



FLASH FLOODS AND PLUVIAL FLOODING



ISPRA

Istituto Superiore per la Protezione
e la Ricerca Ambientale



**REGIONE AUTONOMA
DELLA SARDEGNA**



**MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE**

Working Group F Thematic Workshop

Flash flood and pluvial flooding from the point of view of the European Insurance Industry

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Agenda

- Possibilities of insurance
- Tools for risk assessment
- Flood losses
- conclusions








Possibilities of insurance (1)

- Insurance solutions developed for the flood cover widely vary across Europe
- So does the market penetration e.g. less than 10% in Greece, 20% in Germany and more than 75% in the United Kingdom



Possibilities of insurance (2)

AT	BE	CH	CZ	DE	DK	ES	FI	FR	GR	IT	NL	NO	PL	PT	SE	TR	UK
O	C	C	O	S	N	P	O	C	S	O	N	P	O	O	O	O	O
Type of insurance cover										Rate of penetration of cover							
C= Compulsory cover by law										 > 75%							
P+Obligatory pool										 25-75%							
O= Optional cover										 10-25%							
S= Cover offered but not widely taken										 < 10%							
N= Non-existent										 not known							

Flood insurance coverage across Europe; CEA

- Compulsory cover (C + P): 5 countries
- Voluntary cover (O + S): 11 countries
- Non existent cover: 2 countries



Possibilities of insurance (3)

2 examples for flood cover insurance:

- United Kingdom: flood cover is standard in home insurance, including those buildings located in high risk areas
- Germany: flood cover is within the so called “extended coverage for elementary perils” additional to the home insurance. Insurance is voluntary, but often buildings located in high risk areas are not covered



Possibilities of insurance (4)

Germany:

- Windstorm & Hailstorm are part of the standard cover for home insurance (buildings / households)
- The extended coverage for elementary perils covers the following risks:
 - Flooding (including torrential rain and backwater)
 - Earthquakes, subsidence, landslides
 - Snow pressure, avalanches
 - Volcanic eruptions



Tools for Risk Assessment (1)

- Because each risk has to be assessed on a case-by-case basis using statistical data, in many countries the insurance industry has developed zoning tools, sometimes in cooperation with public authorities:
- Austria: HORA-platform, is currently being extended to flash and pluvial floods
- France: MRN GIS provides insurers all the flood hazard areas produced by public authorities
- UK: the ABI (insurance association of the UK) has an agreement with the Environment Agency, that insurance companies can use improved public data sets
- Germany: the GDV provides the online risk assessment tool ZÜRS for the insurance industry



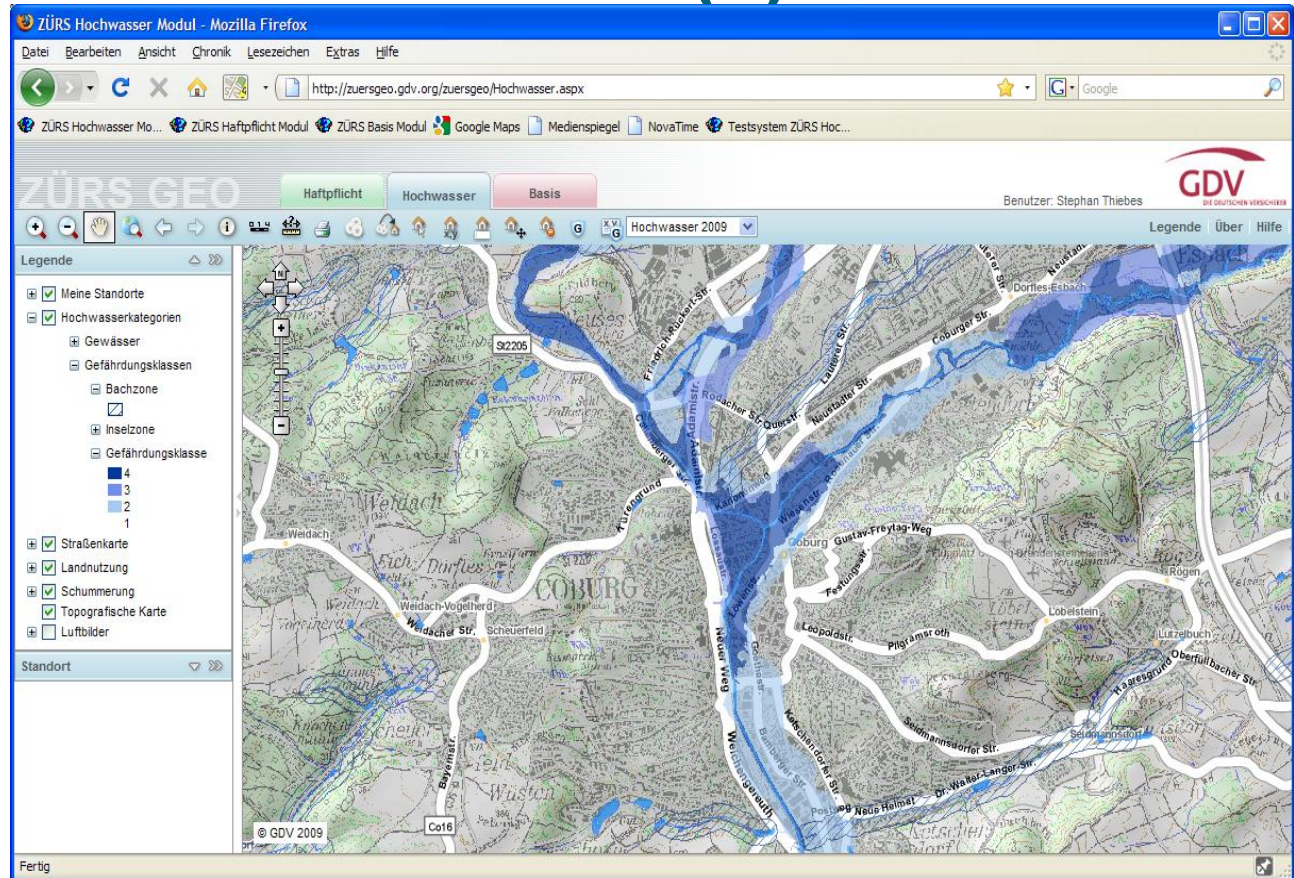
Tool for Risk Assessment (2)

