

Hail hazards in Switzerland

with return periods of up to 300 years

2nd European Hail Workshop Bern
20.04.2017

René Cattin
Dr. Willi Schmid
Dr. Hans-Heinrich Schiesser

To be honest....



Consortium H2016



René Cattin
Meteotest

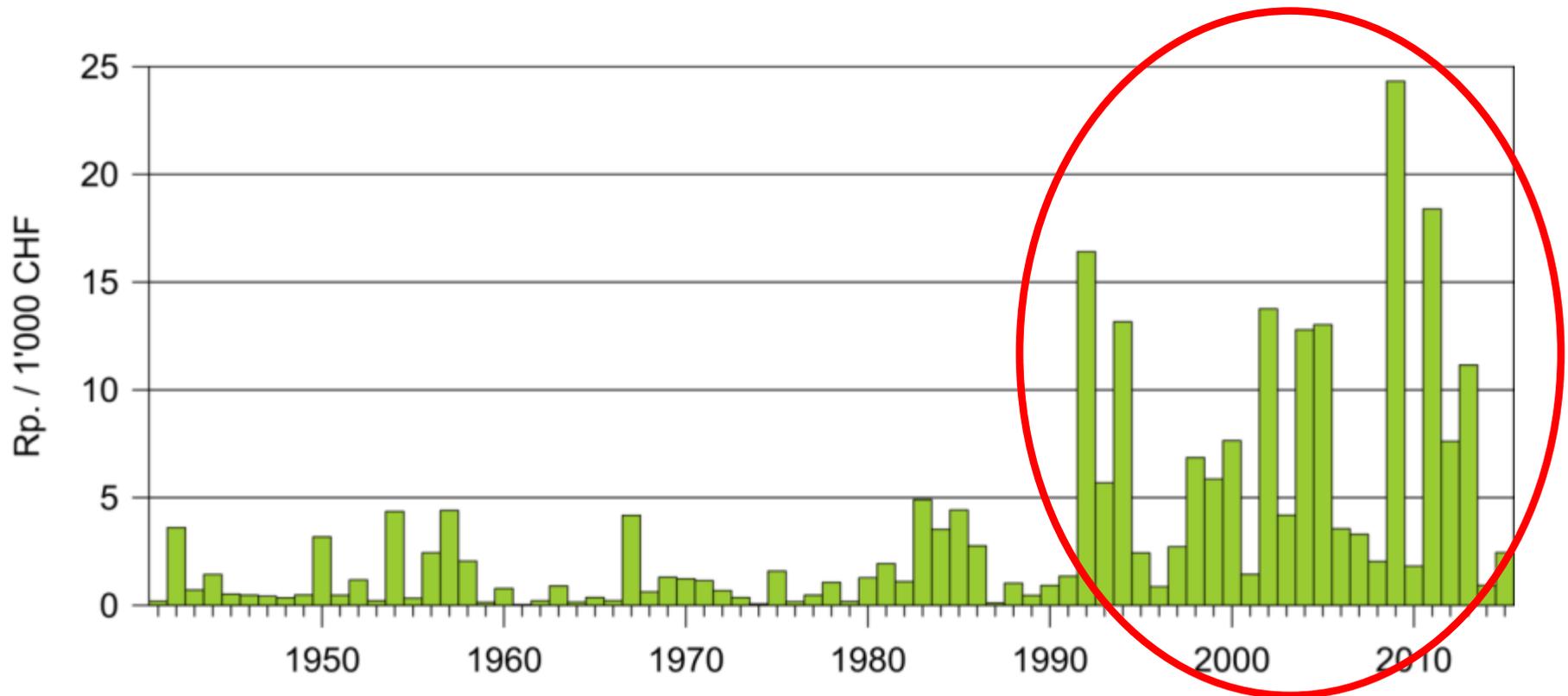


Dr. Willi Schmid
meteoradar GmbH



Dr. Hans-Heinrich Schiesser
ETH hail group 1976-1999

Damages caused by hail



Source: statistics of 18 cantonal building insurances

→ Everybody is concerned about hail hazards

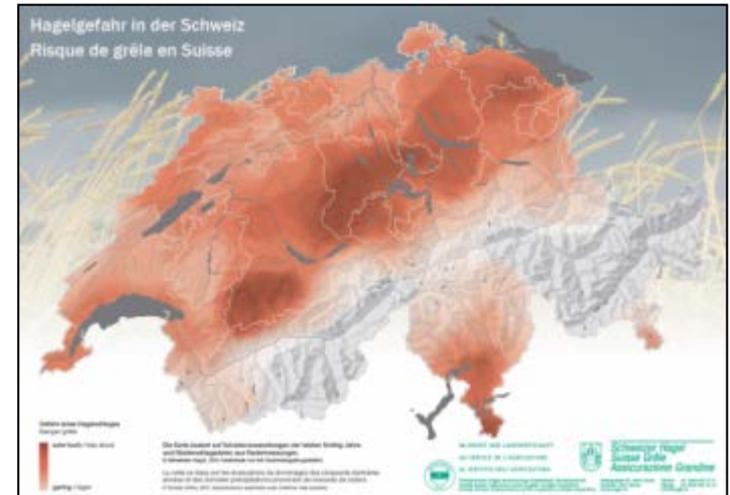
Hail hazard maps in CH



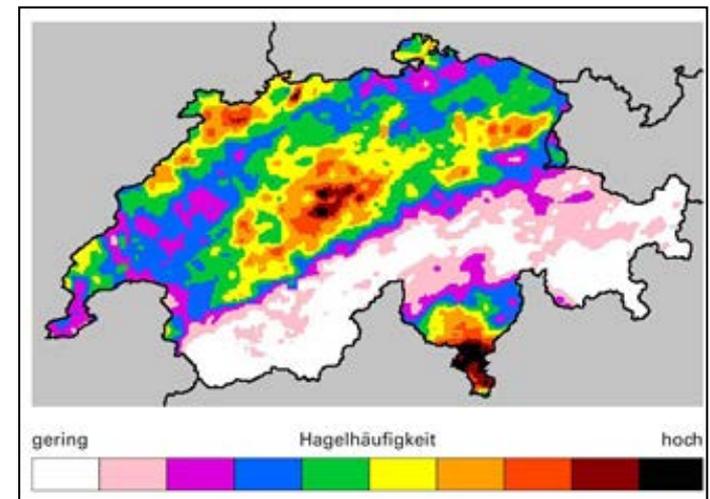
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Hagelkarte Schweizer Hagel, 2011



