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The Potential of Late Medieval and Early Modern Narrative Sources from the Area of Modern Switzerland for the Climate History of the Fourteenth Century

Abstract: The fourteenth century is known to have witnessed several significant environmental and climatological events. This paper analyses Swiss narrative sources to appraise their potential for further study of medieval historical climatology. It examines a number of sources – dating to the fourteenth, fifteenth, and sixteenth centuries – and their references to these fourteenth-century events.

These sources mention major historical events including the Great Famine of 1315 to 1322, the Black Death, floods, and an extremely cold winter. Although they describe some extreme weather events at length, not all of the texts examined mention all the major events, and there are errors in the dating, as well. Such sources do not regularly refer to the weather in general. A reconstruction of the climate in the area of modern Switzerland relying solely on these historical documents is therefore impossible, but they do provide valuable information on various aspects of fourteenth-century environmental and climate history, especially when correlated with other types of climate reconstructions.


Keywords: historical climatology, famine, epidemic disease, narrative sources, 14th century

1 Introduction

In Europe, the fourteenth century was a period of transition in many ways: modern historical research generally acknowledges how disruptions in social structures and economic fluctuations played a role in the late medieval crisis, but scholars also point to the nascent rise of European prosperity during this period.¹ Not all social classes ben-

¹ See, Bruce M. S. CAMPBELL, *The Great Transition. Climate, Disease and Society in the Late-Medieval World*, Cambridge 2016, pp. 1–2; Peter SCHUSTER, *Die Krise des Spätmittelalters. Zur Evidenz eines sozial- und wirtschaftsgeschichtlichen Paradigmas in der Geschichtsschreibung des 20. Jahrhunderts*, in: *Historische Zeitschrift* 269 (1999), pp. 19–55; Gerrit Jasper SCHENK, *Die Zeit Karls VI. zwischen*

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efited from the growing prosperity; many remained vulnerable to crisis.² During the fourteenth century, European societies had to cope with numerous challenges – the Hundred Years War, for example, and the struggle for power in the Holy Roman Empire between vying dynasties, as well as between the Emperor, the electors, and the emerging towns.³ Peasants revolted repeatedly – most notably in the *Jacquerie* in northern France in 1358 and the English Peasants' Revolt in 1381.⁴ At the same time, the Catholic Church was dealing with a series of crisis of its own – the relocation of the papal residence to Avignon in 1309, the Western Schism after 1378, and heretic movements, such as the Apostles in Lombardy or the Lollards in England.⁵ The most severe calamities of all – even apocalyptic in the eyes of contemporaries – were the demographic declines caused by famines from 1315 to 1322 and by the Black Death in the years 1347 to 1351.⁶

The fourteenth century also represents a critical moment in climate history, for many scholars date the onset of the Little Ice Age to the beginning of this period.⁷ Over the course of the 1300s, a number of notable climate and weather anomalies occurred, which also affected the area of modern Switzerland. Some of these anomalies significantly impacted human society: the famines from 1315 to 1322, for instance, were a consequence of weather-induced harvest failures. Bruce Campbell has convincingly outlined remarkable links between climate and the plague in the middle of the fourteenth century.⁸ Therefore, accounts of the plague in Switzerland are also included into this source sample, although they are not actually weather descriptions per se.

For the area of modern Switzerland, a number of available climate reconstructions based on proxies from natural archives include data on the fourteenth century. Among

Frost und Blüte. Katastrophen, Krisen und Klimawandel im 14. Jahrhundert, in: Jiří FAJT und Markus HÖRSCH (eds.), Kaiser Karl IV. 1316–2016. Erste Bayerisch-Tschechische Landesausstellung. Ausstellungskatalog, Prague 2016, pp. 31–39; Jacques LE GOFF, *L'Europe est-elle née au Moyen Age?*, Paris 2003, p. 205.

2 E.g., Christian PFISTER/ Rudolf BRÁZDIL, Climatic Variability in the Sixteenth-Century Europe and its Social Dimension. A Synthesis, in: Christian PFISTER/ Rudolf BRÁZDIL/ Rüdiger GLASER (eds.), *Climatic Variability in Sixteenth-Century Europe and Its Social Dimension*, Dordrecht, Norwell 1999, pp. 5–53, reprint of *Climatic Change*, Special Issue, 43/1 (1999), pp. 5–53.

3 Ulf DIRLMEIER/ Gerhard FOUQUET/ Bernd FUHRMANN, *Europa im Spätmittelalter, 1215–1378* (Oldenbourg Grundriss der Geschichte 8), Munich 2003, pp. 100–109.

4 See Robert FOSSIER, The great trial, in: ID. (ed.), *The Cambridge Illustrated History of the Middle Ages III, 1250–1520*, Cambridge, New York, Melbourne 1997, pp. 87–90.

5 LE GOFF (note 1), pp. 224–229; Jacques VERGER, Different values and authorities, in: Robert FOSSIER (ed.), *The Cambridge Illustrated History of the Middle Ages III, 1250–1520*, Cambridge, New York, Melbourne 1997, pp. 123–146.

6 Bruce M. S. CAMPBELL, The European Mortality Crises of 1346–52 and Advent of the Little Ice Age, in: Dominik COLLET/ Maximilian SCHUH (eds.), *Famines During the 'Little Ice Age' (1300–1800): Socionatural Entanglements in Premodern Societies*, Cham 2018, pp.19–41.

7 Wolfgang BEHRINGER, *A Cultural History of Climate*, Cambridge, Malden 2010, p. 88; Christian PFISTER et al., Winters in Europe: The fourteenth century, in: *Climatic Change* 34/1 (1996), pp. 91–108.

8 CAMPBELL (note 1).

these are the different methods of researching glacier movements in the Swiss Alps,⁹ varved lake sediments,¹⁰ and tree rings¹¹ from Alpine areas. Narrative sources form the basis of several existing climate reconstructions which include the Late Middle Age. These reconstructions focus on central or western continental Europe.¹²

This paper discusses the value of Swiss narrative sources for questions regarding the environmental and climate history of the fourteenth century. Using fourteenth to sixteenth-century sources, the paper aims to answer the following questions: What climatic events do the narrative sources describe? Which events known from other sources do not appear in these texts? Does the information provided in these sources allow for a climate reconstruction? How do the Swiss narrative sources match climate reconstructions based on natural archives?

Section 2 presents an overview on the results of climate reconstructions based on Swiss natural archives. Section 3 briefly introduces the narrative sources analyzed in the study before discussing these and comparing them with the other data in section 4.

9 Heinz J. ZUMBÜHL et al. (eds.), *Die Grindelwaldgletscher*. Kunst und Wissenschaft, Bern 2016; Hanspeter HOLZHAUSER, Gletscherschwankungen innerhalb der letzten 3200 Jahre am Beispiel des grossen Aletsch- und des Gornergletschers, in: *Gletscher im ständigen Wandel. Jubiläums-Symposium der Schweizerischen Gletscherkommission 1993 Verbier (VS): "100 Jahre Gletscherkommission – 100'000 Jahre Gletschergeschichte"*, Zurich 1995, pp. 101–122.

10 Benjamin Jean-François AMANN/ Sönke SZIDAT/ Martin GROSJEAN, A millennial-long record of warm season precipitation and flood frequency for the North-western Alps inferred from varved lake sediments: implications for the future, in: *Quaternary Science Reviews* 115 (2015), pp. 89–100, doi: 10.1016/j.quascirev.2015.03.002; Mathias TRACHSEL et al., Quantitative summer temperature reconstruction derived from a combined biogenic Si and chironomid record from varved sediments of Lake Silvaplana (south-eastern Swiss Alps) back to AD 1177, in: *Quaternary Science Review* 29 (2010), pp. 2719–2730, doi: 10.1016/j.quascirev.2010.06.026.

