

September 2009

## Impact and Implications of Swiss Hailstorms in July 2009

### Executive Summary

Severe hailstorms caused widespread property, motor and crop damage in Switzerland on 23 July 2009. Although hail losses only make up an average of 9% of all claims in Switzerland every year, the peril has the potential to cause severe localised damage in the country. Hailstorms can trigger insurance claims totalling hundreds of millions of euros if they hit Swiss urban areas, and this scenario was realised on 23 July when hail measuring up to 50 mm in diameter badly battered central and northern cantons and caused the biggest Swiss hail loss in recent memory.

In Switzerland, obligatory cover for natural hazards, including hail, is provided by a two-tier system of cantonal and private insurers. For the purposes of this report, Guy Carpenter spoke to representatives of both, and the responses we received suggest cantonal and private insurers are likely to pay out more than 150,000 claims totalling more than CHF733 million (EUR485 million).

This is a significant loss for the Swiss insurance market and the hailstorms are expected to have a substantial influence on the (re)insurance renewal process in the country for 2010. The event illustrates the need for good quality tools and data to help (re)insurance companies quantify their exposure to the hail peril, and Guy Carpenter intends to play a leading role in developing these solutions.

### Meteorological Summary

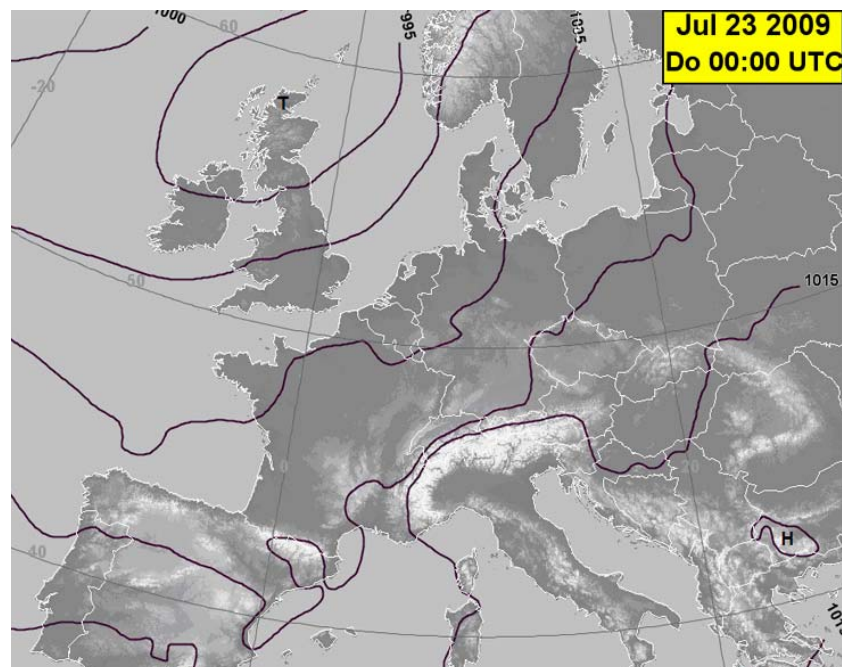
The evening of 22 July was characterised by a particularly strong foehn wind<sup>1</sup> in the alpine valleys which was the product of pressure gradient extremes across the Alps (see Figure 1). The foehn wind was particularly strong for the time of year and resulted in local temperature gradient extremes.

### Storms of 23 July

The severe storms that hit Switzerland on 23 July were fuelled by a warm and humid air mass that moved up from the Mediterranean Sea. The storm-inducing potential of this air mass was increased by the presence of strong winds at high altitude.

