14
2001	20	6	14	52	28	24

Looking through rainfall data we will expect the majority of news in:

- January 2001
- February 1966
- March 2001
- November 1997
- December 2000
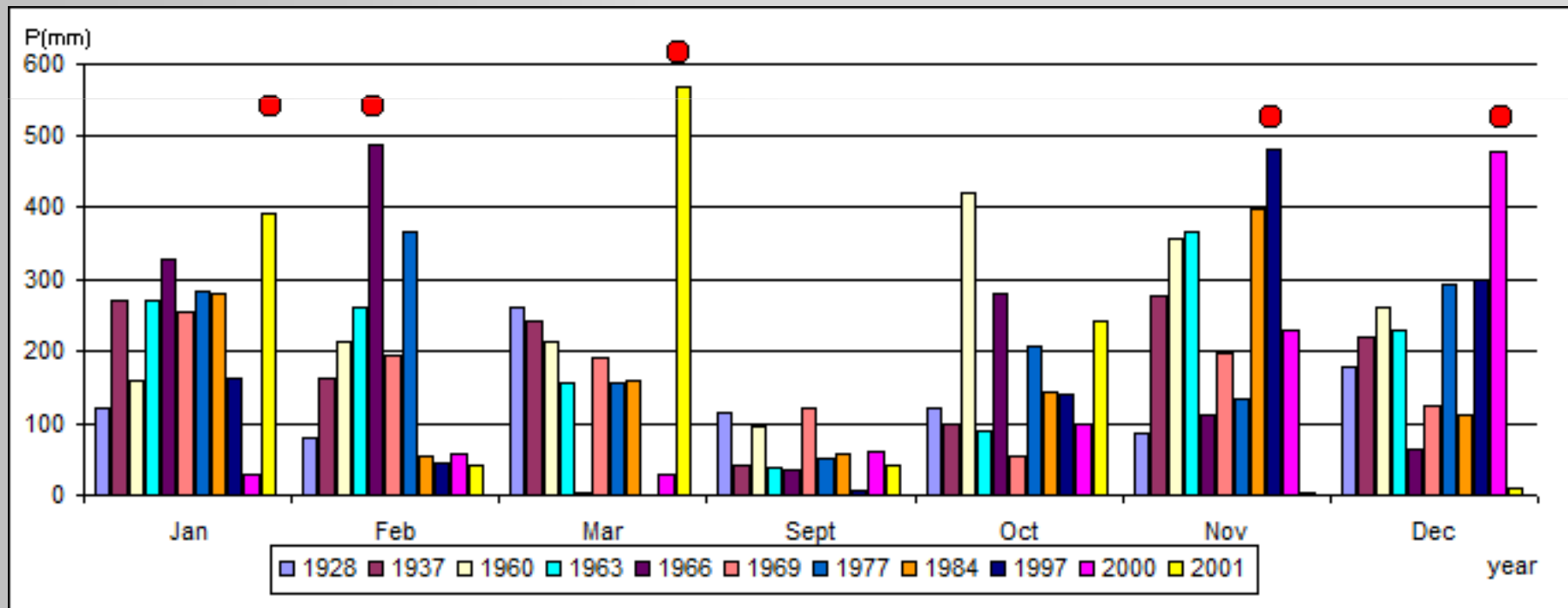
- January 2001

- February 1966

- March 2001

- November 1997

- December 2000

Year	Jan	News	Feb	News	Mar	News	Sept	News	Oct	News	Nov	News	Dec	News
1928	119,3	0	78,7	0	259,1	0	113,3	0	119,9	0	87,2	0	177,9	0
1937	270,4	8	162,3	3	241,7	2	42,1	0	98,2	0	275,1	6	218,0	3
1960	157,5	0	213,5	2	211,5	5	96,6	0	420,2	8	356,8	4	259,3	0
1963	269,5	0	259,9	2	156,4	1	37,3	0	87,7	0	365,9	0	228,0	0
1966	326,7	2	486,8	18	2,0	0	36,1	0	278,0	0	110,5	0	64,1	0
1969	253,5	4	192,6	1	189,2	8	120,4	0	54,8	0	196,0	0	123,4	0
1977	283,1	1	363,5	5	155,6	0	51,3	0	206,0	1	134,2	0	292,0	0
1984	280,7	0	54,4	0	159,1	0	57,3	1	144,2	0	395,4	0	109,9	0
1997	162,2	0	43,3	0	0,4	0	6,9	0	138,1	2	478,9	1	299,2	0
2000	27,1	0	58,3	0	27,2	0	61,1	0	97,2	0	227,3	1	476,7	13
2001	391,1	12	41,9	4	567,4	4	42,5	0	240,0	0	2,4	0	9,0	0