11 Ulf BÜNTGEN et al., A 1052-year tree-ring proxy for Alpine summer temperatures, in: *Climate Dynamics* 25 (2005), pp. 141–153, doi: 10.1007/s00382-005-0028-1; Ulf BÜNTGEN et al., Summer temperature variations in the European Alps, A.D. 755–2004, in: *Journal of Climate* 19 (2006), S. 5606–5623, doi.org/10.1175/JCLI39171; Edward R. COOK et al., Old World megadroughts and pluvials during the Common Era, in: *Science Advances* 1/10 (2015), e1500561, doi: 10.1126/sciadv.1500561.

12 Pierre ALEXANDRE, *Le climat en Europe au Moyen Age. Contribution à l'histoire des variations climatiques de 1000 à 1425, d'après les sources narratives de l'Europe occidentale*, Paris 1987; Gabriela SCHWARZ-ZANETTI, *Grundzüge der Klima- und Umweltgeschichte des Hoch- und Spätmittelalters in Mitteleuropa*, Zürich 1998; Rüdiger GLASER, *Klimageschichte Mitteleuropas. 1200 Jahre Wetter, Klima, Katastrophen. Mit Prognosen für das 21. Jahrhundert*, Darmstadt 2013; Emmanuel LE ROY LADURIE, *Histoire humaine et comparée du climat, vol. 1, Canicules et glaciers (XIIIe–XVIIIe siècles)*, Paris 2004; Christian PFISTER et al., The most severe winters of the fourteenth century in Central Europe compared to some analogues in the more recent past, in: Burkhard FRENZEL/ Erik WISHMAN/ Mirjam WEISS (eds.), *Documentary climatic evidence for 1750–1850 and the fourteenth century (Paläoklimaforschung 23)*, Stuttgart 1998, pp. 45–61; PFISTER/ et al. (note 7).

2 Climate of the Fourteenth Century in the Area of Modern Switzerland

In the area of modern Switzerland, the climate of the fourteenth century has been reconstructed based on different natural archives.¹³ Glacier movements are driven by the sum of a variety of climatic factors: Roughly said, cold periods lead to advancing glacier tongues, warm periods to melting glaciers. Moisture also plays a major role. The glaciers respond with a time shift (sometimes even of decades) to changing climatic conditions.¹⁴ Advances of the Aletsch Glacier with a peak in about 1370 suggest the beginning of a cold period around 1300.¹⁵ Similar fluctuations were observed at the Gorner Glacier, where a peak occurred around 1385, and at other glaciers in the Swiss Alps.¹⁶ Christian Pfister argues that the peak of the Gorner Glacier's advance is linked to the chilly summers from 1345 to 1347 and a subsequent period of cool, wet summers until 1370.¹⁷

Another proxy used in climate reconstruction is tree-ring data. Samples collected from trees either close to the timberline in mountainous areas such as the Alps or close to the northern tree limit provide the most useful data. Based on the tree-ring width or density and with the aid of complex statistical measurements and calibration and verification using instrumental measurements of later periods, scholars can calculate the temperatures of the vegetation periods over time.¹⁸ These methods allow not only for the reconstruction of annual series but also for inter-decadal and low frequency (decadal to multidecadal) climate variability. A June-to-September temperature reconstruction based on numerous samples of live trees and historical timber from Canton Valais revealed a cold period starting at the beginning of the fourteenth century with a nadir around 1320. The years 1315 and 1320 were the coldest of that period. Around the middle of the century, temperatures were moderately higher, only

13 For the classification of natural and human-made archives, see Stefan BRÖNNIMANN/ Christian PFISTER/ Sam WHITE, *Archives of Nature and Archives of Societies*, in: Sam WHITE/ Christian PFISTER/ Franz MAUELSHAGEN (eds.), *The Palgrave Handbook of Climate History*, London 2018, pp. 27–36.

14 Hanspeter HOLZHAUSER, *Die bewegte Vergangenheit des Grossen Aletschgletschers*, in: *Blätter aus der Walliser Geschichte* 41 (2009), pp. 47–102, here pp. 55–56.

15 HOLZHAUSER (note 14), p. 94.

16 Hanspeter HOLZHAUSER, *Dendrochronologische Auswertung fossiler Hölzer zur Rekonstruktion der nacheiszeitlichen Gletschergeschichte*, in: *Bulletin für angewandte Geologie* 13 (2008), pp. 23–41, here pp. 26, 32–35.

17 Christian PFISTER, *Weeping in the Snow. The Second Period of Little Ice Age-type Impacts, 1570–1630*, in: Wolfgang BEHRINGER/ Hartmut LEHMANN/ Christian PFISTER (eds.) *Kulturelle Konsequenzen der "Kleinen Eiszeit" / Cultural Consequences of the "Little Ice Age"* (Veröffentlichungen des Max-Planck-Instituts für Geschichte 212), Göttingen, pp. 31–85, here p. 44.

18 Ulf BÜNTGEN/ Jürg LUTERBACHER, *Alpine Klimageschichte vom Hohen Mittelalter bis in die Gegenwart – Was uns Jahrringe und historische Quellen erzählen*, in: *Blätter aus der Walliser Geschichte* 41 (2009), pp. 103–121, here pp. 108–111.

to decrease once again. During the last two decades of the century, the temperatures rose slightly to a low but stable level. Further extraordinarily cold summers occurred in 1360, 1376, 1377, and 1378.¹⁹ Other studies, however, find a period of increased temperatures in the first two to three decades of the century and a period of low temperatures only around 1350. In one of these studies – the reconstruction of June-to-August temperatures of the Alpine area – details reveal that, depending on the positions of the trees, the segment length and inclusion of the tree pith, the results deviate slightly. For instance, larches in Engadine show a temperature decrease in the second decade of the century. The larches in Valais also show this decrease, but with a time-shift of a few years. Deviations between the reconstructed temperature series can be explained by the use of differing calibration methods.²⁰ In addition, the results are based on different tree species in other areas, and such reconstructions always indicate a range of uncertainty.

Tree rings can also be used to reconstruct precipitation. In the Old World Drought Atlas (OWDA), scholars have access to a database of European June-to-August precipitation indices including year-by-year maps for about two thousand years up until 2012.²¹ This reconstruction shows wet summer seasons, particularly between 1314 and 1316, in 1342 and 1343, as well as from 1386 to 1389. Summers were evidently dry from 1304 to 1306, 1318 to 1320, in 1360 and 1361, 1385 and 1393 (see figure 1).

Another reconstruction of summer temperature on the basis of varved sediments from Lake Silvaplana shows a colder period during the second and third decade of the fourteenth century. The temperatures increase after that, only to reach another nadir around the middle of the century. The second half of the century is marked by a increasing temperatures, which fall once again during the last years of the period examined here.²² Varved lake sediments from Lake Oeschinen form the basis of a summer precipitation reconstruction showing that the fourteenth century was a period of increased wetness, with peaks in warm season precipitation around 1325 and towards the end of the century. Moreover, from 1300 to 1380 flooding was more frequent – with a clear peak around the middle of the century.²³ Lake sediments do not provide yearly but rather decadal resolution.²⁴

In summary, according to the reconstructions based on the archives of nature, it can be assumed that a period of lower temperatures began in the early fourteenth century. Temperature decreases occurred mainly during the second and third decade

19 BÜNTGEN et al. (note 11), p. 5615. The exact annual values of the reconstruction are published on the website of the National Oceanic and Atmospheric Administration (NOAA) <ftp://ftp.ncdc.noaa.gov/pub/data/paleo/treering/reconstructions/europe/buentgen2011europe.txt> (09.01.2019).