- ZÜRS Geo provides an online risk assessment tool for the insurance industry, helps it to assess flood risk, so that a risk-related premium can be offered
- **ZÜRS**: *(Z)onierungssystem für (Ü)berschwemmung, (R)ückstau und (S)tarkregen*
[zoning system for floods, backwater and torrential rain]
- The varying river flood hazards are divided in different hazard zones, whereas backwater and torrential rain are uniformly distributed over Germany → that means no zoning for torrential rain resulting in flash floods and pluvial flooding at the moment



Tool for Risk Assessment (3)

- Screenshot ZÜRS Geo





Tool for Risk Assessment (4)

- Zone division in ZÜRS Geo
- GK 4, high hazard:
 - Statistically, flood at least once every 10 years
- GK 3, medium hazard:
 - Statistically, flood at least once every 10-50 years
- GK 2, low hazard:
 - Statistically, flood at least once every 50-200 years
- GK 1, very low hazard:
 - Statistically, flood less frequent than once every 200 years



Flood losses (1)

- There are many reasons for damages resulting from flash floods/pluvial flooding, for example:
 - water flowing off along the surface
 - backwater rising in the urban drainage system
 - water accumulating in lower-lying areas
 - landslide as a result of a ground which can no longer absorb water



Flood losses (2)

- In the field of loss data it is mostly impossible for the insurance industry too distinguish systematically between individual flood types
- Most flash floods in Europe are categorized under "severe storm", in other parts of the world under hurricanes und typhoons
- As a result, it is not possible to obtain direct information on events of flash floods and pluvial flooding
- Munich Re, with its database NatCatSERVICE, possesses the most comprehensive database of natural catastrophe losses worldwide since 1980. Here sometimes it is possible, to obtain rough flash flood information



Flood losses (3)

- The big flood catastrophes in Germany since 1993 resulted in losses of more than 14 billion Euros
- The many small- and medium-scale floodings all together add losses of several billion Euros.
- Altogether nearly half of all insured losses do not result from flood events at big rivers but from local events of flooding at small rivers or in places far from rivers.



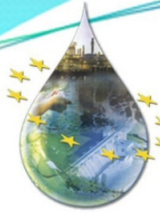
Flood losses (4)

Most expensive flood catastrophes in Germany since 1990,

river floods: black
flash floods: red
mixed floods: purple.

source Munich Re
NatCatSERVICE

year	affected area	Total loss [million euro]	Insured loss [million euro]	Insured part [%]
1993	Rhine area	730	220	30
1994	Saale-Unstrut-area	220	80	36
1995	Rhine area	390	160	41
1997	Oder	320	30	9
1998	all Germany	100	?	?
1999	Danube area	325	65	20
2002	western Bavaria	100	50	50
2002	Elbe- and Danube area	11 600	1 800	16
2005	Danube area	175	40	23
2006	Elbe	120	20	17
2007	Central Franconia (Baiersdorf)	100	< 5	< 5
2008	Baden-Württemberg (Killertal)	>100	>100	?



