

Weather and Weather-Related Natural Hazards in Medieval Hungary III: The Fourteenth Century

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As a third part of the series dedicated to an analysis of documentation of weather events in medieval Hungary,¹ this paper discusses in detail systematically collected weather events and weather-related phenomena documented in the fourteenth century. Earlier studies, based on a much smaller database, have already presented in brief shorter or longer periods of the century.² A new, revised, larger, and more comprehensive set of evidence is examined in this paper. Similar to the previous two papers, in which weather-related evidence concerning the eleventh through thirteenth century were presented, here evidence is discussed concerning the fourteenth-century Hungarian kingdom and (if available) also weather-related information reported for other lands of the Hungarian Crown.

Similarly to the two earlier parts of the series, here flood-related information is mentioned only when the weather background is also mentioned in the documentation. Apart from direct reports on weather, indirect (physical, biophysical) information such as the freezing over of water bodies, low water levels, phenological and harvest-related evidence, locust invasions, and fires are also included. Furthermore, reported bad harvests, high prices, food shortages, and famine, when detectable, are discussed, as preceding and/or ongoing bad

¹ For the first part, related to the eleventh through the twelfth century, see A. Kiss, "Weather and weather-related environmental phenomena including natural hazards in medieval Hungary I: Documentary evidence on the 11th and 12th centuries," *Medium Aevum Quotidianum* 66 (2013): 5-37. The second part deals with weather-related evidence reported for the thirteenth century: A. Kiss, "Weather and weather-related natural hazards in medieval Hungary II: documentary evidence on the 13th century," *Medium Aevum Quotidianum* 68 (2014): 5-46. The present, fourteenth-century, part will be followed by an analysis of fifteenth-century weather-related reports.

² A. Kiss, "Some weather events from the fourteenth century (1338-1358)," *Acta Climatologica Universitatis Szegediensis* 30 (1996): 61-69; eadem, "A 14. századi Magyar Királyság klímájának vizsgálata" (A study of the climatic conditions of the fourteenth-century Hungarian kingdom), *Egyetemi Meteorológiai Füzetek* 10 (1997): 238-241; eadem, "Some weather events in the fourteenth century II (Angevin period: 1301-1387)" *Acta Climatologica Universitatis Szegediensis* 32-33 (1999): 51-64.

weather conditions – apart from other problems – may have seriously affected the rather vulnerable medieval agriculture and economy. Because bad harvests, food shortages, and famine in the fourteenth century are discussed elsewhere in detail,³ here the cases are only mentioned in brief. Compared to the previous centuries, more weather-related information is available, mainly due to a significant increase in the number of detailed source records and their increased availability.⁴

The temporal distribution of the available data is uneven. Most of the direct weather-related information comes from the mid- and late fourteenth century while much less evidence is known from the first decades of the century. Most of the evidence for the spatial distribution of information comes from the north-northeastern part of the kingdom (today's eastern Slovakia), and less from the western and west-central parts of the country (today's western Hungary and western Slovakia; see fig. 1). Additional evidence, mainly narratives about areas west of the kingdom, often describes cases which also refer to Hungary.

Charters (and letters) are the major types of sources for the fourteenth century, providing most of the evidence. Narratives still play some role, but are much less important than in the previous centuries. In one case, indirect information also comes from account books – a source type that had no importance in the high medieval period but gained great significance in the fifteenth century.

³ A. Kiss, F. Piti and F. Sebők, "14. századi rossz termések, élelmiszerhiány, drágaság, (éh)inség – és feltételezhető okaik Magyarországon" (Fourteenth-century bad harvests, food shortages, high prices, famine – and their probable causes in Hungary). *Gazdaságtörténeti Évkönyv* (2016): in press.

⁴ The late fourteenth-century database is not yet complete and other weather-related documentation may come to light in the future. However, because all the charters from the first half of the century have been published in the last 20 years in regesta form by the Szeged Hungarian Medievalistics research group of the Hungarian National Academy of Sciences (see later the references to individual volumes), we have the opportunity to study the material from this period in its entirety.

Fig. 1: Locations in fourteenth-century areas of the Hungarian Crown, mentioned in this paper (present-day placenames in parentheses)



Weather-related information from the beginning of the fourteenth century

"A fulgure et tempestate libera nos Deus" – Introducing a 'thunder'-procession

The late fifteenth-century *Missale Quinqueecclesiensis* by Bishop Zsigmond Ernuszt notes that sometime around the turn of the thirteenth century a procession against lightning and thunderstorms was introduced into the liturgy of the Pécs diocese by Bishop Pál Szécsi (bishop between 1293 and 1306). The procession took place on the day after Corpus Christi (which moves between dates in May and June).⁵ It is an interesting question whether the bishop had any specific practical reasons for this particular type of procession, namely, whether or not the introduction of this new liturgy in Pécs was influenced by potential damage due to an increased number of convective events in this or the preceding period.

A potential parallel (which might have evoked the introduction of this procession type) was mentioned in 1297. The son of Henrik Kőszegi, the western Hungarian oligarch, was struck by a lightning bolt, and as the *Continuatio Vindobonensis* further suggests, many other people (that is, in Austria) were also killed by lightning bolts in that summer.⁶ Unfortunately, there is little further data concerning these events in Hungary or the neighboring areas; the Austrian and Czech narratives – similar to the available Hungarian source evidence – are mostly silent about the character of the summers in this period. In

⁵ T. Fedeles, *Püspökök, prépostok, kanonokok. Fejezetek Pécs középkori egyháztörténetéből* (Bishops, provosts and canons. Chapters of the medieval church history of Pécs), Capitulum 5 (Szeged: Szegedi Tudományegyetem Történeti Intézet, Középkori és Kora Újkori Történeti Tanszék, 2010), 159: *In Nomine Domini amen. In tempore venerabilis in christo Patris et domini domini Pauli dei gracia episcopi Quinqueecclesiensis per eum statutum est ut hic in ecclesia cathedrali et per totam dioecesim secundo die Corporis Christi contra tempestatem et fulgura solennis fiat processio et fidelis grex dominicus devote ieiunans illo die accedat crucem sequens et processionem ad monticulum retro castrum iuxta vineam beate virginis ibi crux alte figatur per plebanos beati Bartholomei. Sed antequam missa processionalis celebretur Suffragia que sequuntur flexis genibus canentur, primo de S. Trinitate. [...] Quibus finitis sacerdos paratus ad missam flexis genibus alta voce dicat: A fulgure et tempestate libera nos Deus. A clero et populo similiter flexis genibus trina vice repetere. Post hec descendant inde processionaliter cum cantu ad ecclesiam Corporis Christi. Ubi missa, que sequitur, cantetur ferialiter per totum de necessitatibus.* Source: *Missale secundum morem alme ecclesie Quinqueecclesiense* (Venice: Johannes Emericus pro Johanne Pape librario Budensi, 1499, L 4a). This fact might have some further importance for us since this type of procession was originally initiated, for example, in the fifth century in the area of Vienna, when the town was hit by various natural hazards, including lightning strikes and earthquakes; and then the procession was introduced later throughout Gallia by the Synode of Orleans in 511. A further interesting point is that this part of the liturgy was introduced in the Hungarian liturgy as a "simple" procession, while the earlier procession was specifically introduced to ask God for protection against lightning and thunderstorms. See Fedeles, *Püspökök*, 165.

⁶ Kiss, "Weather," II, 43.

German areas, however, many convective events were documented in 1293 and 1294, while in many other cases, hot and/or dry summers (usually also richer in convective events) were reported in 1295, 1297, 1301, 1304, and 1305. Moreover, even as early as the 1280s notable convective events were noted in the summers.⁷

Thus, although it is still uncertain whether the higher frequency of convective events and their destructive consequences would have been the reason for introducing the new ceremony, the scarce Austrian (and Hungary-related) evidence, and especially the richer German evidence, raise the possibility that the period of the late thirteenth–early fourteenth century was rich in convective events (for instance, thunderstorms and hail).

Why did Czechs die during the coronation? "Intemperie aeris" in 1301 or 1304

The *Continuatio Zwetlensis* (III) gives an interesting description of the circumstances of King Wenceslaus' coronation in Hungary for the year 1304. The annalist reported that in Hungary many Czechs died due to "bad weather conditions" (*quamplures suorum ex intemperie aeris mortui sunt*).⁸ Apart from this general description, no clearer information is available about these weather conditions. In the same year, the *Continuatio Zwetlensis* (III) mentioned the very low water level of the Danube between Klosterneuburg and Krems.⁹ The problem with this report is that the coronation of Wenceslaus, called King László in Hungary, took place in 1301 (on 27 August).¹⁰

While no information is available concerning the weather in the Czech Lands or the Polish areas for these years, in the German areas the summer of 1301 was rather hot, according to Glaser. The summer of 1304, however, was described as a hundred-year summer with extreme dryness when the spring had also been warm and dry, with very low Danube and Rhine water levels and early

⁷ R. Glaser, *Klimageschichte Mitteleuropas: 1200 Jahre Wetter, Klima, Katastrophen* (Darmstadt: Primus, 2013), 64.

⁸ G. H. Pertz, *Monumenta Germaniae Historica. Scriptores*, vol. 9 (Hannover: Hahn, 1851) (hereafter MGH SS, vol. 9), 660 (*Continuatio Zwetlensis* III): 1304. *Rex Bohemus Wenceslaus cum maxima multitudine armorum Ungariam intrans, muneribus et calliditate, partim etiam potentia, insignia regni Ungarie, hoc est gladium et tunicam beati Stephani regis Ungarie et coronam obtinuit; ubi quamplures suorum ex intemperie aeris mortui sunt.*

⁹ MGH SS, vol. 9, 662 (*Continuatio Zwetlensis* III): *Eo etiam anno Danubius ariditate nimia ita inaruerat, ut inter Neunburgam et Chremsam in tribus locis vadabilem equis et curribus se preberet.*

¹⁰ For the date of the coronation, see, for example, P. Engel, *The Realm of St. Stephen: A History of Medieval Hungary, 895–1526* (London: I.B. Tauris, 2001), 134. Several charters also discuss the coronation question. See, for example, Gy. Kristó, *Anjou-kori oklevéltár* (Angevin Charters), vol. 1 (Budapest–Szeged: Szegedi Középkorász Műhely, 1990), 79, 80, 83, 87, 88, 97.

ripening of grain and grapes.¹¹ This latter information agrees well with the description in the *Continuatio Zwetlensis* and might be related to the extreme heat of the summer of 1304.

1304: Ragusan council reports on great poverty in "Slavonia"/Dalmatia

On 8 May 1304 the Council of Ragusa (today Dubrovnik in Croatia), in a letter to their overlords the Venetians, reported that great poverty and war prevailed in Slavonia at that time.¹² The internal war situation was clearly a major reason for the poverty of the people, but (also referring back to the previous cases) to some extent it may have been related to the situation in Germany, where, as Glaser suggests, this summer was a 100-year summer of heat and drought; basically the entire year was dry and even the spring was warm.¹³

Natural or artificial? Fire in Pozsegavár prior to 1305

A fire in the beginning of the fourteenth century destroyed the Minorite church of Pozsegavár (today Požega in Croatia) and the charters kept there perished. The exact reasons and date of this fire are not known; the negative consequences of the fire (that is, the loss of charters) were mentioned without giving a date. The consequences of this event were further mentioned in charters dated to 1305,¹⁴ 1306,¹⁵ and also 1317.¹⁶ No information is available on the cause of the fire, but – as is apparent in the previous case – 1304 was a very dry

¹¹ Glaser, *Klimageschichte*, 64, 84. For 1304, see also P. 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: École des hautes études en sciences sociales, 1987), 428.

¹² Kristó, *Anjou-kori oklevéltár*, vol. 1, 298. I. K. Tkalčić, *Monumenta spectantia historiam Slavorum meridionalium*, vol. 13: *Monumenta Ragusina. Libri reformationum*. tomus 2. (Zagreb: Academia Scientiarum et Artium ex officina societatis typographicae, 1882), 306: *Die VIII. Madii. In consilio rogatorum aptum, quod propter maximam paupertatem et guerram Sclavonie omnibus illis personis, que debeant cooperire eorum domos de cuppis et non ceperunt ad terminum ordinatum, delongatus fuit terminus omnibus usque ad duos annos, qui cooperire debeant de cuppis sub poena ypp. xxv.*

¹³ Glaser, *Klimageschichte*, 64, 76, 84.

¹⁴ 1305: Kristó, *Anjou-kori oklevéltár*, vol. 1, 375.

¹⁵ Hungarian National Archives (hereafter HNA), DL 86978: 1 Jul 1306; regestum: Gy. Kristó, *Anjou-kori oklevéltár*, vol. 2 (Szeged-Budapest: Szegedi Középkorász Műhely, 1992), 27.

¹⁶ T. Smičiklas, *Codex Diplomaticus Regni Croatiae, Dalmatiae et Slavoniae / Diplomatički zbornik Kraljevine Hrvatske, Dalmacije i Slavonije*, vol. 8 (Zagreb: Academia scientiarum et artium Slavorum meridionalium auxilio regiminis Croat., Dalm. et Slav., 1910), 458; regestum: Gy. Kristó, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 4 (Szeged-Budapest: Szegedi Középkorász Műhely, 1996), 213.

and hot year in the German areas and these weather conditions probably also prevailed in large parts of Central Europe. Due to the political uncertainties of the period, human intervention as a cause of fire cannot be excluded either; especially because, as one can see in the reference to the preceding year in Slavonia, the southern and southwestern parts of the realm were not peaceful areas in those times.

Weather and probable weather-related information in the 1310s

1312 - and the surrounding years: high prices and need?

A charter issued in 1343 describes a purchase and reambulation of several pieces of property,¹⁷ namely, a property in Pechunya (Petenye; today part of Čenčice in northeastern Slovakia) and *villa Chanta* (Csantafalva; today Čenčice) in medieval Szepes (Spiš) county. During the same discussion, earlier charter evidence, dated to 1312, was applied:¹⁸ due to the high prices and need prevailing in that year (*propter anni tunc currentibus /currentis?/ caristiam et sumptus necessarios, venditioni exposuisset*), in order to buy necessary things, the owners had to sell a piece of land (one-third of their Petenye possession).¹⁹

¹⁷ L. Bártfai Szabó, *Oklevéltár a gróf Csáky család történetéhez*, vol. 1. *Oklevelek 1229-1499* (Cartulary to the history of the count Csáky family, vol 1: Charters 1229-1499) (Budapest: Stephaneum, 1919), 90: (included in a charter dated 18 Nov. 1343): ... *in crastino festi beati Johannis baptiste, anno domini Mo CCCo Xllo emanatis, in quibus reperiebatur, quod constituti coram nobis personaliter Dobak ... parte ab una, ac Detricus balistarius parte ab altera, ... quod quandam possessione Pethunye vocatam videlicet duorum aratorum tercie partis dimidiam ipsos contingentem propter anni tunc cernentibus caristiam et sumptus necessarios vendicioni exposuissent, ac eandem Detrico prenotato pro XII marcis fini argenti plene habitis ab eodem cum omnibus utilitativus vendidissent, sibi et heredibus suis perpetuo possidendam*. Based on the original charter, 'currentibus' (or for grammatical correctness: 'currentis') is suggested instead of 'cernentibus'. For more information on earlier studies and further details of the question, see Kiss et al., "14. századi rossz termések."

¹⁸ Regestum: F. Piti, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 27 (Szeged-Budapest: Szegedi Középkorász Műhely, 2007), 474. Although the regestum of this charter has been already published in the relevant (3rd) volume of the same series, no indication was made in it of the "need" question. See Gy. Kristó, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 3 (Szeged-Budapest: Szegedi Középkorász Műhely, 1994), 144-145.

¹⁹ The transcription of the same charter(s), erroneously dating the 1312 charter to 1316, was included in an early (late eighteenth-century) source edition of the *Annalecta Scepusiensis*. M. Schmauk, *Supplementum Analectorum terrae Scepusiensis*, vol. 2 (Szepesváralja [Spišské Podhradie]: Typis typographiae episcopalis, 1889), 93-95. In the original charter (HNA, DL 71639) the year of 1312 is clearly included (for the Hungarian regestum, also clarifying the situation, see Piti, *Anjou-kori oklevéltár*, vol. 27, 474) and thus, the dating (1312) of the Csáky family cartulary is the correct version.

The document is also interesting because ten days before the “need” charter (15 June), at the battle of Rozgony (today Rozhanovce in Slovakia, northeast of Košice) the joint armies of the Amadé family (the northeastern oligarchs) and Máté Csák (the great north-northwestern oligarch) lost to the king’s army.

The seventeenth-century Spiš chronicler, Caspar Hain (also using archival documentation from the town of Lőcse/Levoča), dated a famine that lasted for three years to around the time of the great battle of Rozgony (in 1312).²⁰ Even if the author was writing in the seventeenth century, his information is worth mentioning because he used earlier local narratives and medieval archival evidence in his compilation and, thus, even if the dating of the famine is uncertain, it is an interesting fact that local (written) tradition preserved the memory of a serious food crisis that occurred around the same time. Although one cannot draw conclusions based on the information preserved in a much later narrative, it is worth emphasizing that both the contemporary charter and the early-modern source mentioned the famine in the areas controlled by the Amadé family. The territories of Máté Csák were located west of this area (with the castle of Trenčsén – today Trenčín in northwest Slovakia) neighboring Moravia.