The Swiss Plateau and the Prealps were in the path of some of the most powerful and fast-moving storm cells. As these storm cells were moving at speeds of greater than 60 kmph, the worst hit

**Figure 1: Isobars showing strong pressure gradients at ground level across Switzerland**



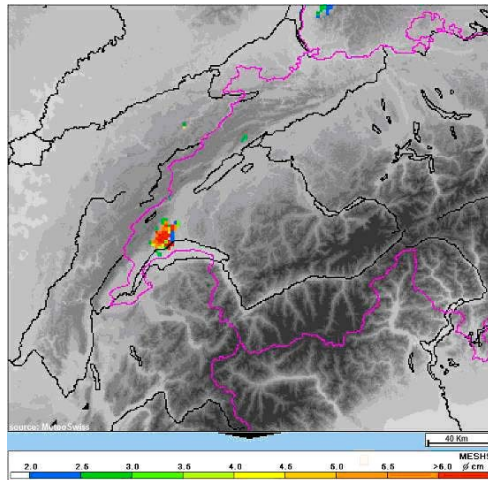
Source: © MeteoSwiss: [http://www.meteoschweiz.admin.ch/web/de/wetter/wetterereignisse/nach\\_foehn\\_starke\\_gewitter\\_20090723.html](http://www.meteoschweiz.admin.ch/web/de/wetter/wetterereignisse/nach_foehn_starke_gewitter_20090723.html)

<sup>1</sup> A foehn wind is a type of dry, down-slope wind that occurs in the lee of a mountain range. Foehn winds can raise temperatures by as much as 30°C in a matter of hours.

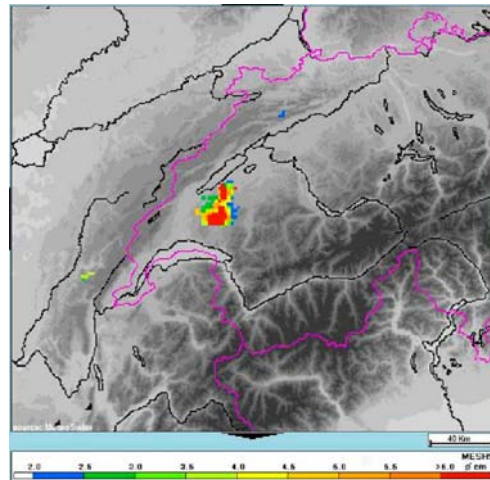
areas were subjected to total precipitation accumulations equivalent to more than 100 mm per hour. Additionally, maximum wind gusts recorded by MeteoSwiss weather stations during the passage of the storm were in excess of 90 kmph and it is likely that wind speeds of over 100 kmph were experienced in localised areas during the passage of the most active storm cells.

Figures 2 to 5 show the movement of the storm cells between around 15:00 and 17:00 local time on 23 July. These images show the rapid progression of the storm cells, which moved from Lausanne to the area around Lucerne in approximately 1.5 hours. Figures 4 and 5 show the separation of the storm into two individual cells at 16:00 local time. The southern, larger cell subsequently moved over Schwarzenburgerland, east towards Aare Valley, Napfgebiet and Lake Lucerne. The northern cell moved across the Bern middleland towards Aargau and Lucerne middleland. Officials said the geographical spread of the storm was unprecedented as it covered more than 600 km in total.

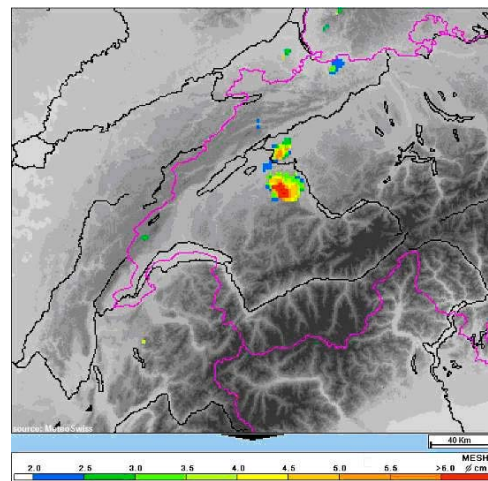
**Figure 2: Storm cell location at 15:15**



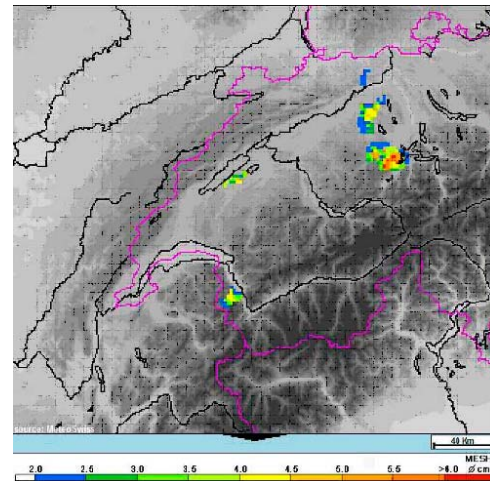
**Figure 3: Storm cell location at 15:35**