The rainiest months have always the greater number of news?

NO
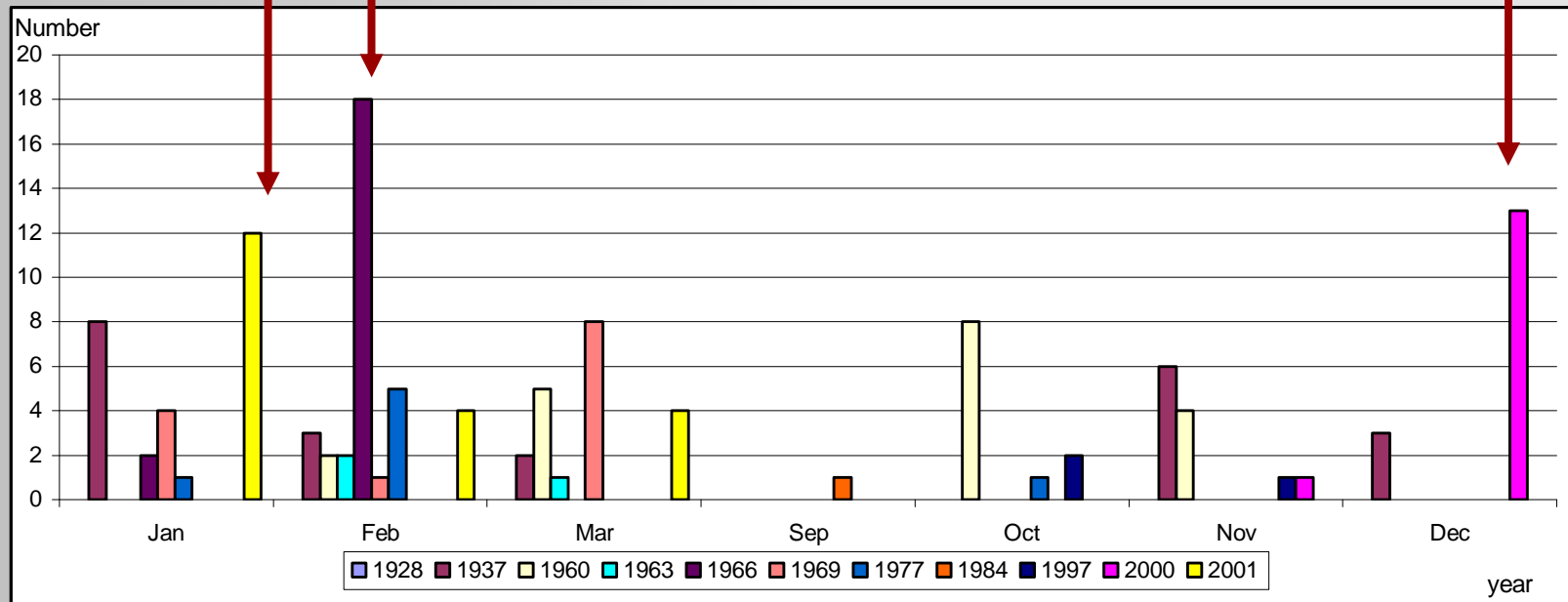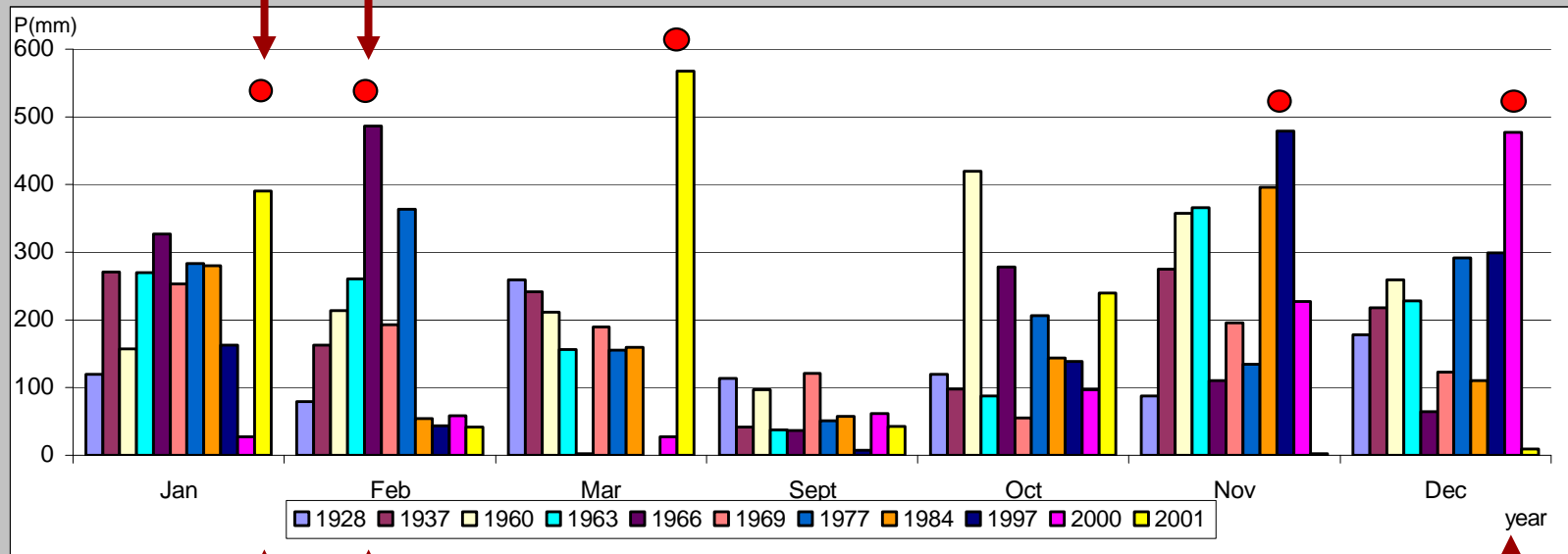
The monthly rainiest episodes have more odd pages?