There had been problems earlier in the same area; almost 1.5 years before the battle of Rozgony, in a charter of 25 February 1311, the Palatine Amade – taking their (current) poverty into consideration (*Nos considerantes necessitates, pauperiem et inopiam*) – corroborated the privileges of the nobles of Spiš (originally received during the reign of King Béla IV). Thus, in this case the noble “nation” of a large area had difficulties, not single individuals.²¹

Although the previous report(s) clearly referred to the northern and northeastern territories, other sources (contemporary charters) suggest that need (and even famine) also occurred in other parts of the country in these years. A rather interesting example comes from the central parts of the country, the area that is today Budapest. On exactly the same day (25 July 1312) when the “high prices” charter was issued in the north (see above), the convent of the Dominican sisters – located on the island of the Blessed Virgin (today Margit Island in Budapest) – decided to sell two pieces of their real estate, referring to their poverty and actual current needs (*propter diversas necessitates, inopiam et*

²⁰ J. Bal, J. Förster and A. Kauffman, *Hain Gáspár lőcsei krónikája* (The Chronicle of Caspar Hain), vol. 1 (Lőcse [Levoča]: Reiss József. T. könyvnyomó intézete, 1910-1913), 12: *Anno 1312. König Carolus muste dasz Zipser Hausz verlassen vor den Graffen Matthaues von Trentschin. Da haben die Caschauer, Leutschauer vnd Zipser dem König hülfte gesendet und den Graffen helfen vertreiben, dadurch sie ihre vornembste Privilegia vnd freyheiten erlanget. / Eodem Anno haben die Zipser von König Carolo Ihre Willkühr, so Ihnen noch König Stephanus Anno 1272 ausz sonderbahren genaden verliehen, verbeszert vnd vermehret bekommen. / Zu dieser Zeit war auch 3 Jahr lang so groszer Hunger, das die Menschen einander geschlachtet und gessen auch die Diebe von galgen sind vor Hunger abgerissen worden. Desgleichen war auch under dem Viehe.*

²¹ Original charter: HNA, DL 39640. Regestum: Kristó, *Anjou-kori oklevéltár*, vol. 3, 15-16.

penuriam rerum temporalium).²² The case is even more interesting if one takes into consideration that the Dominican nunnery on Margit Island had been the richest nunnery in the country since the second half of the thirteenth century.²³ The case of the Margit Island Dominican nunnery in Hungary shows interesting parallels to a Czech case. In 1318 the convent of Zbraslav similarly had to sell properties in order to prevent its members from "dying of hunger" – during a famine (due to a poor harvest caused by unfavorable weather conditions) in the Czech Lands.²⁴

Another important piece of corresponding information in the *Chronicon Aulae regiae* is that in 1312 there was a poor harvest in the Czech Lands caused by great heat and drought.²⁵ However, for the German areas Glaser generally suggests cooler and wetter summers for the 1310s. The summer of 1311 was too humid and not really warm; the consequence was again a bad harvest, for example, in the area of Passau and in Landau an der Isar. On 9 September 1311 frost damaged fields and gardens in Augsburg. In 1312 and the following three years bad harvests caused by unfavorable weather conditions resulted in starvation and the deaths of many people.²⁶ Thus, 1312 was a year with bad harvests in the Czech Lands, the German areas (mentioned especially in the south), and Austria. In the German areas it was already (at least) the second bad year that resulted in food shortages, need, and (together with the next three years) starvation. Only the Czech source gives the direct reason (heat, drought) for the bad harvest of 1312. Since this problem also affected Moravia, the immediate neighbor of Hungary at that time, there is a good chance that the same problems were responsible for the need and famine mentioned in Hungarian charters. Moreover, the Czech Lands were seriously affected by food shortages and hunger not only in 1312 but also in 1315 and 1316 (discussed in more detail below).

Another interesting story may also shed some light on the situation that prevailed at that time. According to John of Winterthur, around the year 1313, people in Alsace, hit by severe hunger, decided to find a new homeland in Hungary. The travellers' ship, however, was scuppered by the captain, who said it was better for them to die in the river than to entirely consume the lands of Hungary. Winterthur also added that many people (in Hungary) actually agreed

²² HNA, DL 40341. Regestum: Kristó *Anjou-kori oklevéltár*, vol. 3, 158.

²³ The example of another (formerly) rich and powerful nunnery, the Blessed Virgin Nunnery of Veszprémvölgy (located in Central Transdanubia), yields more information about the general circumstances: in May 1317 the nunnery had to sell one of its properties at Lake Balaton to repair their dormitory, as they were poor due to the injustice of nobles and magnates. HNA, DL 1892. Regestum: Kristó, *Anjou-kori oklevéltár*, vol. 4, 181-182.

²⁴ R. Brázdil and O. Kotyza, *History of Weather and Climate in the Czech Lands I (Period 1000-1500)*. Zürcher Geographische Schriften 62 (Zurich: ETH, 1995), 112.

²⁵ Ibidem, 111.

²⁶ Glaser, *Klimageschichte*, 63, 64, 88.

and praised him.²⁷ Since John of Winterthur was a child around 1313, his information probably comes from memories and/or reflects information he heard from other people. Thus, it is not sure that the story happened in the way he describes it, probably decades later. However, the story clearly has some important elements; it refers to a severe hunger crisis in Alsace that occurred in the early to mid-1310s, and also to the fact that in Hungary the hunger migrants were not particularly welcome. This inhumane reaction, however, also reveals some contemporary problems that prevailed in Hungary at that time. Apart from the feudal anarchy, which had been a large-scale problem in the country for decades already, the great food crisis of the 1310s led to a crisis situation. It may have been less severe than in the west, but still considerable enough to refuse the arrival of more (poor and hungry) people. In Europe generally, a crisis that combined long-term economic stress and repeated bad harvests that were the result of multiannual unfavorable weather conditions may also have affected Hungary negatively.

Locust invasion(s) in the early 1310s? The testimony of Austrian and Italian source evidence

According to the *Annales Foroiulienses* and the *Chronica Anonymus Leobensis*, in summer 1309 there were locust invasions in Carniola, Styria, Istria, and Northern Italy and the *Continuatio Mellicensis* reports the same for Austria for two years.²⁸ Although this time no reference to this locust invasion is mentioned for Hungary, based on the affected locations it is rather likely that this locust invasion also affected the Carpathian Basin. It might be important

²⁷ F. Baethgen, *Monumenta Germaniae Historica. Scriptores rerum Germanicarum*. Nova series III. (Berlin: Weimann, 1924), 76 (*Chronica Iohannis Vitodurani*): (1313.) *Circiter ista tempora 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 prenominantam terre fructivus tunc magis exuberantem turmatim confluerunt. / Tempore eodem famis accidit homines de terris prefatis fugere et ad terram Ungarie tunc fertile et uberem, sterilitatem aliarum terrarum penitus nescientem, properare. Cum autem in magna (sic!) multitudine ad unam navim fluvii Danubii consedissent, ut proficiscerentur ad terram Ungarie, nauta intelligens ipsorum intencionem et iter et insuper perspicuens eos fame prevalida maceratos, confectos et pene consumptos navem subvertit et omnes pariter in profundum Danubii dimergendi eos precipitavit dicens: 'Melius est, quod in hoc fluvio pereant, quam quod terram totam Ungarie depascendo consumerent.' Quod factum inhumanum immo dyabolico perswasum instinctu, dum hominis terrigenos relacione plurimorum pervenisset, nautam celebriter commendabant.*

²⁸ For sources and analysis, see: Ch. Rohr, *Extreme Naturereignisse im Ostalpenraum. Naturerfahrung im Spätmittelalter und am Beginn der Neuzeit* (Cologne-Weimar-Vienna: Böhlau, 2007), 467-468; D. Camuffo and S. Enzi, "Invasioni di cavallette e fattori climatici dal medioevo al 1800," *Bollettino Geofisico* 14/2 (1991): 24-40 (25-26).

information in this respect that great drought was reported in the Czech Lands in 1307.²⁹

Among the hazards that affected mainly the northern part of Italy in 1314, Italian sources further report on another locust invasion. Based on the descriptions, the locusts arrived in Northern Italy in the "usual" way, namely, from the southern regions of the Carpathian Basin.³⁰ This suggests that at the latest in 1314, but probably in 1313, locusts were present in great numbers in the Carpathian Basin. Although no direct information is available on the prevailing weather conditions of these years in the Carpathian Basin, a long dry spell (with heat) is again mentioned in the Czech Lands for 1312.³¹

Fire in Pozsony prior to May 1314

In a charter dated to 1 May 1314, the negative consequences of a fire (when an earlier charter perished) in Pozsony (today Bratislava in Slovakia) is mentioned (*incendio civitatis posonii essent combuste*).³² Because of the complicated situation of those times, it is not clear whether human intervention or weather conditions were more responsible for this event.

Transylvania: wintery weather in early November 1315

In Hungary, up to now the only known direct report for this year is related to the autumn. A charter dated 9 November describes that during a perambulation process in Szomordok, Transylvania (today Sumurducu in Romania, around 15 km northwest of Cluj Napoca, ca. 440 m a.s.l.), in one section the boundaries could not be resettled due to the "wintery weather."³³

²⁹ Alexandre, *Le climat*, 431; Brázdil and Kotyza, *History of Weather*, 110.

³⁰ Camuffo and Enzi, "Invasioni di cavallette," 26-27. This data is also interesting because invasive locusts usually appeared in great numbers during or after dry periods. 1313 was reportedly dry in Northern Italy (Alexandre, *Le climat*, 435).

³¹ Brázdil and Kotyza, *History of Weather*, 111.

³² HNA, DF 227758. Regestum: Kristó, *Anjou-kori oklevéltár*, vol. 3, 331.

³³ HNA, DL 28717: ... et qui fluvius cadit in fluvium Zomordok, et ibi novas metas Ostendissent, quas Magister Gýwla erexerat, qui magister Gýwla praedictus fassus esset, coram eis, qua meta praedicta inter eos esset communis, quorum com(m)etanei circumqu(oque) quae exponendum in nulla meta prohibuerunt. et quia in yemali tempore esset, et metas reformare non potuissent, eundem Johannem deliberavimus, quod alio tempore vellet metas ipsis reambulandas revocaret. Datum in Klus-Monostora, die dominico proximo ante festum beati Martini confessoris, Anno Domini Millesimo trecentesimo decimo quinto... It has to be mentioned that – although the original charter had some gaps – two eighteenth-century transcriptions are also available from 1761 (HNA, DL 73673, 51), and from 1780 (also included under DL 28717). Although the later transcription suggested 1314 for dating the charter (included in a 1418 charter), the style of abbreviation indicates 1315. For the Hungarian regestum (also with a 1315 dating) see: Kristó, *Anjou-kori oklevéltár*, vol. 4, 72-73.

Since according to contemporary legal practices the perambulation had to be documented within some days after the completion of the process, the perambulation itself probably occurred in early November (that is, before 9 November). The winter weather that obstructed the clear identification/settling of the boundary was perhaps connected to frosty (and/or snowy) conditions. Based on the location (elevation and topographical conditions) of the landed possession, it can be stated that winter weather conditions at the beginning of November may have occurred too early, which suggests a cold spell in late autumn.

1315 was a bad year in the neighbourhood of the Carpathian Basin: in central Bohemia, before 25 July 1315, great drought caused a bad harvest, then great rains and floods occurred in Bohemia and Moravia from 25 July onwards, and the same problems were reported for early September in Austria, combined with delayed vintage in the Vienna region. German sources suggest a rather wet May and summer in 1315; moreover, September was particularly wet with long-lasting rainfall that caused the Wertach and Lech rivers to flood.³⁴ In Poland, the late fifteenth-century chronicle writer, Długos, mentions famine in 1315.³⁵ Nevertheless, no information is yet available concerning the late autumn conditions.

Continuous rainfall caused floods in 1316

Without mentioning any specific location, the *Chronicon Aulae regiae* reports on the great abundance of water caused by a continuous downpour (*ex continuatis imbribus*), "just like a deluge" (*more diluvii*), that destroyed buildings, walls, and castles in Austria, Poland, Hungary, and Missonia in the summer of 1316. Great damage occurred: hay and sowings were destroyed, there were great shortages of food and hay, and many people died. According to the same Czech source, this event and food shortage were followed by a severe winter with much snow and very cold weather.³⁶

³⁴ F. Curschmann, *Hungersnöte im Mittelalter. Ein Beitrag zur deutschen Wirtschaftsge-schichte des 8. bis 13. Jahrhunderts*, Leipziger Studien aus dem Gebiet der Geschichte 6/1 (Leipzig: Teubner, 1900), 208-209; see also Glaser, *Klimageschichte*, 84, 88.

³⁵ J. Długos, *Historia Polonica* (Leipzig: Sumptibus Ioannis Ludovici Gleditschii & Mauritii Georgii Weidmanni, 1711) (hereafter HP), vol. 9, 958: *Bellis externis & commotionibus domesticis paulisper in Regno Paoloniae sedatis, fames omni bello trocior Poloniae regiones inuasit. Dum etenim, niuibz ultra solitum terram occupantibus, dies veris superuenissent, fruges terrae mandatae, a calore vernali paludamento niuis opertae, depastae & extinctae sunt. Ex qua coeli inclementia, contagio famis ad vniuersos perueniens, plures ex agrestibus afflixit, plures atrocitate sua confecit, tam senes quam impuberes.*

³⁶ J. Loserth, *Fontes rerum Austriacarum. Scriptores*, vol. 8 (Vienna: Karl Gerold's Sohn, 1875) (hereafter FRA, vol. 1/8) Liber 1, Cap. 128, p. 379 (*Chronica Aulae Regiae*): *Iste annus domini 1316 tot in se pestilentias et miserias continet, quod eas audire auris refugit, mens stupescit; in hoc anno, ut supra diximus, cometa quaedam in parte aquilonari*

More information is available for Styria and Bavaria: in Styria the Mur River destroyed 13 bridges in 1316, while in Bavaria (among other areas) the Salzach River flooded and caused severe damage. Due to several tributaries of the Danube River in Passau, it flooded both the "entirety" of Austria, and also Hungary, where several villages were submerged.³⁷ Similarly to the above description, the text gives the reason for the flood as continuous rainfall/downpours that occurred in the (upper) catchment area of the above-mentioned rivers. Presumably the same event, although listed under the year 1317, is mentioned in the *Annales Mellicenses*.³⁸ The *Continuatio Zwetlensis* (III) speaks generally about a great flood of the Danube caused by rain in 1316.³⁹

Sources mention great rainfalls that caused the devastating summer flood events in large parts of Central Europe, including Hungary. However, based on these sources one cannot say clearly whether or not the summer was similarly rainy in Hungary. The floods that occurred there might have been mainly the result of extraordinary rainfall in the upper catchment areas of rivers arriving in Hungary from the west.

apparuit, quae disponente deo plurima pericula nuntiavit; aestatis namque tempore contra naturam huius temporis facta est ex continuatis imbribus tam copiosa aquarum habundantia, quod more diluvii in locis pluribus subverteret aedificia, muros et castra. In Austria, Polonia, Ungaria et Misna de hoc diluvio omnium hominum quaerimonia nuntiabat infinita pericula esse facta. See also: E. Pautsch, "Elementarereignisse in den erzählenden österreichischen Geschichtsquellen des 14. und 15. Jh.," unpublished dissertation (Vienna: University of Vienna, 1953), 57-58; Brázdil and Kotyza, *History of Weather*, 111; Rohr, *Extreme Naturereignisse*, 223-225.

³⁷ J. Zahn, *Anonymi Leobensis Chronicon* (Graz: Leuschner&Lubensky, 1865), 33-34. See also Pautsch, "Elementarereignisse," 57-58; C. Weikinn, *Quellentexte zur Witterungsgeschichte Europas von der Zeitwende bis zum Jahre 1850. Hydrographie*, Teil 1: *Zeitwende-1500* (Berlin: Akademie Verlag, 1958), 177. Glaser, *Klimageschichte*, 65 also mentions the heavy rainfall and floods (e.g., three times on the Danube in May and June; flood damages on the Elbe in Thuringia) and in the South German areas.

³⁸ MGH SS, vol. 9, 511. There is no agreement in this question in the available scientific literature: while Pautsch, "Elementarereignisse," 59, or Brázdil and Kotyza, *History of Weather*, 112, do not mention any flood for 1317 (i.e., connect it to the 1316 flood events), Rohr, *Extreme Naturereignisse*, 225 – besides the 1316 flood events – clearly mentions it as a separate flood, dated to 1317; see also Weikinn, *Quellentexte*, 177. As the *Annales Mellicenses* do not mention any flood in 1316, it seems more likely that the source still referred to the great 1316 flood events. However, it is also true that the winter of 1317 was very hard, and – combined with rapid melting – after hard winters the probability of a destructive (e.g., spring) flood event is higher than in normal years. Thus, despite the probable one-year misdating of the *Annales Mellicenses*, the possibility remains that after the devastating 1316 flood events another flood also occurred in 1317.

³⁹ MGH SS, vol. 9, 666: *1316. Item rex Fridericus stiuram a civibus de omnibus que habebant, sub iureiurando accepit; et inundatio maxima Danubii ac omnium fluviorum, tam ex pluviis quam eruption venarum terre, quam nix maxima et nimis diuturna subsecuta omnia sata destruxit.*

The southwestern military campaign: a hard winter on the Sava – in early 1314 or 1317?

A charter dated 1323 reports on the military campaign of King Charles (Robert) I against the Serbian king either in early 1314 or 1317.⁴⁰ Besides the attacks of the soldiers of the Serbian King Uroš, it blames the hard/cold winter weather conditions for the difficulties the Hungarian army had when it crossed the Sava River.⁴¹

Although no information is currently available concerning the weather conditions in Central Europe in the winter of 1314, quite a detailed picture can be drawn for the famous hard winter of 1317. According to the *Continuatio Zwetlenses*, the rains and flood(s) of 1316 were followed by great snow and all the sowings were diminished; this was followed by unheard-of hunger and land infertility in the next year (1317).⁴² Similar information appears in the Czech *Chronicon Aulae Regiae*, which refers to a large area that also includes Hungary.⁴³ In the Czech Lands, the winter of 1316-1317 began on 20 November. It was rather hard with great frosts and much snow in the Czech Lands as well as in Austria. The snow cover in the Czech Lands lasted until late March; this hard winter and the bad harvests of 1316 and 1317 resulted in high prices and intensified hunger.⁴⁴ Similarly, famine is mentioned by the late

⁴⁰ HNA, DL 1884. According to P. Engel, "Az ország újraegyesítése. I. Károly küzdelmei az oligarchák ellen 1310–1323" (The unification of the country. Fights of King Charles I against the oligarchs 1310-1323), *Századok* 122 (1988): 89-146, 115, this military campaign and the Sava crossing took place in 1317, but Kristó, with a rather convincing argument, suggests early 1314 as the most possible date, but definitely not 1317. See Gy. Kristó, *Háborúk és hadviselés az Árpádok korában* (War and warfare in the Arpadian Period) (Szeged: Szegedi Középkorász Műhely, 2003), 311, 329.

⁴¹ Part of the charter is published in: I. Nagy and Gy. Tasnádi, *Anjoukori okmánytár / Codex Diplomaticus Hungaricus Andegavensis*, vol. 2 (Budapest: Magyar Tudományos Akadémia, 1881), 6: ... *difficilis transitus fluvii Zave per algorem hiemalis temporis opposito ac resistente nobis exercitu dictorum Sclavorum gentis in litore seu portu transitus processum nostrum retardaret*. For a regestum of the entire charter (HNA, DL 2884), see Gy. Blazovich and L. Géczi, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 7 (Budapest-Szeged: Szegedi Középkorász Műhely, 1991), 48-49.