**Figure 4: Storm cell location at 16:00**



**Figure 5: Storm cell location at 16:40**



Source: © MeteoSwiss: [http://www.meteoschweiz.admin.ch/web/de/wetter/wetterereignisse/nach\\_foehn\\_starke\\_gewitter\\_20090723.html](http://www.meteoschweiz.admin.ch/web/de/wetter/wetterereignisse/nach_foehn_starke_gewitter_20090723.html)

### *Damage Potential of Hail*

Most of the precipitation produced by the storm cells fell as large hailstones that resulted in severe damage. Some of these hailstones were larger than 50 mm in diameter and commonly of at least 20 mm in diameter (see Figure 6 for an example).

**Figure 6: Example of hailstone size in Oberthal, Bern Canton, during July storms**



Source:© Silas Walther

As Table 1 shows, some of the hailstones produced on 23 July were the size of golf balls and billiard balls. Such hailstones have the capacity to severely damage fruit and other agricultural crops, in addition to vehicle windscreens and bodywork, and property windows and glass roofs. Damage evidence gathered from the July hailstorms seems to confirm this classification (see Figures 7 and 8).

**Figure 7: Hail damage to soft fruit crops**



Source: © Schweizer Hagel

**Figure 8: Hail damage to a large greenhouse**



Source: © Schweizer Hagel

**Table 1: Hail size chart and typical hailstone damage**

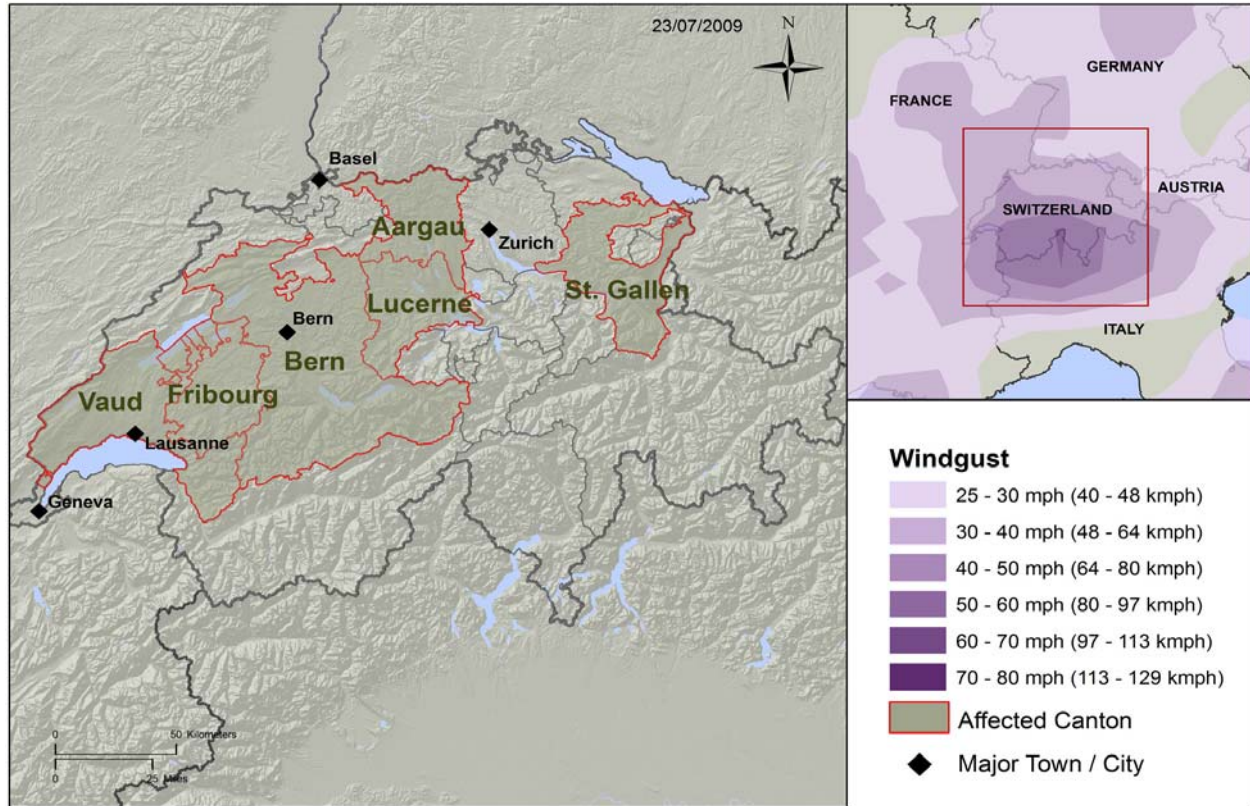
Hail Diameter (mm)	Comparison	Damage
1-5	Ice pellets, not hail	-
5-20	Pea, hazelnut, marble	Virtually no damage, slight damage to plants
20-30	One euro coin	Panes in glasshouses, cloches broken; vehicles, fruit and vegetables extensively damaged
30-40	Walnut, table tennis ball	Car paintwork damaged, glasshouses destroyed, felt or asbestos roofs pierced, branches broken from trees, birds and poultry killed
40-60	Golf ball, billiard ball	Damage to windows and glass roofs; bodywork of cars and aircraft pitted
60-80	Tennis ball	Damage to roofing tiles. Significant structural damage (facades, metal cladding, window frames), risk of serious injury
80-110	Baseball, grapefruit	Aircraft bodywork badly damaged; humans and animals seriously endangered, paving stones pitted, severe damage to forests
>110	Small melon, softball	Risk of fatal injury to humans and animals, damage to the fabric of buildings