20 BÜNTGEN et al. (note 11).

21 COOK et al. (note 11); link to the database: <http://drought.memphis.edu/OWDA/Default.aspx>

22 TRACHSEL et al. (note 11), p. 2728.

23 AMANN/ SZIDAT/ GROSJEAN (note 10), pp. 94–96.

24 FRANZ MAUELSHAGEN, *Klimageschichte der Neuzeit, 1500–1900*. Darmstadt 2010, p. 39.

and around the middle of the century. In addition, precipitation was elevated during the second and third decade, as well as in the middle and at the very end of the century. Moreover, floods were more frequent occurrences around the middle of examined period.

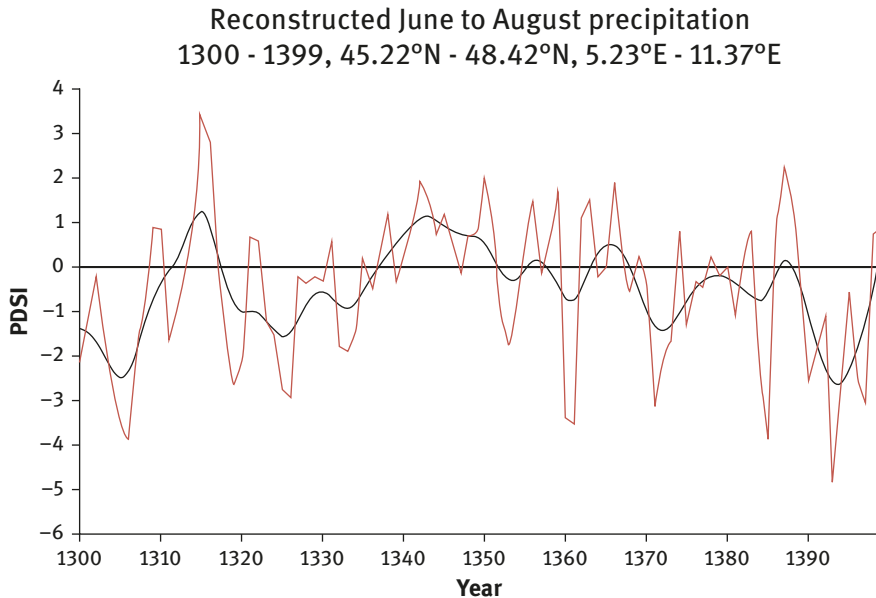


Figure 1: Reconstruction of self-calibrating Palmer Drought Severity Index (PDSI) of June to August precipitation in the area of modern Switzerland derived from Old Worlds Drought Atlas (Cook et al. (note 11) and <http://drought.memphis.edu/OWDA>).

3 Documentary Sources

Depending on the epoch and the area, detailed and reliable documentary sources for climate reconstructions are often available before instrumental measurement started. In England, a fourteenth-century weather diary includes regular observations on temperature, precipitation, and winds over a period of seven years.²⁵ From the sixteenth century onwards, such diaries are also found in continental Europe – for instance

²⁵ Kathleen PRIBYL, The study of the climate of medieval England: a review of historical climatology's past achievements and future potential, in: *Weather* 5/29 (2014), pp. 116–120, doi: 10.1002/wea.2317, here pp. 116–117; William Merle, *Merle's MS. Consideraciones temperiei pro 7 annis*, ed. George James SYMONS. London 1891.

those of Kilian Leib and Wolfgang Haller, the latter provost in Zurich.²⁶ Apart from weather diaries, historiographic narrative texts, such as chronicles or annals, often describe weather conditions and their impacts on nature and society. In cases where a sufficient density of weather-related records can be collected, it is thus possible to develop temperature and precipitation reconstructions using climate indices based on such sources.²⁷ Historical climatologists also reconstruct temperature and/or precipitation derived from information on phenological proxies noted in historical documents, such as grape or grain harvest dates. For the area of modern Switzerland, such series are available for Basel from the late fifteenth century onwards.²⁸ However, the fourteenth-century Swiss sources are more problematic. Few narrative sources are available for the period of this study, and the available sources refer much less frequently and consistently to the weather than those historical sources outlined above. The information that can be gleaned from this body of evidence is limited, even if written sources recorded in the two subsequent centuries are added to the sample – an addition which requires heightened analytical caution.

The fourteenth-century narrative sources for this region present a number of challenges. In fact, there are few truly contemporary accounts of this period; most of texts which relate events from the early fourteenth century were written much later.²⁹ One of the most famous truly contemporary sources is the chronicle by Johannes of Winterthur, a Friar Minor who lived in Basel, Schaffhausen, and later Lindau. It was after 1340 in Lindau that he wrote his chronicle. While the focus of the text is, of course, on politics and religious issues, it also repeatedly describes the weather, floods, epidemic diseases, and famines. Johannes of Winterthur is presumed to have died during the Black Death, which he describes in 1348 before the pestilence reached the area around Lake Constance.³⁰

26 BEHRINGER (note 7), p. 12.

27 E.g., Chantal CAMENISCH, *Endlose Kälte. Witterungsverlauf und Getreidepreise in den Burgundischen Niederlanden im 15. Jahrhundert* (Wirtschafts- Sozial- und Umweltgeschichte 5), Basel 2015; Laurent LITZENBURGER, *Une ville face au climat. Metz à la fin du Moyen Âge 1400–1530*, Nancy 2015; Jan BUISMAN, *Duizend jaar weer, wind en water in de Lage Landen. Onder redactie van Aryan F. V. VAN ENGELN*, vol. 2, 1300–1450, Franeker 1996; Christian PFISTER, *Wetternachhersage. 500 Jahre Klimavariationen und Naturkatastrophen*, Bern 1999.

28 Oliver WETTER/ Christian PFISTER, *Spring-summer temperatures reconstructed for northern Switzerland and southwestern Germany from winter rye harvest dates, 1454–1970*, in: *Climate of the Past* 7 (2011), pp. 1307–1326, doi: 10.5194/cp-7-1307-2011.

29 Regula SCHMID KEELING, *Warum Morgarten? Hintergründe und Erklärungen*, in: *Der Geschichtsfreund* 168 (2015), pp. 21–43, here p. 24.

30 Friedrich BAETHGEN, *Einleitung*, in: ID. (ed.), *Die Chronik Johannis von Winterthur* (Monumenta Germaniae Historica, *Scriptores Rerum Germanicarum*, Nova Series 3), Berlin 1924, pp. VII–XXXVII, here pp. XIX–XXXI; Arno BORST, *Johann von Winterthur. Franziskaner in Lindau*, in: ID., *Mönche am Bodensee: 610–1525* (Bodensee-Bibliothek 5), Sigmaringen 1978, pp. 264–281; Christine PUTZO, *Johannes von Winterthur*, in: *Encyclopedia of the Medieval Chronicle*, vol. 2 (2010), pp. 926–927.

A second source for this study is the anonymous chronicle of the town of Zurich, which starts with the foundation of Zurich in antiquity and ends in 1418, though there are a number of anonymous continuations. From about 1380 onwards, it is considered a contemporary account of events that occurred in and around Zurich.³¹ Committed to parchment around 1415, probably by a lay townsman instead of a cleric, the Zurich chronicle also contains rich descriptions of remarkable weather and other environmental events. Since the author did not copy the most important documents for the history of Zurich into his chronicle, it is unlikely that he had access to the town's chancellery.