⁴² MGH SS, vol. 9, 666 (*Continuatio Zwetlensis* III): 1316. *Item rex Fridericus stiuriam a civibus de omnibus que habebant, sub iureiurando accepit; et inundatio maxima Danubii ac omnium fluviorum, tam ex pluviis quam eruption venarum terre, quam nix maxima et nimis diuturna subsecuta omnia sata destruxit. 1317. Fames et sterilitas inaudita ex nive preteriti anni omnia sata destruyente. Unde siliginis quasi nichil ille annus habuit, tritici vero parum amplius, hordei vero et avene ac estivalium satorum mediocriter, et vini modicum, ita ut rarus esset panis triticeus et siligineus; hordeaceus autem et avenaceus quasi communiter comedebatur.*

⁴³ FRA, vol. 1/8, Liber I, Cap. 128, 379: *Aestatem hanc fluminibus non fructibus fertilem hiemps aspera subsequitur, adducens nivis copiam, frigorisque rigorem.*

⁴⁴ Brázdil and Kotyza, *History of Weather*, 111-112.

fifteenth-century chronicler Długos for Poland and Bohemia for the year 1317.⁴⁵ The winter of 1317 did not pass without some (documented) extreme events in the Byzantine Empire either. In the eastern Mediterranean, flash floods devastated Baalbek (in Lebanon) and very strong north winds were reported in Constantinople.⁴⁶

Town fires reported in 1317: of what origin?

In November 1317 the citizens of Sopron applied to the king to corroborate their old rights, as the charters proving them had perished in a fire in their town. In this case, due to the fundamental importance of possessing these basic documents in such disturbed times, probably the fire had not occurred many years before the date of this request.

Similar to the previous cases, a war situation might be one potential explanation for the fire, as – for example – in the same year, in the summer of 1317, the oligarch Matthew III Csák attacked and burnt down Nitra (because the bishop had excommunicated him).⁴⁷ The event was mentioned in later charters, even many years afterwards.⁴⁸ Nevertheless, the possibly hard cold winter of 1317 may be also counted as another potential cause or background that provided more favorable conditions for the occurrence of a significant fire event.

The Great Famine – also in Hungary?

The great famine in Western and Central Europe is known as probably the most severe famine that occurred in medieval Europe. As noted above in connection with the great flood of 1316 and partly also with the hard winter of 1317, the contemporary Czech source, the *Chronicon Aulae Regis* refers to severe food shortages and hunger in the Czech Lands, Austria, and – among other areas – in Hungary. Some further evidence may provide more information on a possible severe food shortage or even famine that occurred at this time.

In Hungary, at that moment, two examples are available that might be connected to a more severe food shortage. The first case was documented in a charter dated 19 March 1318; on that day, in front of the chapter of Tihany, two

⁴⁵ HP, vol. 9, 964.

⁴⁶ I. G. Telelis, "Climatic fluctuations in the Eastern Mediterranean and the Middle East AD 300-1500 from Byzantine documentary and proxy physical paleoclimatic evidence – A comparison?" *Jahrbuch der Österreichischen Byzantinistik* 58 (2008): 167-207 (206); idem. *Meteorologika fainomena kai klima sto Vyzantio*, tomos 2 (Athens: Akademia Athenon, 2004), 653-654.

⁴⁷ Gy. Kristó, *A vármegyrendszer kialakulása Magyarországon* (The Development of the Counties in Hungary) (Budapest: Magvető, 1988), 51.

⁴⁸ See, e.g., Gy. Kristó, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 6 (Budapest-Szeged: Szegedi Középkorász Műhely, 2000), 191.

noble families declared to take over the lordship of the church of Veszprém (both in person and properties, e.g., in Szöllős), for helping them in the disturbed times, during famine and hunger. They hoped that the church (bishop) of Veszprém would also protect them in the future if problems occurred.⁴⁹

Another rather clear famine case was mentioned in Bihar County (in the eastern part of the Great Hungarian Plain near Transylvania), in a charter dated 20 April 1318. In this charter, a land purchase between a sister and brother is described; the brother, who already owned the neighboring property, had not only supported his sister after her husband died, but also fed and supplied her (and her three children) during the great famine (*tempore famis vallide*).⁵⁰ A charter concerning her dowry had been issued in February 1311. Some time after that her husband died and subsequently the famine occurred – and all these events happened some time before 20 April 1318. Thus, the great famine took place a somewhat longer time after February 1311 and some (unknown) time before the land purchase in mid-April 1318.⁵¹ Moreover, the emphasis on the fact that the brother helped them throughout the famine may suggest a longer duration of this event.

Summing up all the available information, the famine may have occurred between February 1311 and April 1318. It lasted a relatively long time (that is, more than some months, maybe even a year or years). Based on the scarce evidence available, by spring 1318 the famine in the areas noted might have

⁴⁹ I. Nagy, D. Véghely and Gy. Nagy, *Zala vármegye története. Oklevéltár* (History of Zala County. Chartulary), vol. 1 (Budapest: Franklin Társulat, 1886), 146–147 (19 March 1318): ..., quibus hoc tempore impaccato, famis et inedia in fovendis, alendis, nutriendis, defendendis et protegendis, suos fovit, nutrit et protexit, et ut speratur in premissis semper suum laudabile factum, in eorumdem personis recipiet incrementum, cum omnibus ipsorum possessionibus in eadem Zeuleus et in locis aliis habitis et possessis, hereditariis videlicet, emticiis acquisitis et quovis titulo in futurum acquirendis, ad prefatum dominum Stephanum episcopum et ecclesiam suam prenotatam, ac per eundem ad eiusdem successores, ad honorem et honus nobilium iobagionum eiusdem Wesprimiensis ecclesie, se et suos heredes heredumque suorum successores perpetuo et irrevocabiliter inclinasse et annexuisse sunt confessi; ...: regestum: B.L. Kumorovitz, *Veszprémi regeszták 1301–1387* (Regesta from Veszprém, 1301–1387) Magyar Országos Levéltár kiadványai, II. Forráskiadványok 2 (Budapest: Akadémiai Kiadó, 1953), 49. The Szöllős mentioned could be the one formerly located near Veszprém, although another Szöllős near Lake Balaton might also be meant (see Fig. 1).

⁵⁰ HNA, DL 50333: ... et assumpsit idem Stephanus quod hoc tempore famis vallide, ipsam dominam M. [Margaretham] sororem suam cum tribus liberis suis ab alio marito procreatis usque vitam eiusdem domine nutrire alere et sustentare. Regestum: Gy. Kristó. *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 5 (Budapest-Szeged: Szegedi Középkorász Műhely, 1998), 52. For more information, see: Kiss et al., “14. századi rossz termések.”

⁵¹ The last time such terms (i.e., *fames valida*) had been used in Hungarian domestic sources was in connection with the great famine that occurred during and after the First Mongol Invasion, in 1241–1243. See, for example, the previous, thirteenth-century part of this study: Kiss, “Weather,” II, 11–15.

come to an end, unlike in the Czech Lands,⁵² where very high prices and even famine were reported as late as the spring of 1318.⁵³

Weather-related information from the 1320s

1321: Food shortages and bad wine in western and northern communities

In 1321, citizens of the town of Sylva (Zsolna, today Žilina in Slovakia, see Fig. 1) applied to the king for help due to their poverty and need (*inopia, paupertas*). On 12 July the king not only renewed, but also extended their privileges; they did not have to pay tax in the country at four toll places.⁵⁴ Food shortages are also mentioned in this year (without dating), in another charter from western Hungary; in front of the chapter of the St. Michael church in Vasvár (Vas county, western Hungary), the abbot of the prestigious Ják monastery exchanged a piece of arable land of the monastery with a noble family for a vineyard, a mill, and a plough with six oxen. The reasoning is particularly interesting; the abbot, on the one hand, blamed the food shortage caused by the unpeaceful times and, on the other hand, he referred to "other needs" of the monastery and its people (that is, also its servants, serfs, etc.).⁵⁵

Concerning the weather of Central Europe, 1321 was an unfavorable year in the German areas; according to a Braunschweig source, 1321 was a rainy year and the harvest was bad, for example, in Würzburg. Similar reports can also be traced for Northern Italy;⁵⁶ in this year, the summer was similarly rather rainy (with floods in late June). The harvest was poor in the Czech Lands; the yields of crops and seeds were small, probably due to the preceding dry weather

⁵² Brázdil and Kotyza, *History of Weather*, 112.

⁵³ Similar to the early 1310s, problems of religious communities in need were also mentioned around this time. For example, in 1319 a charter describes an exchange of some lands and tithes between the canons of Esztergom and the archbishop of Esztergom in 1319, when the chapter referred to their great need (HNA, DF 248441; CD, vol. 8/2, 217-221: ... *et maxime charitatis viscera circa nos gestans, quos inopia temporalis angebat*). For the year 1319, favorable (mild) weather conditions, a very good harvest, and low prices were suggested for the Czech Lands (see Brázdil and Kotyza, *History of Weather*, 112).

⁵⁴ Charter issued on 12 July 1321: HNA, DF 274688. For the early Latin edition: CD, vol. 11, 508-510: ... *Proinde ad universorum notitiam harum serie volumus pervenire, quod fideles Hospites nostri de Sylva ad nostrae Maiestatis venientes praesentiam humiliter cum Instantia supplicando a nobis postularunt, quod cum ipsi mole paupertatis et inopia plurimum sint afflicti, talem libertatis praerogativam eis concedere dignemur ut ipsi numero, et rerum opulencia possent adaugeri, nobis et Coronae nostrae, debitam fidelitatem semper impensuri*. Regestum: Kristó, *Anjou-kori oklevéltár*, vol. 6, 79.

⁵⁵ HNA, DF 209129: ... *per impaccati temporis neces[... ..] suos fratres ac ad eos pertinentes graviter per defectum victualium et alium necessitatum dicebat*; regestum: Kristó, *Anjou-kori oklevéltár*, vol. 6, 145. For more information see Kiss et al., "14. századi rossz termékek."

⁵⁶ Alexandre, *Le climat*, 442-443. Glaser, *Klimageschichte*, 88.

conditions.⁵⁷ Taking these circumstances into consideration, there is a chance that the food shortage mentioned by the abbot was a real situation and a bad harvest caused by unfavorable weather conditions may also have occurred in Western Hungary near the Austrian border.

1321: Bad wine in Austria and Hungary

As mentioned by the *Continuatio Mellicenses*, in 1321 the wines were rather bad (rotten, smelly, red, and dirty) in both Hungary and Austria (*In Austria et Ungaria provenerunt multa vina ferme putrida, fetida, rubea et immundo*).⁵⁸ These general problems are usually related to fungal diseases caused by too-humid (and cool) conditions during maturation (that is, before the harvest) and fermentation of the wine. The condition, color, smell, and opacity of the wine may all reflect the preceding weather conditions.⁵⁹ Although the text refers to Hungary in general, it is possible that this Austrian source received information mainly from the western part of the country.

The king's escape from broken Bodrog ice: prior to 1322 (between late 1317 and early 1322)?

Some time before 1322 (when the incident was noted in a charter), the ice broke while the Hungarian king was crossing the Bodrog River with his followers; the king's life was saved by Master Ladislaus, who himself almost died. This adventure was shortly commemorated in a donation charter issued on 18 March 1322 (and then also in 1329):

And another case, when with our followers we went to find consolidation on the ice of the river Bodrog, (and) the ice broke because of our followers' weight, the above-mentioned Master Ladislaus, so that our person was not to be threatened in the fearful moment of death, was not afraid, exposing himself to the terrible cruelty of death, and he bravely lifted us up from among the broken pieces of ice....⁶⁰

⁵⁷ Brázdil and Kotyza, *History of Weather*, 112.

⁵⁸ MGH SS, vol. 9, 511. Pautsch, "Elementarereignisse," 60.

⁵⁹ For related scientific literature see A.A. Girtler, "A bor betegségek, I-II" (Wine illnesses). *Mezőgazdasági Szemle* 6/11, 12 (1888): 19-22, 21-29.

⁶⁰ HNA, DL 99892: *Ceterum cum vice quadam super glacies fluvij Budrug consolacionis causa cum quibusdam nostris fidelibus graderemur et ipsa glacies pre gravitare nobiscum existencium in plures partes rupta extitisset prenominate magister Ladislaus, ne in tam formidabili mortis articulo nobis persone periculum immineret, se mortis orrende duricie exponere haud pavescebat, nos de discrimine fracturarum glaciei viriliter erexit et eduxit et ipse in medio ipsi glaciei remansit, cui nisi destra domini faciente virtutem militum hominum auxilium confestim affuisset vitam ibidem terminabat.* See also: Gy. Györffy, "Adatok a románok XIII. századi történetéhez és a román állam kezdetéhez. II" (Data on

The donation charter gives no information on the year of this event. It took place before mid-March in 1322,⁶¹ and presumably after late October 1317, indicated by the fact that the information was not included in a donation charter dated 23 October 1317,⁶² where the merits of the sons of Miklós of the Balogh kindred are described. Since the military campaigns and sieges in which these brothers successfully participated, according to present knowledge, are not completely mentioned in temporal order in the donation charter of 1322,⁶³ one can only say that the event might have occurred in any of the winters (or late autumns-early springs) from 1318 to 1322. Rather little is known about the winters of these years in the neighborhood; nothing peculiar was reported in the Czech Lands, and only the winter of 1322 was reported as cold (with flooding in late February) in the German areas.⁶⁴ However, the fact that the king with his entourage ventured to cross the river on ice suggests a mostly firm ice cover (with varying ice thickness, and/or thawing) – at least on that particular section of the river. At the moment, due to a lack of further comparisons (and also the seriousness of the matter – that is, saving the king's life), the late February 1322 dating seems like a possible option.⁶⁵

the history of the Romanians in the thirteenth century and the origin of the Romanian State II), *Történelmi Szemle* 7/3-4 (1964): 537-568 (549).

⁶¹ Later included in charters dated 1329 and 1347 (HNA, DL 100035): T. Almási, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 13 (Budapest-Szeged: Szegedi Középkorász Műhely, 2003), 94.

⁶² HNA, DL 100035; included in a charter dated 1347.

⁶³ For dates of the military operations see, e.g., Kristó, *A vármegyerendszer*, 34-39; A. Bárány, "Debreceni Dózsa küzdelme a bihari oligarchákkal" (The fight of Dózsa Debreceni with the oligarchs of Bihar), in A. Bárány, K. Papp and T. Szalkai (eds.), *Debrecen város 650 éves. Várostartörténeti tanulmányok* (The town of Debrecen is 650 years old. Studies in urban history), *Speculum Historiae Debreceniense. A Debreceni Egyetem Történelmi Intézet Kiadványai* 7 (Debreceni Egyetem Történelmi Intézet – Debrecen Megyei Jogú Város Önkormányzata, Debrecen, 2011), 75-126 (90-99).

⁶⁴ See Brázdil and Kotyza, *History of Weather*, 112; Glaser, *Klimageschichte*, 76.

⁶⁵ Concerning the king's itinerary, it is only known that on 9 February he was still in Temesvár (and issued two charters there). Then – after the 18 March charter (without location) – the king issued a charter on 21 March in which no location is provided, but from the content of the charter (the king mentions that he promised the corroboration of a testament while in Temesvár) it seems that he was not in Temesvár at that time. He appeared in Temesvár again, issuing a charter on 7 April (Kristó, *Anjou-kori oklevéltár*, vol. 6, 166, 183, 185, 192). It is also interesting that – after acquiring the territories of the heirs of the (former) greatest oligarch, Matthew III Csák, in 1321 – intensive military operations were carried out in Zemplén County against another local noble (Péter, son of Petenye), among others, to take from him the castles of Bodrogszeg (i.e., at the Bodrog River), Borostyán, and Borkó (see Kristó, 1988, 58). Although the dates of the sieges are unknown (they occurred in either 1321 or 1322), one cannot exclude the possibility that – due to the very hard fight (as documented, many warriors died; see Kristó, *A vármegyerendszer*, 58) – the king, some time between mid-February and the end of March, might also have appeared to help ("for consolidation") at the Bodrog River.

Harvest times in 1326

In the year 1326, at least three reports relate to the approximate timing of the cereal harvest; on 25 June, Trau (Trogir in Croatia) citizens in Dalmatia admitted that the (too) small army they had sent to the count of Cordoba was due to a problem with the harvest.⁶⁶ Another piece of harvest-related information comes from the northeastern part of the Great Hungarian Plain; around 13 July, three-and-a-half stooks of harvested grain (that is, still on the stalk) were illegally taken away from a landed possession in Vaja (Szatmár County).⁶⁷ Some days before 19 July, a hundred stooks of winter and spring yields were taken by force from Chakan (Csákány), a landed possession (Somogy County in southern Transdanubia).⁶⁸ Common characteristics of the three cases are that they all happened during or shortly after the harvest time, and the dates provided (ca. mid-July in the northeastern part of the Great Hungarian Plain as well as in southern Transdanubia) are approximately related to an average harvest time. As for parallels in the neighborhood, the summer in the Czech Lands was characterized as dry, but the winter wheat gave a proper harvest.⁶⁹

Fires reported in the 1320s

According to another charter dated 1324, some (based on the text formulation, probably longer) time before, fire had also devastated Esztergom.⁷⁰ Because the fire probably happened several years earlier, it is possible that the event is connected to Matthew III Csák's attack on Esztergom in 1313.⁷¹

Mentioned in the *Chronicon Posoniense* on 28 March 1328, the church (basilica) of the Blessed Virgin burnt down in (Székes)Fehérvár;⁷² the

⁶⁶ CD, vol. 8/6, 98; T. Smičiklas, *Codex Diplomaticus Regni Croatiae, Dalmatiae et Slavoniae / Diplomatički zbornik Kraljevine Hrvatske, Dalmacije i Slavonije*, vol. 9 (Zagreb: Academia scientiarum et artium Slavorum meridionalium auxilio regiminis Croatiae, Dalmatiae et Slavoniae, 1911), 297.

⁶⁷ Gy. Blazovich and L. Géczi, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 10 (Budapest-Szeged: Szegedi Középkorász Műhely, 2000), 185.

⁶⁸ Ibidem, 191.

⁶⁹ Brázdil and Kotyza, *History of Weather*, 113.

⁷⁰ N. Knauz and L.C. Dedek, *Monumenta Ecclesiae Strigoniensis*, vol. 3 (Esztergom: Aegydius Horák, 1924), 48-49.

⁷¹ As mentioned above, Matthew III Csák attacked the Esztergom archbishopric in winter or spring 1312. It is possible that this is the time when the fire occurred; in this case, it would have been at least partly (or mostly) caused by human intervention, although theoretically even in this case the weather conditions could have strengthened the destructive effects of the fire. Related to the dating and further circumstances of the military campaigns, see Engel, "Az ország újraegyesítése," 96-97; Kristó, *Háborúk*, 301-303.

