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# Expanding the Territory of Historical Reconstruction: The Study of Frequency and Severity of Hail Storms, Based on 19th and 20th-Century Records from Swiss Insurance Archives

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Switzerland lies almost in the centre of a zone of high frequency of hail storm occurrence, often causing costly damage to agriculture, motor vehicles, the built environment and – consequentially – to insurance companies. Over the last ten years hailstorms and the resulting damage have been discussed, with some noticeable frequency, in the context of recent climate change. The final report of the Swiss National Research Programme No. 31: "Climate Change and Natural Disasters" (NFP 31: Klimaänderung und Naturkatastrophen) concludes that "the number of days with agricultural hail damage has increased". This can be demonstrated from time series of days with severe hail occurrence in Switzerland between 1920 and 2005. Radar observations provide evidence for a doubling of severe hailstorms (on a scale >100 km) within the twenty-year period 1983 to 2003. More recent large-scale damage resulted from hailstorms on 24 June 2002 (causing damage of approx. 250 million CHF on insured risks) and 8 July 2004 (causing loss of 100 mill. on car insurance alone). 2007 was particularly disastrous for crop insurance. The latest OcCC-report on Klimaänderung und die Schweiz 2050 ("Climate Change and Switzerland, 2050") concludes that peasants, house owners, and insurers should prepare for more extreme hailstorms to come if the frequency of synoptic weather situations favouring hailstorms develops along the trend of the last two decades. However, the same report argues that hailstorms can hardly be simulated by existing climate models, because hail occurrence is a local phenomenon. In other words, existing models of global warming cannot predict the effect global change is likely to have on hailstorm patterns (frequency, severity etc.), which is partly due to the limits of existing time series on hailstorm occurrence. For hail, the instrumental period doesn't begin before the 1950s. As early as 1954, Meteo-Swiss meteorologist M. Bider stated that insurance data were more reliable than observations from the existing network of meteorological offices. Some researchers have even suggested that the entire period before radar observation, beginning in the 1980s, should be classified as pre-instrumental. However, it is undoubted that documents kept in the archives of insurance companies provide valuable proxy information on hail storm occurrence for, at least, the pre-1950-period (well back into the 19th century). This paper discusses key problems in dealing with these proxy data (reliability, interpretation and density of records), as well as methodologies that may lead to extend existing time series on hail storm occurrence in Switzerland. As a consequence, this paper suggests that, for some meteorological phenomena, the field of reconstruction from documentary archival sources must be extended well up into the 20th century, which cannot simply and statically be categorized as "instrumental period".