Years	Jan P(mm)	Odd page	Feb P(mm)	Odd page	Mar P(mm)	Odd page	Sep P(mm)	Odd page	Oct P(mm)	Odd page	Nov P(mm)	Odd page	Dec P(mm)	Odd page
1928	119,3		78,7		259,1		113,3		119,9		87,2		177,9	
1937	270,4	5	162,3		241,7	1	42,1		98,2		275,1	4	218	
1960	157,5		213,5	2	211,5	5	96,6		420,2	4	356,8	4	259,3	
1963	269,5		259,9	2	156,4	1	37,3		87,7		365,9		228	
1966	326,7	2	486,8	15	2		36,1		278		110,5		64,1	
1969	253,5	4	192,6		189,2	6	120,4		54,8		196		123,4	
1977	283,1	1	363,5	1	155,6		51,3		206	1	134,2		292	
1984	280,7		54,4		159,1		57,3		144,2		395,4		109,9	
1997	162,2		43,3		0,4		6,9		138,1		478,9	1	299,2	
2000	27,1		58,3		27,2		61,1		97,2		227,3	1	476,7	5
2001	391,1	4	41,9	2	567,4		42,5		240		2,4		9	

false   **false**   **false**

The monthly rainiest episodes have major graphical spots?

Years	Jan P(mm)	Spot (%)	Feb P(mm)	Spot (%)	Mar P(mm)	Spot (%)	Sep P(mm)	Spot (%)	Oct P(mm)	Spot (%)	Nov P(mm)	Spot (%)	Dec P(mm)	Spot (%)