⁷² I. Szentpétery, *Scriptores rerum Hungaricarum. Tempore ducum regumque stirpis Arpadianae gestarum*. 2 vols. (new edition: Budapest: Nap Kiadó, 1999) (hereafter SRH),

fourteenth-century Hungarian chronicle composition and the *Chronicon Monacense* date this event almost one year earlier, to 1 April 1327.⁷³ This information is particularly interesting because after the death of the greatest oligarchs, the entire country was controlled by the king in the early years of the 1320s. By 1327 and 1328 there was peace in Hungary (especially in the central parts). Thus, there is a chance that this event had some (even if indirect) connection to the prevailing weather conditions. Because all the other versions of chronicles of the period date this event to 1327, the early text edition suggested this year as the real date of the fire.⁷⁴ Notable fire events in early spring are usually connected to dry/cold and/or windy periods of unknown duration. From this particular point of view it is interesting that in Zbraslav (Bohemia) strong winds were reported for four weeks after 25 February 1328, and before 5 August great heat and drought were documented.⁷⁵ According to Glaser,⁷⁶ there is no such information for spring 1327 in the German areas, but there was an early warm spring in 1328.

Weather-related evidence from the 1330s

1330 winter: severe weather conditions obstruct finding boundaries in mid-January

The Buda chapter recorded that on 13 January 1330 the perambulators went out to measure and estimate the landed possessions of Ugh (Tiszaug), but because of the severe weather conditions (*propter asperitatem temporis*) it was not possible to define the boundaries (and landmarks) of the land and thus the procedure had to be postponed. Two weeks later, in another charter (and then again on 8 July) it is also added that – due to the severity of the weather – they

vol. 2: 50 (*Chronicon Posoniense*), 91: *Anno Domini M-o CCCXXVIII. feria quarta ante Dominica Palmarum ecclesia Beate Virginis de Alba Regali, quamvis plumbo tecta fuisset, flebiliter est combusta, uno campanuli excepto, quod est supra sacristiam ubi sanctorum reliquie conservantur, quod nemo dubitat eorum meritis remansisse.*

⁷³ SRH, vol. 1, 491-492 (*Chronici Hungarici compositio saeculi XIV*): (S+V) 208. *Anno Domini M-o CCC-o XXVII-o feria quarta ante Dominicam Ramispalmarum ecclesia Beate Virginis de Alba Regali, quamvis plumbo tecta fuisset contra incendium, ut superies memini, tamen flebiliter es combusta et tota plumbea materia in laminas producta de tecto eius a facie ignis vehementis fluxit liquide sicut cera, excepto uno campanili, quod supra sacristiam est, ...* SRH, vol. 2, 86 (*Chronicon Monacense*): *Anno XXVII. Ecclesia Albensis incendio consumitur, sed iterum rex eam restauravit et plumbo tegere fecit. Anno eadem (sic) nascitur ei filius Andreas.*

⁷⁴ See F. Toldy, *Chronicon Hungarorum Posoniense e cod. ms. chartaceo capituli Poson nunc primum editum, quo faustum ...* (Buda [Budapest]: Typographaeum reg. univers., 1852), 55.

⁷⁵ For more details on the analysis of Czech sources, see Brázdil and Kotyza, *History of Weather*, 113.

⁷⁶ Glaser, *Klimageschichte*, 84.

could not recognize the boundaries and that is why the land estimation had to be postponed.⁷⁷ No information is available in the Central European (that is, Czech, German, Austrian) literature about the character of this winter, but in Ferrara it was reportedly rainy and windy.⁷⁸

Great cold and wind obstruct perambulation in mid-January 1336

According to a charter issued some time between 13 and 20 January (a report from the convent of Jászó to the palatine), on 13 January the perambulators went to the lands of Isopo (Izsép; today Vyšný Žipov in Slovakia), Monorous (Monyorós/Tapolymogyorós; today Skrabské in Slovakia) and Felchwa (Felcsicsva; today part of Čičava in Slovakia; see Fig. 1), but due to the great cold, wind, and the fact that one of the parties was not present, it was not possible to carry out the land division. The same information also appears in another charter of the same lawsuit, dated 27 January.⁷⁹ No weather-related evidence is known concerning this winter in the Central European (i.e., Czech, German, Austrian) literature.

1338: Deep snow melted in late February in the Carpathians

After a very long legal process, on 25 February a perambulation of boundaries finally took place in the area of *possessio Trochan*, *possessio Cherosyna* and *Remethe*, in Sáros County. The perambulators were rather unlucky; due to flood of waters and snow in those areas it was not possible to distinguish the properties, to settle landmarks or separate the boundaries.⁸⁰

⁷⁷ HNA, DL 69666: in dictis octavis Epiphanie domini presente magistro Johanne concanonico et testimonio dicti Capituli Budensi ad faciem dicte possessionis Vgh accessissent, et eandem vicinorum et commetaneorum eisdem convocatibus factis per veteres et antiquas metas reambulare voluissent memoratis magister Mark propter asperitatem temporis metas dicte possessionis minime posse se reinvenire asseruisset, et sic ipsam estomacionem fieri nequivissent. ...; regestum: T. Almási and T. Köfalvi, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 14 (Budapest-Szeged: Szegedi Középkorász Műhely, 2004), 25, 43, 242-245.

⁷⁸ Alexandre, *Le climat*, 452.

⁷⁹ I. Nagy and Gy. Tasnádi, *Anjoukori okmánytár / Codex Diplomaticus Hungaricus Andegavensis*, vol. 3 (Budapest: Magyar Tudományos Akadémia, 1883), 244-245: ad nostram accedentes presenciam literas iamdicti conventus de Jazou nobis presentarunt, in quarum tenoribus ipsas possessiones propter grande frigus et nimium flatum ventorum dividere et eciam propter absenciam ipsius Ladislai filii Benedicti non potuisse facere reperimus, ...; regestum: F. Piti, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 20 (Budapest-Szeged: Szegedi Középkorász Műhely, 2004), 61, 74-75.

⁸⁰ CD, vol. 8/4, 356-366 (362-363): ... Tandem idem Capitulum ad ipsas octavas Domino regi rescripsit eo modo: quod praefatus Ioannes de Echy, homo regius, una cum Blasio, Sacerdote de Choro ipsorum Agriensi, et testimonio eorumdem, in dictis quindenis diei cinerum proxime preteritis, ad faciem dictarum possessionum Trochan, Cherosyna, et

There was great (deep) snow in the area, but some time before mild weather arrived, because melting (and or rain) was needed to suddenly release a large amount of water for a great flood event. The *possessio Trochan* (Trócsány; today Tročany in Slovakia) is situated in the eastern part of Sáros County and the perambulated area was mainly located in the vicinity of the *fluvius Topul* (Tapoly; today Topľou in Slovakia). This late February flood and a melting date for a mountainous area in the northern Carpathians might suggest an early arrival of spring. No information on the winter weather is available in the Central European (Czech, German, Austrian) literature.

1338-1340 or longer? The great locust invasion in Hungary and Central Europe

Locust invasions are mainly connected to dry periods and change or alteration of prevailing wind directions and thus they have special importance when discussing weather-related events.⁸¹ Although some of the Central European narratives clearly state that the locust invasion came to their areas from Hungary in 1338, in Hungary mainly non-contemporary reports are available, suggesting partly different dates for the beginning (and end) of the locust plague. Maybe this is an important reason why the great locust invasion of 1338 in Hungary has been only discussed briefly in the scientific literature.⁸²

The main invasion year in most parts of Western and Central Europe and Northern Italy was 1338,⁸³ but local sources only mention locusts later in Northern Italy and Austria, for example, in 1339 and 1340.⁸⁴ Contemporary Czech sources such as Francis of Prague or the *Vita Caroli* state that in Bohemia (also referring to Moravia and Hungary) locusts arrived in 1338;⁸⁵ similarly,

Remethe vocatarum, in Comitatu de Sarus existencium accedendo, easdem presentibus vicinis et cometaneis earum universis, cum omnibus ad eas pertinentibus per veras earum metas et antiquas, infra declarandas, reambulando modo premissis, et quia in illis partibus habundantia aquarum et nivium tunc extitisset, et ipsae aque ac nives ipsas partes nimium prevaluissent, ideo ipsi easdem divis ipsarum possessionum distinguere et per metarum erectiones ab invicem separare nequivissent, sed mete, quibus sepe dicte tres possessiones a vicinariis possessionibus distinguuntur et separantur, I did not find the original of this charter in the DL-DF database of the Hungarian National Archives.

⁸¹ See, for example, D. Camuffo and S. Enzi, "Locust invasions and climatic factors from the Middle Ages to 1800". *Theoretical and Applied Climatology* 43 (1991): 43-73.

⁸² E. Mályusz, "Kronikaproblémák" (Chronicle problems). *Századok* 100/4-5 (1966): 713-762.

⁸³ See, for example, Alexandre, *Le climat*, 462-466; Rohr, *Extreme Naturereignisse*, 468-476; Glaser, *Klimageschichte*, 65-66. In the present short overview only the sources that help a better understanding of the Hungarian situation (thus, mainly the Austrian and Czech ones) are considered in more detail.

⁸⁴ Camuffo and Enzi, "Invasioni di cavallette," 28-31.

⁸⁵ J. Emler, *Fontes rerum Bohemicarum / Prameny dějin Českých*, vols. 3, 4 (Prague: F. Palacký, 1882, 1884), 354, 427. See also Mályusz, "Kronikaproblémák," 727; Brázdil and Kotyza, *History of Weather*, 114.

Austrian sources such as the *Annales Mellicenses*, *Annales Zwettlenses*, the *Continuatio Claustroneoburgensis* (V), the *Continuatio Novimontensis*, the *Chronicon Anonymi Leobensis* and the *Kalendarium Zwettlense* all suggest 1338 as the starting year of the invasion.⁸⁶ The *Annales Matseenses*, for example, also dates the locust invasion for 1338, and adds that locusts were flying through Bavaria.⁸⁷ In the area of Frankfurt and Würzburg, where locusts also came from Hungary in 1338, the great snow that fell in mid-October destroyed all of them.⁸⁸ The fifteenth-century Polish chronicler Długosz mentions that locusts appeared in Polish areas as early as 1335.⁸⁹

A contemporary eyewitness, John of Viktring (living near Klagenfurt) suggested⁹⁰ in 1338 that locusts arrived from the east through Hungary, Poland, Bohemia, Moravia, Austria, Styria, Carinthia, and Carniola up to the Rhine; in July and August they consumed the vegetation. They stayed for three consecutive years and in the eastern-southeastern alpine areas (i.e., Carinthia, South Tyrol) they were still there (in sharply decreasing numbers) in 1341.⁹¹

The *Annales Zwettlenses* mentions the locusts arriving at harvest time from the "marine areas" (*de partibus marinis*) – this would suggest a southerly direction. The *Continuatio Novimontensis*⁹² adds that locusts were especially destructive in the areas over the Danube; they arrived at harvest time and

⁸⁶ See, for example, MGH SS, vol. 9, 512, 671-672, 683, 691, 735. For a complete overview of Austrian sources (with original texts) related to the invasion see: Rohr, *Extreme Naturereignisse*, 468-476.

⁸⁷ MGH SS, vol. 9, 829.

⁸⁸ See, for example, Alexandre, *Le climat*, 462; Glaser, *Klimageschichte*, 65.

⁸⁹ HP, vol. 9, 1035-1036.

⁹⁰ MGH SRG, vol. 36/2, 175 (John of Viktring): *Igitur ex partibus orientis multitudo locustarum eruperat, Bawariam, Franconiam, Sueviam et montana et per Ungariam, Austriam, Styriam, Karinthiam, Carniolam, Forum-Iulii, Lombardiam usque ad litus Reni omnia virencia terre tempore Iulii et Augusti ad fundum et tocus absumpcionis ultimum dispendium dente sevissimo devoravit.*

Ibidem 178: *...Nunc autem per quatuor annos circa eandem partem anni venientes vel de suis latebris exurgentes iuxta maius et minus fructus et terre genimina destruxerunt. In quarto anno, qui iam volvitur, volucris, ciconiis, conicibus, sturnis ac aliis rapacibus et ingluviosis volatilibus devorati in maximo sunt numero diminute, nec tam ferociter ad consumcionem omnium pervenerunt.*

Ibidem 207-209: *Eodem anno (1338) ex partibus orientis multitudo locustarum erupit et per Ungariam, Poloniam, Bohemiam, Moraviam, Austriam, Styriam, Karinthiam, Carniolam, Sueviam, Bawariam, Lombardiam, Forum-Iulii et montana usque ad litus Reni omnia terre virencia tempore Iulii et August dente sevissimo usque ad tocus absumpcionis dispendium devoravit.Per tres annos continus de suis latebris exierunt et circa eandem partem anni iuxta maius et minus terre germina vastaverunt. Quarto anno ab avibus rapacibus, ciconiis, cornicibus, sturnis et ab aliis ingluviosis devorati in reliquum non venerunt.*

⁹¹ Apart from John of Viktring, the Bozen chronicle also suggests 1341 as a closing year of the invasion (for source and discussion, see: Rohr, *Extreme Naturereignisse*, 473).

⁹² MGH SS, vol. 9, 671.

because of them there was no wine in that year (1338); but still, this great locust plague was not followed by need (lack of food or high prices). According to the same source, the problem, combined with a hard winter, continued in the next year, in 1339.⁹³ In 1340, locusts decreased greatly in the alpine area (and probably also elsewhere) due to a rainy period and floods.⁹⁴

No contemporary source is available about this locust invasion in Hungary. Later sources, such as the domestic (mid-fifteenth-century) Georgenberg chronicle dated the appearance and massive damage caused by locusts to the year 1338. From Hungary the locusts continued to Bavaria, Swabia, and Frankonia.⁹⁵ This information was also cited by later chronicles for the the Spiš region (e.g., the seventeenth-century *Chronicon Leibitzeriana*).⁹⁶

According to the *Chronicon Dubnicense* and the *Chronica Hungarorum* by János Thuróczy, the locust invasion took place in Hungary in 1340 and in the two subsequent years.⁹⁷ This text was further utilised in other fifteenth- and sixteenth-century chronicle variations. It is difficult to tell, however, why the invasion in these Hungarian chronicles was dated two years later than in the European literary tradition. E. Mályusz suggested that it was mainly because this part of the text was written by one or more non-contemporary authors.⁹⁸ A rather important piece of information, however, is that the locusts would have come to Hungary from the south, through the *Syrmium* (Szerémség) area in the southern part of the Carpathian Basin. In the early modern and modern period locusts usually entered from the south along the Danube and also from the east-southeast through Transylvania first.⁹⁹

⁹³ MGH SS, vol. 9, 671-672 (*Continuatio Novimontensis*, Codex Novimontensis).

⁹⁴ MGH SS, vol. 9, 672 (*Continuatio Novimontensis*, Codex episcopalis). See also Zahn, *Anonymi Leobensis Chronicon*, 42.

⁹⁵ SRH, vol. 2, 284 (*Chronicon, quod in Monte Sancti Georgii conservatur*): Anno dni MCCCXXXVIII sein dy hewschrecken gewest alhy in Vnger lant, vnd haben gar alles getreide vnd fru(e)chte getilgit, vnd seyn von hynnen geczogen ken Peyern, ken Swoben vnd ken Franken. (In margine add.)

⁹⁶ C. Wagner, *Analecta Scepusii sacri et profane*, pars II (Vienna: Trattner, 1774), 47 (hereafter AS).

⁹⁷ M. Florianus, *Chronica Dubniciense cum codicibus Sambuci Acephalo et Vaticano, cronicisque Vindobonensi picto et Budensi accurate collatum*. Historiae hungaricae fontes domestici I/3. (Leipzig: M. Taizs, 1887), 129: (*Incendia*) Anno domini millesimo tricentesimo quadragésimo, tribus annis subsequentibus, videlicet quadragésimo primo, et quadragésimo secundo infinita multitudo locustarum ingressa est per Syrmiam in omnem partem Hungarie regni transiens turmatim volitando et gradiendo in terra, super omnia virencia in arboribus segetibusque ac graminibus potestatem accipiens, preter folia vinearum. Post triennium autem in circumiacencia regna, scilicet Polonie, Bohemie et Austrie recedentes se diuiserunt usque ad Italiam et Franciam, et sic morte perierunt. See also: E. Galántai and Gy. Kristó, *Johannes de Thurocz: Chronica Hungarorum* (Budapest: Akadémiai Kiadó, 1985), 154.

⁹⁸ Mályusz, "Kronikaproblémák," 727.

⁹⁹ A. Kiss, "A sáskajárások néhány területi és tájtörténeti vonatkozása a Kárpát-medencében" (Some regional and areal consequences of historical locust invasions in the Carpathian

Summing up all the information collected, this major locust invasion arrived in Hungary and caused great damage at the latest in 1338, but probably earlier; locusts usually arrive at least in the autumn prior to a great outbreak.¹⁰⁰ There was a locust invasion in Hungary at least by 1340 and they were quite possibly still present in 1341.¹⁰¹

At present, no weather reports are available for these years in Hungary. In the Czech Lands, the spring and summer of 1337 were very dry and hot, which caused a bad cereal harvest. In the German areas, however, there was a good harvest in that year.¹⁰² Apart from the mid-October frost and snow noted above that destroyed the locusts in the Frankfurt-Würzburg area, the only information from the broader neighborhood in 1338 comes from the northern parts of Italy, where the late August and September were rainy with flooding. Much more is known about the hard and snowy winter of 1339 in Western and West Central Europe; there was snow even in late April in Northern Italy. There were floods in autumn in northern Italy, southern France, and the southern parts of the German territories. In 1340, frosts and then floods were reported in Austria, storms and hail in July and August in northern Italy, and an early snow (in mid-September) in the mountains of Styria.¹⁰³

Fire reports from the 1330s

On 27 April 1331, the king ordered royal judges not to take decisions in any land ownership-related legal matters as the diplomas had perished in the fire that completely destroyed Ják monastery (in western Hungary). This had primarily been due to a military attack.¹⁰⁴

According to the early seventeenth-century (thus, non-contemporary) *Chronica Leibitzeriana*, there was a great fire in Lőcse (today Levoča in

Basin). In *A táj változásai a Kárpát-medencében. Történeti emlékek a tájban* (Landscape changes in the Carpathian Basin. Historical monuments/memorial places in the landscape), ed. Gy. Füleký (Gödöllő: Szent István Egyetem, 2012), 123-132, 127.

¹⁰⁰ See, e.g., Kiss, "A sáskajárások," 123.