The 'Grössere Basler Annalen', written down in 1412 (with a short continuation until 1416), are a rich source for the history of Basel and its surroundings. The annals start in the year 1275; from 1315 onwards, they are considered a reliable – and from 1370 a contemporary – description of events around Basel.³² Basel is also mentioned frequently in the 'Rötteler Chronik,' which was originally the private chronicle of a noble family in the Markgräflerland region adjacent to the Swiss border. Written in the first half of the fifteenth century, it also covers the last quarter of the previous century with occasional references to weather conditions.³³

In 1420, the town council of Bern commissioned a scribe in the local chancellery, Conrad Justinger, to write an official chronicle of the town's history in the preceding centuries. Justinger himself had not been born until around 1370, meaning he had not experienced most of the century personally. However, he drew upon quite reliable sources for his account of the earlier part of the fourteenth century, a period during which Bern expanded considerably despite having to stand its ground against opponents. Justinger's chronicle focuses on politics, especially alliances with different nearby towns, and the military campaigns that resulted in the expansion of Bernese territory.³⁴ From time to time, mainly in his account of the latter half of the fourteenth century, Justinger also mentions events related to the environment.

In the course of the fifteenth century, the Swiss illustrated chronicles developed, in which self-confident towns in the Swiss Confederacy aimed to present their own history in the form of town chronicles.³⁵ Around 1474, Bern commissioned a local scribe, Diebold Schilling, to write a continuation of Conrad Justinger's official

31 Johannes DIERAUER, Einleitung, in: Id. (ed.), *Chronik der Stadt Zürich* (Quellen zur Schweizer Geschichte 18), Basel 1900, pp. IX–XLVI, here pp. IX–XIX; Gabriel VIEHHAUSER, *Chronik der Stadt Zürich*, in: *Encyclopedia of the Medieval Chronicle*, vol. 1 (2010), pp. 431–432.

32 August BERNOULLI, Einleitung, in: Id. (ed.), *Basler Chroniken*, 5, Leipzig 1895, pp. 3–14.

33 *Ibid.*, pp. 105–119; Albrecht CLASSEN, *Rötteler Chronik*, in: *Encyclopedia of the Medieval Chronicle*, vol. 2 (2010), pp. 1300.

34 Gottlieb STUDER, Einleitung, in: Id. (ed.), *Die Berner-Chronik des Conrad Justinger*, Bern 1871, pp. I–XXXVII, here pp. XIV–XXIV; Kathrin JOST, *Konrad Justinger (ca. 1365–1438): Chronist und Finanzmann in Berns Grosser Zeit* (Konstanzer Arbeitskreis für mittelalterliche Geschichte, Vorträge und Forschungen 56), Ostfildern 2011, pp. 195–196.

35 Carl PFAFF, *Die Welt der Schweizer Bilderchroniken*, Schwyz 1991, p. 9.

chronicle.³⁶ Schilling subsequently wrote both the official chronicle of Bern and a private chronicle, the so-called ‘Spiezer Chronik,’ for the noble Rudolf von Erlach around 1484.³⁷ A comparison to Schilling’s official town account, the ‘Grosse Burgunderchronik’ reveals some deviation between the two texts.³⁸

A few years earlier, around 1470, Benedict Tschachtlan and Heinrich Dittlinger, two influential Bernese politicians,³⁹ wrote their own chronicle of Bern; this is a private chronicle rather than an official chronicle like Schilling’s.⁴⁰ The older sections mainly copy Justinger’s text, adding a further source on the Old Zurich War (1440–1450).⁴¹

During the sixteenth century, in the wake of the Protestant Reformation, further chronicles intended to glorify the early history of the Swiss Confederacy and inspire the members of both confessions to preserve their political union. An example of such texts is the *oeuvre* of Aegidius Tschudi of Glarus, a Swiss Humanist. As a young man, Tschudi, himself Catholic, was deeply concerned with confessional reconciliation. With age, however, he became more and more a religious fanatic. His ‘Chronicon Helveticum’ traces the history of the area of the Swiss Confederacy from 1000 to 1470.⁴²

The first printed chronicle in the examined area was the *Kronica von der loblichen Eydgnoschaft, jr harkommen und sust seltzam strittenn und geschichten* by Petermann Etterlin from Lucerne, which appeared in 1507. He used various humanist sources in the composition of his text, such as Hartmut Schedel’s *Weltchronik*.⁴³

Besides these two lengthy, well known historiographical works, there are a number of shorter texts including the ‘Zurich Annals’, which are a compilation of handwritten notes about Zurich in a printed volume of Etterlin’s chronicle. August

36 Regula SCHMID KEELING, *Schweizer Chroniken*, in: Gerhard WOLF/ Norbert H. OTT (eds.), *Handbuch Chroniken des Mittelalters*, Berlin, Boston 2016, pp. 267–300, here p. 281.

37 Urs Martin ZAHND, *Beschreibung der Handschrift*, in: Hans HAEBERLI/ Christoph VON STEIGER (eds.), *Die Schweiz im Mittelalter in Diebold Schillings Spiezer Bilderchronik*. Studienausgabe zur Faksimile-Edition der Handschrift Mss. hist. helv. I. 16 der Burgerbibliothek Bern, Lucerne 1991, pp. 1–6, here p. 1.

38 Jean-Pierre BODMER, *Chroniken und Chronisten im Spätmittelalter* (Monographien zur Schweizer Geschichte 10), Bern 1976, p. 43.

39 Hans A. MICHEL, *Die Chronisten Bendicht Tschachtlan und Heinrich Dittlinger im Bernischen Staatsdienst*, in: Alfred A. SCHMID (ed.), *Tschachtlans Bilderchronik. Kommentar zur Faksimile Ausgabe der Handschrift Ms. A 120 der Zentralbibliothek Zürich*, Lucerne 1988, pp. 27–53.

40 Richard FELLER/ Edgar BONJOUR, *Geschichtsschreibung der Schweiz. Vom Spätmittelalter zur Neuzeit*, vol. 1, Basel, Stuttgart 1962, p. 31.

41 Regula SCHMID KEELING, *Schweizer Chroniken*, in: Gerhard WOLF/ Norbert H. OTT (eds.), *Handbuch Chroniken des Mittelalters*, Berlin, Boston 2016, pp. 267–300, here pp. 279–280; Pascal LADNER, *Die Tschachtlan-Chronik als Geschichtswerk*, in: Alfred A. SCHMID (ed.), *Tschachtlans Bilderchronik. Kommentar zur Faksimile Ausgabe der Handschrift Ms. A 120 der Zentralbibliothek Zürich*, Lucerne 1988, pp. 77–84.

42 FELLER/ BONJOUR (note 40), pp. 312–325.

43 SCHMID KEELING (note 41), pp. 297–298.

Bernoulli, who published these notes in the nineteenth century, argued that the handwriting is typical of the first half of the sixteenth century.⁴⁴ All these texts do not focus on weather, but in some remarkable cases, they give a description of weather conditions – often in the context of the climate’s impacts on society.

4 Events Described

The Great Famine, which began in 1315, is a well-established event in several areas throughout Europe.⁴⁵ During the twelfth and thirteenth centuries, the European population was increasing rapidly, requiring the cultivation of more and more land⁴⁶ and the introduction of new more intensive, specialized methods of agricultural production.⁴⁷ This population pressure and the limits of agricultural yields made these societies vulnerable to external shocks.⁴⁸ A series of inclement years from 1314 to 1317 witnessed increased precipitation, especially in the summers, which caused massive crop failures that drove the price of food up dramatically. The resulting famine sparked a massive demographic decline, as people both starved directly and fell prey to the epidemics that spread easily due to undernourishment.⁴⁹ With regard to the area of modern Switzerland, information on this famine is quite sparse. On the one hand, it is most probable that the area of the Swiss Plateau also suffered since the Holy Roman Empire, France, Scandinavia, the British Isles, and even parts of the Baltic were affected by the crisis. On the other hand, the Alpine parts of Austria – rather self-sustainable areas – seemed to be spared, so it is possible that not all Swiss regions were affected in the same way.⁵⁰

Johannes of Winterthur mentions the famine, but he gives the year 1313 – probably erroneously. In his description, Johannes attributes the famine to many places on

44 August BERNOULLI, Ueber Zürcher Annalen des XIV. Jahrhunderts, in: *Anzeiger für Schweizerische Geschichte* 22/6 (1891), pp. 273–275.