Hagelkarte VKF, Schiesser 2006



Mobilier Lab für Naturrisiken, UniBern, Luca Nisi, 2015

Hail hazard in Aarberg



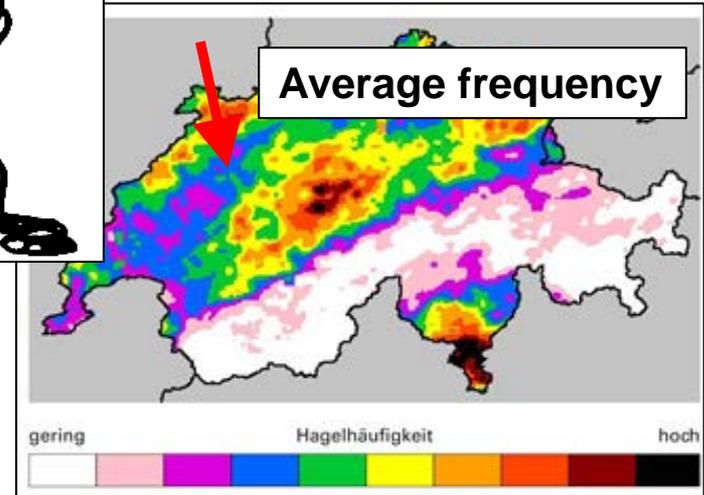
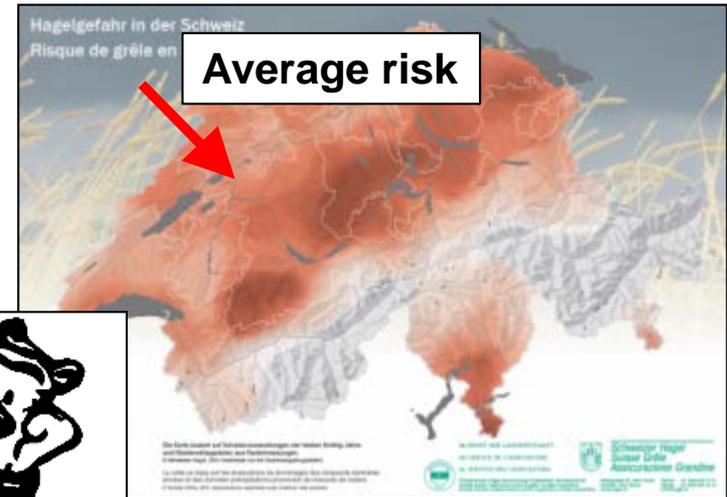
Hail hazard in Aarberg



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A new map is needed



Initiative of VKF (Association of Canton Fire Insurances)

Requirements

- State of the art technology
- Supported and accepted by all stakeholders
- Including all available data sources
- High spatial resolution
- Return periods of up to 300 years
- Different hail stone diameters
- Continuity guaranteed, periodic updates