Source: Munich Re's Highs and Lows Weather Risks in Central Europe, 2008

**Event Summary**

Significant damage was reported across northern and central Switzerland following the hailstorms on 23 July. Wind gusts of more than 100 kmph and heavy rainfall were mixed with hailstones the size of golf balls. Although reports said the storms only lasted for 30 minutes in some parts, they still caused extensive damage in six cantons (Aargau, Bern, Fribourg, Lucerne, St. Gallen and Vaud). Severe disruption to road and rail traffic was also reported and insurance officials said the hailstorms were the most costly to hit Switzerland in 50 years.

**Figure 9: Map of Swiss Cantons affected by July hailstorms**



Source: Guy Carpenter & Company, LLC

The hailstorms caused considerable damage to property and vehicles across Switzerland, and officials said the worst affected cantons were Bern, Fribourg, Lucerne and Vaud. There were widespread reports of damage to roof tiles, windows, shutters and blinds across all four cantons while thousands of vehicles were also hit. In Bern alone, officials said 15,000 buildings were damaged. Flooding was also reported in Bern, inundating several cellars in the canton.

Fribourg was also badly hit by the hailstorms, with widespread property and motor damage reported, particularly in areas north of Gubloux. Towns and villages in Fribourg lost power for several hours and more than 400 firefighters were deployed to help residents clear their flooded cellars. Officials estimated as many as 10,000 homes were damaged in Fribourg. Elsewhere, thousands of buildings were reportedly damaged in Lucerne and Vaud.

The hailstorms caused severe damage to vehicles across the affected areas. Car rooftops were smashed while windscreens and bodywork of vehicles were badly damaged. For the cars that remained road-worthy, severe disruption to traffic was reported as fallen tree branches blocked roads. Rail traffic was also suspended in some parts and replacement buses were deployed.

**Figure 10: Example of car windscreen damage**



Source: © Anne-Claire Deschenaux

Crops were badly damaged by the golf ball-sized hail, with fields of fruit, wheat, sunflowers and vegetables badly hit. Widespread crop damage was reported in Bern and crop fields in parts of Vaud, Fribourg and Lucerne were also affected by the storms. Swiss wine growing regions were also hit, with vineyards in La Côte (Vaud Canton) destroyed.