45 E.g., William Chester JORDAN, *The Great Famine. Northern Europe in the Early Fourteenth Century*, Princeton 1996.

46 CAMPBELL (note 1), pp. 58–65; BEHRINGER (note 7), pp. 80–81.

47 Bas VAN BAVEL, *Manors and Markets. Economy and Society in the Low Countries, 500–1600*, Oxford, New York 2010, p. 325.

48 On the concept of vulnerability of society against hunger see Daniel KRÄMER, *Vulnerabilität und die konzeptionellen Strukturen des Hungers. Eine methodische Annäherung*, in: Dominik COLLET/ Thore LASSEN/ Ansgar SCHANBACHER (eds.), *Handeln in Hungerkrisen. Neue Perspektiven auf soziale und klimatische Vulnerabilität*. Göttingen 2012, pp. 45–65; Daniel KRÄMER, ‘Menschen grasten nun mit dem Vieh’. *Die letzte grosse Hungerkrise der Schweiz 1816/17* (Wirtschafts-, Sozial- und Umweltgeschichte 4), Basel 2015, pp. 192–212.

49 Henry S. LUCAS, *The Great European Famine of 1315, 1316, and 1317*, in: *Speculum* 5/4 (1930), pp. 343–377, here pp. 345–352; COOK et al. (note 11), here p. 3.

50 JORDAN (note 45), pp. 7–11.

this earth, but he especially mentions Colmar in Alsatia, where hundreds were buried in two trenches outside the town walls:

1313. Around this time, many people died in an Alsatian city called Colmar due to a dearth, which occurred in many parts of the world. 3,700 people were buried in two hastily prepared trenches outside the city walls. In other nations, 99,000 people perished, to a large extent in Westrich [parts of the Palatinate, Saarland, Lorraine, and Alsatia] and Lorraine.⁵¹

The ‘Grössere Basler Annalen’ give an account of the famine and the considerable number of people starving:

In the year 1317, there was a great dearth in Basel. One viertel [measure of capacity] rye cost 5 pounds, one viertel spelt 3 pounds, one viertel oats 1 pound 10 shilling. Many people perished because they ate all kinds of food.⁵²

It is remarkable that the chroniclers indicate different years: 1313 and 1317. Neither of them suggests that the dearth lasted for more than one year. The ‘Annales Sancti Victoris Gebennensis’ – a chronicle from Geneva – dates the famine to the year 1322.⁵³ This example shows that dating might be a problem even with contemporary accounts. In retrospect, more than two hundred years later, Tschudi knew that this famine had lasted for at least two years. Since the horror of dying people during that crisis was already distant, it is hardly surprising that his description is brief and includes only two rye prices alongside mention of the dearth and the high mortality rate:

In this year 1316, [...] a viertel rye cost 30 shillings in Bern and, in the countryside, 2 pounds. And the dearth lasted until the next year and was followed by a great mortality.⁵⁴

51 1313. *Circiter ista tempore propter karistiam, que invaluerat in pluribus mundi partibus, perierunt nimia pre fame in civitate Alsacie dicta Colmur tot homines, quod in duabus foveis extra muros ad hoc paratis sepulti fuerant XX et XVII centena et in aliis tribus LXXX. XIX centena hominum, qui pro maiori parte de Westerrich et de Lothoringia, ut fertur, extiterunt. Nam illic fames crudelius inhorruerat et, ut eam homines ibidem habitantes effugerent, ad civitatem prenominatam terre fructibus tunc magis exuberantem turmatim confluerunt.* Friedrich BAETHGEN (ed.), *Die Chronik Johans von Winterthur* (Monumenta Germaniae Historica, Scriptores Rerum Germanicarum, Nova Series 3), Berlin 1924, p. 76. English translation by the author.

52 *Anno 1317 was ein grosse thüre zû Basel; galt ein viertel roggen 5 lb, und 1 viertzel korn 3 lb, 1 viertzel habren 1 lb 10s; sturben vil lüten, das sy allerley ossen.* August BERNOULLI (ed.), *Die Grösseren Basler Annalen*. 238–1416, in: In. (ed.), *Basler Chroniken*, 5, Leipzig 1895, pp. 15–50, here p. 18. In other manuscript versions, the people perish because they starve. English translation by the author.

53 Edouard MALLET (ed.), *Fasciculus Temporis. Chronica Monasterii Sancti Victoris Gebennensis?*, in: *Mémoires et documents publiés par la Société d’histoire et d’archéologie de Genève* 9 (1855), pp. 300–309, here p. 305–306.

54 *Dis 1316. jars [...] galt ein viertel roggen zû Bern 30 ß und uff dem land 2 lib., und weret diese thüri bis in das ander jar, und kame in grosser sterbent daruf.* Bernhard STETTLER (ed.), *Aegidius Tschudi, Chronicon Helveticum*, 4 (Quellen zur Schweizer Geschichte, Neue Folge, 1. Abteilung: Chroniken, VII/4), Basel 1983, p. 18. English translation by the author.

Because these events were traumatic for so many people, one would expect the famine to be described in all the narrative sources examined. Surprisingly, this is not the case. For example, the chronicle of the town of Zurich, which is rich with later comparable accounts, does not mention the famine at all.⁵⁵ The same is the case with the ‘Nüwe Casus’ and Benedict Tschachtlan’s chronicle.⁵⁶ It is also remarkable that all the texts remain silent about the reasons for the famine. Sources from other part of Europe prove that extended rainfalls and low temperatures during the summers from 1314 to 1317 destroyed harvests.⁵⁷ A comparison with the aforementioned temperature and precipitation reconstructions based on varved lake sediments and tree rings shows that cold, wet conditions during these summers are also plausible for the area of Switzerland. The history of the glacier advances likewise confirms a cold period during the first decades of the fourteenth century. The evidence of cold and wet weather gathered from climate proxies located in Alpine areas – together with the written sources here presented – suggests strongly that the area of Switzerland was not spared from the Great Famine.

Almost all the texts used for this study include an account of the St. Mary Magdalene’s Flood in 1342 and the subsequent flood in the following year. The magnitude of these events was enormous and reached far beyond the area of modern Switzerland.⁵⁸

According to Johannes of Winterthur, there had been a terrible flood in Hungary along the Danube already in February 1342. In summer of the same year, in what came to be known as the St. Mary Magdalene’s flood, the river burst its banks in the German countries. Finally, according to Johannes’s account, Lombardy was affected by floods in November:

55 Johannes DIERAUER (ed.), *Chronik der Stadt Zürich* (Quellen zur Schweizer Geschichte 18), Basel 1900, pp. 1–271.

56 Eugen NYFFENEGGER (ed.), *Cristân der Kuchimaister, Nüwe Casus Monasterii Sancti Galli*. Edition und sprachgeschichtliche Einordnung (Quellen und Forschungen zur Sprach- und Kulturgeschichte der germanischen Völker 60), Berlin, New York 1974; Pascal LADNER, Textedition, in: Alfred A. SCHMID (ed.), *Tschachtlans Bilderchronik. Kommentar zur Faksimile Ausgabe der Handschrift Ms. A 120 der Zentralbibliothek Zürich*, Lucerne 1988, pp. 139–439.