¹⁰¹ In this sense, I can accept the starting date of the invasion, but cannot agree with the statement of E. Mályusz, "Kronikaproblémák," 726-728, who counted the locust invasion merely in 1338 and saw the 3-year invasion theory as a mistake of the Franciscan chronicle writer. Based on the descriptions mentioned above it seems more likely that locusts did not appear and disappear within one single year, but stayed in Hungary for (at least) 3 years. Moreover, beyond the information gleaned from contemporary documents, later evidence on locust invasions (see, e.g., Kiss, "A sáskajárások") also suggests that, once arriving in massive numbers, locusts rarely left Hungary within a year – especially in such an intensive invasion as this one.

¹⁰² Brázdil and Kotyza, *History of Weather*, 114.

¹⁰³ Alexandre, *Le climat*, 463-467.

¹⁰⁴ Only a regestum is available: I. Tóth, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 15: 1331 (Budapest-Szeged: Szegedi Középkorász Műhely, 2004), 87.

northeastern Slovakia) in 1332.¹⁰⁵ This information – probably using the same chronicle as a source – was also mentioned by Caspar Hain in his seventeenth-century Spiš chronicle.¹⁰⁶ Since this data is only available in much later, seventeenth-century, documents, it has to be treated with great caution. As for potential Central European weather parallels, mild and windy weather up to 6 January was reported in Bohemia, while the Austrian evidence suggests a hard winter in 1332.¹⁰⁷ In the summer there was great drought and very low water levels in Silesia and Little Poland. A rather warm summer (followed by a good grape harvest) might also have prevailed in Bohemia.¹⁰⁸ The spring of 1332 was similarly warm and dry and there was a good grape harvest in the German areas.¹⁰⁹

In 1338, an accidental fire caused great damage in the street of the Venetians in the town of Nagyvárad (today Oradea in Romania).¹¹⁰ Not much information is available for the neighboring areas about the weather conditions in 1338, but – as noted above – this was the main year of the great locust invasion in Central Europe when the locusts were reportedly coming from Hungary.

Weather and related information from the 1340s

1340 or 1341 (or 1342)? Frost and ice in the North: Lucska, Haruncsár

Although without dating the event, there is also further information about cold and ice (*frigus et gelus*) for five consecutive days (probably in spring?), preserved in a charter dated 19 August 1342 in Sáros County in the mountain area of Luchka (Lucska/Fazekasrét, today Lučka in Slovakia) and Harunchar (Haruncsár, today deserted land in northern Slovakia) close to the castle of Tarkew (Tarkő, today Kamenica in Slovakia), in Sáros County (see Fig. 1).¹¹¹

¹⁰⁵ AS, vol. 2, 47 (*Chronica Leibitzeriana*): MCCCXXXII. *Exarsit Leutschovia, quo incendio pleraque vetera Scepusii monumenta interierunt*. It is interesting to mention that the same 17th-century chronicle also reports on a pestilence, dated by the early-modern source to 1334: MCCCXXXIV. *Tam saeva pestis grassata est, ut vivi vix suffecerint sepeliendi mortuis*.

¹⁰⁶ Bal et al., *Hain Gáspár*, 12: *Anno 1332. ist die Stad Leutsch zum erstenmahl ausgebrandt*. The pestilence mentioned by the *Chronica Leibitzeriana* for the year 1334 is also reported by Caspar Hain: *Anno 1334. Ist so ein gros Sterben gewest, das auch die lebendigen kaum haben können die todten begraben*.

¹⁰⁷ Brázdil and Kotyza, *History of Weather*, 113; Rohr, *Extreme Natureereignisse*, 447.

¹⁰⁸ Brázdil and Kotyza, *History of Weather*, 113–114.

¹⁰⁹ Glaser, *Klimageschichte*, 88. See also Alexandre, *Le climat*, 454.

¹¹⁰ HNA, DL 3171; CD, vol. 8/4, 661–663. Regestum: F. Piti, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia* vol. 22: 1338 (Budapest-Szeged: Szegedi Középkorász Műhely, 2012), 244.

¹¹¹ HNA, DL 68845; L.C. Dedek, *Monumenta Ecclesie Strigoniensis*, vol. 3 (Strigonii [Esztergom]: Typis descriptis Gustavus Buzárovits, 1924), 473–475: *Qui demum reversi, nobis*

Unfortunately, because so far there is no evidence for a royal military campaign towards Poland in 1342 and even previous dates of such a military campaign are subject to debate, no firm conclusions can be drawn on the exact dating of the event.¹¹² Nevertheless, the major Tatar attack on Hungary in 1340 might suggest that a military campaign striking back against the Golden Horde took place afterwards, probably in 1341. In Austria (reported in Styria), from 22 February 1340 great cold occurred and in April and May of 1341 there was also extraordinary cold.¹¹³ Based on all the available data, but mainly based on political-military conditions, the autumn of 1340 is still probably the most likely date for the military campaign and therefore the strong frost event, but neither March-April 1340 and March-April 1341 can be excluded as possible alternatives.¹¹⁴

Rainy weather on 26 May 1342

Rainy weather on 26 May was reported in a charter in 1342 during the reambulation process of *Chalanus* and *Ochalanus* (Biharsalános; today Cenaloș in Romania; see Fig. 1).¹¹⁵ Due to this circumstance, no field survey could take

concorditer retulerunt, quod feria secunda proxima post festum Exaltacionis Sancte Crucis, ..., in dictis possessionibus Luchka et Harunchar habite, comiti Paulo iudici curie serenissimi domini nostri regis, ac vestre magnificencie, pro quibusdam iudiciis in quibus ipsi convicti extitissent, fuissent occupate; et secundo pro eo, quia cum dominus noster rex prelibatus, exercitum in Poloniam misisset contra Thartaros dimicaturum, totus exercitus in eisdem villis descendisset et quinque diebus in ipsis permansisset, eo quod in campo propter frigus et gelu descendere minime potuisset; quo tempore eciam possessiones aliorum nobilium et eciam ecclesie, non solum ipsorum extitissent impeditae et destructe; ac eciam tercio ex eo, quia idem Lucas, cum filiis suis et filii Pauli antedicti, item filii Dominici et Laurencii, filii eiusdem Symonis de eadem Luchka et Harunchar domos, horrea, stabula et alia edificia venderent ad possessiones ipsius domini nostri regis et quorumlibet aliorum, fuissent destructe ac devastate.

¹¹² Discussed in detail by A. Kiss, "Időjárás, környezeti problémák és az 1340-es évek elejének tatár hadjáratai" (Weather, environmental problems and the Tatar military campaigns of the early 1340s). *Hadtörténelmi Közlemények* 125/2 (2012): 483-506. Dhugos, however, did note a certain military campaign of Charles, king of Hungary, in 1342, towards Moldova. See HP, vol. 9, 1063.

¹¹³ Rohr, *Extreme Naturereignisse*, 448.

¹¹⁴ Kiss, "Időjárás," 504: the dating problem is discussed there (and before) in full detail.

¹¹⁵ I. Nagy, *Anjoukori okmánytár / Codex Diplomaticus Hungaricus Andegavensis*, vol. 4 (Budapest: Magyar Tudományos Akadémia, 1884), 226-232: ..., *quod sepedicti filii Douse in prefatis octavis Penthecostes valde mane ad faciem dicte litigiose possessionis cum suis testibus fuissent congregati, prelibatus vero Stephanus filios Bochou cum testibus eiusdem domini Thome woyvode circa meridiem inibi accessisset, et quia eodem die pluviosum tempus affuisset et eciam super facto non exhibicionis dictarum literarum procuratoriarum ac aliarum causarum partes inter se discordassent,...* See also A. Kiss, "Floods and weather in 1342 and 1343 in the Carpathian Basin." *Journal of Environmental Geography* 2/3-4 (2009): 37-47, 39.

place on that day (and probably also on the adjacent days). No parallels (that is, a rainy late May) are currently available in Central European documentation.

1342: A late grain harvest in western Hungary?

On 11 August 1342 (GC:¹¹⁶ 20 August) during the perambulation of *Rendec* (today Ajkarendek), *Ayca* (Ajka) and *Louuld* (Városlőd; see Fig. 1) in central Transdanubia (western Hungary), the owners prohibited others from harvesting the grain on their arable land and taking already-harvested shocks of grain.¹¹⁷ In the seventeenth and eighteenth centuries in the vicinity of the somewhat cooler and wetter Szombathely¹¹⁸ sharing with the harvesters, fixed towards the end of the harvest, usually occurred around mid- to late July. In years with late harvest times, for example in 1697, this date was postponed to early August.¹¹⁹ In this case, by 11 (21) August the harvest was partly collected but still left in the field. Harvesting and then collecting the cereals probably took somewhat longer in the fourteenth century than three or four centuries later.¹²⁰ Still, a mid-August date when harvested cereals had not yet been transported seems to be a late timing for the collection and transportation of harvest. Late grain harvesting work is usually associated with late cereal ripening, which mainly suggests a cool late spring extending into the early and mid-summer conditions.¹²¹

Great snow and extraordinary weather in Zámoly on 15 September 1342

On 15 (GC: 24) September, during a perambulation of landed possessions in *Bahun* (today Báhoň in Slovakia) and *Zamul* (Zámoly; today part of Báhoň in Slovakia), clearing the landmark with *Nogwysta* (Nagyvista; today Vištuk in Slovakia) was also planned, but due to the hard times or weather and the magnitude of snow(!), it was not possible to carry out the legal process nor to measure the debated lands. The proposed date of the perambulation is clearly defined, and – since the previous charter was issued on 1 August and the next

¹¹⁶ According to the Gregorian Calendar (hereafter GC).

¹¹⁷ HNA, DL 66126: *de quindecim iugeris fruguum quindecim capecias similiter prohibuissent quas in eadem terra seminatas inuenissent*.... Regestum: F. Piti, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 26: 1342 (Budapest-Szeged: Szegedi Középkorász Műhely, 2007), 316-317.

¹¹⁸ Szombathely is located approximately 80 km west of Rendek (c. 250-280 m a.s.l.).

¹¹⁹ Szombathely town council protocols, Vas County Archives V/102a. For more information: Kiss, "Flood," 39.

¹²⁰ M. Belényesi, "A földművelés Magyarországon a XIV. században" (Land cultivation in Hungary in the fourteenth century). *Századok* 90/4-6 (1956): 517-555.

¹²¹ See, for example, A. Kiss, R. Wilson and I. Bariska, "An experimental 392-year documentary-based multi proxy (vine and grain) reconstruction of May-July temperatures for Kőszeg, West-Hungary." *International Journal of Biometeorology* 55/4 (2011): 595-611.

one on 8 November – no very different dating is possible and it must be accepted that the area witnessed extraordinary weather conditions with notable amounts of snow.¹²²

The town of Levoča (Lőcse/Leutscha) burnt down: 1342

In 1342, according to the fifteenth-century Georgenberg chronicle, the town of Lőcse in Spiš (Szepesség/Czips; today in northeastern Slovakia) burnt down.¹²³ Caspar Hain's early-seventeenth-century local chronicle also mentions it as the year when the town burnt town for the second time.¹²⁴ For the same year, in Austria the *Continuatio Novimontensis* mentions a storm that destroyed trees and houses, and both versions of the annals report on fires in many towns in this year.¹²⁵

1344 January reports: hard winter weather and fog in the north, hail in the east

No weather-related information is available for 1343, although a number of pieces of flood-related evidence are known from this year.¹²⁶ The next weather report on conditions in early January 1344 comes from a charter dated

¹²² Nagy, *Anjoukori okmánytár*, 282-287 (3 December 1342):..., *quod in predictis octavis festi Nativitatis beate virginis in facie dicte terre litigiose inter prefatas possessiones Bahun et Zamul existentis cum hominibus regiis French predicto et Andrea de Capella qui presencialiter affuissent, accessissent, et presentibus testimoniis dicti capituli Posoniensis videlicet magistris Johanne et Michaeli filiis Alexii concanonice eorum, et non eodem Andrea clerico qui tempore prioris reambulacionis affuisset, eandem particulam terre litigiosam in prima visiva consideratione pro quinquaginta iugeribus terrarum consideratam et signis metalibus consignatam regali mensura mensurassent, et licet propter temporis gravitudinem et nivei magnitudinem reambulantes determinative mensurare non potuissent, et idem Mykou super ipsa particula terre nomine quinquaginta iugerum terrarum ut sibi fuisset impositum iurasset, tamen pro nunc per condignam mensurationem regalem in ipsa particula terre litigiosa in primis quinquaginta iugera terrarum reperissent et eandem ipsi Mykou statuissent perpetuo nomine sui iuris possidendam, deinde sexaginta iugera superflua in eadem terra litigiosa reperientes eidem Johanni statuere voluissent, ubi idem Mykou contradixisset dicendo, quod ipsa particula terre existeret intra signa metalia ipsius particule terre per ipsum iam in litem deducte et ex eo ad ipsius possessionem Zamul pertineret, quamvis homines regii et capituli Posoniensis tunc temporis iuxta continenciam literarum nostrarum minime valuissent ut premisimus propter temporis gravitudinem mensurare, sed pro eadem quantitate pro qua dictus Mykou iurare debuisset reliquissent;*

¹²³ SRH, vol. 2, 284 (*Chronicon, quod in Monte Sancti Georgii conservatur*): ..., *dornoch starb konig Karulus Anno dni MCCCXLII do her hatte XXXII Jor regiret. Czu der selbin czeit ist dy stat Lewtscha verprant, vnd also sein auch dy altin prife des lanids des meiste teil verprant.*

¹²⁴ Bal et al., *Hain Gáspár*, 13: *Anno 1342. Ist Leutsch zum 2 mahl auszgebrant.*

¹²⁵ MGH SS, vol. 9, 672. See also: Rohr, *Extreme Naturereignisse*, 427.

¹²⁶ For more details, see Kiss, "Floods," 37-47.

12 July 1345 that describes an unsuccessful perambulation of *Reeth* (Rét) landed possession near Veresalma/Vörösalma (today Červenica pri Sabinove in Slovakia) in historical Sáros County. The perambulation was ordered by the noble congregation of the county on 2 October 1343 and the report had to be submitted by 13 January 1344. Thus, the attempted perambulation could have taken place any time in between these two dates. However, due to the hard winter conditions and the severity of fog¹²⁷ they could not properly recognize the landmarks. Finally, the successful perambulation, including the identification of landmarks and boundaries, took place on 11 April. The result of the successful perambulation had to be submitted by 18 April. Therefore, at least a week must also be added for the travel in January and the unsuccessful perambulation had to have taken place in the first week of January at the latest.

Another piece of information about weather condition refers to an unknown time (probably months) before late January. In this case the toe-nail of a vagabond priest froze in prison due to cold weather; the priest had been arrested and tortured by the people of the Transylvanian archdean.¹²⁸ Due to the events and the following complaints, the archdean was excommunicated, but in late January, after receiving a full record of the events, the pope absolved the archdean. There is no further information about when the cold weather took place, thus it is difficult to draw further conclusions on the usual or unusual nature of the weather conditions.

For the German areas, Glaser suggests a mild winter in this year. No ice developed on the Danube and the Main Rivers, and there was good weather in Constance at the beginning of the year.¹²⁹

1345: cold January weather?

On 14 January, in the forest near the village of Lelesz (Leles in eastern Slovakia), nine local serfs were completely robbed and/or left naked, and then five of them were forced to go to *Chete* (Csicsér?; today Čičarovce in Slovakia)

¹²⁷ HNA, DL 40984: *ad faciem dicte possessionis Reeth per arbitro prenotato faciendo adduxissent tamen quia ydem arbitrij propter temporis yemalis gravitatem et asperitatem nebularum metas bene agnoscere non potuissent, per eo inter ipsas partes arbitrari nequivissent.* Regestum: F. Piti, *Anjou-kori oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustiantia*, vol. 29: 1345 (Budapest-Szeged: Szegedi Középkorász Műhely, 2013), 271-274.

¹²⁸ A. Theiner, *Vetera Monumenta Historica Hungariam Sacram illustrantia maximam partem nondum edita ex tabulariis Vaticanis deprompta collecta ac series chrolonogica disposita Tomus primus ab Honorio PP III usque ad Clementem PP VI 1216-1352.* (Rome: Typis Vaticanis, 1859), 662-663. Regestum: Zs. Jakó, *Erdélyi okmánytár III: 1340-1359* (Transylvanian Cartulary, vol. 3: 1340-1359), Magyar Országos Levéltár kiadványai II. Forráskiadványok 47 (Budapest: Magyar Országos Levéltár, 2008), 88-89.

¹²⁹ Glaser, *Klimageschichte*, 76.

village on (bare?) feet, by which the serfs suffered greatly from the severe cold.¹³⁰

This winter was reportedly mild in Lower Austria (Klosterneuburg) and, similarly, the Bohemian army's move to Prussia was rather restricted due to prevailing mild conditions (swamps and other water bodies were not frozen).¹³¹ Based on southern and eastern German sources, Glaser suggests prevailing (very) mild weather (when water bodies did not freeze) for the winter of 1345.¹³² One cannot exclude the possibility, however, that the conditions were not bad for the armies when they originally left their homeland.

Urgent needs of religious communities in 1346

At the beginning of February 1346 the monastery of Zebegény mortgaged its land (in Kerekegyház, Baranya County) due to poverty (*y[m]mo potius necessitatibus ipsius monasterii nunc sublevandis*),¹³³ while at the end of November the master of the hospital in Budafelhévíz (today part of Budapest) similarly mortgaged half of its mill (in Szentendre) due to its urgent need.¹³⁴ Naturally, one cannot draw many conclusions based on these cases, but the (urgent) need and financial problems of two religious communities (with privileges) in the mid-1340s may provide interesting background information. Further, the customer in both cases was the magnate, Tóttös Becsei (count of Pilis), and in both cases the religious communities emphasized their actual, urgent problems/necessities as the cause of the mortgages.

Fires and damages in vineyards caused by frequent hoarfrosts – in 1347 or 1348?

Due to their great poverty, need, and hunger, the citizens of a Hungarian royal town applied to King Louis I to avoid paying extra taxes for the king's

¹³⁰ HNA, DF 233644: ..., *quorum ex eis quinque post tergum ligatis manibus in magno frigore usque ad uillam Chetem uocatam pepulissent, qui propter frigus nimium in pedibus tormentati extitissent*. T. Neumann, Bereg megye hatóságának oklevelei 1299-1526 (Charters of Bereg county) (Nyíregyháza: Móricz Zsigmond Könyvtár, 2006), 34-35. For this and later copies of the charter: F. Piti, *Anjou-kori Oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 29: 1345 (Budapest-Szeged: Szegedi Középkorász Műhely, 2013), 128-130, 152-153, 170-171 (referring to DF 233645 and 233646).

¹³¹ Brázdil and Kotyza, *History of Weather*, 115.

¹³² Glaser, *Klimageschichte*, 76.

¹³³ HNA, DL 76787. Regestum: F. Piti, *Anjou-kori Oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 30 (Budapest-Szeged: Szegedi Középkorász Műhely, 2014), 57.

