

"Critical" Circulation	CP Types	Extreme Event Type	Region affected	"critical" months	Examples of European hydro-meteorological extremes	Economic Losses [Mio. US\$]
Zonal Circulation	Wz, Ws wW	Severe winter storms	Western, Central, and Northern Europe (uk, fr, be, nl, de, at, ch, dk)	Oct.- Feb.	Jeanett (Oct. 2002); Anatol, Lothar, Martin (Dec. 1999); Daria, Vivian, Wiebke (Jan.-Feb. 1990) UK, France (Oct. 1987) Capella (Jan. 1976)	> 2 000 17 450 14 800 3 700 1 300
	Wz, Ws, wW	River flooding	Southwest Germany Benelux	Dec.- Feb.	Rhine, (Dec. 1925, Jan. 1955) Danube, Neckar, Enz (Feb. 1990) Rhine, Moselle, Nahe, (Dec. 1993) Rhine, Moselle (Jan. 1995) Rhine, Moselle, Main (Jan. 2003)	1 180 3 500
V b Circulation	TrW, TrM, TM	River flooding	Central, Eastern Europe Eastern Germany, Austria, Czech Rep., Slovakia, Poland	Jul.- Aug.	Odra Flood (Jul. 1997) Wisla flood (Jul. 2001) Elbe , Danube (Aug. 2002)	5 900 700 > 15 000
Southern Circulation	Sa, TrW, TB	River flooding Flash floods Landslides "Föhn" storms	Southern Alpine Region Switzerland, Northern Italy, Southeast France, Bavaria,	July - Nov.	Italy, Switzerland, France (Sept. 1993) Piedmont, Lombardy, Liguria (Nov. 1994) Switzerland, Northern Italy (Oct. 2000) Switzerland, Bavaria (Nov. 2002)	1 500 9 300 8 500 100
<b>SUM</b>						<b>&gt; 85 000</b>

Tab. 1: "Critical" circulations and associated hydro-meteorological extremes for different European regions

Country/Region	Event	Date	Economic Losses [Mio. US \$]	Insured Losses [Mio. US \$]	Fatalities	from - till	CP [days]
uk, Netherlands	Storm Surge	01/02/53	3 000		1932	29.- 31.01.1953	NWz (3)
de, Hamburg	Storm Surge	16.-17.02.1962	600	40	347	12.- 18.02.1962	NWz (7)
Germany	Winter Storm	21.-23.02.1967	302	50	40	19.- 23.02.1967	Wz (5)
W./Central Europe	<b>Storm "Capella"</b>	<b>02.-04.01.1976</b>	<b>1 300</b>	<b>510</b>	<b>82</b>	<b>31.12.75- 06.01.1976</b>	<b>Wz (7)</b>
fr, uk	Winter Storm	15.-16.10.1987	3 700	3 100	17	12.-17.10.1987	Ww (6)
Western Europe	<b>Winter Storms</b>	<b>25.01.- 01.03.1990</b>	<b>14 800</b>	<b>10 200</b>	<b>230</b>	<b>24.01.- 31.01.1990</b>	<b>Wz (7)</b>
uk, de, fr, Benelux	<b>"Daria"</b>	<b>25. - 26.01.1990</b>				01.02.- 08.02.1990	SWz (9)
uk, fr, nl, de, at	<b>"Vivian"</b>	<b>25.- 26.02.1990</b>				09.-16.02.1990	Wz (8)
uk, fr, lu, de, at, ch,	<b>"Wiebke"</b>	<b>28.02.- 01.03.1990</b>				<b>25.02.-01.03.1990</b>	<b>Wz (5)</b>
uk, de, ie	Winter Storm "Undine"	05.- 06.01.1991	900	480	30	21.12.90 -12.01.1991	Wz (23)
uk, ie, de, fr	Winter Storms	23.12.- 05.01.1998	650		15	24.12.97- 08.01.1998	Wz (16)
West.-Central Europe	Winter Storm "Winnie"	24.- 25.10.1998	500		3	09.- 31.10.1998	Wz (15)
dk, de, uk, se, pl	<b>Winter Storm "Anatol"</b>	<b>03.- 04.12.1999</b>	<b>2 250</b>	<b>1 800</b>	<b>&gt; 20</b>	<b>01.- 13.12.1999</b>	<b>Wz (13)</b>
fr, be, de, ch, at	<b>Winter Storm "Lothar"</b>	<b>26/12/99</b>	<b>11 100</b>	<b>5 900</b>	<b>110</b>	<b>23.- 29.12.1999</b>	<b>Ws (7)</b>
es, fr, ch	<b>Winter Storm "Martin"</b>	<b>27/12/99</b>	<b>4 100</b>	<b>2 500</b>	<b>&gt; 30</b>	<b>23.- 29.12.1999</b>	<b>Ws (7)</b>
uk, fr, be, nl, de	<b>Storm "Jeanett"</b>	<b>27.- 28.10.2002</b>	<b>&gt; 2 000</b>	<b>&gt; 1 500</b>	<b>&gt; 30</b>	<b>24.10.- 04.11.2002</b>	<b>Wz (11)</b>
at, ch, pl, cz							

the indices of the subjective "Großwetterlagen Europas" are used. Economic losses from Munich Re [2000, 2002]. For the country code the country code of the Top-Level-Domains (ccTLD) is used.