1928	119,3		78,7		259,1		113,3		119,9		87,2		177,9	
1937	270,4	0,4	162,3	0,2	241,7	0,1	42,1		98,2		275,1	0,3	218,0	0,2
1960	157,5		213,5	0,3	211,5	0,7	96,6		420,2	1,1	356,8	0,5	259,3	
1963	269,5		259,9	0,5	156,4	0,3	37,3		87,7		365,9		228,0	
1966	326,7	0,7	486,8	6,4	2,0		36,1		278,0		110,5		64,1	
1969	253,5	0,9	192,6	0,2	189,2	1,8	120,4		54,8		196,0		123,4	
1977	283,1	1,2	363,5	5,8	155,6		51,3		206,0	1,2	134,2		292,0	
1984	280,7		54,4		159,1		57,3	7	144,2		395,4		109,9	
1997	162,2		43,3		0,4		6,9		138,1	5,8	478,9	2,9	299,2	
2000	27,1		58,3		27,2		61,1		97,2		227,3	1,7	476,7	21,5
2001	391,1	14,5	41,9	4,8	567,4	4,8	42,5		240,0		2,4		9,0	

false   true   true   false   true   true
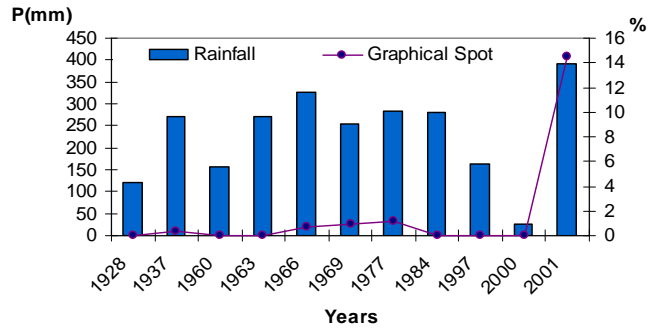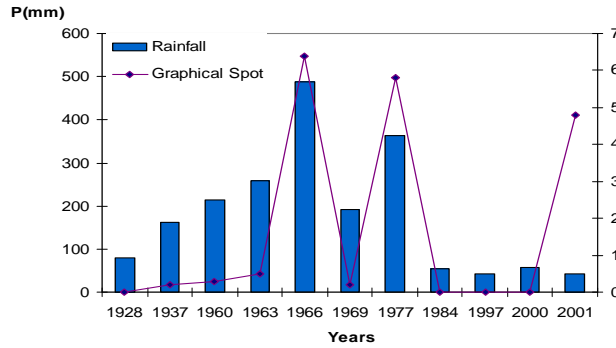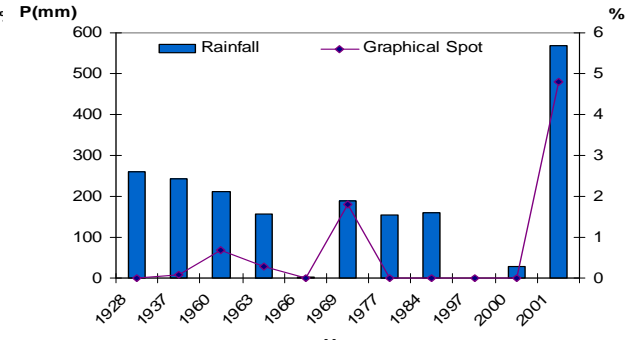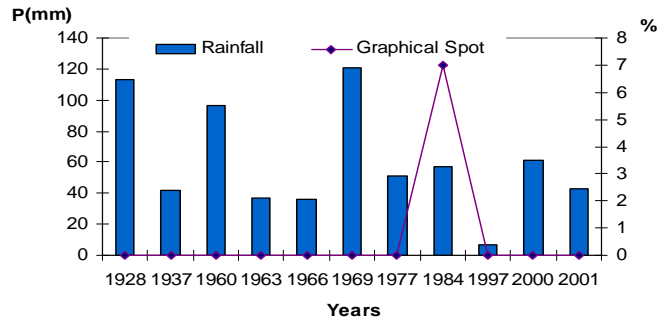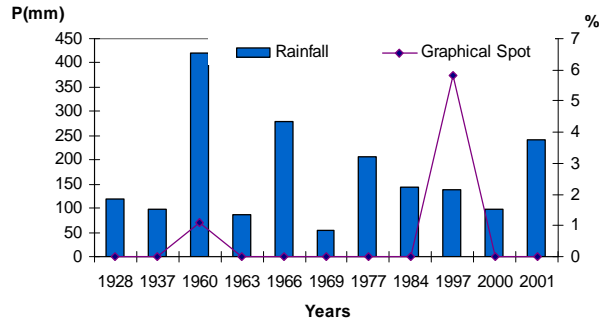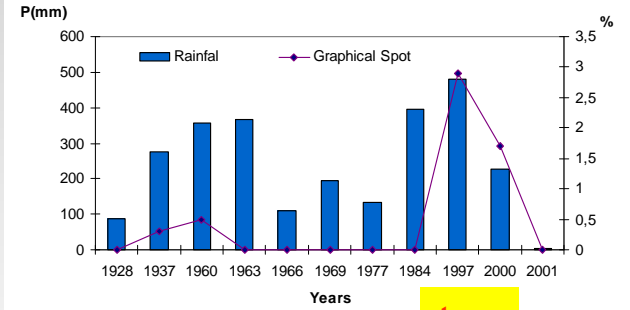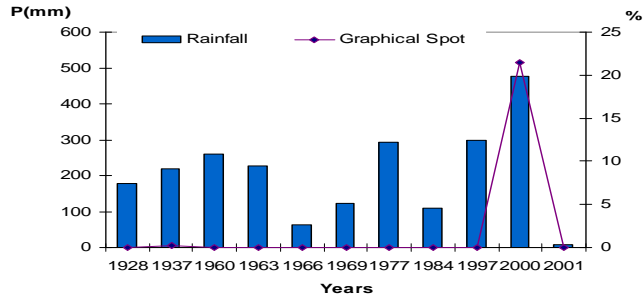
Sometimes