National hail hazard map



→ Project start expected in 2017

Data sources in CH



Available hail data sources in Switzerland

Radar MeteoSwiss dual polarisation

Observations/Sensors MeteoSwiss

Radar MeteoSwiss

→ Urs Germann, Friday, 9h

Period too short for return periods > 50 years

1840

1860

1880

1900

1920

1940

1960

1980

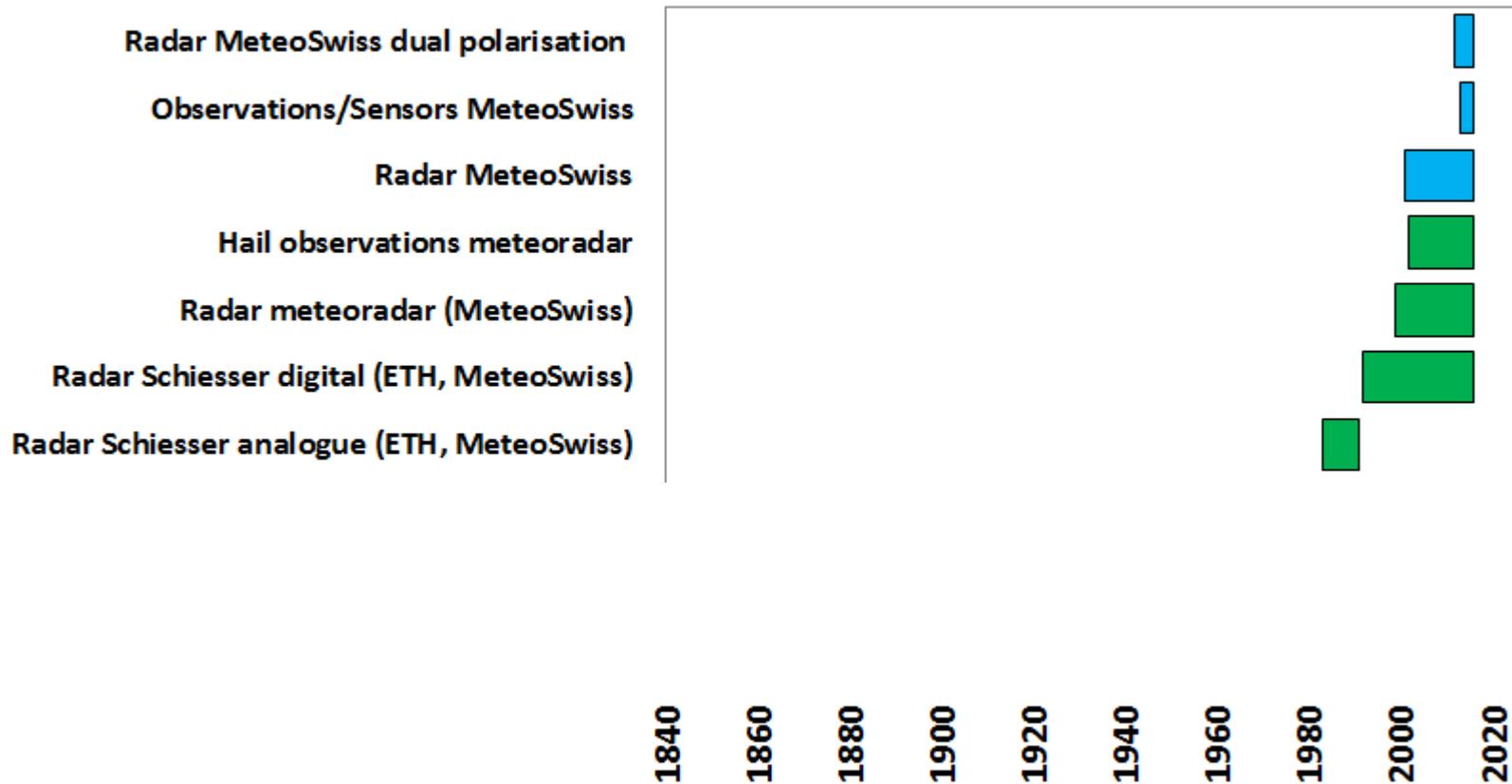