Flood losses (5)

2007

Central Franconia
(Baiersdorf)

Total loss (m€): 100

Ins. loss (m€): < 5

Ins. part (m€): < 5

2008

Baden-Württemberg
(Killertal)

Total loss (m€): >100

Ins. loss (m€): >100

Ins. part (m€): > ?



Flood losses (6)

- The costliest flash floods catastrophes in Europe since 1980 resulted in losses of more than 4 billion Euros
- in Germany since 1990 pure flash floods/pluvial flooding events cost more than 0,5 billion Euros
- The last European flash flood was in Madeira 2010:
 - total loss of the flash floods of February 2010 in Madeira Island is about 1,1 billion Euros.
 - nearly 136 million Euros for the insurance industry
 - corresponding to 2040 claims and 11 deaths.



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Flood losses (7)

The costliest flash floods in Europe since 1980

Period	Event			Description	Losses (US\$ m. original)		Fatalities
					overall losses	insured losses	
3.-9.11.1987	C: Flash flood, landslide	Spain	Mediterranean Sea, Valencia, Murcia, Alicante	Floods up to 2,5 m high, torrential rain (1000 mm/38 hours), landslides. Train services disrupted, communication and power lines cut. Damage to citrus crops US\$ 30m.	1000	185	16
31.10.-2.11.1990	C: Flood	Croatia	Zagreb area	Heaviest rain for 50 years (220-260 mm/48 h). Landslides. River Savinja burst its banks, bridges washed away, roads blocked, houses flooded. Also affected: Slovenia	800	0	0
31.10.-2.11.1992	C: Flash floods, severe storm	Italy	esp. Tuscany, Rome, Sicily	Torrential rain. Rivers burst their banks. Houses, cellars flooded. Toskany: worst rain since 1813 (510mm/October). Homeless: 1,000, injured: numerous	712	2	3
8.-11.9.2009	C: Floods, flash floods	Turkey	Istanbul, Sariyer, Kilyos suburbs; Tekirdag, Kumbag; Canakkale; Bursa; Balikesir; Aydin; Izmir; Antalya	Heavy rain, flash floods up to 4 metres. Worst precipitation for 80 years (220mm), worst flooding in 500 years. Rivers burst their banks. >4,000 houses, several industrial facilities flooded/damaged. 200 cars destroyed. Major damage to infrastructure. Roads flooded, bridges damaged/destroyed. Trees downed. Injured: 20, missing: 5, evacuated: 200.	600	250	38
1.-4.10.1988	C: Flash floods, severe storm, rainstorm	France	Nimes	Torrential rain (300 mm/24 h), heavy flooding. 18,000 houses damaged. Shops, factories and warehouses affected. Streets flooded. More than 1,000 cars destroyed. Power and telephone lines cut. Affected: 50 000	500	315	11
12.-14.11.1999	C: Flash floods	France	Tarn, Lacabarede; Aude; Pyrénées-Oriental, Hérault; Labastide-Rouairoux, Villedaigne	Torrential rain (240 mm/18 hours, Aude, max. rainfall intensity 112 mm/1 hour), wind speeds up to 100 km/h (worst storm for 50 years in the region), landslides. Houses, businesses flooded, dozens of cars destroyed. Roads, railways, bridges destroyed. Power, communication and water supplies disrupted. Losses to agriculture. Missing: 3.	500	400	33

source: © 2010 Münchener Rückversicherungs-Gesellschaft, Geo Risks Research, NatCatSERVICE – As at April 2010



Flood losses (8)

Worldwide:

Berggasthof Aschbach
SW from Munic

Houston: 6,5 b€

Beijing 2004

On the top of a hill

Taipei 2001

Thundershower

Istanbul: 0,6 b€

Basement garage was flooded

Flood loss which is covered in Germany



Flood losses (9)

- Flash floods come unexpected
- However, flash floods following heavy rain can strike anywhere
- But we do not know, when and especially where it will happen.



conclusions

- Worldwide every year there are high losses caused by flood events
- half of all flood losses result from local floods at small rivers or in places far from rivers
- The insurance industry is interested in analysing the subject torrential rain/flash floods/pluvial flooding
- The target is to estimate the risk of local flooding, so that the insurance industry can offer risk based products.
- Therefore further research is required in this area
- easy access to detailed data should be ensured, free of charge, for all stakeholders, including the insurance sector