the higher precipitation coincide with major graphical spots

Sequence of news during the 11 rainiest years at Porto

1937

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																					1		1	1	1	1			2	1	
Feb			1		1			1																							
Mar				1	1																										
Sep																															
Oct																															
Nov	1															1	1	1	1									1			
Dec							2		1																						

1977

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan														1																	
Feb			2									1										2									
Mar																															
Sep																															
Oct										1																					
Nov																															
Dec																															

1960

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																															
Feb																							1	1							
Mar														1	1	1									1	1					
Sep																															
Oct				1																		2	2			2	1				
Nov															1				1	1	1										
Dec																															

1984

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																															
Feb																															
Mar																															
Sep																														1	
Oct																															
Nov																															
Dec																															

1963

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																															
Feb													1	1																	
Mar											1																				
Sep																															
Oct																															
Nov																															
Dec																															

1997

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																															
Feb																															
Mar																															
Sep																															
Oct																				1			1								
Nov												1																			
Dec																															

1966

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																	1					1									
Feb										2		2	1		1	1		2	6	2			1								
Mar																															
Sep																															
Oct																															
Nov																															
Dec																															

2000

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																															
Feb																															
Mar																															
Sep																															
Oct																															
Nov																1															
Dec					2			4	1	1	2	1										2									

1969

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan												1	1	1															1		
Feb																				1											
Mar														1			2	2	1	1	1										
Sep																															
Oct																															
Nov																															
Dec																															

2001

Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan			1		3																						1		2	5	
Feb					1	2		1																							
Mar																							3			1					
Sep																															
Oct																															
Nov																															
Dec																															

Rainfall still is an undesirable enemy?

The several media items and newspapers stories about the occurrence of rainfall

do not contribute to climatologically awareness

We need to help society to improve climatologically knowledge?

We have a great gap between the perception
of weather as science
and
of weather as common sense?

We should

make an effort
(science and media)

and join forces to turn

climatology into common sense concepts,

**and thereby accelerate the process
of**

a **better public understanding** and **perception** of climate

Thank you.