2000

2020

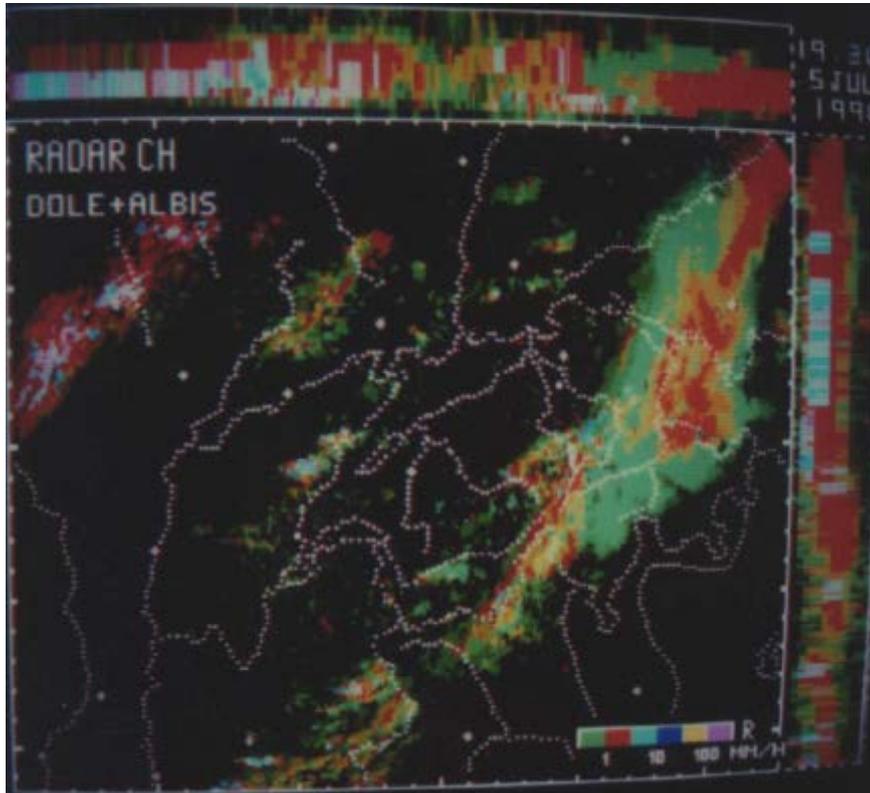
Data sources in CH



Available hail data sources in Switzerland



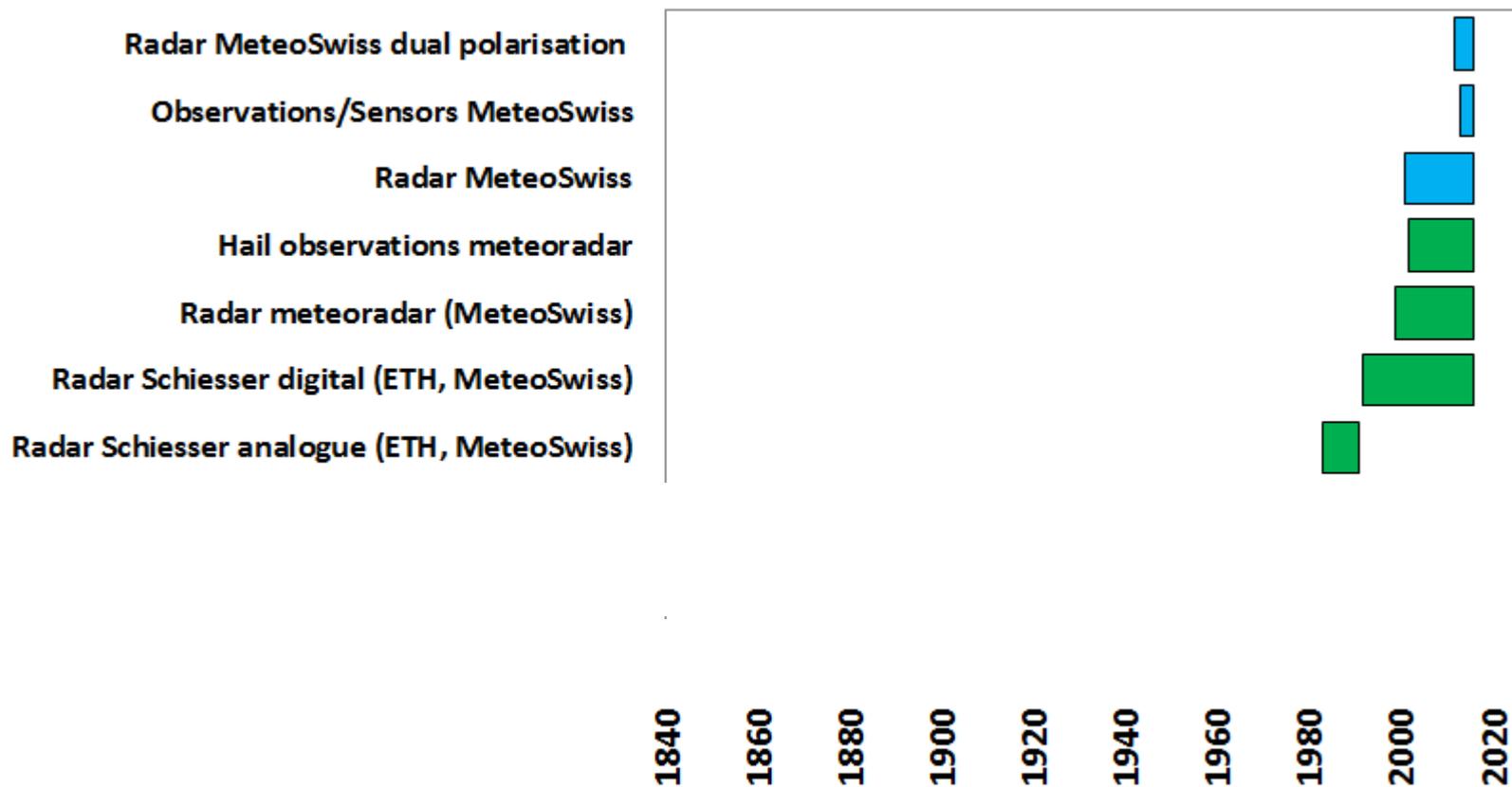
Early MCH radars & ETH radar



Data sources in CH



Available hail data sources in Switzerland



Grossversuch ETH IV

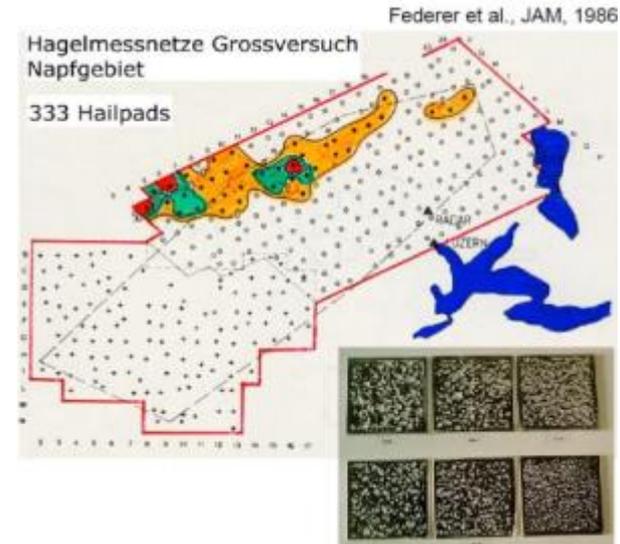
1977 - 1982

«*hail suppression experiment*»