57 E.g., GLASER (note 12), pp. 64–65.

58 Christian ROHR, *Extreme Naturereignisse im Ostalpenraum. Naturerfahrung im Spätmittelalter und am Beginn der Neuzeit* (Umwelthistorische Forschungen 4), Cologne, Weimar, Vienna 2007, p. 227–228; Martin BAUCH, *Die Magdalenenflut 1342 – ein unterschätztes Jahrtausendereignis?*, in: *Mittelalter. Interdisziplinäre Forschung und Rezeptionsgeschichte*, 4. Februar 2014, <http://mittelalter.hypothesen.org/3016>; Hans-Rudolf BORK/ Arno BEYER/ Annegret KRANZ, *Der 1000-jährige Niederschlag des Jahres 1342 und seine Folgen in Europa*, in: Falko DAIM/ Detlef GRONENBORN/ Rainer SCHREG (eds.), *Strategien zum Überleben. Umweltkrisen und ihre Bewältigung*, Mainz 2011, pp. 231–242; Hans-Rudolf BORK et al., *Spuren des tausendjährigen Niederschlags von 1342*, in: Hans-Rudolf BORK (ed.), *Landschaften der Erde unter dem Einfluss des Menschen*, Darmstadt 2006, pp. 115–120; Hans-Rudolf BORK/ Markus DOTTERWEICH, *Jahrtausendflut 1342*, *Archäologie in Deutschland* 4 (2007), pp. 20–23.

In the year of incarnation of the Lord 1342, the River Danube rose extensively due to snow around the Feast of the Purification of the Blessed Virgin Mary [2 February] [...]. Moreover, in the summer of this year, such a large flood occurred as a consequence of rain and rising waters [...]. Around the Feast of Saint Martin [November 11], excessive rainfalls caused a large flood that affected the city of Padua and other parts of Lombardy [...].⁵⁹

For 1343, the same chronicler reports that a famine in the German countries became so severe that people shook with hunger. According to Johannes, it was continuous rainfall and hail that had devastated the entire harvest and caused the famine. The excessive rainfall caused further flooding in central and northeastern Switzerland, where Lake Constance and several rivers burst their banks in a number of places, flooding towns and the surrounding countryside:

Moreover, in this year [1343], at the beginning of September around the feast of Saint Bartholomew, Lake Constance and surrounding rivers flooded due to continuing and immoderate rainfalls. [...] Moreover, in the summer of this year, the Reuss river flooded the whole city of Lucerne due to a sudden rise of water which occurred because of the excessive rainfalls. [...] Also the small unnavigable river called Töss near Winterthur flooded its surroundings. [...].⁶⁰

For the chronology of the weather events, it is crucial that Johannes mentions both floods – in 1342 and 1343 – in these two passages.⁶¹ Without such a reliable description in one single text of similar events occurring in two subsequent years, these events could easily be conflated as one event.

Moreover, the anonymous annals of Zurich mention the severe flood in same town around 25 July 1343:

Flood in Zurich in the year of the Lord 1343, on the Feast of Saint James [25 July]. The water rose to such an extent that it flew over both bridges, and it also flooded the Sihlfeld [a meadow nearby].⁶²

59 *Anno dominice incarnationis MCCCXLII. Danubius fluvius nivibus resolutis circa festum purificationis beate Marie in tantum excrevit, [...]. [...] Preterea eodem anno in estate in partibus Alemanie tanta fuit facta inundacia ymbrium et excrescencia aquarum, [...]. [...] citra festum sancti Martini, apud civitatem Paduanam et aliis partibus Longobardie propter pluviarum excessum tanta aquarum inundancia excrevit, [...].* BAETHGEN (note 51), pp. 189, 191, 195. English translation by the author.

60 *Item eodem anno [1343] in kalendis Septembris circiter festum sancti Bartholomei propter pluviarum continuitatem et immoderanciam lacus Potannicus et fluvii circumque tantum excreverunt, [...]. Item eodem anno, [...] tempore estivalis in una excrescencia aquarum excessive propter ymbrium immensitatem fluvius Rûsa oppidum Lucernense preterfluens tantum excrevit, [...], Parvus quoque fluvius innavigabilis apud oppidum Wintertur fluens Tôsa nuncupatus tantum inundavit, [...]. Sunt autem ista, quod in una excrescencia importuna et a retroactis temporibus insweta et inaudita Reni fluvii supra memorata homines pericola rerum corporumque metus et terrors horribiles incurrerunt et dampna.* BAETHGEN (note 51), pp. 206, 213, 215. English translation by the author.

61 Regarding the floods in these years, see Andrea KISS, Floods and weather in 1342 and 1343 in the Carpathian Basin, in: *Journal of Environmental Geography* 3–4/2 (2009), pp. 37–47.

62 *Diluvium in Zurich anno ec 1343, in die s. Jacobi, sic quod aqua ascendebat ultra ambis pontes; und gieng uber das Silveld hinweg.* August BERNOULLI (ed.), *Annalen 1308–1389*, in: *Anzeiger für Schweizerische Geschichte* 22/6 (1891), pp. 275–278, here p. 275. English translation by the author.

The chronicle of the town of Zurich depicts the same event in different words and gives some additional information about the destruction of houses and infrastructure:

In the year of the Lord 1343, on the Feast of Saint James [25 July], the water level rose a great deal, and a surge flooded both bridges in Zurich and it also flooded the Sihlfeld. It was necessary to weight down the deluged bridges with “torkelbäume” [heavy vine presses] and large rocks. Hans Müller’s large house and three mills were washed away by the Aa river [Limmat] during the night. The debris impounded the river at the bridge near the Hardturm. While people were trying to clear the debris of the house (from the bridges pillars), the bridge collapsed and was washed away. People went into Fraumünster church by ship.⁶³

In this account, as well, both bridges in Zurich were flooded. People tried to secure them by weighing down the constructions with the massive, heavy logs used in wine presses and with stones. A house and three mills, which were adjacent to small bridges in Zurich, were washed away. Like driftwood, their debris endangered and finally destroyed a bridge further downstream.

The ‘Kleinere Basler Annalen,’ also contain evidence of a flood along the Rhine on 25 July:

In the year of the Lord 1340, on the Feast of the Apostle James [25 July], a Rhine flood occurred, which ripped apart the Rhine bridges in Basel, Laufenburg, Säkingen, Rheinfelden, and Breisach and led to great damage in the countryside.⁶⁴

The chronicler dates the flood to the year 1340. The editor of the annals argued already in the early twentieth century that the events described happened in 1343 and not in 1340.⁶⁵ The ‘Grössere Basler Annalen’ likewise date the flood event to the year 1340.⁶⁶ Of course, the chroniclers from Basel were mistaken – the descriptions of these events which all occurred on the Feast of Saint James are too similar to be a coincidence. Evidence from throughout Europe overwhelmingly suggests that this flood occurred in 1343.

The tree-ring-based OWDA confirms wet weather conditions in 1342 and 1343, whereas the varved sediments from Lake Oeschinen also display an increased flood

⁶³ *Anno domini 1343 jar, an sant Jacobs tag, do wart das wasser so grus, das es Zürich über beid bruggen gieng von dem grossen wütgús, und gieng über das Silveld. Und müt man die bruggen beswaren mit trotböimen und standen vol wassers und mit großen steinen. Und ran das groß hus enweg, und runnent dri müllinen uf der A mit dem hus enweg, das Hans Müllers was, in der nacht, und gestünd an der brugg, dú im Hard an dem turn über gieng. Un do man das hus sleizen wolt, do brach die brugg und ran als enweg. Und für man ouch ze Fröwenmünster in der kilchen mit schiffen.* DIERAUER (note 55), pp. 44–45. English translation by the author.