**Swiss Insurance Market**

Insurance officials said the hailstorms on 23 July were the most severe and costly to hit Switzerland in 50 years. Despite typically being local events, these storms can cause severe damage to property, vehicles and crops as the 23 July hailstorms demonstrated.

In Switzerland, obligatory property cover for natural hazards (including hail, flood, windstorm, landslide, falling rock, avalanche and snow weight) is provided by a complex two-tier system of cantonal and private insurers. As Table 2 shows, 19 cantons have their own insurers which provide cover for all buildings

in their respective areas. Cover in these 19 cantons is obligatory and for three of these cantons, contents insurance is also mandatory. In the seven other cantons (known as the Gustavo cantons), buildings insurance is still compulsory but cover is provided by private insurers. Meanwhile, all crop damage in Switzerland is covered by the Schweizer Hagel (Swiss hail) insurance company while private insurers provide motor insurance.

**Table 2: Cantonal/private insurers system in Switzerland**

		Building Insurance			Content Insurance	
		Name of cantonal insurer	Cantonal insurer	Private insurance industry	Cantonal insurer	Private insurance industry
AG	Aargau	AGV	c			p
AI	Appenzell Innerrhoden			p		p
AR	Appenzell Ausserrhoden	AAR	c			p
BE	Bern	GVB	c			p
BL	Basel-Country	BGV	c			p
BS	Basel-City	GVBS	c			p
FR	Fribourg	ECAB	c			p
GE	Geneva			p		p
GL	Glarus	GlarnerSach	c		c	p
GR	Graubünden	GVG	c			p
JU	Jura	ECA Jura	c			p
LU	Lucerne	GVL	c			p
NE	Neuchâtel	ECAP	c			p
NW	Nidwalden	NSV	c		c	
OW	Obwalden			p		p
SG	St. Gallen	GVASG	c			p
SH	Schaffhausen	GV SH	c			p
SO	Solothurn	SGV SO	c			p
SZ	Schwyz			p		p
TG	Thurgau	GVTG	c			p
TI	Ticino			p		p
UR	Uri			p		p
VD	Vaud	ECA Vaud	c		c	
VS	Valais			p		p
ZG	Zug	GVZG	c			p
ZH	Zurich	GVZ	c			p

Source: 'Sachversicherung' by Jürg Hauswirth and Rudolf Suter

**Insured Losses for July 2009 Hailstorms**

For the purposes of this report, Guy Carpenter spoke to the Intercantonal Reinsurance Union (IRV), a body that represents all the cantonal insurers, and the ES-Pool, which represents 15 private insurers in Switzerland. The responses we received suggest cantonal and private insurers are likely to pay out 150,000 claims totalling more than CHF733 million. Table 3 shows how the overall insured loss is split between cantonal and private insurers and line of business.

**Table 3: Breakdown of insured losses from 23 July hailstorms**

	Claims Amount in CHF	Number of Claims
Property Private Insurers*	26,300,000	5,699
Property Cantonal Insurers (IRV)	250,000,000	45,000
<b>Property Subtotal</b>	<b>276,300,000</b>	<b>50,699</b>
Motor*	400,000,000	90,000
Agricultural	45,000,000	7,900
Other*	11,900,000	2,061
<b>Total</b>	<b>733,200,000</b>	<b>150,660</b>

\* Estimate ES-Pool for private insurers in blue  
Sources: IRV, ES-Pool and Schweizer Hagel

The line of business breakdown shows motor losses account for the bulk of the claims. Some 90,000 claims totalling around CHF400 million were made to private insurers for motor-related damage. Most Swiss insurers cover Motor Own Damage with Catastrophe Excess of Loss programmes, and our findings suggest the vast majority of these were triggered, some with a total loss.

Property damage was also substantial with losses reaching more than CHF276 million from 50,000 claims. Cantonal insurers covered the bulk of the property claims, with losses of CHF250 million in the cantons of Bern, Fribourg, Lucerne and Vaud. Our figures estimate the average property loss was CHF5,550 for each building. Although an Elemental Pool exists in Switzerland to cover natural hazard losses, it seems private insurers will have to absorb the cost of the July hailstorms as the pool is unlikely to be triggered in 2009<sup>2</sup>.