Wetterradar 10 cm Emmen

→ hailstone size distributions



333 hail pads

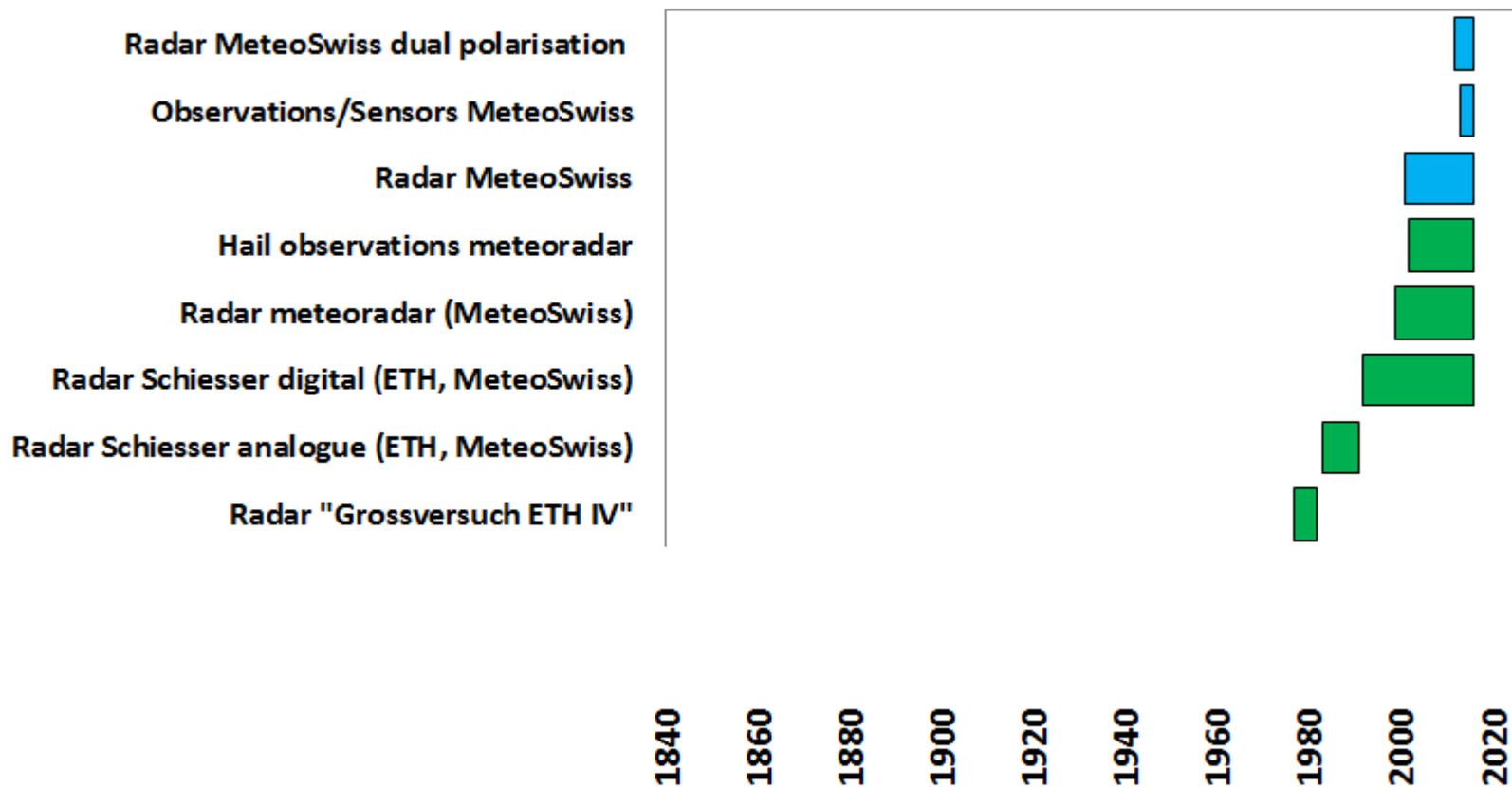


Footprints of hail storms

Data sources in CH



Available hail data sources in Switzerland

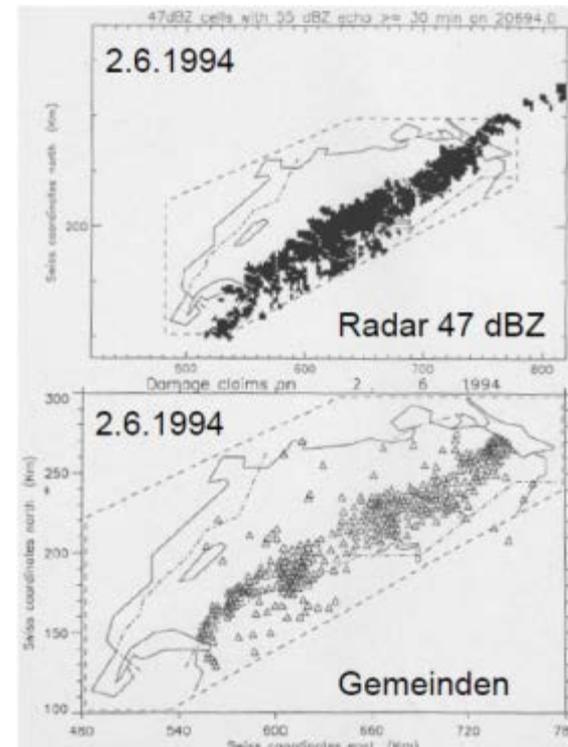


Damage reports Schweizer Hagel

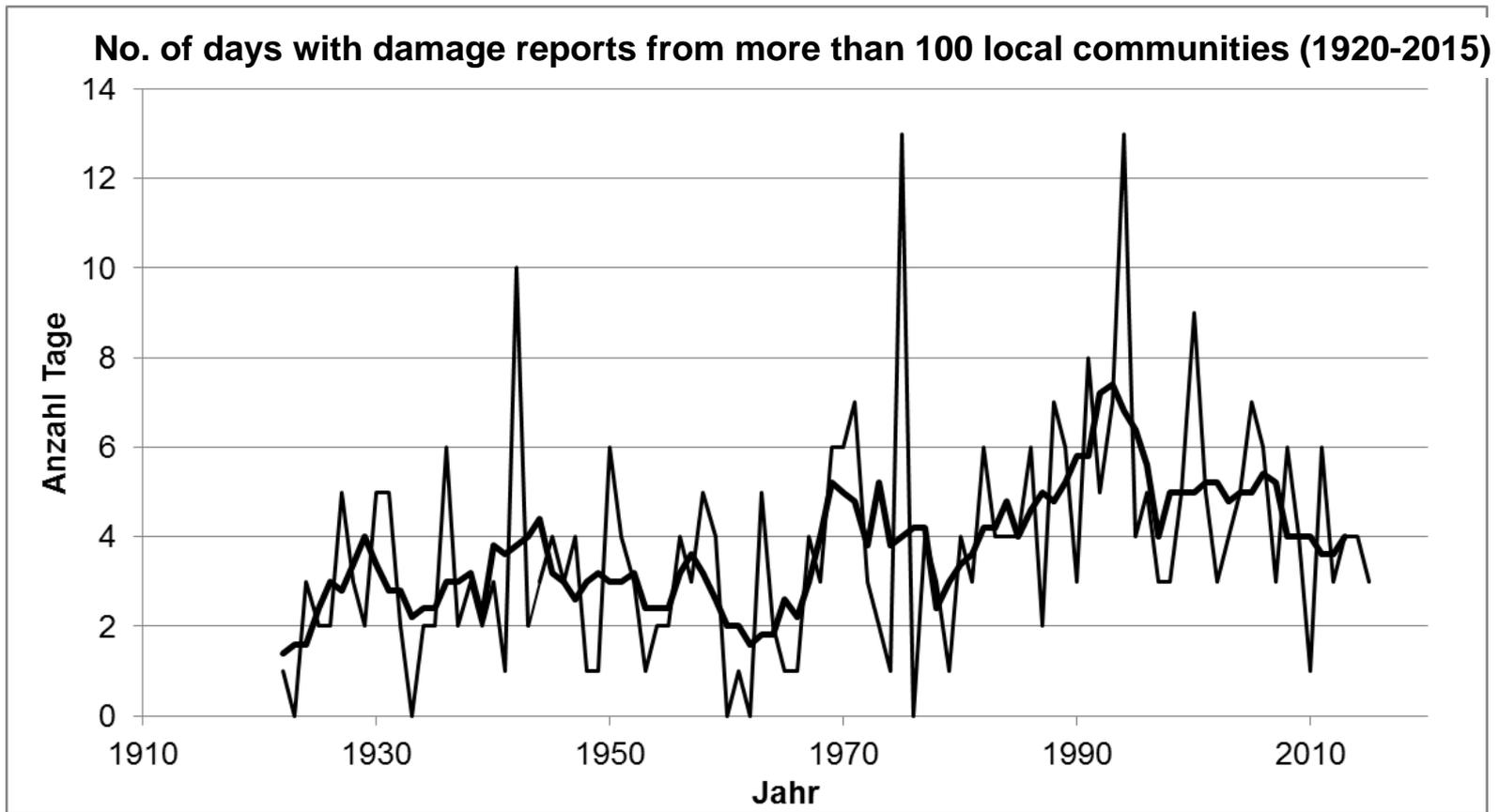


- NFP31 „Klimaänderung und Naturkatastrophen“ (1992 to 1996)
- Systematic list of hail damage reports from 1920 to 1996
- Continued since 1997 on private basis

Anzahl betroffene Gemeinden an Hageltagen 2015					
Monat	Tag	Anzahl	Monat	Tag	Anzahl
5	2	1	7	2	1
5	3	1	7	3	2
5	4	4	7	4	3
5	5	1	7	6	4
5	9	3	7	7	14
5	12	1	7	8	11
5	13	103	7	15	1
5	14	15	7	16	1
5	15	7	7	17	36
5	16	1	7	18	5
5	19	1	7	19	1
5	20	5	7	21	1
5	21	3	7	22	45
5	25	2	7	23	3
5	26	10	7	24	91
5	29	1	7	25	11
6	1	4	7	26	1
6	4	2	7	27	2
6	5	39	8	5	1
6	6	111	8	6	3
6	7	105	8	7	2



