

An Extreme Weather Event in Summer 2007: Hailstorm in Interlaken

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1 Introduction

The summer of 2007 in Switzerland was characterised by a particularly high thunderstorm activity. However, the distribution, frequency and intensity of thunderstorms are extremely variable from year to year. This is especially true for the occurrence of severe hailstorms (fig. 1). They can lead to major damage (human beings and goods, agriculture), and thus, their precise forecasting is of great importance in order to alarm the population in time. Here I summarise the meteorological preconditions on July 19th which permitted the formation of a supercell, which came over Interlaken (Alps, 567m) and switched to a severe hailstorm. I also show radar data of this extreme event and report its impacts. I was an eyewitness of this thunderstorm, the strongest I have ever seen yet...

2 The setting

The weather was very pleasant until the middle of the afternoon. Then, the cloud cover increased continually. A trough descending from the British Isles over the Bay of Biscay brought cold air aloft, while on its eastern side, warm and moist air was transported from the western Mediterranean into central Europe and lifted simultaneously, destabilising the layering of the atmosphere (fig. 2). A high vertical wind shear (not shown) allowed the development of a long-lived supercell (continuous moisture supply in front of the rain zone) composed of two rotating cores with strong updraft leading to hail formation (fig. 3).

3 The event

The intense and impressive thunderstorm, accompanied by lightning, lasted around 30min, precipitating hailstones with diameters of up to 5cm (background picture). Wind gusts above 80km/h were registered. After that, there was a wintery atmosphere: snow-white scenery, fog and silence. In the region of Interlaken, around 6000 buildings were damaged, producing costs of over Sfr. 35 million [3]. This underlines our vulnerability to sudden and severe weather events.

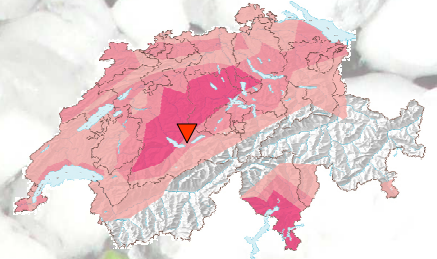


Fig. 1: Hail hazard in Switzerland [1]. White = low, dark = very high. The triangle shows the location of Interlaken (Bernese Oberland, between the Lakes of Thoune and Brienz).

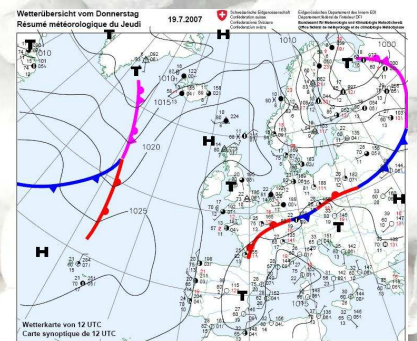


Fig. 2: synoptical preconditions [2].

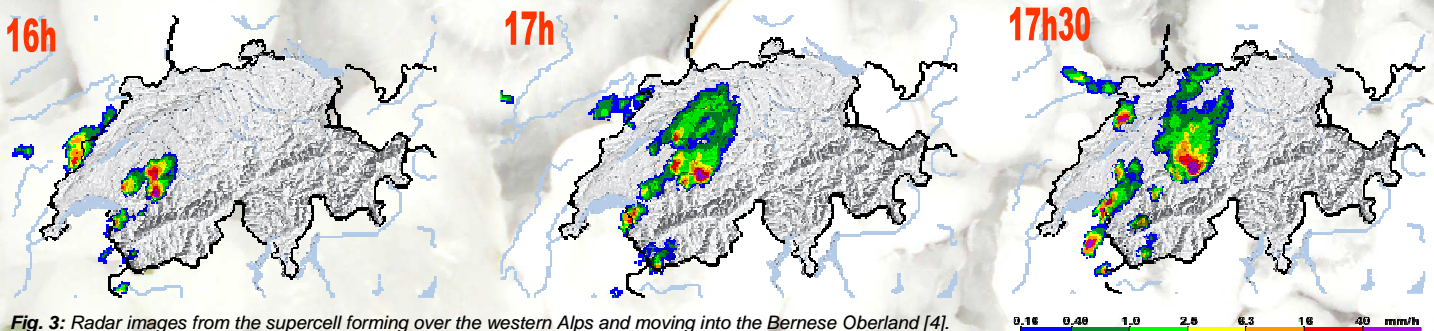


Fig. 3: Radar images from the supercell forming over the western Alps and moving into the Bernese Oberland [4].

4 The impacts



▲ broken trees [5]



▲ damage on buildings... ▲ and crop [5]



▲ inundations, interrupted railways and streets, damage on cars, evacuation of campings, etc. [6]

References

- [1] Swiss hail insurance (www.hagel.ch), mean 1961-2004.
- [2] MeteoSwiss Reports on Weather Events: „Sommerliche Gewitterlagen und aktive Kaltfronten vom 18. bis 23. Juli 2007,“ (available on the web: www.meteoswiss.ch).
- [3] Gebäudeversicherung Bern (GVB), estimation after the event.
- [4] Radar images (from MeteoSwiss): archive (www.landi.ch).
- [5] Own pictures.
- [6] Source: www.flickr.com/photos/mabufeu/860293488/

5 Conclusions

Hailstorms are able to induce substantial local damage and high costs of loss in a very short time. Forecasting and nowcasting methods have to be improved in order to have more time to alert endangered regions and emergency services and diminish the losses (e.g. by protecting cars). That would be a significant contribution to adaptation in a country with a high population and goods concentration like Switzerland, which will be confronted with great climate changes in the near future, affecting the intensity and frequency of extreme weather events.