By the very nature of the hail peril, property damage in the main is limited to the exterior of the building, but for this event substantial claims were also made for contents, caused by damaged awnings for example. In fact, some of the key reasons for the unexpectedly high property losses

<sup>2</sup> The Elemental Pool has an attachment point of CHF450 million, and due to the relatively low nat cat losses of 2009 in Switzerland (other than the July hail loss), the pool is unlikely to be triggered this year.

seem to be new elements with high loss sensitivities such as blinds, shutters, awnings and solar panels (see Figure 11). Some estimates indicate that these elements made up 50% of all losses, and the IRV has consequently sanctioned a study to ascertain why this happened<sup>3</sup>.

Insurers are also closely assessing crop losses after they were recently revised upwards. Insured loss in the agriculture sector are now expected to be CHF45 million, up from the original estimate of CHF35 million, according to Schweizer Hagel.

In terms of geography, the figures show the western cantons of Bern, Fribourg and Vaud suffered the highest insured losses. Buildings insurance cover in all three of these cantons is provided by cantonal insurers, and this is reflected in the high property losses that are allocated to the IRV in Table 3.

**Figure 11: Blind damage at a home in Tentlingen, Fribourg Canton, following the hailstorms**



Source: © Michael Hollinger

The high insured loss from the hailstorms is expected to have a substantial influence on the (re)insurance renewal process for 2010 in Switzerland in the form of increased retentions, larger hail capacities and higher prices.

#### **Historical Hail Events**

Severe hailstorms have become a regular occurrence during the summer months in Switzerland over the last few years, mostly in areas to the north of the Alps. Several other significant hail losses have been recorded in the country over the last ten years. According to Munich Re, a severe hailstorm in June 2002 badly hit the cantons of Aargau and Zurich. The cantons of Thurgau, St. Gallen and Lucerne were also affected and Munich Re said the hailstorms triggered economic losses of CHF335 million, of which CHF260 million were insured.

<sup>3</sup> The study is due to be released later this year.

Hailstorms in July 2004 also caused significant damage in Switzerland and triggered insurance claims worth CHF140 million. Zurich was particularly badly hit during the 2004 storms. Modelled scenarios show how vulnerable Zurich is to the hail peril, with potential motor damage losses of more than CHF300 million around the city.

In June and July 2007, meanwhile, several hailstorms and floods caused substantial insured losses. For the June event, a thunderstorm moved from Lake Geneva through the Swiss Plateau to Lake Constance, causing significant damage in many places. The storm brought heavy rainfall, large hail, strong winds and numerous lightning strikes to parts of Switzerland, particularly the cantons of Berne, Fribourg and Aargau. According to Munich Re, the storms caused insured losses of CHF115 million, although hail damage only made up part of this figure.

In July 2007, severe hailstorms caused significant building damage in the Bernese Highland and the southern foot of the Jura Mountains. The region of Interlaken was worst affected. The Bernese Building Insurance (GVB) said around 6,000 buildings were damaged at a loss of more than CHF35 million. On the same day, a second thunderstorm cell caused damage at the southern foot of the Jura in the area of Biel. The GVB said about 2,000 buildings were damaged, triggering losses of around CHF5 million.

### **Conclusion**

Hailstorms in Switzerland pose a significant threat to property and the local population, despite the localised nature of the peril. Although hail events lack the widespread destruction of floods and windstorms, the peril is potentially costly, especially in densely developed urban areas.

This was well demonstrated by the 23 July hailstorms. Golf ball-sized hail caused considerable damage to property, vehicles and crops across a wide area of Switzerland, and in the worst affected cantons of Bern, Fribourg, Lucerne and Vaud particularly. The extensive damage culminated in an insured loss of around CHF733 million, one of Switzerland's biggest ever hail losses.

The July hailstorms are likely to have a significant impact on 2010 (re)insurance renewals in Switzerland. The increased frequency of severe hail events in Switzerland over the last few years illustrates the need for good quality tools and data to help (re)insurance companies quantify their exposure to the peril, and Guy Carpenter intends to play a leading role in developing these solutions.

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