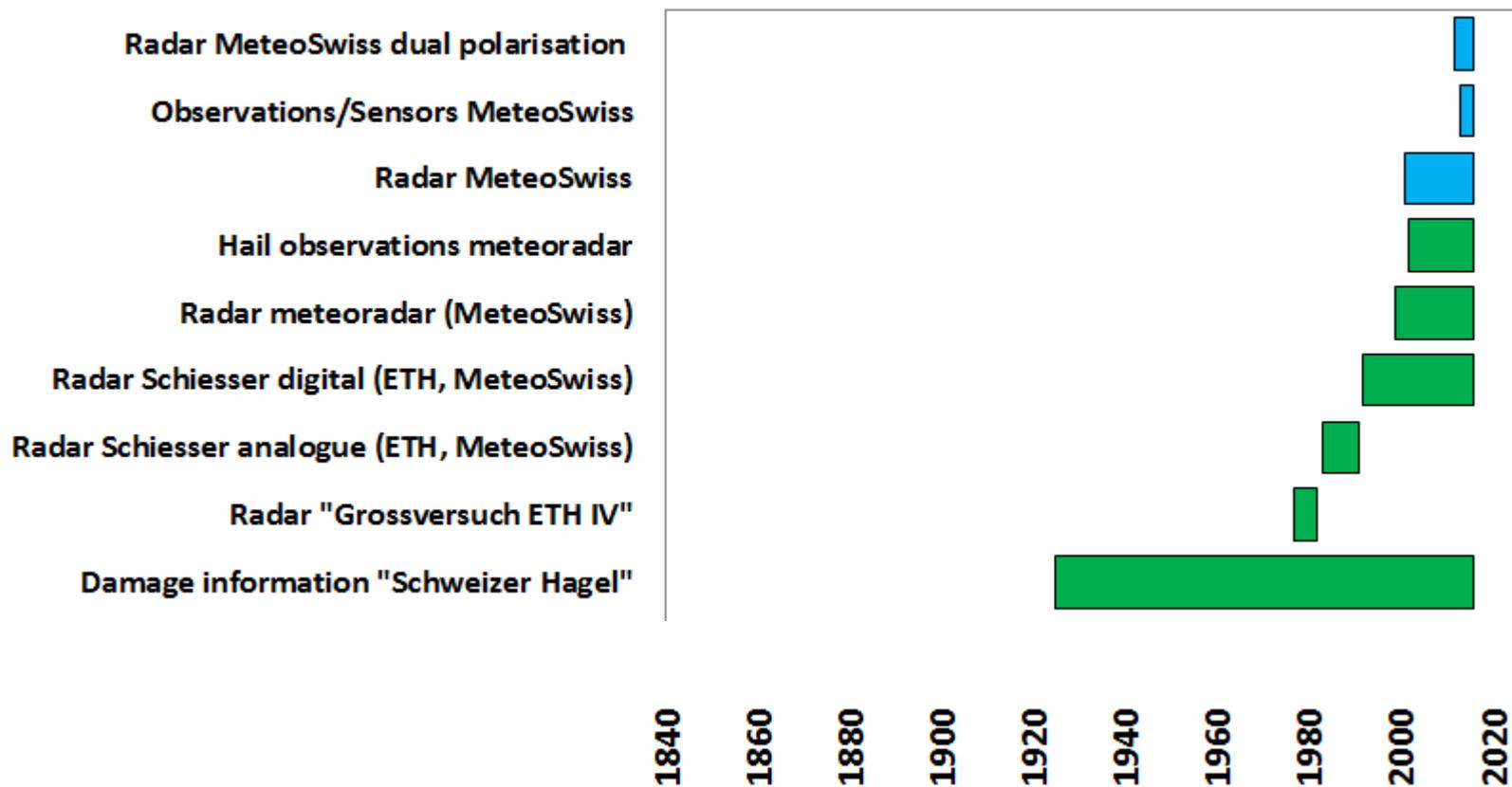
Damage reports Schweizer Hagel



Data sources in CH



Available hail data sources in Switzerland

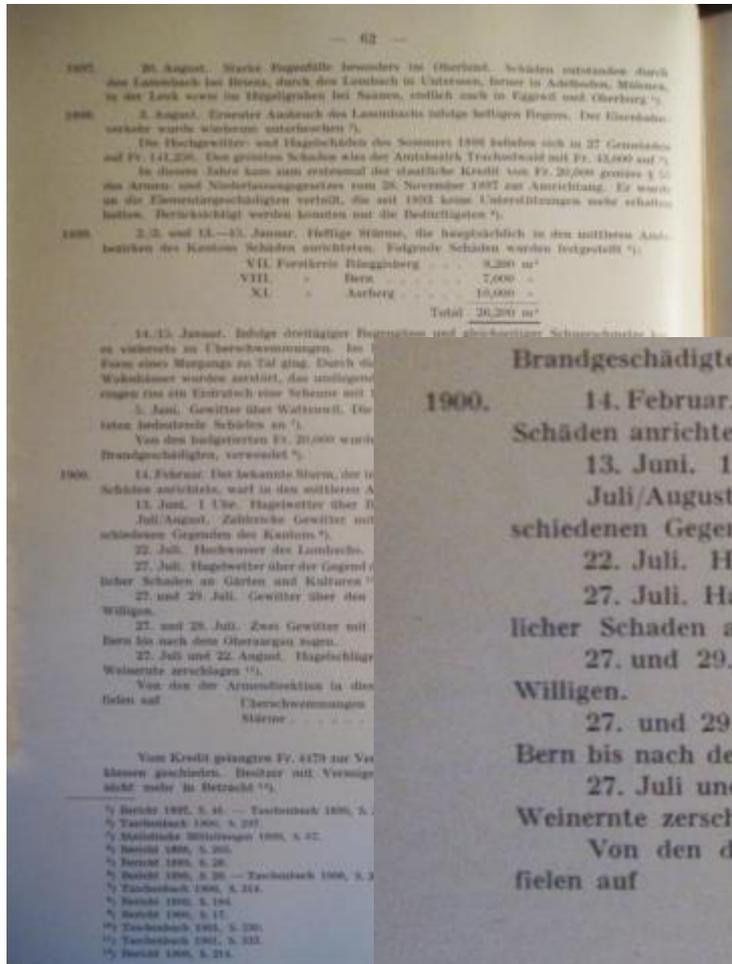


Natural hazards Bd. I and II



1938, Hermann Lanz, Curt Rommel

→ Information needs to be digitized



Brandgeschädigten, verwendet *).

1900. 14. Februar. Der bekannte Sturm, der in verschiedenen Kantonen zwischen Jura und Alpen Schäden anrichtete, warf in den mittleren Amtsbezirken des Kantons Bern 40,000 m³ Holz *).

13. Juni. 1 Uhr. Hagelwetter über Belp, Toffen und Muhlern ¹⁰⁾.

Juli/August. Zahlreiche Gewitter mit schweren Regengüssen. Hagelschlag über verschiedenen Gegenden des Kantons *).

22. Juli. Hochwasser des Lombachs. Zerstörung der Schutzbauten.

27. Juli. Hagelwetter über der Gegend der Schosshalde (Bern) bis nach Stettlen. Empfindlicher Schaden an Gärten und Kulturen ¹¹⁾.

27. und 29. Juli. Gewitter über den Engelhörnern. Schäden durch den Lugibach bei Willigen.

27. und 29. Juli. Zwei Gewitter mit Sturm und Hagel, die vom Schwarzwasser über Bern bis nach dem Oberaargau zogen.

27. Juli und 22. August. Hagelschläge im Seeland. In Allfermee und Vinelz wurde die Weinernte zerschlagen ¹¹⁾.

Von den der Armendirektion in diesem Jahre angemeldeten Elementarschäden entfielen auf

Überschwemmungen	Fr. 37,564
Stürme	» 2,196
	<hr/>
Total	Fr. 39,760

Vom Kredit gelangten Fr. 4479 zur Verteilung. Die Betroffenen wurden in 4 Vermögensklassen geschieden. Besitzer mit Vermögen über Fr. 20,000 fielen für die Unterstützung nicht mehr in Betracht ¹²⁾.

