

This manuscript evaluates historical records of tax relief to reconstruct weather events and their impacts, using a region of the Czech lands during the 18th century as a case study. As discussed in the manuscript (section 5.2), similar records have been evaluated for other parts of the world. However, this study represents their most detailed and consistent application in European historical climatology. The article therefore makes a substantial contribution to both the climate history of a particular regional and the methods of historical climatology. It is well written, clearly organized, and nearly ready for publication in its current form.

RESPONSE: We would like to thank the reviewer 1 for generally positive evaluation of our study as well as several comments, which we are trying to respond below.

I suggest only that the authors address the following minor issues:

The term “rustical” (line 103 and elsewhere) is not familiar. Please explain it or use “rural”.

RESPONSE: On line 102 we mentioned “rustical land (i.e., land held by peasants)”. From this explanation follows that “rustical” was used for land in holding by peasants to distinguish it from “dominical”, i.e. land belonging to nobility.

Based on the reconstruction in figure 10b, it seems that the frequency of reported hailstorms fell after 1780, while the frequency of other damaging events increased. Should we interpret this as an actual decrease in the frequency of hailstorms? Or is this apparent change more likely to reflect changes in the way that damage was assessed and compensated?

RESPONSE: With respect to great spatiotemporal incompleteness of data and its uncertainties we have to be very careful to formulate any statements concerning of trends in frequency of presented damaging events. We can only describe what we see in Fig. 10b (years or periods of higher or lower frequencies/records), but without any speculation concerning increasing or decreasing tendencies in phenomena recorded. For example, increase in “other damaging events” after 1780 can reflect to the fact, that from 1775 CE it was also allowed to ask for tax relief in case of water damage and there started to appear tax relief for events with both hailstorm and water damage, treated in Fig. 10b as separate events. The higher available number of surviving documentary sources from the 17th to the 19th century also favour an increase in recorded damaging events.

In section 5.1 or 5.2.1, I would like to see a little discussion of how these records might be compared or combined with other sources to help reconstruct past weather and its impacts. After all, we do not know how consistent these sources were. That is, when we have a report of damage then we can probably infer that some damage really occurred. However, when we don't have a report of damage, we don't necessarily know what that means. Maybe there wasn't any extreme weather or damage, or maybe we just don't have a record of damage and tax relief. Do we have any other descriptions or proxies of extreme weather (e.g. hailstorms) in this region and period that we could use to test the consistency of these damage reports? Could we use these damage reports to help understand changing exposure or vulnerability to extreme weather that we have reconstructed from other sources? And how does the frequency of hailstorms and damage in this period compare to the frequency of modern hailstorm in the region?

RESPONSE: The reviewer is fully true expressing doubts about presented data (“After all, we do not know how consistent these sources were. That is, when we have a report of damage then we can probably infer that some damage really occurred. However, when we don't have a report of damage, we don't necessarily know what that means. Maybe there wasn't any extreme weather or damage, or maybe we just don't have a record of damage and tax relief.”). We expressed it in Sect. 5.1 Data uncertainty, which follows particularly from involving of

different regulations for tax relief requests (Sect. 2.2) and spatiotemporal incompleteness and details of tax records. Consistency of damage records from tax relief can be tested only from other documentary sources (e.g., chronicles, public granaries), that partly agreed with events covered by tax records and which allowed us to extend tax relief data by other 148 events (see Fig. 10b). General incompleteness of the used data does not allow to characterise “changing exposure or vulnerability to extreme weather” as mentioned by the reviewer. Comparison of “the frequency of hailstorms and damage in this period to the frequency of modern hailstorm in the region” is extremely difficult because of no systematic data concerning damage. Based on Czech Hydrometeorological Institute database, data from our studied region are rather sparse, with frequent changes of available stations and mostly short period of their observations, from which is extremely difficult to create any valuable series. Trying to take above reviewer comments in account, we added the new second paragraph in Sect. 5.1 Data uncertainty as follows:

“Reported uncertainties have to be taken into account in evaluation of the results obtained. It concerns, for example, interpretation of frequencies of damaging weather events in summarising Fig. 10, for which any conclusions about longer increasing or decreasing tendencies in frequency of presented events would be very speculative. Moreover, rather local occurrence of such phenomena like hailstorms or torrential rains complicate their observation even in the recent network of meteorological stations of the Czech Hydrometeorological Institute (CHMI), moreover do not recording any damage. Frequent changes in stations and periods of their observations are reflected in missing studies dealing with spatiotemporal variability in any such areas as represented by Prácheň Region in our study, except of existing systematic hailstorm analyses from the eastern part of the Czech Republic (Chromá et al., 2005; Brázdil et al., 2016).”

New reference:

Chromá, K., Brázdil, R., and Tolasz, R.: Spatio-temporal variability of hailstorms for Moravia and Silesia in the summer half-year of the period 1961–2000, *Meteorol. Čas.*, 8, 65–74, 2005.

In section 5.2: Similar tax support was also used in the event of natural disasters in the Ottoman Empire. See Sam White, *Climate of Rebellion* (Oxford UP, 2011), p.79-85.

RESPONSE: The following sentence was complemented at the end of second paragraph in Sect. 5.2.2 as follows:

“Tax support of farmers has been also used in the case of damaging hydrometeorological phenomena in the Ottoman Empire (Ursinus, 1999; White, 2011).”

New references:

Ursinus, M.: Natural disasters and Tevzi: Local tax systems of the post-classical era in response to flooding, hail, and thunder, in: *Natural Disasters in the Ottoman Empire*, edited by: Zachariadou, E., Crete University Press, Heraklion, 281 pp., ISBN 978-960-524-092-9, 1999.

White, S.: *The Climate of Rebellion in the Early Modern Ottoman Empire*, Cambridge University Press, New York, USA, 376 pp., ISBN 9780511844058, 2011.