¹³⁴ HNA, DL 3865: *Habito consilio inter nos mutuo et de matura deliberacione per meliori statu et vtilite domus nostre predictae, nec non ex urgente necessitate eiusdem obligamus et presentibus in pignoramuz*. Regestum: Piti, *Anjou-kori Oklevéltár*, vol. 30, 459-460.

Italian military campaign. For reasons, the town citizens referred to the difficulties caused by continuous fires and damaged vineyards that had been the result of frequent/great hoarfrosts (*per continua incendia, et laesionem vinearum nostrarum per frequentes pruinas contingentem*).¹³⁵ Because the king's inquisition found the application correct, he freed the town from paying the military tax.

This charter is preserved in a "book of *formulae*," created for officers, a sample book of how to write charters on different topics and how to formulate sentences. Although in these cases complete (real) charters were used, dates were usually not included. Thus, based on the text it is only known that the charter was probably dated (shortly) before the military campaign of King Louis I to Italy. To some extent, it is possible to identify the time and the most probable town(s) that applied for the tax release.

Between 1347 and 1350, three military campaigns to Italy were organized and the king himself participated in two of them. The first Italian campaign took place between 11 November 1347 and May 1348; another army left for Italy this time without the king) in late spring 1349, and the king led his second Italian campaign between 18 April and 25 October 1350. The charter could have been written before the king's first or the second Italian military campaign, thus probably in either 1347 or 1348. Theoretically, also 1349 or early 1350 would be possible, but since the charter does not mention the problems caused by the Great Plague at all, the later dates are less likely. In the *Codex diplomaticus*, Fejér, who published this charter without any explanation, dated it to 1348.

As for the location, theoretically any town in Hungary strongly dependent on wine production (and export) could have been the applicant, but it was presumably a royal town (*civitas nostra*). Probably based on this information, Fejér suggested Pozsony (Bratislava in Slovakia) as the town in question. This idea, namely, that a town in the west was the applicant, might be supported by

¹³⁵ CD, vol. 9/5, 630-631: ... *Quod licet dicta ciuitas vestra et nos incolae in eadem commorantes inter alias ciuitates vestras ingenti fama, et magno praeconio extollamur tamen prout fama exterius volat et disseminatur interius mentitur huiusmodi parte dissimulationem; scire enim desideramus vestram Maiestatem quod per continua incendia, et laesionem vinearum nostrarum per frequentes pruinas contingentem in tantam inopiam peruenimus quod fere maior pars ciuium ob talem extremae paupertatis inopiam et famem inopiaeque ad impositionem presentis collectae vestrae fugam ceperunt, et prorsus de hac ciuitate alias transire volunt causa commorandi;....* . CD, vol. 9/5, pp. 631-632: *Ludouicus, Dei grati a Rex Hungariae, etc. vi supra; humilis querela vestra desiderabilisque supplicatio nobis patefecit, quod licet vestra extrinseco maior existat quam intrinseco vsus – fructus, vtilitates possidentes opulencia, intelleximus etiam ex tenore litterarum vestrarum nobis directarum quod incolae praescriptae ciuitatis nostrae pro oppositione talis collectae et pro praeteritis erumpnis et dampnis per incendia, et vinearum suarum deuastationes fugam reperissent, de ipsa ciuitate nostra alias transire intenderent, causa commorandi; et quia nos ad praesens talem exercitum arripuimus in quo plus orationum suffragia et deuotorum hominum suspitia quam pecuniarum congeries nobis possunt subsidiari.*

the fact that based on the *Continuatio Novimontensis*, the *Annales Zwettlenses*, and the *Chronicon Anonymi Leobensis*, memorably unpleasant and sour grapes were harvested in 1347 due to the cold and rainy summer and bad weather conditions (*intemperies aeris*) followed by early snow and strong frosts in autumn.¹³⁶

For the German areas in 1347, Glaser suggests a precipitation-rich spring and summer with snow that remained for 10 days in Upper Swabia. Moreover, in the same year, harmful frosts were mentioned in mid-September in Würzburg.¹³⁷ In the Czech Lands, July 1348 was windy and frequent gales in the Prague area caused great damage to the harvest and buildings. Summer was generally dry with a poor cereal harvest.¹³⁸ According to the Carinthian Friesach annals, in 1348 many people were struck by lightning.¹³⁹ Moreover, according to the *Kleine Klosterneuburger Chronik*, twelve thunderstorms destroyed vines and crops in this year.¹⁴⁰ Glaser further suggests¹⁴¹ that also in spring 1349 there was a cold period in March, and on 27 and 29 April frosts harmed the grapes in Würzburg. Based on all the information, not only 1347, 1348, even 1349 could be the year of the letter of application, but 1347 and especially 1348 seem to be the more likely dates.

Severe weather and floods of waters: no perambulation in early January 1349

In a charter dated 13 January 1349, another legal procedure is described that had taken place on 2 January. In the presence of neighbors and the king's man, the new owner of the lands of Keresztúr and Tasolya (Kristy and Tašul'a in Slovakia; see Fig. 1) was officially introduced to his possessions. Although the new owner took over the lands without any problems, they could not visit the boundaries and landmarks of the landed possession due to the severity of the weather "in those times," and also because of flood waters.¹⁴² The formulation

¹³⁶ Rohr, *Elementare Naturereignisse*, 448.

¹³⁷ Glaser, *Klimageschichte*, 85, 86, 89.

¹³⁸ Brázdil and Kotyza, *History of Weather*, 115.

¹³⁹ MGH SS, vol. 9, 673 (*Continuatio Novimontensis*): *Anno domini 1347 generalis fuit ubique intemperies aeris ut ex intenso frigore uva immaturata remaneret et pre duricia tundi vix poterat, vina in tanta amaritudine sunt procreata ut nullus a retroactis temporibus tantam acerbitem posset recordari..* Az információ szó szerint átvette a *Chronicon Anonymi Leobensis*. See also Zahn, *Anonymi Leobensis Chronicon* 45. For more Austrian sources mentioning the event see Rohr, *Elementare Naturereignisse*, 448. For the 1347 case and also for sources concerning 1348 and 1349 see also Rohr, *Elementare Naturereignisse*, 427.

¹⁴⁰ Rohr, *Elementare Naturereignisse*, 427.

¹⁴¹ Glaser, *Klimageschichte*, 85.

¹⁴² HNA, DF 278864: *.... in crastino festi circumcisionis domini iam preteriti utpote feria sexta accessissent ad faciem possessionum Kehrezthur et Thasula supradictam, et easdem universis vicinis et cometaneis suis legitime convocatis per suas veteras metas et antiquas reambulando, cum omnibus utilitatibus et pertinentiis earundem, de eo jure de eaque*

of the text about the timing of the events is rather interesting because it suggests that the weather conditions were bad around this time and not merely on the day of the perambulation.

Poverty and (long-term) tax reduction: spring 1349

On 27 April 1349, due to their great need and poverty (*considerantes dictorum Jobagionum nostrorum de Kapruncha inopias et paupertates miserissima*), the serfs of Kapronca (today Koprivnica in Croatia) received tax reduction from the archbishop of Esztergom until their situation got better.¹⁴³ Although no further information is available concerning the cause, the serfs were clearly in considerable need.

Reports from the 1350s

Need reports for 1350 and 1351

On 1 January 1351 the “guest” (*hospes*) population of Dobronya (today Dobra Niva), Németspelsőc (today Pliešovce), and Bábaszék (today Babiná; at present all located in Slovakia) asked for tax reduction from the tax rate that had been fixed during the reign of Béla IV (1235-1270).¹⁴⁴ This problem is interesting because it seems that taxes that were appropriate and accepted by the *hospes* population barely a century before became unpayable by/in the mid-fourteenth century.

Somewhat similar problems were raised by the *hospes* population of Szepsi (today Moldava nad Bodvou in Slovakia) who – referring to their poverty and need (*paupertates, necessitates*) – received permission for the free use of the

plenitudine, qua per dominum Thomam filium Blasy coram dicto Comite paulo informa premissis proposicionis eodem quo supra resignate extitissent, statuissent memorato facere perpetuo possidendas, autem earundem possessionum propter arduitate presentis temporis et aquarum inundationes, que in illis partibus nunc nimium prevaluissent nondum eligere potuissent atque renovare homo noster similiter personaliter coram nobis comparando premissa sit sicut idem homo vester nobis consequenter affirmavit. Regesta: F. Sebők, Anjou-kori Oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia, vol. 32 (Budapest-Szeged: Szegedi Középkorász Műhely, 2015a), 48-49.

¹⁴³ HNA, DL 43553. Regestum: F. Sebők, *Anjou-kori Oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 33 (Budapest-Szeged: Szegedi Középkorász Műhely, 2015b), 149.

¹⁴⁴ HNA, DF 268293. Regestum: É. Teiszler, *Anjou-kori Oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 35 (Budapest-Szeged: Szegedi Középkorász Műhely, 2016: in prep.).

royal forest.¹⁴⁵ The monastery of Désvár (today Dej in Romania) could not repair its damaged mill and dam on the Szamos River due to their need and poverty (*inopia, paupertas*), and – in order to earn the money necessary for the repairs – the community sold another mill.¹⁴⁶ Moreover, in November 1351 the Pauline monastery of Pilis also sold their vineyard, amongst other items, referring to their actual need (*penuria, necessitas*).¹⁴⁷

Based solely on this information, it is difficult to draw any conclusions on the weather conditions (or related circumstances) of those years. The urgent needs of religious communities in different parts of the country in 1350 and 1351 may provide interesting general background information for any further analysis in a larger-scale context.¹⁴⁸

Fire reports from the early-mid 1350s

According to Török and Legeza, on 30 April 1351 the eleventh-century basilica in Kalocsa burnt down.¹⁴⁹ Whereas a charter dated 20 March 1354 deals with an unexpected fire of the church in Buda in which charters perished,¹⁵⁰ another charter, dated 10 February 1357, describes the death of an entire family that had occurred four years before, probably in their possession at Kálló.¹⁵¹ In a further charter, dated 21 March 1356, other charters are mentioned that perished in a fire event that probably took place in Felsőmacskás in medieval Kolozs County in Transylvania (Szentmártonmacskás; today Sânmărtin in Romania).¹⁵²

Winter of 1356-1357: great snow and cold in the north

Not far from the cold winter event recorded in 1338, a perambulation of *Adrianuagasa* (Adriánvágása – a piece of land after forest clearing) took place

¹⁴⁵ I. Nagy, *Anjoukori okmánytár / Codex Diplomaticus Hungaricus Andegavensis*, vol. 5 (Budapest: Magyar Tudományos Akadémia, 1887), 515-516. The author is grateful to Éva Teiszler who drew attention to this and the next two published charters.

¹⁴⁶ K. Géresi, *A nagy-károlyi gróf Károlyi család oklevéltára*, vol. 1 (The cartulary of the count Károlyi family of Nagykároly) (Budapest: Kocsi Sándor, 1882), 203-204.

¹⁴⁷ Nagy, *Anjoukori okmánytár*, vol. 5, 527-528.

¹⁴⁸ According to a charter dated 22 February 1351, the abbot of Heiligenkreuz monastery in Lower Austria also sold two vineyards due to the needs of the monastery. See: HNA, DF 238730. Regestum: Teiszler, *Anjou-kori Oklevéltár*, vol. 35, (in prep.).

¹⁴⁹ J. Török and L. Legeza, *A kalocsai érsekség évezrede* (Millennium of the Kalocsa archbishopric) (Budapest: Mikes kiadó, 1999), 23. No information is available from the Czech Lands for this year, and for the German areas Glaser only suggests a generally mild spring with early vine blossoming in May. See: Glaser, *Klimageschichte*, 85.

¹⁵⁰ HNA, DL 4411.

¹⁵¹ HNA, DL 56581.

¹⁵² HNA, DL 26752. Regestum: K. Rábai, *Anjou-kori Oklevéltár / Documenta res Hungaricas tempore regum Andegavensium illustrantia*, vol. 40: 1356 (Budapest-Szeged: Szegedi Középkorász Műhely, 2014), 268.

in the mountain area of *Wyfalu* (Újfalu=Pécsújfalu; today Pečovská Nová Ves in Slovakia), the castle of *Torkeu* (Tarkő; today Kamenica in Slovakia), and *Veresalma* (Veresalma/Vörösalma; today Červenica pri Sabinove in Slovakia) on an unknown day between 19 December 1356 and 12 March 1357. On a day in the defined period (but probably in the later part of this period) perambulators went to the debated location, but they could not settle landmarks and walk along the boundaries as the snow was too deep and the cold like winter; thus the perambulation was postponed to 1 May.¹⁵³

West and north of Hungary no information is available for Austria, Poland or the Czech Lands. According to Glaser, the winter of 1357 was mild in the German areas; in Constance there was no snow or ice until 13 February, but after this date there was much snow that stayed until 4 March.¹⁵⁴ This later evidence might show some parallel to the weather conditions described in the charter about the postponed perambulation in the western Carpathians. It might be further interesting that floods occurred in the second half of December in Flanders and also on IJssel Lake in the second half of December 1356 and in early January 1357. Moreover, floods were also reported in November and December in Northern Italy and also in Avignon, which suggests an early to mid-winter period rich in precipitation.¹⁵⁵

No new landmarks settled due to frozen ground in the winter of 1358

On 20 January 1358 (*in quindenis festi Epiphaniarum Domini*), although a perambulation was due in Hont County, there was hard winter weather and the ground was so frozen that in *Ztarchan* (Tarcvány/Sztarcvány; today Dolné Semerovce in Slovakia),¹⁵⁶ located in historical Hont County, the perambulators could not settle new landmarks.¹⁵⁷ Landmarks, if they are not trees or already-existing objects, are practically always connected to some kind of earthwork.

¹⁵³ HNA, DL 68910: ... *dicte terre octoaginta laneorum tunc propter magnitudinem nivium et aeris distemperanciam facere et consu(m)pmare non valuissent*, ...

¹⁵⁴ Glaser, *Klimageschichte*, 77.

¹⁵⁵ Alexandre, *Le climat*, 485.

¹⁵⁶ For the location, see Gy. Györffy, *Az Árpád-kori Magyarország történeti földrajza*, vol. 3 (Historical geography of Hungary in the Arpadian Period) (Budapest: Akadémiai Kiadó, 1987), 257.

¹⁵⁷ Gy. Tasnádi Nagy, *Anjoukori okmánytár* (Angevin chartulary), vol. 7 (Budapest: Magyar Tudományos Akadémia, 1920), 16-19 (23 January 1358): ..., *per veras suas metas et antiquas taliter et hoc ordine reambulassent: primo et principaliter ab oriente iuxta terram quondam Leustachii, nunc vero Petri filii Egidii incipiendo, sub duabus arboribus piri duas metas terreas de novo propter congelationem terre cum securi consignassent*; *Dixerunt etiam, quod quia propter tempus yemale et congelationem terre in cursibus predictarum metarum novas metas erigere non valuissent, licet signa posuissent, tamen partibus volentibus ipsi(s) commisissent, ut transacto isto yemali tempore, ad hoc apto tempore, dum citius potuerunt, ipsimet novas metas unanimiter erigere deberent in locis per eos assignatis*.

Thus, in winter the circumstances obstructing perambulation were usually either flooding or snow. Here, however, the ground was deeply frozen which, on the one hand, may suggest that there was no significant snow-cover, but on the other hand, that low temperatures prevailed at least for a short period. Neither for this nor for the next case are parallel weather observations available in the published scientific literature for Central Europe.

Great snow in the south in early April 1358

On 8 April 1358, a perambulation should have taken place at *Zekaspataka* landed possession (Székáspataka/Krassószékás; today Secășeni in Romania)¹⁵⁸ in the southern part of medieval Krassó County. The perambulators, namely, the king's man, the canon of the Csanád chapter, and the castellan of Érsmlyó, reached the debated land, but due to the snow they could not carry out the perambulation,¹⁵⁹ so the legal process was postponed to 27 May when finally the perambulation took place successfully.

Late autumn 1359: Rains, dense fog, and flood obstruct perambulation in the mountains

On 22 November 1359, due to the great rainfall, dense fog and floods of waters, perambulators could not perambulate the boundaries belonging to the church of *Iaszow* (Jászó) in the upper Bódva (Bodvou in southeastern Slovakia) catchment.¹⁶⁰ They successfully perambulated the land and settled new boundaries on the lands of *Sepsi* (Szepsi; today Moldava nad Bodvou), *Debreg* (Debrőd; today Debrad'), *Somogh* (Somodi; today Drienovec), *Nyihaza-*

¹⁵⁸ Györfly, *Az Árpád-kori Magyarország történeti földrajza*, vol. 3, 494.

¹⁵⁹ F. Pesty, *Krassó vármegye története. Oklevéltár* (History of Krassó county. Chartulary), vol. 3 (Budapest: Athenaeum, 1882), 32-42 (38): ..., *quod ipsi in octavis festo pasce domini proxime preteritis, vnacum Gregorio procuratore magistri Johannis Byseni, tunc Castellani de Ersomlou, ac Gregorio, Farkasio, et Nicolao filijs Zokul, ad facies possessionum Zekaspataka vocatarum in Comitatu de Crassou existencium accessissent, et cum easdem iuxta veteres ipsarum metas et antiquas reambulare voluissent, propter magnam Niuem, tunc inibi existentem reambulare nequiuisent*,.... I am grateful to Róbert Papp who raised my attention to this document.

¹⁶⁰ CD, vol. 9/3, 91-95:; *et cum terram seu terras ad ciuitatem Szomolnok Banya occupatas videre seu conspiciere voluissent, praedicti homines regii et noster tandem Iudex scilicet Dulenuch et quidam ciues de eadem ciuitate venientes, eisdem in quibusdam locis prope villam Ecclesiae praedictae Meczenseff vocatae, iuxta fluium Piwunya metam terream demonstrassent, et licet dicta regia Maiestas in ipsis litteris suis vniuersas metas ipsius Possessionis Ecclesiae de Iaszov reambulare et vbi contradictum non fuerit, nouas metas erigere eisdem hominibus suis praecepisset, tandem ipsi propter nimias pluuias et inundationes aquarum et densitatem nebulae vltiores metas possessionis ipsius Ecclesiae reambulare nequiuisent. Datum feria quarta proxima post festum S. Catharinae Virginis et Martyris, Anno Domini M. CCC. LIX.*

teleke/Nyihaza telek, *Ay* (Áj/Háj; today Hačava), and *Thorna* (Torna, today Turňa nad Bodvou). After settling a new landmark, the church of *villa Meczenzeff* (Mecenzéf, today Medzev) at the Pivunya waterflow (*fluuium Piwunya*), they could not proceed towards the lands of *Szomolnok Banya* due to great rains, flooding, and dense fog. Thus, they could not perambulate the upper boundaries of Jászó church that included the towns of *Szomolnokbánya* (today Smolník), *Gölnicbánya* (today Gelnica), and *Idabánya* (Aranyida, today Zlatá Idka), all located west and north-northeast of Jászó.