⁶⁴ *Anno domini 1340 an sant Jacobs tag des zwelfbotten do kame in grosser Rin, der fürt die Rinbrügge enweg ze Basel, ze Löfenberg, ze Sekingen, ze Rinvelden und ze Brisach, und tet grosen schaden in dem lande.* August BERNOULLI (ed.), *Die Kleineren Basler Annalen*. 1308–1415, in: ID. (ed.), *Basler Chroniken*, 5, Leipzig 1895, pp. 55–67, here p. 56. English translation by the author.

⁶⁵ BAETHGEN (note 51), p. 215.

⁶⁶ BERNOULLI (note 52), p. 20.

frequency around the middle of the fourteenth century. Moreover, contemporary witnesses experienced the flooding as a remarkable event. Aegidius Tschudi's account overlaps with that outlined above, adding that, after to the Limmat flood in Zurich, people erected a stone marker in the Niederdorf to remember the height of the water in 1343:

A stone with an inscription was erected on the street in the city of Zurich [Niederdorf] where the tavern "Sternen" is located, for the purpose of commemorating the depth of the water.⁶⁷

One of the most defining disasters of the fourteenth century was the Black Death. The bacterium *Yersinia Pestis*, which caused this epidemic,⁶⁸ originated in Asia and presumably travelled along the Silk Roads to Europe. The plague reached the north shore of the Black Sea in 1347, claiming its first victims in Constantinople in the same year. Shortly thereafter, it had arrived in Sicily and in Marseilles, and it spread from there to the harbor towns of the Adriatic and Tyrrhenian Seas. By the spring of 1348, the Black Death was also raging in the German countries.⁶⁹ The spread of the disease was influenced and considerably favored by the climatic conditions of the epoch and the weather of the respective years.⁷⁰

The sources reviewed for this study describe three phenomena around the Black Death, of which two were linked only indirectly to the plague. As one might expect, the chronicles go into some depth regarding the epidemic's spread and its typical characteristics. Several of the local chronicles also mention flagellants, which were a manifestation of the collective panic that afflicted people faced with this devastating disease and soaring mortality rates.⁷¹ However, flagellants had already appeared before the Black Death hit Europe, and, therefore, this religious movement was not caused by the plague but rather intensified by it.⁷²

Others reacted by looking for scapegoats to blame for the epidemic: The chronicles also report how, in several towns in the Holy Roman Empire, Jews were suspected of having poisoned city wells. These accusations resulted in antisemitic violence and pogroms during this period.⁷³ Of course, pogroms had occurred long before this time

67 *Do ward der stein mit der geschriff an der gassen uff Dorf genant zů Zurich in der statt ufgericht, der bim wirtzhus zum Sternen stat, zů einer gedächtnus wie hoch das wasser domaln geflossen.* STETTLER (note 54), pp. 316–317. English translation by the author.

68 Kirsten I. Bos et al., A draft genome of *Yersinia pestis* from victims of the Black Death, in: *Nature* 478 (2011), pp. 506–510.

69 Klaus BERGDOLT, *Der Schwarze Tod in Europa. Die grosse Pest und das Ende des Mittelalters*, Munich 1994, pp. 33–80.

70 CAMPBELL (note 1), pp. 3–19.

71 BERGDOLT (note 69), p. 107.

72 František GRAUS, *Pest – Geißler – Judenmorde. Das 14. Jahrhundert als Krisenzeit* (Veröffentlichungen des Max-Planck-Instituts für Geschichte 86), Göttingen ²1988, p. 43.

73 BERGDOLT (note 69), p. 107.

and independently of the plague, and the idea of minorities poisoning well water in order to cause epidemic diseases was also not new.⁷⁴

Johannes of Winterthur briefly mentions the Black Death twice in his entry for 1348. He tells how countless people perished in Sicily, Avignon, and Marseilles. In Messina, all the brethren of the Carmelite Convent and the hermits there perished from this unknown disease.⁷⁵

Conrad Justinger also writes about the disease in Bern in 1349, reporting that many days about sixty bodies had to be carried out of the town. The plague also affected those living in the countryside.⁷⁶ Diebold Schilling incorporates this passage into his 'Spiezer Chronik,' as does Benedict Tschachtlan into his account. Furthermore, Schilling and Tschachtlan tell of unmanned ships at sea after their entire crews died of the plague:

And people say that many ship crews died at sea, and, therefore, nobody steered the ships.⁷⁷

Tschudi wrote his chronicle two centuries after the Black Death had ravaged this area; he still has a sense that the Black Death was a unique and remarkable demographic catastrophe that left many towns, monasteries, landscapes, and islands nearly devoid of human inhabitants:

In the same year, 1348, and also in the following, an unprecedented and cruel mortality occurred throughout Christendom. As a consequence of that, [the populations of] many cities, towns, monasteries, countrysides, and island almost became extinct.⁷⁸

The flagellants are also mentioned in some of the narrative sources under consideration here. Justinger tells us that they came to Bern in 1349.⁷⁹ Tschudi describes how they whipped themselves in public, wandering from one place to another. According to Tschudi, this fanatical movement attracted people from all classes and included

74 František GRAUS, *Judenfeindschaft im Mittelalter*, in: Wolfgang BENZ/ Werner BERGMANN (eds.) *Vorurteil und Völkermord. Entwicklungslinien des Antisemitismus*. Freiburg, Basel, Vienna 1997, pp. 35–60, here pp. 40–43, 50–53.

75 BAETHGEN (note 51), pp. 275–276, 279.

76 Gottlieb STUDER (ed.), *Conrad Justinger, Chronicka der Stadt Bern*, in: ID. (ed.), *Die Berner-Chronik des Conrad Justinger, Bern 1871*, pp. 1–291, p. 111.

77 *Ouch seit man für war, daß uf dem mere in etlichen schiffen die lüt gantz ußsturben, daß die schif nieman fürrt*. Urs Martin ZAHND (ed.), *Textedition*, in: Hans HAEBERLI/ Christoph VON STEIGER (eds.), *Die Schweiz im Mittelalter in Diebold Schillings Spiezer Bilderchronik. Studienausgabe zur Faksimile-Edition der Handschrift Mss. hist. helv. I. 16 der Burgerbibliothek Bern, Lucerne 1991*, pp. 455–578, here p. 504; LADNER (note 56), p. 203. English translation by the author.

78 *Des selben 1348. jars und ouch das nechstvolgende daruf was ein mercklicher unerhörter grusamer sterbend in gantzer christenheit, also das vil stett flecken clöster landschafften und inslen schier gar ußsturben*. STETTLER (note 54), p. 345. English translation by the author.

79 STUDER (note 76), p. 111; ZAHND (note 77), p. 504.

noblemen, priests, citizens, countrymen, sundry craftspeople, and wealthy individuals. As the chronicler says, an amazing number of people joined that horde.⁸⁰

Moreover, Justinger and Schilling report that Jews were blamed for poisoning wells all over the world. Obviously, they had doubts about the truth of the story, since they use the term *verlúmdet*, which means “defame.”⁸¹ Tschudi also describes the pogroms which ensued and how many Jews committed suicide by burning their own houses to avoid falling into the hands of the angry mob.⁸²

The major annals from Basel give only a brief account of the events linked to the Black Death. They mention the both flagellants and the epidemic disease. Because the Jews were blamed for the plague, they were burned in Basel, Zurich, and Augsburg, according to these annals.⁸³ There are even narrative texts, such as the anonymous annals of Zurich, that do not mention the Black Death at all. Astonishingly, in the text from Zurich, the author reports that all the Jews in Zurich were burned in 1349 but says nothing else about those years, not even mentioning the plague.⁸⁴ Keeping in mind that these annals were written as additions to a printed edition of Etterlin’s ‘Kronica von der loblichen Eydgnoschaft,’ the author presumably considered it unnecessary to add anything further about the Black Death. However, Etterlin himself describes only the flagellants in his work without explicitly mentioning the Black Death.⁸⁵ Of course Etterlin’s chronicle was committed to paper more than 150 years after these events.