Country/ Region River Basin	Event	Date	Economic Losses [Mio.US\$]	Insured losses [Mio.US\$]	Fatalities	Subjective Circulation Pattern (CP)		
						from – till	GWL	Days
Germany/ Rhine	Flood	31.12.1882				21.12.- 24.12.1882	NWz	4
						25.12.- 27.12.1882	Wz	3
						28.12.- 30.12.1882	SWz	3
Rhine / Moselle	Flood	Dec. 1925- Jan. 1926	19			18.12.- 30.12.1925	Ws	13
						31.12.- 04.01.1926	Wz	5
Germany/ Rhine	Flood	17.01.1955				10.01.- 19.01.1955	Ws	10
Southwest Germany/ Hesse, Bavaria Baden-Württemberg	Flood Flash Floods	22.05. - 26.05.1978	382		3	19.05.- 22.05.1978	HFz	4
						23.05.- 25.05.1978	TM	3
						26.05.- 30.05.1978	NEa	5
Southwest Germany Danube, Enz, Nahe	Flood	15.02.1990				01.02.- 08.02.1990	SWz	8
						09.02.- 16.02.1990	Wz	8
Southwest Germany, UK, Benelux, France Rhine, Moselle, Nahe Neckar	Flood	20.12. - 31.12.1993	1 180	810	14	08.12.- 24.12.1993	Wz	17
						25.12.- 29.12.1993	TrW	5
						30.12.- 06.01.1994	Wz	8
Germany, Benelux, France/ Rhine	Flood	19.01. - 03.02.1995	3500	910	28	09.01.- 12.01.1995	NWz	4
						13.01.- 18.01.1995	Wa	5
						18.01.- 22.01.1995	wW	5
						23.01.-02.02.1995	Wz	11
Southwest Germany, Belgium, France Rhine, Moselle, Main	Flood	03.- 04.01.2003				21.12.- 26.12.2002	wW	6
						27.12.02- 04.01.03	Wz	9

Tab. 3 : Major river floods in Southwest and Western Germany and the Benelux and causing "critical" circulation types. For CP classification the indices of the subjective "Großwetterlagen Europas" are used. Economic losses from Munich Re [2000, 2002].

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Period of maximum Precipitation	River Basin Country/Region	Economic Losses [Mio. US \$]	Insured Losses [Mio. US \$]	Fatalities	Subjective Circulation Pattern (CP)		
					from - till	CP	[days]
<b>Odra 1997 flood</b>							
<b>04.-07.07.1997</b>					01.-05.07.97	TrW	5
					06.-13.07.97	Na	
<b>18.-21.07.1997</b>	Southern Poland, Eastern Czech Rep.	<b>5 900</b>	<b>795</b>	<b>110</b>	18.-23.07.97	NEz	
<b>Wisla 2001 flood</b>							
<b>16.-27.07.2001</b>	Upper Wisla Basin				08.- 13.07.01	Wz	6
(max. 21.-26.07.01)	(Southern Poland, Northern Slovakia				14.-20.07.01	TrW	7
	Eastern Czech Republic	<b>700</b>	<b>30</b>	<b>26</b>	21.-28.07.01	BM	
<b>Elbe and Danube 2002 flood</b>							
<b>06.-07.08.2002</b>	Eastern Bavaria, Austria, Bohemia	<b>Austria 3 000</b>	<b>400</b>		02.-08.08.02	TM	6
		<b>Germany 9 200</b>	<b>1 800</b>				
<b>10.-12.08.2002</b>	Erzgebirge, Czech Republic	<b>Czech Rep. 2 300</b>	<b>900</b>		09.-13.08.02	TrM	5
	Station Zinnwald near Dresden	<b>Europe &gt; 15 000</b>	<b>3 100</b>	<b>&gt; 100</b>	14.-20.08.02	HFa	
	12.08.02 312 mm/24h						

Tab. 4: Major floods of Odra (1997), Wisla (2001) and Elbe (2002) all caused by circulation type Vb .Economic losses from Munich Re [2000, 2002].

Floods, Flash Floods and Landslides in the Southern Alpine Region								
Country/ Region	Extreme Event type	Date	Economic losses [Mio.US\$]	Insured losses [Mio.US\$]	Fatalities	Subjective Circulation pattern (CP)		
						from – till	Type	Days
Switzerland/ Ticino, Locarno, Calanca Valley	Flood	07.08.- 08.08.1978	270		9	04.08.- 06.08.1978	Wa	3
						07.08.- 10.08.1978	Nz	4
Italy/ Valtellina, Como, Sondrio Bergamo	Flood, Landslides	18.07.- 28.07.1987	626		44	17.07.- 23.07.1987	TB	7
						25.07.- 30.07.1987	TrM	6
Italy, Switzerland, France	Flood	20.09.- 28.09.1993	1 500	500	17	15.09.- 18.09.1993	HNz	4
						19.09.- 24.09.1993	TrW	6
						25.09.- 28.09.1993	TM	4
Italy/ Piedmont Lombardy, Liguria	Flood Flash floods	04.11.- 06.11.1994	9 300	65	64	28.10.- 02.11.1994	Wz	6
						03.11.- 09.11.1994	Sa	7
Germany, France, Switzerland	Flood	12.05.- 17.05.1999	250		5	08.05.- 14.05.1999	SWz	7
	Flood	22.05.- 28.05.1999	460		8	15.05.- 18.05.1999	NEa	4
Germany, Austria, Switzerland	Flood					19.05.- 21.05.1999	SEz	3
						22.05.- 27.05.1999	BM	6
						28.05.- 03.06.1999	SWa	7
Italy, Switzerland, France	Flood Landslide	13.10.- 20.10.2000	8 500	420	38	09.10.- 13.10.2000	TB	5
						14.10.- 23.10.2000	Sa	10
Italy,France Switzerland, Bavaria	Flood Landslide Föhnstorm	14.11.- 17.11.2002	> 100		2	09.11.- 13.11.2002	Wz	5
						14.11.- 19.11.2002	TrW	6

Tab. 5 : Floods , flash floods, landslides and "Föhn" storms in the Southern Alpine Region their damages and causing "critical" circulation types.

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