As for potential Central European parallels, in early autumn there were floods in Prague and Zittau in Bohemia, but otherwise only the wet character of the summer (in the Czech Lands, Lower Austria, and Poland) and then the very warm winter 1359-1360 are emphasized.¹⁶¹ For the German areas, Glaser mentions the mild and temperate winter of 1360, but he suggests a cold autumn for 1359.¹⁶² Moreover, in southern France the Durance flooded in mid-November at Avignon.¹⁶³

Weather reports and related information from the 1360s

Great snow: the early spring of 1361 in the North

On 10 March 1361 a piece of land was given back to Peter, son of Bodor of *Sarnochamelleke*. However, because of the great snow they could not carry out the perambulation (and therefore the land measurements) on the *Sarnochamelleke* landed possession (near the *Sarnocha* waterflow).¹⁶⁴ Some of the nearby settlements, such as *Polereka* (today part of Abramová in Slovakia), *Nadaser* (Nádasér; today Nedožery in Slovakia) and the convent of Turóc are mentioned (the latter was the responsible legal authority) in the perambulation charter.

Although no information is available from the neighboring areas and Central Europe about the weather conditions of early to mid-March, there was a cold and dry winter in this year in the Zwettl area and Bohemia, and it was also reported as cold in Bonn. Moreover, according to a Paris source, the winter was not only severe but also long.¹⁶⁵

¹⁶¹ Brázdil and Kotyza, *History of Weather*, 115-116.

¹⁶² Glaser, *Klimageschichte*, 77, 89.

¹⁶³ Alexandre, *Le climat*, 489.

¹⁶⁴ HNA, DL 90540: ... *ad faciem dicte possessionis Sarnouchamelleke vocate accedendo vicinorum et commetaneorum suorum legitimis convocationibus prohabitis utrîsque partibus presentibus particulam terre predictum petrum filium Bodor demonstratam recaptivatamque reambulasset, reambulata vero per eo quia nives magne inibi extitisset.*

¹⁶⁵ Alexandre, *Le climat*, 490-491; Brázdil and Kotyza, *History of Weather*, 116; Glaser, *Klimageschichte*, 77.

A series of perambulation processes took place in the wetland area in the Lake Fertő basin near the villages of Sarród and Pomogy (today Pamhagen in Austria).¹⁶⁶ The first perambulation was to take place some time after the order was issued on 3 March and before 11 April when the next field survey took place. At that time, it was not possible to carry out the perambulation due to the frosty weather and great snow and, thus, this part of the field survey was postponed.¹⁶⁷

During the process that took place on 11 April, at one point of the perambulation close to the water of Fertő Lake, the process was obstructed by water and mud, and this part of the perambulation at one particular meadow could not be carried out at that time. The division of pastures and the lake portion in Fertő was postponed until winter (freezing) time when they planned to reach the meadows and the lake portion on ice (*tempore glaciali*). It is interesting to add that the next perambulation, which should have taken place on 9 February 1362, was again postponed.¹⁶⁸ In this case, there is no information about why the perambulation was postponed, so no conclusions related to the weather then can be drawn.

As for potential European parallels, the hardness of winter was emphasized in Bonn and Zwettl, but in the latter case a lack of snow was also mentioned. A long and hard winter was reported in Paris.¹⁶⁹ According to a report from Niederaltaich, dated by Alexandre to 1362 (1361 in the original), the winter was more rainy than snowy, and at the same time in Paris similarly mild, almost continuously rainy, weather prevailed.¹⁷⁰

¹⁶⁶ Published as a separate charter: CD, vol. 9/3, 323-331 (328). The charters (with texts and datings separated) included in one charter, issued on 16 June 1362, were published in G. Dreska, *A pannonthalmi konvent hiteleshelyi működésének oklevéltára / Monumenta credibilia conventus de monte Pannonia*, vol. 1 (A Győri Egyházmegyei Levéltár Kiadványai. Források, feldolgozások 6 (Győr: Győri Egyházmegyei Levéltár, 2007), 118-127 (124): *residuis vero tribus partibus earundem possessionariorum porcionum ipsis nobilibus de Kyra similiter a parte ipsius possessionis ipsorum Kyra, iure peremnali remanentibus et per dictum Benedictum remissis ac renunciatis, sed quia tunc propter gelida tempora et nivium habundanciam, inter porcione possessionarias parcium ipsarum metas necessarias erigere nequivissent,*

¹⁶⁷ CD, vol. 9/3, 329; Dreska, *A pannonthalmi konvent*, vol. 1, 126: ... *Inde transiret versus meridiem aliquantulum, ubi inter duo iugera terre arabilis, in loco Balenteleke versus possessionem Pomagh vocatam, in extremitate cuiusdam prati posita esset meta terrea, inter partes distinctiva, ulterius autem aqua et luto obstantibus in erectionem metarum procedere tunc temporis nequivissent,*

¹⁶⁸ Dreska, *A pannonthalmi konvent*, vol. 1, 123.

¹⁶⁹ Alexandre, *Le climat*, 490-491. See also Brázdil and Kotyza, *History of Weather*, 116; Rohr, *Elementare Naturereignisse*, 443.

¹⁷⁰ Alexandre, *Le climat*, 492.

Drought threatens the Trau/Trogir area in 1362: an example from the Dalmatian coast

On 25 March 1362, the duke (*banus*) of Dalmatia and Croatia gave permission to the shepherd community of Black Vlachs or Morlachs (*gens Morlachi*) to stay within the territories of Trau/Trogir (in Dalmatia, today part of Croatia) until 24 April because of the great drought that threatened the area at that time. Due to this drought their animals (especially lambs) and also other agricultural resources (e.g., vineyards, arable fields, etc.) were in danger.¹⁷¹

Bad crop harvest in 1361, prohibition of grain export in 1362

In July 1361, Duke Rudolf IV of Austria issued a charter in which he referred to natural calamities, namely, plague, fires, and bad harvests of cereals and grapes that affected his territories at that time. When talking about the bad harvest, he mentioned Hungary, the Czech Lands, and Bavaria among the affected areas.¹⁷² The information on the Czech and Austrian bad harvests was also mentioned in other sources.¹⁷³

Presumably related to the same problem, on 13 April 1362, the Hungarian king issued an order to the Ragusan council asking them not to buy up more harvested goods (*fruges*) in his kingdom (i.e., in the countries of the Hungarian

¹⁷¹ CD, vol. 9/3, 336-338: ... *Quod cum nobiles viri ciuitatis Tr. Serm. Principis D. N. Regis Hung. fideles, et dilecti sepe sepius in eo videlicet, quod quedam particula gentis morlachorum ipsius D. N. Regis intra confines, et terminos dicte sue ciuitatis seu in territorio ipsorum descendissent, ymo, et alii morlachi intra confines, et terminos ciuit. eorum figendo tentoria ipsorum animalia seu pecudes ad aquandum intra metas terminorum ipsorum depellendo damna non modica in satis seu bladis, nec non et in vineis, pascuis, et Gays incessanter irrogarent Coeque ciuit. eorum, nec non et singulares persone ipsius ciu. si successiuis temporibus per ipsam gentem similia perpetrarentur in maximam egestatem possent devenire, et popularibus hominibus destituentium querimoniam porrexissent tamen quia temporis nimia siccitas, et onerosa nunc ad presens in tantum imminabat, ac etiam agnellosum teneritas ipsorum Morlaccorum affuit; vt dum ipsi Morlachi praesenti tempore a loco ipsius habitationis remoti fuissent in maximum damni periculum incidi potuissent.* For more details, see A. Kiss and Z. Nikolić, "Droughts, dry spells and low water levels in medieval Hungary (and Croatia) I: The great droughts of 1362, 1474, 1479, 1494 and 1507." *Journal of Environmental Geography* 8/1-2 (2015): 11-22 (13-14).

¹⁷² E. Schwindt and A. Dopsch (eds.), *Ausgewählte Urkunden zur Verfassungs-Geschichte der deutsch-österreichischen Erblande im Mittelalter* (Innsbruck: Verlag der Wagner'schen Universitäts-Buchhandlung, 1895), 203: ...und auch von der ungewondleichen missewechst die ditz iar beschehen ist an getraide nicht alain in unsern land zu Osterreich sunder auch ze Unge^arn ze Behem ze Pairn und in andern umbligunden landen. For further analysis, see also: P. Csendes and F. Opll (ed.), *Wien, vol. 1: Geschichte einer Stadt Von den Anfängen bis zur Ersten Türkenbelagerung* (Vienna: Böhlau, 2001), 269; Rohr, *Elementare Naturereignisse*, 443.

¹⁷³ Brázdil and Kotyza, *History of Weather*, 116; Rohr, *Elementare Naturereignisse*, 443.

Crown) and in the lands of his possession (*de regno et terris suis*), and not to allow the harvest (cereals) to be exported to other countries from the town and its territory.¹⁷⁴ Based on this charter one can presume that the prohibition on exporting food referred not only to Ragusa, but also Hungary, Croatia, and Slavonia.¹⁷⁵ Although there are no reports on the weather in Hungary, as noted for Austria the winter of 1361 was cold and dry, while the summer was reportedly hot and dry in Silesia, and prices remained generally high until the 1362 harvest.¹⁷⁶

Locust invasion in 1363-1364 and/or 1366?

Although without exact dating, in the Chronicle of the Hungarians the contemporary chronicler, John of Küküllő, mentions that – among other calamities – locusts and mice ate the grain spikes and other crops, which resulted in hunger at different times during the reign of Louis I.¹⁷⁷ Moreover, he also mentions droughts and bad weather conditions that could have been a source of harvest failures. Although apart from this evidence (for instance, the damage from bad weather in the late 1340s and the drought of 1361 and/or 1362) there is little source evidence on any of the events John of Küküllő mentions, but based on some further indirect evidence an attempt to date some of these weather-related events can be made.

During Louis' reign locust invasions were reported twice in countries where locusts might have arrived from Hungary, in 1346-1347 and in 1363-

¹⁷⁴ The king also ordered its public announcement in the town. See J. Gelchich and L. Thallóczy, *Ragusa és Magyarország összeköttetéseinek oklevéltára / Diplomatarium Ragusanum Reipublicae Ragusanae cum regno Hungariae*, Magyar Tudományos Akadémia Történeti Bizottsága (Budapest; Kiadja a M. Tud. Akadémia Tört. Bizottsága 1887), 35: *Serenissimus dominus noster dominus rex Hungarie misit suas litteras domino rectori consilio et communi Ragusii, inter cetera continentes nobis precipiendo, ut non sumamus in antea fruges, cuiuscumque generis exstant, de regno et terris suis educere ad terras alienas in portu nostro. Et quod hoc faciamus in civitate nostra et nostro districtu publice promulgari. Et si quos huiusmodi publicationem fruges de regno et terris suis vendentes et educantes invenerimus, illos tales in rebus et personis puniamus absque omni compassione. Et aliud pro sua gratia non facturi.*

¹⁷⁵ For more detailed information, see Kiss et al., "14. századi rossz termések."

¹⁷⁶ Brázdil and Kotyza, *History of Weather*, 116; Rohr, *Elementare Naturereignisse*, 443.

¹⁷⁷ The work of John of Küküllő has been preserved in the *Chronicon Dubnicense*: (*De pestilencia fame et terremotu*): *Item etiam tempore sui regiminis pestilencie per loca particularia, et etiam per totum regnum Hungarie, et etiam in alys vicinis regnis vigerunt. Et fames diuersis temporibus per locustas et mures, specias frugum et aliarum segetum corrodentes, et per siccitates temporum, ac aeris tempestates inualuerunt. Et pluribus vicibus terremotus per loca factus est.* Published in M. Florianus, *Chronica Dubniciense cum codicibus Sambuci Acephalo et Vaticano, cronicisque Vindobonensi picto et Budensi accurate collatum*, *Historiae Hungaricae fontes domestici* I/3 (Leipzig: Typis M. Taizs, 1887), 191. Also mentioned by the 15th-century chronicle writer Thuróczy: Galántai and Kristó, *Johannes de Thurocz*, 185 (*Chronica Hungarorum*).

1366. For 1346-1347 little source evidence is available and therefore it is difficult to state firmly the fact of a significant invasion. Two non-contemporary narratives mention it, in 1346 for the Czech Lands, and in 1347 for Northern Italy.¹⁷⁸ The case is different for the 1360s; clear reports are available for these years from both the immediate neighborhood of Hungary and also from more distant areas. In (Lower) Austria, according to the Klosterneuburg annals, there was a locust invasion in 1366.¹⁷⁹ Locusts are mentioned in Italy as early as 1363, brought by the *vento schiavo temperato*, a wind blowing from the northeast, from the direction of the southwestern Carpathian Basin.¹⁸⁰ Locusts also appeared in the Frankfurt area in late August 1364, and many locusts again caused damage in August 1366 at Stuttgart. An invasion of rats was also mentioned at that time in Strassbourg.¹⁸¹

Southern Transdanubia: deep snow and a severe winter in early January 1364

The chapter of Fehérvár reported to the country judge, István Bebek, that – due to the too deep snow and severe winter conditions – on 8 January 1364 it was not possible to perambulate the boundaries of *Tamasy* castle (Tamási) and its lands, on the one hand, and the settlement of *Hedruh* (Hedrehely) in Somogy County on the other.¹⁸² Beyond the fact that a central area in Hungary had deep snow and hard winter weather in early January, the location and extent of the two properties are also important. Whereas an extensive piece of land in Tolna County with extensive boundaries belonged to Tamási castle, Hedrehely in Somogy County was/is located rather far away (ca. 70-80 km) from Tamási and, thus, when great snow and a severe winter are mentioned for both places, this refers to a much larger region in southern Transdanubia than merely two separate properties.

The winter of 1364 was famous for its severity all over Europe.¹⁸³ Glaser, for example, calls it as a “record” long, severe, and snowy winter that lasted in the German areas until mid- to late March.¹⁸⁴ The frost was so deep in the southern German areas, for example, that people had problems with the water

¹⁷⁸ Brázdil and Kotyza, *History of Weather*, 115; Camuffo and Enzi, “Invasioni di cavallette,” 31-32.

¹⁷⁹ MGH SS, vol. 9, 736. Alexandre, *Le climat*, 500; Rohr, *Elementare Naturereignisse*, 475.

¹⁸⁰ Alexandre, *Le climat*, 493; Camuffo and Enzi, “Invasioni di cavallette,” 33-35.

¹⁸¹ Alexandre, *Le climat*, 495, 500. Glaser, *Klimageschichte*, 67.

¹⁸² HNA, DL 87396: in octavis diei Strennorum proxime preteritis ... ad facies predicti castri Tamasy et possessionum ad idem pertinencium necnon pretacte possessionis Hedruh et suarum pertinenciarum vicinorum et cometaneorum suorum legitimis conuocationibus habitis et temporis ac dictis partibus presentibus accedendo easdem reambulare ac in condigno suo precio estimare voluissent tamen propter yemis nimiam frigiditatem et niuium validitatem, easdem possessiones reambulare et suomodo e[stimar]e nequiuissent.

¹⁸³ Alexandre, *Le climat*, 493-498.

¹⁸⁴ Glaser, *Klimageschichte*, 177.

supply. This memorable harsh winter was also documented in Silesia, and – probably caused by a sudden thaw of much snow – there was a great flood in Prague on 27 January.¹⁸⁵

1364: Crisis revisited? Food shortage and famine: inland tolls diminished

Due to the threatening famine in the country, the central government required urgent solutions in 1364, and therefore special orders were issued on 15 July (thus, around harvest time). According to the royal order, people were not allowed to store more grain than they would use within a year. The rest had to be sold at the average price to those lacking grain – these transactions had to be controlled by the local chapters, monasteries, and (if lacking those) local parish priests. Moreover, the king decided to decrease all toll payments within the country borders for wheat, barley, oats, millet, malt, bread, lentils, peas, beans, vegetables, and all other legumes.¹⁸⁶

¹⁸⁵ Brázdil and Kotyza, *History of Weather*, 116. See also: Alexandre, *Le climat*, 498. It is, however, rather interesting that none of the contemporary Austrian narratives mentions this hard winter.

¹⁸⁶ HNA, DF 238823; CD, vol. 9/3, 408-411: *Nos Ludouicus, ... Genitrice nostra carissima, ac nonnullis Prelatis et Baronibus Regni nostri, de fertiliori et uberiori Statu regnicolarum nostrorum anxie cogitantes, presenti caristie, frugum seu bladorum per opportuna remedia cupientes obuiare; statuimus committentes, ut in qualibet Ciuitatum, et liberarum villarum regalium et reginalium, Ecclesiarum, ... possessionatorum hominum, talis modus observetur; ut Iudices, villici, et Iurati Civitatum, et villarum predictarum in eo, quod blada seu fruges cuiusvis generis vel speciei existant, non plura, quam ad sustentationem Ciuitatensium vel villanorum ad unum Annum sufficientia fore, Nos vero ex superabundanti Regia pietate de Consilio Domine Regine, matris nostre ac Prelatorum et Baronum nostrorum predictorum statuimus, quod pro bladis, seu frugibus, videlicet tritico, siliginibus, ordeo, auena, milio, brasio, farina, panibus, nec non de lentibus, pisis, fabis, oleribus, et aliis leguminibus, undecunque, et quecunque loca, per quoscunque, et quotiescunque a data praesentium infra vnus anni spatium intra limites Regni nostri, et non extra, regnicolis nostris venditioni exponenda deferentur, nullum tributum, nullumque tellonium, in terris et aquis, tam in locis tributorum regalium, reginalium, ecclesiarum, prelatorum, abbatum, monialium, prepositorum, priorum, et fratrum cuiuscunque ordinis et religionis existant, nec non baronum, nobilium, et possessionatorum hominum, excepto solo naulo, seu tributo portuum, quod iusto et levi modo ab ipsis exigi volumus, ab eisdem exigatur;* For a more detailed analysis, see Kiss et al., “14. századi roszs termések.” 2016.