Europe experienced an exceptional winter in 1363/1364. The written records in many places report on the bitter cold temperatures and the bodies of water which froze during this time.⁸⁶

The authors of the chronicle of the town of Zurich and the ‘Klingenberger Chronik’ give an account of extremely low temperatures in this winter, when Lake Zurich froze over so solidly that horses and carriages could travel over it. The ice lasted until Good Friday, 30 March 1364, but had thawed by the evening of Easter.⁸⁷ As Justinger describes – and Schilling as well as Tschachtlan repeat in their accounts – the winter of 1363 was terribly cold all over the German countries, and the icy temperatures

80 STETTLER (note 54), p. 333.

81 STUDER (note 76), p. 111; ZAHND (note 77), p. 504.

82 STETTLER (note 54), pp. 345–347. Regarding the suicide of Jews facing conversion (Kiddush Hashem) see Simha GOLDIN, *Apostasy and Jewish identity in High Middle Ages*. Manchester 2014, pp. 67–68, 79–80.

83 BERNOULLI (note 52), p. 20.

84 BERNOULLI (note 44), p. 275.

85 Eugen GRUBER (ed.), Petermann Etterlin, *Kronica von der loblichen Eytgnoschaft, jr harkommen und sust seltzam strittenn und geschichten* (Quellenwerk zur Entstehung der Schweizerischen Eidgenossenschaft, Abteilung III: Chroniken und Dichtungen 3), Aarau 1965, p. 124.

86 GLASER (note 12), p. 77.

87 Bernhard STETTLER (ed.), *Die sogenannte Klingenberger Chronik des Eberhard Wüst, Stadtschreiber von Rapperswil* (Mitteilung zur vaterländischen Geschichte 53), St. Gallen 2007, p. 125; DIERAUER (note 55), p. 81.

lasted through March.⁸⁸ The anonymous town chronicle apparently contains an error; it copies Justinger's text more or less verbatim but reports that the frost lasted until May.⁸⁹ The 'Kleinere Basler Annalen' also provide details regarding the exact dating, claiming that winter began on 13 December and lasted fourteen weeks until March:

In the year of the Lord 1364 occurred a cold winter. This winter began on the day of Saint Lucius' Feast [3 December] and lasted for 14 weeks without interruption.⁹⁰

This cold winter cannot appear in tree-ring based temperature reconstructions because tree rings only indicate weather conditions during the trees' vegetation period.

There are also other especially cold or warm seasons, thunderstorms, comets, and further remarkable events mentioned only in few sources or only in one source, such as a flood in 1387 in Fribourg. An anonymous chronicle of that town describes the event on the day before Saint Francis (3 October). The Sarine, a river that crosses the city, burst its river banks and destroyed all the mills and some houses and barns:

In this year, 1387, on the eve of the Feast of Saint Francis [4 October], the water rose of the Sarine river that flows across Fribourg to such an extent that all the mills, and many houses and barns, were destroyed.⁹¹

Indeed, also the OWDA and the varved sediments from Lake Oeschinen show particularly wet weather conditions in the years from 1386 to 1389, and again around the end of the century.

As a final example, the summer of 1393 was extremely hot and dry. Justinger tells his readers that it was so dry that the soil was like ash. No rain fell in the period between the time when the barley was sown, nor when it was harvested, milled, baked, or eaten.⁹² The drought is reported in other places in Europe; a number of rivers including the Rhine and Mosel fell to remarkably low levels.⁹³ Once again, the same drought is also visible in the year 1393 in the OWDA.

88 STUDER (note 76), p. 124; ZAHND (note 77), p. 510; LADNER (note 56), p. 210.

89 Gottlieb STUDER (ed.), *Die anonyme Stadtchronik*, in: ID (ed.), *Die Berner-Chronik des Conrad Justinger. Nebst vier Beilagen*, Bern 1871, pp. 314–466, p. 391.

90 *Anno domini 1364 do was ein kalter winter. Und vieng der selbe winter an sant Lucien tag an, und wert 14 wochen ganze an enander, das underlibung ni was.* August BERNOULLI (ed.), *Die Kleineren Basler Annalen. 1308–1415*, in: ID. (ed.), *Basler Chroniken*, 5, Leipzig 1895, pp. 55–67, here p. 57. English translation by the author.

91 *In eodem anno 1387 in vigilia S. Francisci crevit serona aqua juxta Friburgum in tantum, quod omnia molendia, aliquas domos et horrea destruxit.* Gottlieb STUDER (ed.), *Anonymus Friburgensis*, in: Gottlieb STUDER (ed.), *Die Berner-Chronik des Conrad Justinger*, Bern 1871, pp. 467–477, here p. 470. English translation by the author. Pascal Ladner shows that there is no other evidence for this flood. See Pascal LADNER, *Spätmittelalterliche und frühneuzeitliche Freiburger Quellenbelege zu Klima und Meteorologie*, in: *Blätter aus der Walliser Geschichte* 38 (2006), pp. 207–230, here p. 215.

92 STUDER (note 76), p. 178.

93 GLASER (note 12), p. 67; ROHR (note 89), pp. 442–443. Christian Rohr dates the event to the year 1394, although the chronicle gives the year 1393.

5 Conclusion

The selection of narrative sources presented here shows that the texts describe only a part of those extreme weather events that occurred during the period examined. The most obvious case is the Great Famine: given its dramatic nature, one might expect these sources to report on it in more detail. Instead, the few texts which mention the famine at all do not go into great detail or try to explain its causes. Again, the sources seem incomplete regarding the floods in 1342 and 1343. Only Johannes of Winterthur describes events in both years, the other sources focus only on one. Therefore, further analysis will be necessary in order to determine the exact chronology of floods in those years.

This source availability differs from weather sensitive sources in other areas and epochs. Moreover, the comparison of the Swiss narrative sources with the reconstructions based on proxies from natural archives, such as tree rings, varved lake sediments, and glacier movements, suggest information is missing in the written texts. Therefore, the data density will not be sufficient in order to produce classical climate reconstructions with the use of indices only for this area.

Nonetheless, the narrative sources can provide exact dating – given that dating errors are carefully eliminated, for even contemporary chroniclers are sometimes inaccurate in that regard. These exact dates clearly represent an advantage compared to other methods of climate reconstruction. In addition, unlike reconstructions based on natural archives, the narrative sources can provide information on societal impacts.

Furthermore, the assumption of societal teleconnections⁹⁴ between the weather conditions, the output of agricultural production, food availability, and demographic development in the area of Switzerland offers the possibility of combining the results of reconstructions derived from natural archives with the written records. In the case of the Great Famine, this means that when the sparse famine descriptions of Basel, Geneva, and Colmar are linked to the results of reconstructions based on tree-ring data and varved lake sediments, a considerable probability is shown of large areas of today's Switzerland having suffered from wet and cold weather conditions during the summers in question and possibly also endured crop failures like other European areas. In this case, it seems likely that large parts of the population also suffered from famine.

In addition, the comparison between the descriptions in the narrative sources and reconstructions based on proxies from natural archives also shows that, in most cases, documentary data and natural proxies are consistent. This suggests that the narrative sources are highly reliable. The Swiss narrative sources of the fourteenth century obviously develop their full potential for historical climatology when compared to documentary sources of a broader area and to results from reconstructions based on natural archives.

⁹⁴ See chapter 1 in this volume in regard to the societal teleconnections.