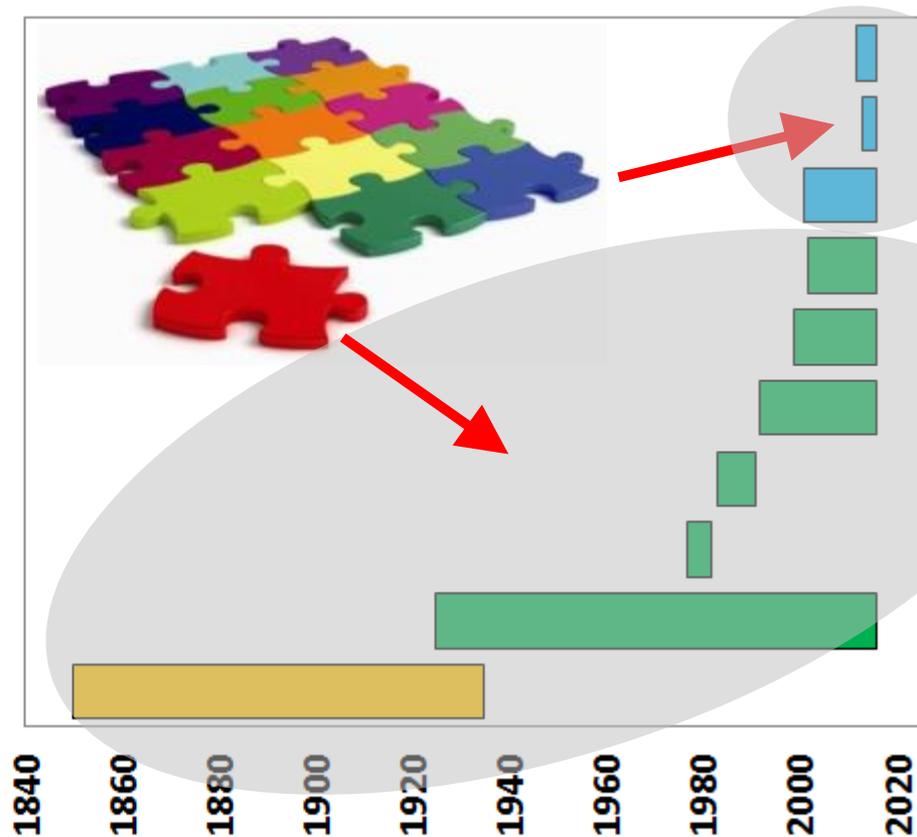
¹⁾ Bericht 1897, S. 46. — Taschenbuch 1899, S. 298.

Data sources in CH

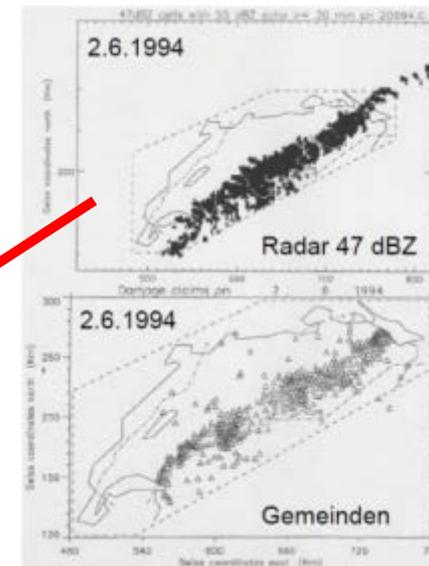
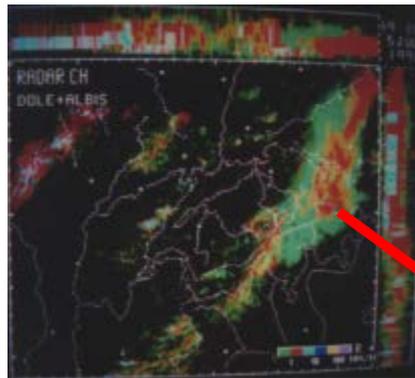
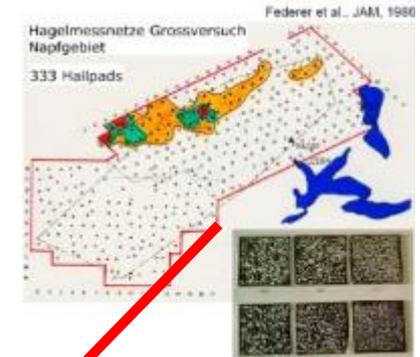
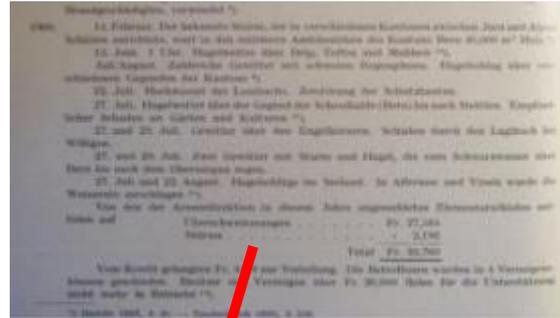
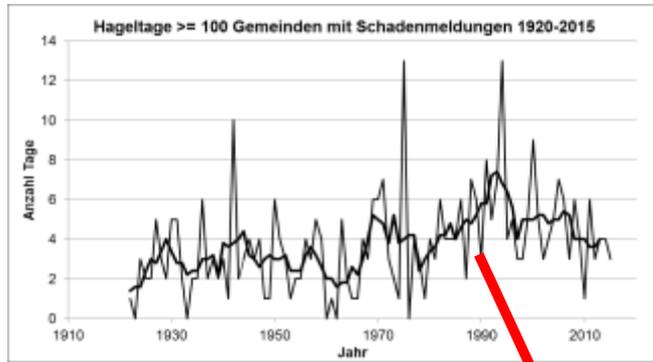


Available hail data sources in Switzerland

- Radar MeteoSwiss dual polarisation
- Observations/Sensors MeteoSwiss
- Radar MeteoSwiss
- Hail observations meteoradar
- Radar meteoradar (MeteoSwiss)
- Radar Schiesser digital (ETH, MeteoSwiss)
- Radar Schiesser analogue (ETH, MeteoSwiss)
- Radar "Grossversuch ETH IV"
- Damage information "Schweizer Hagel"
- Natural Hazards Bd. I and II



Lots of bits and pieces



Once the puzzle is solved..



..we get

- a unique long term hail data set for Switzerland
- a suitable data basis for extreme value statistics
- a good data basis for evaluation of statistical models
- a catalogue of hail events back to 1850



Munich hail storm 12.7.1984

Thank you!

Fragen & Feedback?



www.meteotest.ch