Weather reports and related information from the 1370s

Shortages and/or very high prices in Hungary: (1373-)1374

While travelling in Hungary, the papal tax officer complained of shortages and/or very high prices and floods that made his journey very expensive.¹⁸⁷ Based on his itinerary, the problematic part of his journey in Hungary took place in the winter. Although no information is known about the harvest of 1373, the summer of 1373 was dry and hot in the German territories.¹⁸⁸ Moreover, this winter was famous in other parts of Central Europe for floods caused by unusually rainy conditions.¹⁸⁹ In February 1374, for example, there were two significant floods of the Vltava River in Prague.¹⁹⁰

Bad weather, plague, and food crises in the early 1380s

Early March 1381: bad weather conditions and flooding in the east, deep snow in the west

Reported in a charter dated 4 March, 1381, in the area of *Rožuag* (Rozvágy) and *Zygan* (Cigánd) not only flooding, but also bad weather conditions prevailed in early March. Thus, a perambulation – planned for 6 March – had to be postponed two days before it should start.¹⁹¹

According to another charter, issued on 11 March, 6 March was bad not only in the central lowland areas, but also at the western border. During the perambulation process of *Wagh* landed possession (Vág in Sopron county, along the Rába River), the perambulators could not fix the boundaries of arable land,

¹⁸⁷ *Rationes collectorum pontificorum in Hungaria / Pápai tized-szedők számadásai* 1281-1375 (Mon. Vat. Hung. 1/1) (Budapest: Franklin Társulat, 1887), 460-461:.... *Item die VII. Decembris anni LXXIII, quia tunc noviter fuerat commissum michi per dominum Heliam, de recipiendo decimam regni Ungarie, tam pro dicta decima, quam pro mediis fructibus beneficiorum per sedem apostolicam collatorum recipiendis, arripui iter meum pro circueundo ecclesias catedrales et collegiatas regni Ungarie. Unde redii ad Calidas Aquas ad domum domini Cardinalis die XII. Martii anni LXXIII. Expendi tam propter magnam caristiam, quam propter inundationem aquarum et transitus ipsarum, in IIIxx. XIII. diebus CLXVII. florenos et quartam. / Item pro uno equo, qui fuit mortuus in via, XV. florenos auri.*

¹⁸⁸ Glaser, *Klimageschichte*, 67.

¹⁸⁹ See, for example, Alexandre, *Le climat*, 508-511; Glaser, *Klimageschichte*, 222; O. Wetter, Ch. Pfister, R. Weingartner, J. Luterbacher, T. Reist and J. Trösch, "The largest floods in the High Rhine basin since 1268 assessed from documentary and instrumental evidence," *Hydrological Sciences Journal* 56/5 (2011): 733-758 (753).

¹⁹⁰ Brázdil and Kotyza, *History of Weather*, 117.

¹⁹¹ HNA, DL 96560: ... *metas inter possessiones Rožuag et Zygan vocatas ... propter intemperanciam aeris et aquarum inundacionem ipsam possessionum reambulatum bono modo fieri non valuisset, ...*

meadows, forests, and other resources due to deep snow and bad weather conditions.¹⁹²

As for potential weather parallels and preceding weather conditions in Central Europe, in Augsburg the late autumn was frosty and snowy, but then the weather was quite rainy (reported in both Mainz and Augsburg) until early to mid-January, when harsh frosts and snow prevailed between 21 January and 2 April.¹⁹³

High prices and/or shortages in 1381

On 14 June 1381, the Dominican nuns from Margit Island (today in Budapest) sold their landed possession called Csúza (*Chuzza*) in Baranya County; the nunnery received 500 forints for the land. Out of this sum, they planned to spend 300 forints for food due to the shortages (or high prices) of those times, while the remaining 200 forints were to cover the expenses of some necessary repair work on their buildings. Concerning the same purchase, in a charter dated 16 September high prices and/or need as well as shortages were mentioned as prevailing in the country at that time.¹⁹⁴ Among the possible reasons for these problems one can mention the severe epidemic documented in 1381.¹⁹⁵

As for weather-related information concerning Europe, the winter of 1381 or at least part of it, was rather severe with a great deal of snow in large parts of Western and Central Europe, while March was rainy around Mainz, followed by dry conditions until mid-May when rains prevailed. Due to these rains the cereal harvest was good in this year.¹⁹⁶ The grain harvest was poor in England in the same year, however, and grain prices were very high (and still rising) in the French territories, while plague prevailed in most of Europe throughout the year.¹⁹⁷

¹⁹² HNA, DF 262640: ... *terras autem arabiles feneta et silvas ac alias utilitates eiusdem possessionis Wagh propter magnam nivem et malum temporis deinde nequivissent*. Regestum: P. Kóta, *Regeszták a vasvári káptalan levéltárának okleveleiről (1130) 1212-1526* (Regesta of the charters of Vas county archives), Vas megyei levéltári füzetek 8, Középkori oklevelek Vas megyei levéltárakban 1 (Szombathely: Vas megyei levéltár, 1997), 67.

¹⁹³ Alexandre, *Le climat*, 520; see also Glaser, *Klimageschichte*, 78.

¹⁹⁴ CD, vol. 9/5, 475-481: *ex quibus eaedem Dominae trecentos florenos in caristia, quae in regno protunc viguisset, pro victu ipsarum*

¹⁹⁵ CD, vol. 9/5, 481. For the 1380-1382 plague in Hungary see, for example, I. Bertényi, *A tizennegyedik század története* (History of the fourteenth century) (Budapest: Pannonica kiadó, 2000), 77; J.-N. Biraben, *Les hommes et la peste en France et dans les pays européens et méditerranéens*, vol. 2 (The Hague: Mouton, 1976), 440. A recent, more detailed, overview of the available sources on this epidemic and its probable consequences in Hungary are provided by Kiss et al., "14. századi roszs terméscsk."

¹⁹⁶ Alexandre, *Le climat*, 520. See also Glaser, *Klimageschichte*, 90.

¹⁹⁷ See, for example, L.R. Ladurie, *Histoire humaine et comparée du climat*, tome I: *Canicules et glaciers XIIIe-XVIIIe siècles* (Paris: Fayard, 2004), 88-89.

Weather-related evidence in the 1390s

Frosts, a bad grape harvest, and deserted vineyards reported in 1392

In a letter to Queen Elisabeth, Pozsony citizens complained to the queen about the severe damage that had occurred in their vineyards due to cold weather (*propter frigidi temporis invasionem indicibilia dampna perpassi fore*).¹⁹⁸ Nevertheless, it seems that in 1392 not only was the grape harvest bad, but another letter reports on a bad hay harvest, and it seems that the grapevines suffered not only in 1392 but also in previous years; as a result many vineyards were deserted and some people even blamed the Jews for this situation.¹⁹⁹

For 6 October, 1392, the *Annales Mellicenses* also report a great frost and hoarfrost (in Austria) that destroyed all the vineyards to such an extent that, according to the description, hardly one-tenth remained and even the remaining harvest was bad.²⁰⁰ Similar problems were described in the German wine-producing areas; in Mainz, great frosts occurred on 7 October, while according to a Limburg source, frost damaged the vineyards along the Rhine, Lahn, and Mosel Rivers as early as 29 September. Moreover, frosts also damaged the vines in the Nördlingen area. After that, a great deal of snow fell on 25 November in Nuremberg. An early, snow-rich winter in November and early December, followed by a sudden thaw and flood in Prague, were also reported in Bohemia.²⁰¹

Very early grapevine ripening in 1393?

In 1393, there was a hot summer and great drought in the Czech Lands and also in Austria.²⁰² Even if no direct evidence is available for the same period in Hungary, some indirect information suggests that May and July temperatures were higher than usual. In a case related to a legal debate, the chapter of Székesfehérvár – after a legal survey – stated on 3 March 1394 that in the previous year in Zala County Master Gyula had not only harvested grapes in Kál in the

¹⁹⁸ T. Ortway, *Pozsony város története* (History of the town Pozsony), vol. 2/3 (Bratislava: Stampfel Károly, 1894), 164. This letter is only known from Ortway's reference ("Dipl. Pos. I. 747"), and so far I have not found it in the medieval source collection of the Hungarian National Archives (DL-DF collection).

¹⁹⁹ This letter is also known only from Ortway's reference ("Dipl. Pos. I. 833"; in: Ortway, *Pozsony város története*, 164): *Item man mag Irn gnaden auch erczellen, wie die Stat kainerlay nucz noch Rentt nicht hat, weder vil noch wenig als andre stett mer allein die weingarten die haben, uns etlich Jar noch einander gar grobleich gevelet, und besunderleich fert und hew. Dorumb auch maniger weingarten öd bleiben musz und dy armen lewt awuch vil schuldig bleibent den Juden.*

²⁰⁰ MGH SS, vol. 9, 514 (*Annales Mellicenses*).

²⁰¹ Alexandre, *Le climat*, 530-532; Brázdil and Kotyza, *History of Weather*, 119; Glaser, *Klimageschichte*, 90.

²⁰² See, for example, Brázdil and Kotyza, *History of Weather*, 119.

vineyard of the bishop of Veszprém, but around 8 September (GC: 17 September) he also destroyed the vines and damaged the boundaries.²⁰³ As the harvest and the destruction of vines and the boundaries occurred at the same time, the illegal vintage might have occurred on the same day or immediately before. This means that the grapes ripened early, even if it is clear that the real vintage probably would have taken place some time later.

1395 High prices in Hungary?

In his letter sent from Buda on 27 November, 1395, Paulus de Armannis, the ambassador of Mantua, apart from his political reports, described the very high prices (or shortages?) that prevailed at that time in Buda. Referring to this unfortunate circumstance, he asked the prince of Mantua to allow him to return home earlier.²⁰⁴ No information is available concerning the weather conditions in Hungary for this or the previous year.

In Silesia and Austria there was a bad harvest in 1394 and the Klosterneuburg annals refer to good cereal and grape harvests for the year 1395. Although a reference is also available mentioning a bad harvest in 1395, Czech research – comparing Silesian and Austrian sources – rather suggests a bad harvest and high prices in 1394 but not in 1395.²⁰⁵ Nevertheless, in 1395, both the grapevines and crops were damaged by hail around Mainz and Cologne in May and June, and problems continued in these areas in 1395.²⁰⁶

²⁰³ HNA, DF 200361: *...., quod Magister Gywla tempore cuius preterisset revolutio annualis quandam vineam in territorio et in monte possessionis Kal sitam vindemiant vindemiateque circa festum nativitatis beate Marie virginis vires penitos extirpant per extirpationemque metas eiusdem possessionis destrui et aboliti fecisset in preiudicium et derogarum dicti domini Episcopi et sue ecclesie valde grande*. Regestum: E. Mályusz, *Zsigmondkori oklevéltár*, vol. 1 (Cartulary of the Sigismund period) (Budapest: Akadémiai Kiadó, 1951), 367.

²⁰⁴ L. Óváry, *A magyar tudományos akadémia történelmi bizottságának oklevél-másolatai. Első Füzet* (Charter copies of the History Committee of the Hungarian National Archives, first volume) (Budapest: Magyar Tudományos Akadémia Történelmi Bizottsága, 1890), 58–59. Since Óváry did not refer to his source in detail, at present one can only rely on his regestum of the original letter.

²⁰⁵ Brázdil and Kotyza, *History of Weather*, 119.

²⁰⁶ Alexandre, *Le climat*, 534. Only a few data are available in Europe for the winter of 1395, but in the Paris area the weather was rather rainy with floods; and (just like, for example, in 1374) inundation damaged the cereals.

Before November 1400 the basilica of Veszprém burnt down

According to the permission of the pope issued on 8 November 1400, the bishop of Veszprém was allowed to rebuild the basilica, which had burnt down previously.²⁰⁷ The date or year of the fire event is unknown.

Overview

Most of the weather-related evidence is available in domestic charters (only one from Austria); the next significant group is foreign (Austrian, Czech, and Polish) narratives. In only a few cases do domestic narratives contain useful information. Compared to the previous centuries, the composition of source evidence directly or indirectly referring to weather conditions went through a significant transformation; while in the eleventh to thirteenth centuries narratives play a leading role, by the fourteenth century legal documentation (charters) become the most important source for weather and related phenomena. When the data are available in charters dating and location are rather precisely defined in most cases, although providing information only for a couple of days. Still, they often provide information that shows significant parallels to the prevailing weather conditions of a month or season in neighboring countries where documentation is predominantly available in narrative sources.

Despite the great number of flood-related items, the weather itself is not reported about often; but when reported, in most cases the available documentation refers to problems caused by cold temperatures. Apart from floods, the indirect consequences of unfavorable weather conditions were bad harvests and subsequent food supply problems, high prices, and shortages. Compared to the previous centuries, in the fourteenth century these phenomena are relatively well-documented. Fires are another piece of potentially related information with a large number of documented cases. In the present paper events were only listed when there was a chance that weather may have contributed to the development or spread of the fire.

The available fourteenth-century evidence can be grouped as follows:

1) Temperature-related weather information:

- a) winter cold/severity: the Drava crossing in early 1314 or 1317, in mid-January 1330 at Tiszaug (central Hungary), in mid-January 1336, 1344, and in 1357 in the north/northeast (the Carpathians); in early January 1345 in the northeastern Great Plain, in early January 1349 in the northeast (Tasolya), in early January 1364 in southern Transdanubia;
- b) winter weather in early November: Central Transylvania in 1315;

²⁰⁷ J. Lukcsics, *Monumenta Romana Episcopatus Veszprimiensis / A veszprémi püspökség római oklevéltára*, vol. 2 (Budapest: Franklin Társulat, 1899), 324.

- c) deeply frozen ground in mid-January 1358 in the north (Sztracsány);
 - d) harmful/disturbing frosts: in Sáros county (north) in autumn 1340 (or spring of 1340 or 1341), prior to 1348 or 1349 in Pozsony(?), in early spring 1361 at Lake Fertő, in 1392 in Pozsony (damaged vineyards).
- 2) Evidence of precipitation events:
- a) deep/great snow: in late February 1338 and in winter 1357 in Sáros County (northeastern Hungary), in early April 1358 in the south, in early March 1361 in both Turóc County (north), Lake Fertő/Neusiedl (west), in early January 1364 in south Transdanubia, in early March 1381 in north Transdanubia;
 - b) incessant rain: in 1316 in the eastern alpine area; also floods in Hungary;
 - c) rains: in late autumn 1359 in the northeast (Szomolnok area);
 - d) rainy weather: in late May 1342 in Bihar County, in late autumn 1359 in the northeast;
 - e) dense fog: in late November 1359 in the northeast (Szomolnok area);
 - f) hoarfrosts: prior to 1347 or 1348 (or 1349) in Pozsony(?);
 - g) drought: in (winter-)early spring 1362 in mid-Dalmatia.
- 3) Biophysical indicators:
- a) bad grape harvests: 1321 in (west?) Hungary, 1347 or 1348 and 1392 in Pozsony;
 - b) locust invasions: (1309-1310, 1313-1314?), (1346-1347), (1337?-)1338-1340(-1341?), 1363-1366(?);
 - c) probable early grape ripening: 1393 in central Transdanubia;
 - d) probable late grain harvest: 1342 in central Transdanubia;
 - e) approximate average harvest date: 1326 in both Vaja (northeastern -Great Plain) and Csákány in the west (southern Transdanubia);
 - f) bad crop harvest in Hungary: 1361.
- 4) Other weather(-related) phenomena, physical indicators:
- a) bad weather conditions: in late summer 1301 (or 1304) in Székesfehérvár, in mid-September 1342 in Pozsony county (west); in early March 1381 in the northeastern -Great Plain;
 - b) broken ice; prior to spring 1322 on the Bodrog River;
 - c) strong wind: in mid-January 1336 in the northeast (Čičava);
 - d) religious procession introduced against thunder: late 13th or early 14th century;
 - e) fire events: prior to 1305 (Pozsegavár), prior to May 1314 (Pozsony), prior to late 1317 (Sopron), prior to 1324 (Esztergom), in spring 1327 (or 1328; Székesfehérvár), 1328 and prior to 1347 or 1348 (Pozsony), prior to spring 1331 (Ják), 1332 and 1342 (Lőcse), 1338 (Nagyvárad), in spring 1351 (Kalocsa), prior to spring 1354 (Buda), prior to spring 1356 (Felsőmacskás in central Transylvania), in the years before February 1357 (Kálló), and prior to 1400 (Veszprém).

- 5) Food supply problems and consequences:
- a) food shortage: 1321 in the west (Vasvár);
 - b) shortages/high prices: 1312 in the northeast; in winter 1374, 1381, 1395 in (central?) Hungary;
 - c) (great) poverty (*paupertas*) and need (*inopia, penuria*): 1304 in Slavonia/Dalmatia, early 1311 for Sáros County nobility, in July 1312 in central Hungary, 1321 in the north (Zsolna), 1346 in central Hungary (Zebegény and Budafelhévíz), 1349 in Kapronca, 1351 in the north (Dobronya), northeast (Szepsi) central Hungary and in Transylvania (Dés), 1381 in central Hungary;
 - d) famine (for a long time): prior to spring 1318 in the eastern Great Plain and central Transdanubia;
 - e) prohibition of grain export from the countries of the Hungarian Crown: in spring 1362;
 - f) order for food redistribution; inland tolls decreased: in summer 1364;
 - g) hunger migrants from the southwest German areas: 1313 and/or ca. mid-1310s.

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DES AMTES DER NIEDERÖSTERREICHISCHEN LANDESREGIERUNG

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Vorwort

Das vorliegende Heft von *Medium Aevum Quotidianum* beschäftigt sich mit zwei wichtigen Projekten zur Alltagsgeschichte des Mittelalters und der frühen Neuzeit. Beide Beiträge konzentrieren sich auf Gebiete des mitteleuropäischen Raumes und bieten wichtige neue Ergebnisse zur Erforschung der Geschichte von Alltag und materieller Kultur in Ungarn und Österreich.

Andrea Kiss bietet als Fortsetzung ihrer Beiträge in Heft 66 (2013) und 68 (2014) den dritten Teil ihrer Untersuchung zur Wettersituation im mittelalterlichen Ungarn, der sich dem 14. Jahrhundert widmet. Dabei zeigt sich, wie zu erwarten, die Quellenlage als weitaus besser als in den zwei vorangehenden Untersuchungen zum 11./12. und zum 13. Jahrhundert.

Ingrid Matschinegg und Sarah Pichlkastner, beide Mitarbeiterinnen am Institut für Realienkunde des Mittelalters und der frühen Neuzeit der Universität Salzburg in Krems an der Donau (Niederösterreich), offerieren eine Projektskizze zur Erforschung der Ernährungssituation in Fürsorgeeinrichtungen in Österreich unter der Enns vom 14. bis zum 17. Jahrhundert. Das Projekt stellt Teil des Forschungsnetzwerks *Interdisziplinäre Regionalstudien (FIRST)* dar, einer Vernetzungsinitiative der im Bundesland Niederösterreich ansässigen Forschungseinrichtungen auf dem Gebiet der Geistes-, Sozial- und Kulturwissenschaften.

Gerhard Jaritz